

Thesis on

Puerperal Fever

its
causation and prophylaxis

by
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Puerperal Fever, Causation and Prophylaxis.

A practical acquaintance with several cases of this much dreaded disease, and a subsequent reference to the literature of the subject, has determined me on writing some remarks upon it, and selecting it as the subject of my Thesis.

This subject of all the departments in Midwifery, seems the one in which the greatest differences of opinion exist, and many problems connected with it yet remain to be solved. Writers of our text books on Midwifery, fully appreciate the difficulty in treating with this subject (Leishman p. 478). Before being very long in practice however, especially if much engaged in Obstetric work, one soon sees the importance of an understanding of it, considering the frequency with which it occurs, and the heavy mortality accompanying it, a mortality amounting to about 10 or 15% of the deaths occurring in women during the child bearing age, according to the report of the Commission appointed by the Society of Obstetrics and Gynaecology of Berlin. (Zeitschr. f. Geburtsh. und Gynäk., Vol III), For only by a clear understanding of the nature and causes of it, can we formulate any proper rationale of its prevention and treatment.

Doubtless it is met with in its worst and most fatal forms in hospital epidemics, where the intensity of the poison, seems to reach its highest form, with a corresponding virulence in the symptoms, and fatality as to results.

From 1664, probably the earliest record we have of an epidemic, and which occurred at the Hôtel Dieu, in Paris (Paris antiseptic methods in Obstetrics p 63) we have a continuous record of outbreaks occurring in the maternities of the chief European cities. During the latter part of the 18th century, violent epidemics occurred in all the principle towns of Europe. Since 1740

there have been described no fewer than 200 epidemics of this disease (Leishman p. 792). A point worthy of notice in regard to these epidemics is the difference in degree of the intensity of the symptoms, and rate of mortality, occurring in the various occasions, Having in some a very low death rate, in others the mortality being frightful, as in the attack occurring at the Hotel Dieu described by Malouin, where scarcely a single patient recovered (Leishman p. 795), & again on 1st April 1856, an attack broke out at the Paris Maternity, and lasted till the 1st of May. Here the mortality was one death to every six labours occurring. (Garnier These de Paris 1857). Another point is that when it occurred in a large town, at the same time as it occurred in the lying-in hospital of that town, the percentage of cases occurring, and the mortality, were much higher in these institutions, than among women confined at their own homes. In 1773 Young describes an epidemic occurring at the Edinburgh Maternity. He says the disease attacked nearly all the women after the first day of the lying-in, and nearly all the women succumbed, while in the city the puerperal cases recovered more slowly, but there was scarcely a death there, so much so, that he attributed the cause to a local infection, and advised closing the hospital for a long time (Bar p. 64). Again in the Paris Maternity for 1856, the mortality was 1 out of 19. It was only 1 to 387 in the 13th district of the city, so that the mortality was seventeen times greater at the maternity than in the city - and in France the general opinion came to be that Puerperal Fever was developed in Maternity Hospitals (Bar p. 68). And the suppression of these institutions was spoken of. Also Lefort showed that the mortality in all countries was always high in maternities than in private practice, and even in cities where the maternities were conducted

with the greatest care, the mortality was still from 5 to 10 times greater in these institutions than it was among those women who were attended at their homes, and that struck by these results obtained in maternity hospitals, obstetricians have put in practice every resource that hospital hygiene offers. The mortality has diminished in consequence, but it always remained higher than it did in private practice ("Des maternités" Paris p. p. 93. 94)

Theories advanced as to the cause

Hippocrates, Galen, Sydenham, & Smellie all believed it to be due in some way or other to suppression of the lactia. In 1686 Puzos described it as due to derangement of the milk secretion. He held that milk formed from the food in pregnant & newly delivered women, circulated in a confused mass with the blood through all the body. During pregnancy, the milk was most strongly drawn to the uterus by the infant, being necessary for its nourishment, but it sometimes happened that the infant could not use it all, and, therefore, the excess escaped by the vagina, by the breasts, or by the urine, and in the pores & perspiration, It did not, however, always escape, but it became clotted from melting with an acid in the blood, & milk deposits took place in different parts of the body. (Parvins Midwifery p. 564)

For about a century this theory held its ground. The next theory attributed the origin of the disease to some local affection of different parts of the abdominal organs - an inflammation of the uterus and appendages, of the peritonium, of the veins &c, so that it was a Metritis, a peritonitis, a phlebitis &c,

Another school again attributed it to an opposite condition - a general condition - and said it was a true specific fever, a view still held by some, chief among whom is Dr Fordyce Barker, of New York, Up till 1867. however no clear idea of the cause was known. Semmelweis, who, about this time, became

attached to the Vienna Obstetrical Clinic, made a set of observations, He observed, that at the Maternity, during the period the physicians in attendance made no post-mortem examinations, the death rate was lower than during the period they made them; as the following show

From Augt. 1786 to Dec. 1822, the physicians connected with the Vienna Clinic, had not performed any autopsies - During this period 71,395 women were confined in this Hospital; there were only 895 deaths - or a mortality of 1.25%.

From 1st Janry. 1823 to 1st Janry 1833, post-mortem examinations were made, and the mortality increased considerably, out of 28,429 deliveries, 1509 deaths occurred, or a mortality of 5.30%.

For the six years immediately preceding the attendance of Semmelweis, the proportion increased to 9.92%. So he concluded that a poison, whatever the Cadaveric poison was, was introduced by the hand of the attendant, into the genital tract, and caused the symptoms of the fever (Bar p. 66). He never allowed any of the students coming from the dissecting, or post mortem room to make a vaginal examinations without first disinfecting their hands with Chloride of lime, and as a result the mortality dropped to 1.27%. This result, certainly, was very encouraging, and was a clinical proof that decomposing animal matter could be absorbed through the parturient canal, and cause the febrile condition. No doubt, however, this was much exaggerated as a cause of infection. Subsequent observations tend to show that the danger of infection arises very much from the nature of the Post Mortem Examination, or in other words from the nature of the disease (which caused death). It being a well recognised fact that making a P.M. of a case where septic peritonitis had been present, and then attending a confinement, would be hazardous in the extreme, likewise

in Erysipelas and the specific fevers, the danger would be much greater than in cases of death from such common diseases as Bronchitis &c. While acting as House Surgeon at the Glasgow Maternity, I had to check some students for going to the dissecting room while taking out their cases. I carefully observed several cases they had attended, but failed to trace any septic influence. At the same time I believe, in all cases, the strictest precautions should be enjoined, so that even the possibility of danger from such a source would not exist.

The observations of Semmelweis threw a new light on the subject. They pointed to a local infection, but what the poison was remained undetermined. In 1857 the discovery of the lactic acid fermentation by Pasteur, with the subsequent discovery of the germ theory by Sir Joseph Lister, threw a new light on this point. The germ theory, applied first to Surgery, very soon found practical application in Obstetrics. In 1850 Sir James Y. Simpson published a paper on "The analogy between Surgical & Puerperal Fever" and the view now generally held is that this analogy, as pointed out by Simpson, is really an identity, that Puerperal & Surgical Septicaemia are practically the same thing. That it is in reality a puerperal infection, with or without, pyaemic abscesses.

The following experiments shall be briefly alluded to, so as to follow, in detail, the points which led to the present theory.

Septicaemia

If organic matter be exposed to the air, it decomposes or putrefies. Many organisms are present, mainly the Bacteria Ferments, and a common bacillus. These will grow if exposed to the air. One organism, however, will grow only if not exposed to the air. This Pasteur has managed to cultivate, and on injecting it into an animal rapidly causes septic poisoning. It occurs in

the form of threads or sticks, varying in size, and which are movable. This organism will grow in the closed cavities therefore, as the peritoneum, connective tissues spaces &c.

Lyarmia

In his researches in relation to metastatic abscesses, Pasteur has isolated a pyogenic organism or micrococci, which is both aerobic and anaerobic. It occurs in the form of very short rods, turning or twisting on themselves, of a gelatinous appearance & flexible. Later all movements cease, it becomes constricted, & forms the double microbe or diplococcus

Again Davaine injected into the subcutaneous tissue of rabbits a small quantity of putrid or blood, and caused rapidly fatal septicaemia, which he could reproduce in other animals by introducing some of the blood of the affected animal. It was at first supposed that by repeated injections from one animal to another, the virulence of the microorganisms was increased through each generation, and so that a smaller quantity of blood was required for each subsequent injection. Later investigations, especially those of Gaffky & Dawdeswell, have shown the fallacy of this, and that the maximum of intensity of the virus was reached in the second, or at least the third generation. A greater quantity of the blood of the first animal is required, because it dies from the combined effect of the first injection of putrid fluid, and before the bacteria have multiplied to such an extent in the blood, that some of them are contained even in a very minute fraction of a drop.

Coke & Kelts produced a similar septicaemia in rabbits, by injecting blood from a puerperal patient (Virchow und Hirsch, Jahresbericht für 1886, 1, p. 195)

Panum (Arch f. path anat und phys. t. 1, p 368) macerated putrefying shreds of flesh. filtered & boiled the filtrate, on injecting the filtrate into animals he could produce toxic symptoms.

These experiments have received fresh support by the discoveries of the ptomaines by Gauthier & Selmi, (Selmi, *Vierteljahrsschr. Archiv.*, t. LXXIX, p. 563. Gauthier, *ac méd.*, 1882-83) & Bergmann has shown that sepsine like all ptomaines can be produced only by the fact of the presence of living microbes (Bergmann, *Allgemeine Chirurgie von Huxtor*, p. 545). Dr L. Rouget in an inaugural dissertation (*Thèse de Genève* 1887) states that he has succeeded in isolating certain ptomaines from the urine of puerperal patients.

In 1879 & 1880 Pasteur (*Bulletin de méd.* 1879) in putrid lochia showed the presence of organisms, micrococci, vibrios and bacteria conveyed by air, in contact with the genital wounds. In some cases he discovered, in the blood of patients the microbe en chapelet. In pus from the peritoneal cavity of those who succumbed to puerperal infection he showed the presence of the microbe en chapelet, sometimes alone, sometimes associated with bacteria or the pyaemic microbe. In 1880 Dalmis, in his inaugural thesis, found the microbes capable of penetrating into the genital passages are variable in form, quality, & quantity. He found the chain like organisms in the blood & lymphatics. He isolated the pyaemic micrococcus. & in one case, an hour after death, he isolated a form of septic bacillus in the blood of a patient who rapidly succumbed. He says he can classify the forms of puerperal fever according to the organisms found. His classification is as follows

I. Rapid acute septicaemia, which kills without any notable local lesions. In this form he finds the chief microbe to be a moving bacillus, which in rare cases appears early, both in the lymphatics & blood. In the cases observed micrococci were always found in the lymphatics.

II. In a less rapid form of the disease there is a tendency to suppuration, the lymphatics & the peritoneum being chiefly affected.

A micrococcus growing readily into chapelets is the chief microbe, found abundantly in the lymphatics. The same septic bacillus as that seen in the last form is found also in the lymphatics, and appears in the blood only shortly before death. This septic bacillus appears to correspond with the microbe observed by Pasteur in rapid forms of puerperal septicaemia

III. In forms characterised by thrombosis & phlebitis, and tending to Pyaemia, micrococci were found in the blood, these were in small quantity, and could frequently only be obtained in certain parts of the body, not everywhere throughout the vascular system

IV. In slow forms of the disease, associated with phlegmon, or tendency to metastatic abscesses, and accompanied by great anaemia, micrococci were also found in the blood. In cases where the haematie lesions existed alone, cultures from the blood showed only double points and Xoozlea. When it was accompanied by phlebitis and infarctus, the almost constant form in cultures, was that of double points in enormous quantities. Chapelets appeared late or not at all. When there was also lymphatic lesion, with development into abscesses, cultures of the blood gave rise almost constantly to long chapelets, similar to those found in the lymphatics

Dohis showed that, during life the microbes can be seen in the blood in very small quantity, as the movement of the blood hinders their development, but that when some of the corpuscles become agglutinated, and form an embolus in a small vessel, the microbes multiply rapidly in & around the embolus. In some cases of acute septicaemia, he found the blood swarming with bacilli, shortly after death, which, after such a short interval, he considered could not be the result of the multiplication of the ordinary bacilli of decomposition - Here no doubt the multiplication of the bacillii

was hindered by the blood current, & the oxygenation of the blood, during life, and they were constantly being eliminated from the system, but as soon as the blood became stagnant, after death, they rapidly multiplied in the blood. A point of practical importance may here be noticed - some practitioners have given up practice for some weeks, after the occurrence of some cases of puerperal septicaemia in their practice, and used disinfectant measures during the time they were off. On resuming practice fresh cases have occurred. While micrococci, bacteria, & bacilli are killed by antiseptics in general use, the spores of some forms of bacilli have been found to resist boiling for fifteen minutes, solutions of carbolic acid 1-10 - and even solutions of perchloride of mercury 1-100 (Klein, microorganisms & disease p. 190) so that in the cases mentioned probably the spores had been carried about by the medical attendant as on his hands, and these would resist the action of the antiseptic agents he had used. After rapidly fatal cases of it, therefore, special precautions should be taken, before attending another case.

Having traced the experiments in relation to micro organisms thus far, I will now give some cases that have occurred in my own practice, and see how far their origin bears out with what has been written,

Case I, Mrs H —, aged 36,

This case was attended during the confinement by a midwife or general sort of nurse, on the fourth day I was asked to see her - she said the day previous she had a cold, creepy feeling over her head, just like what she had felt when taking a cold in the head. Her temperature was 103.6, Lochia very scanty & offensive, Bowels constipated, She complained of a feeling of nausea & vomited almost everything she took, There was

considerable tenderness on pressing over the uterus, the abdomen was slightly distended, She got a uterine clauche 1.3000, when some clots were washed away. Turpentine stupes were applied to the abdomen. An enema of castor oil & soap was given. Powders of Iucine 2 gr, & powdered opium 1/2 gr. were given every three hours. Next day the temperature was 100° - the nausea was diminished, and the tenderness over the abdomen was much less. For the next two days she got a vaginal clauche morning & evening. of warm water to which some tincture of Iodine was added. about 3i to the quart of water, she quickly got convalescent, & was able to sit up on the 10th day.

Case II Mrs Y - aged 29, 3 children previously -

After coming for me to go to see Mrs H, the previous case - the midwife went back to her, to arrange the bed & sponge her before I should go. While doing this she was asked to go at once to attend Mrs Y, as the labour would be over unless she went at once. On arrival, she found the head of the child was almost born, the delivery being over about twenty minutes after she entered the house. This would be about ten o'clock in the morning. On the evening of the following day she had a chill, and next morning I was asked to see her. Her temperature was 104.6°, pulse 110 - Lochia almost entirely suppressed, great pain over the lower part of the abdomen, she complained of severe headache, with sickness & vomiting. On introducing the hand into the uterus to give a clauche, the interior felt hotter than normal & the surface had a soft smooth feel, The sensation imparted to the hand was very much like what I have noticed in white swelling of the knee joint, if after amputation you make a section through the swelling & touch it with your hand,

The treatment here was the same as that adapted in the previous case. Next day (4th) the following was the condition. Temperature 104°, pulse 112, hard and firm, headache worse, the abdominal symptoms were not any relieved, & slight distension was noticed. The skin was hot & dry. I drew off some of her urine with a catheter, & on testing it found it contained some albumen. The sickness was very bad. 5th day. The symptoms were worse. The abdominal distension was greater, & the pain was so great she lay with her knees bent, and she could not bear the weight of the bed clothes. Diarrhoea was present, and the urine was very scanty. Her breathing was quiet and shallow, pulse 120, soft & compressible. Vomiting took place without any effort, came up they told me like in water brash, or in other words the vomiting was almost involuntary. Antipyrin, in 15 gr doses, was given every two hours till three doses were given. The temperature being reduced to 100°. Carbolic acid solution 5% was given instead of the corrosive sublimate on account of the large amount of albumen in the urine. Turpentine stupes had been applied to the abdomen, till the surface was almost raw, & then hot linseed poultices were applied. An emetic of ipecacuanha was given but with no good result. All the nourishment consisted of a little barley water, & an egg beat up in milk & a little brandy added. with a little ice champagne to allay the sickness. On the same day diarrhoea came on. & 1/4 gr morphia suppositories were given. On the 7th day turpentine 30 m, with 10 m eucalyptus oil was given every four hours. The case went gradually worse. The diarrhoea became dark coloured. On the morning of the 8th day the pain seemed to lessen, and she died at night. The following

was the result of the P.M. examination. The uterus was large & softened. The internal surface seemed almost gangrenous. The part which had been occupied by the placenta was in a state of ulceration; on part of the mucous membrane there was a false membrane which I could easily strip off. The peritoneal cavity contained a whitish fluid, much like what I saw in a case of chylous ascitis. There was a lymphic exudation on the part of the peritoneum covering the uterus and broad ligaments.

On introducing my hand into her uterus, the first day I saw her, to give her the uterine douche. I swept away with my hand a small quantity of purulent like liquid. I put this into a glass vessel, & added a little dilute phosphate of soda solution. I injected some of this into three rabbits subcutaneously. One of them died in about ten hours, another died some hours later, while on the third rabbit I did not notice any effect. Immediately after the first rabbit died I injected some of its blood into another rabbit & it died in about six hours. After the post mortem examination I tried some of the peritoneal fluid and found I could produce the same septicaemia in another rabbit. But here I only produced it in one out of the three I tried it on. Again taking a little of the fluid, removed from the interior of the uterus, I diluted it with some water, boiled it for about half an hour in a glass retort. I then filtered it & injected some of the filtrate into two rabbits repeatedly, but with a negative result. From these experiments I concluded that the cause of the febrile disturbances in these cases was some micro-organism, or living matter, which was capable of rapid development, and which was capable of being destroyed

by the action of a high temperature

How had this organism reached the woman?

On questioning the midwife very closely, she told me that her son had a sore on his leg, which she washed and dressed every morning. On going to look at it I found a nasty suppurating wound, which had been caused by a blow from a pick while at work. Round the wound the skin was red & the subcutaneous tissue much infiltrated, in other words a condition of erysipelas was developed. The conclusion I arrived at was that the infection had been carried from this wound to Mrs K- in the first case, & had been communicated to Mrs J-, in a more concentrated & virulent form. The haste she was called to Mrs J, while attending on Mrs K- would insure that her hands if washed at all, got a very imperfect cleansing. Here as shown by Davaine's experiment the intensity of infection is much greater in the second generation

Case III, Again about eighteen months ago I was asked to see a patient who had been confined about ten days previously. On arriving at her house along with her medical attendant we found she had newly died, the latter told me she had had a very difficult labour. He first tried to turn the child, but failed, and had afterwards to deliver her on the floor with forceps. In one or two days her condition became highly febrile. She went gradually worse each day, and pyaemic abscesses had developed in her joints. She was treated I think with Iodine- and salicylate of soda. On feeling her uterus just after death, it was enlarged, very soft & flabby. On speaking to the Dr afterwards, who was an intimate friend, I found he paid no heed to any antiseptic

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precautions. He merely washed his hands & the instruments in warm water, and used a little of the soap as a lubricant for the instruments. After using the forceps they were merely rubbed with a cloth to dry them, and the only thing done before using them to another case was to put them in warm water, so that I had no doubt but that in this case the septic material had been conveyed with the instruments.

Case 17, while acting as house surgeon at the maternity, shortly after I went, I saw two cases which had been attended by students, where the woman was in a slightly febrile condition, very offensive lochia, & pain at this side of the uterus, which was much increased on pressure. After giving a uterine douche, or at most two, the temperature would become normal, & the lochia lose their offensive odor. I never found any of these cases which had been attended by the nurses. I also on going out with the students to their first three cases, impressed on them the necessity of thorough cleanliness of the hand before each examination, & never to examine after expulsion of the afterbirth. As a result I never found any more of these cases. The fact that one of the students told me he had introduced his finger high up into the vagina, after expulsion of the placenta, to see if any shreds of membrane were left, seemed to me to prove that some organism, the ordinary germs of putrefaction, had been introduced by the finger, & finding a suitable nidus in the blood clots & inside the uterus, had developed & set up putrefactive processes, & that certain poisonous materials were absorbed by the lymphatics, causing uterine lymphangitis, the slightest form of puerperal septicemia. I have seen one or two of these cases occurring in the practice of midwives & do not wonder at it, considering that many of them

especially among those not recently trained, or probably not trained at all, after making a vaginal examination, simply dry their finger on any dirty cloth lying about, considering it a pity to use, or to dirty a clean cloth - & as a lubricant use either a bit of lard, or any kind of oil lying about the house - probably using nothing at all. It is quite easy to understand, if the confinement last 12 or 24 hours, & several examinations be made at various intervals during this period - the ordinary germs of putrefaction would find a suitable nidus in the secretions left on the finger after such examinations, and be easily conveyed to the genital tract at some period of the labour, and so set up putrefaction in the uterus, from repeated observations. I am convinced that this condition of lymphangitis, is frequently set up from this cause.

Escherich has shown the presence of pyogenic cocci in the milk of women suffering from puerperal fever, and Longard has confirmed this, & these investigators have made experiments on animals, which have just brought forth young, which show, that very shortly after the injection of these organisms into the blood, they appear in the milk (British Medical Journal, March 3rd 1888, p. 403).

What is the relation of Erysipelas & the Specific Fevers to puerperal fever?

Erysipelas

This disease occupies a sort of intermediate position between the typhoid & the non-typhoid diseases. Lehleisen has shown that this disease is due to the presence of a coccus, which is not a pyogenic organism. He has obtained cultivations of the organism, & proved it caused the disease, by inoculating the ear of a rabbit with cultures of the organism, Again the streptococcus pyogenes is especially associated with phlegmons,

& erysipelalous macerates, where the pus occurs in the form of infiltration of the tissue, accompanied by death of portions of tissue, this organism, the streptococcus pyogenes, is pyogenic, and is the chief organism of pyaemia (British Medical Journal Feb 25th 1888 p. 207). The German School who maintain that all puerperal fever is identical with surgical septicaemia, scarcely deny that Erysipelas has a close connection with puerperal fever, and while denying that a typhoid disease can cause a condition, in the puerperal woman, indistinguishable from septicaemia, they are obliged to differentiate phlegmonous from superficial erysipelas, regarding the former as merely a septic inflammation. In this form of erysipelas, as noted before, the pyogenic streptococcus pyogenes is present, The relationship Erysipelas occupies has been specially noted in hospital practice. In general hospitals, where there was a lying in ward, it has been noticed that erysipelas has prevailed in the Surgical wards, & puerperal fever in the lying in ward at the same time, and the results were so disastrous that such wards were abandoned (Leishman p. 780). In the Medical Press & Circular for April 1877, Dr Attkill records the outbreak of a series of cases of puerperal fever subsequent to the accidental introduction of a case of erysipelas into one of the wards of the Rotunda Hospital. In Leishman's Midwifery p 793, a medical man is recorded to have attended ten cases of confinement, between 8th Jan. & 22nd March. They all had puerperal fever, and eight of them died. During this time he was in constant attendance upon a patient suffering from gangrenous erysipelas - from the first case I noted before I have no doubt myself, but that it was communicated from a case of erysipelas of the phlegmonous variety,

Scarlet Fever & other typhoid diseases

In Guy's Hospital reports, Vol LXIV, Mr Hauser records an

outbreaks of scarlatina in Guy's Hospital, in which patients having wounds specially suffered, and the rash after commenced in the neighbourhood of the wounds, so that scarlatina like erysipelas can take the form of a traumatic infective disease, so that if viewing the uterus, immediately after labour, like a wound, it could be understood how scarlatinal poison could commence in the uterus & spread through the system. A great point under discussion just now, in reference to this subject is, if the scarlatinal be conveyed to the puerperal woman can it produce anything in her but scarlatina, modified of course by the peculiar conditions of her state? To this question many among whom may be noted Matthew Duncan answer no. In Leishman p. 781, it is stated that we may have the course of the disease running with extraordinary rapidity & violence, without any or very trivial traces of eruption, without soreness of throat, in fact without any of the typical signs of scarlet fever, and that a previous attack of scarlet fever does not afford to the puerperal woman the same degree of immunity against its recurrence, which it does to others. The question here is this - is the almost entirely masked character of the disease, its septic nature, and fatal character, not explained by assuming it to have been a case of local infection, and that in cases, where we have the usual symptoms, with an ordinary course, the infection has been through the ordinary channel? The difference in the character, and result of this obstetrical form, from Surgical scarlet fever, which generally causes such slight disturbance, can be easily explained by the state of the puerperal woman, the great local changes of which the uterus is the seat, and the great general disturbance consequent on the new function called into play. At the Obstetrical Society of London, Dr. Broad

read a paper on "Scarlatina during pregnancy & in the puerperal state" and arrived at the following conclusions (British Medical Journal, March 17th 1888, p. 589).

I The infection by the poison of scarlatina generally produced in the puerpera, a disease which presents for the most part the usual symptoms of scarlatina, & runs the ordinary course of the disease without the appearance of septic manifestations

II, That the disease, in addition to the usual symptoms of scarlatina (to a certain extent modified) may occasionally present signs of septic poisoning. That, when present at the outset of the disease, pelvic inflammation and septicaemia may usually be regarded as accidental complications, but, at a later stage, such signs may be the expression of a septic process, analogous to the secondary throat of ordinary scarlatina

III, That in rare instances the disease may assume a masked form, in which the ordinary signs of scarlatina are absent, or so slight & evanescent, as to escape observation, and that, in some such cases, the only manifestation of the illness may be found in signs usually referred to septic poisoning. At the discussion which followed the reading of Dr Barall's paper, Dr Dolan, of Halifax, & Matthew Duncan did not believe that puerperal women contracted scarlatina so readily as was generally supposed - Dr Dolan states that the puerperal death rate did not rise in Halifax during scarlatinal epidemics. Matthew Duncan stated that when scarlatina raged in London, causing 25-0 deaths a week there was no increase of puerperal fever.

Dr Galabin arrives at the following conclusions, from an examination of the cases collected by the Collective Investigation Committee (British Medical Journal, April 30th 1887 p. 923).

I, The puerperal woman has a special susceptibility to the disease, while in pregnancy there appears to be an unusual immunity

II While the mortality of the disease is much greater than usual, generally from 20% to 50%, this mortality is not due to the throat affection, which is almost always slight.

III It is not unfrequently accompanied by local lesions of the pelvis & peritonium -

So that scarlatina in the puerperal woman shows diminution of some of its own special symptoms, greater fatality, and the addition often of some of the symptoms usually present in puerperal septicaemia.

The following is my own experience.

In the latter part of 1886, there was an epidemic of Scarlet Fever at Maybole, Ayrshire. While daily attending some cases of the fever, I also attended at the confinements of several women. In one case when I arrived the child was born some time & I had to remove the placenta by introducing the hand into the uterus. All the cases made good recoveries, developing no unfavourable symptom during the puerperium. One woman did die from some septic condition some days after labour. The medical attendant had seen some cases of Scarlet fever, but whether this had anything to do with the cause I am not aware. No other cases, during the epidemic, developed any septic condition. Dr. Givau, one of the medical men, told me at that time, he confined a young married woman. On visiting her the day following, a child about two years old was in bed beside her. On looking at it he found the child covered with a scarlatinal rash. The mother told him she allowed it to come in beside her because it had not appeared very well - The mother made a normal recovery, & developed no symptom either of scarlatina or any septic condition. About the same time I was asked to see Dr. Mc Dougall of Givau, the day before he attended a confinement, but did not feel very well. During

the night he attended another confinement, while here he found his throat so sore he could scarcely swallow. On seeing him next day I found him covered pretty extensively with the scarlatinal rash, typical sore throat &c. Several cases of scarlet fever occurred in Ginnar at the same time, I saw both of the cases he had confined, while he was actually suffering from scarlet fever - and they made a normal puerperium. Last summer and autumn

I attended about 150 cases of measles, & several cases of scarlet fever. At the same time I had to attend midwifery cases where I had to use the forceps six times, perform turning once, & removed the placenta in two cases. They had all a normal puerperium. Only a fortnight ago I attended a case of scarlet fever. The grandmother of the child, who practices as a midwife, lives in the same house & took part in the nursing of the child. For the first four or five days she went about attending as usual, though she had been told not to, and I did not know of any case going wrong. These cases lead me to the conclusion that the danger arising from scarlatina is overestimated, if one only takes great caution in the use of local antiseptics to thoroughly cleanse the hands, at the same time admitting that the patient herself is more liable to catch the infection owing to the puerperal state, than she would be if in her ordinary state of health. That if she did take the fever it might run an ordinary course, or that inflammation of some of the pelvic organs might ensue, in which case, owing to the septic condition which arose, the prognosis was more unfavourable than in an ordinary case. Or that the poison of the fever may be directly conveyed to the puerperal woman by the hand or by infected sponges &c, conveyed through the genital tract that is to say, and that

here the nature of the scarlet fever was quite masked, it assumed a septic character, there being inflammation of the pelvic or abdominal viscera generally. It is of a rapidly fatal form.

The poison of other specific fevers may cause puerperal fever as Typhus Fever (Leishman p 793). Variola & Enteric fever, (Leishman p 782)

Drain poisoning

During the very warm weather last summer I attended a case, where the confinement took place in the back room of the house. Immediately below the window there was a cess pool, owing to the scarcity of water, due to the dry weather, a very bad smell arose from it, which penetrated into the room. Several of the people in the house complained of a sore throat, which I also caught myself. The tonsils were enlarged, greyish in colour, along with a swelling of the glands of the sides of the neck. The woman did not complain of her throat, but about the fifth day instead of improving she developed a febrile condition. The lochia became offensive, & thinner in consistence, like dirty water, she had slight pain over the uterus. A uterine douche only afforded a very short improvement. At my suggestion she was removed into a front room which was large and airy. She immediately began to improve & recovered in about a week. Was this a case of puerperal fever? If so, was it due to the same poison which caused the sore throats? - I think this cause might fairly be put in the same category as scarlet fever, diphtheria &c. In the ordinary state of the body, it affected the throat, in the puerperal condition, it seemed to affect the uterus, interfering with the cycle of changes, going

on at the time, and of which the uterus is, at the time being the seat, so to speak, producing a condition analogous, at least, to puerperal fever, or which I believe to be really a form of puerperal fever.

Much yet remains to be discovered as to the relationship of micro-organisms to puerperal fever. By Cultivation & Experiments on animals; it is to be hoped that many obscure points will be cleared up. Probably the differences in form of the disease, some being marked mainly by rapid septicaemia, some by peritonitis, some by thrombosis & phlebitis, others again by slow pyaemia, may depend upon the difference of species of micro organism specially concerned, but, by a thorough application of our present knowledge, to prophylaxis and treatment, much has been done to combat what is most properly regarded as a most grave disease, & what, when it used to occur in the form of hospital epidemics was such a dreadful scourge.

In this disease, as in most others, there are some predisposing causes, which may be mentioned

I. Season of the year; or the relations of meteorology.

Baines has demonstrated that puerperal fever prevails most fatally in the winter (British Medical Journal, Nov 12th 1887 p. 1039). During the puerperal condition the aqueous vapour, carbonic acid, and organic excreta, given off by the lungs and skin is increased. To get rid of this excess the air must be comparatively dry - to absorb the water discharged into the lungs, & it must be warm that it may not check excretion, & that its tension may favour diffusion, or the due interchange of Carbonic acid for oxygen, and carry off & convert more freely the organic matter, so that it is seen the diffusive power of the air is a most important matter, of course during winter the air is often saturated with moisture, as in foggy and

misty weather. In this condition the air is nearly stagnant, and consequently its diffusive power is much reduced

II. Bad Insanitary conditions

This has already been referred to, where removal to another room effected a beneficial change in the condition of the patient. The effects of overcrowding in Maternities is also well known. Another point in connection with this is, confinements often take place on the second or third floor. The drains and water closets are below this, or as in a farm house, where manure heaps generally are in the vicinity, percolation may readily take place to the basement of the house. In winter time a fire is generally kept burning night & day, the windows in the room being usually kept shut, the air in the room quickly gets exhausted, and a fresh supply is drawn up from below. It can be easily understood, therefore, how polluted air, contaminated it may be with the germs of infectious diseases, may occupy the lying-in room, in the presence of these bad insanitary conditions

III. Mental or emotional conditions of the patient

Some obstetricians properly regard this as a predisposing cause, Sloan, speaking of autogenetic septicaemia, does not believe the patient's blood becomes poisonous, but that predisposing emotions, by diminishing the resisting power of the patient, caused decomposition of the lochia, which were also in that state more readily absorbed

IV. The strumous Diathesis, & other dyscrasias

V. Haemorrhage

If this much exceeds the normal amount, the rate of absorbtive power is greatly increased, and any noxious matter in the tissues, or the parturient canal is more liable to be absorbed,

VI. Relaxed condition of the uterus

This is generally associated with Haemorrhage, but may not, as in the case of a very tedious labour. This condition acts by favouring the retention of clots & by producing a certain amount of suction action.

VII. Good health, mental & physical, of the patient

Watson Cheyne states that in experiments on the presence or absence of organisms in the living tissues, that while organisms were absent when the animal was in a good state of health, yet, if the vitality of the animal became in any way depressed, as by administering large doses of phosphorus for some time, organisms could be found in the blood & tissues of the body at times. If of a putrefying fluid, not containing pathogenic organisms, varying quantities are injected into the circulation of animals, it will be generally found that after twenty four hours, the organisms have entirely died out in those animals which received a small dose, while in those in which a larger quantity was injected, or in other words, in those whose vitality was depressed by the introduction, at the same time, of a quantity of the poisonous chemical products of these bacteria, organisms may still be found alive. (Brit. Med. Jour. March 3rd 1888 p. 454). and Kocher has shown, that by injury to a bone in dogs, he can cause acute osteomyelitis, if the animal be afterwards fed with large quantities of putrid material. He holds that during the process of some wound, or inflammatory disease, if the digestive organs are very much out of order, organisms may multiply to a great extent in the intestinal canal, & may enter the blood, and reach the seat of the local injury or disease (Brit. Med. Jour. March 10th 1888 p. 525). While House Surgeon at the Royal Infirmary I have often noticed how much more apt you were to have sloughing, and foul discharges from a wound in an unhealthy

strumous & ill fed person. Under this heading would be included a healthy state of the secreting organs. as the kidneys, skin, &c. If these be at fault poisonous matters will be stored up in the blood, and so favour infection.

VIII, Birth of a male child, and primiparous cases occurring at a more advanced period of the child bearing age, these predispose because of the greater traumatism, and the more frequent use of operative means &c.

Treatment

Treatment will be referred to, from a point of view of prophylaxis. This will chiefly consist in a practical application of what has gone before. The following are the chief indications

- I. Keep up good health in the pregnant woman, physical and moral
- II. Let the confinement take place in a well ventilated room, & the air that is circulating in the room be as pure as possible
- III. Thorough asepticity of the hands of the attendant, and of any instruments, sponges, cloths &c. that may be used
- IV. If the attendant be attending, at the same time, any cases of the typhoid diseases, or erysipelas, or engaged in dressing any foul or suppurating sore, as an open cancer, great precautions must be taken not to convey any of the germs to the puerperal woman
- V. During labour make as few examinations as possible, and never unless necessary after labour. Limiting the duration of labour, Preventing any part of the placenta, or pieces of membrane remaining in the uterus, Preventing injuries, Endeavouring always to obtain firm contraction of the uterus following delivery, and attention to the cleanliness of the patient during the puerperium.

I for prevention of puerperal fever the preparatory treatment of the patient before delivery is of great importance. During pregnancy she should not be treated by her friends as if she were an ordinary invalid. She should be encouraged by her friends to take daily, moderate exercise in the open air, walking being probably the best form. Her diet should be generous and nutritious, but not stimulating. Injudicious friends should not talk to her about the dangers to be encountered, or recall to her mind any cases she may have known to have died during their confinement. As in the case of a young woman here, who received a letter from her mother telling her to be sure and have the attendance of a medical man at her approaching confinement, and in the same letter telling her about a young married woman in her native town, who had died, not long before, in her first confinement. This knowledge had the effect of putting her into a highly nervous condition. Instead of this her mind should be kept off her approaching condition as much as possible, and kept in a cheerful state. If the tone of her health gets below what it ought to be, she should get a course of tonic treatment, as the ordinary Quinine and Iron mixture. A formula I have found to agree very well is, Citrate of Iron & Quinine, 2 or 3 gr. 20 M. spt. Chloroform, made up with a little infusion of Quassia and water, to be taken three times a day. An occasional tepid bath, to keep the skin in a healthy condition is to be recommended, and the bowels should not be allowed to get costive, but kept regulated with simple aperients, as castor oil, Casearia sagrada, or some of the mineral waters as Hungaryi János or Friedrichalle. It is most important that the glands, as the liver, kidneys, lungs & skin, should be kept in a good working condition. Immediately after labour we have

a disintegration of the tissues, built up during gestation, commencing to take place. Absorption is very energetic, & consequently large quantities of effete matters are thrown into the blood. If the secreting apparatus be at fault these are not properly eliminated from the blood but become stored up in it, and, according to Barnes give rise to an autogenous form of puerperal fever, with considering any external poison at all, as bacteria, as a causation. At all events, there is no doubt at all, but that, given the other condition of infection, as the entrance of bacteria through a wound in the genital canal, these germs would find the blood in a fit condition for rapid development.

II, The room the confinement takes place in should be a well ventilated and well lighted compartment. The lying in room, if possible, should face the South, as a room facing this position is generally warmer, lighter & drier. A fire should be kept burning in the room. This causes a current of air & at the same time keeps the air in the room warm & dry. Should the room be on the second or third floor, with the water closets & drains beneath, to prevent air, probably contaminated, coming up from below to replace that exhausted by the fire, it is well to keep the door shut & let the fresh air come directly from without, either through the open window, or if that be too cold, by such a contrivance as Ellison's conical ventilators. Among the lower classes it might happen that shortly before the confinement, there had been an infectious case, as Scarlet Fever, in the same room as would require to be used during the confinement. In this case the room & furniture should be well disinfected before the labour, as by fumigating it throughly with sulphur fumes, washing the walls & ceiling with chloride of lime, &c. Should the same bed & bedding

require to be used, as that on which an infectious case lay, as I have found happen among very poor cases, it is most important to have them disinfected too, where practicable, as in a large town, to have them submitted to the influence of hot dry air, about 150°C , for some time, or if in the country, the whole bedding should be well boiled, unless such material as straw or chaff be inside the bed, which in that case ought to be burned. After labour any vessels containing blood P° , should immediately be removed from the room, and any discharges from the patient should be taken out at once.

III, Cleanliness of the hands. This is one of the most important points. The following is the method I prefer to adopt. The nails should be kept short, the hands are to be well washed in hot water, with carbolic soap, with a vigorous use of the nail brush, the nail brush to be used not only to the ends of the nails but also to the roots, the hands are then soaked for one minute in a solution of Conosiv Sublimate 1-1000. Afterwards pure water is poured on the hands, or they are rinsed in clean water. They are then dried & the fingers anointed with carbolic vaseline 1-40 - Every time a fresh examination is made the fingers should be dipped in the sublimate solution previously, which should be kept at the bedside for this purpose. The method we were taught at the Patenda Hospital was, 1st thorough scrubbing for a couple of minutes with carbolic soap and a nail brush in a 5% carbolic solution, 2nd rinsing in fresh carbolic solution, 3rd soaking the hands for a short time in a 1-500 sublimate solution, Iodised water is preferred by some, in preference to either a carbolic or Conosiv sublimate solution. I have used it but prefer either of the other

two substances. After washing the hands well in soap and water, using the nail brush also, they are then put in pure water to take all the soap off. Afterwards they are rinsed in a solution made by adding a drachm of liquor iodi to about a pint and a half of warm water, the objection to this method is the skin of the hands gets discoloured, dry and hard, and is apt to crack - Many substances are used as a lubricant to the finger among which may be named carbolic oil 1-20, Sublimated vaseline 2 to 3, eucalyptus oil & vaseline 1-7, the most common however being carbolic vaseline 1-40, Benzocated lard, or lanolinum, which is expensive however, is preferred by some to vaseline. Whatever lubricant be used it is best carried about in tubes similar to artists colour tubes. All sponges, catheters, tubes &c, before being applied to the patient should be dipped in a sublimate solution 1-1000, & any sponges, vaginal tubes &c that have been used to a case of puerperal septicaemia, should never be used to any other patient, in case of coming infection, but should be destroyed. If the hand should have to be inserted into the uterine cavity, the forearm up to the elbow, as well as the hands, must be washed in the antiseptic solution, when I require to use forceps, in order to render them aseptic, I first pour a sufficient quantity of boiling water over them to cover them, taking them out of the water I then put them in a carbolic solution 1-5, & wash them with a piece of flannel cloth, the handles are washed as well as the blades, & special attention is taken to clean about the locks, If the forceps be nickel plated I now put them into a solution of corrosive sublimate 1-1000, instead of the carbolic solution. but if the instruments be not plated, the sublimate will stain them.

IV. If attending some of the zymotic diseases as scarlet fever are you justified in attending at the same time to obstetric work? - Whatever theoretical reasons can be advanced against this practice, a medical man engaged in the routine work of his profession must do it. Speaking of my own experience and I have attended cases of scarlet fever, measles, diphtheria, & enteric fever, & at the same time engaged actively in obstetric work, I have never seen any bad results following. Before going to a confinement I change all my clothes if I have been previously seeing a fever case. In a few cases I have also taken a warm bath & used carbolic soap to wash with - I do not know if this be essential - Some authorities recommend a disinfectant bath - while at the Copenhagen maternity, suspected persons have first to enter a disinfecting chamber before entering the wards. These two last methods, particularly the last one, I consider going to the extreme, & certainly, at least, my fitted for hospital practice. A more essential thing than these I consider to be thorough case as to the absolute cleanliness of the hands, by carrying out the method already spoken of, and while attending the labour I merely go into the room occasionally to see how the case is progressing, & do not stay in the room longer than is necessary to make an examination. I make as few examinations as possible. During the intervals, if the weather be favourable I keep in the open air - if not I sit in a room removed from the labour room, or even sit in the next house.

V. During the labour we should confine ourselves to making as few examinations as is necessary, by this the danger of introducing septic germs by the fingers is lessened.

This should be more particularly observed after the labour is over - The labour should not be allowed to be too protracted, and in some cases the timely application of the forceps is advisable. This acts beneficially, in several ways. (A) It may prevent contusion of the soft parts - where the labour is apt to be slow & lingering, the presenting part by pressing on the soft maternal tissues may produce serious contusions, leading to sloughing (B). The uterus may get worn out, so that after labour we do not get firm contraction, Clots of blood or shreds of membrane are therefore more liable to be retained (C) The vital resisting power of the patient gets reduced by a very protracted & painful labour, and absorptive power is increased (D) In very long cases more frequent vaginal examinations are performed, with a consequent increased possibility of danger in introducing septic matter.

To prevent shreds of membrane or pieces of placenta being retained, Credé's method of conducting the third stage of labour should be resorted to, when the child's head is born, the left hand is to be placed on the uterus, the uterus is to be pulled down with the hand, consequent on the expulsion of the body of the child. It is best that the patient should have assumed the dorsal position. If the tone of the uterus be good the hand is merely to be kept on it. If fairly good uterine contractions come on, expression is better not resorted to, owing to the liability that the placenta, bulky as compared with the membranes, may be squeezed out too soon, & leave some shreds of membrane behind. Should the uterus not show signs of contraction, gentle friction may be used by the hand to stimulate it to contract, & when it does contract slight expression with the hand can be made, to help the efficiency of the contractions. If after waiting for twenty

minutes or half an hour, without obtaining efficient contractions, expression by the hand outside may cause the placenta to be removed. To do this the fundus of the uterus is to be firmly grasped with the palm of the hand, the four fingers being on the posterior, with the thumb on the anterior surface of the uterus. The uterus is to be firmly squeezed in the direction of the pelvic axis, without making any downward pressure. This method is exceedingly valuable, when the uterine action is feeble, as it imitates the normal process, and is much more rational than pulling on the cord. If however partial adhesion of the placenta or membranes has occurred, & it still remains in the uterus, we ought to introduce our hand in the uterine cavity & carefully detach them with the fingers, using the strictest antiseptic precautions as to cleanliness of the fingers & hand, & sponging the vulva previously with an antiseptic lotion. In all cases I make it a practice after expulsion of the afterbirth, to carefully examine it to see if any fragments be left behind. Should I detect any part of it, or pieces of placenta or membrane be left in the cavity I prefer to try to remove it at once, rather than leave them inside & thereby expose the patient to septicæmic risks.

Prevention of injuries. These can be best prevented by a thorough understanding of the physiology of labour, and a proper knowledge of operative interference. A few general points only will be noted. If using forceps they should not be introduced unless the os is fully dilated, or at least in a soft and dilatable condition. They should be well guided in through the os, if they require to be used in the uterine cavity, so that the thin uterine segment be not included, that is the thin lower segment of the uterus. The blades should be accurately applied to the sides of the child's head to prevent slipping - and as an indic-

action of this occurring, the index finger of the left hand should be applied to the child's head, during traction, when the blades are slipping the point of the finger will be found to leave the child's head. Delivery must not be effected too quickly, for fear of rupturing the perineum, owing to imperfect dilatation of it. As the head approaches the outlet, the handles should be carried well forwards & upwards. Again in conditions where we wish to bring on speedy labour, as in eclampsia, dilatation of the os is best accomplished by using such an apparatus as Barnes's bags, in preference to quick dilatation with instruments which are apt to cause rupture of the cervix. Again if using the blunt hook, or the crochet possibly we require to be very careful they do not slip & wound the maternal passages. One of the chief points however under this heading is rupture of the perineum. Many opinions are held as to the prevention of this. My experience leads me to believe that no rigid rule is to be formulated, but that each case must be treated in a manner according to its requirements. In practice I have had extremely few cases of this complication, all that were being of a very trifling character & not needing any treatment. My experience also showed me that when using forceps I was less apt to have even slight laceration than in ordinary cases. As a rule, I believe support of the perineum is not required. If the labour be too quick, & the perineum not sufficiently dilated, direct pressure ought to be made on the head of the child, which is to be pushed towards the cavity of the os. A plan I find of great use is the following. As the head is advancing towards the outlet & commencing to distend the perineum, I rub, lightly, into the stretching tissues some vaseline, or preferably some lanoline, working my hand constantly at the fire. From practice I believe this to be of great use, especially in forceps cases. As the occiput is born, & the stage of crowning reached, I slip the

forefingers of my left hand into the child's mouth, & taking the occiput in my right hand, I carry the head in a direction forwards & upwards, as if going to carry it round the pubis. Of course the ordinary rule of getting her to cry out during the height of a pain. & removing any aids to expulsion, as a towel tied round the top of the bed to catch by, or anything to press the feet against, are to be observed. The following observations have also guided me as to interference at this stage. As the head advances to the outlet the chin is pressed on the sternum. The fourth movement of the mechanism of labour is that of extension, the chin consequently leaves the sternum, this I do not believe it does while passing the perinaeum, but it does this only as the occiput is passing under the pubic arch. So that the pressure on the perinaeum is not so much of a downward character, as must be implied if this extension took place previous to the passing forwards & upwards of the occiput under the pubic arch, but is more of a gliding downward & forward character. The lesson I drew, in cases where manual interference was indicated, was to apply gentle pressure in front of the anus with two fingers of the left hand, to prevent too rapid descent of the brow, & so keep up the flexion till the occiput clears the pubic arch. I then put the fingers of the right hand behind the occiput, that is between the pubis & the occiput, and place the thumb on the crown. The forefingers of the left hand I then use to slip the perinaeum over the brow, till I get this finger into the child's mouth. I am then able to central the head, & carry it forwards & upwards round the pubis. By this plan of delivering the occiput first, and keeping the chin pressed on the chest, you bring the cervico-bregmatic diameter through the orifice - this diameter my measure $3\frac{1}{2}$ in, while the occipito-frontal measures $6\frac{1}{2}$. Should the perinaeum be torn it should be

stitched at once. The torn surfaces should be first washed with antiseptic solution, & silver wire or silk worm gut used as sutures which are best secured with compressed shat. A little iodoform can then be dusted over the wound. In this condition and also if much tearing of the vagina has occurred a warm vaginal antiseptic injection should be given every day - or morning & night if the case require it. If the lochia turn purulent a vaginal tampon dipped in carbolic oil, or a tampon made of absorbent wool, which has been dipped in a sublimate solution, can be placed in the vagina, & removed three or four times a day, and a fresh one introduced each time, so that the purulent discharges should not come into contact with the wound.

Keep the uterus compressed, after the third stage of labour is over the case should get a dose of ergot - the liquid extract is generally used - given in drachm doses, but this is not so reliable as freshly made infusions - In some if the tonic contraction be so good as desired - a subcutaneous injection of ergotine may be given - 2 to 3 grs being used - A good firm bandage should then be applied - a bolster case, as recommended by Leishman, being always handy, & as suitable as anything else. A pad below the bandage is not generally required & if be used it must not be placed right on the top of the uterus, as I have seen students do, but above the uterus. So that it will prevent the uterus expanding in an upward direction. The binder should not be applied till firm contraction of the uterus is obtained. The binder if well applied, tends to keep the uterus contracted, & prevents any suction action by the loose abdominal parietes taking place - The uterus should be compressed once a day by the medical attendant - & morning and night by the nurse - & some ecbolic given during the puerperium.

a good form being Enyal & mix romica given three times a day. Attention to cleanliness of the Patient, Before labour the patient ought to take a hot bath, During the puerperium the genitals ought to be cleansed twice a day with some antiseptic lotion as warm water to which some Condy is added, or a 1-40 Carbolic lotion, or simply by using Carbolic soap & warm water with a new sponge, Any soiled sheets should not be allowed to lie below her, but be removed. Diapers of sublimated wood woad are best to use for the case, as they can be afterwards burned - but if linen diapers be used they should be dipped in a solution of Corrosive sublimate 1-2000. An antiseptic powder should also be used for dusting over the vulva each time it is washed - a good form is a powder composed of equal parts of Boracic acid, boracic acid, & Iodoform, Some obstetricians, as Playfair recommend daily vaginal injections, but unless there be special indications for these as factor of the lochia, I can see no advantage in them, but as Sloan points out they are objectionable, owing to the introduction of foul matter being thereby favoured, and the practice of uterine douches in every case, as recommended by others, is a needless & dangerous proceeding.

Question of douching

The question of douching is one on which a considerable amount has been written, It is a prominent factor in the prophylaxis & treatment of puerperal fever, As a recognized mode of treatment in this condition it has come into use since the application of antiseptic principles to midwifery. It was used however long before this. Harvey used them in cases of retained placenta (Matthew Duncan on "Antisepsis during labour & delivery" British Med. Jour, Feb 15th & 22nd 1879). Recolin also used injections of warm water ("mémoires de l'académie royale de chirurgie")

t. III. p. 202, 1757), Lavoisier in cases of putrefaction occurring in the womb also used injections of warm water. These used them simply for the purpose of getting rid of foreign materials, as pieces of retained placenta, from the interior of the womb when putrefactive processes had set in. The first who used them with the present idea, that is with a view to prophylaxis, was Semmelweis. He used injections of chloride of lime, to prevent portions of clot, placenta or membranes remaining in the uterus from undergoing putrefaction. After the advantage of these injections in such cases was pointed out, they came to be practised by a good many obstetricians, but this doctrine did not become generally adapted as a recognised method of treatment till the application of the germ theory to obstetrics. What then is the rationale of this treatment? The douches are given either to keep the uterine surface aseptic, as after operative work where the hand or instruments have been introduced inside the uterine cavity. Should any germs have gained entrance during such procedure, the antiseptic liquid will sterilise them, or again should septic mischief be already set up inside the uterine cavity, the injected liquid will destroy the vitality of the microorganisms. So it is at once understood that the value of washing out the uterus is limited to cases where the septic mischief is developed in, or confined to the uterus itself. That is to say, the uterus acts as a central depot. It serves out to the general system toxic material, which is then eliminated by the excreting organs, so that by acting on the uterus locally, by certain agents we cut off the supply as it were. But where the development of the toxic condition has gone beyond this these douches can do no good. These douches then are given either with a view to prophylaxis, or as a curative measure when the putrefactive or septicæmic process has set in. It is however chiefly with a view to

prophylaxis, (or at all events they are most frequently given with this idea) that they are used. Having seen what is the rationale of their use the question to be answered is Is there anything to be gained if the strength of the fluid be not enough to have the power of arresting putrefactive processes, & to have a sterilizing action on the microorganisms? To this question, with a slight qualification, I would answer no. Some are recommending routine uterine douching during using a strong antiseptic agent - using hot water coloured with Condy- or Saucias^{re}. This practice I believe to be both useless and dangerous, should there be no septic germs introduced as in normal confinements, as a rule, there are not; what is to be gained by the injection? Should septic germs happen in any case to be introduced, the fluid recommended, Condy, or Saucias, used in the strength it is, would practically have no effect at all in hindering the development of them; Besides deriving no good from these in ordinary cases, there is the danger of introducing septic matter during the operation. The only qualification I would add to the previous question is - supposing the tone of the uterus to be not very great & large clots to occupy the cavity, these clots would doubtless form a suitable nidus for the organisms of putrefaction, and an injection of hot water by bringing away the clots, and improving the tone of the uterus would lessen danger, but even here I would always prefer adding a suitable antiseptic agent to the injection. From the previous statements I would say that uterine douching ought only to be resorted to when we have reason to fear that septic organisms have reached the uterine cavity, or in which septic processes are already going on. Looking now at the question from a prophylactic point of view, when have we occasion to fear that such organisms have been introduced? The general

answers to in all cases where the hand or instruments have been introduced inside the uterine cavity. In hospital practice this might be so, and while House Surgeon at the Maternity, I acted upon this rule, but in private practice I do not think this rule holds good at all. If strict precautions be taken as to absolute purity of the hands &c. previously detailed, the douches would require to be very seldom used. In practice here I am very frequently called out by midwives to remove the afterbirth. In most of these cases, after thoroughly washing the hands & arms, & washing the external genitalia with a sublimate solution, I introduce the hand into the uterine cavity, and clear out the entire contents before withdrawing the hand. In the last ten cases I adopted this procedure I did not give a douche afterwards, but the cases all made a normal recovery. Again in forceps cases, I have used them 44 times. In 26 of these cases I subsequently gave a douche, while in the remaining 18 I did not. The cases I did not give them in made as good recoveries as those I did. These cases tend to show that the introduction of the hand within the uterus, if strict antiseptic measures be taken, is not such a dangerous proceeding as some would have us believe, & is not a positive indication for the subsequent employment of a uterine douche. At the same time recognizing the importance of such a proceeding, and that it should only be done in actual cases of need. The following indications I hold call for a douche.

I, Birth of a putrid foetus. Here it is advisable to give it, but the following cases show it is not quite essential. About two months ago I was called into a house to attend a young married woman who had been suddenly seized with labour pains. It was her first case. After being with her for about

half an hour she was delivered of a much decomposed foetus. As I was a considerable distance from home & I had no apparatus with me, I was unable to give a douche, but I thoroughly emptied the uterus by Doyle's method, & put on a firm binder. She made a good recovery. Again I attended a woman in her ninth confinement where she was delivered of a much macerated foetus. I could not give a douche because I had broken my tube, and I had several miles to walk to the Surgery for another. She also made a good recovery.

II, In some cases where the hand has been introduced into the uterus, as in cases of very adherent placenta, where it requires to be scraped off the uterine wall with the tips of the fingers, & shreds of it generally left behind. And in bad instrumental cases where the hand is frequently introduced, & the soft parts are exposed to a considerable amount of contusion, here a douche is advisable owing to the frequent opening up of the uterine canal. But if the placenta has come away easily, or the instruments have been easily applied & used, there is no need of one.

III, In cases of secondary haemorrhage, where the uterus fills up with a large clot, here the hand should be introduced to break them up, and a douche given to render their expulsion certain, and cause a good contraction of the uterus, as if any of these clots remain they form such a suitable nidus, for the germs of putrefaction.

IV, In cases where curetting may have been resorted to, as in some cases of incomplete abortion, and premature labour.

V, In cases of foetid lochia with tenderness over the uterus, along with high pulse & temperature, foetid lochia alone do not call for it. These vaginal injections should first be tried.

4 if these do not diminish the foetus uterine clutches are then used
 VI. Where portions of membrane are retained in utero, or part of the placenta has been retained after abortion - Unless owing to haemorrhage which cannot be otherwise checked, as by subcutaneous injection of ergotine, the expectant treatment should be adopted. Should high pulse & temperature supervene however, with purid lochia, then uterine clutches are indicated,
 VII. Whenever symptoms of septic infection show themselves, at any period of the puerperium.

It must be admitted that some obstetricians teach differently from this, many advocate daily vaginal injections, as Playfair, while a few as More Madden of Dublin recommend daily uterine douching - At the Dublin meeting of the British Medical Association he read a paper in the Obstetric section in which he said that from the first day of delivery until Convalescence has taken place, the uterine cavity as well as the vagina, should daily be thoroughly washed out with hot water to which has been added some terebene, sanitas, or carbolic acid. As regards the vaginal douches in every case I think this can only be considered as a piece of meddling interference with nature, fraught with a disadvantage always, & I might also say with the possibility of danger to the patient during every injection - (Disadvantage in respect that the giving of two or three warm vaginal injections every twenty four hours must have a weakening effect on the patient, especially on one already weak - again in proceeding to give the injection the patient is exposed during a certain, or in the case of some nurses I have seen a very unpleasant, period, so that she becomes liable to the danger of catching a chill, and also where great care may be taken the bed is apt to get wet - added to these

we must take into account the unnecessary movements of the patient, which during the first two days at least are not pleasant. Again there is always the possibility of danger, as by these vaginal douches the introduction of foul matter is favoured which may set up septic mischief the very thing we wish to avoid. When it comes to uterine douching the objections to unnecessary interference are much stronger, just in proportion to the great difference of danger between the two proceedings.

Antiseptic agents that are used,

The two great agents that are used are carbolic acid & corrosive sublimate - while Iodine is occasionally used by some, Carbolic acid used to be generally used, but more recently it has been replaced to a great extent by corrosive sublimate, though at the present time there is an outcry against it, Koch's experiments have shown that corrosive sublimate is much more destructive to microbes than carbolic acid. The spores of anthrax bacillus would still grow after immersion for seven days in a 2% solution of carbolic acid, as also they did after immersion for a day in a 5% solution. But after immersion in a solution of 1-10,000 of corrosive sublimate for from 5 to 60 minutes the same spores became sterile. Immersion for 10 minutes in solutions up to 1-20,000 also sterilised the spores. He places the limit of the action of the sublimate on the spores of the anthrax bacillus as somewhere between a 1-20,000 and a 1-50,000 solution. His experiments on mice are also interesting as showing the power of the sublimate over microbes. Here spore laden threads were dipped for a given time in solutions of different strengths, and then inserted below the skin of different mice - Corrosive sublimate possesses several other advantages, as its easy solubility in the presence of chloride

of ammonium renders its being easily carried about. A very easy way to carry it about is to put 80 gr in a two ounce bottle, adding a sufficiency of chloride of ammonium to the water to dissolve it. 3ʒ of this added to a pint of water gives a solution of the strength of 1 in 1536 - or 3ʒ added to one pint of water makes a solution roughly speaking of 1-3000 - Other advantages are its absence of odour, its cheapness, and its less irritant action on the skin than carbolic acid. The great disadvantage of it is its toxic action on the system, which has been recorded after some cases of douching.

Carbolic acid is not used now so much as formerly, the chief reasons being the more powerful action of the corrosive, its disagreeable odour, and its irritant action, both on the hands of the attendant, & sometimes on the patient in the form of a painful erythematous rash on the labiae. I remember a nurse at the Maternity told me she could scarcely endure to put her hands in it - and while House Surgeon at the Royal Infirmary to Dr W. J. Keating he told me the carbolic acid had such an irritant action on his hands, he had to rub them with eucalyptus vaseline before putting his hands in the carbolic solutions. Owing to this reason I believe mirrors are apt, unless under observation, not to use this agent properly, & for sponging the genitals, or giving a uterine douche, a weak sublimate solution is preferable, the great objection to the sublimate viz its toxic action, cannot be said to hold so strongly by any means in the case of Carbolic acid, but here also I am convinced that toxic symptoms will occasionally develop too. In one case I gave a douche of it several times, and found the urine diminished in quantity, & of a dark or olive green colour on standing a little. The patient was very irritable,

and fevered, and the respirations were increased in quantity. The strength of the solution was 4%. After stopping the injections the patient got all right. In this case the placenta had been adherent, and I gave a douche after its removal. On the two following days I repeated the douche, not that I thought there was any necessity of it, but I wished to see if any toxic effect would be produced by using the solution of this strength. I requested all the urine she passed to be kept till I saw it. I detected the smell of the acid in it on the second day, & the change of colour on the third. If I had occasion to use it again I should not use a stronger solution than 2%.

Iodine - In one case of a putrid puerperia I gave a douche made by adding 3 $\frac{1}{2}$ of liquor iodi to the quart of warm water. The case made a good recovery. I have also used it in the case of vaginal injections, where the lochia were putrid, and it seemed to act very well. An objection to its use however is its odour, its staining & hardening action on the skin, & its staining action on linen.

Toxic action of the sublimate

A considerable number of cases of poisoning by mercury have been now recorded. Dakin in vol. XXVIII of the Obs. Soc. Trans, has called attention to eleven cases of deaths that have been recorded, & in his own experience of 170 cases he had, there were 14 cases of poisoning. Krabs gives an account of its use in the Buda Pesth lying-in hospital. Out of 2,629 lying-in women, the uterine cavity was washed out, after labour or during the lying-in, with sublimate in 263. In ten of these symptoms of poisoning occurred. In 269 cases in which the vagina only, not the uterus, was washed out there was only one case of poisoning (Arch. für Gyn., Bd XXV). In the Liège Maternity the sublimate has been used for the last three

years. There have been no cases of septicaemia, & no cases of mercurialism of any account (Journal des Accouchements de Liège Nos I & XII, 1887). I think from my own experience that if proper precautions be taken the danger is not so great as is said to be - & that there is in many of the cases some point deficient. A case I had recently made me believe this. About a month ago a young man came to me suffering from a bad attack of gonorrhoea, I tried him with the ordinary injections of Sulphate of zinc, alum. acetate of lead. &c. but got no good. I then made him up an injection of corrosive sublimate & put, as I thought at least, sufficient chloride of ammonium into it to dissolve the sublimate. He used the injection for two days & was deriving benefit. On the evening of the second day, when there was about a quarter of the injection remaining in the bottle, he found when he used it a violent burning pain in the canal, and had great tenesmus, & bloody diarrhoea & pain in the bowels. He became so bad I was sent for, There no doubt the sublimate had not properly dissolved at first, but did so after so much water had been taken out, so that the remaining solution was very concentrated. It is quite possible that some such explanation would clear up some of the cases of poisoning, Again the douche ought to be at a temperature of from 116° to 116° F. The douche being at this heat has a stimulating action on the uterine muscular tissue - so much so that very hot injections of water is the best treatment of post partum haemorrhage. The uterus then by contracting firmly after the douche does not allow any of the mercurial fluid to remain in the cavity, which is very important as regards absorption of the mercury. Again after the

douche is given I squeeze the uterus well with the hand, drawing
 back the perineum with the other hand, so as to drain the
 fluid out of the uterus as it were. I then afterwards give a
 subcutaneous injection of ergotine (3 gr). If there be any fear
 of toxic action following, a douche of hot water alone can
 be given immediately after the sublimate douche. A method
 that will do much to overcome objection to the sublimate
 douche is that of using an acidified sublimate douche.
 In the ordinary solution the mercury is precipitated on the uterine
 surface in the form of an albuminate of mercury. It is
 mordanted on the uterine surface as it were, & this albuminate
 is redissolved in the presence of an excess of albumen - so
 that a process of gradual absorption of mercury takes
 place into the system. The acid if added to the solution
 prevents the mercury being deposited as an albuminate,
 & if an injection of hot water be given immediately after, the
 whole of the mercury in the uterus can be pretty well
 removed. The danger to be feared here of course is the
 production of acute mercurialism, owing to the immediate
 absorption of the mercury, but if the solution be not
 too strong I don't think this would be likely to happen.
 In giving sublimate douches the gums to be examined morning
 & night, and if the presence of a red line be detected carbolic
 acid ought to be substituted for the sublimate. If poisonous
 symptoms do occur they are generally marked by red line
 along the gums, which sometimes become spongy & bleed -
 the teeth getting loose - before the red line appears the gums
 get tender, diarrhoea which becomes bloody, vomiting, thirst
 loss of appetite, faecula of the breath, white patchy
 appearance of the tongue & generally albumenuria. A
 practical point there would be, if in giving sublimate

draughts. salivation, diarrhoea which could not otherwise be accounted for, vomiting with foetor of breath, or a red line along, or tender condition of, the gums, appears, then the mercury ought to be given up at once, & replaced, if need be, with carbolic acid.

Contra indications.
Some state that contra indications are Phthisis, Anaemia, Kidney Disease (albuminuria), & lacerations of the perineal tract. In anaemic cases. & cases of slight laceration I have used sublimate draughts without seeing any ill effect—

The point in reference to different antiseptic agents which are used in midwifery, is the incompatibility of some of them. In using sublimate solutions care should be taken before putting the hand in the solution, that any soap which has been on the hand, has been thoroughly washed off, as a very small quantity of soap will throw down the mercury from the solution used. Again if using Carbolic acid, & Condy's fluid to the same case, care must be taken that there be no mixing of them, as if any of the acid be added to the Condy's solution a dark brown precipitate is immediately thrown down. Again Iodine & mercury cannot be used together as a small quantity of mercury will fix the free iodine. Again Condy & soap are incompatible, when the soap is added to a Condy's solution, the latter is turned brown, so here again the lesson is if using solutions of Condy's fluid, be sure all soap is thoroughly washed off the hands.

Mode of giving the draught

The instruments used in giving the draught are generally an ordinary Higginson's syringe, & a glass cannula, perforated at the end, bent as to suit the pelvic curve. A great point is not to introduce any air into the uterine cavity. Use the Higginson's syringe

is condemned by many. To overcome this difficulty the simplest instrument to use is a glass funnel, to which an indiarubber tubing 5 or 6 feet long is attached. The glass cannula again is attached to the other end of the tubing. The funnel and tubing are then filled with the fluid to expel the air, a little clip at the end of the tubing next the cannula can then be put on till the cannula be introduced into the uterus, if there be little assistance at hand. This is the method I have used in washing out the bladder in cystitis. I tried it in giving a uterine douche a few times. By holding up the funnel about a foot above the level of the patient the fluid runs into the uterus by gravitation. I do not think however, this method will be much adopted. More Madden has introduced a form of irrigator. He claims that by using it air is less likely to be introduced, & the fluid is less likely to be forced through the patulous Fallopian tubes, or into the open & dilated uterine sinuses, than by using a siphon apparatus as Higginson's syringe. Again ^{many} forms of cannula are in use. Some use a gum elastic catheter, but here the eye of it is apt to get blocked up. Canulae grooved in the side, or double canulae are also used. The grooved one is a very good form, but in the double cannula I would imagine the eye of the returning tube would get after blocked up. In the Brit. Med. Jour. Feb 26, 1887. p. 462 Dr. Alexander (Duke) calls attention to a tube he has introduced. It is an ordinary vulcanite tube & is attached to the rectal nozzle of a siphon syringe. It has one opening at the point only. The tube is surrounded for about one third of its length with a cage of crossed wires, removable at pleasure, the top of which splits the current injected into four distinct streams, but allows of free egress for the return current. It is almost impossible that the entire cage & point of the tube should become blocked, & the wires being plated are easily kept clean,

M. Leraux, interne at the Pitié Hospital, has also invented a sound with double current for intra uterine injections. The instrument is a modification of his double current catheter for the continuous irrigation of the urethra. This however is more for use in gynaecological than obstetric practice - For all practical purposes, however, the ordinary Higginson's syringe, & glass cannula do perfectly well. I have given as many as 65 douches & have always found them act admirably. I have always found the os uteri sufficiently patulous to allow me to use the common glass cannula. If at first it were rather closed I introduced my hand into the vagina & soon dilated it with my fingers sufficiently. Those however who have a large hand, & the introduction of it would cause great pain to the patient, would in such a condition be better to use a grooved glass tube, or the double channelled catheter.

The strength of the solutions I now use is from 1-3000 to 1-6000 of the sublimate, & of carbolic 2%.

Method of giving the douche,

As regards the position of the patient she may either be placed on her back, with her shoulders slightly raised, & the douche pan to receive the fluid as it runs out the vagina placed beneath her buttocks, or she can be laid across the bed with her hips depending over the bed. The latter is the more convenient I think, I take the Higginson with the cannula attached & pump a little sublimate solution through it first & put it into the solution to clean it. I then put water of a temperature of about $114^{\circ} F$ into a jug, & add the sublimate from the stock bottle to make the injection of the required strength say 1-3500. The syringe is then charged with the solution, & after exhausting the air thoroughly I dip the uterine or

perforated end of the canula under the solution too, to prevent the air running back into it. I then give it to a nurse to hold - I then introduce my left hand into the vagina, the vulva having been previously washed with a little of the sublimate solution, & the nurse brings the jug close to the patient. the end of the canula being kept all the time under the surface of the liquid. Taking hold of the glass canula with my right hand, I request her to squeeze the tube, just where it fits on to the canula, before I take the end out of the fluid. As soon as she does this I insert the canula into the vagina and guide it into the uterus with the left hand. The nurse now holds off the tube, & I proceed to give the douche. By following this method no air is introduced. Another time when air gets introduced through the syringe is towards the end of the douche. The receiving end of the syringe must always be under fluid else air is sucked in & forced into the uterus. & when the fluid reaches near the bottom of the vessel the douche ought to be stopped. The canula should be carried right up to the fundus, & in injecting care must be taken not to inject too forcibly, or quickly, but it ought to be done slowly, steadily, & without jerking. If done in this way the return fluid easily runs out and there can be no danger of any of the fluid being forced through the Fallopian tubes, or separating clots which serve to plug the uterine vessels and so cause haemorrhage. Of the evil effects which follow douching in rare cases, apart from toxic symptoms, are introduction of the fluid through the Fallopian tubes & thence into the peritoneal cavity, introduction of air or the fluid into the open uterine sinuses, & haemorrhage owing to separation of clots

which plug the uterine vessels. I have never met with any of these, & if proper care be taken I think they will rarely if ever happen. In giving the douche the injection should be continued till the fluid returns clear, or almost clear. After withdrawing the canula the uterus should be well squeezed with the hand the perinaeum being drawn back at the same time. This is to ensure that no fluid is left lying in the uterus. A subcutaneous injection of ergotine, 3 grs. should then be given & a binder firmly applied. As to how often the douches ought to be given, if given with a view to prophylaxis of course only the one is given, if given in the treatment of the septicaemic condition, the number will depend on the nature of the case itself, but it is seldom that more than two or three are required.

To sum up the question of douching I have had recourse to perform it about 65 times altogether, while house surgeon at the maternity, I used it every case where the forceps were used, or where the hand had been inside the uterine cavity, I do not use it in all such cases in private practice now, still I suppose I use it often than in ordinary practice. A very large number of confinements take place here, (this being a colliery district, & I being medical officer to the colliery). For the most part the confinements are attended by midwives, who have received no training, after their being at the case sometime I am often called out to remove the after-birth or apply forceps etc. In most of these cases I prefer to give a douche afterwards, but if I attend the case myself from the commencement I rarely give a douche. Sublimated believe to be the best agent to use. & if proper care & precaution be taken I believe there is hardly ever any ill result to be feared. Vaginal douches again in

ordinary cases are not needed, not only so, but in these exists the possibility of danger in these cases owing to the possible introduction of foul matter. When they are used the best agent is also corrosive sublimate, in a solution of 1-5000 or 1-6000. If given by a nurse, an injection of warm water ought to be given afterwards, because here ever, toxic symptoms might arise, if much fluid were left lying in the canal.