AN ADDRESS

ON THE

RELATION OF PUERPERAL FEVER TO THE INFECTIVE DISEASES AND PYÆMIA.

Delivered before the Obstetrical Society of London, on Wednesday, April 7th, 1875.

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IN opening a discussion this evening on the relation of puerperal fever to the infective diseases which are among the most numerous class of cases treated by the physician and general practitioner, and to the varied forms of traumatic fever which, under the head of pyæmia, fall more frequently under the care of the operating surgeon than of the obstetrician, I wish particularly to impress upon all who honour me by their attention, that my object is rather to elicit than to impart information; to call forth the stores of knowledge now latent in the Society, to ask for the results of your observation, rather than to attempt to add to the knowledge of the Fellows by any contribution of my own.

It has been the custom of the Society in whose room we meet to stimulate the Fellows to enrich the *Transactions* by papers of original research and sterling value; to make this one of the chief objects of the Society; and, if not directly to discourage, certainly not to encourage, full or exhaustive discussions at the meetings. I have long felt, and have publicly expressed my conviction, that this course might be amended with great advantage to all medical societies, and to the advancement of medical science and practice; and I had some small share, in the earliest of the preliminary meetings of this Society—I may say even before the Society was constituted—in determining that in our *Transactions* there should be a permanent record not only of the papers read before the Society, but of the discussions to which the papers gave rise. This custom has ever since been honoured in the observance, and the example is now being followed by other societies. If I am not greatly mistaken, the discussion on Pyæmia in the seventh volume of the *Transactions* of the Clinical Society will be referred to hereafter with more interest and profit than any of the papers in that or in any of the earlier volumes of that Society's *Transactions*; and the discussion on Cancer in the twenty-fifth volume of the *Transactions* of the Pathological Society was most certainly as great an addition to the value of that volume as one could well imagine, until last night many of us heard the opening address of Dr. Bastian on a subject closely allied to some of the questions which I have to bring before you this evening, and the admirable speech of Dr. Sanderson in commencing the discussion, both full of deep thought, and eminently characteristic of the tendencies of our age and our nation to reject any theory which is not supported by facts, and to bring the highest developments of science to our help in the needs of daily life. These discussions lead to the almost painful reflection, how greatly would the value of the earlier volumes of the *Medico-Chirurgical Transactions* have been increased, if we had now not only a copy of the papers read, but a report of the comments they called forth from Baillie and Halford; from Cline, Cooper, and Abernethy; from Travers, Brodie, and Lawrence; from Bright and Addison. The marble busts of these great men of the past now surround us; but the workers of the present and the future can find no record of what they have said here, and can only regret that, while their form and features are preserved by the sculptor, their thoughts have not been embalmed by the reporter and the printer.

"Who of us can tell
What he had been, had Cadmus never taught
To man the magic that embalms the thought?"

As I have reason to believe that the discussion this evening will be fully and accurately reported, and will be preserved in our *Transactions*, I must now ask you to pardon these few prefatory remarks, and also to forgive me if I venture to express the hope that, as the subject of puerperal fever is not of less interest than that of cancer, is closely allied with pyæmia and with the relation of bacteria to contagious and infectious diseases, it will be debated with as much ability and as complete freedom from any other than purely scientific and truthful feeling, as have characterised the discussions at the Clinical and the Pathological Societies.

If you permit me to consider what I have so far said as introductory, and to commence the subject of puerperal fever now, I hope I shall not

encroach upon your time beyond the fifteen minutes within which limit I have tried to condense what I wish to say.

In order that some definite direction might be taken in this inquiry, attention has been already publicly requested to six leading questions. The first, second, and third are so closely allied, that I will, if you please, read them together now.

1. Is there any form of continued fever, communicated by contagion or infection, and occurring in connection with childbirth, which is distinctly caused by a special morbid poison, and as definite in its progress and the local lesions associated with it as typhus or typhoid, scarlet fever, measles, or small-pox?

2. May all forms of puerperal fever be referred to attacks of some infective continued fever—as scarlet fever or measles—occurring in connection with childbirth on the one hand; or, on the other, to some form of surgical fever, or to erysipelas, caused by or associated with changes in the uterus and neighbouring parts following the process of childbirth?

3. If all cases of contagious and infectious diseases which occur under other conditions than that of childbirth are set aside, does there remain any such disease as puerperal fever?

In framing these questions, after searching for an accurate definition of the term puerperal fever, or for some short description of this as distinguished from other forms of continued fever, I have taken, as the most accurate and comprehensive, the definition from the Nomenclature of Diseases drawn up by a Committee appointed by the London College of Physicians (for which definition I believe the Committee are indebted to Dr. Arthur Farre). It is this: "A continued fever, communicable by contagion, occurring in connection with childbirth, and often associated with extensive local lesions, especially of the uterine system." To this definition, this very important note is added: "In returning cases of puerperal fever, the more important local lesions, such as peritonitis, effusions into serous and synovial cavities, phlebitis, and diffuse suppuration, should be specified."

Here, then, we are led, on the authority of the most distinguished obstetric teacher of his day, supported by a committee appointed by the Royal College of Physicians of London, to the conclusion that in puerperal fever we have a contagious continued fever *often* associated with the important local lesions just enumerated; not *always*, but *often*. You may then, according to this definition, have this contagious fever without these local lesions. The poison may be so potent, or the dose so large, that it may kill before there is time for the development of the local lesion; or the dose may be so small, or the poison so feeble, that it only produces some transient elevation of temperature, some greater rate in pulse and respiration, some increased action of skin, kidneys, and bowels, and the morbid material is eliminated before any local lesion is established. But I must ask you to say if, in your experience, you ever saw such a case which could not, on careful inquiry, be traced to exposure of the patient to some one or other of the contagious or infectious fevers—to scarlet fever or diphtheria—to measles or small-pox? I need not remind you how these diseases are intensified or modified by the puerperal condition; and I proceed to ask if, in any case where puerperal fever could not be proved to be really scarlet fever, diphtheria, measles, or small-pox occurring in connection with childbirth, it was not a traumatic or surgical fever, erysipelas, pyæmia, or septicæmia; the local lesions associated with the fever assuming rather a primary than a secondary importance in the chain of sequence. Time does not permit me to enter on the very important practical question as to the sole dependence of erysipelas upon a specific morbid poison. Whether this peculiar inflammation of the skin and cellular tissue, tending to spread indefinitely and preceded or accompanied by fever, can arise from the spontaneous generation in the human body of a poison communicable by contagion; or, whether a poison capable of producing erysipelas exists at all times in varying quantity somewhere, ready to increase and multiply under favourable conditions; or, whether (as some believe) erysipelas may arise independently of any poisonous influence from without, we need not inquire now. The important fact for us now is, that erysipelas often attacks the parts concerned in the process of childbirth, and that the fever which accompanies it, intensified by the puerperal condition, is a very fatal form of one of the diseases confounded together under the term puerperal fever. Set aside the infectious fevers and erysipelas occurring in connection with childbirth; and then we come to the local lesions associated with puerperal fever, and we ask what relations this fever and the local lesions bear to each other. Bruises or tears of the genital canal or perineum; inflammation, and the production of pyrogenic liquids or solids, which may contain both bacteria and some poisonous material or particles which have the power of impregnation; diphtheritic exudation on the mucous membrane of the uterus and vagina, especially on the place of the separated placenta, and plugging of the lymphatic vessels with granular

masses or colonies of bacteria or spheroids; the rapid development and growth of plant-life, and the disturbance of function and alteration of structure which must follow; does all this arise under perfect sanitary conditions, spontaneously, or from mere chemical decomposition, or only when some poisonous agent is introduced from without—the seed of some plant sown in a fruitful soil?

Again, supposing inflammation is set up in the uterus, in its veins and lymphatics; that the albuminoid secretion known as the lochial discharge contains pus; that pus, or putrid material, or organic germs, are found in the lymphatic vessels of the uterus and the subperitoneal cellular tissue, with diffuse peritonitis; that the blood in the uterine veins clots, softens, breaks up, is the seat of chemical and vital change, is detained in or near the pelvis, or is carried away to distant parts, or alters the composition and properties of all the blood in the body; that we have purulent infection, or pyæmia—putrid infection, or septicæmia; can all this arise in a healthy woman, placed in favourable conditions, if she be not exposed to some morbid poison? Is puerperal fever ever a simple traumatic fever modified by this puerperal condition, or does it always and necessarily depend on the action of a morbid poison? Or, let me put the question in another form. Did you ever see a case of puerperal fever which was not really either a case of scarlet fever or measles, or some such infectious or contagious fever, or erysipelas? or a traumatic fever caused by the bruising or tearing of the parts concerned in childbirth, and the changes in the blood-vessels, blood, and lymphatics, following the injury? If you have seen such a case, then let us know something about the fever, its period of latency, its course and duration, and its termination; and especially tell us something about the poison which has been the cause of the fever.

Time does not allow me to do more than put the question. I await your reply, and pass on to the fourth, fifth, and sixth heads of our subject, which I will also read together. They are these.

4. Assuming that a form of continued fever—communicable by inoculation, contagion, or infection—does frequently occur in connection with childbirth, how can its spread in private and in hospital practice be most certainly prevented or checked?

5. What relation have bacteria and allied organic forms to the pyæmic process in the puerperal state?

6. What is the value of antiseptics in the prevention and treatment of puerperal fever?

And, to show the close connection of these with the previous questions, I must remind you that even those who admit that a tear of the perinæum, or a bruise of the vulva, by leading to inflammatory exudations around the vagina or uterus, or to clotting of blood in the veins, and consequent changes in the whole of the blood in the body, is quite sufficient to account for fever, which, aggravated by the puerperal condition, may lead to all the local lesions specified in the note to the official definition of puerperal fever—even those believers in the spontaneous or local origin of the fever, seeing the hundreds of cases where the injury is observed without the fever for every one where the fever is observed, and the prevalence of the fever in certain seasons and districts, and in the practice of certain surgeons or midwives,—still freely admit that it is only under some endemic or epidemic condition, or as a result of contagion or infection, that the ordinary wounds, or bruises, or tears, inevitable during the process of parturition, and commonly free from any serious consequence, become in exceptional cases so deadly.

It is especially in this direction that the knowledge of our country Fellows may be of the greatest value to us. In the practice of a large hospital, or in private practice in a large city or a thickly populated district, it is impossible to say that a patient may not have been exposed to some contagious or infectious disease. But, when isolated cases arise in private practice in the country, where any source of poisoning can be readily traced, the accurate record of such cases, their origin and course, and their arrest or extension, may be of incalculable value. A country surgeon attends a man who has erysipelas after a broken arm. He also attends a healthy woman in an isolated cottage in a natural labour. There is no puerperal fever in the district, yet this woman dies of puerperal fever, and so do others attended about the same time by the same surgeon. These women, in all probability, would have recovered in the ordinary course, had not erysipelas occurred in the man who broke his arm. Such a history as this would have tenfold weight, as being free from numerous sources of fallacy and doubt attending any similar history in a large city.

And, again, we cannot consider the mode of preventing the spread of puerperal fever without examining into the part which bacteria and other organic forms may play either as poisons or as carriers of poison. Here I must ask you to allow me to refer to a paper, which I read twelve years ago at Cambridge, on the Causes of Excessive Mortality after Surgical Operations. It may be found in the second volume of

the *Medical Times and Gazette* for 1864. In that paper, I gave some account of Pasteur's researches on fermentation, on the organised corpuscles in the air, on spontaneous generation, and on putrefaction; sketching rapidly the results of some of his researches, to show the influence of the germs of the lowest organisms present in the atmosphere, especially bacteria and vibrios, upon animal bodies in health and disease, and on our tissues during life and after death, and especially upon the development of epidemic and contagious diseases. I also showed, from the observations of Angus Smith, Chalvet, Eiselt, and Réveil, that germs may be often found in the air of crowded rooms and hospital-wards, which only require favourable conditions for their rapid development.

Now that the influence of bacteria is beginning to assume a more general importance in pathological investigation, I must remind you of the account, which was published twelve years ago, of what I even then thought Pasteur's discoveries were leading us to. I may also say that, in the same paper, I gave some account of the relation of bacteria to splenic apoplexy in sheep; and referred to demonstrations of the presence of living germs in the air capable of reproducing contagious diseases, by Lemaire finding the achorion in the air which had passed over a scalp affected with favus, and by the experiments of Kennedy and Salisbury on the production of measles by the inoculation or inhalation of fungi given off from mouldy straw or linseed-meal. And then, in concluding that paper, after recording proofs—1. That the injection of a certain quantity of pus into the blood produces pyæmia and affections characterised by multiple abscesses; 2. That the injection of putrid matter produces septicæmia, or putrid infection, characterised by the symptoms of typhoid gastro-enteritis; 3. That the injection into the blood of the exudative materials in contagious diseases, as in glanders, produces the general contagious affections; and that, in all these cases, the introduction of the foreign substance or poison into the blood must be regarded as the origin of the disease—I went on to give some account of Polli's antiseptic treatment of these various forms of disease by sulphurous acid and the alkaline and earthy sulphites, showing how they arrest or prevent fermentation and putrefaction, and how it might not only be expected that the living fluids and tissues charged with the sulphites would resist the action of morbid poisons, and that there were proofs that, when the sulphites had been taken, they really altered the actions of pus upon the blood of a living animal, as well as that of putrid matters injected into the blood, and that of a virus distinctly contagious and not putrid.

This was in 1864. It was two years afterwards—towards the end of 1866—that Lister began to treat cases antiseptically in the Glasgow Infirmary, using carbolic acid rather than sulphurous acid or the sulphites but with the express purpose of destroying the organic germs present in the air, or in any of the liquids or solid substances about the patient; or of protecting any wounded or injured part from the contact or development of the germs. How he has gone on gradually perfecting the details of the antiseptic system, I need not describe to you; and the results are too well known to require more than the most passing allusion to the prevention of surgical fever, of pyæmia and septicæmia, the checking the spread of erysipelas after its importation into a ward, the lessening of mortality after both the greater and the more trifling operations, the saving of limbs after compound fractures, the healing of large burns, ulcers, or abscesses, and the general freedom of hospital-wards from noxious odours and matters, and from the introduction of poison from the dead-house or dissecting-room, while the hospital atmosphere is not only purified for the patients, but for the surgeons and nurses.

If all this have been gained since 1866 in Glasgow and Edinburgh, and in other British and foreign hospitals, where the example has been more or less closely followed; if traumatic fever and pyæmia can be kept out of a surgical hospital, why should not puerperal fever be kept out of a lying-in hospital, or be prevented from spreading, if it have been accidentally imported? There has been a great outcry against lying-in hospitals of late; but I trust this Society may be able to guide the feeling rather in the direction of freeing them from puerperal fever than of destroying them. What has been done by reducing the size of a surgical hospital in Edinburgh and in London, the size of the wards, the number of beds in each ward, the number of attendants, and enforcing the utmost care in protecting the patient from any contagious or infectious influence, and in securing the greatest possible cleanliness in all things about her; in reducing the mortality after one of the most serious operations to which a human body can be subjected and still live,—is known to those who have watched the progress of ovariectomy. It is for you to say whether a similar enforcement of obedience to the laws of sanitary science, a more exact observation of the origin and progress of the many different conditions which have been classed together under the one head puerperal fever, and of the treatment called for by each condition; and a

careful attention to the details of the antiseptic system, as it is brought more completely into accord with our daily increasing knowledge of the natural history of the lowest forms of organic life, shall or shall not be your rule and guide henceforth in your daily practice. What I have said in the very hasty and imperfect sketch it has been possible for me to offer in the few minutes you have so kindly accorded to me may soon pass out of your thoughts. But I am fully persuaded that there are many here to-night who will be able to assure us that such a diminution of unnecessary or excessive mortality after childbirth may be hoped for as may relieve you and your successors from much anxiety and sorrow, and, while making your own lives more useful and happy, may raise still higher in national esteem the noble profession to which we should all be proud to belong.

TWO CASES OF INOCULATION WITH THE SEPTIC LOCHIA OF PUERPERAL WOMEN.

By WILLIAM STEWART, L.R.C.P. Edin., Barnsley.

THE elucidation of the nature of the poison and the etiology of puerperal septicæmia, is of such vital importance, and, at the present time, occupies such a prominent place in the mind of the profession, that I feel no apology is required from me for bringing under the notice of the profession the two following cases.

CASE I. Miss G., aged 52, a delicate woman, frequently suffering from hepatic derangement, and the subject of an obscure internal abdominal tumour, said to have followed an injury from a railway accident, called me to see her on Sunday, October 8th, 1871. I found her suffering from most excruciating pain in the right forefinger. The pain was so agonising that I was led to inquire whether she had not scratched or injured it in any manner, when she informed me she had very slightly scratched that finger and the one next to it a few days previously. Upon remarking further that I was afraid she had received some poisonous matter into the scratch, she then remembered having given an injection to a lying-in woman on the evening of the 6th (about thirty-six hours before my visit), whose nurse was very inexperienced, and had neglected to change the patient for several days after delivery. I was informed by the medical gentleman in attendance upon the confinement, that his patient had peritonitis at the time. My patient had wrapped a piece of adhesive plaster round the middle finger, which was therefore quite unaffected, but unfortunately had left the scratch on the forefinger totally unprotected. Here, then, was the clue to the case, decomposing lochial discharge applied to the recent scratch. This case ran a most acute and rapid course. Thirty-six hours after the application of the septic matter, I saw the patient. The finger was then hard and indurated, but not much swollen. The back of the hand was very red and much enlarged. The inflamed lymphatics in red streaks could be seen passing up the forearm; and in twelve hours more, in spite of all measures adopted to arrest the advancing disease, the finger had mortified. The next day, her relatives being very anxious, I met in consultation two neighbouring medical gentlemen, who agreed with me as to the cause of her symptoms; but the gangrene continuing to spread soon involved the other fingers, hand and wrist, and was followed by a fatal termination on the 10th, being ninety hours from the application of the poison, and about forty-eight hours from the time when I first saw the case. Throughout the short course of her illness, the general symptoms were those of high fever, persistent vomiting, and, towards the close, delirium.

CASE II. The poison in this case was introduced from a puerperal patient in my own practice. Mrs. L., a primipara, was delivered by Dr. Heath, my assistant, on October 24th, 1874. Three days afterwards, symptoms of acute peritonitis set in, preceded by decomposition of the lochia and accompanied by profuse diarrhoea, and other symptoms of blood-poisoning. Injections of Condy's fluid into the uterus and vagina were used to disinfect the discharge. These were administered by Mrs. M. (her mother), who, on November 5th, two days before her daughter's death, had inflicted a slight wound with a table-knife over the first joint of her left thumb. The wound being slight, she did not consider it necessary to mention it, or to apply any dressing to the part, but continued to administer the injections without any protection to the thumb. On the 7th, I found her suffering from most violent pain in the thumb, which was swollen and indurated; the wound was gaping and sloughy in appearance, the back of the hand red, shining, and erysipelatous. A free incision on the thumb above the wound, followed in a few days by another on the back of the hand, gave exit to a large quantity of pus, and relieved to a certain extent the severity of the symptoms; but the purulent affection seemed to travel along the cellular tissue of the forearm, which in turn had to be relieved by inci-

sion. The lymphatics were inflamed as high as the elbow, where there was a patch of erysipelas. This case terminated favourably in six weeks, leaving only the first joint of the thumb stiff.

These cases appear to me to be specially instructive; first, because of the danger to which attendants are exposed when it becomes necessary to give vaginal injections to puerperal patients. And I think it becomes the duty of the medical attendant to warn the nurses to take precautions not to allow the discharge to come into contact with any recent wound or abrasion of skin. Secondly, they are exceedingly interesting from their tendency to throw light upon the nature and production of puerperal septicæmia, as they show that the application of decomposing lochia alone to a recent scratch or wound has been sufficient of itself to produce gangrene of the part and death of the patient in the one case, and a very severe attack of phlegmonous erysipelas in the other, although no puerperal condition existed in either of the inoculated subjects. I think we may, therefore, draw the conclusion, that the passage of decomposing lochia over any abraded surface in the vaginal passage is sufficient to produce puerperal septicæmia without the importation of any other specific poison. In this manner, we may account for the disease attacking much more frequently primiparous cases, as the vagina and perineum are much more likely to be slightly lacerated in those than in multiparæ. If it were possible to apply as effectually the antiseptic treatment to these cases as it is carried out by Professor Lister in surgical cases, I have little doubt that as good results would be obtained. Obstetricians too frequently begin to lock the door when the horse is stolen; we wait until there is evidence of decomposition having already taken place in the lochia before steps are taken to prevent or counteract the danger. Cannot some antiseptic means be devised to be used from the time of delivery? I should be inclined to think that folds of antiseptic gauze instead of the ordinary napkin, and an antiseptic lotion for detergent purposes, would be of very great service, and might prove quite sufficient to prevent the setting in of putrefactive change in the discharge.

ERYSIPELAS AND MIDWIFERY PRACTICE.

By HENRY H. HATHERLEY, M.R.C.S. Eng., Nottingham.

THE following case is, I think, of especial interest at the present moment, when the question of infection in relation to midwifery practice is much discussed.

Mrs. II., aged 37, wife of a lacemaker residing in New Radford, came under my care on January 8th last for erysipelas of the face, she being at the time far advanced in her tenth pregnancy. The course of the disease was at first most unfavourable, the whole of the scalp and naso-pharyngeal tract becoming involved. She had great fever and prostration, sleeplessness and constant delirium, and marked difficulty of deglutition. On January 11th, she was confined by a midwife of a live male child at the full term. From January 11th, Mrs. II. steadily improved; the erysipelas subsided; the lochia were profuse, but otherwise natural; the secretion of milk was normal. Both mother and child (who still has the breast) did well.

In this case, parturition, instead of adding an element of danger, appeared to have a favourable influence on the course of the erysipelas, the patient's improvement dating from her confinement. The midwife has an extensive practice, but no harm accrued to any of her patients. I attended about this time nine labours (between January 5th and 22nd), all of which did well, although I took no special precautions to prevent infection.

I think that, as far as any inference can be drawn from this isolated case, it is that the danger of infection to lying-in women from ordinary zymotic disease is less than is commonly supposed, and that a medical man is justified in fulfilling his midwifery engagements when attending infectious cases other than true puerperal fever.

The question of responsibility for infection is a very serious and a very difficult one: to debar practitioners (morally, if not legally) from attending midwifery, whilst attending cases of scarlet fever, erysipelas, typhoid or typhus fever, diphtheria, etc., would not only mean ruin to many a medical man, but would so limit the number of medical men "justified in practising" as seriously to inconvenience the public.

I am one of those who believe that the term "puerperal fever" is applied too comprehensively, and that a more strict definition of this disease would shut out many so-called cases of "puerperal fever". I would ask, in conclusion, the following questions.—1. What proof have we that puerperal fever is not a distinct zymotic poison, incapable of being produced by any common infectious disease? 2. Can it be proved by statistics that puerperal fever is generally of more frequent occurrence during the prevalence of such diseases as scarlet fever, erysipelas, etc.?