AN ADDRESS

ON

PUERPERAL FEVER: ITS CAUSES, CHARACTERS,
AND RELATIONS.*Delivered before the Obstetrical Society of London, on Wednesday,
January 5th, 1876.*By WILLIAM O. PRIESTLEY, M.D., F.R.C.P.,
President of the Society.

GENTLEMEN,—At the commencement of another year it is usual for your President to take a brief retrospect of the past, to review the work of the session, and report on the general condition of the Society. During the past session, the Society has again done excellent work, and several papers of unusual interest, with the discussions upon them, will appear in the forthcoming volume of *Transactions*. The event of the session, however, has been the discussion on puerperal fever; and the Society is greatly indebted to Mr. Spencer Wells for taking the initiative in the debate, and for the able manner in which he drew up and illustrated certain propositions, in the form of interrogatories, to elicit the opinions of Fellows. The discussion, indeed, not only proved attractive to large audiences who assembled in this room on each successive evening, but the subject had so profound an interest for medical practitioners everywhere, that the published debates were read with eagerness throughout Great Britain, Ireland, and other countries where obstetric medicine is cultivated. During the progress of the debate, the Society had the advantage of hearing the matured opinions of many of its Fellows resident in London and the provinces, some of them being professors and teachers of world-wide reputation. We were honoured by the presence of the Professor of Midwifery from one of the Scottish Universities, and one celebrated professor crossed the Atlantic to state his views, and combat prevailing ideas which he believed to be erroneous. The Society should also acknowledge its indebtedness to the distinguished surgeons and physiologists who so ably sustained the debate in some of its collateral aspects.

The Society may well be congratulated on the widespread interest attached to its proceedings this session; and among the other benefits accruing, not the least is the fact, that the discussion on puerperal fever attracted for the first time to these rooms two of our honorary resident Fellows, Dr. Arthur Farre and Dr. West. It is well known that both these gentlemen are authorities of the highest order in the department of Obstetric Medicine, and their contributions to the debate will henceforth enrich the archives of the Society. And surely a topic of such commanding interest and gravity as puerperal fever, or by what other term it may be proposed to call it, well deserves careful investigation. It is a study which may worthily occupy the keenest and best intellects. The acute forms of illness which occur after delivery, and often end fatally, are especially cruel affections; attacking women, as they commonly do, during the very flower of their age, just at the dawn of fresh hopes, and at the time of their greatest usefulness in life. The anxiety of mind caused to the medical man when such cases occur in his practice, and the damage which, rightly or wrongly, results to his professional reputation, can only be appreciated by those who have had the painful experience. The mental anguish so engendered is reported, indeed, sometimes to have culminated in mental aberration.

Dr. Farr, of the Registrar-General's office, estimates the mortality after childbirth in this country as 1 in 190 women delivered; but Dr. J. Matthews Duncan, in his address at Norwich in 1874, regards this as much too low a rate, and, after careful computation, states the mortality, within four weeks after delivery, to be 1 in 120; while, if the time be extended beyond four weeks, he believes that the number of puerperal deaths reaches as high as 1 in 100. This last calculation is so appalling, that we may fain hope it is in some way exaggerated; but, taking the lowest estimate, 1 in 190, we find ample scope for grave reflection, and more especially as a large proportion of the deaths so computed arise from puerperal fever, or the group of *post partum* diseases which have been somewhat vaguely designated by the name of "puerperal fever". Moreover, the number of ascertained deaths does not express all the mischief done. Many of those who survive the

attack are greatly hindered in recovery, are exposed to much suffering, and possibly remain permanently enfeebled or maimed for life. If reason were required, therefore, for the interest manifested in the late discussion, it is sufficiently forthcoming in the above statistics, and more especially as in and out of the profession there is a growing impression that these deaths are in a great measure preventable.

Disappointment has been expressed by some critics, that after so protracted a discussion, in which so many eminent men have taken part, no more definite conclusions should have been arrived at, no more practical results attained. It was inevitable in a discussion on such a subject that the most diverse opinions should be expressed; but, with all due submission, I venture to take exception to such criticism, and I trust I may be able to show that some advances have been made towards a more precise knowledge of the subject. The debate has obviously enabled us to take stock of our knowledge, and, in doing this, it is evident that certain ideas, hitherto fragmentary and vague, concerning the nature and origin of puerperal fever, have assumed a more concrete form than heretofore. The progress of pathological science has in this, as in other departments, been gradually producing certain definite conclusions and results, which become more and more apparent as time goes on, but hitherto have scarcely been fully appreciated.

Had time permitted, your President might, at the close of the debate, have rendered a service to the Society by presenting a summary of the various arguments used in treating the several propositions laid down by Mr. Spencer Wells. As the occasion did not present itself then, I propose to occupy your time this evening in an endeavour to take up the threads of the discussion, and trace out what may be the general conclusions or practical results arising from it. The task of summing up, however, is by no means an easy one. In view of the many conflicting opinions which have been expressed on some of the points considered, it has seemed like an attempt to educe order out of chaos; and I trust the Fellows who have spoken will pardon me if in the remarks I have to make I in any sense misinterpret their meaning, and if I adopt certain views in preference to others.

In attempting to summarise the debate, I shall venture to make such commentaries as have occurred to me; and, without necessarily adhering to the form or order of the questions proposed by Mr. Wells, I shall pass in review the various points he has raised.

1. *Definition*.—As to definition: what is it that we mean when we speak of "puerperal fever and its relations to the infective diseases and pyæmia"? On this question of definition we had the assistance and heard the opinion of so high an authority as Dr. Arthur Farre, who has defined puerperal fever to be "a continued fever, communicable by contagion, occurring in women after childbirth, and often associated with extensive local lesions, especially of the uterine system". Dr. Farre, however, has informed us that this definition is only for the purpose of identification, and does not pretend to explain the phenomena of the disease, or to indicate its nature. As an illustration of the extreme difference of opinion expressed in this discussion, I may point out that, even on this preliminary question of identification, Dr. Suow Beck contends that the definition, as published in the *Nomenclature of the Royal College of Physicians*, cannot be maintained in practice; while, on the other hand, Dr. Fordyce Barker thinks the definition "absolutely perfect". It is obvious that the definition would include all the forms of infective continued fevers which may attack the lying-in woman, whether they are peculiar to the puerperal state or not; and in this sense it may be faulty, but it is not easy to define what is almost Protean in character, and exhibits itself in such varying forms. The definition may well answer the purpose, if only it be borne in mind that in this sense puerperal fever is a comprehensive term, including a diversity of puerperal febrile affections, and that it does not express any theory or doctrine as to their pathological nature. In this respect it differs essentially from the definition of typhus or typhoid fever, and other zymotic diseases, which have characteristic symptoms, well defined pathological appearances, and are believed to be always produced by the same specific poison.

2. *Is Puerperal Fever a Specific Disease?*—Had I been asked no long time ago if I believed in the existence of a perilous and often fatal form of fever peculiar to the puerperal condition, I should unhesitatingly have replied in the affirmative. Nevertheless, the several speakers who have addressed themselves to this question have with a surprising unanimity denied the existence of a specific puerperal fever, and expressed their conviction that the so-called puerperal fevers are diseases recognised as occurring in other than puerperal patients, but modified and rendered more formidable by the local and systemic peculiarities associated with parturition. Professor Leishman of Glasgow, indeed, who had taught and written concerning a specific puerperal fever, made a formal recantation of his former views on this sub-

ject, and, with certain reservations, stated his belief that a large proportion of so-called puerperal fever has its origin in pyæmic or septicæmic infection. The only notable dissident from this view is our distinguished honorary Fellow Dr. Fordyce Barker, of New York, who, in a very able speech, asserted the doctrine of a distinct and specific puerperal fever. Dr. Barker's defence of his position was supported by a variety of arguments that were at once ingenious and forcible, and it may fairly be presumed he has put before us the most weighty reasons which can be urged on that side of the question. The fact remains, nevertheless, that clinical investigation and pathological research have both in recent times been pointing in an opposite direction, and teaching that what has hitherto been called puerperal fever or fevers are but forms of blood-poisoning or septicæmia similar to those observed in other than puerperal patients, having, it may be, a diversity of origin, and intensified and modified, it may be, by the peculiarities of the puerperal state, but still essentially the same, and not constituting a pathological genus apart. While the discussion was pending, I took occasion to read the article on Surgical Pyæmia in Holmes's *System of Surgery*, written by Mr. Callender, the able surgeon who was good enough to come here and tell us something of the surgical aspects of septicæmia; and I confess I was struck not only by the identity of symptoms between puerperal fever patients and surgical patients affected by pyæmia, but also by the corresponding varieties in each case, whether we look to the origin, severity, or pathological results.

In employing the term "pyæmia", Mr. Callender guards himself against being supposed to imply that pus is the active poison producing the symptoms described. Modern pathology teaches that the blood may be poisoned by other ingredients than purulent matter; and those of you who were present on the first night of the debate listened to a lucid exposition on this subject by Mr. Hutchinson, in which he expressed his belief that pyæmia, or pus in the blood, was due to inflammation of the patient's own veins, and to suppuration in their interior. Septicæmia he defined as blood-poisoning induced by inflammation of the patient's own tissues other than the veins, whether that inflammation arose spontaneously, or was caused by an irritant from without. It is now clearly established that septicæmia, pyæmia, and phlebitis are distinct pathological conditions, although all may be coincident in the same patient.

Formerly, two opinions were held concerning the pathological nature of puerperal fever. Puzos, Levret, Hamilton, and White regarded it as an idiopathic putrid fever. Armstrong, Mackintosh, and Campbell maintained that it was essentially a local inflammation, of which the fever-symptoms were merely a sympathetic consequence. Boyer, Le Gallois, and Cruveilhier endeavoured to show the analogy between the condition of a woman recently delivered and any other patient who was the subject of surgical injury, and to point out the similarity of the morbid affections to which both were liable. Cruveilhier, indeed, compared the uterus after delivery to an amputated stump, inasmuch as its muscular walls were laid bare, and at the placental spot were the gaping orifices of divided vessels. Subsequent research has proved that the uterine walls are not so absolutely denuded as M. Cruveilhier supposed; but there is no doubt as to the presence of large open channels at the placental spot, through which deleterious matters may gain a ready access to the general circulation. Following out this idea, Sir J. Y. Simpson in 1850 wrote a memoir on the analogy between puerperal and what he called surgical fever—a term much objected to by some surgeons.

Probably the best essay on puerperal fever which has appeared during the present generation is that by the late Dr. Robert Ferguson, one of my predecessors in the Chair of Midwifery at King's College. Dr. Ferguson attributed puerperal fever to a vitiated state of the fluids of the body, and regarded all varieties of local lesion as consecutive to vitiated circulation. He pointed out, what is now generally conceded, that none of the local lesions are constant, and so "none can be assumed as the essence of the malady; and, as all may exist, they may each and all be regarded as the results of a cause capable of producing them singly or conjointly". Whether, therefore, the fever takes the form of the "peritoneal", the "gastro-enteric", the "nervous", or the "complicated", where several organs or tissues are attacked at once, a poison in the blood is the one source and cause. So generally accepted is this doctrine advanced by Dr. Ferguson, that Dr. West was in some sort justified in saying, "We have not advanced far, if at all, beyond the conclusions which Dr. Ferguson laid down". In another sense, Dr. West's assertion stops short of expressing the whole truth of the case; for, if we have as yet found no better explanation of the phenomena observed in connection with puerperal fever than "a vitiated state of the fluids", nevertheless a whole army of ardent workers have been investigating and adding to our knowledge

concerning the nature of the poison which produces such fearful results, the various ways in which it finds its entrance into the blood, and the best methods of obviating its effects. A further impetus has been given to our knowledge of the subject by Virchow, who, after repeating the experiments on purulent infection recorded by Gaspard in 1809, and adopting the term "septicæmia" from Piorry as appropriate for forms of blood-vitiation other than by pus, published his researches on thrombosis and embolism. Among obstetricians, the names of Spiegelberg, Schroeder, D'Espine, Barnes, Matthews Duncan, and others, are well known as writers on this subject, who have all contributed something to its further elucidation.

As to the way in which the poison finds its entrance into the systemic circulation, Dr. Ferguson did not overlook the peculiar condition of the interior of the uterus at the placental spot, as affording a ready mode of ingress for what might be deleterious; and he held that all wounds and bruises in the genital canal might create diseased secretions from a traumatic surface, and by absorption give rise to the phenomena of puerperal fever.

Taking, then, the outcome of the discussion in this Society, and the evidence from other sources, it may be stated that puerperal fever, or fevers which are attended by high temperature, and are commonly associated with extensive local lesions, are due to the inception of a morbid poison which vitiates the blood, and which produces a great variety of symptoms in accordance with the nature and intensity of the virus, the amount of the dose absorbed, the state of the patient when attacked, and a diversity of other conditions, which have been alluded to more or less fully by the several speakers.

As to the origin of the poison, whatever may be its nature or chemical composition, Dr. Barnes states that it has two sources: in the one case, the virus is formed in the patient's own body as the result of initial morbid changes in some special part which infects eventually the rest of the system; in the other case, the virus is imported into the body of the patient by contamination from without. To the one class of cases he applies the term "autogenetic", to the other "heterogenetic"—synonyms which correspond to the appellations "auto-infection" and "hetero-infection" of Schroeder.

In the autogenetic or auto-infective form, septic matter is spontaneously formed within the system of the patient, as the result of disorganisation and death of tissues by a process which Virchow has termed necrobiosis. Thus, the retention of a portion of placenta, or of membranes, or of blood-clots, may become a source of septic poisoning; or a contusion or laceration of the cervix, vagina, or perineum, may become the seat of unhealthy action, and organic substances in process of decomposition are formed, which, on being absorbed, vitiate the blood. That fluids do pass from the uterine cavity into the uterine sinuses is abundantly proved; but Dr. Snow Beck has stated, as further evidence on this point, that, after the uterus has been injected by the perchloride of iron to arrest *post partum hæmorrhage*, the uterine sinuses have been found gorged with grumous fluid containing an abundance of iron. Dr. Savage, who has paid particular attention to the anatomy of the uterus, is inclined to doubt if poison is absorbed by its veins, and thinks the absorbents are the chief agents in this process. Dr. Tilt I understood to hold a like opinion. Dr. Graily Hewitt, Dr. Snow Beck, and others, have enlarged on the great facility afforded to the absorption of septic fluids by an undue relaxation of the uterine walls after delivery, and hence deduce the great importance of thoroughly promoting its contraction upon the expulsion of the placenta. Dr. Hewitt goes so far as to say that he has never seen a case of puerperal pyæmia in which this relaxed condition of the uterus was absent. Dr. Beck attributes the influence which has usually been ascribed to hæmorrhage as a predisposing cause of septicæmia, entirely to relaxation of the uterus as the prime factor; but this, I take it, is a somewhat too exclusive statement, as Magendie clearly proved that, with empty vessels, absorption is very rapid in other parts of the body, as well as the uterus. Dr. Tilt attaches great importance to fetid lochia, and their absorption, as factors in producing the febrile affections of the puerperal state. He believes they are not only more frequent than commonly supposed in ordinary cases, but that scarlatina, or other zymotic disease in a puerperal woman, may cause the lochia to become putrescent and virulent: their absorption then adds a fresh peril to the case, and accounts for the serious character of the complication. And if absorption of decomposing or putrescent materials formed in the patient's own body is to be feared when there is no breach of continuity other than that caused by the separation of the placenta, how much greater may become the danger when any laceration has taken place in the genital canal, which exposes a wounded surface to external agencies! Mr. Callender has reminded us of a truth formerly indicated by Benjamin Gooch of Norwich, that there is nothing more irritating or acrid than the fluid of a wound itself immediately after operation,

and if this be pent up, it may become a source of autoinfection. Mr. Spencer Wells has become thoroughly conversant with this fact in practising ovariectomy, and he drains off from the cavity of the peritoneum the acrid fluid which would otherwise inevitably poison his patient. But Mr. Callender has further informed us that in surgical practice "a patient may be tolerant enough of decomposition which may be set up by a wound in his own body, but will be intolerant of poison conveyed to him or her from any other wound." If this be true in surgery, *a fortiori* it is true in obstetrics, and demonstrates how essential it is to the safety of his patient that the accoucheur should keep his fingers free from all contamination.

Turning to the heterogenetic or hetero-infective forms, in which the virus is imported from without, the inquiry suggests itself, Whence is derived the poison which, introduced into the system, has such potent results? Is it always one and the same, or are there several poisons capable of producing different diseases in non-puerperal patients, but provoking generically the same results when introduced into the body of a woman recently delivered? It is this part of our problem which seems to me most difficult to solve; and yet upon a correct solution of it probably depends the reconciliation of many conflicting views, and certainly the adoption of proper prophylactic measures for preventing the spread of puerperal fever. And this brings me to Mr. Wells's second interrogatory, which deals with

3. *The Relation of Puerperal Fever to Zymotic Disease.*—Concerning the special rôle which the poison of scarlet fever plays in the production of puerperal fever, we have had most valuable evidence brought out by this discussion; and although there has been some conflict of opinion, there are certain practical deductions which are very apparent. In the first place, we have had the evidence of two or three men engaged in large general practice, who have attended labours side by side with cases of scarlet fever, and who are able to tell us from personal experience that a woman recently delivered may go safely through scarlet fever, with the disease so little modified as to retain its distinctive characters, and to be recognisable. Dr. Squire, Dr. Brunton, and Dr. Brown, afford conclusive testimony on this point; and Dr. Squire goes so far as to assert that "puerperal fever is not typhus, typhoid, small-pox, measles, diphtheria, nor even scarlatina". The testimony of Dr. Savage and Dr. Wynn Williams is to the same purpose, at least so far as scarlatina is concerned. Cases have been occasionally recorded like that of Dr. Cordes of Geneva, and Dr. Jackson of Notting Hill, where scarlet fever passed through the system of the mother, who was herself protected by a previous attack, and infected her child *in utero*, without serious consequences to the mother. Further, Hirsch and Veit have endeavoured to show by statistics that scarlet fever and puerperal fever are not the same diseases, because there is no coincidence between the prevalence of the two ailments at the same time. On the other hand are high authorities—Dr. Arthur Farre, Dr. Barnes, Dr. Braxton Hicks—not controverting the statement that a puerperal woman may sometimes safely go through scarlet fever with all its distinctive characters; but asserting besides that scarlatina poison is specially perilous when engrafted on the puerperal state; and that, on account of the constitutional peculiarities after delivery, it is prone to produce what has been called puerperal fever, or a form of scarlet fever so wanting in its usual characters as to be unrecognisable. Dr. Braxton Hicks's paper in the twelfth volume of the *Obstetrical Transactions* is a remarkable exposition on this part of the subject, and furnishes a new starting point. And, in truth, there is nothing very unphilosophical in consenting to both these positions. A small dose of the poison in a perfectly healthy woman after delivery may run through its ordinary course, and be eliminated; while a larger dose, or one from a more virulent source, imported into the blood of a less healthy woman, may produce a more malignant type of disease, not having its ordinary manifestations, just as some of the worst cases in an epidemic of cholera are not attended by the usual symptoms of vomiting and purging.

There is, however, a fallacy in reference to the occurrence of scarlatina in the puerperal patient which must not be overlooked. As stated by Dr. Griffiths and others, there may be a rash closely resembling the scarlet fever eruption which is due to toxæmic poisoning of another kind, and which may be mistaken for scarlatina.

I recollect that it was a current opinion among the medical men in a crowded manufacturing town where I first studied medicine, that scarlatina communicated to a lying-in woman was almost certain death; and I was early impressed with the danger of these cases by knowing a medical man who was believed to have carried scarlet fever to the ladies of three county families, and so caused their death. I have since learned that scarlet fever is not so universally fatal as I then supposed; and the history of Queen Charlotte's Lying-in Hospital, which has been kindly furnished to me by Dr. Blakeley Brown, conclusively proves this. From 1857 to 1871, there were twenty-six cases of scarlet fever

in the hospital. Of these, two were removed to St. George's, and the results are not stated. Of the remaining twenty-four, six died—a fourth of the entire number attacked. I still, therefore, cherish a wholesome horror of scarlatina in the lying-in room.

There can be no doubt that lying-in women are prone to be affected by any febrile diseases to which they may be exposed. It matters not whether it be scarlet fever, measles, small-pox, or other zymotic disease; unless they be protected by a previous attack, the affection is apt to break out with more than ordinary severity, with graver complications, and frequently tends to a fatal termination. During pregnancy, the accession of one of the exanthemata will often bring on abortion or premature labour, showing the profound impression made on the system. Dr. Barnes even has suggested that the protection afforded by a previous attack of scarlet fever breaks down under the trial of childbirth. And it is to be remarked that, because certain patients have escaped easily, or, it may be, on one or more occasions it has visited a series of patients lightly, these examples do not vitiate the rule. There is obvious danger in dogmatising on questions concerning which we are but imperfectly informed as yet, and in arguing only from negative results. By taking too exclusive a view in the case before us, we may fall into pathological error, or, what is worse, neglect precautions necessary for the safety of our patients.

If the evidence be true in reference to the exanthemata, it is even more forcible, and borne out by a greater concurrence of opinion concerning the serious peril encountered by the puerperal woman when exposed to the poisons of erysipelas, diphtheria, and typhus. Mr. Wells and others have mentioned instances in which there could be no doubt that puerperal fever was produced by direct or indirect communication with erysipelas; and other Fellows had painful experiences to relate, had time permitted, of puerperal deaths caused unwittingly by going from patients having erysipelas to the lying-in room. The connection between the two has long been noticed; and observations have accumulated with such force and frequency as to constitute absolute proof of close affinity. Many new-born children have died of erysipelas whose mothers were the subjects of puerperal fever; and instances have not been rare where the medical man attending a puerperal fever patient has from her contracted erysipelas, and died also.

My friend Dr. Fordyce Barker, who contends strenuously for the specific character of puerperal fever, admits in his larger work, and also in a recently published lecture, that the close relation, or what he calls the "solidarity", between puerperal fever and erysipelas is conclusively settled. He considers, however, that, although they are interchangeable, they are distinct diseases. I fear that logically this acknowledgment of interchange of symptoms is somewhat adverse to the theory that identity of cause will necessarily produce identity of result. In recognition of the same mutual relation, Virchow speaks of puerperal fever as *malignant puerperal erysipelas*.

A connection has also been remarked between puerperal fever and diphtheria. The late Professor Martin of Berlin, probably erroneously, came to regard the diphtheritic process in the genital organs of lying-in women as the only essential element of puerperal fever. That there may be a connection at times seems certain. Dr. Playfair has brought forward some evidence on this point; and Dr. Fordyce Barker, Dr. Lusk, and others in America, have described the diphtheritic process as occurring in certain puerperal fever epidemics in the hospitals there.

In reference to typhus fever, again, there is evidence that, if communicated to a woman after delivery, it may produce a virulent and fatal form of so-called puerperal fever. Among the examples are those mentioned by Dr. West and Dr. Beck. In one instance, after the introduction of a case of typhus fever into the Dublin Lying-in Hospital, "puerperal fever appeared in forty-eight hours afterwards, although the hospital had been free from it for a year before". Sir Henry Marsh, indeed, from seeing the frequent relation between the typhus and epidemic puerperal fever, remarked that "the true character of epidemic puerperal fever seems to be typhus".

The proclivity to be affected by prevailing febrile diseases, or to initiate them, is, no doubt, due to the peculiar constitution of the pregnant and puerperal woman described at length by Dr. Richardson and Dr. Arthur Farre. The excess of fibrin in the blood, and the diminution of the salts, exist even before parturition. Afterwards, the sudden arrest of the utero-placental circulation, and the consequent effect on the maternal blood-current, with the later initiation of the milk-process, and the involution of the uterus, furnish, as it were, so much combustible material. All constitute so many disturbing forces, which, added to the susceptibility of the nervous system, must render even the healthy woman sensitive to febrile disturbance, and favour the development of rapid changes in the composition of the blood, if only a small leaven of ferment in any form be added to it. Moreover, from the present artificial habits of society, few parturient women are so healthy

as they might be, and, consequently, they become a more ready prey to disease.

A series of predisposing causes common to other diseases as well as to puerperal fever have been enumerated; sewage-air, depressing mental conditions, pre-existing ailments, etc. All these may so lower vitality, that even the occurrence of a chill may develop febrile conditions. The greater proclivity of unmarried women to puerperal fever has been remarked by Campbell, Home, Leake, John Clarke, and others; and there are some striking illustrations of the effects of mental influences in provoking the disease given by Professor Lusk in the *American Medical Journal* last November.

There seems to be literal truth in the remark made by Dr. West, that "there is not one single solitary cause to which we can refer the symptoms of puerperal fever; that it occurs now from one cause, now from another". With equal truth, also, it may probably be asserted that there is not one puerperal fever, but several, arising from a diversity of causes. The term puerperal fever has, indeed, been somewhat loosely but habitually applied to all diseases of lying-in women which were attended by febrile symptoms and tended to a fatal termination. In attempting a more accurate pathology, it is well to bear in mind that fever is only a symptom of disease; and that we have to find out what is the underlying disease, of which the fever is but the indication. Perhaps the best practical classification of puerperal fevers which has been suggested, in accordance with our present knowledge, is: 1. The ephemeral forms, which depend on some transient cause; and the graver class, divided into (2) the autogenetic or auto-infective form, and (3) the heterogenetic or hetero-infective, in which the poison is imported from some zymotic or other infective source, and the origin of which can be traced. Notwithstanding this classification, there will always be cases the origin of which it is difficult or almost impossible to detect. These must necessarily form a class by themselves, until further knowledge enables us to assign to them their proper place.

4. *Epidemic and Endemic Characters of Puerperal Fever.*—A warm discussion has taken place as to whether puerperal fever is ever really epidemic; that is, dependent on general atmospheric or other influences which pervade a community, as distinctive from the miasms of unhealthy hospitals or the propagation of the disease from one patient to another by inoculation. Dr. Matthews Duncan is inclined to doubt the evidence of its epidemic character altogether, and to regard it as essentially endemic. There is no doubt, as he suggests, that the word "epidemic", as applied to an outbreak of puerperal fever, has been at times used by authors carelessly, and that "endemic" would have been the more appropriate term; but the annals of medicine still afford undoubted evidence of the epidemic character of puerperal fever at definite epochs, and, if we turn to the histories by Hirsch, by Dr. Robert Ferguson, and others, besides the speech of Dr. Fordyce Barker in this Society, we shall find that it occurred extensively in certain years among all classes of the community, in hospital and out of it, in town and country. In 1821, for example, it occurred as an epidemic in France, in Holland, in Scotland, and in London at the same time; while, further, it has been noticed that, when puerperal fever prevails epidemically in the human subject, the lower animals die in large numbers of diseases connected with parturition. I confess I cannot see what is gained in argument by those who contend that puerperal fever is essentially a form of pyæmia (using the term pyæmia with the latitude they attach to it), by denying that puerperal fever is at times epidemic, unless it be desired to prove that the disease always originates in some local inflammation of the generative organs, and that the febrile symptoms are only the natural effect of the intense constitutional effect so engendered. This theory of the localists, as it has been called, was supported by Professor Meigs, Professor Pajot, and others, but has received little countenance in this country. Erysipelas is so undoubtedly and frequently epidemic in its character, has so commonly a spontaneous or idiopathic origin, apart from its association with traumatic injuries, that, if the mutual interchange between puerperal fever and erysipelas be admitted, the epidemic character of both follows as a matter of course.

The influence of a vitiated atmosphere in overcrowded hospitals in producing an endemic form of the disease is only too well confirmed. Whenever a number of lying-in women are aggregated together, there is danger that a miasm may be generated which will develop puerperal fever, and it is by no means easy to define the amount of ventilation and isolation which are necessary to prevent these untoward consequences. Hence a feeling has gradually been growing up that, notwithstanding the economic and educational advantages of lying-in hospitals, poor women are more safely confined at their own homes. In the recent congress on maternity hospitals at Brussels, M. Lefort stated that, in Paris outside the hospitals, the mortality had been one in 212, while in the Maternity Hospital it had been one in 29. Fortunately,

the statistics of maternity hospitals in this country are not so unfavourable, but the mortality in them even is much greater than when patients are delivered at their own homes. At King's College Hospital, we had a notable instance of the very serious results provoked in puerperal women by their being confined under the same roof with patients in general medical and surgical wards. The mortality in the lying-in wards gradually increased year by year, until at length it reached the fearful maximum of nearly one in every thirteen women delivered, and then it was determined to close the midwifery department altogether.

5. *Contagiousness of Puerperal Fever.*—Turning to Mr. Wells's fourth interrogatory, which bears upon the contagious or infectious character of puerperal fever, I find there is no question among the various speakers that the disease may be propagated from one patient to another, although there may be some difference of opinion as to the way or means by which it is communicated, and some forms are regarded as less likely to be infectious than others. For a long time, the contagiousness of puerperal fever was disputed, and in Paris writers and practitioners remained unconvinced of its contagiousness long after it had been conceded elsewhere. In our day, the direct proofs of its contagious quality have accumulated to such an extent, that to disregard them in practice would amount, on the part of a medical practitioner, to a plain dereliction of duty. So far as some of the forms are concerned, however the attack may have originated, if it be but a single case, it may become the focus and centre of propagation to other women. And, of the several ways in which the subtle poison may be conveyed to the lying-in woman, none is more certainly proved than that it may be conveyed by the hands of the practitioner in making vaginal examinations. But this is not the only way. It may probably be communicated through the clothes, instruments, respiration, or even the secretions of the medical practitioner, midwife, or nurse. That it may be so spread, we have ample evidence, if we look back to the records of Gordon, Armstrong, Gooch, Ramsbotham, and others. Dr. Robertson of Manchester gives one of the strongest instances possible. In the space of one calendar month, a midwife attended twenty cases belonging to a lying-in charity; of these, sixteen died of puerperal fever. Other midwives of the same charity attended 380 cases in the same district and at the same time, and none of these were affected by the disease.

For further evidence on this subject, I may refer to the works of Dr. Tyler Smith, Barnes, Routh, and Semmelweiss; and I can particularly recommend the perusal of the book published by Professor Wendell Holmes, one of the most charming and original of writers on general as well as on medical subjects.

There is very cogent collateral evidence towards proof that the blood of a puerperal patient may be infected by other channels than by the genital canal. It is certain that puerperal fever may begin in a patient before her delivery. Dr. Barnes's statement that he has been conscious of absorbing poisonous and offensive emanations from patients with putrid discharges, and that he has suffered from shivering, diarrhoea, and foul breath as the result, affords a very strong presumption that an attendant may go about charged with an infectious disease, and convey an atmosphere about him which shall be most deleterious to susceptible patients. There is a very ingenious exposition in reference to this matter in Dr. Tyler Smith's *Manual on Obstetrics*, and he strengthens the position by reference to cases in which pregnant women who have had small-pox in childhood, and are proof against infection, have nevertheless, as in Dr. Cordes' case previously mentioned, on being exposed to the poison, conveyed the disease to the foetus *in utero*.

My friend Dr. Moir, a former President of the College of Physicians in Edinburgh, has sent me the following short history, which seems to indicate that a diseased child *in utero* may infect the mother with a form of pyæmia which may be transmitted on to other lying-in women. I quote his own words.

"Mrs. H., who had had several previous very easy confinements, had threatenings of labour on a Monday. Instead of a rapid delivery, as usual, she had slight pains and much *malaise* all the week, and was confined latish on the Saturday evening. Child above the average in size, about 9 lbs., fat and healthy looking. On Sunday forenoon, the child died very unexpectedly and without apparent cause. On examination next day, it was found that one pleural cavity was filled with thick purulent matter, the lung being forced back and, of course, undistended with air. The mother never had milk, as usual, fevered with much general pain, and afterwards had all the symptoms of puerperal fever. Large abscesses formed in various parts of the body, some being opened, which gave partial relief. They were on the legs, arms, chest, and a very large one implicating almost the whole dorsal muscle. This one was not opened. The pyæmia in this case was evidently ex-

isting before delivery from the symptoms, and from the child's being affected. So much for Mrs. H.

"Two hours after her child was born, I was called to Mrs. W., who had had several children: easy cases. She was ill only two hours; took rigors on the third day, and died about six days after delivery, with all the symptoms of puerperal fever. Two hours after Mrs. W. was confined, I was called to Mrs. F., who also had an easy delivery; had all the symptoms of puerperal fever; but recovered after a hair-breadth escape, not recovering for six months. Observe: the three cases were all over within eight hours. I undoubtedly carried the infection from Mrs. H., whom I had been seeing constantly during the six days she was ailing. She survived the delivery about twelve days; Mrs. W. only about six."

But are all forms of puerperal disease attended by febrile disturbance equally infectious? This is an inquiry which bears with moment on the necessity for precautions on the part both of doctors and of nurses, and the question is constantly being raised, Should a nurse who has been attending this or that modification of the disease be permitted to pass on at once to the charge of some other expectant patient? On this point, Dr. Hicks says "that the majority are contagious, I have no doubt; whether all are so, I am uncertain. I am inclined to think that those forms derived from the zymotic diseases are the most so; those from the self-generated kinds are least so." Dr. Routh concludes that some forms are contagious and others are not so; and Mr. Wallace believes that it is "what would be called the pyæmic cases which are non-contagious". Dr. Barnes, again, states that "the autogenetic forms proper do not appear to possess active powers of propagation"; and Dr. Fordyce Barker, concurring in this remark, regards this difference of contagious property as one of the proofs that puerperal pyæmia or septicæmia are generally different from true puerperal fever. I take it, then, that opinions coincide pretty generally that some forms are highly contagious and infectious, others are less so; and it is probable that those arising from extraneous sources are most contagious; those from poison generated in the patient's own tissues least so; or perhaps I may put it in a somewhat more practical form, as a broad rule for guidance, at the risk of being less scientific and precise, that the most acute forms, running to a rapid termination, are most likely to be highly contagious; those which run a more chronic course, and are attended by secondary complications, are least so. Nevertheless, as we do not know yet that even the chronic cases may not in a minor degree be infectious, it behoves us to exercise caution in attending these cases, to purify nurses who have been in charge, and, above all, to be careful not to convey any of the discharges to other lying-in patients.

6 *Relation of Bacteria to Puerperal Fever.*—I quite concur in what has fallen from the several speakers concerning the relation of bacteria and other allied forms to puerperal diseases. We are obviously only on the threshold of that important inquiry; and although the researches of Klebs, of Waldeyer, of Mayrhofer, of Lister, of Sanderson, of Heiberg, and Orth, have established a nearly connecting link between bacteria or other allied organic forms and pyæmic processes, the field of investigation is rather one for the pathologist and microscopic observer than the obstetrician. The gynaecologist would, nevertheless, thankfully receive any information which would enable him to cope successfully with these terrible maladies, either in the way of prevention or cure.

7. *The Prevention of Puerperal Fever.*—I turn now to the last division of the subject, which deals with the prevention of puerperal fever, and with what Dr. Playfair calls "the burning question", the conduct of the medical practitioner in face of perils of this kind. And first I would remark, that I concur with much that is contained in the letter of our distinguished honorary Fellow, Dr. Matthews Duncan, which was read at the May meeting. It would be most disastrous to our profession, and eventually injurious to the public interest, if medical men were liable to vexatious or criminal prosecutions because they were suspected of carrying infection from one patient to another. Members of the medical profession do not need to be reminded by such measures that they pursue their avocations for the public good. I believe no class of men practise more self-abnegation in the exercise of their work than doctors do; and the perils to which they are constantly exposed almost equal the risk of the battle-field. This selfishness has become, in a manner, traditional, and together with it a courage and fearlessness in doing what they consider right at all hazards. I would, however, earnestly warn my brother practitioners not to be misled by some inferences which may be drawn from parts of Dr. Duncan's letter, however high his authority, and, as a consequence, indulge in a laxity of precautions, when such momentous interests are at stake. I cannot but think that if any member of our profession had pursued the same course as Mrs. Marsden, under like circumstances, his conduct would have been most reprehensible; and

I agree with Mr. Spencer Wells, that he would not be deserving of the sympathy and help of this Society. It is certainly better to err on the side of over-caution than of over-laxity.

The method, therefore, to be pursued for guarding lying-in women from noxious influences, consists of all those measures which prevent the formation of poisonous materials in her own system, and which secure her isolation from all contagion from without. In following out the first indication, it is necessary to provide, as much as may be practicable, for a woman encountering her confinement in the best possible condition of health, by impressing upon her the necessity of obedience to natural laws during her pregnancy. If complications occur during pregnancy, they must be combated as the circumstances will permit. Dr. Barnes has informed us that albuminuria at the end of pregnancy is extremely apt to go into puerperal fever. In these cases, therefore, a sedulous watch must be kept, the bowels must be carefully attended to, and other suitable treatment for these cases adopted. The process of parturition should be conducted with the view to the genital canal of the woman being exposed to the effects of irritation, continued pressure, and laceration, as little as may be possible. After the birth of the child, a full and perfect contraction of the uterus should be secured, by seeing that the organ is not emptied too suddenly, and that the hand follows the fundus down from above as its contents are expelled. Subsequently to delivery, the various known methods should be practised to promote the contraction of the walls of the womb and the diminution of the uterine cavity; and any clots forming, should be removed from time to time during the hour after removal of the placenta. It is superfluous to say that the placenta should be extracted in its entirety, when possible; and great care should be taken not to leave any detached portions adherent to the uterine walls. The same precautions should be observed, when practicable, in cases of abortion. If any considerable laceration of the perinæum have taken place, the edges of the wound should immediately be united by sutures, not only for the purpose of restoring the perinæum, but also to prevent contamination of the wound by putrid discharges. In the case of other wounds in the vagina or cervix uteri, especial care should be taken to keep them clean by repeated injection, and to leave as small a raw surface exposed as may be practicable. In all cases where the lochia are in the least degree offensive, the vagina should be well injected with Condy's fluid and water, or other innocuous disinfectant, twice in twenty-four hours, or oftener if necessary; and the injection may be carried into the uterine cavity, if it be much distended, and there is a suspicion that it harbours foetid contents. The injection of the womb-cavity, however, should be conducted slowly, carefully, and without force. These uterine injections were practised long ago by William Harvey, and there is concurrent testimony in this and other countries of their marked utility in abating the symptoms even when puerperal fever has apparently set in.

Next in importance is to take care that there is no fecal accumulation in the bowels, and to recollect that the existence of previous diarrhoea may be the indication that retained masses are lying in the intestines and producing irritation there. Dr. Greenhow alluded to this during the debate; and it must be within the experience of many how acute febrile symptoms, accompanied, it may be, by delirium or incipient mania, have passed away with a proper evacuation of the bowels. I may put it, in short, that, to promote recovery after parturition, every direct or reflex source of irritation should be removed, pure air and water ensured, absolute cleanliness observed; and perfect quietude, mental and physical, should be enjoined. Nursing the child should also be recommended when the mother's condition permits, as puerperal ailments have been observed more frequent in women who have not suckled their children.

To secure the isolation of a lying-in woman from noxious influences which may be communicated to her from without may be difficult, and in some cases perhaps impossible; but as Mr. Callender has informed us that surgeons have learned to banish, for all practical purposes, those affections which may be termed septicæmic from surgical wards of hospitals, so I cannot help thinking that the accoucheur will in time succeed in preventing the like affections in puerperal women, so far, at least, as the heterogenetic cases are concerned. We are all agreed as to the absolute necessity of preventing, directly or indirectly, any communication between cases of erysipelas and puerperal patients. We are agreed also as to the necessity of the midwifery practitioner avoiding all *post mortem* examinations. His hands should avoid all contact with specific poisons or septic materials; and if perchance his fingers have touched anything suspicious, he should at once carefully and thoroughly disinfect them. The necropsies which seem most baneful are of those bodies which have recently died of erysipelas, peritonitis, zymotic disease, or any other inflammatory and febrile affections; and in such instances the accoucheur should not even be present in the

room when the dissection is made, as, though he decline to touch, yet his person and clothes may become infected by the poison. There may possibly be a doubt whether one who dissects bodies altered by decomposition or antiseptic injections, as they are commonly found in the dissecting-room of medical schools, is so liable to contaminate a puerperal patient as he who makes an necropsy soon after death. Semmelweis, however, believed that animal matter in a state of putrefaction would cause puerperal fever, and immediately lessened the mortality, during the fearful epidemic of puerperal fever which raged in the Vienna Hospital in 1846 and 1847, by obliging all dissecting students to wash their hands in chlorine or chloride of lime before making vaginal examinations. Impressed by Semmelweis's views and opinions, I endeavoured, during my occupancy of the Chair of Obstetric Medicine at King's College, to prevent students frequenting the dissecting-room and *post mortem* theatre from attending midwifery cases, and the result was a very small mortality in the outdoor maternity charity.

This care about absolute cleanliness of the hands in attending labours should extend even to occasions when a medical man has had digitally to examine patients suffering from offensive discharges either proceeding from the surface or from the interior of the body. We have heard in this discussion that the discharges from cancer may produce fever in a lying-in woman; and this is probably true of other putrescent discharges. I have had grave anxiety, extending over some weeks, about a patient after her delivery; because I had gone straight from an instrumental case where labour had been so protracted that febrile symptoms had set in, and the passages had become influenced, so as to pour out an irritating muco-purulent discharge.

When a medical man has a bad case of puerperal fever in his own practice, or is required to see one in consultation, he should certainly not go direct to another midwifery patient without first changing his clothes, besides careful ablution of his hands; and he will be all the safer in his ministrations if he adopt some of those precautions mentioned by Dr. Swayne and others, such as using a Turkish bath, or the more radical measures for disinfection recommended by Dr. Wynn Williams, and for the details of which I may refer to his speech.

Many chemical substances have been recommended to be added to water for purifying the hands: iodine, chlorine and its compounds, sulphurous acid, cyanide of potassium, carbolic acid, and the permanganates. It matters not which agent is employed, so long as it is used carefully and efficiently; and if it be necessary to disinfect clothing, this is readily done by exposing it in an oven to a high temperature, for which many upholsterers have a suitable arrangement. With all deference to Dr. Matthews Duncan, I have no doubt that every medical practitioner who earnestly desires to promote the welfare of his patients and to keep himself blameless should at once abstain from attending fresh cases of labour when one or more of those recently delivered by him have died with acute febrile symptoms, or are still so ill as to require his constant visits. When, indeed, there is the remotest suspicion that he may convey the poison in his own person, he should not incur the risk of disseminating it. How long he ought to absent himself from midwifery practice, is yet a moot point. Dr. Swayne thinks a medical man should seclude himself for a week only; others think a month hardly sufficient. The remarkable experience of Dr. Huntley of Yarrow led him to believe that he actually generated poison in his own body, as the result of some faulty process, which he communicated to his patients. Taking all the circumstances into consideration, I am disposed to recommend a week's seclusion after regular attendance has ceased on a single puerperal fever case. When a series of cases have occurred in the practice of any one medical man, he should absent himself from midwifery practice for a month at least. During either the short or the longer interval of seclusion, the means for disinfection should be fully carried out.

Finally, I have to say a word or two as to the propriety of attending patients suffering from scarlet fever or other zymotic disease, and lying-in women, at the same time. After what has been said in this debate, I cannot expect the same accord of opinion as on other parts of the ground I have gone over; but I would earnestly beg those who have as yet had so favourable an experience, when attending the two sets of patients conjointly, to ponder well what has been said by others on the reverse side of the question. It cannot be expected that men in general practice, who may be in charge of a scarlet fever or small-pox patient, shall at once relinquish all midwifery practice for the time being, because zymotic diseases are so prevalent that this would practically preclude their attending confinements altogether, or make their attendance on midwifery patients so irregular as to be unreliable. Nevertheless, in view of the dangers which have been indicated by various authorities, albeit their experience may seem to point to different conclusions, they are bound to exercise vigilance, lest perchance they slip into a pitfall unsuspected by them. In seeing an ordinary case of illness, a medical man

rarely hitherto stays sufficiently long in the sick-room to concentrate any considerable dose of contagium about him, and the after-exposure to fresh air in passing from house to house no doubt usefully dissipates any smaller quantity. I would suggest, however, to those treating infectious cases, and liable at the same time to be summoned to cases of midwifery, or who may be in attendance on puerperal women, that they should not stay long in the sick-chamber; not undertake the duties of nurses, as Dr. Duncan puts it; that they should see puerperal patients before seeing infectious cases, and never go from the infectious case direct to the lying-in room, without changing clothes and the most careful ablutions. Some doctors change their clothes and wash with a disinfectant whenever they have seen infectious cases. Whatever either will, or may, conduce to the wellbeing of patients, will, I am sure, not be regarded as either too irksome or troublesome by any member of our profession.

[The rest of the address was occupied with interesting biographical sketches of Sir C. Locock and other eminent obstetricians whose loss the Society has had to deplore during the past year, and of whom obituary notices appeared at the time in our pages.]

LETTSONIAN LECTURES ON THE INFLUENCE OF CLIMATE IN THE TREATMENT OF PULMONARY CONSUMPTION.

Delivered before the Medical Society of London.

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LECTURE I.

MR. PRESIDENT AND GENTLEMEN,—When the Council of the Medical Society did me the honour to elect me Lettsomian Lecturer for the present year, some doubts arose in my mind as to what subject would be of interest to the Fellows; but I have decided that the objects of a Society like this would be best attained by selecting some avowedly obscure subject on which light may possibly be thrown by an accumulation of facts, dry though these facts be. Therefore, I choose the Influence of Climate in the Treatment of Pulmonary Consumption, because the large clinical stores laid up by my father and myself may enable me to draw some deductions on this weighty topic.

The study of climate has from time immemorial engaged many and skilful workers, and our knowledge of meteorology has made special strides in the last half-century. Few countries exist where observations, barometrical, thermometrical, hygrometrical, are not daily taken either in Government observatories or by private individuals; and each morning our *Times* newspaper brings us tidings of the weather telegraphed from various parts of Europe, and anxiously looked for by farmers, by doctors, by seamen, and even by the old ladies waiting for a fine day to cross the Channel.

A storm appears off the West Coast of Ireland, and is instantly wired to Victoria, and thence intelligence is despatched to every part of the kingdom; and, when the rude south-wester appears among us, he finds hoisted drum-signals, and our vessels—that is, those with wise skippers—snug in harbour, and fewer victims abroad for his vengeance.

Several praiseworthy attempts have been made of late to trace the effect of weather on the causation of disease, and some information on this subject has been furnished by Dr. William Farr and by Dr. Edward Ballard; but a very wide field remains open to all medical men to connect more closely the phenomena of the atmosphere with those of the human body. There is no lack of excellent works on climate, with ample meteorological data, and even long lists of the diseases prevalent on this or that soil, in order to furnish us with grounds for forming a theory as to the appropriate climate for certain diseases; but of actual results on patients we have but few tabulated records, and to these, it must be allowed, we should strive to make additions.

In contending with the great scourge of all classes in this country—pulmonary consumption—we employ a number and variety of weapons, each, as we think, suitable to the particular case in question, and brandished with different degrees of faith and hope, according to the amount of those qualities present in the practitioners' and in the patients' minds. If any improvement be visible, we are so thankful for it, that no attempt