

The pathology and treatment of phlegmasia dolens / by F. W. Mackenzie.

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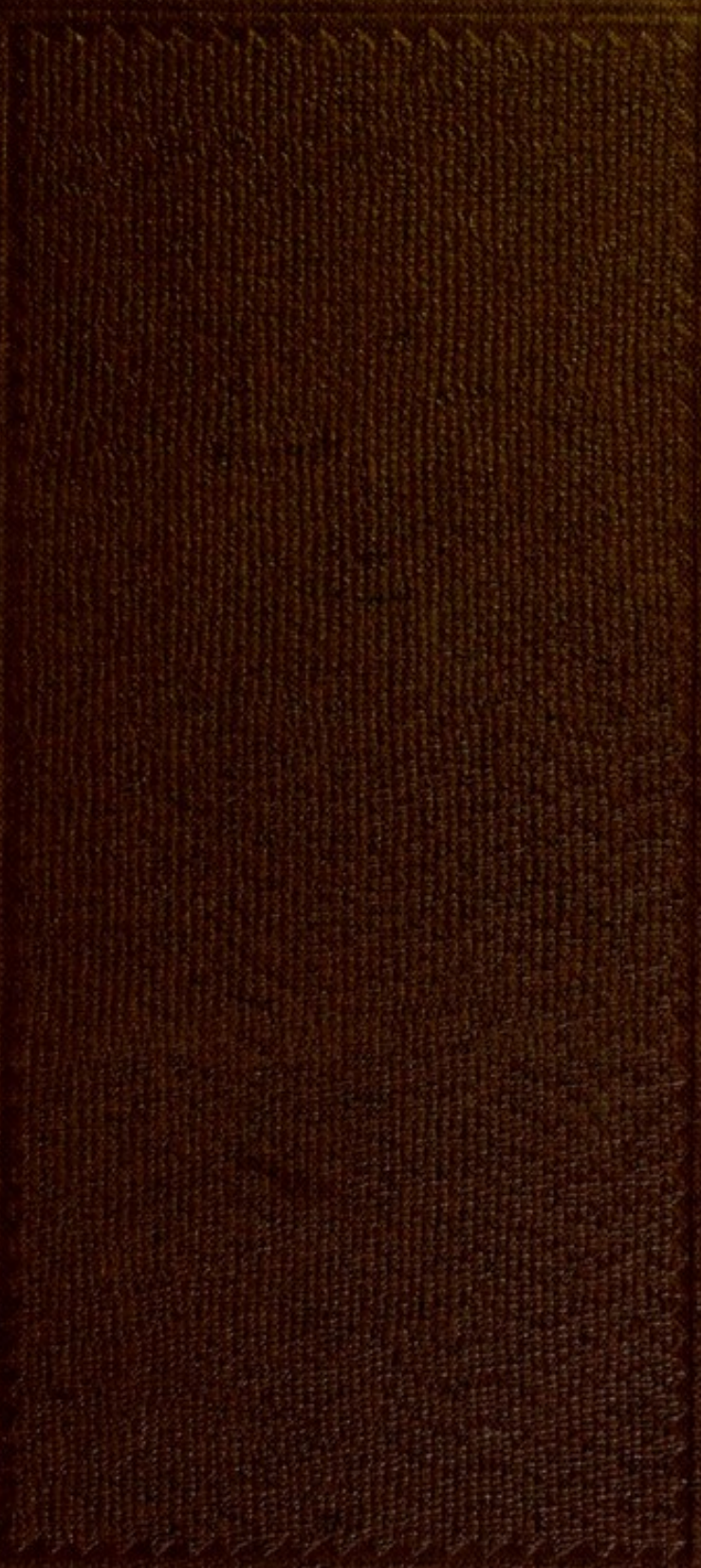
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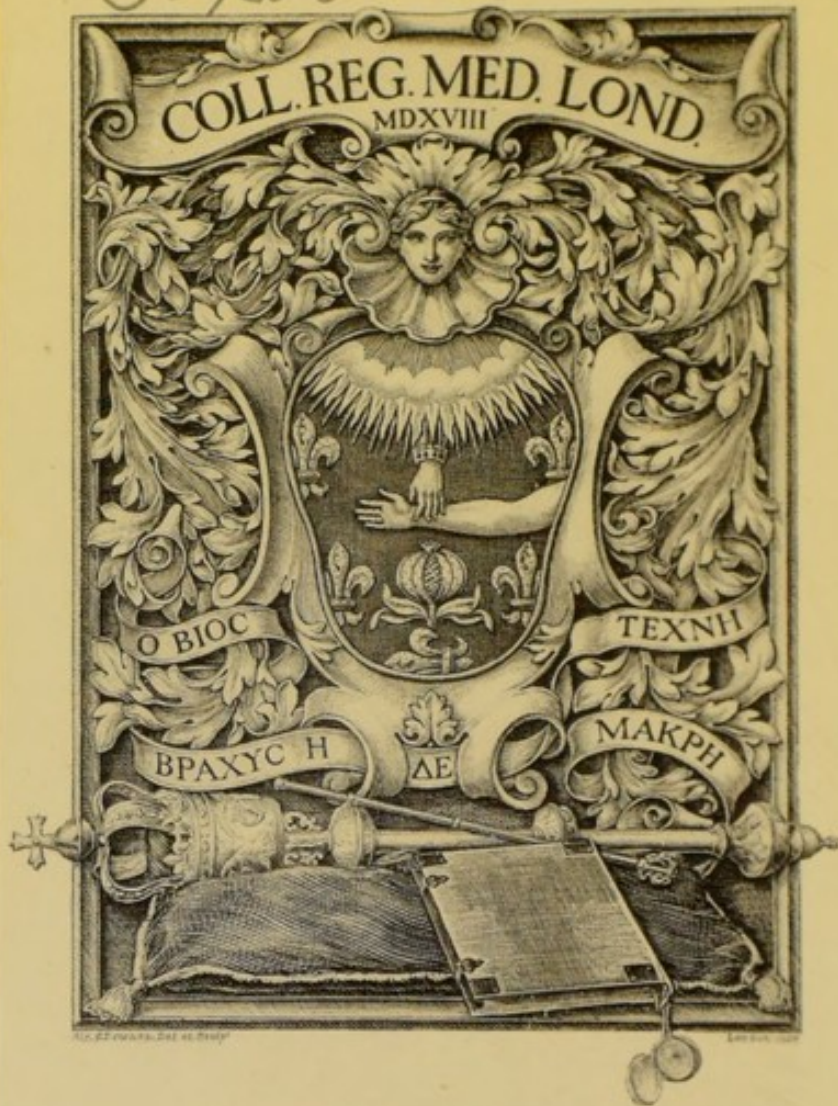


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THE HISTORY AND PRESENT STATE

OF THE

AMERICAN

REPUBLIC

IN THE

YEAR 1790

BY

JOHN ADAMS

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THE
PATHOLOGY AND TREATMENT
OF
PHLEGMASIA DOLENS,

AS DEDUCED FROM CLINICAL AND PHYSIOLOGICAL RESEARCHES;

BEING THE

Lettsomian Lectures on Midwifery

DELIVERED BEFORE THE MEDICAL SOCIETY OF LONDON
DURING THE SESSION 1861-62,

BY

F. W. MACKENZIE, M.D., M.R.C.P.L.,

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TO THE QUEEN CHARLOTTE'S LYING-IN HOSPITAL; SENIOR PHYSICIAN TO THE
WESTERN GENERAL DISPENSARY; VICE-PRESIDENT OF THE
MEDICAL SOCIETY OF LONDON, ETC.

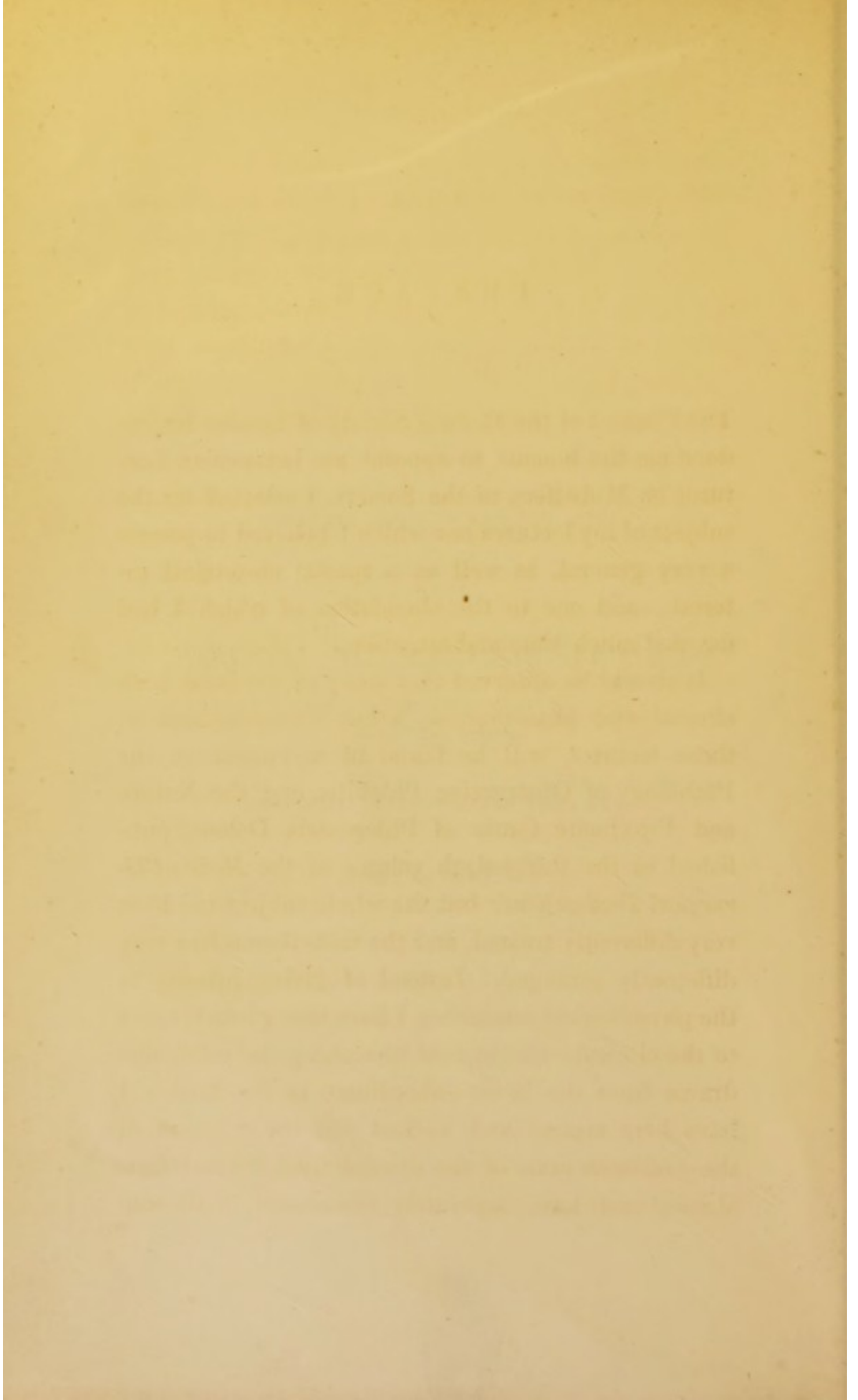
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TO
THE PRESIDENT AND FELLOWS
OF THE
MEDICAL SOCIETY OF LONDON,
THESE LECTURES
ARE VERY RESPECTFULLY INSCRIBED
BY THE AUTHOR.



P R E F A C E.

THE Council of the Medical Society of London having done me the honour to appoint me Lettsomian Lecturer on Midwifery to the Society, I selected for the subject of my lectures one which I believed to possess a very general, as well as a special obstetrical interest; and one to the elucidation of which I had devoted much time and attention.

It should be observed that many of the facts, both clinical and physiological, which are contained in these lectures, will be found in my paper on the Pathology of Obstructive Phlebitis, and the Nature and Proximate Cause of Phlegmasia Dolens, published in the thirty-sixth volume of the *Medico-Chirurgical Transactions*; but the whole subject has been very differently treated, and the facts themselves very differently arranged. Instead of giving priority to the physiological researches, I have here given priority to the clinical; and instead of making the inferences drawn from the latter subordinate to the former, I have here argued and worked out the question of the *proximate cause* of the disease from clinical facts alone; and have separately considered it in con-

nexion with those furnished by physiological investigations. I have thus, I trust, vindicated myself against an imputation which was, as I conceive unjustly, thrown out against my paper, viz.—“that I had endeavoured to deduce a theory of the disease from experiments upon the lower animals, among whom it is unknown”—for, in truth, I had only sought in physiological investigation for such aid as would the better enable me to interpret the phenomena of the disease, and without which I felt that it would be impossible to form right conclusions respecting the origin, nature, and relations of the various symptoms and lesions which together constitute its clinical history. And I may add, that my theory of the proximate cause of the disease was not propounded until it had been mutually affirmed by the results of both clinical and physiological researches.

I would further add, with reference to physiological inquiries generally as applied to practical medicine, that I have never regarded them in any other light, or resorted to them otherwise, than as strictly *auxiliary* to clinical research; and, whenever the subject under investigation would admit of being explained without them, no one would deprecate a resort to them more than myself. But whoever will reflect upon the obscurity in which much that related to the pathology of phlegmasia dolens was involved when I commenced these inquiries, and the failure of

even the best endeavours to unravel it by clinical study alone, must admit that without some other light and guidance, our prospect of arriving at a correct knowledge of its true nature and pathology was very slight; and I but sought for that assistance in the investigations I undertook, which could not otherwise have been obtained.

Moreover, if the state of our knowledge respecting the nature and ætiology of phlebitis, at the time I began this investigation, be compared with what it is at present, it will be found to amount to little short of a revolution in medical science; and it is a source to me of extreme satisfaction to know that the pathological views I ventured to put forward respecting it, as deduced from my own personal inquiries—and which were directly opposed to those current—have been very generally confirmed by subsequent investigations, and are now accepted by some of the highest authorities in the profession. In the present lectures, I have endeavoured to place the whole subject in a much clearer light than I was enabled to do from the limited space at my command in my published paper, and by omitting all extraneous and experimental details, to bring the essential points of the inquiry into greater sequence and connexion.

It will be seen that I have throughout carefully avoided entering upon anything like professional or personal controversy. I have felt that to prove others to be in the wrong, would in no way tend to prove

myself to be in the right; and I entertain too much respect for the eminent obstetricians who have preceded me in the investigation of this subject, to desire to detract in the least from the merit of their labours. It is sufficient for me to avow, that I have had but one object in view in the prosecution of this subject, and that is the attainment of truth. The investigations of others I have in no way sought to disparage or repudiate; on the other hand, I have fully accepted all their substantiated facts: and I claim for myself no other merit than that of having carried our knowledge respecting them a little further, and of having thus worked out a theory of the disease more in accordance with its general history; and at the same time more suggestive of the true principles upon which its treatment, both preventive and curative, should be conducted.

11, Chester Place, Hyde Park Gardens, London,
March 1862.

ON
PHLEGMASIA DOLENS.

LECTURE I.

THE PATHOLOGICAL HISTORY OF PHLEGMASIA DOLENS.

Delivered November 18th, 1861.

MR. PRESIDENT AND GENTLEMEN,—I have selected the pathology and treatment of phlegmasia dolens as the subject for the present course of lectures, from a conviction that it is one peculiarly adapted to the purpose for which they were instituted, and the auditory to which they are to be addressed. For whilst, on the one hand, the subject is eminently obstetrical, and indeed of the highest obstetrical importance, it is yet one, on the other, the interest of which is not limited to the sphere of obstetric practice, but is equally extended to every branch of pathology and every department of medical practice. For I need scarcely observe that this disease, at one time regarded as the exclusive "*apanage*" of the puerperal state, is now found, with the progress of medical science, to have a much wider relationship, and to occur in connection with various morbid and diathetic conditions, not only in the non-puerperal female, but in persons of the opposite sex; and I venture to express my belief that there is scarcely

a febrile movement capable of being inaugurated in the economy with which, under certain circumstances, it may not be identified. Regarded, therefore, with reference to its special obstetrical, as well as to its general pathological interest, it has appeared to me to be a subject well suited for a course of obstetrical lectures, to be addressed to a body of gentlemen engaged, not alone in obstetrical, but in every department of medical practice, and together constituting a medical society at once the oldest and the most catholic in the metropolis.

But I may add that I have not been guided exclusively by these considerations in the selection of my subject. Beyond the obstetrical and general interest which is attached to phlegmasia dolens, there is yet another circumstance which has influenced me in selecting it for the subject of these lectures; viz., the fact that I have devoted much time and labour to the investigation of its pathology, and have reason to believe that I have been thus enabled to enlarge our knowledge of its nature, and extend our practical resources in regard to its treatment. An outline of these researches was published in the thirty-sixth volume of the *Medico-Chirurgical Transactions*; but their entire bearing upon the disease in general, its prevention and cure, was but cursorily and dimly portrayed; and I gladly avail myself of the privilege conferred upon me by the council to submit them in a more complete and comprehensive form through these lectures to this Society, and through this Society to the profession at large. And I venture to do so with the greater confidence, because all subsequent experience has confirmed me in the conviction of their general accuracy, and at the same time has enabled me to extend very widely their practical application.

§ HISTORICAL NOTICE.

A brief review of the recent state of our knowledge respecting the pathology of phlegmasia dolens, will best serve to show how necessary some further investigation was to its correct understanding, and the direction in which such investigation was required to be pursued.

The medical literature of the disease, I may premise, dates from a comparatively recent period,—scarcely earlier than the commencement of the last century. And the reason is obviously connected with the historical fact that, until that period, midwifery had scarcely been recognised as an art worthy of cultivation by the profession, and had therefore for the most part been exercised by female practitioners. With the commencement of that era, however, a new and important impulse was given to its study, and medical men, in the different nations of Europe, were now led to consider it well worthy of their attention. Mauriceau, Deventer, La Motte, Puzos, and Levret may be regarded as its earliest cultivators; and greatly is the world indebted to the labours of these men—the pioneers in a new and hitherto neglected field of medical inquiry—for the zeal and ability they brought to bear upon its investigation. With their writings it may be said that the literature of the disease commences, and to their writings we must accordingly look for the earlier views which were promulgated respecting its nature and pathology, as we may otherwise look for much sound and practical information.

Mauriceau, then, whose theory of the disease is probably the oldest, having noticed that it often supervenes upon suppression or disturbance of the *lochial* discharge, attributed it to a retention of those humours which should thereby flow away, and their reflux upon the affected extremity. On the other

hand, Puzos and Levret, whose opinions follow in historical order, having observed it to follow upon a suppression of the *lacteal* secretion, conceived that it depended upon a metastasis of milk from the breasts to the limb. Now it is worthy of remark that these, the earliest theories of the disease, although speculative in the highest degree, and altogether untenable, yet rest upon a certain foundation of truth, and indicate a fact of some practical importance, which has been established by more recent researches; viz., that the causes of lochial and lacteal suppression or disturbance, whatever they may be, may, under certain circumstances, become the effective causes of phlegmasia dolens; and therefore it is certain that the facts themselves were rightly discerned in relation to the disease, whilst their correct interpretation alone was misconceived.

The next theory of the disease which was propounded was that by Mr. White of Manchester, who, in the year 1784, endeavoured to show that the proximate cause of the disease was an obstruction of the lymphatic vessels and glands of the affected extremity, tending to an accumulation of lymph below the seat of obstruction.

In 1792, Mr. Frye of Gloucester published an essay on the disease, in which he promulgated what might be called a modification of White's theory; viz., that the essence of the disease consisted not in an obstruction, but in a rupture of the lymphatic vessels at the brim of the pelvis, and in the consequent escape of lymph into the cellular tissue, and its diffusion throughout the limb.

Subsequently Dr. Ferrier advocated another modification of the lymphatic theory; viz., that the disease consisted, not in obstruction or rupture, but in inflammation of the lymphatic vessels and glands; and this doctrine, at the best hypothetical, received the assent of many eminent obstetricians, including Hamilton, Capuron, and Gardien.

More recently still, Dr. Hull advanced the opinion that the disease consisted in a general inflammation of all the different organs and tissues of the affected limb, whence coagulable lymph was largely thrown out into the cellular tissue, producing the swelling and tension so characteristic of the disease.

Lastly, in the year 1823, the prevalent and now generally accepted theory was propounded by the late Professor Davis, which attributed the disease to inflammation and obstruction of the principal veins of the extremity. This theory has been claimed for Bouillaud, and has been energetically supported by Dr. R. Lee. It should be added that this is the only theory of the disease which rests upon anatomical evidence: the theories of the metastasis of the lochia, and of the milk, being altogether speculative; whilst those of inflammation, obstruction, and rupture of the lymphatics, as well as that of a general inflammation of all the structures of the affected extremity, rest either upon hypothetical grounds alone, or are only very partially supported by anatomical investigation.

It is not, therefore, to be doubted, that the phlebitic theory of the disease rests upon far more valid and certain grounds than any other which has hitherto been put forward; nor is it a matter of surprise, that it should therefore have been very generally accepted by the profession. But the question still remains—How far does the existence of crural phlebitis, as an assured anatomical fact, adequately account for all the very varied phenomena of the disease? In other words—How far is phlebitis truly the proximate cause of the disease, or merely an important integral constituent of it; not, however, the *cause* of the other lesions common to it, but, like them, a parallel consequence of some more general and diffusive agency? Now these questions appeared to me to a certain extent to be resolvable by physiological investigation. By this we could

ascertain the direct effect of crural phlebitis artificially produced in the causation of the disease ; by it we might determine how far phlebitis itself was a primary or a secondary affection ; and lastly, by it we might obtain a clue to the unravelling of the very intricate details which together constitute the clinical history of the disease. I accordingly entered upon the investigation of this subject with every care and precaution, and was finally led to the following conclusions :—

1. Crural phlebitis, in a pure and uncomplicated form, cannot give rise to all the local and general phenomena of the disease, and therefore cannot be its proximate cause.
2. Phlebitis itself is, for the most part, not a primary, but a secondary affection ; and in the great majority of cases is a consequence of the circulation of impure or morbid blood in the veins.
3. The proximate cause of the disease is, therefore, presumably a morbid condition of the blood, which I have experimentally shown to be capable of producing not only the lesions of the veins met with in the disease, but all its other phenomena.

I have thus indicated the point in the pathological history of the disease at which my inquiries were commenced, and the conclusions to which they have tended ; and it is the validity of those conclusions which I shall more especially endeavour to establish in the present lectures. In doing so, I will successively consider how far they are supported by the clinical history of the disease ; how far by physiological and anatomical investigations ; and lastly, how far they furnish a better and more comprehensive platform whence to survey the varied phenomena of the disease, and to deduce sounder and broader principles for its prevention and cure.

§ CLINICAL HISTORY.

In proceeding to this part of the inquiry, it will be necessary, in the first place, to define clearly the essential characters of the disease whose nature we are about to investigate. For, without doing so, we might, as has often been the case in medical inquiries, become engaged, through a confusion of terms, in a philological rather than in a pathological discussion. Fortunately, the leading characters of the disease have been very succinctly given by a writer who had no theory or hypothesis to support, and whose definition is very generally accepted by authors. Callisen describes the disease as consisting in "tumor elasticus, albescens, renitens, calidus, dolens, foveam impressi digiti haud retinens," or, as paraphrased by Dr. Hull, "the disease consists in a tense, elastic, hot, painful swelling, which generally extends rapidly over the whole of one of the lower extremities, the skin retaining its natural colour, or even becoming whiter, and presenting more or less of a shining appearance." In its local manifestations it would thus appear to be characterised by two principal conditions—

1. By a persistent and peculiar swelling of the affected limb, not depending upon simple oedema, but possessing a degree of tension, heat, firmness, and elasticity which is not common to ordinary oedema, and
2. By an impairment of the nervous and muscular functions of the limb, as indicated by pain, tenderness, and loss of motor power.

Let me, then, in the first place invite you to consider how far these phenomena are explicable upon the theory of phlebitis being the proximate cause of the disease, regarded solely from a *clinical* point of view.

The question, then, briefly stated, is the following:—Can phlebitis, or as it is here termed, “crural phlebitis,” in a pure and uncomplicated form, give rise to all these several and diversified lesions, involving a disturbance in the sensorial, motorial, and secretory functions of the limb? And if we take the cases of phlebitis which have been published by surgical writers as the criterion, we can have no hesitation, I would submit, in according a negative answer. I cannot, of course, with the limited time at my disposal, quote individual cases at length; but I may refer you to the writings of Abernethy, Travers, and Arnott, for many interesting examples of the disease in which the symptoms in question were altogether absent. The condition of the limbs in cases of phlebitis recorded in Mr. Arnott’s paper has been analysed and tabulated by Dr. Ferguson, and is appended to his valuable essay upon Puerperal Fever; and as he, at least, could have had no theory to uphold, his analysis may be regarded as impartial. It is equally concise, and I may therefore be permitted to quote it. Of eleven out of twenty-one cases of phlebitis, the state of the limb is noted; and of these it is stated that in one it was swollen, painful, and purulent; in a second swollen, painful, and purulent; in a third inflamed to the axilla, with pain at the wound of the vein; in a fourth swollen to the axilla; in a fifth swelling had taken place gradually; in a sixth it was swollen and painful; in a seventh there was tenderness merely of the groin; in an eighth there was pain in the leg, calf, and ankle; in a ninth the skin was red and tender; in a tenth the limb was œdematous; and in the eleventh it was only partially œdematous. It is impossible, I repeat, not to recognise a great discrepancy between the condition of the limbs in these cases of phlebitis and that which has been described by Callisen as occurring in phlegmasia dolens.

Pursuing the inquiry in relation to the clinical history of the disease, I have successively to bring under your notice—
1. Its mode of origin and probable ætiology; 2. Its symptomatology; and 3, and lastly. Its morbid anatomy: selecting those cases which have occurred during the puerperal period, as being the most typical, for systematic examination; and those which have occurred under other circumstances, as being less typical, for more cursory examination.

I. ÆTIOLOGY.

Antecedent Labour. The phenomena of labour being regarded as constituting the starting point for the commencement of those actions which may ultimately determine the attack in certain cases, the following analysis of facts, in connexion with the character of the preceding labour, is submitted as bearing upon this part of the clinical history of the disease, premising that it is drawn from the histories of sixty cases of puerperal phlegmasia dolens. With regard, then, to the labour numerically considered subsequently to which the attack occurred, this is noted in thirty-four out of the sixty cases; and of these, in

8 it occurred after the 1st labour.

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| 8 | „ | „ | 2nd | „ |
| 3 | „ | „ | 3rd | „ |
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| 1 | „ | „ | 11th | „ |
| 1 | „ | „ | 12th | „ |

It is clear, therefore, that the liability to the attack is greater after the first and second, than after any subsequent,

labour—nearly one-half of the whole number having occurred after the first and second. And in connection with this fact, it may be as well to recall to mind that the circumstances which principally distinguish these from subsequent labours, are—1st. Greater and more protracted parturient efforts, tending to greater constitutional exhaustion; and 2ndly, greater and more continuous pressure upon the soft parts, tending to a greater risk of injury and contusion: circumstances which, by favouring a disposition to febrile and inflammatory action, directly tend to the production of those morbid conditions of the blood whence, we contend, the disease most commonly, if not invariably, takes its origin.

But, on the other hand, we learn from a study of the peculiar character of the labours which preceded the attack, that this febrile and inflammatory disturbance has no necessary connection with the labour itself, but may otherwise occur, and give rise to it irrespectively of any undue severity or difficulty in the act of parturition, or the infliction of any mechanical injury. For of thirty-eight cases in which the character of the labour is noted, in twenty-two, or more than one half, it is stated to have been natural, and in ten only severe; whilst in one only it was preternatural; in two difficult, and accompanied with instrumental injury; in two tedious; and in one protracted, with retained placenta. These statistics respecting the character of the labour, therefore, qualify, but do not negative the conclusions drawn from those respecting the labour numerically considered; they do not negative the inference that febrile and inflammatory action usually precedes, and probably gives rise to the attack; yet they clearly show, that such febrile and inflammatory disturbance has no necessary dependence upon the labour itself, or any injury sustained during the parturient act. Doubtless any such injury may be, and in fact,

in a given number of these cases, may reasonably be supposed to have been, its effective cause ; but this only in a casual, and not in an essential manner, and operating, probably, in common with various other causes productive of the attack, through the medium of the febrile and inflammatory actions which are thus set up, and whose tendency is directly to modify the constitution of the blood. I venture to submit this explanation of the probable *modus operandi* of uterine injury and inflammation in the causation of the disease, inasmuch as these facts clearly negative a doctrine lately affirmed, that it is due to mechanical injury of the uterus propagated through the uterine to the crural veins ; because it is clear that in these cases the disease supervened upon comparatively few instances of such injury.

Relative liability of the two lower extremities to the attack.
In reference to this question I have to remark, that of the sixty cases analysed, in two this circumstance is not recorded, whilst in one the left arm was attacked, and in another both lower extremities were simultaneously affected, leaving fifty-six for the determination of this question ; these, briefly analysed, give the following summary results. In twenty-three the attack began in and was limited to the left lower extremity, and in sixteen it began in and was limited to the right ; in ten the attack began in the left, and subsequently extended to the right ; and in seven the attack began in the right, and afterwards extended to the left. The result of this analysis is therefore in harmony with the general observation that the left lower extremity is more liable to the attack than the right ; and in seeking for an explanation of this fact it may be observed, that this relative liability is in very accurate accordance with two circumstances which may possibly account for it ; 1st, The greater relative frequency of the attach-

ment of the placenta to the left side of the uterus as compared with the right, and, 2dly, the greater relative disposition to recumbency on the part of the patient on the left side as compared with the right. The latter fact holds, I believe, very generally in regard to this country, whence my statistics are derived, both as regards the position maintained during labour, as well as that subsequently observed ; whilst the former is founded upon the investigations of Dr. Carrière, of Strasburg, who, in a thesis on obstetric auscultation, remarks that of sixty-six cases in which the placental sound was noted, in thirty-eight it was heard on the left side of the uterus, and in twenty-eight on the right ; a proportion which very nearly represents the relative liability of the two lower limbs to the attack, as given by my statistics. The coincidence between these facts may either be casual or otherwise ; but, so far as they go, they are strictly in accordance with the theory of the disease I have proposed. For it is on the side where the placenta is attached that the uterine wound would be left on its separation ; and it is from this that unhealthy secretions, consequent upon injury, inflammation, or constitutional disturbance, would be thrown out and most favourably placed for absorption ; whilst here also their transmission through the uterine into the crural veins, and thence into the systemic current would be favoured, simultaneously tending to the production of obstructive inflammation of these vessels, and a general vitiation of the blood. Equally it might be argued that the side upon which the patient is most recumbent should be the one which would be the most liable to the attack ; because the lochial and other maternal secretions, naturally gravitating to this side, would be here most favourably placed for absorption and transmission through the corresponding veins into the general circulation ; and thus, when rendered unhealthy from any cause, would

equally tend to an inflammatory obstruction of these vessels, and a general vitiation of the blood.

Date of attack after Labour.

In 1 the attack began on the day after delivery.

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| 4 | „ | 2nd | „ |
| 1 | „ | 3rd | „ |
| 3 | „ | 5th | „ |
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| 1 | „ | 17th | „ |
| 6 | „ | 21st | „ |
| 2 | „ | 22nd | „ |
| 2 | „ | 23rd | „ |
| 1 | „ | 27th | „ |
| 5 | „ | 30th | „ |
| 1 | „ | 31st | „ |

and in 3 the date is not given.

Now, on looking to these several dates, the first general inference which is deducible is, that there is no particular period after labour which is peculiar to the attack. But, bearing in mind that out of fifty-seven cases, in forty-seven it began within twenty-one days after delivery, we may deduce an argument therefrom in favour of its blood origin ; for it is within that period that those great puerperal actions are inaugurated

which powerfully tend to modify or deteriorate the general condition of this fluid ; such, for instance, as the febrile reaction consequent upon labour, and the establishment of the milk, the modifications of the lochial secretion thereby or otherwise induced, the effects of injury or contusion of the soft parts, and the reception of effete organic matter into the circulation consequent upon febrile action and the involution or disintegration of the uterus. These and other circumstances peculiar to the puerperal period tend in an especial manner to modify the condition of the blood, and, as such, to predispose to various local and constitutional diseases.

But a further scrutiny into the origin of the disease will serve to show that these puerperal actions and constitutional conditions, which have been referred to as peculiar to the three weeks succeeding parturition, constitute the predisposing rather than the exciting causes of the attack, and that the latter are to be sought for in the operation of various disturbing influences tending to febrile and inflammatory action of various kinds superadded to and co-operating with them. It would indeed be inconsistent with the scheme of a Beneficent Providence, and contrary to all experience, to suppose that a function so essential to the preservation of the species as that of parturition should of necessity be fraught with such calamities as those we are now considering ; and accordingly we find, from a reference to the preceding analysis, that there is no one period throughout the puerperium at which, of necessity, the attack is liable to supervene. On the other hand, it will be found that its occurrence is in every respect variable and uncertain, and strictly determined in all cases by the super-vention of some casual cause of bodily derangement, of febrile disturbance, or of inflammatory action, as represented in the following statistical summary :

In 33 it followed upon some form of puerperal fever.

- 13 „ upon exposure to cold.
- 3 „ upon dietetic errors.
- 3 „ upon the operation of epidemic influences.
- 4 „ upon tubercular disease of the lungs.

2 it followed quickly upon severe and protracted labour, whilst in 2 no specific information is given on this head.

It would thus appear, that in nearly all these cases the attack followed upon or occurred in the progress of some febrile movement variously induced, which would thus seem to constitute the bridge or connecting link between the act of parturition and the final development of the disease; and, admitting this position to be valid, then it equally follows that some abnormal or morbid condition of the blood must have existed either antecedently to, or contemporaneously with, the commencement of the disease. Indeed the very diversity of the morbid states which preceded the attack in these cases, and out of which it may be said to have been engendered, is alone a strong argument in favour of its blood origin, for it is to this one pathological condition they all tend, as it is from this one cause all the phenomena of the disease may be deduced.

Pursuing the analysis of the antecedents and probable causes of the disease in these cases, I would remark, that the instances of puerperal fever which preceded the attack may, for practical purposes, be arranged under two heads, viz., 1st, those in which it followed upon severe protracted or instrumental labour, in which the uterine organs had presumedly sustained some injury calculated to inflame them, and, 2dly, those in which the febrile movement which preceded it was constitutional, or was at least irrespective of any local injury. My object in making this subdivision is to show that uterine injury is less

frequently the cause of phlegmasia dolens than is generally supposed, and that, consequently, the disease is seldom occasioned by the transmission of inflammation of the uterine to the crural veins, consequent upon mechanical injury of the former vessels. On the other hand, it may rather be assumed that, where such injury had preceded the attack, it has occasioned it through the intervention of inflammatory discharges furnished by the inflamed uterine cavity, which have thence been transmitted through the uterine and crural veins into the general circulation; a principle of causation which would assimilate itself to the probable *modus operandi* of all the effective causes of the disease. Premising this subdivision, I shall proceed to lay before you a tabulated summary of the respective antecedents and probable causes of the attack in the different cases which I have collected.

Of the thirty-three cases of puerperal fever, then, which preceded the attack, fourteen followed upon labour of a severe and protracted character, and in which, therefore, it may be presumed that some injury was sustained by the uterine organs calculated to give rise to inflammatory action. These present respectively the following sequences of morbid actions:

- 1.* Severe labour with hæmorrhage; sixth day, fever and pleurisy; fifteenth day, phlegmasia dolens.
7. Protracted labour and retained placenta, followed by puerperal fever, which continued till the third week, when phlegmasia dolens began.
13. Difficult labour, having the lochia much disturbed. Date of attack not stated.
18. Difficult labour, and severe instrumental injury; fourth

* These numbers refer to the Index of References appended to these Lectures.

- day, puerperal fever ; fifth day, exposure to cold ; sixth day, phlegmasia dolens.
22. Bad health before confinement, difficult labour ; sixth day, peritoneal fever ; fifteenth day, phlegmasia dolens.
23. Difficult labour ; third day, puerperal fever ; fifth day, phlegmasia dolens.
25. Legs swelled before labour, labour difficult ; fifth day, fever ; ninth, pleurisy ; twenty-seventh, phlegmasia dolens.
29. Lingering and frightfully painful labour ; third day, metritis ; seventeenth day, exposure to cold, phlegmasia dolens evening of same day.
30. Tedious labour ; metritis a few days afterwards, which remitted, but returned on the twelfth day ; thirteenth, phlegmasia dolens.
34. Laceration of vagina during labour, mercurial frictions to ptyalism ; fourteenth day, phlegmasia dolens.
39. Tedious labour, lasting three days, twin birth ; tenth day, peritoneal fever ; fifteenth, suppression of the milk, followed by phlegmasia dolens.
40. Very hard labour, child dead and putrid, flooded twice before delivery, frequent rigors ; fourth week, phlegmasia dolens.
41. Labour preternatural, child still-born ; tenth day, peritoneal symptoms ; fifteenth day, fever and diarrhoea ; twenty-first, phlegmasia dolens.
49. Difficult labour ; uterine symptoms a few days afterwards ; ninth day, phlegmasia dolens.

In nineteen cases the attack followed upon some form of puerperal fever which had presumably arisen independently

of difficult parturition, or any obvious injury of the uterine organs, and the course of morbid action, in these cases, is indicated in the following sequences.

2. Second day, peritonitis, with fever, which continued until tenth day, when phlegmasia dolens began.
10. Twin birth, hæmorrhage, metritis ; fourth week, phlegmasia dolens, preceded by fever.
11. Obscure febrile symptoms till tenth day, when phlegmasia dolens began.
12. Third day, puerperal fever, offensive lochia, pelvic abscess ; tenth day, phlegmasia dolens.
17. Fell on back before labour ; fourth day, fever and pelvic symptoms, which continued until the thirteenth day, when phlegmasia dolens began.
20. Great mental distress before labour ; second day, fever ; third, swelling in ham ; fifth, suppression of lochia and milk ; eighth, abscess in calf ; tenth day, phlegmasia dolens.
21. Fifth day, metritis and suppressed lochia ; seventh, attack of phlegmasia dolens.
32. Febrile excitement followed labour, which continued until the twenty-first day, when phlegmasia dolens began.
33. Sixth day, peritoneal fever and suppressed lochia ; ninth, phlegmasia dolens.
35. Varicose veins of left leg ; fifth day, uterine symptoms and phlegmasia dolens.
36. Fifth day, puerperal fever ; twenty-first day, phlegmasia dolens.
38. Attacked with fever a few hours after delivery, which continued until the tenth day, when phlegmasia dolens began.

40. Labour followed by puerperal fever ; twenty-first day, phlegmasia dolens, preceded by general indisposition.
41. Third day, peritoneal fever, which continued till thirteenth, when phlegmasia dolens set in.
42. Child died during labour ; third day, peritoneal fever ; eighth, diarrhoea ; tenth, phlegmasia dolens.
48. Fifth day, metritis and suppression of the lochia ; seventh day, phlegmasia dolens.
54. Tenth day, attacked with pain in the abdomen, legs, and ankles ; eleventh, phlegmasia dolens.
56. Fourth day, symptoms of metritis ; seventh, rheumatism ; twenty-second, phlegmasia dolens.
59. Second day, pyrexia, which had not abated on the twelfth day, when phlegmasia dolens set in.

In thirteen cases the attack followed upon exposure to cold, and the particular sequence of morbid actions leading to it in these cases is given in the following summary.

5. Seventh day, exposure to cold, quickly followed by pleurisy, and this by phlegmasia dolens.
6. Three weeks after labour caught cold, upon which the attack quickly followed.
14. Fifth day, much purged during night, and exposed to cold ; febrile symptoms, followed by phlegmasia dolens the evening of the same day.
24. Seventh day after labour undertook the management of the house ; eleventh day, seized with rigors, followed by fever ; twelfth, phlegmasia dolens.
27. Fourteenth day after labour caught cold, and phlegmasia dolens began a few hours afterwards.
29. Lingering and frightfully painful labour ; third day, metritis ; seventeenth, exposure to cold, phlegmasia dolens the same evening.

46. Twentieth day after labour exposed to cold, which was followed by rheumatism, and by phlegmasia dolens on the twenty-second.
53. Could not suckle infant, and probably caught cold in the attempt ; eighth day, pain in left crural arch ; thirteenth, phlegmasia dolens.
55. Attacked by cold, producing catarrhal and pneumonic symptoms, which were followed by phlegmasia dolens in forty-eight hours.
57. Had previously suffered from rheumatism ; phlegmasia dolens followed exposure to cold.
58. Patient plethoric, and delirious in the last stage of labour ; second day, phlegmasia dolens, which was caused by cold.
60. Ninth day after labour exposure to cold, followed by pain in the left side and by phlegmasia dolens.
45. Ninth day after labour attacked with pleurisy, and on the thirteenth by phlegmasia dolens.

In three cases the attack followed upon some error of diet, as indicated in the following summary :

16. Fifth day, fever and pleurisy ; fifteenth day, improper use of wine, etc., followed by febrile reaction ; thirtieth, pelvic suppuration ; forty-first, phlegmasia dolens.
28. Sixth day, drank some cold ale, which was followed by fever and gastro-intestinal and cerebral symptoms ; twelfth day, phlegmasia dolens.
51. Sixth day, great gastro-intestinal derangement, consequent upon eating a bulky rich meal ; febrile symptoms followed, and phlegmasia dolens on twelfth day.

In three cases the attack followed upon, and was probably

owing to, the operation of some epidemic influence, as thus indicated :

3. Twentieth day, attacked with epidemic diarrhoea ; thirtieth, ditto and phlegmasia dolens.
15. Varicose veins during gestation ; second day, attacked with erysipelas, and with phlegmasia dolens a week afterwards.
19. Phlegmonous erysipelas immediately followed labour, giving rise to œdema, etc.

In four cases the attack followed upon pulmonary consumption, or some other form of constitutional disease, viz. :

9. Phthisis before labour, in the progress of which, subsequently to parturition, the attack supervened.
37. Feeble constitution ; third day after labour diarrhoea supervened, which continued until the twenty-first day, when phlegmasia dolens began.
47. Febrile symptoms after labour, bad general health, livid blotches over surface, offensive vaginal discharge ; phlegmasia dolens during fourth week.
52. Bad health before labour ; much gastro-intestinal derangement, which continued until the fourteenth day, when phlegmasia dolens began.

Two cases followed quickly upon severe and long-continued uterine action, of which the sequence of morbid actions tending to the disease may be thus summed up :

21. Bad health previous to labour ; had a hard labour, which lasted four days ; child still-born ; symptoms of the disease set in, in thirty-six hours afterwards.
50. Labour very violent ; head rested long at the brim of the pelvis ; during a strong pain something gave way, and twenty-four hours afterwards the attack began.

But before finally dismissing the consideration of the etiology of the disease, I would beg to add that I am in a position to strengthen the views I have expressed as to its blood origin, by a reference to its mode of production in cases which have occurred otherwise than during the puerperal state. Of such I have collected and analysed forty, and, carefully scrutinised, they point to the same pathological origin, and justify the same pathological inferences. Thus, in one series of cases, the attack was found to follow upon, or to occur during, the course of some ordinary fever, just as we have seen it to occur after labour in connection with puerperal fever. In another series it occurred in connection with local inflammation or disease of the pelvic organs, just as in a preceding series we have seen it to occur in connection with uterine inflammation consequent upon uterine injury. In another series of cases the attack followed upon exposure to cold, which we have seen to be a fruitful source of the disease during the puerperal state. In a fourth series, typified also in the puerperal cases, the attack occurred in connection with constitutional disease, such as diabetes, consumption, etc. Lastly, in a fifth series it followed upon suppression of the menstrual secretion, just as in the puerperal cases it has been known to follow upon suppression of the lochial and lacteal secretions. I have indicated these facts in the following series of tables, which represent in detail the precise antecedent circumstances which led to the attack in the non-puerperal cases.

In ten cases the attack followed upon some form of fever, as shown in the following instances :

83. Had suffered from fever, and been largely depleted ;
seventeenth day afterwards, febrile symptoms set in,
and the attack began.
84. Was convalescing from fever and intestinal inflammation,
and whilst greatly debilitated the attack began.

- 85. Fever, followed by agueish symptoms, during which the local affection was discovered.
- 86. Patient convalescing from fever, and whilst greatly debilitated the attack began.
- 62. The attack began with fever, sickness, vomiting, and pain in all the limbs.
- 63. Before attack began, had frequent rigors and profuse perspirations.
- 64. Fever, headache, and pains in the side, for which she was bled with relief, preceded the attack.
- 65. Got wet four days before attack, which was followed by fever, subsequently to which phlegmasia dolens began.
- 76. Had been suffering for some time from fever, and was much reduced and emaciated when the attack began.
- 87. Gastric fever, etc.; three days afterwards catamenia appeared scantily, and next day the attack began.

In eleven cases the attack followed upon exposure to cold, as indicated in the following series :

- 66. Had stood for two days at work in a ditch, above his knees in water, fever followed, and in seven days phlegmasia dolens began.
- 74. Exposure of left lower extremity to cold, the patient being thinly clothed.
- 82. The attack was attributed to exposure to cold.
- 89. Exposure to cold : inflammation of the bowels and free depletion preceded the attack.
- 92. Got wet through when fatigued, and attack followed in two days.
- 93. Bilious fever, when convalescent exposed to a draught of cold air, followed by rheumatism, and this by the attack.

95. Bilious derangements, exposure to cold, and rheumatism, preceded the attack.
96. General bad health and exposure to cold preceded the attack.
97. Irregular menstruation and frequent exposure to cold preceded the attack.
98. Got wet through and had rheumatism; a week afterwards the attack began.
99. Attack preceded by rheumatic fever, brought on by lying upon the grass when much fatigued.

In eight, the attack occurred in the progress of pulmonary consumption or some other constitutional disease, as shown in the following summary :

67. Had laboured under symptoms of phthisis for nine months before attack.
68. Had laboured under symptoms of phthisis for sixteen months before attack.
61. Had suffered from rheumatism and pains in various parts of the body before attack.
75. Had been for several years in a bad and delicate state of health prior to the attack.
77. Had laboured for some time under diabetes mellitus, and had evidently tubercles in the left lung when attack began.
78. Had been addicted to drinking, and had gastric fever and pneumonia previously to the attack.
80. Bad health, hectic fever, and phthisis, preceded the attack.
81. Had been ill a fortnight before the attack began.

In seven cases the attack followed upon the operation of local causes, calculated to vitiate the blood, such as suppurating sores, malignant ulcerations, etc., as follows :

71. Malignant disease and extensive ulceration of the uterus preceded and attended the attack.
72. Cancerous ulceration of the uterus preceded and attended the attack.
73. A sanious discharge from the vagina and extensive ulceration of the uterus preceded and attended the attack.
90. Wound over a branch of the right saphena preceded the attack.
91. Varicose veins and an ulcer above the left malleolus.
94. Operation for the removal of an uterine polypus, followed by offensive puriform discharges; phlegmasia dolens nine days afterwards.
100. Operation for lithotomy; phlegmasia dolens thirteen days afterwards.

In three cases the attack followed upon sudden suppression of the catamenia, which in two was occasioned by exposure to cold.

69. Sudden suppression of the catamenia from immersion of the body in cold water, immediately preceded the attack.
70. Sudden suppression of the catamenia, followed by violent fever, preceded the attack.
80. Attack referred to the sudden suppression of the catamenia from exposure to cold and wet.

I fear I have drawn largely upon your patience in dwelling upon these multifarious details. But it has appeared to me that they are necessary to a right understanding of the nature and origin of the disease; and in laying them before you I have been guided by two principal motives; 1st, the desire to present

you with the fullest epitome of the ætiology of the disease that I could ; and, 2dly, that of enabling you to deduce thence correct views as to its pathological essence. Now we have seen from these analyses that the antecedents and probable causes of the disease are of the most widely spread and diversified character, and that they are not peculiar to the puerperal period, or even to the female sex ; and, therefore, we may at once discard all such theories of the disease, which connect it exclusively with either lochial or lacteal suppression, uterine injury, or inflammation, or, in fact, with any peculiar state of the uterine system subsequently to labour. On the other hand, fully admitting the efficacy of these influences in its occasional causation, we yet see the disease originating in so many others of a different nature, that we are compelled to fall back upon one of two explanations ; viz., either that the disease has as many separate modes of origin as the causes assigned, or that there is some common link or medium to which these varied influences all tend, and through which they operate in the causation of the disease. I submit, in conclusion, as a matter of inference from clinical facts alone, and the study of the antecedents of the disease, that the latter view is the more probable ; and that, inasmuch as all the antecedent circumstances which have been detailed tend to a common consequence, viz., an abnormal condition of the blood, it is to this common result we must look for the immediate origin of the disease.

II. SYMPTOMATOLOGY.

Division into the Simple and Complicated Forms of the Disease. In proceeding to treat of the symptoms of the disease, I would beg to direct your attention, in the first place, to the fact that the disease really occurs in two distinct forms, the *simple* and the *complicated*. And this distinction, not

hitherto made, will be found to reconcile the discrepancy which exists in medical writings as to its danger and mortality. For, whilst the former is wholly or almost entirely free from danger, the latter is more or less fraught with it, according to the gravity of the particular malady with which it may happen to be complicated. The simple form occurs, so far as I have observed, under four principal circumstances: 1st, during the convalescence, from some form of puerperal fever; 2dly, in connection with large losses of blood, sustained either during or subsequently to labour, or with anæmia antecedently existing; 3rdly, as the result of exposure to cold during an otherwise prosperous convalescence from childbirth; and, lastly, as the effect of a febrile movement consequent upon some error or irregularity of diet. On the other hand, the complicated form occurs during the progress of some form of puerperal fever; in connection with pelvic inflammation or suppuration; with malignant disease of the uterus or pelvic organs; with constitutional disease of a grave character, such as phthisis, diabetes, etc., with zymotic fevers; or with inflammatory disease of various important organs. Now, in all these cases it must be evident, that the danger or gravity of the crural affection must be determined less by this affection itself than by the malady with which it is complicated, and which, from the preceding reference, must in some cases be of the most serious nature. Believing, then, that this subdivision of the disease is not only conducive to its better understanding, but is necessary to its proper treatment, I would venture to urge it very strongly upon your consideration.

(a) Simple or Uncomplicated Form of the Disease.

In the *first* of the four circumstances under which I have stated the simple form of the disease to arise, the attack occurs

during the convalescence from some form of puerperal fever; and in this case the attack may be either ushered in with febrile symptoms, or may be first indicated by pain or uneasiness in some part of the affected limb. This may be first felt either in the hip, the groin, the popliteal region, or the calf of the leg; or it may commence as high up as the lumbar region, or be first felt along the brim of the pelvis. The pain, wherever manifested, is soon followed by swelling, at first partial, and confined to the immediate seat of pain, but it rapidly extends over the limb, and, within twenty-four hours, becomes general. With this general swelling, which is of a tense, shining, white and elastic character, there is usually increased heat of the limb, exquisite sensibility, and an entire loss of motor power; together with these local symptoms, the femoral vein will be found hard, tense, cord-like, and extremely tender, and the inguinal glands in some cases swollen, and painful. The local suffering soon occasions much constitutional disturbance. There is loss of appetite, a furred tongue, scanty and high-coloured urine, a quick pulse, and the general phenomena of acute symptomatic fever. After a few days, varying from seven to ten, and determined mainly by the severity or mildness of the attack, the more urgent local symptoms begin to abate, and the febrile disturbance to subside; but the limb often remains for some time afterwards swollen, weak, and painful, and the constitution is often left in a very enfeebled state.

In the *second* variety, the attack occurs as a remote consequence of uterine hæmorrhage sustained during or after labour, or of a previously anæmic state of the system. In this the disease is ushered in with symptoms of great debility, owing, it cannot be doubted, to the fact, that the blood, already impo-

verished by hæmorrhage, is now being slowly poisoned by the absorption of putrescent matters from the maternal passages. For I need scarcely observe, that the exsanguine condition of the blood-vessels in these cases must favour absorption on the one hand, just as the depressed vitality of the constitution must favour a tendency to putrescence in the lochial and other secretions detained in the maternal passages on the other; and these conditions, although inadequate in all cases to produce an immediate attack of fever, may yet in some be fully adequate to produce an ulterior attack of phlegmasia dolens. The description of Denman particularly applies to this form of the disease. He observes that "it happens at no precise time after delivery, as it has come on at any period from the fifth or sixth day to the third or fourth week; but most commonly it occurs between the fifth and twelfth day. Whenever it does appear, the whole constitution is speedily and greatly affected by it. The pulse is extremely quick, and generally feeble; the heat of the body is much increased; the tongue is white and clammy, and the countenance pale and dejected; the urine, which is voided in small quantities, is thick, and of a muddy colour, unlike what is observed in any other disease, the muddiness gradually lessening as the disease abates; the patient is constipated, the fæces being of a pale colour and clayey consistence; and the uterine discharges, whatever their quantity may be, have an offensive smell and unnatural appearance. It is, however, to be observed, that this smell and appearance do not always continue through the course of the disease, *but on inquiry will be found to have existed at, or some days before, its commencement.*"

In this case, the progress of the disease is irregular and uncertain, often protracted, and subject to occasional exacerbations; moreover, it is not limited to one extremity, but may attack both, either simultaneously or successively.

In connection with the foregoing history of this form of the disease, which I have partially quoted from Denman, it is interesting to observe how closely his theory of it assimilates itself to the one I am advocating. After pointing out how prominently the lesions of the lymphatics stand forward in this affection, he observes, "but it remains to be proved how it comes to pass that these glands are originally affected; and this I should endeavour to explain by presuming that, as the lymphatic vessels of the uterus and vagina are very much increased in size during pregnancy, they are more capable of absorbing any fluid which may come into contact with their orifices; and if any fluid *not consonant in its qualities with that which they were by nature intended to convey were to be admitted and conducted to the gland*, to which any particular lymphatic may lead, a morbid affection of the gland might be produced, which would occasion all the succeeding mischief." Now if, in this quotation, we substitute the word veins for lymphatics, and the word blood for that of lymph, which is implied, we should have, as I conceive, a correct exposition of the essential nature of the disease.

The *third* form of the disease I am speaking of arises from exposure to cold, and commences with symptoms not unlike those of ordinary rheumatism; and it probably only differs from an attack of rheumatic inflammation of the extremity in the fact that the great crural veins are simultaneously obstructed with the development of the symptoms of rheumatic irritation,—and doubtless from the same cause; for it will hereafter be shown that lactic acid, the presumed *materies morbi* of rheumatism, circulating in excess in the blood, directly tends to produce obstruction and inflammation of the veins; and this, by concentrating the general diathetic condition of the blood upon the affected extremity, must tend

to intensify the character of the local irritations, and so far to distinguish the case from an ordinary rheumatic affection of the limb. The twenty-second case reported in Dr. Hull's essay on phlegmasia dolens gives a very apt illustration of this type of the disease, and may be quoted for its conciseness.

"CASE. Mrs. A. of Salford, aged 20, was delivered by me on the 18th December, 1795, of her first child. She had an easy, natural labour, and no after pains. The lochia was natural, both as to quantity and duration. She suckled her infant, and had a plentiful secretion of milk. She recovered very well for the first fortnight.

"On the fourteenth day after her delivery, she came down stairs, and supposed she had caught cold, as she was on this day seized with coldness and shivering, succeeded by heat and other symptoms of fever. In a few hours afterwards, she perceived a violent pain in the calf of her left leg, and the part soon after began to swell. The pain and swelling next day had ascended as high as the groin (but the abdomen was not affected), and had descended to the foot, and the whole limb had assumed the appearances usually met with in these cases. Her milk was abundant, and her urine of the natural quantity. I directed a saline mixture for her, and linimentum ammoniæ to be applied to the limb every four hours.

"On the seventeenth day, as the febrile symptoms still continued, and her bowels were not sufficiently open, I directed a powder, containing two grains of antimonial powder, and five grains of rhubarb, to be taken every four hours instead of the saline mixture. The external application was not changed.

"On the twenty-first day after delivery, the febrile symptoms continuing, and the swelling of the left leg being not at all abated, she was attacked with pain in the calf of the right leg, which soon extended over the whole limb, and was succeeded

by a very considerable swelling, similar to that in the other leg.

“On the twenty-eighth day the febrile symptoms were much alleviated, and the extremities, which had hitherto been equally swelled, tense, and tender, both began to subside at the same time, and, at the end of a week from this, no vestige scarcely of swelling remained.” (Hull’s *Essay*, pp. 196, 197.)

The *fourth*, or gastric form of this variety of the disease, is also well illustrated in a case reported by Dr. Hull. It follows upon some error or indiscretion of diet, and is immediately attended with symptoms of gastro-enteric disorder, together with febrile disturbance, in the progress of which the local symptoms are manifested. I quote the case reported by Dr. Hull, as being short, and the best mode of illustrating this form of the disease.

“CASE. Mrs. H., of Manchester, in the 26th year of her age, was delivered by me of her second child on the 1st December, 1795. Her labour was easy, the lochial discharge was regular, and did not cease till the fourteenth day. She did not give suck.

“On the sixth day after her delivery she drank a glass of cold ale, and was soon after attacked with coldness and rigors, which were very violent, and continued for a long time. These were succeeded by a hot fit, pain, tension, and tenderness of the abdomen. She had a troublesome vomiting and diarrhoea, with confusion, and some degree of delirium.

“When the symptoms of puerperal fever had continued in an alarming degree for six days, the calf of her right leg became affected with severe pain, and then the pain, swelling, and tenderness of the abdomen were relieved and subsided, but the diarrhoea was still very urgent, and continued about three

months. The pain in the leg was soon followed by a swelling. It ascended to the groin, and afterwards passed down the leg to the foot, and the whole limb became swelled, tense, and tender, but was neither discoloured nor pitted on pressure.

“On the second day afterwards, the left lower extremity was swelled in a similar way. The limbs were nearly equally affected, and were extremely painful for about a fortnight. It was three months before the swelling disappeared, and, during a great part of this time, the lower part of the abdomen was rendered uneasy and painful whenever she attempted to walk, or suffered her legs to hang down for any length of time. Although the limbs were carefully examined in every stage of the complaint, neither the lymphatic glands nor vessels were ever found inflamed or enlarged.

“On account of the violence and long continuance of the diarrhœa, no blood-letting or purgative was employed. The patient took pulv. ipecac. comp. at bed-time, gentle astringents to moderate the diarrhœa, and moderately stimulant and tonic medicines to support her strength.”

Now, in all these forms of the disease, the attack may be said to have occurred in a simple and uncomplicated form, and so it generally does in the great majority of cases which occur during the ordinary convalescence from childbirth. In the first series of cases it occurs during the recovery from some antecedent attack of puerperal fever or inflammation; but, inasmuch as the force of this antecedent malady has expended itself, and its danger has passed away, it ceases any longer to complicate the crural affection. In the second series, it occurs as a remote consequence of loss of blood and the absorption of putrescent matters from the maternal passages, but without the complication of any intercurrent febrile or inflammatory affection. In the third, the attack may be regarded as one of

rheumatic irritation of the limb, intensified by the simultaneous obstruction of the crural veins, and the consequent locking up of the *materies morbi* upon the various organs and structures of the affected extremity. Whilst, in the fourth and last series, it follows upon dietetic errors, and is a probable consequence of the absorption of unhealthy secretions and unassimilated matters from the disordered gastro-enteric mucous surface. I repeat, then, that in all these cases there is comparatively no danger, because there is obviously no dangerous complication; but in the next form of the disease to which I have to direct your attention there is the greatest danger, not only because the crural affection does not occur in a simple form, but because it is liable to be complicated, both with the malady which may have preceded it, and also with various others which are liable to spring up coincidentally with, or consecutively to it; doubtless as common consequences of the same morbid or diathetic conditions.

(b) *Complicated Form of Phlegmasia Dolens.*

In this form of the disease, unlike the preceding, the crural affection occurs during the progress of some antecedent malady rather than during the period of convalescence from it; and on this account it might be regarded rather as an integral portion of such malady than as an independent affection; and the more so, inasmuch as the earlier symptoms of the attack are merged in those of the preceding affection. Taking a given number of cases in which the symptoms are recorded, I have made the following analysis, with the view of showing the nature of the antecedent malady with which the crural affection is most generally complicated, and I find, out of 37 cases, that in

11 the precursory symptoms were those of either general or
puerperal fever

| | | | |
|---|---|---|-------------------------------------|
| 5 | „ | „ | Peritoneal inflammation |
| 4 | „ | „ | Tubercular phthisis |
| 3 | „ | „ | Epidemic or zymotic disease |
| 3 | „ | „ | Rheumatic fever |
| 3 | „ | „ | Pelvic cancer |
| 2 | „ | „ | Pelvic inflammation and suppuration |
| 3 | „ | „ | Suppressed catamenia |
| 2 | „ | „ | „ lochia |
| 1 | „ | „ | General cachexia |

Now these affections alone would constitute a grave and extensive series of lesions with which the crural affection is liable to be complicated ; but, as already remarked, its possible complications do not end here, but may be variously extended by the simultaneous or successive development of various other lesions which, equally with the crural, are doubtless the effects of the same pathological cause. These also I have analysed in a given number of cases, and find that they furnish the following causes of complication from this source, viz. :

In 14 there were symptoms coincidently present of Pulmonary or pleuritic inflammation

| | | |
|---|---|-------------------------------------|
| 7 | „ | Gastro-enteric disturbance |
| 5 | „ | Cerebral inflammation or disease |
| 5 | „ | Articular disease |
| 4 | „ | Pelvic inflammation and suppuration |
| 2 | „ | Peritoneal inflammation |
| 2 | „ | Ophthalmia |
| 1 | „ | Pericarditis |
| 1 | „ | Extensive abscesses or suppuration |

Whilst in 10 the prominent coincident affection was that which may be best described by the term toxæmia, or a state of general blood-poisoning.

Now it is scarcely necessary to observe, that with the liability to so many and such serious complications, the crural affection in these cases must be always of a very grave, and sometimes of a very fatal nature ; and this gravity is stamped upon it throughout the whole of its course. Thus it is often ushered in with shivering or rigors, but without any decided or well-marked reaction following. On the other hand, the debility is from the first extreme, and rapidly tends to the most utter prostration ; the pulse is frequent and weak, the skin dusky, and often the seat of a febrile efflorescence, the eyes glassy, the countenance anxious and suffused, and the cheeks often present a hectic flush. Nor are the lesions of the affected extremity limited to those which are met with in the simple form of the disease. On the other hand, the crural affection is further aggravated or complicated by a disposition to the formation of abscesses, to the infiltration of pus into the intermuscular cellular tissue of the limb, to articular disease of various kinds, and often by a tendency to sloughing and mortification of such parts as are subjected to pressure. Whilst, lastly, the general symptoms are of the most severe and diversified character ; these, however, I need not particularise in detail, inasmuch as they are fully represented in the preceding analyses, and may be said, altogether, to constitute an assemblage of morbid actions, in which scarcely any organ or structure of the body can be said to be altogether exempt.

III. MORBID ANATOMY.

Division into Special and General Morbid Anatomy. Keeping in view the preceding subdivision of the disease into the simple and complicated forms, and the comparative freedom from danger of the former, it must be evident that our knowledge of its morbid anatomy is chiefly or entirely derived from

the post mortem examination of cases of the complicated form. But, inasmuch as we have seen that the complications which are liable to occur are of a very widely-spread and diversified character, it must follow that the morbid appearances met with in these cases must be equally wide-spread and diversified, embracing not only the pathological anatomy of the disease itself, but that also of all the antecedent and consecutive maladies with which it may have been complicated. As, therefore, it would be impossible to give fully the morbid anatomy of all these several lesions, I propose to confine myself more especially to a summary of that of the limb which may be said to constitute the *special* morbid anatomy of the disease, referring only very cursorily to the morbid anatomy of the associated lesions which may be said to represent its *general* morbid anatomy.

(a.) *Special Morbid Anatomy.*

As regards, then, the limb, the following morbid appearances have been met with as affecting its several structures.

1. *Cellular Tissue.* This, as well as the adipose, is sometimes found indurated, vascular, and infiltrated with serum, lymph, pus, or a sanious fluid.

2. *Veins.* The principal veins of the affected limb have been found very generally obstructed and inflamed, although it is stated that in some cases observed by Caspar, Rigby, Fraser, and others, no morbid change or obstruction could be detected in either the femoral, or the other large veins of the extremity; and the lesions of these vessels vary from simple obstruction, without any evidence of inflammation, to the most complete inflammatory obliteration. In the former case, the vein is found simply filled with a coagulum, or coagula of blood variously coloured, from a dark red to yellow, and pre-

senting different degrees of consistency in different cases. In this stage, the venous coats present no sign of inflammation, the lining membrane being smooth, pale, and translucent, and no inflammatory product being met with. In more advanced cases, however, inflammatory appearances become superadded; the venous coats are now thickened, and abnormally vascular, the external coat is often found adherent to the surrounding cellular tissue, and the internal, besides being reddened, is often studded with fibrinous deposits, which in some cases assume the character of a false membrane. The obstructing coagula are now generally found softened down into a pul-taceous puriform looking matter, often regarded as pus; but, so far as I have observed, not presenting the genuine appearances of pus under the microscope, but rather those of softened fibrine, and evidently produced by the liquefaction of the obstructing coagula. The veins principally affected are the femoral, the external and internal iliacs, the profunda, and sometimes the cava, whilst, less frequently, the uterine, vaginal, and saphena have been found diseased.

3. *Lymphatics.* The lymphatic vessels have often been found enlarged, infiltrated with serum, and matted together by condensed cellular tissue; whilst, in some cases, pus is reported to have been found in them. In like manner, the lymphatic glands are often found diseased, being generally enlarged, morbidly vascular, and purulent.

4. *Joints.* The sacro-iliac synchondrosis, the hip, and knee-joints, have been found diseased, and effusion of a serous or sanious fluid, together with pus, has been found in their interior.

5. *Arteries.* The cellular sheath, and the left iliac artery, have been found infiltrated and purulent, and the femoral artery, vein, and nerve, have been found agglutinated together

by inflammatory lymph, whilst in some cases the arteries of the limb have been found unusually contracted.

6. *Muscles.* In rare cases, pus has been found infiltrated into the intermuscular cellular tissue, and the muscular fibre has been found softened, and even pultaceous in spots.

7. *Integument.* Beyond a variable discolorisation, mortification and gangrene have been found in certain rare cases, more especially of such parts as have been subjected to pressure.

(b) *General Morbid Anatomy.*

In the Abdomen. The peritoneum has been found inflamed more or less extensively, with effusion of serum, lymph, and pus into its cavity, and adhesions between its visceral and parietal portions. The intestines have been found inflamed, and their mucous membrane extensively ulcerated. The liver enlarged, inflamed, and purulent. The kidneys diseased,—in one case being pale and degenerated, and in another, covered with hæmorrhagic spots, and purulent. The spleen enlarged and congested, and pus in the thoracic duct.

In the Pelvis. Extensive evidences of inflammation have been found in the pelvic organs. The fundus and body of the uterus softened and inflamed, and its interior softened, black, and purulent. The ovaries, ovarian ligaments, and Fallopian tubes, as well as the uterine veins, inflamed and purulent. Phagedenic and cancerous ulceration of cervix uteri. Cancerous disease of pelvis. The symphysis pubis and sacro-iliac synchondrosis diseased and purulent. Pus in the peritoneal sac between the uterus and rectum,

and the lining membrane of the latter organ extensively ulcerated.

In the Thorax. Evidences of pulmonary, pleuritic, and pericardial inflammation have been found. Congestion, apoplexy, hepatisation and suppuration of the lungs. Tubercular deposits and cavities. Effusion of lymph and serum into the pericardial and pleural cavities, and adhesions between the parietal and pulmonary portions of the pleura. The ventricles of the heart have been found studded with fibrinous deposit. The left mammary gland inflamed, and several of the axillary glands inflamed and purulent.

Head. The surface as well as sections of the brain have been found studded with hæmorrhagic spots, and the left eye diseased, disorganised, and purulent.

And now, gentlemen, having laid before you as complete a summary of the clinical history of the disease as my time will allow, I would ask you, in conclusion, to consider how far, looking to the multifarious details which constitute that history, you are prepared to assent to the doctrine that the primary seat and source of the disease is in the crural veins, and that crural phlebitis is its proximate cause. In connection with the affected extremity, we have seen this lesion of the veins associated with kindred lesions of almost every other important organ and structure; and in connection with the constitution at large, with grave disease of almost every vital organ. How, then, is it possible, in view of these facts, to assign to the lesion of the veins that prominence and priority which is implied in this theory? In that period of the history of medicine when disease and morbid actions began to be studied by the light and guidance of morbid anatomy, there was scarcely

a fever or a malady which was not traced to, and assumed to depend upon, some particular local lesion; a doctrine which time and opportunity have sufficiently refuted. But the theory of phlebitis as the proximate cause of phlegmasia dolens, was propounded with the very earliest glimmering of light which dawned upon it from that source, even with the first dissections; and if our views of morbid action were bounded solely by the evidences of anatomy, such theory would still be the most plausible, as it is probably the most apparent. But in more recent times we have learnt the necessity of calling in to our aid other sources of information for the right interpretation of disease. We have been taught to look to its natural history, its origin, progress, and terminations, and the effect of remedies, as giving equal light, and affording equal information; and, tested by these, the conviction is irresistible, that the phlebotic theory rests upon too narrow and contracted a basis, and that, looking to the extensive series of morbid actions, and the widely-spread evidences of disease throughout the body which mark its progress, we are led to the conclusion that we can only adequately account for it and for them by assuming that they are the common effects of some more general and diffused morbid cause; and thus, from the study of clinical facts alone, we are, I would submit, compelled to ignore the phlebotic theory of the disease in favour of some other, the nature of which I will further endeavour to elucidate by another series of investigations in the ensuing lecture.

LECTURE II.

PHYSIOLOGICAL RESEARCHES INTO THE ORIGIN OF PHLEBITIS
AS CONNECTED WITH THE PATHOLOGY OF PHLEGMASIA
DOLENS.

Delivered November 25th, 1861.

MR. PRESIDENT AND GENTLEMEN,—In the preceding lecture I endeavoured to lay before you a comprehensive analysis or epitome of the clinical history of phlegmasia dolens, with especial reference to the question of the probable nature of its proximate cause. And having submitted to you the grounds upon which I venture to maintain the insufficiency of phlebitis, as of any other local lesion, to account satisfactorily for the phenomena of so complex a disease, judged of by *clinical* evidence, I shall proceed to place before you in the present the conclusions I have arrived at upon this point from *physiological* research—from researches which were specially undertaken for the purpose of determining how far crural phlebitis, in a pure and uncomplicated form, was capable of giving rise to a malady so complex, or how far phlebitis, generically, might not be traced up to a higher and more general morbid agency, the operation of which simultaneously upon the veins and the different other organs and structures of the affected limb would adequately account for all the very varied lesions which are met with in the disease.

Let me, however, premise briefly what I conceive to be the

questions more especially to be solved by physiological research.

Reverting, then, to the various theories of the disease which have been proposed, we have seen that the one only which has stood the test of anatomical investigation is that which ascribes it to crural phlebitis—phlebitis, with a few exceptions, having been invariably found upon post mortem examination, and constituting, indeed, the most important anatomical lesion discoverable in the affected extremity. Discarding, then, the lesions of the nerves, lymphatics, and other anatomical constituents of the limb, occasionally met with in post mortem examinations, as being incidental rather than essential,—and although very generally, yet not invariably, met with on dissection,—it follows that our inquiry becomes limited, as already stated, to a determination of the question of how far crural phlebitis, in a pure and uncomplicated form, can give rise to the very complex phenomena of the disease, or how far phlebitis itself can be traced up to, and deduced from, some more general and diffused morbid agency capable of producing the various other local and general symptoms which are coordinately met with.

Now, in the investigation of this subject, it will be necessary to bear in mind that the symptoms of phlegmasia dolens are not merely such as are dependent upon an obstructed condition of the principal veins of the extremity, but comprise others which are characteristic of other lesions. Thus, the character of the swelling is not simply that of œdema, but it is tense, hot, and elastic. The condition of the nerves is one of exalted sensibility, often amounting to the most agonising pain. The motor powers of the limb are impaired to a degree which, in some instances, verges upon positive paralysis, and in addition to the tension and obstruction of the chief veins, there is often

redness and tenderness in the course of the lymphatics and principal cutaneous nerves. Now, the first question it was proposed to investigate was, how far these manifold forms of local lesion would follow upon crural phlebitis artificially produced.

I. EFFECTS OF CRURAL PHLEBITIS IN PRODUCING THE SYMPTOMS OF PHLEGMASIA DOLENS.

To determine this question I had recourse to the three following series of experiments; first, to ligaturing the iliac veins, and observing the resulting phenomena at different periods after the operation; secondly, to extensive irritation of the lining membrane of the same vessels by means of chemical and mechanical irritants; and thirdly, to sustained compression of the femoral veins by means of firm metallic compresses. For the particular details of these experiments, I must refer you to my paper published in the thirty-sixth volume of the *Medico-Chirurgical Transactions*,—the time allotted for the delivery of these lectures, allowing me to give only a very general summary of what was observed, and which may be thus epitomised.

Effects of Ligaturing the Iliac Veins. The constitutional effects which follow upon ligature of the iliac veins would appear to be of a very transient character, and to be referable to the extensive wound which is necessary to expose the vein rather than to the actual operation itself. They were most marked and severe on the day of the operation, during which the animal remained quiet, subdued, and disinclined to take food; at the end of twenty-four hours they had in a measure subsided, and from this time almost rapidly disappeared. The local effects were also of a transient rather than of a persistent character, and were confined, in a great measure, to swelling,

stiffness, and an inability or disinclination to move the affected extremity : for, as far as could be judged, there was neither tenderness on pressure, nor any preternatural heat of the limb, except in the immediate neighbourhood of the wound. These symptoms, moreover, were not of long continuance. The swelling was greatest during the first and second days following the operation, and it then steadily and quickly disappeared. Its character, again, was that of ordinary oedema—it readily pitted on pressure, and was nearly equally diffused over the ligatured extremity.

Now, in this brief review of the consequences of crural phlebitis, as induced by ligature of the iliac veins, it must, I think, be admitted that the phenomena differ very widely from those which are met with in phlegmasia dolens. The symptoms were far more transient and ephemeral, seldom lasting more than forty-eight or seventy-two hours ; and whilst, in phlegmasia dolens, the swelling is firm, tense, and elastic, in these cases it was otherwise. It was compressible, soft, and inelastic, and hence readily pitted upon pressure, and, as far as could be judged, there was neither pain, tenderness, nor preternatural heat of the affected extremity, nor any remarkable loss of motor power. Again, the state of the veins on post mortem examination was found to be very different from that met with in phlegmasia dolens ; there was an absence of any extensive obstruction of these vessels, or of any disposition on the part of the inflammation to extend itself. To this, indeed, may be ascribed the transient character of the local symptoms ; for, inasmuch as the inflammation and obstruction of the veins were limited to the immediate seat of the ligature, a collateral circulation could be readily established, and thus the consequences of such inflammation and obstruction were speedily done away with.

But whilst the consequences of inflammation of the iliac veins, thus induced, do not accord altogether with the phenomena of phlegmasia dolens as ordinarily observed, they are, upon the whole, strictly in accordance with those that have been observed, from time immemorial, in connection with wounds, injuries, and operations upon these vessels. "The ancients," says Mr. Travers, "treated the veins with singular rudeness—pricking, cutting, tying, and burning them, without ever adverting to any other than the mechanical effects of such operations upon the diseases for which they were institutedHippocrates punctured varices: Ætius, Paulus, Avicenna, and Albucasis describe the operation of excision. This seems to have been the practice of Fallopius and Severinus. Fabricius Aquapendens and Fabricius Hildanus inclosed the varicose vein between two ligatures, and emptied it by incision. Ambrose Paré, Petit, Dionis, and others, emptied it by punctures, and brought its sides into contact by compression..... Many of the older operating surgeons in the country, army and navy, still adopt the practice of tying veins after amputation, and are unwilling to believe that it can ever be productive of mischief. I have frequently," says Mr. Travers, "seen the femoral vein tied without any obvious ill effect; and one of the most experienced and successful operators in the West of England lately assured me that he had been in the constant practice of tying the main vein distinctly from the artery in amputation. Neither do the continental surgeons entertain any apprehension of a ligature upon a vein, nor are they, I believe, in any degree aware of the extensive inflammation to which the interior tunic of the vessels is in consequence exposed." The experiments I have related are fully in accordance with these facts, and it will be sufficiently shown in the sequel that operations upon veins are not in themselves pro-

ductive of either serious or dangerous consequences, and that the formidable symptoms which sometimes follow upon such operations have another origin, and may be traced to a very different cause.

Effects of more extensive Inflammatory Obstruction of the Crural Veins. In the next place I proceeded to test the effect of more extensive inflammation and obstruction of the crural veins in the causation of the symptoms of phlegmasia dolens. Two experiments were performed. In one the whole tract of the crural veins, from the femoral up to the termination of the iliac in the cava, was chemically irritated by application of a solution of nitrate of silver; in the other, a similar tract of the venous system was mechanically irritated by the insertion and retention of an elastic bougie. Of these experiments, however, it may be sufficient to remark that whilst, in the former, the most complete and extensive inflammatory obstruction of the crural veins was produced throughout the entire of the tract indicated, yet, that this was unattended or followed by the usual symptoms of phlegmasia dolens, as may be judged of by the following summary of the results.

In twenty-four hours there was very little constitutional disturbance. The leg was somewhat swollen; but it could be moved without any apparent difficulty, and the swelling was soft and inelastic. There was no particular tenderness of the limb, nor was there any indication of the inflammation having extended along the femoral vein. In forty-eight hours the appearances were much the same; the inflammation had not extended further down the femoral vein, nor was there any increased swelling or loss of motor power. In seventy-two hours no fresh symptoms had developed themselves: on the other hand, the swelling and stiffness had begun to subside, and the dog appeared to be otherwise perfectly well. It was

allowed to live for ten days subsequently, but no further symptoms occurred in connection with the operation. I exhibit a drawing of the dissection of these veins, to show how complete and extensive the inflammation and obstruction had been.

Effects of Mechanical Injury of the Crural Veins. Lastly, in a third series of experiments, the femoral vein was exposed, and a strong metallic compress was secured upon it, so as simultaneously to obstruct the circulation, and mechanically contuse and inflame its coats; but no perceptible swelling of the limb or loss of its motor power resulted, although after death the coats of the vein were found thickened, indurated, and opaque at the point at which the compress had been applied.

General Conclusions. We may, therefore, I think, deduce from these experiments that the symptoms of phlegmasia dolens are not producible by inflammation and obstruction of the crural veins alone, however rapidly or extensively induced. There is an absence of any constitutional fever or disturbance; the swelling of the limb is neither elastic nor abiding, but simply cedematous, and there is no impairment of either its sensory or motor functions. With such facts, clearly demonstrated, there is, I submit, no other conclusion than that the affection of the veins is not the primary or essential lesion, or the proximate cause of the complaint.

But whilst I believe that this conclusion is not only deducible from the foregoing experiments, but will be found upon the whole to be supported by the clinical history of phlegmasia dolens, as I have shown in the preceding Lecture, it must ever be remembered that an inflamed and obstructed condition of the iliac veins constitutes one of the most important and, indeed, pathognomic features

of the complaint; and therefore, in seeking for a theory of the disease, we must exclude any which does not equally account for this, as well as for its other pathological characters. The problem, then, which has to be solved is this—What are the specific causes or conditions which can both obstruct and inflame the veins and simultaneously disturb the sensory, the motor, and the secretory organs of the affected extremity, so as to give rise to the concurrent phenomena by which the disease is characterised—are they local or constitutional? and in what do they respectively consist? Now, these are questions which cannot be satisfactorily answered until we have correctly determined the pathology of obstructive phlebitis, and more particularly, to what extent it is dependent respectively upon local, and constitutional causes.

I accordingly pursued the investigation of this subject at some length, from a conviction that it was absolutely essential to a correct understanding of the pathology of phlegmasia dolens, and I was fortunately enabled, in the course of my inquiries, to effect the solution of the problem I had proposed to myself. The entire course of physiological investigation will be found in the thirty-sixth volume of the *Medico-Chirurgical Transactions*; but the following outline will serve to indicate its nature, and the general conclusions that were arrived at.

I. PATHOLOGICAL ORIGIN OF PHLEBITIS.

Effects of Mechanical Injury and Irritation of the External Coat of Veins in producing Phlebitis. In the first place, a series of experiments was performed for the purpose of determining the influence of mechanical injury and irritation of the external coat of veins in the causation of obstructive phlebitis. In some, this membrane was mechanically injured and con-

tused in several places, whilst in others, chemical irritants were extensively applied, such as solutions of the nitrate of silver and the bichloride of mercury; but these several influences were found to be inadequate to the production of phlebitis as ordinarily understood. The external coat, it is true, became inflamed, morbidly vascular, coated with lymph, and adherent to the surrounding parts; but the circulation throughout these veins was unimpeded, there was no exudation of lymph into their interior, or any occlusion of these vessels. In fact, obstructive phlebitis, in the strict sense of the word, did not occur, and it seemed to me that the following inferences might be deduced from the facts that were observed in relation to the question.

1. That obstruction of veins is not a necessary consequence of all forms of venous inflammation, and in particular of that which follows upon irritation or injury of their external coat.

2. That inflammation of veins thus excited is not disposed, in a healthy animal, to extend itself indefinitely, but, on the other hand, is strictly limited to the immediate seat of such irritation or injury.

3. That the external coat of veins very readily reacts under the influence of irritating causes, being in these cases morbidly vascular, covered with inflammatory lymph, and adherent to the surrounding tissues.

4. That such reaction and external inflammation may occur without giving rise to any corresponding inflammation of the lining membrane; for in these cases the latter was healthy, and the vein consequently pervious, or at least free from any inflammatory exudation or obstruction.

And if we admit the accuracy of these conclusions, it must follow that neither operations upon veins, such as ligature, ex-

cision, venesection, or division, nor rheumatic inflammation of their external coat, nor mechanical injuries, such as contusion or laceration, are essentially the causes of obstructive phlebitis, as has sometimes been assumed. Nor is it probable that injury of the orifices of the uterine veins, whether occasioned by instrumental operations or the forcible separation of the placenta, can excite inflammation and obstruction of the crural veins by being propagated to them along the coats of the hypogastric; for we have seen from these experiments that, in a state of health, inflammation of veins, consequent upon mechanical injury, is not so disposed to extend itself.

Effects of Irritation of the Lining Membrane of Veins in producing Phlebitis, the blood being previously and subsequently excluded. A second series of experiments was now undertaken for the purpose of determining the effects of irritation or stimulation of the lining membrane of veins in the causation of obstructive phlebitis; and more particularly with the view of ascertaining how far the doctrine advanced by Gendrin and other French pathologists was correct, which attributed the obstruction met with in phlebitis to the exudation of lymph and formation of pus in the interior of veins consequent upon such internal irritation. In different instances solutions of the bichloride of mercury, of the nitrate of silver, and of the sulphate of zinc, were so employed, the blood having been previously, as well as subsequently, excluded from the portions of the venous system thus treated. But in every case in which the readmission of the blood was prevented, it was found that no such obstruction had taken place. There was no effusion of lymph or formation of pus in the interior of these veins, and they were throughout either entirely empty, or at all events perfectly pervious, thus negating the observations, or rather assumptions, I have referred to.

Effects of Irritation of the Lining Membrane of Veins in producing Phlebitis, the blood being previously excluded, but subsequently readmitted. But in another series of experiments a different course was pursued. In these the lining membrane of the veins was similarly irritated, whilst the blood was similarly excluded ; but in these, unlike the foregoing, the blood was subsequently readmitted after the irritation had been effected, instead of being permanently excluded. Now these experiments were attended with very remarkable and instructive results ; for in each it was found that the column of blood readmitted immediately coagulated throughout the entire tract of the veins so treated. The phenomena of obstructive phlebitis were thus fully produced, and the important principle was established that, irrespectively of any abnormal condition of the blood on the one hand, or of any appreciable venous inflammation on the other, the phenomena of obstructive phlebitis might be produced by merely modifying or disturbing the vitality of the lining membrane of portions of the venous system.

Reviewing, then, the results of these experiments collectively, which were especially instituted for the purpose of determining the share taken by the veins, exclusively of the blood, in originating the phenomena of obstructive phlebitis, we may conclude, on the one hand, that inflammation of the external coat is inadequate to produce them, so long as the vitality of the lining membrane is unaltered or unimpaired ; and on the other, that considerable irritation of the latter is equally incompetent so long as the blood is excluded. The obstruction of the vessels observed in the last series of experiments not having been caused by an exudation of lymph or other inflammatory product into their interior, but rather by an arrest and coagulation of the blood subsequently readmitted into them, and evi-

dently due to the altered condition of the vitality of their lining membrane induced by the previous irritation.

Effects of Vitiating the Column of Blood in Particular Veins in producing Phlebitis. Now, inasmuch as it was thus shown that a mere alteration in the vital condition of the lining membrane of veins is capable of so disturbing the normal relations which in health subsist between the blood and these vessels, as to occasion a coagulation of the former when healthy, in portions of the latter when thus irritated, it became a question to determine how far these conditions being reversed respectively, that is to say, the lining membrane of the veins being healthy, and the blood unhealthy, the same phenomena would occur, and an arrest and coagulation of such blood take place in the venous system. I made very many experiments and observations upon this point, and obtained the most clear and unmistakeable results; the answer furnished was distinctly in the affirmative, and thus the converse of the proposition above stated was established, viz., that just as healthy blood circulating through portions of the venous system, the vitality of whose lining membrane has been altered or impaired, may become arrested and coagulated within them, so also it may happen that unhealthy blood, passing through the interior of healthy veins, may also be arrested and coagulated within them, and thus give rise to all the phenomena of obstructive phlebitis.

The experiments undertaken for the purpose of elucidating this question were both varied and numerous, and the results were such as I apprehend can leave no doubt upon the mind as to the validity of the conclusions which have been stated. In the great majority of cases weak solutions of lactic acid were employed for the purpose of vitiating the blood, and this agent was selected, both because it represents the principal consti-

tuent of an important animal excretion, and is also known to be present in an excessive and abnormal proportion in many diseases, during the progress of which phlegmasia dolens is known to supervene. Such, for instance, as rheumatic and puerperal fever, in both of which this acid has been found in abnormal excess, and in the progress of which phlegmasia dolens not unfrequently occurs.

From among many observations made for the purpose of elucidating this point, I select the following as illustrating the effects of the circulation of blood thus artificially vitiated in the causation of obstructive phlebitis.

EXPERIMENT. On the 26th July, 1852, I ligatured the left jugular vein of a dog superiorly, and through an opening made below the ligature, I injected half a drachm of lactic acid, containing 15 per cent. diluted with ten drachms of water. A ligature was then applied to the vein, and the wound closed by suture. The dog was not materially affected by the operation, and was killed the next day, and the parts then examined.

Dissection. The jugular vein was found obstructed throughout by a coagulum which adhered closely to its interior; it was somewhat discoloured about the middle of the vein, but at the seat of ligature and elsewhere was of a dark colour, and had generally the characters of an ordinary coagulum. On removing it, the lining membrane of the vein was found to be opaque, and studded here and there with small deposits, some being pale coloured and transparent, whilst others were red, and apparently consisted of fibrine deposited from the blood. Some little vascularity of the interior of the vein was also perceptible, but, upon the whole, not to any great extent, either externally or internally. Nor were the coats of the vein much thickened or otherwise diseased.

EXPERIMENT. On the 15th July, 1852, I ligatured both

femoral veins of a dog, and, having opened the right above the ligature, injected two drachms of lactic acid of the same strength as the above, diluted with 10 drachms of tepid water. The dog, during the operation, appeared to be faint, breathed irregularly, and seemed otherwise to be much affected, but shortly recovered himself. The next day both hind legs were swollen, but more especially the left. In forty-eight hours the swelling of both legs had in a great measure subsided, and the dog was otherwise well. He was now killed and the parts examined.

Dissection. The superficial veins of the posterior extremities were somewhat enlarged, but very little serum was found exuded into the cellular tissue. There was much inflammation in the neighbourhood of each wound in the thigh. The veins of the left extremity were generally but little obstructed, and there was only a small coagulum found below the ligature of the femoral vein. The right external and common iliac veins were, however, filled throughout with a coagulum which was solid and firm below, but less so above; so that on removing the fluid portion of the blood it was found that the vein contained here only a mere coating of fibrine. This coating was continued up the vena cava for some distance, and throughout was slightly adherent. Above the opening in the left femoral, and for about two inches into the iliacs, the veins were thickened, opaque, and here and there reddened. There was, however, no deposit of fibrine, lymph, or pus, or any other inflammatory appearance, and the lining membrane throughout was perfectly smooth.

EXPERIMENT. On the 23rd July, 1852, I ligatured the left femoral vein of a dog, and injected half an ounce of lactic acid of the usual strength diluted with an equal quantity of water into it towards the heart. The animal was sensibly affected by

the operation ; he breathed heavily and irregularly, and shortly afterwards appeared to be faint and giddy, and incapable of standing. He had now frequent gulpings, made efforts to vomit, and had, apparently, a disposition to tenesmus or diarrhoea ; the breathing became more irregular, convulsions ensued, and he died in about half an hour from the period of the injection.

Dissection. The iliac veins of the left side, from the femoral up to the cava, and a considerable extent of the cava, were found obstructed by what appeared to be a firm coagulum ; and on opening these vessels, this was found to be closely adherent to their lining membrane. After a short time, however, this apparent coagulum began to contract, and in doing so separated itself from the veins, exuding at the same time a serous fluid from its interior. This contraction proceeded until the coagulum which had previously filled the entire cavity of the veins, now occupied but a small tract of their interior. The coats of the veins which had been obstructed were perfectly healthy, no morbid redness, vascularity, or opacity was anywhere observable, and the lining membrane to which the coagulum had been adherent was perfectly smooth, white, shining, and free from any trace of inflammation.

Now I would particularly invite your attention to the facts of this case, because they elucidate many important questions bearing upon the subject under consideration. In the first place, it is clear that extensive venous obstruction followed the tract of the vitiated blood in its course upwards to the heart. Secondly, it is certain that this could not have been the effect of phlebitis, both because the time was too short to allow of its production, and also because the appearance of the lining membrane throughout was such as to negative this view ; whilst, thirdly, it is equally certain that the obstruction could

not have been owing to a general coagulation of the blood in these veins, because the coagulation was limited to the layer of blood which was immediately in contact with their lining membrane. Clearly, then, the vitiating matter operates in the production of obstructive phlebitis by rendering the blood so vitiated in some way less capable of being transmitted through the venous system than healthy blood; but to this question I shall hereafter revert.

The point, then, to which our investigations into the ætiology of phlebitis have arrived, is that which clearly establishes its important relations with, if not its immediate dependence upon, an unhealthy condition of the blood, rather than upon mechanical or physical injury of the venous coats. For of the several modes in which we attempted to produce it artificially, in two only were the attempts successful, viz., in the instances above stated, in which the blood was artificially vitiated, and in those in which the blood having been excluded from particular tracts of the venous system, the lining membrane of these tracts was irritated by chemical solutions, and the blood subsequently readmitted. But, practically, we may almost ignore the latter view of its production, because the experiments which were performed, and through whose agency it was affected, can scarcely ever be expected to be realised at the bedside. We shall hereafter see that the tendency to phlebitis is always greatest in those portions of the venous system which have been predisposed to it by previous injury or impaired vitality; but even here it is probable that the effective cause is an abnormal or unhealthy condition of the blood, the existence of which as an antecedent condition to the occurrence of phlegmasia dolens has been shown to be the most patent fact which is stamped upon the clinical history of the disease.

Effects of a General Vitiating of the Blood in producing

Phlebitis. But we have hitherto pursued this inquiry only so far as to establish the principle that the *direct* vitiation of the blood may immediately produce an obstruction of those portions of the venous system which lie in the tract of such vitiated blood in its progress onwards towards the heart; and if it could be assumed that phlebitis had always a local cause for its production, such, for instance, as a divided vein and a suppurating wound connected with the opening, as generally happens in those cases of phlebitis which follow upon venesection, we might feel that the inquiry was complete. But in the case of phlegmasia dolens we have to account for the origin of phlebitis from various febrile and constitutional states, all, it is true, representing some type of blood disorder, but acting on the venous system, and producing phlebitis, irrespectively of any direct injury of the veins or *local* cause of vitiation adequate to account for it. An important question, therefore, remained for solution, viz., how far phlebitis could be artificially produced by vitiating the general mass of the blood, rather than by directly vitiating the column of blood in any particular tract of the venous system. To solve this question I performed many experiments, and at last obtained results which could leave no doubt upon the subject; and which clearly established the fact, that not only particular veins, but particular portions of the venous system, might become obstructed, and consecutively inflamed, as a consequence of a general vitiation of the blood, irrespectively of the immediate vitiation of the blood in particular portions of the venous system.

In the drawing I now exhibit you will observe the most complete and general obstruction of the crural veins of both posterior extremities of a dog, effected by the injection of dilute lactic acid into the general circulation; and I venture to sub-

mit that a more perfect specimen of extensive inflammation and obstruction of the crural veins cannot be found in the necroscopical history of phlegmasia dolens than that which was presented by the dissection from which it is copied, and which it so accurately represents. The history of the case is the following.

EXPERIMENT. The right femoral vein of a dog was ligatured on the 16th of June, 1852, and the effects of the operation were carefully noted for several days. In twenty-four hours there was some little œdema of the limb, but it was not painful or tender, and the dog moved it without difficulty. In forty-eight hours the œdema was nearly gone. In seventy-two hours there was none perceptible, and the limb appeared to be perfectly natural. The left femoral vein was now ligatured, and above the ligature half a drachm of lactic acid diluted with ten drachms and a half of tepid water was injected towards the heart. In twenty-four hours the corresponding extremity was greatly swollen throughout, its temperature was raised, it was painful on pressure, and the dog moved it with difficulty. In forty-eight hours its general condition was the same, the swelling was still considerable, the limb was tender on pressure, and the dog still moved it with difficulty. It was now killed, and the parts examined.

Dissection. The left posterior extremity was generally swollen. The subcutaneous and intermuscular cellular tissue was morbidly vascular and infiltrated, and the muscles themselves were in places swollen and congested. The iliac veins of this side were obstructed with a firm coagulum, which extended somewhat into the cava, *whilst the femoral and all the principal veins of this extremity were found similarly obstructed.* On opening these vessels it was found that the external and common iliac veins were filled with a firm coagulum, which was

throughout adherent to their lining membrane, and on removing it, some red gelatinous looking matter was left upon the interior of the veins, which for the most part could be readily brushed away, but here and there portions of it were firmly adherent. The colour of the lining membrane of those veins was somewhat redder than natural, but the membrane itself was for the most part smooth and glistening. At its junction with the femoral, the coats of the external iliac vein were thickened and opaque, and it did not collapse on being cut through. The left femoral vein was filled with a dark coagulum, which was somewhat soft and grumous immediately below the ligature, but which elsewhere was of firm consistence. It was slightly adherent, and, on removing it, a little gelatinous-looking matter was left upon the lining membrane, which could be easily brushed away. This vessel was neither thickened nor opaque, nor was any increased vascularity of its coats observed. The principal branches of the femoral vein were all filled with firm coagula, but these were very slightly, if at all adherent to the interior of the veins. The posterior tibial vein was thickened, and its coats did not collapse on being divided; it was throughout filled with a coagulum. The right femoral vein contained a firm coagulum, which was slightly adherent, and, on removing it, a little red matter was left upon its interior. This vein was neither vascular, thickened, nor opaque. A small coagulum was also found in the right popliteal vein. On making transverse sections of the different coagula found in the veins, it was observed that their exterior was much firmer than their interior. The former consisted of firm coagulated blood, the latter of little more than a grumous semi-fluid material. Hence it seems reasonable to conclude that coagulation had commenced at the circumference of the coagula, where the blood was in contact with the lining membrane of the veins.

Now here I would pause in the narrative of these researches, in order to direct your attention to the very important fact that we have here seen produced for the first time, not merely crural phlebitis on the most extensive scale, but crural phlebitis associated with various other lesions of the affected extremity. As regards the symptoms observed during life, it is noted that in twenty-four hours the affected extremity was greatly swollen throughout, its temperature was raised, it was painful on pressure, and the dog moved it with difficulty. In forty-eight hours its general condition was the same, the swelling was still considerable, the limb was tender on pressure, and the dog still moved it with difficulty. Can it be doubted that these are among the most characteristic symptoms of phlegmasia dolens? Again, in regard to the post mortem appearances, it was found, in addition to the extensive lesion of the veins described, that the subcutaneous and intermuscular cellular tissue was morbidly vascular and infiltrated, and that the muscles themselves were in places swollen and congested. Can it, again, be doubted that these are among the principal morbid appearances which are met with in regard to the limb in fatal cases of phlegmasia dolens. In fact, it cannot be doubted that we have here a case of phlegmasia dolens artificially constructed by the simple process of vitiating the blood by charging it with an excess of lactic acid. I maintain, then, that the theory of the disease I contend for is thus established by synthetical construction, as it had been deduced from analytical investigation. For it is here clearly proved that it is a morbid condition of the blood which gives rise to the lesions of the veins as it does to the other lesions of the affected extremity; that therefore the lesions of the veins met with are secondary to a vitiated condition of the blood rather than primary phenomena, and that they are related to the other crural lesions met with.

in the disease, not so much in the order of cause and effect, as in being, like them, parallel effects of the same common morbid cause. Phlebitis, therefore, cannot be regarded as the proximate cause of the disease. It constitutes, indeed, the most prominent, and perhaps the most constant, of all the local lesions met with; and its presence, doubtless, gives a force and intensity to the morbid actions prevailing, which would not otherwise occur, by concentrating them upon the affected limb. But in seeking for the proximate cause of the disease, we may trace it to a higher source than any of these local lesions; to a more general morbid influence, out of which they may all be analytically deduced, as we have thus seen they may be synthetically constructed.

Lest, however, it should be supposed that the extensive obstruction of the veins which followed the injection of lactic acid into the blood in the preceding experiment was in any way due to the operative proceedings had recourse to, I would beg to observe that no such obstruction occurred in any of the antecedent experiments in which the veins were similarly ligatured or divided, and further, that in this the right femoral vein had been previously ligatured without any such obstruction resulting. But, to put the question beyond a doubt, I repeated precisely the same operation upon another dog, with the sole difference of injecting tepid water into the blood, instead of lactic acid, and the result proved, that no obstruction whatever of the veins took place, even after a longer interval had been allowed to elapse, as shown in the following experiment.

EXPERIMENT. The femoral veins of a dog were ligatured June 28, 1852; above the ligature of the right an opening was made, and half an ounce of tepid water injected towards the heart. The dog was examined regularly for several days, but no swelling was observable in either of the posterior extremi-

ties, neither did the dog at any time appear to suffer from pains, weakness, or stiffness, of either of these limbs. In seven days the animal was killed, and the veins immediately examined. The pelvic veins were throughout perfectly pervious and healthy. The femorals at the point of ligature were slightly thickened and obstructed, and adhered to the surrounding parts, but elsewhere they were perfectly healthy, and no other morbid appearances were anywhere perceptible.

As, however, I was unwilling to let the question rest upon the evidence of a single observation, I repeated the same experiment in a variety of ways in different animals, and, upon the whole, with results which were affirmative of the correctness of the principle I have stated. In all, considerable obstructions of veins followed the track of the vitiated blood in its progress onwards towards the heart, whilst in the majority there was also obstruction of the distal veins of the extremity, which, consistently with the results of preceding experiments, could only have arisen from the action of the vitiated blood after it had gone the round of the circulation. Thus in one instance, in which the jugular vein was opened, and some weak lactic acid injected; in the course of the circulation it was found that a firm coagulum occupied the whole of its interior, which extended down to the right auricle, and was in places fibrinous and decolorised. In another, in which three drachms of lactic acid, diluted with nine drachms of water, were injected from the right femoral vein towards the heart, it was found that not only had a layer of coagulum been deposited upon the lining membrane of the iliac veins and the cava, as high as the renal, but that a firm coagulum occupied also the right femoral, from its commencement to its termination in the popliteal. In a third, in which a similar quantity of dilute lactic acid was injected into the femoral vein towards

the heart, it was found that not only were the iliac veins of the same side firmly obstructed, and a layer of coagulum deposited upon, and adherent to the cava for some distance, but that the femoral vein of the opposite extremity was also obstructed to a considerable extent. In a fourth, in which impure lactic acid largely diluted was injected into the right femoral vein towards the heart, it was found that not only were the right iliac veins and some of their branches obstructed by a firm adherent decolorised coagulum, but that the right femoral vein, down to the popliteal and several of its branches, were similarly obstructed, whilst a firm coagulum occupied also the left femoral vein down to the popliteal. In a fifth, it was found, where the same irritant had been injected into the femoral vein, that not only were the iliac veins of the same side, and some portion of the cava obstructed with a firm, adherent, decolorised coagulum, but that the femoral veins contained also coagula on the distal side of the ligatures which had been applied to them.

It appears to me that the results of these experiments are essentially affirmative of the truth of the principle which I have advanced; for they show that not only may large tracts of the venous system become obstructed by the action of vitiated blood in its progress onwards towards the heart, but that other portions of the venous system may also become obstructed by its action after it has gone the round of the circulation; and this I would submit has been shown to occur in a sufficient number of instances to justify the general conclusion, that whenever the blood is vitiated, whether from local or constitutional causes, not only particular veins, but large portions of the venous system, may, under certain circumstances, become obstructed and inflamed, and this independently of any direct injury of the veins on the one hand, or local vitiation of the blood on the other.

Physiological Deductions from the foregoing Facts as to the probable Nature and Cause of Obstructive Phlebitis. In commenting upon these facts in my paper published in the *Medico-Chirurgical Transactions*, I referred the obstruction and inflammation of the veins in these cases to an abnormal irritation or excitation of their lining membrane immediately induced by the action of morbid matter in the blood, and I explained the sense in which the term was used in the following words. It had been shown, I remarked, that when an irritant had been applied to the lining membrane of a vein whilst the blood is excluded, that the blood immediately coagulates on being again readmitted, and that consequently this coagulation must arise from some impression made upon the blood by the lining membrane thus irritated. It had further been shown that this may occur without any evidence of inflammation of the vein on the one hand, or apparent structural change of the vessel on the other, and that the coagulation is limited in the first place to the portion of blood in contact with the lining membrane. Upon these data, I assumed *that the phenomena in question depended upon a disturbance of the relations which normally subsist between the blood and the lining membrane of the veins*, and that this was immediately due to an irritation or abnormal excitation of the latter, occasioned by the morbid matter circulating with the blood. In this sense, then, the term was intended to signify a state of excitation of the venous membrane in which the equilibrium is disturbed that naturally subsists between it and the blood, and it pointed to that general principle of design, harmony, or adaptation, in the animal economy, in virtue of which the different organs subserve their respective purposes, and respond to their appropriate stimuli. Thus we know that pure atmospheric air gives no uneasiness to the respiratory mucous mem-

brane, whilst impure air, or a drop of water, gives rise to violent irritation of it, and that certain kinds of food are grateful to the mucous membrane of the stomach and alimentary canal, whilst others excite irritation and disorder. So also it appeared to me it might be assumed, in regard to the circulatory organs, that a certain physical and vital condition of the blood was best calculated to ensure its easy transmission through the blood-vessels. Now, should these qualities, whether physical or vital, be greatly altered from their natural condition, it appeared to me reasonable to conclude that, just as irritation might be set up in the former case, leading to various forms of disorder, so, in regard to the latter, might irritation of the lining membrane of veins be excited without any visible change of structure, in virtue of which a disturbance would ensue in the relations which normally subsist between it and the blood. I knew at least of no other way in which the phenomena in question could be as satisfactorily accounted for, seeing that they were not dependent upon inflammation of the vein on the one hand, or upon changes exclusively confined to the blood on the other; and I further remarked that this opinion was strengthened by the fact that, in cases in which the irritation of the lining membrane of the vein had been slight, extensive coagula thus formed in veins have softened down and been removed, without leaving any trace of inflammation of the vessel behind.

Further reflection and observation have convinced me that the idea which was paramount in my mind when the foregoing lines were written was rightly founded, and that the interpretation of the facts which had been presented to me in a long course of experimental investigation was substantially correct; but I have since felt, and the opinions of others have confirmed me in the feeling, that the idea I intended to convey by the

term irritation, as applied to the state of the lining membrane of the veins in these cases, was liable to be misunderstood, and, consequently, to lead to an erroneous and confused interpretation of the meaning I had intended to convey in employing it. And yet the term was not hastily or unadvisedly used. It was used in strict accordance with the definition or signification assigned to it by Broussais, who defines irritation to be, "the condition of an organ, the excitation of which is carried to so high a degree, that the equilibrium resulting from the balance of all the functions is broken." Now, used in this sense, the term aptly expresses the idea I had conceived of the cause of the arrest and stagnation of unhealthy blood in the veins in these cases, rather than its onward propulsion, as in the case of healthy blood. Because it seemed to me that the arrest and stagnation directly resulted from this very disturbance of the harmony or equilibrium which, in health, subsists between healthy blood and healthy venous tissue. And as in other organs abnormal actions may be excited, under the influence of what is generally known or spoken of as irritation, inverting the due order or normal state of these functions, so it appeared to me that the same term might be employed to designate that inversion of the normal state of the venous circulation in which the blood is attracted and deposited within the veins, rather than, as in health, repelled and circulated. The truth is, however, that the term irritation has been used in so many senses, that it can scarcely be understood as having any; and I have accordingly endeavoured on the present occasion to discard it altogether, and, by substituting another, viz., *an altered state of the vitality of the lining membrane of the venous system*, to use an expression which, conveying the same meaning, is less liable to create confusion or misunderstanding.

Physiological Confirmation of Deductions as to the probable Nature and Cause of Obstructive Phlebitis. The views I would thus venture to advance, as explanatory of the cause of the arrest of the venous circulation in these cases, and the consecutive development of obstructive phlebitis, may be further strengthened by a reference to certain physiological considerations by which the circulation is maintained in health.

I have stated that the phenomena in question appeared to me to depend upon a disturbance of the normal relations which in health subsist between the blood and the venous tissue. Now this normal relation I conceive to be one of *vital repulsion* or polarity—in the words of Professor Oken, the blood is the fluid body, the body is the fixed, and the *antagonism* or polarity of these is a vital force—and whoever considers the vast extent of the vascular system through which the blood is distributed in the round of the circulation, and takes into consideration the physical resistance which must be opposed to it by its mere friction against the sides of the vessels through which it passes, and adds to this the mutual attraction that must exist between its molecular constituents and the sides of the vessels respectively, must admit that, without some counteracting or countervailing influence, the force of the heart and arteries would be inadequate to its due propulsion. Now this counteracting influence I take to be a species of repulsion, the direct consequence or effect of the vital force possessed by the vessels and the blood, and directly antagonistic to and destructive of those physical forces by which the blood would otherwise be retarded in its circulation, and attracted to and deposited upon the interior of these vessels.*

* The constituents of animal and vegetable tissues, says Liebig, have been formed under the control of a cause of change in form and

Whatever, therefore, impairs the vital power of the vessels, and exercised by them as an important agency in the circulation of the blood, to the same extent lessens the force of the circulation, and, by allowing the substitution or preponderance of physical over vital force, thereby favours the attraction and deposition of the blood upon the lining membrane of the veins rather than its repulsion and circulation.

And by a similarity of reasoning, it may be shown that it is upon the exercise of the same vital force that the molecular condition of the blood is preserved in that state best suited for its circulation. Its fluidity, so necessary, as Hunter has remarked, for its motion, distribution, and the easy separation of its parts, is clearly a property dependent upon its vitality; and in proportion as this is impaired, do we find, in the same degree, the physical forces of inanimate matter prevailing, particle uniting with particle by the force of molecular attraction, until at last, with the extinction of life, it becomes a dense, solid, coagulated mass.

Now, it may be shown that, in the results of all the experiments I have detailed, we see but an illustration of the truth of these views. When I exclude the blood from a portion of the venous system, and apply some irritating solution to its interior, the blood immediately coagulates on readmission, because I have thereby disturbed or impaired the vital condition of the venous tissue so treated, and have thus destroyed or impaired one of the forces by which the circulation is maintained—the vital force of repulsion is now superseded by the physical force of attraction, and thus the blood is attracted to, instead of being repelled from, the parietes of the

composition operating on the organism. This is the vital force which has *determined the direction of attraction, and which opposes cohesion, heat, electricity, etc.*, and annihilates their disturbing influence.

vessel; it is, in fact, deposited upon its interior, and there coagulates, instead of being repelled and circulated.

When, again, I throw into the circulation solutions of lactic acid, puriform fluids, or other devitalized matters, it cannot be doubted that I thereby impair or destroy the vital properties of the blood, and thus create a tendency to its coagulation in the same proportion as I have depressed or impaired its vitality. Mr. Henry Lee has found that the admixture of pus and other morbid animal secretions with the blood, hastens very remarkably its rate of coagulation, both within and without the vessels of the body; and I have found that the addition of apparently inert but devitalized fluids, such as healthy serum and pure water, equally accelerates its rate of coagulation; thus, whilst I found that the blood of the rabbit began to coagulate ordinarily in two minutes and a half, and was completed in five minutes and a half, I found that, when it was received into a vessel placed in warm water, containing a similar quantity of serum, it began to coagulate in less than half a minute, and that coagulation was completed in less than one minute; and that an ounce of rabbit's blood, received into a vessel containing half an ounce of water of the temperature of 110° , began to coagulate in one minute, whilst coagulation was general in two minutes. Now it cannot be doubted, I apprehend, that in these, and many similar instances which I could adduce, the accelerated rate of coagulation was directly due to the addition of devitalized matter to the blood, which, by abstracting from it the principle of vitality, upon which its fluidity depends, hastens its rate of coagulation in the same relative proportion.

Application of Physiological Deductions to the Explanation of the Nature and Cause of Venous Obstruction and Inflammation in various Cases. However theoretical these

considerations may appear, they have yet a direct and important bearing upon the ætiology of phlebitis in connection with that of phlegmasia dolens. Thus, it is a well-known fact, and one to which I fully adverted in the preceding lecture, that its origin in many cases is intimately connected with an enfeebled state of the vital powers. Before the appearance of any swelling, or any sense of pain in the limb about to be affected, women, says Denman, become very irritable, with a sense of great weakness, and grievously depressed in their spirits, complaining only of transient pains in the region of the uterus; and from these the approach of the disease has frequently been foretold. And it is a well-known fact, to which also I have adverted, that nothing so much favours its occurrence as great losses of blood, sustained either during or subsequently to labour. Now the reason of this will, I think, appear sufficiently evident, if we take into consideration that in these cases the vitality of the blood is not only lowered by the generally depressed state of the system, but that the depleted condition of the vessels consequent upon excessive hæmorrhage must, as shown by the experiments of Magendie, favour the rapid absorption of extraneous fluids into them, which, being extravascular, must be, therefore, to a certain extent devitalized, and as such must additionally lower the vitality of the blood, and so favour its arrest and coagulation in the veins rather than its onward propulsion and circulation.

Another series of cases bearing upon the vital condition of the blood in relation to the causation of phlebitis and phlegmasia dolens, are those connected with an abnormal excess of fibrine. Now, it is notorious that in rheumatism and puerperal fever this abnormity exists; for in both it has been experimentally found that the fibrinous constituent is in considerable excess, and in no others is phlegmasia dolens so

liable to supervene. Now, consistently with the views I have advanced, it may be contended that the tendency to the deposition of fibrine in the veins in these cases must, *cæteris paribus*, be in the inverse ratio of the amount of vital power possessed by the blood and its vessels. That is to say, assuming that the normal fluidity of the blood is maintained by the exercise of the vital force, and ceases with its impairment and extinction, we can understand how a defect of vital power, whether consequent upon constitutional causes or great losses of blood, may equally favour the deposition of fibrine in the veins, and ultimately the phenomena of obstructive phlebitis. Two types of the disease present themselves as connected with this point, the one being of a sthenic, the other of an asthenic character. In the former, it may be assumed that the amount of fibrine circulating is in excess of the ordinary or normal vital force necessary to maintain its fluidity; in the other that, the amount of fibrine not being in excess, the vital force is yet unduly depressed, and thus inadequate to maintain the fluidity of a normal amount of fibrine. In either case, however, the effect arises from *a discrepancy between the fibrinous constituent and the vital force of the blood*; and in either the same consequence ensues, viz., a deposition of the fibrine, and a consecutive obstruction and inflammation of these vessels.

Consecutive Phenomena of Venous Obstruction and Inflammation. I have thus endeavoured to show that it is in an abnormal condition of the blood, or *in a discrepancy between the physical and vital forces engaged in the circulation*, that we are essentially to look for the first steps in the pathological series which ultimately issue in phlebitis; and the following may be regarded as the consecutive phenomena, so far as I have been able to trace them. The blood having been, first, retarded in its current, and secondly,

coagulated in the interior of the veins by the formation of successive layers of fibrinous deposit, commencing upon the lining membrane, and thence proceeding inwards, the vein becomes obstructed and distended, constituting the first stage of obstructive phlebitis. Shortly after this follow swelling, thickening, opacity and infiltration of the venous coats, with effusion of lymph or serum into the surrounding cellular tissue, and abnormal vascularity. This vascularity is first observed upon the exterior of the vessel, the lining membrane being as yet smooth and free from any, and no otherwise diseased than in being here and there spotted or reddened from the imbibition of the colouring matter of the blood. By degrees the coagulum by which the vein is obstructed becomes paler and paler, and assumes greater firmness and consistency; its outer layer now becomes intimately connected with the lining membrane of the vein, which, on examination, presents a roughened appearance from the deposition of fibrine upon it: and if the plastic or vital force of the constitution be equal to it, the whole coagulum may become organised, and the vein permanently occluded, thus giving rise to the second, or complete stage of what is known as obstructive or adhesive phlebitis. On the other hand, should the vital or plastic force be low, the organisation of the coagulum will not take place, and the consequent phenomena of obstructive phlebitis will not be completed; but the blood thus stagnant in the vein, being thrown out of the circulation, soon loses its vitality, and the changes to which dead blood is liable begin, therefore, to take place in it. The fibrine becomes disintegrated and softened down into a puriform pultaceous-looking fluid, formerly regarded as pus, but for the most part possessing none of the cellular or microscopical characters of true pus: whilst the semi-organised layers of fibrine in contact with the interior of the vein have been

erroneously regarded as evidences of the exudation of lymph and formation of false membranes. In proportion as the vital power is low, and septic influences prevail, does this disintegration or liquefaction of the fibrine more or less rapidly proceed ; and in the same proportion does it, in passing into the circulation, infect the blood, and give rise to the various constitutional symptoms and disorders which are commonly known as constituting pyæmia, just as the condition of the vein, when examined in this stage, presents all the phenomena of what is commonly known as pyæmic or suppurative phlebitis.

Confirmatory Evidence. Now if the phenomena I have thus indicated as occurring in the origin and progress of venous inflammation, be compared with what has been observed in regard to the origin and progress of ordinary, or, as it may be here called, in contradistinction, capillary inflammation, it will, I think, be admitted that they are strictly analogous, if not altogether identical. Thus we have seen, in tracing the successive steps of venous inflammation, that it commences with an arrest and stagnation of blood in the veins. The second stage consists in an union of the molecular constituents of the blood, and their deposition upon the lining membrane of the veins ; the third in the gradual but complete obstruction of these vessels ; and the fourth in the consecutive effusion of lymph and serum into the surrounding cellular tissue. Now, equally in regard to the phenomena of capillary inflammation, it was observed by Kaltenbrunner, that the first stage consisted in a retarded or impeded state of the circulation in the capillaries. In the second it was observed, that the molecular constituents of the blood united into small masses, and adhered to the sides of the vessels : in the third, that a general stagnation of blood thence ensued, leading to a complete obstruction of the capillaries : whilst, in the fourth, that alterations in the

capillary coats, and effusion of lymph, etc., into the surrounding cellular interstices took place.

And if we carry the parallel further between the phenomena of capillary and of venous inflammation as I have now sketched it, we may recognise a strong similarity, if not a perfect identity, between their respective causes and modes of origin. For, whilst we have traced the origin of phlebitis, in the great majority of instances, to an altered condition of the vitality of the lining membrane of the veins on the one hand, and an abnormal condition of the blood on the other, do we not see that it is essentially to the same conditions we may trace the origin of capillary inflammation in the great majority of cases? Thus, in the various injuries inflicted upon the capillaries of frogs in the prosecution of microscopical observations, as well as in the various forms of injury from mechanical violence received into the surgical wards of hospitals, do we not observe but the operation of causes all tending to one given effect, viz., the injury or impairment of the vital power of the vessels of the injured parts? whilst, in the operation of all septic agencies, abnormal diathetic conditions, febrile movements, and constitutional disorders, do we not equally recognise the presence of a widely spread and dissimilar class of causes, having all a common tendency to a common consequence, viz., a disordered or abnormal condition of the blood? And just as it happens that in the one case we see extensive tracts of the capillary system obstructed and inflamed from constitutional causes alone, without any direct injury or violence being applied to them, so do we see, in the other, extensive tracts of the venous system obstructed and inflamed from constitutional causes alone, irrespective of any direct injury of these vessels, or of the direct insertion of any vitiating matter into them calculated to excite it.

But we may yet carry the parallel a step further, and show that the same general laws which govern the selection of particular tracts of the capillary system for the seat of inflammation from systemic causes, equally govern the selection of particular portions of the venous system in regard to inflammation under the same circumstances. For, just as we know that previous injury, relative weakness, or antecedent disease, renders particular organs throughout life predisposed to inflammatory action from constitutional causes, so in the case of the veins, it is the fact that it is those portions of the venous system which are relatively weak, or have sustained antecedent injury or disease, that are the most predisposed to inflammation in connection with the same causes. Thus it may be said that the utero-placental veins are predisposed to it by being torn across in the removal of the placenta ; that the crural veins of parturient women are generally predisposed by the actions of pregnancy and the pressure of the gravid uterus ; and that any vein surgically or otherwise wounded or injured, becomes thereby predisposed to inflammation. One other circumstance only need be referred to, which is the influence of cold partially applied to the body in predisposing veins to morbid action. This is true generally in regard to the capillaries, and experience teaches that it is equally so in regard to the veins.

General Application of the foregoing Inquiry. And now, gentlemen, in conclusion, let me briefly recapitulate what appears to be the great practical lesson or corollary to be drawn from the whole of the investigation I have laid before you. It appears to me to be plain and unmistakeable, and to define clearly the true relations of phlebitis to the phenomena of phlegmasia dolens. We learn from one series of observations detailed, that phlebitis may be produced and occur in a local or isolated form as the result of a local cause, as shown

in the instance in which the crural veins were inflamed from the femoral to the cava by the application of a chemical irritant; and here all the genuine phenomena of phlebitis were produced, but none of the phenomena of phlegmasia dolens. But in another series of cases we find that phlebitis may be produced, and equally extensively, by vitiating the general mass of the blood; and here, in addition to phlebitis, we have superadded all the phenomena of phlegmasia dolens. The conclusion, therefore, that appears to me to be inevitable is, that phlebitis occurring as a local disease, and from the operation of a local cause, is never associated with the phenomena of phlegmasia dolens, nor under any circumstances can give rise to it; but that, when it arises from, or in connection with, constitutional causes, or from local causes calculated simultaneously to infect the blood generally, then that the lesion of the veins is very generally accompanied with the symptoms of phlegmasia dolens. The effective cause, therefore, of the phlebitis, as of the crural affection, is the constitutional condition out of which both have arisen; and phlebitis stands in no other relation to the ætiology of the disease than in that of intensifying the local actions going on in the affected extremity, by concentrating upon it the general or diathetic conditions which may have given rise to it. Thus regarded, however, phlebitis plays a prominent, although subordinate, part in the phenomena of the disease. It intensifies the morbid actions going on in the affected limb, but at the same time it does not create them; it is strictly a secondary effect, and, like the other lesions of the extremity, is a common consequence of the same constitutional or morbid causes which may be in operation, and upon which they both mutually depend.

Conclusion. It thus appears to me that the conclusions deducible from physiological research essentially harmonise

with those drawn from clinical experience, and so far—inasmuch as they mutually affirm and support each other, and point to the blood-origin of the disease—they furnish a strong argument in favour of the correctness of the views I have ventured to submit to you in relation to its nature and pathology. It now, therefore, only remains for me to show how far a recognition of these views tends to more enlarged and correct principles of treatment ; and this, the last and most important topic to be considered, I propose to take up and elucidate in the ensuing and final Lecture.

LECTURE III.

APPLICATION OF PATHOLOGICAL AND PHYSIOLOGICAL INFERENCES TO THE PREVENTION AND CURE OF PHLEGMASIA DOLENS.

Delivered December 2nd, 1861.

MR. PRESIDENT, AND GENTLEMEN,—I proceed, in the last place, to the practical application of the views unfolded in the preceding lectures to the prevention and cure of phlegmasia dolens. I have endeavoured to show, in what has preceded, that, whether we look to the broad evidence of clinical experience, or to the more precise evidence of physiological research, we are equally led to recognise the important fact, that the essence of the disease consists, not in any particular local lesion, whether phlebitis or otherwise, but in an assemblage of local lesions attended with constitutional disorder of varying types and tendencies, having a common origin in an abnormal or vitiated condition of the blood, and that the causes of this abnormality are of a very widely spread and dissimilar character. So extensive, indeed, is the range of morbid actions conducive to the disease, that I venture to repeat, that there is scarcely a febrile movement capable of being inaugurated in the economy which may not, under certain circumstances, give rise to it. The first great practical lesson, therefore, to be learnt from the foregoing investigations, is the importance of studying the disease in connection with all those forms and types of febrile disturbance which are liable to occur during the puerperal

state, and to give rise to it. "*Obsta principiis*" should be the guiding maxim of the obstetrician in these cases ; and I merely inculcate a dogma in harmony with the most recent advances in scientific medicine, and to which it is daily more and more tending, in affirming that the great principle to be kept in view should be *prevention*. Now this is to be effected in the present case by the prevention or cure of those febrile movements which precede and give rise to the attack ; and this, therefore, will constitute the first subject for consideration in the present Lecture.

But, before entering upon this question, let me briefly direct your attention to those particular circumstances of the puerperal state which so greatly predispose the puerperal female to phlegmasia dolens as compared with the non-puerperal female and the male. Why is it, it may be asked, that this greater proclivity to the disease should exist during the puerperal state ? Now the answer, I apprehend, cannot be doubtful, if we look to the tenor of the foregoing investigations ; for it may with truth be asserted, that it is in the direct relation and intimate connection between the maternal organs and their functions, and the great pelvic veins and the general circulation, that the explanation is to be found. Abstract from the puerperal female all that relates to the condition of the uterine system consequent upon parturition, calculated to affect injuriously the blood, and obstruct the pelvic veins, and you reduce her proclivity to the disease to the same average ratio as that of the non-puerperal female ; and abstract from the latter all the functional conditions peculiar to her sexual system in relation to the same conditions, and her proclivity to the disease will be found to exceed but little that of the male. The fact is, that in each of these cases we observe the liability to the disease to be in the direct ratio of the existence of cer-

tain pelvic influences, calculated to vitiate the blood on the one hand, and to obstruct the pelvic veins on the other. Now, during the puerperal state, these conditions are most rife, and attain their maximum force and intensity. I need only refer, for instance, to the increased development of the vascular system of the uterus—to the various uterine discharges which follow upon labour, and their close proximity to the pelvic veins—and to the disintegration or degeneration of uterine tissue connected with the involution of the uterus. Now all these conditions, apart from others of a constitutional character, may, under certain circumstances, furnish morbid matters calculated simultaneously to vitiate the blood, and obstruct the venous channels through which they are transmitted into the circulation, and so give rise to the phenomena of the disease. Again, in the non-puerperal female, as compared with the male, we observe the existence of various secretory functions connected with the uterine system, whose suppression or derangement is calculated to affect injuriously the blood, and simultaneously obstruct the pelvic veins through which they enter the circulation. In the male, on the other hand, the liability to the disease is dependent chiefly upon the operation of constitutional, rather than of local causes, to which, together with malignant disease of the pelvis, the two sexes are nearly equally prone; and, so far as the influence of these causes extends, it will be found that the liability to the disease observes a nearly equal proportion in the two sexes.

I. PREVENTIVE TREATMENT OF PHLEGMASIA DOLENS.

Proceeding, then, to the consideration of the chief causes which, during the puerperal period, give rise to those forms of febrile disturbance, in connection with which phlegmasia dolens

is liable to supervene, I may remark that they are referable to two great groups, or classes :

1st. *Various irritations of the solids tending to inflammatory disease.*

2nd. *Various vitiations of the fluids tending to febrile disease.*

In other words, local irritations of various kinds, giving rise to the phenomena of symptomatic fever, and various morbid conditions of the blood, giving rise to the phenomena of idiopathic fever. I proceed, in the first place, to treat of the former.

(a) Irritations of the Solids tending to Inflammatory Disease.

Now, in connection with the irritative disorders of the puerperal state, it is necessary to bear in mind that the general condition of the puerperal, as of the pregnant female, is one of increased or preternatural irritability. During the period of pregnancy this condition is manifested in a variety of ways, both in regard to mental and bodily feeling, and it is continued and maintained throughout the greater part of the puerperal state. Hence the nervous system is peculiarly susceptible and impressible ; and hence causes of irritation, which might otherwise be harmless, frequently become now the effective cause of many serious disorders. Nor is the operation of these influences restricted solely to the production of bodily ailments ; for the mind, participating in the general state of the system, is often morbidly irritable and unsettled, and maniacal aberration, consequent upon either exhaustion, impoverished blood, or bodily irritation, is not unfrequently lighted up. Undoubtedly, therefore, the great rule of practice for the prevention of disease during the puerperal state should be to tranquillise the nervous system on the one hand, and to invigorate it on

the other ; whilst, simultaneously, we should endeavour to mitigate or avert those bodily irritations which are liable to supervene upon labour, and which, neglected or overlooked, react so injuriously upon the system.

The means by which the former purpose is to be effected should be mainly hygienic, and but subordinately medicinal. By perfect repose, and the avoidance of all mental and bodily stimuli, the general tranquillity of the system may be adequately maintained ; whilst, by a diet easy of assimilation, but as invigorating as can be borne, the tone of the system may be adequately supported. Now, in this respect, it has appeared to me, that the usual dietary after labour is scarcely suited to the latter purpose ; for, whilst solid animal food and fermented drinks are obviously inadmissible, it equally appears to me that a strict adherence to a diet of tea, gruel, and farinaceous food for the first three or four days after labour, inadequately supports the tone and vigour of the system, and enables it to sustain those important actions which are incidental to that period. It has, therefore, been my practice for many years to direct strong beef-tea to be prepared as a leading article of diet, and to be given daily to the patient in quantities regulated by the requirements of her case ; whilst good milk, diluted with an equal quantity of barley-water, taken as an ordinary drink, forms an useful auxiliary, and powerfully promotes the lacteal secretion. Without, however, venturing to prescribe the exact formula, I would repeat my conviction, that such a dietary as I have suggested will be found better calculated to insure the patient a favourable convalescence, and exemption from febrile disorder, than one exclusively watery and farinaceous, and more especially during those periods or seasons when epidemic or endemic influences are rife.

The second indication pointed out is the alleviation or re-

moval of any local irritation which may supervene upon labour, and otherwise create a tendency to symptomatic fever. These irritations may be regarded under two heads; first, the more proximate in regard to labour; and secondly, the more ultimate or distant. The former comprise more particularly irritations connected with after-pains, with urinary retention, and with an overloaded or neglected condition of the bowels. The latter are those connected with the establishment of the lacteal secretion; those arising from gastro-intestinal disorder from imprudence in diet; those dependent upon spinal irritation; and, lastly, those identified with inflammatory irritations of the uterine system arising from the operation of the more common causes of disease, such as exposure to cold, or mechanical injury sustained in the progress of difficult or instrumental deliveries.

I feel that some apology may be necessary for introducing to the notice of the Society such common-place, and, it may be said, casual occurrences as after-pains, urinary retention, and neglected bowels, as sources of grave disease. But, beyond observing that I have seen them tend to severe and unexpected consequences, I would remark, that my object in doing so is to pass in rapid review the various incidents of the puerperal state which, if neglected or overlooked, might conduce to febrile disturbance, out of which phlegmasia dolens might possibly supervene; and, in this point of view, I feel that I have the fullest justification for the course I am pursuing. Dr. Meigs, whose reputation as an obstetrician is very great, has pointed out, and expressed his conviction, that the study of after-pains in relation to puerperal pathology has been greatly neglected; and he expresses the opinion, that our knowledge respecting them is well worthy of a careful supervision. I have known a neglected retention of urine give rise to grave

febrile disturbance; and I shall presently place before you the particulars of a case, in which an overloaded state of the bowels, from neglect before labour, led to a train of alarming symptoms, and a distinct threatening of the disease under consideration. Let me premise that my object is not so much to dictate formulæ of treatment, as to concentrate in the smallest space the general considerations which should regulate our practice in the prevention of the disease, and only cursorily to subjoin such suggestions as experience has led me to regard as expedient and useful.

Irritations connected with After-pains. Reverting to the observations of Dr. Meigs as undoubtedly those of a thoughtful and experienced practitioner, I would repeat that he views after-pains in a much more serious light than we are generally accustomed to do. He doubts whether we can always discriminate between mere after-pains and others of a grave nature; and even in the case of the former, he expresses his conviction that they not unfrequently light up fever in the system, as a reaction against the local suffering or disorder. It may, then, be a proper question to consider, how they may be best alleviated or prevented; and I believe that much may be done in the way of their prevention, and that something, although less, may be done in the way of their cure. Now their prevention, I conceive, is very much to be effected by retarding rather than accelerating the birth of the child, and the subsequent delivery of the placenta. I have always found that, in proportion as the birth of the former and the removal of the latter are accelerated, is the liability to after-pains increased; and therefore it should be a rule, as much as possible, to leave the delivery to uterine action alone—sustaining and promoting that action, when necessary, by pressure and friction—but avoiding, as far as possible, manual extraction. The same rule should be ap-

plied to the delivery of the after-birth, and, on its removal, any coagula which may be left in the uterine orifice should be carefully swept out by the examining finger. The uterus is thus left in a better state for its healthy and gradual contraction, and a better impetus is thus given to its consecutive and final involution. As curative treatment, in the event of after-pains being severe, the contraction of the uterus may be further promoted by occasional doses of the infusion of ergot, combined with a little chloric ether, morphia, camphor, or henbane, rather than opium, which, from its constipating effect upon the bowels, and disordering effect upon the stomach and brain, should be given as sparingly as possible in these cases. Above all things, I would insist very strongly upon the early administration of a purgative with the view of emptying the lower bowel, and thus removing what is often a superadded and aggravating cause of irritation and pain.

Irritations connected with Urinary Distension. I will only venture, in connection with this subject, to repeat that I have known this a source of severe febrile disturbance, and to suggest that the possibility of the existence of such a cause of local irritation should never be overlooked.

Irritations connected with an Overloaded or Neglected Condition of the Bowels. The irritations connected with this cause constitute, I believe, one of the most fruitful sources of trouble in the first days of the puerperium ; and, so strongly am I impressed with this view, that, for many years past, I have adopted a practice directly at variance with that which I believe is generally prevalent in this country—and which consists in allowing the bowels to remain for two or three days in a state of quietude or repletion—by directing a full laxative dose of castor oil to be given as soon after delivery as the patient can conveniently take it. I am aware that the opposite practice is

defended upon the ground that it is necessary, in order to avert the dangerous consequences of a too early irritation of the alimentary canal by purgatives. But it may be replied that the practice I have pursued, and strongly recommend, implies neither irritation of the alimentary canal on the one hand, nor purging, in the strict sense of the word, on the other ; but merely the early evacuation of the faecal contents of the bowels, which, being out of the course of the circulation, are in a manner already extraneous to the body, and, as such, are liable to various physical and chemical changes detrimental to the health of the patient. An aperient given with this view, and subserving no other than this purpose, so far from weakening or irritating, directly, gives strength and averts irritation ; and the motive for this practice is founded upon the fact that, however carefully attended to, there is an unavoidable tendency to faecal accumulation during the latter weeks of pregnancy ; and this, however harmless during the active state of gestation, when the nerve-sympathies are centred in the uterine system, may yet, with the termination of this period, become a fertile source of various forms of irritative and febrile disorder. Hence it happens, that the after-pains are often aggravated, the lochial discharge interrupted, the appetite impaired, the sleep disturbed, the patient rendered irritable, and a general susceptibility to febrile disturbance is engendered. Of course these tendencies will vary in different persons, according to their customary habits and the strength of their nerves ; but, in the case of delicate females, of those resident in large towns, and more especially of the votaries of fashion, I have no hesitation in asserting that these faecal accumulations to which pregnancy gives rise are, in many instances, productive of troublesome and unexpected symptoms ; whilst, on the other hand, their removal at the earliest period after labour will both avert

those consequences, and render the general convalescence more favourable ;—that is to say, the course of the lochial discharge will be more normal, the tendency to after-pains lessened, the accession of the milk more easy, the sleep sounder, and the appetite better. I cannot, of course, adduce cases in illustration of every position laid down ; but the following may be quoted as showing the occasional dangers arising from a neglected condition of the bowels previously to labour.

CASE. Lady B. was visited by me about a week before her expected confinement, which took place on the evening of the 8th September. She was then suffering from a very disordered state of her stomach and digestive organs, and her bowels had for some time been in a very constipated state ; the tongue was thickly coated, her appetite was bad and extremely capricious, and she suffered a good deal from flatus and abdominal distension. I urged her to take some aperient medicine, but she was unwilling to do so, on the ground that her tongue was habitually a bad one ; that her stomach was always irritable, and that it was inconsistent with the practice of homœopathy, of which she was a disciple, to take purgatives. The presentation was natural, and the labour, though at first complicated with a good deal of sickness and stomachic disorder, progressed and ended favourably. Nevertheless the tongue was dry, furred at the edges, and red in the centre, and her general state indicated much gastro-intestinal disorder. She declined to take any aperient medicine, and throughout the day felt faint and languid. The next morning she thought herself better, but her tongue was still coated, her abdomen was tumid, and she had a great disinclination for food. The following morning I found she had passed a restless night, and the tongue was still dry, red, and furred, the abdomen tumid, and the appetite bad. She refused to take castor oil, and I

therefore ordered her a rhubarb mixture. At nine p.m. she had taken three doses of it, but the bowels had not acted. Her head was now hot and throbbing, and she felt as though it would burst; her mouth was parched, and she felt numbness in her hands; the pulse was full and quick, and she had other symptoms of febrile disturbance. I was anxious to get the bowels relieved, and proposed an enema, to which she objected; but, before I left, a dark bilious evacuation passed, and she then reported herself as feeling better, in fact quite a different person. I left with a strong injunction that she should continue the use of the aperient mixture until further relief should be obtained. The next morning, though somewhat better, she had passed a bad night, and she had been restless and slept but little. The bowels had not again acted, although she had taken two additional doses of the aperient mixture. Towards evening, however, two evacuations took place, both offensive and bilious, and she afterwards expressed herself as feeling better, and inclined for sleep. The next morning her symptoms were very unfavourable; she had slept badly, and had evidently been very restless and uncomfortable; the tongue was dry, furred, and red in the centre, and she had acute pains in the left iliac region; her pulse was quick, and she was generally feverish. The bowels had acted twice during the night, but the stools were very offensive. In the course of the day, I found her suffering from much pain, which occupied the right iliac region, and darted through to the hip. These parts were very tender, and the pain she suffered was so great that she was in tears; the tongue was still dry and furred, and the abdomen distended. Two drachms of laudanum were rubbed into the affected part, and a large bran poultice was subsequently applied;—with these external applications, five grains of grey powder and Dover's powder were prescribed.

Four hours subsequently the pain was relieved, but she had not slept, and complained of fulness and tension in her head, had throbbing of the temples, dryness of her mouth, and constriction of her throat; later in the day her head was very uneasy, her tongue was dry, she had a tendency to delirium, and she complained of being faint and hot. She still declined taking any active aperient, and the only remedies prescribed were mild mercurials with James's powder. The next morning she was better; she had slept comfortably, and had no return of pain or headache, and, for the first time, she took a little light food with enjoyment;—the same plan of treatment was continued. On the following day her symptoms were less favourable; she had passed a restless night, was feverish, and suffered much from headache. The bowels had acted freely once, and the tongue, although cleaning, was still coated. She still objected to any active aperient medicine, and therefore, with the view of promoting a healthier state of the digestive organs, some dilute phosphoric acid with tincture of bark was prescribed. The next day she was generally better, and had slept better; but the tongue was still furred, and the digestive organs were far from being in a healthy state. Her symptoms continued stationary until the second day from the last report, when she had acute pain in the iliac region, and, at three the next morning, I was suddenly called to her on account of the accession of severe and agonising pain in the iliac and hypogastric regions; the tongue was now dry, and the pulse quick; no apparent cause could be given for these symptoms, but she was evidently highly nervous and excitable; a large mustard poultice had been applied over the seat of pain, and this was followed by an opiate and a warm epithem. Her symptoms continued to fluctuate throughout the day, but towards evening, as the abdomen

was generally tumid, I prevailed upon her for the first time to take a full and effective dose of castor oil. The result was both extraordinary and satisfactory ; it acted three times, and the nurse reported that more than half a chamber-vessel of scybalous matter had been voided. From this time all her symptoms subsided ; and, in about a month from the date of her confinement, she left London for Brighton, perfectly recovered.

The preceding narrative is somewhat longer than I could wish ; but it is greatly curtailed from my original notes, and so fully supports the views I have expressed, and the practice I have recommended, that I trust no apology is necessary for introducing it to your notice.

Irritations of the Mammary Glands consequent upon the Accession of the Milk. There are five sources from which febrile or inflammatory irritation may arise in connection with these organs after labour. 1. An imperfectly developed nipple. 2. Excoriated nipples. 3. Abnormal distension of the lactiferous ducts. 4. Consecutive distension of the capillaries, leading to inflammation and suppuration of the gland. 5. General distension of the mammæ, in cases where the mother does not nurse her child.

Of the first of these sources of irritation it is only necessary to observe, that if the nipples in the case supposed have been neglected before labour, and are manifestly insufficiently developed after labour to admit of the child's suckling, it is far better to suspend the function altogether, than to persist in endeavours which must ultimately prove abortive, and possibly a cause of much suffering and disturbance to the mother. In the second case I would observe, that where the excoriation of the nipples has been slight, I have found the continued application of lint, moistened with cold water and

covered with oil silk, the most soothing and healing epithem ; whilst, in severer cases of excoriation, I have seen more benefit result from the application of a solution of tannic acid in glycerine, in the proportion of a scruple of the former to a drachm of the latter, than from any other application. With regard to abnormal repletion or distension of the lactiferous ducts, and consecutive distension and inflammation of the capillaries of the gland, it is obvious that their prevention and cure must consist in the early and regular application of the child to the breast,—thus preventing the morbid distension which might otherwise ensue. Milk-fever and mammary inflammation may be assumed to depend primarily upon a preternatural distension and obstruction of the lactiferous vessels, just as ordinary inflammation may be assumed to depend primarily upon a preternatural distension and obstruction of the capillaries. And the sympathy between these vessels respectively in regard to the mammary glands is such, that any abnormal distension of the former is very liable to be followed by a corresponding distension of the latter. The evident key, therefore, to the prevention of milk-fever and mammary abscess, is to be found in the early and regular application of the child to the breasts, to which may be added a restricted diet, especially in regard to liquids, and the occasional exhibition of a saline aperient. With regard to the last point of difficulty raised, viz., those cases in which the mother does not nurse her child, repeated observation has convinced me that the less is done to the breasts in the way of what is called dispersing the milk, the better. I have seen much harm result from it, and am persuaded that it is best to do nothing more than to foment the breasts, if painful, and gently rub them with sweet oil if indurated or tense. The diet should of course be restricted in these cases, and a daily saline purgative given until the distension of the breasts has subsided.

Irritations connected with Gastro-intestinal Disorder. The irritations to be spoken of under this head are distinct from those already alluded to as resulting from a neglected condition of the bowels during the latter period of pregnancy and the first days after labour. These are, indeed, less connected with a loaded state of the bowels than with irritative disturbance of the stomach and digestive organs generally, consequent upon various incidental errors or indiscretions of diet. Their accession is, therefore, not limited to any particular period of the puerperium, but is indefinitely extended throughout its entire course; and hence no more important rule can be enforced, than the necessity of guarding sedulously against them. I have adverted to the fact that the general state of the female after delivery is one of undue or preternatural irritability, and this condition, which applies to the system generally, applies more particularly to the state of the alimentary mucous surface. Hence, various causes of irritation, and even many articles of food, which, under ordinary circumstances, would be easily assimilated, will frequently produce now, not only severe gastro-enteric derangement, but consecutively nervous and febrile disorder of an alarming nature. In tracing out the ætiology of phlegmasia dolens, we found that it was often a direct consequence of the febrile disorders which arise from gastro-enteric derangement, and the following case may be quoted as showing the sequence of morbid actions which may lead to this result.

CASE. A lady of extremely nervous temperament had been safely delivered of a still-born child at the eighth month, having previously been largely depleted on account of a severe attack of puerperal convulsions. She did well until the seventh day after her confinement, when, at two p.m., she had dinner, which consisted of fish, bread, and vegetables, together with

some rich sauce. This she appeared to enjoy very much, and it was afterwards ascertained that she partook of it very largely. Soon afterwards she felt faint and sick, complained of intense headache, and became very nervous and excitable, so much so, that the slightest noise occasioned her great alarm. After a time she had uneasy sensations in the pelvic region, in the right hip and back, and these soon extended down the whole of the right extremity. Unfortunately, the cause of these symptoms was not at first recognised, and the proper remedies were consequently withheld. Soothing, rather than evacuating measures were employed, but no adequate relief was obtained from them. On the other hand, the nervous symptoms increased, the pelvic and abdominal organs became greatly disturbed, the pulse quick, the tongue dry and brown, and there was occasionally a disposition to delirium. Further advice was sought for, and the soothing plan was still recommended, on the ground that the symptoms depended mainly upon weakness and nervous irritability consequent upon the previous loss of blood. At the end of forty-eight hours the state of the patient had but little improved, and threatenings of the formation of a pelvic abscess were now perceived. The whole of the chylopoietic and pelvic viscera were greatly disordered, the abdomen was tense, painful, and tumid, and the patient often delirious. After a time, throughout which there was much pain in the right hip, the superficial veins about the groin began to enlarge, the corresponding extremity to swell, and the general symptoms of phlegmasia dolens to develop themselves, and these subsequently appeared in a much severer form in the opposite extremity. The usual treatment applicable to these cases was employed, and the patient made a slow but satisfactory recovery.

Seeing, then, how fraught with dangerous consequences these

irritations are, it becomes of the utmost importance to recognise them quickly, and to relieve them promptly ; and I believe that the diagnosis is best made from a consideration of the following circumstances : 1st, the sudden and unexpected accession of the symptoms ; 2dly, the occurrence of a severe rigor, followed by much febrile commotion ; 3dly, the occurrence of symptoms coincidently of severe cerebral irritation or oppression, with those of abdominal disorder—such, in regard to the former, as acute lancinating headache, great intolerance of light and sound, great nervous irritability, and an occasional tendency to delirium—and in regard to the latter, sickness, pain, tenderness, and tumidity of the abdomen, with other symptoms of gastro-intestinal disorder. Whenever, then, this assemblage of symptoms present themselves, either suddenly or unexpectedly, in the course of the puerperal state, a rigid inquiry should be made into the diet of the patient, and, should any evidence be obtained of either excess or irregularity, the case should be regarded as one of gastric or intestinal disorder, and I believe that the following plan of treatment will be found the most efficacious. 1st. The most complete evacuation of the contents of the alimentary canal, both by a brisk emetic and effectual purgative, assisted by copious warm water enemata. 2dly. The relief of secondary, or consecutive symptoms ;—as regards the head, by the application of leeches, cupping, cold lotions, or even blisters, to relieve cerebral oppression, with mild sedatives or calmatives, perfect repose and tranquillity to relieve nervous irritation ;—and, as regards the abdominal organs, warm epithems or poultices, with or without opiates, or soothing frictions to relieve abdominal pain and tenderness ; with, lastly, the strictest adherence to the most mild and nutritive food.

Irritations connected with the Spinal Ganglia and Nerves.

Passing from the subject of gastro-enteric irritations which operate more especially through the medium of the ganglionic nervous system in the causation of febrile and inflammatory disorder, I proceed to consider a kindred form of irritation, viz., irritations of the ganglionic centres of the spinal cord, which operate more immediately through the medium of the cerebro-spinal system in the causation of similar morbid phenomena. In other words, to irritation of the cerebro-spinal axis immediately derived from mental or sensorial impressions, and affecting the system injuriously through the medium of the cerebro-spinal system of nerves. For, just as it is true that the morbid phenomena I have just spoken of may be regarded as the reflex consequences of irritations applied to the gastro-enteric mucous membrane, and productive of febrile and constitutional derangement through the agency of the ganglionic system of nerves, so is it true that the morbid phenomena I am now to speak of, may be regarded as the reflex consequences of cerebral or sensorial irritations operating through the agency of the cerebro-spinal axis. And, if I might judge from my own observations, I should be led to conclude that there is no more prolific source of febrile and nervous excitement, incidental to the puerperal state, especially in regard to sensitive and nervous females. Here, however, the primary cause of irritation is mental, and not physical—sensorial, and not organic; and accordingly, in the investigation of these cases, we are at once led to the inquiry, how far the phenomena in question have originated or been preceded by mental or emotional influences; for, in proportion as we arrive at affirmative data on these points, may we infer that the morbid phenomena are of an irritative character, and have their origin in irritative disturbance of some part of the cerebro-spinal axis. I have had occasion to advert, in speaking of the general irrita-

bility of the nervous system in pregnant and puerperal women, to the great extent to which the mind and the sensorium generally participate in this condition ; and hence, not only is there an inordinate amount of irritability manifested in the mental and sensorial condition, but, in certain cases, this preternatural irritability operates in a secondary and more serious manner in the causation of bodily derangement, by the intermediate production of an irritable state of the spinal cord or its ganglionic centres, to which many forms of bodily suffering may be traced. The nature and character of these consecutive derangements will vary, from mere local irritation simulating inflammation, to the most general state of nervous irritation simulating fever ; and I have more than once seen the most experienced obstetricians deceived and misled by their resemblance, as in the following instance.

CASE. Mrs. R. B., a lady of extremely nervous temperament, was attended by me in her second confinement on December 12, 1841. The labour was comparatively short and easy, and no unfavourable circumstance occurred until the 18th. She then began to suffer from nervous symptoms, which were followed by gastric and febrile derangement ; subsequently pain occurred in the uterine region, but rather recurrent than persistent, and increased by pressure. An eminent obstetric physician, who was called in, attributed these symptoms to a mild attack of puerperal fever, and considered that there was congestion of the left ovarian ligament. Leeches, mild mercurials, and Dover's powder were prescribed, and upon this treatment she apparently improved ; but she continued irritable and feverish, and, within a week, there was a sudden return of all the uterine symptoms. The pulse now rose ; there was much constitutional disturbance ; and the abdominal pain was very acute, and increased by pres-

sure. This sudden return of these symptoms suggested a doubt in my mind as to their inflammatory nature, and this was confirmed by the result of inquiries. It appeared that she had sustained a severe mental shock during her pregnancy, from the death of a relative, and the return of her symptoms had been occasioned by her nurse falling with her child. The spinal column was examined, and found extremely tender over the lumbar region. Counter-irritation was recommended, with mild tonics and a nutritive diet, and her symptoms rapidly subsided in the most favourable manner.

In the diagnosis of these cases, we must rely ; 1st. In a great measure, as in the preceding, upon the sudden and unexpected character of the attack. 2dly. Upon the intermittent or recurrent character of the symptoms, rather than their persistency. 3dly. Upon the preponderance or excess of nervous excitation over inflammatory action. 4thly. Upon the general discrepancy between the character of the symptoms manifested and those of more settled disease. 5thly. Upon the excitable and nervous character of the patient. 6thly. Upon the occurrence of antecedent mental shock or emotion. And, lastly, upon the existence of spinal irritation in a more or less marked form. Whenever these evidences are present, the case may be regarded as one of irritation rather than of inflammation, as one of excitation rather than of fever ; and, with the employment of soothing and sustaining measures, both medical and dietetic, together with effective counter-irritation over the irritable portions of the spinal cord, and soothing applications to the distant and suffering parts, the symptoms will generally yield, and convalescence will be re-established almost as rapidly and unexpectedly as it had been interrupted.

Inflammatory Irritations of the Pelvic and Abdominal Organs. The part of our inquiry to which we have now

arrived brings us at once to the consideration of puerperal fever as connected with inflammatory irritation, or disease of the abdominal and pelvic organs ; and thus directly opens up one of the most difficult and intricate questions in the whole range of puerperal pathology, viz., *the nature of puerperal fever*, in regard to which the greatest diversity of opinion continues to prevail. Here, also, the arbitrary arrangement or classification which I had proposed of these fevers, into those originating in local irritation, and those arising from blood contamination, must for a moment be set aside ; for I have here to speak of febrile states and conditions which, we shall see hereafter, may indifferently be produced by either. Peritoneal or uterine inflammation being in one series of cases as distinctly referrible to irritative disorder consequent upon mechanical injury, exposure to cold, or the operation of the more common causes of disease, as it is in another attributable to a poisoned or morbid condition of the blood, which may be said to represent the more specific ; and doubtless it is the difficulty of discriminating in all cases between, and determining the exact share taken by, each of these causes respectively, in the production of the disease, when both, probably, may be simultaneously in operation, which has led to the great diversity of opinion which is met with in medical writings respecting the pathology of puerperal fever. In entering upon this subject, I will therefore premise some general observations upon the doctrines which have been held respecting it, and upon the phenomena common to all forms and types of the disease ; and I will subsequently revert to a more specific consideration of those varieties in its type and character which are implied in the classification I have attempted.

The theories or opinions, then, which have been held re-

specting the nature of puerperal fever, although variously modified, may essentially be reduced to two.—One, which regards it as an idiopathic fever, and the local lesions met with in its course as merely secondary or consecutive phenomena—the other, which assigns to the local lesions the precedence and priority, and regards the attendant fever as a mere secondary or symptomatic effect. The former doctrine has been advocated more especially by White, Hamilton, Puzos, and Levret, and the latter by Gordon, Macintosh, Meigs, Armstrong, etc. Now, in looking to the general validity of these doctrines, it is impossible not to perceive that they mutually err in their exclusiveness, or, in other words, in their assigning too arbitrarily either to the blood or the nervous system the sole agency in the causation of phenomena which both are equally capable of producing. For, just as it is true that local irritation, acting through the medium of the nervous system, may produce febrile excitement and inflammatory disease, so equally may these be produced by a morbid condition of the blood; and hence, in assigning to either of these pathological conditions the sole or exclusive agency in the causation of puerperal fever, we assign to it an agency which equally belongs to the other. The first proposition, therefore, that I would submit is, that the phenomena of puerperal fever do not originate, in all cases, either in vitiation of the blood or in local irritation of the solids, whether inflammatory or otherwise, but may indefinitely originate in either.

Secondly, I have to submit that the phenomena of puerperal fever, as to type and character, are not necessarily regulated or determined by the nature of its primary cause—whether this may have been common or specific; and implying by the former term various *physical* agencies capable of producing fever, such as cold, variable temperature and mechani-

cal injury, acting probably through the nervous system; and by the latter, various *septic* agencies which operate in and through the blood. For such is the constitution of the animal economy, as observed by Wilson Philip, that there is nothing capable of affecting it but has both a sedative and a stimulant power in regard to it, according to the degree in which it is applied, and the state of the body at the time of its application—the stimulant effect arising from the lesser, and the sedative from its greater application. Thus, to take as an example two agencies equally powerful and effective in the causation of fever—viz., cold and contagion—we find that, whilst they respectively belong to the two opposite causes of disease I have enumerated, and respectively act—the one through the nervous system and the other through the blood—yet, in their ultimate effects their action upon the body is very similar; cold, within certain limits, producing a stimulant effect and giving rise to fever of a sthenic or inflammatory type; whilst, beyond those limits, it produces the most sedative effects on the body, and gives rise to fever of the most asthenic or adynamic character. Now, equally in regard to septic influences, we observe the most varying types of fever produced by their action on the blood, as exemplified in the different exanthemata, which in one epidemic may require depletion, and in another support. The principle might be further illustrated by a reference to the action of various other agencies upon the economy, such, for instance, as that of alcohol, caloric, electricity, and other physical as well as septic agents, from all of which the most opposite effects may be produced, according to the degree in which they are applied, and the state of the body at the time of their application;*

* The principle involved might be further illustrated by the effects of physical injuries inflicted on the body, as instanced in the case of con-

and thus we may deduce the second proposition I have to advance, viz., that the type of puerperal fever is not necessarily determined by the nature of the causes which have produced it, whether common or specific, or in other words, whether acting directly through the blood or the nervous system, but rather by the degree and manner in which they are applied, and the state of the body at the time of their application.

Lastly, I have to observe that the pathological lesions met with after death in cases of puerperal fever are determined less by the nature of the exciting cause of the attack, than by the relative susceptibility or weakness of particular organs or parts. For, whether the origin of fever be connected with the operation of common or specific causes, we equally find in the progress of the febrile movement induced, that those organs or parts which have been thus predisposed will invariably receive the chief force of the attack, and manifest the greatest amount of physical injury or disease after death; and this, whether the origin of the attack may have been connected with the operation of common or specific agencies.

cussion, mechanical injury, and burns—in each of which cases, according to their severity, febrile reaction of a powerful or feeble character may ensue. Such, also, is the case with various internal inflammations, and more especially of the abdominal viscera, which may either be attended with fever of a sthenic or asthenic character, according to their extent and the state of the vital powers of the patient. “I have seen,” says Dr. Wilson Philip, “the power of circulation so enfeebled by violent and extensive inflammation of the alimentary canal, that within twelve hours after the attack it was impossible to obtain four ounces of blood, although large veins in both arms and both legs and one of the temporal arteries were opened, no blood having been taken previously, and the patient at the time of the attack having been strong and in good health.” Doubtless similar forms of peritoneal inflammation may supervene after labour; and the consideration of these facts should, to my mind, suggest moderation on the part of those who are disposed to lay down arbitrary rules for or against blood-letting in pneumonia and other inflammations, not only for the present, but for all time.

Thus it is that the abdominal and pelvic organs are predisposed by the circumstances of pregnancy and labour; and so it happens that these organs invariably present the greatest number and variety of morbid lesions after death from puerperal fever, whatever the origin or cause of that fever may have been.

The general principle, then, that I would propose to lay down as deducible from the foregoing facts and considerations is, that a theory of puerperal fever, founded exclusively upon its presumed origin, must be equally partial and defective. That in certain cases physical agencies, acting through the medium of the nervous system, may give rise to it, and in others, septic agencies, acting through the medium of the blood; and that, whilst puerperal women are simultaneously subject to the operation of both series of causes,—as they must be so long as they are liable to mechanical injury during labour, and exposure to cold, etc., afterwards, and have at the same time an effective cause of blood vitiation in the presence of devitalised blood and other organic secretions in the maternal passages,—it must be difficult to assign to either the exact share taken in its production; and hence that the peculiar nature of the fever in any given case is not to be deduced from general or abstract theories, but rather from a careful scrutiny of the particular facts and circumstances appertaining to the case.

From these general remarks upon the pathology of puerperal fever, I return very briefly to the consideration of those inflammatory irritations of the pelvic and abdominal organs, which are so liable to supervene upon labour, and to give rise to it; and, in doing so, it may be as well to point out the particular circumstances which render these parts so peculiarly liable to inflammatory disease at these times. Now it cannot

be doubted that these, very briefly stated, *are the actions and conditions consequent upon pregnancy and parturition*. In connection with the former, may be mentioned the great determination of blood to the uterine organs, the greatly increased vascularity of its structure, the greater development of all its organic constituents, and the great exaltation of its vital and organic sensibilities; whilst, in connection with the latter, may be mentioned, the violent contractile action of the uterus during labour, its liability to pressure by the abdominal muscles, its susceptibility to mechanical injury or contusion, lacerations of the cervix, and finally the disruption of the placenta, and the uterine wound left by its separation. Now these are the circumstances which more especially predispose the *pelvic* or *uterine* organs to inflammation after labour; whilst the increased vascularity and development of the peritoneum in connection with pregnancy, and its intimate connection with the pelvic organs on the one hand, and the abdominal on the other, accounts for the rapid spread of inflammation from the one to the other, and the great extent to which *the abdominal viscera* participate in the inflammatory affections of the pelvic.

The great proclivity of the abdominal and pelvic organs to inflammatory lesions after labour, and the important influence they exercise upon the destinies of puerperal women, is illustrated in the following table, taken from Dugés, representing the inflammatory lesions in 341 fatal cases of puerperal fever.

| | | | |
|----------|---------------------------------|---|------------|
| Of these | Peritonitis was observed in | - | 266 cases. |
| | Metritis, or pus in veins, etc. | - | 200 |
| | Ovaritis | - | 48 |
| | Gastritis and enteritis | - | 4 |
| | Pleuritis | - | 40 |
| | Pericarditis | - | 6 |

| | | | | |
|--------------------------|---|---|---|---|
| Arachnitis | - | - | - | 1 |
| Pus in muscles or joints | - | - | - | 8 |

These, then, are the inflammatory affections which are to be anticipated and recognised, and, if possible, averted or cured, as an important step in the preventive treatment of phlegmasia dolens. To pursue the subject further, however, would be inconsistent with the scope and character of these Lectures. I will, therefore, merely observe, that the sooner a correct diagnosis can be made the better; that the treatment should be prompt and vigorous, and guided rather by the type and character of the attack in each individual case, than by considerations as to its pathological nature or origin. For, whether puerperal fever originates in vitiations of the blood, or in irritations of the solids, it has equally two types, the sthenic, or inflammatory, and the asthenic, or adynamic; and, in proportion as it approaches the former, should the treatment be active and antiphlogistic, whilst, in proportion as it inclines to the latter, should it be soothing, antiseptic, and sustaining.

(b) *Vitiation of the Blood tending to Febrile Disease.*

We now enter upon the consideration of the last pathological link which connects the phenomena of labour with those of phlegmasia dolens; viz., the direct vitiation of the blood by the absorption of septic or morbid matters from the maternal organs. For, just as we have seen that one great cause of blood-infection in puerperal women is identified with the products of various local inflammatory diseases to which they are more or less liable, and which we have just considered, so do we find, in the circumstances now stated, another equally effective; and whether the blood be vitiated by the primary absorption of morbid matters from the maternal passages, or by the secondary products of previous fever or in-

flammation, the same series of morbid actions will ensue, and an equal liability to phlegmasia dolens will be created.

In the preventive treatment of the disease we have, therefore, to consider what is the nature of the conditions of the uterine system after labour which are so favourable to blood-infection, with a view to determine how far their injurious action upon the system may be best obviated or corrected; and I believe that there is no department of practical medicine in which a correct knowledge on these points can be more usefully and beneficially applied to the prevention and cure of disease.

The general principle, then, that may be affirmed on this subject is, that there exist in the uterine and maternal organs after labour certain invariable conditions more or less conducive to blood-contamination and fever, according as they are more or less injuriously acted upon by certain elemental or septic agencies. These are respectively,

1st. The invariable presence of devitalized blood, and other organic matters in the maternal passages, favourably circumstanced for septic changes.

2dly. The presence of an extensive wound in the interior of the uterus, left by the separation of the placenta, from which, under certain circumstances, unhealthy secretions may be poured out.

3rdly. The occasional retention in the uterus of portions of the placenta and secundines, from which, in the progress of degeneration or decay, deleterious products may be furnished.

5thly. Puriform or inflammatory discharges poured out by the uterine wound under circumstances of irritation or inflammation;—here, however, the previous existence of inflammation, strictly speaking, removes this presumed cause from the present mode of blood-infection; but I mention it as showing how closely the most opposite causes converge in its produc-

tion, and how difficult it must be, in certain cases, to determine the exact share taken by the fluids or the solids respectively in producing it.

6thly. Organic products derived from the disintegration or involution of the uterus which, representing the degeneration and decay of muscular and fibrinous structure, may, under certain circumstances, prove peculiarly noxious.

Such, then, are the principal local conditions connected with the uterine system after labour, which, operated upon by certain elemental or septic agencies, are capable of evolving products which, on absorption, are calculated to vitiate the blood, and produce various febrile diseases. Let it, however, be added, that the co-operation of some such secondary agency is necessary to this effect. For, with few exceptions, the local uterine conditions stated are common to every female after labour, whereas puerperal fever, and the other disastrous consequences of blood-contamination, are, fortunately, only occasionally or exceptionally met with. Hence it must be assumed that the superaddition of some such agency is necessary for the development of those septic products by which the economy is so greatly endangered; and of these the following may be enumerated as the most frequent and potential.

1st. The direct insertion of some septic or infectious matter or ferment into the uterine or vaginal cavity, as in the case in which the contagion of fever is conveyed from one patient to another by the fingers of the attending practitioner.

2dly. The operation of epidemic or local influences conducive to various forms of endemic fever, and such as are produced by bad or defective sanitary arrangements.

3rdly. The operation of septic agencies conducive to specific types of febrile disease, such as those of erysipelas or scarlet fever, the operation of which is sometimes intimately connected with the development of puerperal fever.

4thly. The injurious agency of impure, confined, and especially of hospital air, which operates with peculiar force in the causation of all forms of septic fever. And,

5thly. The existence of a greatly depressed state of the vital powers consequent upon great hæmorrhage, physical exhaustion, insufficient food, or great depression of mind ; which is probably effective, by allowing physical and chemical changes to take place in the extravasated blood and other organic matters in the maternal passages, whence septic products of an injurious nature are elaborated.

Reviewing, then, the whole of these facts, we are led to the conclusions, 1st, that the great source and effective centre of blood-contamination in the cases we are considering, is the devitalised blood, and other organic matters and secretions lodged in the maternal passages, as an inevitable consequence of the act of parturition, whence, under certain circumstances, the germs of poison and disease irradiate to every point of the constitution ; and, 2dly, that the means by which their injurious tendencies upon the body can be best mitigated or prevented must be those, on the one hand, which most powerfully fortify the constitution against their action, and those, on the other, which most powerfully tend to arrest or modify the putrescent changes going on in the organic matters occupying the maternal passages. For the fulfilment of the first indication, hygienic and dietetic measures are most important, whilst the latter is to be effected by the steady use of antiseptic injections. From these I have seen the best results follow ; and my plan has been, after washing out the parturient passages by warm water, to employ injections of creasote, in the proportion of a minim to an ounce of water, once or twice daily. The practice is applicable to all cases in which the lochia are foetid, or the secretions are unhealthy, and more especially whenever febrile symptoms of

a low or septic character present themselves after labour. In support of this view the following case, which was some time ago communicated to this Society, may be quoted.

CASE. A young woman was delivered by craniotomy on the 27th June, in the Paddington Infirmary, after a tedious and difficult labour, in which the head had rested for some time at the brim of the pelvis. The next morning she was found to have slept a good deal, but she complained of pain and soreness in the hypogastric and left iliac regions, and the abdomen generally was tumid and tender. She was ordered a dose of castor oil and turpentine immediately; and five drops of the tincture of opium, with five grains of the sesquicarbonate of ammonia, were directed to be taken every four hours. The vagina, at the same time, was ordered to be well syringed with warm water, and an injection, consisting of eight minims of creasote diffused in a pint of thin mucilage, was to be subsequently administered. On the 29th she was reported to have passed a bad night; the countenance was flushed, the skin hot, and the pulse frequent and strong. The bowels had acted three times. A saline antimonial mixture was substituted for the ammonia, and a warm, moist epithem was placed over the abdomen. The creasote injections, preceded by one of warm water, were to be repeated. On the 30th she had passed a good night; the abdominal tenderness was less, and the abdominal tumour was smaller and softer. The bowels had acted once, the breasts were discharging milk freely, and the fever was less. On the 1st July she had been a good deal purged, but was otherwise doing well. She now complained of weakness rather than of anything else; the pulse was good, the skin moist, and the uterine tumour was favourably subsiding. The saline mixture was omitted, and five grains of the sesquicarbonate of ammonia every four hours were sub-

stituted—the creasote injections being continued with twelve minims instead of eight. On the 2nd July she was extremely hysterical, but, by the addition of assafoetida to the ammonia, the hysteroidal symptoms were removed, and the creasote injections were continued, increased to sixteen minims. On the 3rd July the patient was better; and, from this date to the 14th, when she took her discharge, no unfavourable symptoms occurred.

In the use of vaginal injections in these cases, it is important to avoid exposure of the patient to cold. Hence, a suitable slipper should be employed, and the injecting apparatus should be provided with a tube sufficiently long to be conveyed under the bed-clothes, without occasioning any exposure of the patient's body.

II. CURATIVE TREATMENT.

I proceed, in the last place, to a consideration of the curative treatment of phlegmasia dolens, as drawn from the preceding inquiries; and in doing so I would repeat, that the first great principle that is deducible from them is, that the disease is not to be regarded or treated as a local affection, either of the limb itself, or of any of its organic constituents, whether venous or otherwise, but rather as the crisis of some febrile or constitutional movement centred in the blood, and having its origin in various morbid or diathetic conditions, the precise nature of which in any individual case can only be determined from a careful consideration of the various circumstances under which it may have arisen. Now we have seen that the disease is derived, in one series of cases, from the morbid products of simple inflammatory action vitiating the blood; in a second, from septic matters directly absorbed into the blood from the maternal passages; whilst, in a third, it may be

traced to a combination of both these agencies, in which the precise influence of either in its causation, must with difficulty be determined. Hence the curative treatment must be equally varied and comprehensive; aiming at the correction of what is septic in the blood on the one hand, and the elimination of what is morbid on the other; and I do not think I can better discuss the general principles upon which the disease should be treated, than by considering it with reference to the two leading types under which it invariably presents itself, viz., the sthenic and the asthenic, or the inflammatory and the adynamic. For, whether the disease originate in a direct vitiation of the blood from the absorption of septic matters from the parturient passages, or secondarily, from the reception of inflammatory products into the blood—whether it occur in a simple or complicated form, it equally presents these two leading types, to which all the various forms of the disease may, for practical purposes, be referred.

(a) *Treatment of the Sthenic or Inflammatory Type of the Disease.*

Regarding, then, the blood as the great source, or *fons et origo mali*, I deduce the primary indications of treatment from a consideration of its morbid condition; and, regarding the crural malady as a secondary consequence or effect of the blood vitiation, I equally deduce the secondary indications from the more marked and prominent symptoms which characterise the local affection; and, in connection with the former, three leading indications present themselves, having for their object respectively, the *depuration*, the *correction*, and the *reparation* of the blood. I will proceed to treat severally of each, and, in the first place of the

Depurative Treatment. Now, assuming our pathological

conclusions to be correct, I need scarcely remark, that the more rapidly and effectively the blood can be cleared of its morbid or septic products, the more rapid and effective will be the check put upon the progress and activity of the morbid actions which are called into play by their presence. Hence in all cases, unless specially contra-indicated, the *first* curative measure proposed should be an active emetic; and, beyond its depurative tendency, it will be found to call forth powerfully the curative energies, or *vis vitæ* of the constitution. The circulation of the blood will thus be equalised, the tendency to internal congestion and venous stagnation will be overcome, whilst, at the same time, the powers of the constitution will be aroused into an active resistance against the *materies morbi* in action, whatever it may be. It may be added, that Mr. Trye, who states that he never lost a patient from the disease, attributes his success in a great measure to the practice of invariably beginning the treatment with an emetic.

The *second* curative measure under this head should speedily follow upon, if it be not combined with, the first, and should consist in the administration of an efficient purgative, with the view of obtaining free bilious evacuations; and I would add, that these should be invariably sustained in a moderate degree throughout the whole of the active stage of the malady. I may observe that Dr. Hamilton, in his memorable paper upon the treatment of inflammatory diseases by mercury and opium, published in the 9th vol. of the *Medical Commentaries*, very strongly insists upon the necessity of premising what he calls an eccoprotic purgative; and the necessity for maintaining moderate purgation throughout the active stage of the disease—combined with any other treatment that may be deemed necessary—is founded upon the consideration that, throughout its whole progress, the products of febrile and in-

flammatory disease are continually being poured into the blood, and hence the merely casual or occasional resort to purging must fail to meet the more important necessities of the case.

The *third* curative measure in regard to the present indication, is identified with the due maintenance of the renal and cutaneous excretions. This may be simultaneously effected by the nightly administration of a pill containing a grain of calomel, squill-powder, and digitalis, and a fraction of a grain of tartar-emetic and morphia, together with the exhibition, at stated intervals, of suitable doses of the acetate of ammonia, with, if necessary, colchicum and nitre. Here, however, it is to be remarked, as it was in reference to the bowels, that the action of the skin and kidneys should be adequately sustained during the whole of the active stage of the disease, as being essential to its early and complete resolution. Thus, then, by premising an emetic, and subsequently maintaining an active state of blood-depuration through the agency of purgatives, sudorifics, and diuretics, the first principal indication of treatment is to be fulfilled.

Corrective Treatment. The second indication points to the *correction* of the peculiar morbid condition of the blood which may exist in these cases. Now, in treating of the physiological causes of the stagnation of the blood in, and obstruction of, the veins, I referred to, and pointed out two principal conditions as conducive to these results. The first being an excess of fibrine in the blood, over and above the proportion that can be maintained in a state of fluidity by the exercise of the normal vital force; the second being a defect of the vital force in which the normal proportion of fibrine is precipitated, from a preponderance of physical or chemical force over that of the vital or organic. Now the former abnormality of the blood constitutes the prevalent condition in

the cases we are at present considering, just as the latter will be found to be the more prevalent in those we are about to consider under the asthenic type. We have, therefore, to determine the best means by which this excess of fibrinous material in the blood can be diminished, or maintained in a state of fluidity, and we shall find that the consideration of this question at once suggests a very important therapeutical measure, viz., the free administration of the alkaline salts, and more especially those of potash and ammonia,—in regard to which I would offer the following observations.

I have already adverted to the acetate of ammonia as being a useful and effective sudorific in the depurative treatment of the disease, but I have now to add that, beyond fulfilling that purpose, it subserves most importantly another; viz., the indication we have now under consideration. For the ammoniacal salts are all possessed of a solvent power in regard to the fibrinous constituent of the blood, and doubtless, in health, materially contribute to maintain its fluidity. Now, in carrying out the present indication, we may further increase the chemical or solvent power of the acetate by the addition of the hydrochlorate; and I know of no medicine that is more beneficial, whether from its chemical or physiological properties, in the treatment of certain forms of rheumatism and diseases of an analogous character, in which the fibrinous principle is in excess; I, therefore, propose the combined administration of the hydrochlorate, and even of the sesquicarbonate, if not otherwise inadmissible, with the acetate of ammonia, as an important means of fulfilling the second indication applicable to these cases, viz., the correction of the abnormal or super-fibrinated condition of the blood.

But, further, I have alluded to the advantages possessed by the potash salts in cases in which the same over-fibrinous con-

dition of the blood exists; and I previously pointed out, in connection with the first indication, the necessity of maintaining a moderate but sustained purgation throughout the whole of the active stage of the disease. I have now to submit, that these indications may also be combined by the administration of a full dose of the bitartrate of potash every morning in warm water. Generally, half an ounce will act freely, but not severely; and I was also led to apply the practice to these cases from the great advantage I had derived from it in the treatment of rheumatic fever. Here, then, as in the former case in which we combined the two indications of correcting and depurating the blood, by the simultaneous administration of the acetate and muriate of ammonia, may we also combine the two similar indications of depuration and correction by the one remedy proposed. These, then, with saline drinks containing some of the potash salts, such, perhaps, as the ordinary lemon and kali, dissolved in water, and taken in a state of effervescence, are the means by which I conceive the second curative principle in the treatment of this type of the disease can be best fulfilled.

Reparative Treatment. The third and remaining general indication to be fulfilled is, the renovation and improvement of the blood; and with this is connected the important question of the restoration of the general health, which, in some cases, is seriously impaired by the attack. Here, however, our means must be chiefly hygienic and dietetic, and should comprise every available resource for the attainment of the end proposed. Medical measures are now comparatively secondary in importance; but the following suggestions may not be altogether out of place. As a general rule, it is desirable to maintain a moderately active state of the excretory functions throughout the entire convalescence from the disease; and the

motive for doing so is founded upon the fact that, the large venous trunks being extensively obstructed by fibrinous deposit, a source of secondary fever exists in the retrograde changes to which such organic matter is liable, and the reception of their products into the blood. Here, however, the mildest depurants are alone indicated, and the stimulant action of iodine upon the excretories may be now usefully resorted to in the form of the iodide of potassium, which may be advantageously given in a strong decoction of bark and sarsaparilla. Under other circumstances, however, it may happen that the mineral acids, in conjunction with quinine and bark, may better tend to the renovation of the blood and the promotion of appetite; whilst, with either, the preparations of iron may be combined. I repeat, however, that this part of the treatment and the present indication generally, is chiefly to be fulfilled by hygienic and dietetic measures, and that medical aid should be given in strict subordination to them.

Treatment of Local Symptoms. The secondary indications are deduced from the more prominent symptoms of the affected extremity. These are for the most part, pain, either inflammatory or neuralgic, general swelling and tension, and, consecutively, weakness and an impairment of motor power. We accordingly deduce the first local indication from the existence of pain, which, as stated, may be either inflammatory or neuralgic, but more frequently partakes of the character of both. In proportion, then, as it is inflammatory, are leeches and warm poultices or epithems indicated; and, as this inflammatory pain is very generally found to occur along the tracts of the large veins and lymphatics, as a consequence of the morbid distension and consecutive inflammation of these vessels, it is in their tracts more particularly that the leeches should be applied. On the other hand, should the pain be of a more

diffused or neuralgic character, embrocations containing olive oil, with varying proportions of chloroform, laudanum, or aconite should be used ; and one of the most efficacious in my experience has been a liniment made of veratria, tincture of aconite, and the ordinary soap-liniment.

The second local indication points to the relief of the general swelling and tension of the affected extremity which, in these cases, are so intensely distressing. For this, a general elevation of the limb from the hip to the foot, which should also be flexed inwards, affords in all cases the greatest relief ; and this will be increased by encircling the whole limb thickly with cotton or medicated wool, covered over with oil-silk. When, however, this application fails to give adequate relief, the limb may be similarly encircled with spongio-piline, well moistened with a warm decoction of poppies, or, what is sometimes better, equal parts of hot vinegar and water. The latter fomentation has appeared to me, in many cases, to answer better than any other ; it certainly stimulates the skin powerfully, and promotes active diaphoresis, whilst at the same time it very greatly relieves deep-seated pain and tension ; with these epithems, however, the limb should be daily and freely lubricated with sweet oil, and, if possible, before the application of each.

The last local indication refers to the restoration of the motor power, and reduction of the swelling of the limb, which often remains to a considerable extent after the force of the malady has expended itself. For these, daily frictions with strong camphorated oil should be resorted to ; a flannel bandage, properly adjusted, should also be worn ; and galvanic currents, both continuous and interrupted, should be passed daily through the limb ; whilst, lastly, the patient should be urged to exercise it to the fullest extent, as an indispensable step to the early restoration of its strength and motor power.

(b) *Treatment of the Asthenic or Septic Type of Phlegmasia Dolens.*

We now approach the consideration of the last topic to be discussed, viz., the curative treatment of the asthenic type of phlegmasia dolens; and with this may be combined the consideration of the treatment of the septic forms of the disease as distinguished from the inflammatory; for, although I have endeavoured to show that the type of the disease is not strictly or necessarily determined by the nature of its pathological cause, yet, as a general rule, it will be found that the asthenic type of the disease is most frequently connected with the operation of septic causes, and the sthenic with inflammatory. Here, then, it is assumed that the blood is directly poisoned by the absorption of septic or deleterious matters from the parturient organs or otherwise, without any inflammation necessarily intervening; and, accordingly, we have here more directly to address our remedial measures to the abnormal condition of the blood thus engendered, as constituting the essential or proximate cause of the disease in these cases. These indications may, however, be considered under the same heads as those under which we considered the curative treatment of the sthenic type, viz., the *depuration, correction, and renovation* of the blood; premising that the means for effecting each must be materially varied in the two cases.

Depurative Treatment. Now I hold that the depurative principle is by far the most important and reliable that can be brought to bear upon these cases, whatever their type or character, striking, as it does, at the very root, or the *fons et origo mali*. For, essentially, it is no other than the regular and systematic elimination, or weeding out from the blood, through the agency of the more important excre-

tory organs, the morbid products which are in circulation, and which essentially constitute the proximate cause of the disease. And, further, I hold that no apparent amount of vital prostration is inconsistent with the early and systematic resort to this practice, in cases in which such vital prostration is clearly a consequence of septic agencies. On the other hand, it may be maintained that, such depression of the vital power being a direct result of the poisonous principles in the blood, no doctrine can be more rational in theory, as I am prepared to show no treatment can be more successful in practice, than that which aims at their early and effective removal. Another principle which I hold to be equally important and indispensable in the management of these cases is, the necessity of a sustained or systematic elimination of these septic matters from the blood by suitable evacuants, rather than their occasional removal only by eliminative medicines; and the motive for this practice is founded upon the consideration that the very essence of a septic fever, and of septic action, implies the presence of a certain septic or fermentative principle in the blood, whose operation consists in the conversion of certain blood-constituents into morbid products analogous to itself, ceasing only in this action when it has exhausted either itself or the blood-constituent upon which its action is determined; or until the normal or vital force of the organism has re-established its supremacy over the new or abnormal force which has hitherto superseded it. Now, inasmuch as this implies the continued transmutation of certain materials of the blood into poisonous products or compounds whereby the disease is maintained and intensified, I hold that the occasional resort only to eliminative treatment utterly fails to accomplish the essential demand that exists in these cases; and I, therefore, contend that eliminative treatment should be resorted to not merely occasionally, but

systematically, throughout the whole of the active stage of the disease, and in a less decided manner throughout the period of convalescence; and I may add that, so far from its increasing the prostration that may exist, it directly tends to remove it.*

We have, therefore, to determine what are the most appropriate evacuants in the particular type of the disease now under consideration; and I have no hesitation in saying that, unless the attack has occurred in the progress of some fever which has greatly exhausted the vital powers, the treatment should be here also commenced with a stimulating emetic; such, for instance, as a combination of the sesquicarbonate of ammonia and ipecacuanha, given in water every quarter of an hour until the desired effect is produced. Sub-

* There are two opposite periods in the course of fever, in which evacuant medicines are very generally withheld, to the great detriment of the patient. The first is that of the early or incubative stage, in which, the typical character of the disease being as yet undeveloped, the mildness of the symptoms encourages a reliance upon expectant rather than upon active treatment. This period may last indefinitely from one to two weeks; and, if during this period such measures should have been withheld, unexpected and alarming symptoms may at any time supervene from the accumulation of the febrile poison in the blood, which has been throughout steadily, although insidiously, elaborating itself. The second is the more advanced, in which, such accumulation having been allowed to take place, the vital organs are suddenly embarrassed or overpowered by its injurious action. Here the symptoms of oppression or prostration are so marked, that evacuants are for the most part deemed inadmissible, and reliance is mainly placed upon the free administration of stimulants. It may be doubted, however, whether this practice is either the best or the most reliable in the particular circumstances of the case. Certainly, many so treated succumb; whilst the passage which follows in the text, from Dr. Bryce's work on *Yellow Fever*, fully shows that an opposite practice, and one which aims at the elimination of the morbid matters by which the vital powers are oppressed, may be successfully resorted to, and, I would add, without in any way militating against the simultaneous administration of stimulants.

sequently, the depuration of the blood should be mainly trusted to mild mercurial purges, which, being less weakening and irritating, will be found preferable to salines, which should, therefore, be only incidentally resorted to for this purpose; and, inasmuch as they act more directly through the liver, the resulting discharges will be more depurative and beneficial to the system. A combination of calomel or grey powder with jalapine, in varying proportions, given every morning, serves the purpose well, and, if necessary, its purgative action may be increased and sustained by suitable doses of the fresh infusion of senna with the compound spirit of ammonia. Now this purgative or eliminative system, for reasons already given, should be daily continued until the blood has been adequately depurated, and febrile action subdued,—the strength of the patient being at the same time supported by wine, cordials, and nourishment; and, whilst the purgative should form the first medical proceeding of the day, the last may be the administration of a suitable opiate or sedative at bedtime. In support of the practice here recommended in the treatment of septic fevers generally, I might appeal largely to my own experience, to Denman's chapter on Puerperal Fever, and to Saunders's essay on the Malignant Sore Throat; but the following quotation from a work published by Mr. Bryce, in 1796, on a successful method of treating yellow fever, is so much to the point, and so thoroughly in accordance with my own experience, that I venture to quote it. After stating that the first great indication in the treatment of the disease was to evacuate all putrid matters from the system, and having remarked that the repetition of saline purges by procuring merely watery stools, exhausted the patient's strength more than the good effects from them compensated, he remarks, that by far the most efficacious purgative was a combination of calomel with

jalap; and, with reference to this, he tells us "that he has often given such a cathartic when the pulse was so feeble as scarcely to be felt, when hæmorrhages, low delirium, nervous tremors, and faintings, seemed to indicate the greatest debility; and, after several copious, viscid, and excessively putrid evacuations, procured in this manner, he has had the satisfaction to find that the patient very soon acquired great increase of strength; that these threatening symptoms went entirely off; and that, by continuing the evacuations according to circumstances, the disease was soon brought to a happy termination." I have referred to this passage as shewing that the fulfilment of the depurative principle of treatment by suitable purgatives is not inconsistent with a great amount of organic weakness.

Corrective Treatment. The second principle of treatment, viz., the corrective, should closely follow upon, and be continued, *pari passu*, with the first; by the depurative we endeavour to rid the blood of the poisonous principles which are already in circulation, and by the corrective we seek to check their further formation. Now, inasmuch as the type of fever and of phlegmasia dolens we are now considering is of a septic character, and is supported by the operation of septic agencies, the means to be looked to for the fulfilment of this indication must necessarily be antiseptics; and, acting upon the observation of Liebig, that the best antiseptics were respectively sulphurous acid, arsenious acid, the mineral acids, certain metallic salts, empyreumatic substances, volatile oils, etc., I sometime ago made a comparative trial of each in the treatment of septic fevers, and from this I was led to the conclusion, that the mineral acids, as a class, were the most safe and effectual, and ultimately I was led to give a preference to the hydrochloric. Accordingly, the plan I adopted was to

direct one ounce of dilute hydrochloric acid to be taken daily in a quart of barley or plain water, sweetened with syrup of ginger, and flavoured with lemon-peel, whilst, with the view of recruiting the saline constituents of the blood, about half an ounce of the chlorate of potass was usually added, and, occasionally, a little sulphate of magnesia for the purpose of depuration. I had reason to believe, for some time, that this practice was strictly original, as it had been strictly deduced from original observations; for, although I was aware that the mineral acids had been long given in septic or malignant fevers, with the view of correcting putrescency, yet I was not aware that they had been given to the extent and in the manner I have proposed throughout the whole course of such fevers, both with a view of *preventing*, as well as of *correcting* malignancy. However, in the course of some desultory reading, I found that very much the same plan had been recommended, and apparently empirically, by one Professor Reich, of Erlangen, towards the close of the last century, and that it was reported upon so favourably by a commission appointed at Berlin to investigate its therapeutical value in the treatment of fevers, that the author was awarded a pension by the king of Prussia, besides having other professional advantages ceded to him. Further, I found that a Mr. Braithwaite had communicated to the *Philosophical Magazine* about the same time a paper, in which a similar practice was recommended in scarlet fever; and the effect of it is said to have been so successful, that not only was every case cured, but the tendency to secondary dropsy and glandular disease was entirely averted by it. I must therefore, of course, renounce all claim to priority in the employment of this practice; but I am glad to be able to refer to such strong corroborative testimony in its favour.

There is yet another remedial agent, widely differing from

the preceding, which, in the low forms of septic fever and phlegmasia dolens may be usefully resorted to in large, concentrated, and frequently repeated doses, viz., the sesquicarbonate of ammonia; and I should scarcely have referred to it under the head of corrective measures as regards the blood, but for the following passage from a report presented by the French Institute to the Minister of the Interior at the commencement of the present century, on manufactures injurious to health, which would seem to shew that, beyond its stimulant and physiological action upon the economy, it may possibly have a chemical or corrective action upon the septic matters formed in the blood in the progress of septic fevers, and thereby modify or diminish their injurious effects upon the system.

The passage I refer to is the following: "There is one very important observation to be made on the spontaneous decomposition of animal substances, which is, that the emanations from them appear to be the less dangerous, in proportion as the matters undergoing putrefaction are less humid. In this latter case a considerable quantity of carbonate of ammonia escapes, which imparts its predominant character to the other matters volatilised, *and corrects the bad effect of those which would otherwise be deleterious.* Thus, the decomposition of stercoraceous matter, and of the refuse of the cocoons of the silkworm in the open air, and in situations, the position and inclination of which permit the escape of the liquids, evolve an enormous quantity of carbonate of ammonia, which counteracts the poisonous quality of certain other vapours; whilst these same substances, decomposed in water or very wet, emit sweetish and nauseous fumes, the respiration of which is extremely dangerous."*

* Edinburgh Journal, vol. ii, p. 293.

But, whether we accept this view or not of the corrective or antiseptic powers of ammonia in septic fevers, repeated observation has convinced me that, in certain cases, its administration is highly advantageous ; and if I were to indicate the particular cases in which it is preferable to the mineral acids, I should say, those in which the vital prostration is very great on the one hand, and those in which there is an inflammatory tendency on the other. To administer it effectively, however, it must be given in the manner recommended by Dr. Peart, to whom we are mainly indebted for our knowledge of its efficacy in malignant fevers, viz., in full, concentrated, and frequently-repeated doses ; whilst I would in all cases advise it be given, with a view to depuration, in a little fresh infusion of senna. So administered, I can indorse the opinion that it possesses the power of increasing the strength of the arterial action, at the same time that it diminishes its frequency ; that it supports the *vis vitæ*, without increasing the heat or irritability of the system, and, by such means, counteracts the tendency to malignancy in low fevers. I have elsewhere adverted to the antiseptic powers of creasote, and would merely add that, in the form of vaginal injection, it should be daily employed throughout the whole course of the form of phlegmasia dolens we are now considering.

Reparative Treatment. The last general indication points to the renovation of the blood, and the restoration of constitutional power ; a principle to be effected by the steady and sustained administration of suitable food, wine and stimulants to an extent commensurate with the demands of the case. But here I would observe that, in the fulfilment of this indication, we have a powerful auxiliary in quinine, which, in combination with the mineral acids and proper evacuants, may be beneficially given throughout the whole course of septic fever. When much febrile

heat or inflammatory irritation exists, its administration should, in my opinion, be temporarily withheld ; but, otherwise, it is not incompatible with the ordinary symptoms which attend every stage of such fever, operating, as it does, beneficially upon the nervous system, whose powers it recruits, and through whose agency it exercises a favourable influence upon the blood and secretions. Guided by these considerations, its employment may be commenced with the earliest manifestation of the febrile movement, and it may be continued, in gradually increased doses, to an extent commensurate with the tolerance of it by the system ; and, so given, it cannot, I think, be doubted that it both curtails the duration of the fever, and powerfully assists in the restoration of strength.

These, then, are the more important remedial agents—evacuants, the mineral acids, or ammonia, and quinine, which would appear to be the remedial means best adapted for the fulfilment of the three principal indications which present themselves in the treatment of septic fevers, viz., the *depuration*, *correction*, and *reparation* of the blood ; and upon their judicious combination and employment must our success in the treatment of such fevers mainly depend. Their action should, of course, be assisted by a suitable regimen ; and it may be necessary, in certain cases, to combine measures for the relief of inflammatory complications ; but these I need not enlarge upon, inasmuch as their right selection and application must depend upon the circumstances peculiar to each individual case.

Neither need I enter upon a consideration of the various local, or, as I have elsewhere termed them, secondary indications of treatment in relation to this form of the disease ; inasmuch as they have been fully treated of under the preceding, or inflammatory type, and require no particular modification in the present.

There is, then, but one other point to which I have to allude before concluding the treatment of the septic forms of phlegmasia dolens ; and that is, the necessity for the freest ventilation in these, as well as in all forms of septic fever. In doing so, I avail myself of the opportunity of remarking that this, one of the most important remedial measures inculcated by sanitary writers of the present day, was one as fully recognised in the days of the past as of the present generation ; and by no one more so than by the eminent physician in whose name these lectures are addressed to you. For if you look into the writings of Lettsom, and more especially his *Medical Memoirs*, you will find that, in his treatment of fever, he carried this principle to the fullest possible extent ; directing that the windows and doors of the patient's apartment should be kept open throughout the day, in order that he might be exposed to, and receive the fullest current of fresh air that could be admitted. There is no nearer approach to this practice, that I am aware of, than that which is inculcated by Miss Nightingale, in her recent work upon nursing ; and, taking her as the exponent of the advanced school of sanitary reformers, and her work as reflecting the most recent advances in sanitary science, we may see how in this, as in many other instances, the learning of the present day is but a reflex of the past,—with this difference perhaps, only, that that which is empirical in one generation becomes, by the advancement of learning and of science, to be rational in another.

And now, gentlemen, I have fulfilled, to the best of my ability, although very inadequately to my wishes, the task I proposed to myself on undertaking the duties of your

Lettsomian lecturer on midwifery. In the discharge of those duties I have addressed myself to you as to a jury empannelled to consider and decide upon certain weighty questions appertaining to medical science—questions bearing upon the nature of a disease of the highest pathological importance, as it is of the greatest social interest—upon one which has the most intimate relations with every puerperal malady, and more distant relations with a wide range of non-puerperal diseases; and, in the discharge of those duties, I have endeavoured to lay before you such evidence as would lead to the development of truth, rather than to the attainment of victory. For, believe me, however interested I may feel in the establishment of the truth of the doctrines I have submitted to you in relation to the pathology of phlegmasia dolens,—identified, as they are, with much anxiety and labour on my part,—I can with candour affirm, that I wish for them no further recognition than that which, on the closest scrutiny, they may be deemed fairly entitled to. But, whatever may be your verdict in regard to them,—whatever may be the opinion of our contemporaries, or of posterity, concerning them, I cannot finally take leave of the subject without thanking you, and the Fellows of the Medical Society of London generally, for the great kindness and consideration with which you have listened to my case, and the facts and arguments by which I have endeavoured to support it.

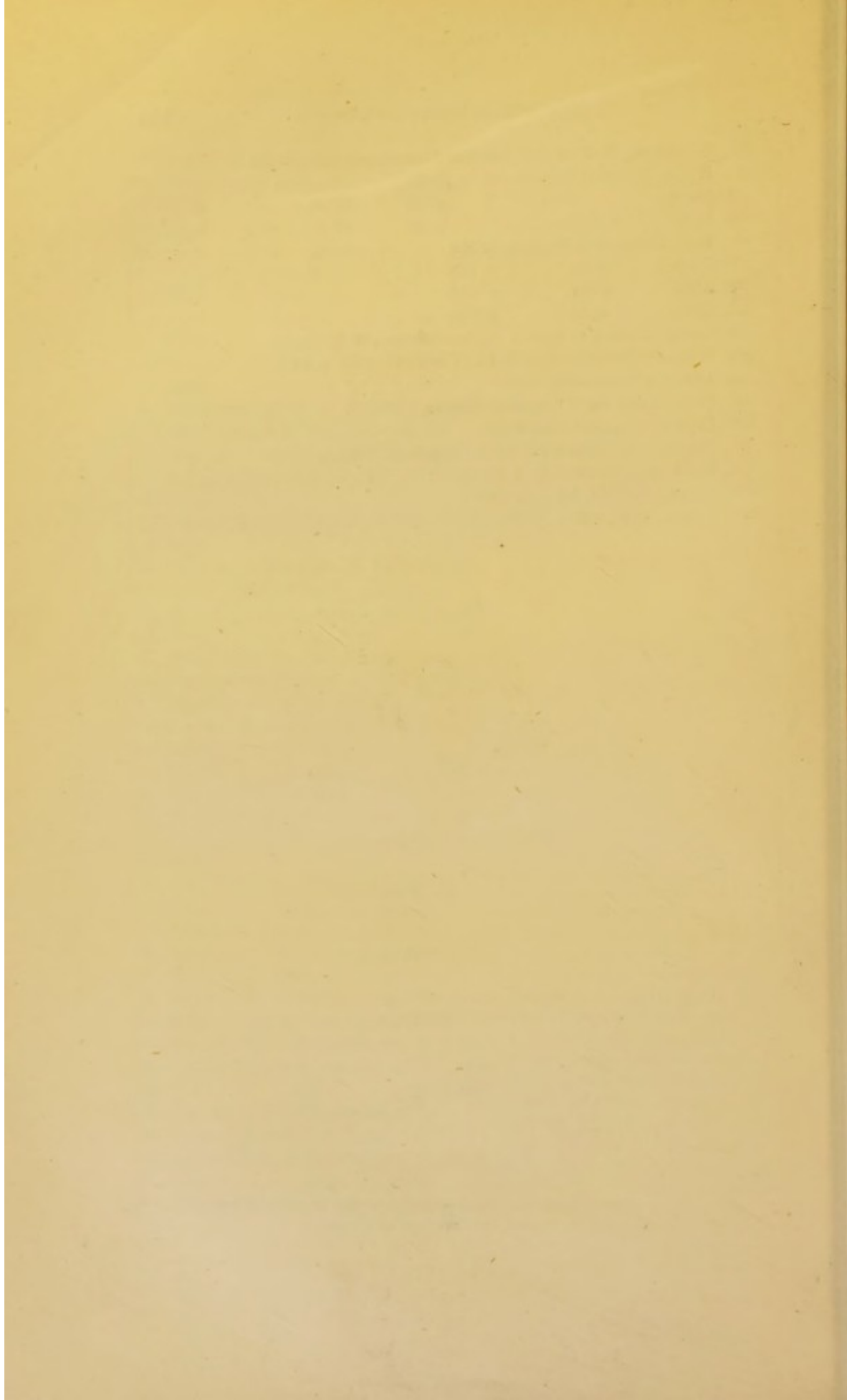
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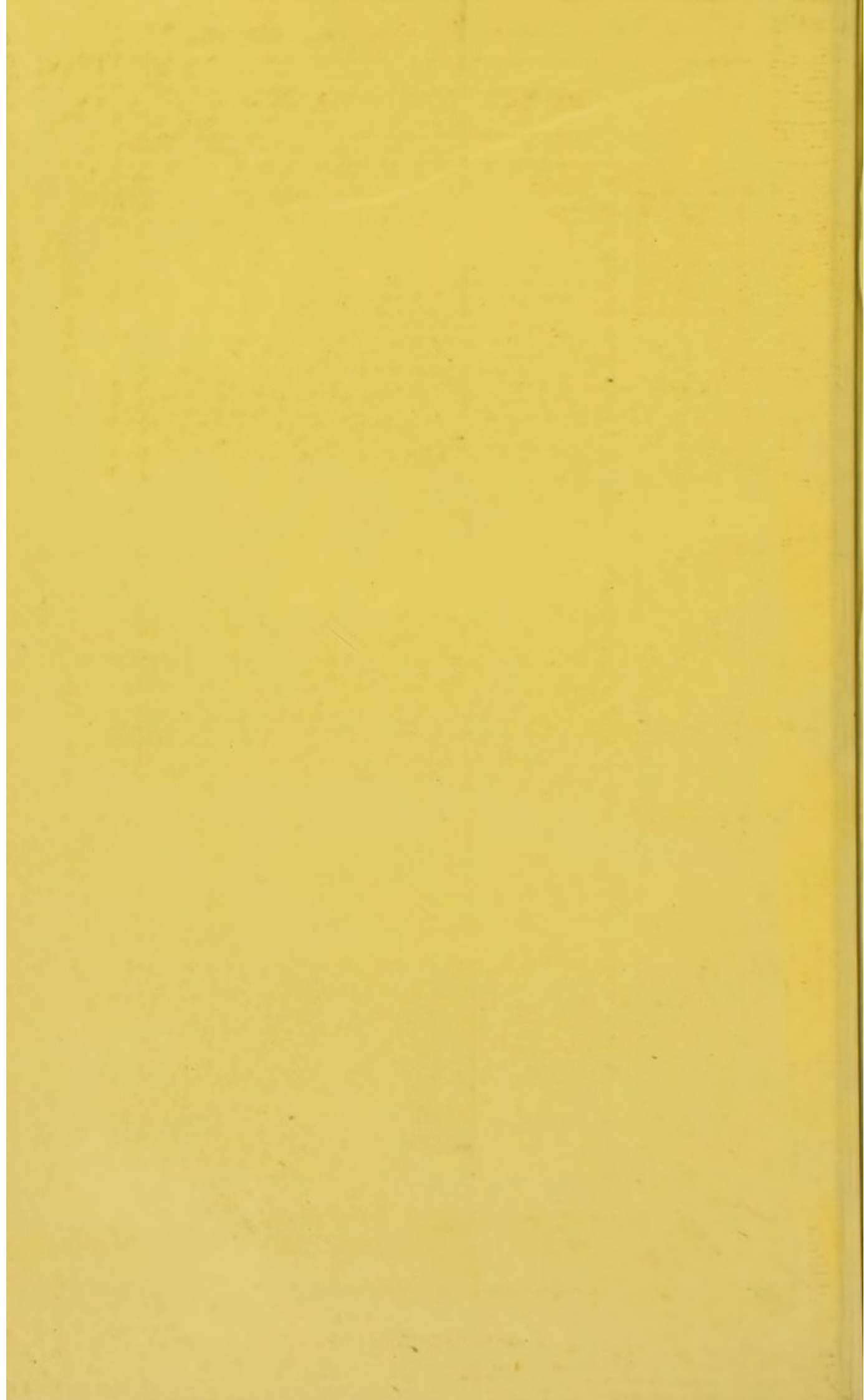
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