

repeat this draught night after night, during the acute stage of the malady. If we cannot induce the patient to swallow the medicine it may be given in the form of enema.

It is generally admitted that in mania, preparations of opium, formerly much relied on in the treatment of the disease, are apt to do more harm than good. Dr. Blandford gives a strong opinion on this point. He says: "In prolonged delirious mania I believe opium never does good, and may do great harm. We shall see the effects of narcotic poisoning if it be pushed, but none that are beneficial. This applies equally to opium given by the mouth and by subcutaneous injection. The latter, as it is more certain and effectual in producing good results, is also more deadly when it acts as a narcotic poison. After the administration of a dose of morphia by the subcutaneous method, the patient will probably at once fall asleep, and we congratulate ourselves that our long-wished-for object is attained. But after half an hour or so the sleep suddenly terminates, and the mania and excitement are worse than before. Here you may possibly think that, had the dose been larger, instead of half an hour's sleep you would have obtained one of longer duration, and you may administer more, but with a like result. Large doses of morphia not merely fail to produce refreshing sleep; they poison the patient, and produce, if not the symptoms of actual narcotic poisoning, at any rate that typhoid condition which indicates prostration and approaching collapse. I believe there is no drug the use of which more often becomes abused than that of opium." It is otherwise in cases of melancholia, especially in the more chronic forms. In these, opiates in moderate doses, not pushed to excess, may be given with great advantage. The subcutaneous injection of morphia is by far the best means of exhibiting the drug, from its rapidity of action and facility of administration.

There are other methods of calming the excitement of the patient besides the use of medicines. The prolonged use of the warm bath, the patient being immersed in water at a temperature of 90° or 92° for at least half an hour, is highly recommended by some as a sedative. The wet pack serves the same purpose, and is more readily applied in refractory subjects.

Judicious nursing is of primary importance. The patient should be kept in a cool, well-ventilated, and somewhat darkened room. If possible she should remain in bed, or, at least, endeavors should be made to restrain the excessive restless motion which has so much effect in promoting exhaustion. The presence of relatives and friends, especially the husband, has generally a prejudicial and exciting effect; and it is advisable to place the patient under the care of nurses experienced in the management of the insane, who, as strangers, are likely to have more control over her. It is not too much to say that much of the success in treatment must depend on the manner in which this indication is met. Rough, unskilled nurses, who do not know how to use gentleness combined with firmness, will certainly aggravate and prolong the disorder. Inasmuch as no patient should be left unwatched by day or night, more than one nurse is essential.

The question of the removal of the patient to an asylum is one

which will give rise to anxious consideration. As the fact of having been under such restraint of necessity fixes a certain lasting stigma upon a patient, this is a step which everyone would wish to avoid if possible. In cases of acute mania, which will probably last a comparatively short time, home treatment can generally be efficiently carried out. Much must depend on the circumstances of the patient. If these be of a nature which preclude the possibility of her obtaining thoroughly efficient nursing and treatment in her own home, it is advisable to remove her to a place where these essentials can be obtained, even at the cost of some subsequent annoyance. In cases of chronic melancholia, the management of which is on the whole more difficult, the necessity for such a measure is more likely to arise, and should not be postponed too late. Many examples of incurable dementia arising out of puerperal melancholia can be traced to unnecessary delay in placing the patients under the most favorable conditions for recovery.

Treatment during Convalescence.—When convalescence is commencing, change of air and scene will often be found of great value. Removal to some quiet country place, where the patient can enjoy abundance of air and exercise, in the company of her nurses, without the excitement of seeing many people, is especially to be recommended. Great caution must be used in admitting the visits of relatives and friends. In two cases under my own care the patients relapsed, when apparently progressing favorably, because the husbands insisted, contrary to advice, on seeing them. On the other hand, Gooch has pointed out that when the patient is not recovering, when month after month has been passed in seclusion without any improvement, the visit of a friend or relative may produce a favorable moral impression and inaugurate a change for the better. It is probably in cases of melancholia, rather than in mania, that this is likely to happen. The experiment may, under such circumstances, be worth trying; but it is one the result of which we must contemplate with some anxiety.

CHAPTER V.

PUERPERAL SEPTICÆMIA.

Difference of Opinion as to Puerperal Fever.—There is no subject in the whole range of obstetrics which has caused so much discussion and difference of opinion as that to which this chapter is devoted. Under the name of *puerperal fever*, the disease we have to consider has given rise to endless controversy. One writer after another has stated his view of the nature of the affection with dogmatic precision, often on no other grounds than his own preconceived notions and an erroneous interpretation of some of the post-mortem appearances.

Thus, one states that puerperal fever is only a local inflammation, such as peritonitis; others declare it to be phlebitis, metritis, metro-peritonitis, or an essential zymotic disease *sui generis*, which affects lying-in women only. The result has been a hopeless confusion; and the student rises from the study of the subject with little more useful knowledge than when he began. Fortunately, modern research is beginning to throw a little light upon this chaos.

Modern View of the Disease.—The whole tendency of recent investigation is daily rendering it more and more certain that obstetricians have been led into error by the special virulence and intensity of the disease, and that they have erroneously considered it to be something special to the puerperal state, instead of recognizing in it a form of septic disease practically identical with that which is familiar to surgeons under the name of pyæmia or septicæmia, generally produced by the pathogenic infection of lesions of continuity in the parturient canal, resulting from separation of the decidua and placenta, or from lacerations of the cervix, vagina, or perineum.

If this view be correct, the term "puerperal fever," conveying the idea of a fever such as typhus or typhoid, must be acknowledged to be misleading, and one that should be discarded, as only tending to confusion. Before discussing at length the reasons which render it probable that the disease is in no way specific or peculiar to the puerperal state, it will be well to relate briefly some of the leading facts connected with it.

History.—More or less distinct references to the existence of the so-called puerperal fever are met with in the classical authors, proving beyond doubt that the disease was well known to them; and Hippocrates, besides relating several cases, the nature of which is unquestionable, clearly recognizes the possibility of its originating in the retention and decomposition of portions of the placenta. Harvey and other writers showed that they were more or less familiar with it, and even made most creditable observations on its etiology; the actual name "puerperal fever" was first used by Strother¹ in 1716, but it was not until the latter half of the last century that it came prominently into notice. At that time the frightful mortality occurring at some of the principal lying-in hospitals, especially in the Hôtel Dieu at Paris, attracted attention, and ever since the disease has been familiar to obstetricians.

Mortality in Lying-in Hospitals.—Its prevalence in hospitals in which lying-in women are congregated has been constantly observed both in this country and abroad, occasionally producing an appalling death-rate; the disease, when once it has appeared, frequently spreading from one patient to another in spite of all that could be done to arrest it. It would be easy to give many startling instances of this. Thus it prevailed in London in the years 1760, 1768, and 1770 to such an extent that in some lying-in institutions nearly all the patients died. Of the Edinburgh Infirmary, in 1773, it is stated that "almost every woman, as soon as she was delivered, or perhaps about twenty-

¹ Criticon Februm, 1716.

four hours after, was seized with it, and all of them died, though every effort was made to cure the disorder." On the Continent, where the lying-in institutions are on a much larger scale, the mortality was equally great. Thus in the Maison d'Accouchements of Paris, in a number of different years, sometimes as many as 1 in 3 of the women delivered died; on one occasion 10 women dying out of 15 delivered. Similar results were observed in other great Continental hospitals, as in Vienna, where, in 1823, 19 per cent. of the cases died, and in 1842, 16 per cent.; and in Berlin, in 1862, hardly a single patient escaped, the hospital being eventually closed.

Such facts, the correctness of which is beyond any question, prove to demonstration the great risk which may accompany the aggregation of lying-in women. It is to be observed, however, that the cases in which the disease produced such disastrous results occurred before our more recent knowledge of its mode of propagation was acquired, when no sufficient hygienic precautions were adopted, when ventilation was little thought of, and when, in a word, every condition prevailed that would tend to favor the spread of a contagious disease from one patient to another. More recent experience proves that, when the contrary is the case, the occurrence of epidemics of this kind may be entirely prevented, and the mortality approximated to that of the best class of home practice. The results almost universally obtained of late years by the introduction of strict antiseptics into lying-in institutions afford a most instructive commentary upon the causes of puerperal fever. Thus, in the Maternité, in Paris, the mortality from 1858 to 1870 was 1 in 11; at the present time it is only 1 in 100. At the Foundling Hospital in St. Petersburg the mortality before the introduction of antiseptics was 1 in 27; since their use 1 in 147. Similar satisfactory results have been reported in lying-in institutions in London, and in America—indeed universally wherever antiseptic precautions have been adopted.¹ There is, indeed, no more striking chapter in the history of modern medicine than this. Formerly a woman who was delivered in a lying-in hospital ran a risk not far short of some of the capital operations; now she is as safe in one of them, perhaps safer, than if she was confined in one of the most sumptuous of private houses.

The more closely the history of these outbreaks in hospitals is studied, the more apparent does it become that they are not dependent on any miasm necessarily produced by the aggregation of puerperal patients, but on the direct conveyance of septic matter from one patient to another.

In numerous instances the disease has been said to be generally epidemic in domiciliary practice, much in the same way as scarlet fever or any zymotic complaint might be. Such epidemics are described as having occurred in London in 1827-28, in Leeds in 1809-12, in Edinburgh in 1825, and many others might be cited. There is, however, no sufficient ground for believing that the disease has ever been epidemic in the strict sense of the word. That numerous cases have often occurred in the same place and at the same time is

¹ See "The Prevention of Lying-in Fever," by Vassily Sutugin, Edin. Med. Journ., vol. 1884-85, p. 731.

beyond question; but this can easily be explained without admitting an epidemic influence—knowing, as we do, how readily septic matter may be conveyed from one patient to another. In many of the so-called epidemics the disease has been limited to the patients of certain midwives or practitioners, while those of others have entirely escaped: a fact easily understood on the assumption of the disease being produced by septic matter conveyed to the patient, but irreconcilable with the view of general epidemic influence. We are not in possession of any reliable statistics of the mortality arising from puerperal septicæmia in ordinary general practice. It has, however, been well pointed out in the Report on Puerperal Fever, presented by the Obstetrical Society of Berlin to the Prussian Minister of Health,¹ that not only do the published returns of death from metria afford no reliable estimate of the actual mortality from this source, but that they are very far more numerous than deaths from any other cause in connection with pregnancy and childbirth.

Theories advanced regarding its Nature.—It would be a useless task to detail at length the theories that have been advanced to explain the disease. Indeed, it may safely be held that the supposed necessity of providing a theory which would explain all the facts of the disease has done more to surround it with obscurity than even the difficulties of the subject itself. If any real advance is to be made, it can only be by adopting a humble attitude, by admitting that we are only on the threshold of the inquiry, and by a careful observation of clinical facts, without drawing from them too positive deductions.

Theory of its Local Origin.—Many have taught that the disease is essentially a local inflammation, producing secondary constitutional effects. This view doubtless originated from too exclusive attention to the morbid changes found on post-mortem examination. Extensive peritonitis, phlebitis, inflammation of the lymphatics or of the tissues of the uterus, are very commonly found after death; and each of these has, in its turn, been believed to be the real source of the disease. This view finds but little favor with modern pathologists, and is in so many ways inconsistent with clinical facts that it may be considered to be obsolete. No one of the conditions above mentioned is universally found, and in the worst cases definite signs of local inflammation may be entirely absent. Nor will this theory explain the conveyance of the disease from one patient to another, or the peculiar severity of the constitutional symptoms.

Theory of an Essential Zymotic Fever.—A more admissible theory, and one which has been extensively entertained, is that there is an essential zymotic fever peculiar to, and only attacking puerperal women, which is as specific in its nature as typhus or typhoid, and to which the local phenomena observed after death bear the same relation that the pustules on the skin do to smallpox, or the ulcers in the intestinal glands to typhoid. This fever is supposed to spread by contagion and infection, and to prevail epidemically both in private and in hospital practice. The most recent exponent of this view, Fordyce

¹ "Denkschrift der Puerperalfieber-Commission," *Zeitschrift f. Geb. u. Gyn.*, 1878, Band iii. S. 1, translated in *Edin. Med. Journ.*, vol. 1878-79, p. 435.

Barker, in his excellent work on the *Puerperal Diseases*, entered at length into all the theories of the disease. He, like all others holding his opinions, entirely failed, I cannot but think, to bring forward any conclusive evidence of the existence of such a specific fever. It is no doubt true that in typhus and typhoid, and other undoubted examples of this class of disease, there are well-marked local secondary phenomena; but then they are distinct and constant. He makes no attempt to prove that anything of the kind occurs in puerperal fever. On the contrary, probably there are no two cases in which similar local phenomena occur; nor is there any case in which the most practised obstetrician could foretell either the course and duration of the illness or the local phenomena. Again, this theory altogether fails to explain the very important class of cases which can be distinctly traced to the absorption of septic matter from decomposing coagula and the like. Barker meets this difficulty by placing such cases under a separate category, admitting that they are examples of septicæmia. But he fails to show any difference in symptomatology or post-mortem signs between them and the cases that he believes to depend on an essential fever; nor would it be possible to distinguish the one from the other by either their clinical or pathological history.

Theory of its Identity with Surgical Septicæmia.—The modern view, which holds that the disease is, in fact, identical with the condition known as pyæmia or septicæmia, is by no means free from objections, and much patient clinical investigation is required to give a satisfactory explanation of certain peculiarities which the disease presents; but in spite of these difficulties, which time may serve to remove, it offers a far better explanation of the phenomena observed than any other that has yet been advanced.

According to this theory, the so-called puerperal fever is produced by the absorption of septic matter into the system, through solutions of continuity in the generative tract, such as always exist after labor. It is not essential that the poison should be peculiar or specific; for, just as in surgical pyæmia, any decomposing organic matter may set up the morbid action.

In describing the disease under discussion, I shall assume that, so far as our present knowledge goes, this view is the one most consonant with facts; but, bearing in mind that very little is yet known of surgical septicæmia, it must not be expected that obstetricians can satisfactorily explain all the phenomena they observe.

The best basis of description I know of is that given by Burdon Sanderson, when he says: "In every pyæmic process you may trace a focus, a centre of origin, lines of diffusion or distribution, and secondary results from the distribution. In every case an initial process from which infection commences, from which the infection spreads, and secondary processes which come out of this primary one."¹ Adopting this division, I shall first treat of the mode in which the infection may commence in obstetric cases, and point out special difficulties which this part of the subject presents.

¹ *Clinical Transactions*, vol. vii. p. 108.

Channels through which Septic Matter may be Absorbed.—The fact that all recently delivered women present lesions of continuity in the generative tract, through which septic matter brought into contact with them may be readily absorbed, has long been recognized. The analogy between the interior of the uterus after delivery and the surface of a stump after amputation was particularly insisted on by Cruveilhier, Simpson, and others—an analogy which was, to a great extent, based on erroneous conceptions of what took place—since they conceived that the whole interior of the uterus was bared. It is now well known that such is not the case; but the fact remains that at the placental site, at any rate, there are open vessels through which absorption may readily take place. That absorption of septic material occurs through this channel is probable in certain cases in which decomposing materials exist in the interior of the uterus, especially when, from defective uterine contraction, the venous sinuses are abnormally patulous and are not occluded by thrombi. It is difficult to understand how septic matter introduced from without can reach the placental site. Other sites of absorption are, however, always available. These exist in every case in the form of slight abrasions or lacerations about the cervix or in the vagina, or, especially in primiparæ, about the fourchette and perineum. There is even some reason to think that absorption of septic matter may take place through the mucous membrane of the vagina or cervix without any breach of surface. This might serve to account for the occasional, though rare, cases in which the symptoms of the disease develop themselves before delivery, or so soon after it as to show that the infection must have preceded labor; nor is there any inherent improbability in the supposition that septic material may be occasionally absorbed through the unbroken mucous membrane, as is certainly the case with some poisons, for example that of syphilis. Hence there is no difficulty in recognizing the similarity of a lying-in woman to a patient suffering from a recent surgical lesion, or in understanding how septic matter conveyed to her, during or shortly after labor, may be absorbed. It is necessary, however, to suppose that absorption takes place immediately or very shortly after these lesions of continuity are formed, for it is well known that the power of absorption is arrested after they have commenced to heal. This fact may explain the cases in which sloughing about the perineum or vagina exists without any septicæmia resulting, or the far from uncommon cases in which an intensely fetid lochial discharge may be present a few days after delivery without any infection taking place.

The character and sources of the septic matter constitute one of the most obscure questions in connection with septicæmia, and that which is most open to discussion.

Division into Autogenetic and Heterogenetic Cases.—A popular division of the subject has been into cases in which the septic matter originates within the patient, so that she infects herself, the disease then being *autogenetic*; and into those in which the septic matter is conveyed from without and brought into contact with absorptive surfaces in the generative tract, the disease then being *heterogenetic*.

Of late the term autogenetic has been objected to on the ground

that retained coagula and the like, contained within the person of the patient, would not of themselves decompose and give rise to infection unless microbes had found their way to them from without and set up decomposition. In this strict sense the word may be admitted to be inaccurate. At the same time the division was a very practical one, and it laid stress on the danger of leaving organic structures, such as portions of placenta, membranes, or clots, within the genital tract. With this explanation, therefore, the division may be retained. It is supposed that disease of this type originates from sapræmic intoxication due to the absorption of poisonous materials resulting from putrefactive changes, but that it differs from the septic infection, inasmuch as organisms do not invade the tissues and multiply in them. Clinically, however, the two types of disease cannot be distinctly differentiated, and it is admitted that they may be combined, true pathogenic micrococci finding a congenial soil in the decomposing structures, and subsequently invading the tissues. The former class of disease may be termed *sapræmia*, corresponding to cases which have been described as autogenetic; the latter *septicæmia*, corresponding to the heterogenetic type.

Sources of Sapræmia or Self-infection.—The sources of sapræmia may be various, but they are not difficult to understand. Any condition giving rise to decomposition, either of the tissues of the mother herself, of matters retained in the uterus or vagina that ought to have been expelled, or decomposing matter derived from a putrid fetus, may start the septicæmic process. Thus it may happen that from continuous pressure on the maternal soft parts during labor, sloughing has set in; or there may be already decomposing material present from some previous morbid state of the genital tract, as in carcinoma. A more common origin is the retention of coagula, or of small portions of membrane, or of placenta, in the interior of the uterus, which have putrefied from access of air; or in the decomposition of the lochia. That the retention of portions of the placental tissue has at all times been the cause of septicæmia may be illustrated by the case of the Duchesse d'Orléans (in the time of Louis XIII.), who had an easy labor, but died of childbed fever. An examination was made by the leading physicians of Paris, in their report of which it was stated: "On the right side of the womb was found a small portion of after-birth, so firmly adherent that it could hardly be torn off by the fingernails."¹ The reason why self-infection does not more often occur from such sources, since more or less decomposition is of necessity so often present, has already been referred to in the fact that absorption of such matters is not apt to occur when the lesions of continuity, always existing after parturition, have commenced to heal. This observation may also serve to explain how previous bad states of health, by interfering with the healthy reparative process occurring after delivery, may predispose to self-infection. It is interesting to note that puerperal septicæmia, arising from such sources, is not limited to the human race. In the debate on pyæmia at the Clinical

¹ Louise Bourgeois, by Goodell.

Society, Mr. Hutchinson recorded several well-marked examples occurring in ewes, in whose uteri portions of retained placenta were found.

Source of Heterogenetic Infection.—The sources of septic matter conveyed from without are much more difficult to trace, and there are many facts connected with heterogenetic infection which are very difficult to reconcile with theory, and of which, it must be admitted, we are not yet able to give a satisfactory explanation.

It is probable that any decomposing organic matter may infect, but that some forms operate with more certainty and greater virulence than others.

One of these, which has attracted special attention, is what may be termed cadaveric poison, derived from dissection of the dead subject in the anatomical and post-mortem theatres, and conveyed to the genital tract by the hands of the accoucheur. Attention was particularly directed to this source of infection by the observations of Semmelweis, who showed that in the division of the Vienna Lying-in Hospital attended by medical men and students who frequented the dissecting-rooms the mortality was seldom less than one in ten, while in the division solely attended by women the mortality never exceeded one in thirty-four; the number of deaths in the former division at once falling to that of the latter so soon as proper precautions and means of disinfection were used. Many other facts of a like nature have since been recorded which render this origin of puerperal septicæmia a matter of certainty. An interesting example is related by Simpson with characteristic candor: "In 1836 or 1837, Mr. Sidey, of this city, had a rapid succession of five or six cases of puerperal fever in his practice, at a time when the disease was not known to exist in the practice of any other practitioners in the locality. Dr. Simpson, who had then no firm or proper belief in the contagious propagation of puerperal fever, attended the dissection of Mr. Sidey's patients and freely handled the diseased parts. The next four cases of midwifery which Dr. Simpson attended were all affected with puerperal fever, and it was the first time he had seen it in practice. Dr. Patterson, of Leith, examined the ovaries, etc. The next three cases which Dr. Patterson attended in that town were attacked with the disease."¹ Negative examples are of course brought forward, of those who have attended post-mortem examinations without injury to their obstetric patients, which merely prove that the cadaveric poison does not, of necessity, attach itself to the hands of the dissector; no amount of such testimony can invalidate such positive evidence as that just narrated. Barnes believes that there is not so much danger attending the dissection of patients who have died of any ordinary disease, but that the risk attending the dissection of those who have died of infectious or contagious complaints is very great indeed.² I presume there is no doubt that the risk is greater when the subject has died from zymotic disease; but the distinction is too delicate to rely on, and the attendant on midwifery will certainly err on the safe side by avoiding

¹ Selected Obstetric Works, p. 508.
² "Lectures on Puerperal Fever." *Lancet*, 1865, vol. II. p. 112.

as much as possible having anything to do with the conduct of dissections or post-mortem examinations.

Infection from Erysipelas.—Another possible source of infection is erysipelatos disease in all its forms. The intimate connection between erysipelas and surgical pyæmia has long been recognized by surgeons, and the influence of erysipelas in producing puerperal septicæmia has been specially observed in surgical hospitals into which lying-in patients were also admitted. Trousseau relates instances of this kind occurring in Paris. The only instance that I know of in London was in the lying-in ward of King's College Hospital, where, in spite of every hygienic precaution, the mortality was so great as to necessitate the closure of the ward. Here the association of erysipelas with puerperal septicæmia was again and again observed; the latter proving fatal in direct proportion to the prevalence of the former in the surgical wards. The dependence of the two on the same poison was in one instance curiously shown by the fact of the child of a patient who died of puerperal septicæmia dying from erysipelas which started from a slight abrasion produced by the forceps. A more recent and very remarkable example is related by Dr. Lombe Atthill.¹ A patient suffering from erysipelas was admitted into the Rotunda Hospital on February 15, 1877. The sanitary condition of the hospital was at the time excellent. The patient was removed next day, but of the next 10 patients confined in adjoining wards, 9 were attacked with puerperal peritonitis, the only one who escaped being a case of abortion. But the connection between erysipelas and puerperal septicæmia is not limited to hospitals, having been observed in domiciliary practice. Some interesting facts have been collected by Dr. Minor,² who has shown that the two diseases have frequently prevailed together in various parts of the United States, and that during a recent outbreak of puerperal fever in Cincinnati it occurred chiefly in the practice of those physicians who attended cases of erysipelas. Many children also died from erysipelas whose mothers had died from puerperal fever.

Infection from other Zymotic Diseases.—There is good reason to believe that the contagium of other zymotic diseases may produce a form of disease indistinguishable from ordinary puerperal septicæmia, and presenting none of the characteristic features of the specific complaint from which the contagium was derived. This is admitted to be a fact by the majority of our most eminent British obstetricians, although it does not seem to be allowed by Continental authorities, and it is strongly controverted by some writers in this country. It is certainly difficult to reconcile this with the theory of septicæmia, and we are not in a position to give a satisfactory explanation of it. I believe, however, that the evidence in favor of the possibility of puerperal septicæmia originating in this way is too strong to be assailable.

The scarlatinal poison is that regarding which the greatest number of observations have been made. Numerous cases of this kind are to

¹ *Medical Press and Circular*, January-June, 1877, p. 339.
² *Erysipelas and Childbed Fever*. Cincinnati, 1874.

be found scattered through our obstetric literature, but the largest number are to be met with in a paper by Dr. Braxton Hicks in the twelfth volume of the *Obstetrical Transactions*, and they are especially valuable from that gentleman's well-known accuracy as a clinical observer. Out of 68 cases of puerperal disease seen in consultation, no less than 37 were distinctly traced to the scarlatinal poison. Of these 20 had the characteristic rash of the disease; but the remaining 17, although the history clearly proved exposure to the contagium of scarlet fever, showed none of its usual symptoms, and were not to be distinguished from ordinary typical cases of the so-called puerperal fever. On the theory that it is impossible for the specific contagious diseases to be modified by the puerperal state, we have to admit that one physician met with 17 cases of puerperal septicæmia in which, by a mere coincidence, the contagium of scarlet fever had been traced, and that the disease nevertheless originated from some other source—an hypothesis so improbable that its mere mention carries its own refutation.

With regard to the other zymotic diseases the evidence is not so strong; probably from the comparative rarity of the diseases. Hicks mentions one case in which the diphtheritic poison was traced, although none of the usual phenomena of the disease were present. I lately saw a case in which a lady, a few days after delivery, had a very serious attack of septicæmia, without any diphtheritic symptoms, her husband being at the same time attacked with diphtheria of a most marked type. Here it would be difficult not to admit the dependence of the two diseases on the same poison.

It is, however, certain that all the zymotic diseases may attack a newly delivered woman, and run their characteristic course without any peculiar intensity. Probably most practitioners have seen cases of this kind; and this is precisely one of the points of difficulty which we cannot at present explain, but on which future research may be expected to throw some light. It seems to me not improbable that the explanation of the fact that zymotic poison may, in one puerperal patient, run its ordinary course, and in another produce symptoms of intense septicæmia, may be found in the channel of absorption. It is, at any rate, comprehensible that if the contagium be absorbed through the skin or the ordinary channel, it may produce its characteristic symptoms and run its usual course; while, if brought into contact with lesions of continuity in the generative tract, it may act more in the way of septic poison, or with such intensity that its specific symptoms are not developed.

It may reasonably be objected that if puerperal and surgical septicæmia be identical, the zymotic poisons ought to be similarly modified when they infect patients after surgical operations. The subject of specific contagium as a cause of surgical pyæmia has been so little studied, that I do not think anyone would be justified in asserting that such an occurrence is not possible. Fritsch, of Halle, and other German physicians have recently shown how elaborate antiseptic precautions in lying-in hospitals may prevent the origin of the disease from such sources. Sir James Paget, in his *Clinical Lectures*, seems

to believe in the possibility of such modification. He says: "I think it not improbable that, in some cases, results occurring with obscure symptoms, within two or three days after operations, have been due to scarlet-fever poison, hindered in some way from its usual progress." Sir Spencer Wells informs me that he has seen cases of surgical pyæmia which he had reason to believe originated in the scarlatinal poison; and his well-known success as an ovariologist is, no doubt, in a great measure to be attributed to his extreme care in seeing that no one likely to come in contact with his patients has been exposed to any such source of infection.

Sewer-gas and Defective Sanitary Arrangements.—Exposure to sewer-gas may, I feel sure, produce the disease. In two cases of the kind I had the opportunity of closely watching an untrapped drain opened directly into the bedroom—in one instance into a bath, in the other into a water-closet. Both cases were indistinguishable from the ordinary form of the disease, and in both improvement commenced as soon as the patient was removed into another room.

In a case I saw some years ago at Notting Hill, the patient, who had been confined within a week, had all the symptoms of a most intense attack of septicæmia, but none of a diphtheritic character, while her husband lay in an adjoining room suffering from a diphtheritic sore-throat. Here the waste-pipe of the bath was found to communicate directly with the sewer. In spite of her intense illness, I had the patient removed to another house, and from that moment she began to improve. In two other cases in which the same source of disease was detected, the removal of the patient from the infected atmosphere was immediately followed by a marked amelioration in the symptoms. I know of three similar cases which ended fatally, in which I have every reason to believe that the cause of the disease was poisoning by sewer-gas. Frankenhauser has related a curious case of the poisoning of four puerperal women by sewer-gas. Gustave Braun¹ ascribes a recent mortality in his clinic of 8.87 per cent. to bad sewerage, his wards being in direct connection with the sewerage system of the General Hospital, and near the closets of the adjoining barracks. Technical antiseptics had been as faithfully practised as is possible where instruction has been given to midwives. In fact, the whole question of the influence of defective sanitary conditions on the puerperal state deserves much more serious study than it has ever yet received, and I have long been satisfied that they have often much to do with certain grave forms of illness in the lying-in state, the origin of which cannot otherwise be traced.²

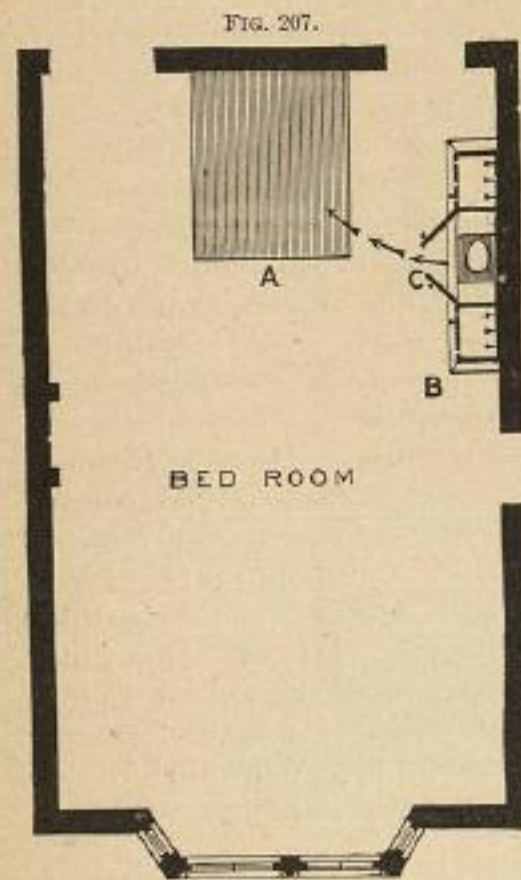
¹ *Centralblatt für Gynäk.*, 1889, No. 33.

² Since the above was written, I have published a special paper on this subject ("Defective Sanitation as a Cause of Puerperal Disease," *Lancet*, February 5, 1887). I append from it two cases, as I think the diagrams illustrating this source of danger may prove of interest:—The annexed diagram (Fig. 207) represents a bedroom in a large house in a fashionable part of the West End, which had been recently taken and done up in the most costly way. I attended the lady of the house in her second confinement, and she lay in her bed at A. Shortly she developed well-marked septic symptoms, and I naturally investigated the sanitary state of the house to see if it threw any light on their origin. I could find nothing amiss. There was no bath or fixed washstand near the room, and the closets were at a distance, with the soil-pipe running down the outside wall, as it should do. It was not until some days afterward that I discovered the extraordinary arrangement depicted in the diagram, which no one could possibly have suspected, and the knowledge of which the patient had given special directions should be withheld from me. At B is represented a very handsome and innocent-looking piece of furniture which seemed

Septicæmia from Contagion Conveyed.—The last source from which septic matter may be conveyed is from a patient suffering from puerperal septicæmia, a mode of origin which has, of late, attracted special attention. That this is the explanation of the occasional endemic prevalence of the disease in lying-in hospitals can scarcely be doubted. The theory of a special puerperal miasm pervading the hospital is not required to account for the facts, for there are a hundred ways, impossible to detect or avoid—on the hands of nurses or attendants, in sponges, bedpans, sheets, or even suspended in the atmosphere—in which septic material derived from one patient may be carried to another.

The poison may be conveyed in the same manner from one private patient to another. Of this there are many lamentable instances recorded. Thus it was mentioned by a gentleman at the recent discussion at the Obstetrical Society, that five out of fourteen women he attended died, no other practitioner in the neighborhood having a case. This origin

to be a fixed wardrobe, to which purpose its ends were in fact devoted. The centre door, however, formed by a large mirror, opened on a concealed water-closet (c), which luxury no one could have looked for in such a situation. I subsequently discovered that this was a brilliant idea of the husband's, who actually had had a special soil-pipe carried through the centre of the house, which communicated directly with the main drain, with no ventilation, and who had thus contrived, at an enormous cost, to have a stream of sewer-gas laid on close to his bedside. And be it remarked that builders and plumbers had carried out this ingeniously dangerous arrangement without giving the slightest hint that it was either unusual or perilous. Of course, as soon as I made this discovery I had the patient removed to another room, when her symptoms soon abated.



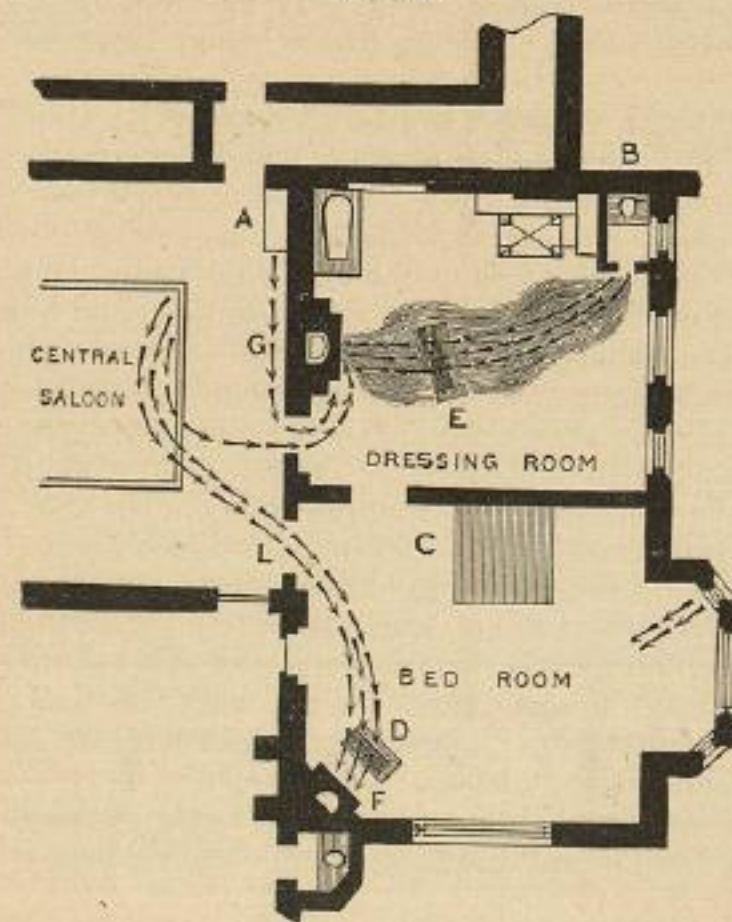
I could easily go on multiplying examples of this kind, but I shall content myself with one more case, which was thoroughly worked out, with very instructive results. It was that of a lady who was confined of her first child, in the country in a large and expensive house, newly built, and supposed to be supplied with all the most perfected sanitary arrangements. There was nothing particular about the labor, and for the first ten days the convalescence left nothing to be desired. On the eleventh day she got up and lay on the sofa (Fig. 208, b) opposite the fire (F), which, as it was in January, was burning day and night. The day after, although she had a headache and felt poorly, she again got up and lay on the sofa. The subsequent day, although feeling very ill, she again insisted on getting up, and lay on the sofa at g, in her husband's dressing-room. On the following day she was very ill indeed, with a temperature of 104° and a pulse of 120, and I was summoned to see her. It is needless to say more of her illness, which rapidly increased, except that, feeling satisfied it was caused by defective sanitation, I advised her removal to a house in the neighborhood, in spite of the very grave symptoms that existed, with the most satisfactory result, for within twenty-four hours her temperature had fallen, and she rapidly became convalescent. Of course, at this time nothing was known of what actually existed,

but I was led to form this conclusion from the fact that a number of the servants and residents were suffering from sore-throats, and from being told that almost everyone who came to stay felt ill and out of sorts. Subsequently the sanitary state of the house was thoroughly investigated by one of the most distinguished sanitary engineers in London, from whose reports the accompanying diagram (Fig. 208) is copied. It is useless to enter into a description of all the abominations which were found to exist, which, in a house of the kind, in the building of which no expense was spared, were almost past belief. For the purpose of my story it will suffice to say that the smoke test showed that there was a very abundant escape of sewer-gas in both the bedroom and dressing-room, which, from the fact that there were large fires burning constantly in both rooms, passed in a continuous current in the direction of the arrows. In addition, the plumbing-work in the closet, B, in the dressing-room, had been so imperfectly done that its contents found their way out under the floor, E. Now, mark how thoroughly and curiously these facts prove the cause of the disease. The patient lay in the bed at c, which, from the accident of its being winter, and the

of the disease was clearly pointed out by Gordon¹ toward the end of last century, who stated that he himself "was the means of carrying the infection to a great number of women," and he also traced the spread of the disease in the same way in the practice of certain midwives. In some remarkable instances the unhappy property of carrying contagion has clung to individuals in a way which is most mysterious, and which has led to the supposition that the whole system becomes saturated with the poison. One of the strangest cases of this kind was that of the late Dr. Rutter, of Philadelphia, which caused much discussion. He had forty-five cases of puerperal septicæmia in his own practice in one year, while none of his neighbors' patients were attacked. Of him it is related: "Dr. Rutter, to rid himself of the mysterious influence which seemed to attend upon his practice, left the city for ten days, and before waiting on the next parturient case had his hair shaved off and put on a wig, took a hot bath, and changed every article of his apparel, taking nothing with him that he had worn

current of sewer-gas being drawn therefore to the chimneys, was quite out of its reach, and for the first ten days after her confinement, while she remained in bed, she was perfectly well. On the eleventh day, when she got up, she was placed directly in the current of sewer-gas at b, and instantly got poisoned. On the twelfth and thirteenth days she was again exposed to the absorption of further and more intense poisoning, at e; while immediately on her removal to fresh and

FIG. 208.



uncontaminated air all her threatening symptoms disappeared. Remark also that there was nothing peculiar in the symptomatology, nothing different from an ordinary and rapidly progressing case of puerperal septicæmia. It seems to me that this instructive history is about as complete a demonstration of the origin of puerperal disease from defective sanitation as anyone could possibly desire, and I can see no flaw in the chain of evidence.

¹ See Lectures on Puerperal Fever. By Robert J. Lee, M.D.

or carried, to his knowledge, on any former occasion: and mark the result. The lady, notwithstanding that she had an easy parturition, was seized the next day with childbed fever, and died on the eleventh day after the birth of the child. Two years later he made another attempt at self-purification, and the next case attended fell a victim to the same disease." No wonder that the late Charles D. Meigs, in commenting on such a history, refused to believe that the doctor carried the poison, and rather thought "that he was merely unhappy in meeting with such accidents through God's providence." It appears, however, that Dr. Rutter was the subject of a form of *ozæna*, and it is quite obvious that, under such circumstances, his hands could never have been free from septic matter.¹ This observation is of peculiar interest as showing that the sources of infection may exist in conditions difficult to suspect and impossible to obviate, and it affords a satisfactory explanation of a case which was for years considered puzzling in the extreme. It is quite possible that other similar cases, of which many are on record, although none so remarkable, may possibly have depended on some similar cause personal to the medical attendant.

Proby² suggests that a similar source of infection may occasionally be found in a carious tooth or alveolar abscess, the pus infecting the examining finger.

The sources of septic poison being thus multifarious, a few words may be said here as to the mode in which it may be conveyed to the patient.

Mode in which the Poison may be Conveyed to the Patient.—

As on the view of puerperal septicæmia which seems most to agree with recorded facts, the poison, from whatever source it may be derived, must come into actual contact with lesions of continuity in the generative tract, it is obvious that one method of conveyance may be on the hands of the accoucheur. That this is a possibility, and that the disease has often been unhappily conveyed in this way, no one can doubt. Still it would be unfair in the extreme to conclude that this is the only way in which infection may arise. In town practice, especially, there are many other ways in which septic matter may reach the patient. The nurse may be the means of communication, and if she has been in contact with septic matter she is even more likely than the medical attendant to convey it when washing the genitals during the first few days after delivery, the time at which absorption is most apt to occur. Barnes relates a whole series of cases occurring in a suburb of London, in the practice of different practitioners, every one of which was attended by the same nurse. Again, septic matter may be carried in sponges, linen, and other articles. What is more likely, for example, than that a careless nurse might use an imperfectly washed sponge, on which discharge has been allowed to remain and decompose? Nor do

¹ This is stated on the authority of an obstetrical contemporary of Dr. Rutter. See Amer. Journ. of Med. Sciences, 1875, vol. lxi, p. 474. (Minor.)
The author quotes from the editor. Dr. Rutter had an *ozæna* which in time much disfigured him from its effect upon the contour of his nose. He was unfortunately inoculated in his index finger from a patient, and neglected the pustule. He had ninety-five cases of puerperal septicæmia in four years and nine months, with eighteen deaths. The question of Dr. Meigs, who was a non-contagionist in regard to puerperal peritonitis, was remarkably apposite: "Did he distil a subtle essence which he carried with him?"—Harris's note to the third American edition.
² Lancet, December 21, 1889.

I see any reason to question the possibility of infection from septic matter suspended in the atmosphere; and in lying-in hospitals, where many women are congregated together, there can be little doubt that this is a common origin of the disease. It is certain, whatever view we may take of the character of the septic material, that it must be in a state of very minute subdivision, and there is no theoretical difficulty in the assumption of its being conveyed by the atmosphere.

Conduct of the Practitioner in Relation to the Disease.—This question naturally involves a reference to the duty of those who are unfortunately brought into contact with septic matter in any form, either in a patient suffering from puerperal septicæmia, zymotic disease, or offensive discharges. The practitioner cannot always avoid such contact, and it is practically impossible to relinquish obstetric work every time that he is in attendance on a case from which contagion may be carried. Nor do I believe, especially in these days when the use of antiseptics is so well understood, that it is essential. It was otherwise when antiseptics were not employed; but I can scarcely conceive any case in which the risk of infection cannot be prevented by proper care. The danger I believe to be chiefly in not recognizing the possible risk, and in neglecting the use of proper precautions. It is impossible, therefore, to urge too strongly the necessity of extreme and even exaggerated care in this direction. The practitioner should accustom himself, as much as possible, to use the left hand only in touching patients suffering from infectious diseases, as that which is not used, under ordinary circumstances, in obstetric manipulations. He should be most careful in the frequent employment of antiseptics in washing his hands, such as the 1:1000 solution of perchloride of mercury. Clothing should be changed on leaving an infectious case. Much more care than is usually practised should be taken by nurses, especially in securing perfect cleanliness in everything brought into contact with the patient. When, however, a practitioner is in actual and constant attendance on a case of puerperal septicæmia, when he is visiting his patient many times a day, especially if he be himself washing out the uterus with antiseptic lotions, it is certain that he cannot deliver other patients with safety, and he should secure the assistance of a brother practitioner, although there seems no reason why he should not visit women already confined, in whom he has not to make vaginal examinations.

Prophylaxis of Septicæmia.—If the views here inculcated as to the nature and the mode of infection in puerperal septicæmia be correct, it is obvious that much may be done in the way of prophylaxis. A perfectly aseptic management of puerperal women is practically impossible. In most lying-in institutions very rigid rules are now laid down to prevent the possibility of infective matter being conveyed to the patient either on the hands of the attendants, or on instruments, napkins, and the like, and with the most satisfactory results. As the risk is much greater when lying-in women are collected together, such precautions, which this is not the place to discuss, are absolutely indicated. They are not, however, easily applicable in ordinary private practice; but there are certain simple precautions which everyone