

PUERPERAL CONVALESCENCE

AND THE

DISEASES OF THE PUERPERAL
PERIOD

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JOSEPH KUCHER, M.D.



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PREFACE.

THE great reduction in the mortality from puerperal fever which has been effected in recent years, is due to Semmelweiss, and has gone on, *pari passu*, with the degree of exactitude in which his instructions have been carried out. I have found no book in the English language which faithfully reflects this statement, or duly acknowledges its correctness. After over four years of service in the Vienna lying-in hospital, where first the benefits of Semmelweiss' discovery were experienced, and after several years of private practice, I venture to offer my little book to the profession. In this book I have attempted to concisely reflect the views on the management of childbed, and upon the origin and treatment of the puerperal diseases, as accepted and in practice at the Vienna lying-in hospital. About forty thousand women were confined there during my term of service. Of these a third came under my immediate observation, and owing to the kindness of my

colleagues, Drs. Breus, Felsenreich, Palik, Riedinger, and Welponer, ample opportunity was afforded me to study many of their interesting cases and to compare their management with my own.

The results in the lying-in hospital were, considering the many unfavorable circumstances which could not always be controlled, excellent. In the year 1878, we had in our ward only 29 deaths out of 3,142 puerperal women, and during the most unfortunate time the mortality did not reach two per cent.

Extensive reading and larger experience in private practice made me change some of my views and modify some of my therapeutical measures, but they are for the most part the same as those which are in vogue in the Vienna lying-in hospital.

My experience in private practice here is comparatively insignificant, yet sufficiently large to show that the same management which gave such excellent results in the lying-in hospital succeeds still better in private practice. The number of my cases here is only 139. Of these, 80 were primiparæ, and 59 multiparæ; in 3 cases there were twins; 5 cases were complicated by placenta prævia. Although I had the same indications for operative interference in the Vienna lying-in hospital as here, the number of operations in these cases is very large. This is due to two reasons. Many of the operative cases were met with in consultations and then I find forceps, on account of deficient contractions of the uterus among

the well-to-do, to be required at least twice as often as in the Vienna lying-in hospital, where mostly healthy servants and peasant girls are confined. Forceps are there applied only in three to five per cent. of the cases. In the year 1878, in 3,142 labor cases, the forceps were used in 97 (80 primiparæ and 17 multiparæ), although deformities of the pelvis are there very common (eight to ten per cent.), while here they are exceedingly rare.

The operations in these 139 cases were : In 32 cases forceps (27 primiparæ and 5 multiparæ), in 12 cases turning and manual extraction, in 4 cases manual extraction, in 3 cases introduction of the whole hand into the uterine cavity to bring down a foot in breech presentations, in 4 cases induction of premature labor, in 2 cases perforation of the head after unsuccessful attempts with the forceps, in 1 case artificial separation of the placenta. Of these 139 cases 136 were met with either in my own practice or in consultation with other physicians. None of these patients suffered from puerperal fever ; and other complications during childbed were remarkably rare. One patient suffered from parametritis (page 184), one was an invalid for some weeks (heavy loss of blood from placenta prævia, and temperature 102° before my arrival), I turned according to Braxton Hicks ; one patient had a severe hemorrhage four hours after labor, which I expected, on account of the presence of twins and long-delayed labor. I advised control of

the uterus for some hours, but the attending physician, being satisfied with the good contraction, trusted the further control to the nurse. In two cases I had hemorrhage a few hours after labor, which was soon controlled by friction of the uterus and injection of hot water. In two cases I had suppuration of the mamma, in one case (page 193) very likely through my own fault; in the other I was not called before suppuration had begun. In two cases I found severe dysuria. In no case did I see diphtheritic ulcers or symptoms of perimetritis, which are so common in a lying-in hospital, even at times when the mortality is small.

I am aware that this exceptional success is not wholly due to my merits—I owe much to favorable circumstances. The patients, with few exceptions, have belonged to the well-to-do class, and my antiseptic precautions could be easily carried out. Not one of the patients had been examined except by myself or by physicians who are particular about cleanliness. How circumstances beyond our control may influence our results is shown by the following three cases, in which I took, unfortunately, an active part.

CASE I.—Multipara, forty-eight years of age, very stout. Suffering for two months from severe bronchitis; had been confined in her previous labors by a midwife, and, although not compelled to do so by straitened circumstances, engaged the same midwife again on this occasion. As the labor did not progress, and

after rupture of the membranes no presenting part was within reach, the midwife introduced the whole hand and found a breech presentation. She thereupon asked leave to send for a physician. Dr. Glück, who was called, found the patient exhausted; pulse, 120; temperature, 100°; the breech engaged in the superior strait, and the pains without the slightest effect on its progress. Dr. Glück sent for me, and with his assistance I brought down a leg, and extracted with much difficulty a boy weighing twelve pounds; the child had been dead only a short time, as the skin was just beginning to peel off. We used all antiseptic precautions, and washed out the uterus, which contracted well. The operation was finished at two o'clock A.M. During the day the patient remained weak and exhausted, respiration accelerated, pulse and temperature the same as during labor. We made the diagnosis of beginning fatty degeneration of the heart, bronchitis, and possibly infection, although nothing abnormal in the genital organs, no pains or tenderness of the uterus on pressur  could be found. Next day, Dr. G. Thomas was called, who found the patient in the same condition. I asked Dr. Thomas to give us his unbiased opinion, whether the symptoms were due to the affection of the heart or to infection, as I cared more for the correct treatment than for the confirmation of our diagnosis. Dr. Thomas said these symptoms could be caused by infection, if this were a case of what the French call *sepsis foudroyante*, as it evidently was not such a case, that we must explain the symptoms by the bronchitis and beginning fatty degeneration of the heart, and that this was the disorder requiring treatment; and he added, with his usual politeness, that he could not suggest anything better than we had prescribed. After Dr. Thomas' departure, I thought the possibility of infection could nevertheless not be excluded, and even a slight infection, which in another case might do no harm, could, with the present complication, be sufficient to kill the patient. We therefore washed out the uterus several times during the day and night with corrosive

sublimate. Next day Dr. Thomas saw the patient again, and for the last time. We told him the measures we had used, of which he approved, but in regard to diagnosis he still adhered to his former opinion, as the symptoms were the same. The patient grew weaker, without showing any local or characteristic general symptoms of infection. The temperature in the vagina rose only once to 102°, usually it was 100° to 101°. Patient died the seventh day after labor. No post-mortem was allowed, on account of religious scruples.

To Dr. Glück's and my own utter surprise, Dr. Thomas later changed his opinion about this case, mentioning it in his paper, "On the Treatment of Puerperal Fever," as a case of puerperal fever, pure and simple.

CASE II.—Primipara, thirty years of age. Was delivered of the first twin after a tedious labor by a midwife, who, after introducing the whole hand, found that the second child was in a transverse position. A physician was called, who made several fruitless attempts at turning. Another physician who was sent for did not touch the patient when he saw her bad general condition (temperature, 102°; pulse, 120), and he sent for me. Turning and extraction were very easy, but patient died at the end of the first week from puerperal fever.

CASE III.—Multipara, thirty years of age. Was attended for twenty-four hours by a midwife, and then a physician was sent for, on account of severe hemorrhage from placenta prævia partialis. He tried to deliver with the forceps, but the forceps glided off. I found the patient exhausted; temperature, 102°; pulse, 120. Turning and extraction were easily performed, but the patient died at the end of the first week from puerperal fever.

These cases occurred at intervals of a year. To meet them oftener would soon disgust any physician with obstetrics.

I know, of course, that a number of physicians here have had a far larger experience in private practice than myself, and with perhaps equally good results. If my experience had been gained only in private practice, I should not presume to give advice to other physicians; but considering my private practice as a mere supplement to my hospital practice, and backed by both, I think I can give some directions to practitioners with less experience.

As this book is intended for practitioners, I have omitted many things which are merely interesting but are of no practical use, and have often contented myself with giving the leading principles in the treatment, leaving the details to be determined by the experience of the individual practitioner. Any one who is interested in scientific details can find ample information in such excellent books as those of Spiegelberg, Winckel, Schroeder, Fritsch, Hervieux, and others. It is not my purpose to give a complete review of the science and art of the management of puerperal convalescence as they are represented by the teaching of good authors. I have desired simply to give an available guide to practitioners. In my opinion it is better for the practitioner to know thoroughly a good route which he can safely follow under all circumstances, than to know of several routes which may be good for an experienced traveller, but are likely to lead an unwary one into a swamp. The therapeutical measures

which I advise have been useful not only in my own hands but in those of many other physicians, and can be easily applied by anyone. No treatment is recommended which I have not tried and found reliable. I have placed my reliance in practice upon the accumulated results of my experience, as being my sheet anchor in the maelstrom of contradictory assertions.

Though some of the important chapters are rather sketchy, I have tried to compress within a few lines everything of importance. A few important suggestions well remembered may be of more use than the reading of a long article, where it is often hard to find out what is important and what is not. I have refrained, as much as possible, from entering into controversies, or giving copious quotations, as so much has been written on this subject that a complete bibliographical catalogue would fill a large volume. I have made, however, an exception in regard to puerperal fever, as this is the most important subject within the whole range of obstetrics, and views on puerperal fever which Fritsch calls anti-diluvian are still widely accepted. Upon no question in obstetrics have I such strong convictions, and convictions based on so large an experience, as upon the etiology of puerperal fever. If I should succeed in converting some practitioners who still consider puerperal fever an essential disease, to accept Semmelweis' theory, I should deem it a sufficient com-

pen- sation for the severest criticism which my short-comings in other regions may elicit. I should be very proud of such a conversion, as thereby not only valuable lives may be saved, but also useful workers may be gained for a field which still needs the active co-operation of every practitioner. Not only is the nature of the infectious matter (which is the cause of all puerperal fevers) almost unknown, but the sources of infectious matter are not yet all explored, and practitioners may have opportunities for more minute observation than are always possible to a clinician with large material. Now much valuable help is lost, because many practitioners still waste their intellectual forces in a wrong direction.

I take this opportunity to give my thanks to Dr. L. Conrad, to whose liberality I owe most of my gynecological and obstetrical practice. Drs. Adler, Schnetter, Schwedler, and many others have also helped me kindly.

33 EAST THIRTY-THIRD STREET,
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CHAPTER I.

ANTISEPTICS.

ASEPSIS, that is, the absence of infecting matter, is now considered in every lying-in hospital to be the key-note of all obstetrical interference, and to be the *conditio sine qua non* of a good puerperal convalescence. And even the obstetricians who still deny that puerperal fever and its kindred affections originate only from infectious matter do nevertheless recognize the great importance of asepsis, and urge its perfect maintenance in private practice. My own experience has so impressed me with its importance that I think a sign, with the legend, "Look out for infectious matter!" should always be before the mental eyes of an obstetrician. The management of puerperal convalescence may be so simple as hardly to require the attendance of a physician, or so complicated as to baffle the best medical skill. This difference depends almost entirely upon the management of labor, as labor and puerperal convalescence stand in the same relation to each other as cause and effect. The evil results of any mismanagement during labor manifest themselves sooner or later during

puerperal convalescence. There is, however, no other untoward accident during labor which is more to be dreaded, and is more antagonistic to a normal puerperal convalescence, than is infection. If infection has taken place during labor, complications during the puerperal period will crop up as mushrooms after a rainy day. Not only the mortality, but also the morbidity, with all the innumerable ills which make the parturient an invalid for months and years, originate from this same source. All other unfavorable conditions, as, for instance, the enfeebled constitution of the patient, length and difficulty of labor, the surrounding air, the season of the year, and many other circumstances arising during the labor, which were formerly regarded as of great importance, pale into insignificance when compared with the dangers of infection. Those who find this assertion too bold have only to look at the wonderful results now obtained in the lying-in hospitals the world over. Never has a theory been more fruitful in good results than this theory about infection. Whatever views an obstetrician may have about puerperal fever, he cannot afford to disregard the teachings about infection.

Although the paramount importance of asepsis is generally recognized in principle, it has not yet passed into the *succum et sanguinem* of every physician. This is partly due to the teachings of some authors, that infection is only one of the many causes of pu-

erperal fever, and partly to the observation that good results can be obtained without antiseptic precaution or by the use of different antiseptic lotions. Besides this, our knowledge in regard to infectious matter is still very incomplete. We have not yet explored all its sources, and its nature is almost unknown.

Some very valuable information, however, has been gained by large experience. Firstly, it is proven by irrefutable facts, as we shall see later, that infectious matter is the only known, and most probably the only existing, cause of puerperal fever; and that infection takes place exclusively by direct contact of the infecting matter with the lesions in the genital tract, before or during the labor, by such palpable means as the fingers, instruments, cloths, sponges, etc., of the physician or nurse; and that if we succeed in preventing this kind of infection, puerperal fever and all kindred disorders are stamped out, or become at least as rare as any of the rarest complications during childbed. Secondly, it is equally certain that there are some lotions by the use of which the infecting matter can be removed or neutralized. Numerous are the (antiseptic) lotions which have been found effectual in this regard. The best known are: Carbolic acid, corrosive sublimate, salicylic acid, chloride of lime, permanganate of potassium, thymol, iodoform, iodine, biniodide of mercury, and several others. None of these lotions has shown such signal

superiority over the others that it could be called the lotion par excellence. This is no great matter, since we know that our success depends less upon the adoption of this or that lotion than upon the exact execution of one or the other of the prophylactic procedures which have been found reliable.

If we knew all the sources where infecting matter may lurk, and if we could be sure that neither we nor our instruments had come in contact with infecting matter, the use of disinfectants would be, of course, unnecessary. We hear often that this or that physician, who never uses any disinfecting lotions, has better results than another who does make use of such lotions. This is obviously no argument against disinfectants; it shows only that one physician can be free from infecting matter without using disinfecting lotions, and that another will not be free when he has exposed himself to infection and his disinfection has not been thorough enough. Who is holy needs no purification. In the long run it will be always found that the best policy is to use in every case, whether we are conscious of having exposed ourselves to infection or not, such measures as have been found efficient for disinfection, and to use them more vigorously when we have exposed ourselves or our utensils to infection.

Very instructive in this regard is H. Fritsch's experience ("Path. und Ther. des Wochenb.," p. 10). During one of the years of his practice he had to

dress three times a day a putrid wound of his brother, and to perform daily two to three obstetrical operations; and during this whole year he lost no case from puerperal fever, while formerly a mortality of four to six per cent. had not been uncommon in his obstetrical experience. Fritsch thoroughly cleansed his hands after each dressing with soap and water, used after this a solution of carbonate of potash, and then a five per cent. carbolic acid solution.

Many misconceptions about aseptic management of labor are still prevalent. The most common mistake is to suppose that any physician who has read about antiseptic precautions can execute them exactly, and upon the occurrence of any mishaps to blame the antiseptic precautions and not their imperfect application. It is forgotten that the execution of antiseptic precautions requires practice, and that in the beginning even a careful physician is liable to make mistakes; while disinfecting measures which may be sufficient for common use are insufficient when the danger of infection is great. To dip the fingers or instruments in some antiseptic fluid is not sufficient, if a thorough cleansing with soap and water has not preceded the use of antiseptic lotions. The infecting matter may have dried in under the fingernails or in the furrows of the fingers or instruments, and it may be very hard to remove it; then, during the examinations and manipulations it may be dissolved and start the infection. Many physicians do not

pay the attention to their fingers they would if they knew the dangers from unclean nails. Among the Austrian peasants it is a common belief that fresh wounds should not be touched with the nails, as this would produce suppuration. The danger is not in the nails, but in the infectious matter which is carried upon or under the nails. "Many a woman's death-warrant has been carried under the finger-nails of her physician" (Emmet) is still more true for obstetrical than gynecological cases. Long finger-nails are as useful for an obstetrician as sand in the shoes; the sooner we get rid of both the better.

Another quite common mistake about antiseptic precautions is to believe that the labor has been conducted according to antiseptic principles, when the nurse has been allowed to cleanse the external genital organs of the parturient with the "next best" sponge or rag, and that the nurse was very clean in her manipulations and understood antiseptic precautions. As the nurse can always throw the responsibility on the attending physician, we cannot expect that she will be as careful as the physician, who is always made responsible finally for all mishaps.

Many physicians who know the dangers of infection are not yet convinced that infection takes place only from manipulations in the genital tract, and they waste their antiseptic precautions somewhere else instead of concentrating them on the place where and upon the things from which infection

takes place. Every palpable thing which comes in contact with the lesions in the genital regions can be the carrier of infection. Cloths which have been washed together with infected cloths, or have been used somewhere else, can impart the infection when they are used for wiping the external genitals.

Up to the present time no prophylactic measures or procedures have been discovered by the adoption of which we can secure absolute immunity from infection, and consequently from puerperal fever. Only an outsider would say that infection can be prevented in every case; any one who is engaged in a large obstetrical practice knows how difficult, and sometimes even impossible, it is to prevent infection in every case. Still, the adoption of prophylactic antiseptic measures has given such wonderful results in lying-in hospitals and in private practice as to convince any one, who is open to conviction, of their necessity. These measures have distanced all other prophylactic measures so far that it is the duty of every obstetrician to give them the most prominent place among his prophylactic precautions. As different antiseptic precautions have given equally good results, every physician is still at liberty to take his choice, but he must bear in mind that the disinfectants must be applied the more vigorously the more he has exposed himself to infection or the greater the dangers from infection are; that a disinfectant which is good for ordinary cases may be in-

sufficient in exceptional cases; and that, if mishaps happen, the chances are one thousand to one that his precautions were insufficient, and not that the infection was beyond his control. As an antiseptic lotion carbolic acid (two to five per cent.) was formerly generally used. Now solutions of corrosive sublimate ($\frac{1}{4}$ —1 part sublimate to 1,000 parts of water) are used in most of the lying-in hospitals. But thirteen cases of severe poisoning, with four deaths, caused by the use of corrosive sublimate of the given strength for vaginal and intra-uterine injections, have been recorded in German literature; and these accidents have occurred in the practice of physicians of large experience, and who are careful in their manipulations. Poisoning may happen also from the use of carbolic acid, or any of the efficient disinfectants. Precautions are therefore required in the use of any of them. I was always convinced of the advantages of antiseptic precautions, and have become stricter in their application with larger experience.

CHAPTER II.

NORMAL CHILDBED.

WHEN systematic antiseptic precautions have been used during labor a normal puerperal convalescence can be expected with the greatest confidence, and nothing is further required than to control the condition of the uterus, to regulate the functions of the pelvic organs and of the breast, and secure repose to the patient. In this country it is customary to apply after labor a bandage over the abdomen. It is supposed that a binder preserves the figure, fixes the womb, keeps up pressure, and obviates repletion of the abdominal parietes and organs, prevents relaxation of the uterus and secondary hemorrhage; that it is not only a sanitary measure, but a remedy to protect the puerpera from serious complications. All these advantages are more or less illusory. Good involution of the abdominal walls by the recumbent position and good nourishment contribute more to the preservation of figure than a binder can. Then the bandage cannot, without great discomfort to the patient, be applied so firmly as to fix the womb and prevent relaxation of the uterus and secondary hem-

orrhages. A patient may bleed to death, notwithstanding a well-applied binder; many a woman has suffered severely because the attendants were lulled into a false security by the bandage. When the uterus begins to disappear behind the symphysis, a tight binder does positive harm by crowding the uterus in the hollow of the sacrum. The only benefit a binder can do is to support the abdominal walls when they are very much relaxed. In such a case, or if the patient wishes it, a loose binder is applied two or three hours after labor, when a relaxation of the uterus is not likely to occur.

THE CONDITION OF THE UTERUS.

Nothing requires greater attention during the puerperal convalescence than the condition of the uterus, as it is the mainspring of all other complications. Immediately after labor the fundus should be in the middle line, on a level with the navel, or a little below, no matter how much it has been extended before. Whenever the fundus ascends above the navel, it is a sure sign that it is either not well contracted, or that the bladder or the flexura sigmoidea are distended, or that there are blood coagula in the vagina. Contraction of the uterus is best controlled by palpitation through the abdominal walls. After the expulsion of the child a hand is put on the fundus from time to time. When the uterus is found relaxing, contractions may be brought on by gentle

friction, by palpation, eventually by firm pressure with the thumb on the anterior, and the other fingers on the posterior surface of the womb. When the uterus relaxes again, and we are sure that nothing is left in its cavity, injections of hot water (in Vienna, cold water), combined with gentle friction from without, are resorted to. The administration of ergot may be useful, but its action is not reliable, and cannot be expected before fifteen to thirty minutes. The main reliance is placed on external manipulations. This control is continued according to the condition of the uterus. One hour is usually sufficient, when the uterus is firmly contracted and remains so.

When a tendency to relaxation is shown, the control must be continued for two to three hours. As the uterus is felt as a round hard tumor, about the size of a child's head, any nurse can be instructed how to do this. It is, however, better to stay a little longer than to give the minutest instructions. Many a calamity can be prevented by this precaution. In the Vienna Lying-in Hospital, the patient is left for the first three hours after labor in the room for confinements, where she can be better looked after than in the lying-in room. .

A chill post-partum is not rare ; it is due either to shock after an exhausting labor, or more frequently to exposure while the skin is covered with perspiration ; it is much rarer in private practice, where the

patient is more comfortably situated usually than in a lying-in hospital. Warm drinks and warm covering soon make the patient feel comfortable.

Thirst may be present after labor, from the heavy loss of fluids. Some indifferent mineral waters, plain cold water, milk, weak coffee or tea, are good drinks, and can be given freely. Wine or milk-punch are only given on special indications, when stimulants are needed. The patient is then allowed to sleep, while the contraction of the uterus is controlled from time to time. When the mother has recovered from the exhaustion of labor the baby is put to the breast, if the mother wishes to nurse. Nothing else is given the baby during the first twenty-four hours than plain boiled water, if it cries.

At the next visit, the time of which will depend upon the condition in which the patient had been left, special attention is paid to the contraction of the uterus, to the amount of discharge, to the condition of the abdomen, of the breast, the pulse, and the temperature. These are the points which are looked after, no matter how well satisfied the patient may feel herself. Some hours after she may feel very differently if anything is amiss in these respects, and has not been properly attended to. No important information is taken on trust from the patient or nurse. When the uterus is not properly contracted, and in the middle line below the navel, the cause is found out and removed; clots in the uterus or va-

gina or a distended bladder are the most common causes. The length of the uterus diminishes rapidly, so that by the fifth or sixth day the fundus is only four fingers' breadth above the symphysis, and disappears behind the symphysis in ten to fifteen days.

RETENTION OF URINE.

When the head has pressed a long time on the urethra, or the bladder has not been emptied during the labor, and over-distention has ensued, the patient is often not able to pass water, owing to mechanical obstruction, caused by the tumefaction of the urethra, or to paralysis of the bladder from over-distention. Usually it is easy to make out a swelling, with regular outline, reaching from the pubis up to various levels, and even extending to the umbilicus, dull on percussion, and fluctuating on palpation, with the history of no urine passing, or a desire to pass it, or very frequent passing; but each of these symptoms may be absent, and yet the bladder may be abnormally full; for instance, it may be impossible to define the limits of the distended bladder owing to the fat in the abdominal walls or to gas in the intestines; urine may pass away from over-distention. Very often there is no desire to pass water, though the bladder is much distended, as by the contusion the local nervous sensibility has been lowered, or the patient is still exhausted; therefore, in from five to six hours after

labor, the patient should be urged by the nurse to pass water. The height of the fundus uteri is usually a good indication of the condition of the bladder. When there are no coagula in the uterus or vagina, and the fundus is abnormally high, or is pushed to the side and cannot easily be brought in the middle line, or if we have any other reason to suspect the retention of urine, the catheter is applied. Delirium, high fever, perspiration, and shivering may be caused if this precaution is neglected. For the first few days attention must be paid to the condition of the bladder. If the patient is not able to pass water during the first six hours, we can wait (if the uterus is well contracted) for six or twelve hours longer, and meanwhile use warm cataplasms to the abdomen, and warm injections in the vagina. If these be without effect, a catheter is introduced, with antiseptic precautions; the external genitals are syringed before the application, to avoid the introduction of lochia. The catheter is applied every six to eight hours during the day, and eight to ten hours during the night. The secretion of urine is increased during childbed. Winckel found an average of over two litres of urine, of 1.010 to 1.019 sp. gr., within twenty-four hours. Retention of urine occurs usually only in the first few days after labor, but it may happen later in childbed from some inflammation or other morbid condition in the tissues surrounding the urethra.

PULSE.

Immediately after labor the pulse is often accelerated, but becomes usually slower within the first twenty-four hours. Blot, in 1863, observed that healthy puerperal women very often show a considerable retardation of pulse. This observation has since been generally confirmed. Olshausen found a reduction in the rate of pulse in sixty-three per cent., and Winckel found considerable retardation continue for a while in fifteen per cent. The rate of pulse is between 40 and 70, and remains so for from ten to fourteen days. The greater the retardation the longer it continues, not being affected by after-pains or beginning secretion of the milk. But slight pathological changes are sufficient to prevent or remove the retardation. Temporarily the retardation can be removed by hot drinks or mental excitement. Though Winckel found retardation of pulse in some cases of puerperal ulceration of the vagina, with œdema of the vulva on the corresponding side, and Olshausen observed the retardation continue for twelve to twenty-four hours after beginning of fever, slow pulse is one of the most favorable symptoms; I would rather see a pulse of 60 and temperature of 100°, than temperature of 98° and pulse 100. Olshausen found fifty-two per cent. of the patients with retardation of pulse without fever, and twenty-four per cent. with only slight fever,

while only thirty-seven per cent. of patients without retardation were free from fever. Observation with the sphygmograph makes it probable that this retardation is due to the reduction in blood-pressure and arterial tension.

TEMPERATURE.

Though slight disturbances during the first few days after labor are sufficient to raise the temperature, the great revolution going on in the system has very little influence upon the bodily heat. The average temperature of a healthy puerperal 98.5° to 100.5° , is a little higher than in the non-puerperal state, but the daily fluctuations of temperature are not greater than in other persons.

Within the first twelve hours the temperature rises to 99° or 100° , especially when this time coincides with the normal daily rises of temperature from the night to the morning, or from noon to the evening, but falls again in the following twelve hours, and in the next succeeding period again becomes slightly elevated. The evening temperature is usually a little higher than the morning, but the difference is inconsiderable. A rise of temperature above 101° is generally considered abnormal, and its cause is to be looked for outside the physiological processes. We know that a slight cause can produce considerable elevation of the temperature; therefore this normal type of temperature is less

often (in about fifty per cent.) met with in lying-in hospitals than in private practice, where disturbances and pathological changes in the genital regions are less frequent. I take the temperature in the axilla, and add 1 to $1\frac{1}{2}^{\circ}$, which is the difference between the temperature of the axilla and the vagina.

AFTER-PAINS

are so common in multiparæ that they are considered physiological as long as they are slight or pass off soon, and become abnormal only through their intensity or duration, or when they are met with in primiparæ. The causes of after-pains are precipitate labor, over-extension of uterus (as in cases of hydramnion), twins, a large child, when sufficient time is not given to the uterus to decrease gradually in size, or if something has been left in the cavity, which interferes with the firm contraction of the uterus, as blood-clots, portions of placenta, or a uterine polyp.

After-pains begin usually some hours after labor, are often very severe, and lancinate toward the legs. Sometimes patients complain more of cramps in the thighs and legs than of pains in the abdomen. Although the pain is intermittent, it usually recurs so quickly that the patient cannot sleep or rest; there is no tenderness over the uterus on pressure.

The better the uterus contracts, the sooner the after-pains cease. Friction of the uterus, firm

pressure of the fundus uteri, hot vaginal injections, administration of ergot, are the best means to bring on firm contraction of the uterus. After-pains are more rapidly and effectually controlled by this method than by any other remedy. I use external friction over the uterus the day after labor, without any fear of resulting irritation or inflammation, and I consider firm contraction as the best preventive of inflammation.

After-pains may be caused also by the retention of lochia, where there is a flexion of the womb or obstruction of the cervix by clots or pieces of membranes; free discharge of the lochia is secured by correcting the malposition of the womb or by removing the obstruction.

I do not give narcotics for after-pains until I am satisfied that the uterus is well contracted, and that there is nothing in its cavity to prevent firm contraction.

Gastro-intestinal disturbances, overloading of the stomach, or gas in the intestines may simulate after-pains. A purgative or emetic gives complete relief in such cases, or warm cataplasms or turpentine stupes are often used.

Continuous pains, with exacerbations, which are often taken for after-pains, are more frequently symptoms of endometritis.

After-pains with a sense of bearing down indicate distention of the vagina with coagula.

Paroxysmal pains, resembling after-pains, sometimes occur in the bladder, uterus, or leg, for which even on very careful examination no cause can be found. A large dose of quinine in such cases is often more efficient than narcotics. Not every pain after labor is after-pain; in every case a careful examination of the abdomen, and of the parts where the pains are complained of, should be made.

LOCHIA.

From the time of delivery to the end of puerperal convalescence a discharge from the genitals takes place, changing in quantity and quality during this period, and varying in quantity and somewhat also in quality with each parturient. It is usually more profuse in women in whom the menses have been profuse, or who have had a discharge from the vagina during the pregnancy, or who do not nurse.

Immediately after labor the discharge is of a pinkish, sanguineous color (*lochia cruenta*), consisting almost entirely of blood; by the admixture of the secretions of the cervix and vagina it soon becomes brownish and sticky; coagula are formed when blood is discharged in a larger quantity, and not soon expelled from the uterus or vagina. About two pounds is the average amount of lochial discharge for the first three or four days in a normal case. After the third or fifth day the lochia assumes a yellowish-green color (*lochia serosa*), from the ad-

mixture of fatty detritus of the decidua. The odor is usually disagreeably penetrating, and is due to the presence of ammonia and fatty acids.

The more decidua left behind the more disagreeable the odor will be. It may become intensely fetid, without any indication of puerperal fever, when large débris of decidua, or portions of the membranes are retained and decompose. In such cases we must be on our guard. Ergot and hot vaginal injections are indicated.

In the second week the lochia are white (lochia alba), purulent, tenacious, the offensive smell has disappeared. The discharge of lochia for the first ten days has been found to average about three pounds.

The lochia remain sanguineous for a week, and coagula are discharged from time to time when the womb is not well contracted. The better the womb contracts the sooner the discharge ceases. If the involution of the uterus is retarded the bloody discharge may continue for weeks or months. Any slight excitement or disturbance may increase the lochia, and cause them to become sanguineous again. The same disturbance may occur when there is inflammation in the genital organs, or ulceration or laceration of the cervix. Beginning endometritis, flow of milk, watery discharges from the bowels, and free perspiration are apt to lessen the amount of the lochia, or stop them altogether for a day or two. Sometimes the lochia are scanty, and stop very soon without ap-

parent cause. Flexions of the uterus—more frequently ante- than retro-flexions—obstruction of the cervical canal by membranes, portions of placenta, or blood coagula may, at any time prevent the escape of lochia. The uterus then becomes enlarged and after-pains occur, usually accompanied by a rise of temperature. If decomposition take place, chills and other symptoms of infection set in. Correction of the malposition and evacuation of the uterine cavity, followed by syringing, removes the disorder; after four or five weeks the discharge stops, but sometimes a purulent discharge continues, especially if the woman has suffered from it before. Here I have very often found the lochia sanguineous after the first, and sometimes even after the second week, in patients with a very satisfactory puerperal convalescence, and where no cause could be found for it. I am inclined to ascribe this to a luxurious manner of living and want of exercise. Ergot and hot vaginal injections usually stop the disorder in a short time.

APERIENTS.

If the bowels have not moved spontaneously by the third day, an enema should be given; if the enema fails of desired effect, or if the patient objects to its use, a laxative is given. If there is headache, flatulence, or irritation, in consequence of constipation, a movement of the bowels should

be secured the second day. In this country castor-oil is the most popular laxative. I never order it unless the patient tells me that she finds it to be the most effective and least disagreeable laxative. There are a number of more pleasant aperients. I prefer citrate of magnesia or some aperient mineral water, as castor-oil is nauseating, and more easily spoils the appetite than any other laxative. Some authors claim that it is ill-suited for patients suffering from hæmorrhoids, from its tendency to produce tenesmus and irritation of the rectum. I continue to use enemata or laxatives until the bowels move spontaneously. Cooked fruits given with the breakfast, or a glass of cold water before breakfast, are often sufficient to produce an easy movement. When enemata have been used for some time a laxative is indicated occasionally; it procures more thorough evacuation of the bowels.

HÆMORRHOIDS.

Pregnant women often suffer from hæmorrhoids. After the labor, the pressure of the uterus and habitual constipation during pregnancy, which are the most frequent causes of hæmorrhoids, are removed, and the hæmorrhoids relieved, and patients rarely complain of them during childbed. If the disorder continues, hot-water cataplasms, as hot as they can be borne, painting with a solution of iodo-

form in ether or astringent ointments, with regulation of the bowels, are usually sufficient.

In very bad cases during pregnancy, or in puerperal convalescence, when the hæmorrhoids have developed from long-continued pressure of the head on the rectum during labor, I find artificial paresis of the sphincter ani the best remedy. To do this, I introduce both thumbs into the rectum, with their dorsal surfaces in apposition, while the patient is under anæsthesia, then separate the thumbs to the widest extent until the sphincter is so dilated that a paresis for some days ensues. Care must be taken not to burst one of the varicose tumors.

DIET.

For the first and second day liquid food is best adapted to a lying-in woman. I have no objection to steaks, chops, or meat of chickens, or other birds, being given the second day after confinement, if the patient have a desire for solid food. There is, however, no need of forcing the appetite, except in cases in which the patient is in a weak condition from a previous disease or from heavy loss of blood or fever. There is a happy medium between over-feeding and starvation. No condition of the patient during childbed is more desirable than good appetite. I have no fixed bill of fare in these cases. The patient can choose her own diet if she select easily digestible food. A restraint on the appetite is some-

times needed for the first or second day, so that the patient is not allowed to take solid food to her full capacity, the appetite being sometimes stronger than the digestive power, which is less when the patient is in the recumbent position than when she walks about.

Overloading of the stomach is apt to spoil the appetite for some days, as the consequences of any imprudence during this time are longer felt than when the patient is up. Very soon the patient finds out how much she can take without overtaxing her digestive powers. Smaller quantities, and oftener repeated, agree with all patients better than one heavy meal. I think it is better that the physician and patient should together choose the bill of fare than to prescribe the same diet for every patient. What may be judicious for one patient may disagree with another. Previous habits of the patient should be taken into account. There is no sense in urging a patient to take meat during the first days of child-bed, if she dislikes it. The appetite for meat will come sooner if we let nature take its course. The juice of fruits is often relished, raw fruits, however, are far less advisable than stewed. It is a common opinion among the laity that beef-tea and wine are very strengthening. These are good stimulants, but have little nutritive power; besides this they are apt to lessen the appetite. Stimulants, as whiskey, milk-punch, stout, ale, etc., are only given on special indi-

cations. Childbed requires no stimulants, the best stimulant is milk and easily digested food; milk, however, sometimes causes flatulence and constipation.

There is no objection to lager-beer for the German women, and claret for the French, who are accustomed to these drinks. Beer has often a good influence on the secretion of milk, but in some cases the milk does not agree with the baby when the mother takes beer.

REST IN CHILDBED.

All experiments to dispense with rest in childbed have been, and will continue to be, failures so long as the physical condition of our women remains the same. A squaw can do many things immediately after labor which would kill any other woman; we cannot expect from our patients the same as from the savages, if they have not their constitution. The parturient woman should be kept quietly in bed, on her back or on her sides, until the uterus has contracted sufficiently to be hidden behind the symphysis, and until all sore surfaces in the genital canal are healed or covered with granulations, and during the first six weeks she should avoid any great exertion. We have to bear in mind that the uterus, which weighs immediately after labor twenty-two to twenty-four ounces, at the end of the first week still weighs nineteen to twenty-one

ounces; that the greatest diminution takes place during the second week, the weight then coming down to ten or eleven ounces; that at the end of the third week it is still three to four times as great as in the non-puerperal state, and only regains its normal weight at the end of the second month. By too violent exertions thrombi may be detached in the placental site, and severe hemorrhage brought on, or the thrombus carried into the circulation and lodged as an embolus in one of the organs. Even quick movement in bed should be avoided. One has only to look at the women, how weak the strongest of them feel, and he will then not urge them to exertions. There is no fear that the protracted dorsal decubitus will lead to retroversion or retroflexion, because they need not lie on their back; they can change the position from one side to the other.

After the tenth day the patient can get up, if the puerperal convalescence has been satisfactory in every regard. If there has been the slightest anomaly in the involution of the uterus, or the patient has had fever, some days longer in bed are the best preventives of any accident. During the first days the patient is up, she should not walk or sit too long without lying down to rest before again walking about.

CHAPTER III.

LACTATION.

THE secretion of milk begins to a greater or less extent in the later weeks of gestation, and is at the end of labor, though not fully established, as a rule, sufficient for the wants of the baby. There is, therefore, no need to ply the child with tea or other liquids; during the first two days pure water is all that it needs, if no milk at all should be secreted. The child nurses most readily when it is put to the breast before it has received anything else. It can also better draw out the nipples before the breast becomes swelled by the influx of milk. When, however, the epithelium of the nipples is very tender or the nipples are eroded, it is better to wait until the flow of milk is fairly started, as fruitless efforts are likely to excoriate the nipples. The first milk is a viscid, turbid flow, of yellowish-white color, consisting of milk-globules, of large granular and small fat-corpuscles, and has laxative properties to remove the meconium from the bowels of the baby. Later the milk becomes more copious, thinner, and of bluish-white color.

Formerly physicians advised the early application of the child to the breast to insure good contraction of the womb. We know now that palpation and friction over the uterus are better and more reliable means. The second or third day, sometimes a few days later, the full development of the lacteal function of the breast begins, and is usually associated with more or less pain and a feeling of dragging down in consequence of the turgescence of the breast. Sometimes the rush of milk to the breast is so sudden that the whole breast becomes very painful, or the turgescence is limited to several lobules, which appear hard and are painful on touch.

The second and third days have always been, and are still dreaded in the lying-in room. It is known that complications arising during childbed are usually preceded by some disturbance on the second or third day, when the turgescence of the breast begins. All these disorders have, therefore, been erroneously ascribed to the secretion of milk and called "milk fever." Better observation has shown that these disturbances are usually due to some other causes, and that the secretion of milk is a physiological process which takes place without any marked disturbance.

Milk fever, which was formerly a bugbear, has lost all its terrors now that it is known that the disturbances usually ascribed to it are either due to absorption of infecting matter from the genital

tract, to sore nipples, intestinal disorders, mental excitement, or some other causes, and that a rise of temperature above 101° is usually due to one of these causes. When these conditions are absent, the greatest turgescence of the breast will elevate the temperature only one or two degrees, while the temperature rises to 104° when one of these causes is present, even when swelling of the breasts is hardly noticeable. The swelling caused by sudden stoppage of nursing does not raise the temperature or cause any other disturbance. The turgescence of the breast never leads to inflammation, but inflammation may cause swelling of the breast. For these reasons many physicians reject the expression "milk fever" altogether; and authors who still believe in milk fever state, after careful examination of a great number of cases, that, when the temperature rose upon the second or third day above 101° , in only four per cent. could this rise be attributed to congestion of the breast, and that the rise of temperature was ephemeral. I have heard patients so often complain very much of the swelling of the breast without any rise of temperature, that I came to the same conclusion as Winckel, that congestion of the breast can cause only a temporary rise of temperature of 1° to 2° , and that if the temperature goes up above 101° it is due to some other cause. If we are satisfied with the information given by the nurse or patient that she is doing very well, "with the exception of a

little milk fever," then we will often find milk fever. But if we look for another cause for the elevation of temperature, milk fever will be exceedingly rare.

This physiological turgescence of the breast lasts only a day or two, and is greatly relieved by supporting, bandaging, or gentle rubbing of the breast, and a good purgative. A healthy mother is the best nurse, and she should be encouraged to suckle her child. If she is not inclined to nurse for some weeks, then it is perhaps better not to try it, especially when the nipples are very tender or inclined to soreness. The small benefits which nursing for a few days may have on the womb or the child are outweighed by the trouble which the flux of the milk, produced by the nursing, and especially the soreness of the nipples, may cause. The secretion of milk may be deficient from inactivity of the secretory apparatus or from imperfect development of the breast, which is either small or is large and well formed, and is what is called a fleshy breast, its bulk being made up of adipose substance instead of glandular tissue and blood-vessels. The inactivity of the secretory apparatus can be overcome only when it is due to some constitutional disorder. Electricity and a number of drugs have been highly recommended, but there are no reliable galactogogues but a well-regulated diet and hygienic measures. Plain, nourishing food, more farinaceous than animal, with plenty of

milk and moderate exercise in the open air, are the best galactogogues. The quantity of milk depends mostly upon the quantity of nourishing food. No sudden changes in the diet ought to be made, and regard is to be had for previous habits. Though cows give more milk when they are kept quiet, some form of moderate exercise in the open air is so beneficial for the digestion and constitutional welfare of a mother that it has indirectly great influence on the quantity of milk. It is true that some frail, weak women are better nurses than some vigorous, healthy women ; but, as a rule, the better the woman is nourished the more milk of good quality can we expect. Good milk is the best stimulant for a nursing mother ; there is no need for other stimulants. Lager-beer or claret may be given to those who are accustomed to these drinks. Lager-beer is preferable to stout, or ale ; it has sometimes a good influence on the quantity of milk, but the quality seems, in some cases, not to agree with the child. I saw in several cases intestinal disturbances come with the use, and disappear with the discontinuance of beer. The milk may be good in every respect, so far as we can judge, but still not suit the baby. The milk may be too poor, in which case the child does not thrive, or the milk is too rich, and the child suffers from diarrhoea. When the milk is too poor, the mother requires better nourishment ; when the milk is too rich, pure water, with a little lime-water given daily once or

twice, instead of one or two nursings, often relieves the intestinal disturbance.

Péligot examined the nutritive value of milk at various periods of the secretion, and found that the longer the milk remains in the breast the thinner and more watery it becomes. The milk that first flows from a distended breast is comparatively watery, and the quality becomes richer as the gland is progressively emptied. Of this observation we can take advantage when we find that the milk is too rich or too watery. We could put the baby to one breast at one nursing, and to the other at the next, or partly empty both breasts at each nursing, giving the baby the poorer or richer parts according to indications. The child should be put to the breast, from the beginning, in regular intervals of two to three hours, according to its strength, and later every four hours, but not every time it cries or the mother feels a momentary discomfort from the breast. It is a bad habit to let the child fall asleep with the nipple in its mouth; milk remains in the mouth and decomposes, aphthæ form in the mouth of the child, and sore nipples are the consequence. The milk is sometimes tardy in coming, but will keep on in sufficient quantity and quality when it does come, and efforts should not be given up when the nipples are not sore. In other cases the milk comes readily, but fails in a short time without apparent cause. Puerperal fever and other acute diseases

often lessen the quantity of milk indirectly by impairing the digestion; when the attack is light or short the milk returns again. Various reasons may render it advisable or necessary to stop nursing for a couple of days. This can be done without fear that the quantity of milk will be diminished. Menstruation appears sometimes during lactation, and may have an unfavorable influence on the milk by lessening the quantity or impairing the quality. Usually the disturbance, if there is any, is slight, and passes off very soon, and menstruation, as a rule, is no contra-indication to nursing. Should the disturbance be considerable, the mother is unfit for nursing.

A new pregnancy or some intercurrent serious disease contra-indicates nursing.

Nursing can be continued from nine to twelve months, if the health of the mother and of the child is good. As soon as it is found that nursing impairs the health of the mother, nursing must be discontinued. Some mothers suffer very soon from nursing, while others can nurse for years. If the previous health of the mother has been delicate, tetany and many other disorders may occur, if the first indications for weaning are disregarded.

The summer here is the most unfavorable time for weaning. If the mother cannot nurse through the summer it is better to wean the baby a month before. When the quantity of milk is not sufficient

it can be supplemented by artificial food, given during the night. In exceptional cases this mixed food does not agree so well with the baby as artificial food throughout.

Depressed nipples are often a cause of inability to nurse. If the depression is of a high degree, all preparatory treatment during the pregnancy is of no use. As soon as the breasts begin to swell through the influx of milk, they become as depressed as before. In the slighter degrees, preparatory treatment and nipple-shields are sometimes of use. Mental excitement has often an unfavorable influence on the quantity and quality of milk, though it is unknown what changes occur in the milk. It has no other influence on the child than a temporary slight intestinal disturbance. Worrying or continued anxiety often make a woman unfit for nursing, on account of the concomitant impaired digestion.

Choice of a Wet-Nurse.—It is easy to describe an ideal wet-nurse, but hard to get a good one. Notwithstanding all the troubles which every wet-nurse causes, more or less, the advantages of nursing, especially for weak children, during the first six months are so great that the best artificial feeding is no substitute, but a poor makeshift. The children often seem to thrive with artificial food, but they have little resistibility, and readily succumb, especially during the summer, to intestinal disorders.

What we have most to guard against is some constitutional affection of the wet-nurse, as tuberculosis, scrofulosis, and especially syphilis. Her child may look well, and still the mother may suffer from syphilis. It is always safer to take a wet-nurse who has been under observation for some time in a lying-in hospital, or one of whose family we know something. It is not advisable to take her before six weeks after her confinement, as troubles in her genital system are likely to occur. On the other hand, there should not be more than two or three months' difference in the confinements; the age from eighteen to thirty. A good digestion, good teeth, good general condition, and good condition of her own child make a woman acceptable as a nurse.

We can get some idea about the quantity of milk from the general condition and appearance of the breast; as to the quality, experience alone can tell. When the child thrives, this is the best evidence that the milk is suitable; in the contrary case, all microscopical and chemical examinations are useless. A mistake is sometimes made by putting a wet-nurse on a too rich meat diet, with little farinaceous food.

Wet-nurses are often not disposed to do even light work, but they ought to take some exercise to keep the digestion in good condition.

Galactorrhœa.—This may be simply a superabundance of secretion (polygalactia), an abnormal quantity, without affecting the nutritive value of the milk

—the breast is flooded with milk. It may continue even after nursing has been stopped. No danger results to the child. If it takes too much, it ejects it without any further trouble, but this waste of material may weaken the mother.

Regulation of diet, more animal than farinaceous food, restriction of fluids, especially of milk, saline laxatives, bandaging of the breast, and iodide of potash are indicated.

In other cases of galactorrhœa, not only the quantity but also the quality of the milk is pathological. The milk is of a more watery consistence, and therefore less nutritious. This disorder is likely to injure mother and child, and the mother more than the child. The watery consistence is compensated for by the abundance, but on the mother this disorder is a great drain, especially as it usually occurs in mothers who are already weakened by a previous disease. Usually both breasts are affected, sometimes only one. This disorder sometimes continues after nursing has been stopped, and from one ounce to several pounds of milk is secreted in a day. Strong persons can bear this for a while, but in weak women symptoms of what has been called *tabes lactea* appear. The patient becomes pale, loses flesh, the digestion is impaired, the blood impoverished, the skin becomes dry and flaccid, and the least exertion tires the patient. In short, all the symptoms which are included in the term "*oligæmia*" appear.

The same symptoms may also appear in women who nurse too long, or continue to nurse although their general health has suffered. A nutritious diet, with restriction of fluids and tonic treatment, has often a good effect. Bandaging the whole breast, from the periphery to the centre, with exclusion of the nipples, sometimes cures this disorder. If it cannot be soon remedied the mother is unfit for nursing.

CHAPTER IV.

SORE NIPPLES.

THIS is the popular term for all conditions of the nipples which show loss of epithelium. It includes erosions, abrasions, fissures, ulcers, and eczema. Abrasions and fissures (linear ulcers) either at the apex, in the interpapillary grooves, or at the base of the nipples, are very common and very painful during lactation, though often so slight that they can only be detected on careful examination. They are caused either during pregnancy from want of proper care, pressure from corsets, discharge of the milk, or some other irritation, but most frequently they are due to the irritation from suckling. Tenderness of the skin, depressed nipples, vesicles or scabs on the papillæ, are the predisposing causes. Long ago it was observed that the fissures, besides being extremely painful, might cause a rise of temperature to 104°. At first this was ascribed to irritation of the nerves in the fissures, to the depth of the fissure, or to special sensibility of the patient. Further observation has shown that very slight fissures often cause these symptoms, while extensive and deep fissures, where

the nipples remain connected with the breast only by the lacteal tubes, cause no other trouble than extreme pain. From these observations the conclusion was arrived at that there must be some extraneous cause for the rise of temperature, and this cause was found in infection. It is known that fissures are very liable to be infected by the dirty fingers of the nurse, mycotic or ulcerative affections in the baby's mouth, or rags with which the nipples are cleaned, etc. But the infection not only causes a rise of temperature, but is also almost the exclusive cause of every inflammation of the breast during the lacteal period. For these reasons the slightest lesion in the nipples deserves our careful attention. The nipples should be examined during pregnancy, and if any morbid affection is found, and the woman intends to nurse, pressure on the nipples by clothing should be removed and appropriate treatment resorted to. During the lacteal period the nipples should be examined, and no information in regard to them given by the nurse or mother should be taken on trust. Treatment is often very unsatisfactory in its results, on account of the continued irritation from suckling. The shortest cut to cure during lactation would be to stop nursing, but as this would often involve great inconveniences, we have to try to cure the fissure, and still allow nursing to continue. In some cases any of the astringent lotions or ointments give speedy relief; in other cases all remedial applica-

tions are ineffectual, as their great number sufficiently testifies, and nothing short of suppression of lactation avails. Still, much can be done by appropriate treatment and by restricted use of the affected nipple. The best results have been obtained from antiseptic treatment. This consists in keeping off new infection and by the use of antiseptic lotions. The nipples are carefully wiped off, after each nursing, with cotton or some clean rag, the sore spots found, and the remedies applied directly to them with a soft brush or some other means. The benefit of the remedies is much impaired if they have to be washed off before each nursing, because frequent washing retards the healing process. This inconvenience can be obviated by wiping the remedies off with cotton or soft linen, and then using a nipple shield. The shield, however, must be large enough, so as not to compress or irritate the nipples. Nitrate of silver, carbolic acid, and other solutions, which form insoluble compounds with the organic tissue, need not be wiped off, and are therefore preferable, but their application causes smarting.

Remedies such as benzoin, traumatizin, collodion, and others, which form an artificial cuticle over the crack, and therefore prevent further infection, are often useful. I have found a ten per cent. solution of tannic acid in tincture of myrrh very effectual. This solution is painted three or four times a day over the fissure, and the nipples are covered with a piece of

cotton soaked in the same solution. Before each nursing the nipples are wiped dry; after the nursing the nipples are again dried, and the solution applied. Whatever treatment is used, the nurse must be told to clean her hands before touching the nipples, and care must be taken that no new infecting matter is conveyed to the fissures. If the treatment does not give speedy relief, or the fissure extends and the patient has fever, nursing must be stopped for a day or two, but no attempts at drawing off the milk should be made, this irritating the nipples as much as nursing. Gentle rubbing or a laxative will relieve the momentary discomfort caused by the accumulation of milk. When, however, the nipples are deeply fissured or deeply depressed, or the base of the papilla is undermined by erosions, the patient is unfit for nursing, and the sooner nursing is stopped the better, as otherwise the patient is put to a great deal of suffering, runs the risk of having the breast inflamed, and may finally be forced to stop nursing.

Eczema of the breast is easily cured by the use of a three per cent. solution of nitrate of silver, or by the continued application of ung. diachyli.

CHAPTER V.

MASTITIS.

ETIOLOGY.

ON the second or third day after labor, with the turgescence and heaviness of the breast, the full functional activity of lactation is entered upon. This normal physiological incident was formerly regarded as most potent in the production of the various local and general disturbances so frequent at this time, and as the first symptom of a developing mastitis. As mastitis occurs almost exclusively only during lactation it was quite natural to suppose that some irregularity in the secretion of milk was the cause of the inflammation. Retention or impaired flow of milk played, therefore, an important part in the etiology of mastitis. This supposition was confirmed by the history of the beginning of the disorder. The mother usually informs the physician that she has given the baby the breast with accustomed regularity, but that she could not satisfy the child nor procure the relief, usual after nursing, from the discomfort of a full breast; that a degree of fullness remained after nursing; that the nipples had

troubled her while nursing, and that the pain has extended to a portion which is now exquisitely sensitive on pressure, perhaps also red and indurated. In addition, she will have had a marked rigor or chill, attended or followed by more or less acceleration of pulse and rise of temperature, which could not by the older physicians be accounted for in any other way. An explanation for the impeded flow of milk was easily found in some supposed disorder in the nipples or lacteal tubes, induced by exposure to cold, by mental emotions, or some other imprudence. All these symptoms and the information imparted by the patient confirmed, especially when no redness over the skin of the affected part could be detected, the supposition that stagnation of milk was the cause, and not the consequence of inflammation, a conclusion from *post hoc* to *propter hoc* was arrived at.

The influence of these preconceived notions was so strong that no attention was paid to other facts. It was forgotten that inflammation usually begins at the end of the first or second week, or later, when the flow of milk is fairly started, and not when there is only an irregularity in the secretion, as in the beginning, and that these symptoms do not appear when nursing is suddenly stopped; furthermore, that mastitis is as frequent in cases in which no exposure to cold or mental emotions have preceded the inflammation as in cases in which these noxious in-

fluences have been present, and the various plans of treatment resorted to for expediting the flow of milk and preventing the inflammation were not only ineffectual, but usually made the disorder worse. When we take these facts into consideration we can no longer acquiesce in the supposition that impeded flow of milk plays any part in the production of mastitis.

Retention of milk may, in the same way as the retention of other secretory fluids from accumulation of contents, cause eventually a slight circumscribed inflammation; but this is rare and totally different from the phlegmonous inflammation found in mastitis. In such cases of retention the local and general symptoms are moderate, the redness circumscribed, fluctuation distinct, fever and tenderness very slight, the disorders often disappear by resolution after bandaging, and if an incision is made a simple cyst is found with no sinuses and containing milk, more or less inspissated, and decomposed milk-globules, but no pus.

Cold, mental disturbances, general debility, and even epidemic influences have been accused of causing mastitis. More attentive observation has shown that all these causes can be present and no inflammation follow, if there are no fissures or abrasions on the nipples; and, on the other hand, all the supposed etiological factors may be absent and inflammation occur if the nipples be fissured or abraded.

In all cases of mastitis we find that sore nipples have either preceded or are associated with the inflammation. The fissures and abrasions are, as mentioned before, the channels by which the infecting matter gains entrance to the breast and causes inflammation. All causes, therefore, which lead to sore nipples lead indirectly to mastitis. Women who do not nurse rarely suffer from mastitis, as the nipples are less likely to become sore and, consequently, infected.

In the Vienna Lying-in Hospital mastitis is very rare, because nursing is at once discontinued when the mother complains of sore nipples.

The infecting matter gains entrance through the lymph-vessels, and perhaps through the lacteal tubes. Microscopical examination shows that the inflammation always begins either in the stroma of the gland or the connective tissue surrounding it and never primarily affects the glandular cells themselves.

Direct injury and other causes of inflammation are extremely rare factors compared with infection through fissures. Metastatic abscesses may occur during puerperal fever, but then mastitis is of secondary importance.

SYMPTOMS.

The symptoms are at first local—pains in the breast, preceded by or in connection with sore nipples, induration over a circumscribed area, and in-

creased tenderness on pressure. The inflammation begins either in the superficial or in the deeper layers of the areolar tissue. In the beginning we can easily distinguish in which layer the inflammation has commenced, but when the inflammation has spread and suppuration has taken place, it is not always possible to make out from whence it has started.

A classification into supra-mammary, mammary or parenchymatous, and sub-mammary inflammation, according to the starting-point, is often used, but it is more than doubtful whether the inflammation ever begins in the glandular tissue proper. In the so-called "parenchymatous" inflammation the areolar tissue has always been found, on microscopical examination, to be the part primarily affected; the epithelium of the gland has never been found primarily involved.

To the local symptoms of inflammation general symptoms are soon added, the gravity of these depending upon the degree of extension of the inflammation.

Acceleration of pulse, rise of temperature, loss of appetite, headache, general uneasiness, a chill or repeated chills, are the most common symptoms.

Supra-mammary inflammation does not differ from other subcutaneous inflammations in its symptoms or cause. It is important, however, to prevent the spreading of inflammation to the deeper layers of connective-tissue, which would greatly complicate the disorder.

In parenchymatous mastitis the inflammation begins in the areolar tissue of the gland itself. This is the most common and the most disagreeable variety. It either begins here primarily, or by extension from the neighboring tissues. The beginning of this inflammation in the second or third week, or at any time later, is usually marked by a chill, followed by high temperature and gastric disturbances, and boring, lancinating pains in the breast. One or several lobules become hard and tense, and tender on pressure. Several lobules may be affected at the same time, or the inflammation may spread from one lobule to several others. The severity of the symptoms is usually in proportion to the extent and depth of the inflamed tissue. When the whole gland is affected a large, hard, irregular mass is made out through the tense superficial tissues. When only part of the breast is affected a well-defined, hard, wedge-shaped lump, situated in the substance of the gland, with a knotty feel and painful on manipulation, is found, while the rest of the gland is soft and flabby; later on, the lump becomes more diffused.

Though mastitis usually begins only when the dangers arising from infection of the genitals is over it may rarely occur in the first few days after labor. In such a case we might be in doubt whether the constitutional symptoms—chill, fever, headache, etc.,—are due to functional turgescence in the breast, combined with pelvic disorders, or to a beginning mastitis.

When the functional turgescence affects the whole breast the differential diagnosis is very easy, as the whole breast is enlarged, rotund in form, somewhat tender on pressure, while mastitis always begins in a circumscribed spot, forming a hard, knotty lump, very tender on pressure, and soreness of nipples is or has been present. The differential diagnosis is more difficult when the functional engorgement is limited to several lobes and if there be at the same time considerable general disturbance due to pelvic or other causes. As a rule, however, the diagnosis of beginning mastitis is very easy.

The occurrence of suppuration is usually characterized by increased pains, extension of the inflammation, higher fever, and repeated chills. When the suppuration is superficial the skin becomes red, and fluctuation is very distinct. In deep-seated suppuration, however, the color of the skin either remains unchanged or assumes a dusky, livid, glossy appearance, is œdematous and pits on pressure. We find a boggy feeling, and fluctuation is indistinct or not present at all. The patient feels a sense of heavy weight and distention and throbbing pains, which are increased by every movement of the arm.

The inflammation may extend to the axillary glands. When several separate lobes become inflamed they may suppurate at the same time, forming a large abscess, or they suppurate in succession, so that abscess after abscess develops. This morbid

condition may be protracted for weeks and months. The deeper seated the inflammation the longer it will be before the suppuration reaches the surface and finally breaks through. Then all the symptoms will abate, but the relief will be only temporary, the opening usually closing very soon. The pus again makes an opening, which again closes with the same result. When the opening occurs at a point unfavorable to the discharge of pus fistulous tracks result, with consequent long-continued suppuration, whereby entire lobes may disappear, milk-ducts become perforated, and milk mixed with pus be discharged from the fistulous opening, or the abscess opens into a milk-duct and pus flows with milk from the nipples. Blood-vessels may be eroded, and fatal hemorrhage has occurred from this cause. The patient becomes broken down in health from pain, loss of sleep, loss of appetite, and hectic fever, with repeated chills and sweating. The long-continued suppuration entails such a drain on the vital powers that the patient looks as if she were suffering from consumption. These grave symptoms never occur when the case is properly treated, but they are not rare in neglected cases.

SUB-MAMMARY INFLAMMATION.

The inflammation of the retro-glandular areolar tissue is very rare as a primary affection ; usually it is secondary to a deep-seated mammary inflamma-

tion, to caries of the ribs, to the opening of a suppurative pleuritis. The inflammation may originate either in the centre or in the periphery. As the pus always sags downward, inflammation in the upper margin is more tedious than in the lower part, where pus can more easily and more completely find an exit. In large sub-glandular abscesses the whole breast becomes enlarged, prominent, and is projected forward by the pressure of the pus, is readily movable upon the pectoral muscles, swimming, as it were, on a fluid. Every movement of the arm is painful. The symptoms are almost the same as in the mammary variety. The inflammation may spread to the mammary tissue.

The prognosis in mastitis depends upon the seat and extent of inflammation and upon the treatment. Though this affection rarely leads to a fatal issue, in neglected or ill-treated cases pyæmia may result, or the patient, when exhausted by the long-continued suffering, becomes an easy prey to some intercurrent disease.

TREATMENT.

As long as it was supposed that impeded flow of milk was the cause of mastitis treatment was directed to improving the flow. Frictions, massage, breast-pumps, restriction of diet, all in accordance with the supposed cause of obstruction, have been prescribed, and the inflammation made worse.

Now that it is known that mastitis is nothing more than a phlegmonous inflammation, starting by infection through fissure of the nipples, the treatment has changed completely. The treatment is either preventive or curative ; attention is paid to the breast, especially to the nipples, as before mentioned. When inflammation has set in our attention is directed to limiting the extent of inflammation and preventing suppuration. All manipulation, as friction, rubbing, repeated nursing, emptying the breast by pumps, etc., are not only useless but positively injurious ; they irritate the breast instead of allaying the inflammation. The breast must be kept at rest as much as possible and suspended by a well-fitting sling, nursing on the affected side restricted or, if the inflammation is extensive, discontinued. An ice-bag, or, what is usually more agreeable, a towel soaked in cold water and covered with oiled silk, gives great comfort and helps to check the inflammation. Lead or iodine lotions are often effectual in holding inflammation in abeyance. If the inflammation is extensive the corresponding arm must be kept quiet, and if nursing is to be discontinued the secretion of milk can be lessened by strong saline laxatives or iodide of potash. Equalized methodical pressure with circles of adhesive plasters, as devised by Fricke for orchitis, is usually more effectual than any other treatment.

If, in spite of all our efforts, suppuration ensues,

and an abscess forms, the early detection of pus and incision of the abscess is of prime importance. By early incision we shorten the stage of suffering and convalescence, and prevent the burrowing and extension of suppuration, with its resulting fistulæ, rigors, and fever. Partly from natural fear of an operation, partly from the teaching of some authors to wait until the abscess becomes superficial, interference is often unduly delayed. When the abscess is superficial and not extensive, we may allow the patient to decide whether she prefers an incision or will wait for a spontaneous opening.

In deep-seated abscesses it is not advisable to agree to a compromise. Delay only leads to further spread of inflammation or more extensive disorganization of tissue. Patients should not be frightened beforehand by the prospect of an operation. As soon as the aforementioned symptoms, or, in doubtful cases, the exploring needle indicates suppuration in the breast, free outlet to the pus must be given. In superficial or large abscesses, covered with a thin layer of tissue, a simple opening is sufficient; in deep-seated abscesses, however, this is usually not only insufficient, but even worse than no incision; if the pus cannot easily escape decomposition may result, with consequent spreading of inflammation. The opening should be made under anæsthesia, as without this it can hardly be as exact as is necessary. A careful incision in a radial direction, through the

integument and fascia, is made so as to expose the tissue under which the abscess lies, then a director is pushed through this tissue into the cavity of the abscess and a dressing-forceps pushed along the groove of the guide into the cavity, the blades opened wide and the tissues separated so that free exit is given to the pus.

A finger is introduced into the cavity and a drainage-tube inserted. If a recess be found from which pus cannot flow by its gravity, a counter-opening on the most dependent point is absolutely necessary, otherwise the retained pus will decompose, cause chills, and form fistulous openings. A simple counter-opening often shortens the disorder for weeks. If there are several abscesses in the gland, each of them must be treated in the same manner.

Recurrence of chills or fever indicates retention and absorption of pus and requires a better opening of the abscess. This operation always involves, on account of the congestion of the breast, more or less hemorrhage.

The hemorrhage is usually parenchymatous, so that no blood-vessels need be ligated. Manual compression for a while will arrest the bleeding; to prevent its return roller bandages or adhesive plasters are applied.

Fistulæ are the penalties of a too late or an incomplete opening of an abscess. In renewing the dressing pus is found, when opening has been correctly

performed, on the dressing and not in the cavity. Whenever pus is found accumulated in, or can be squeezed out of, the cavity the operation has not been correctly performed. In old cases, with sinuses and fistulæ, from which pus is being discharged, the source of suppuration must be found by probing, and all sinuses and fistulæ laid open ; this is the shortest way to recovery. After having slit open the suppurating surface, and made, if necessary, some counter-opening, we can dispense with all the fluids which have been recommended for healing up the fistulæ.

Removal of the dressing every day, and injection of pure water or some weak antiseptic solution, is all that is needed. When no pus is found on the dressing, or brought out by injection, the drainage-tubes are removed (fifth to tenth day). These tubes should not be removed too soon in deep-seated abscesses, as even large openings have a great tendency to close, and might do so before the walls of the cavity are agglutinated. The patient need not stay in bed, but the corresponding arm should rest in a sling, as every movement of the arm is imparted to the breast.

Suppuration and long-continued discharge of pus are a great drain on the system, the ill effects of which we have to counteract. Great attention must be given to constitutional treatment. No reliance ought to be put in remedies except those which are apt to improve the digestion ; the best antipyretic in suppuration is the knife. When the pus can freely

escape, fever stops at once. Nourishing food in the most easily digestible form should be given freely. If the suppuration has not lasted too long and a great part of the glandular tissue has been destroyed the patient can nurse again if she is strong ; but if pains during nursing should reappear nursing must be discontinued, as otherwise mastitis might recur.

CHAPTER VI.

POST-PARTUM HEMORRHAGE.

THIS accident is very often due to mismanagement of the third stage of labor or to insufficient control of the uterus after labor. When these two causes are eliminated, post-partum hemorrhage is comparatively rare. I have seen it only 15 times in the 3,142 labors before referred to, and C. Fürst ("Biannual Report," 1881 and 1882), saw it occur in G. Braun's clinic 100 times (this inclusive of the slight hemorrhage) in 6,230 cases. The hemorrhage may occur, first, immediately or a short time after labor (primary hemorrhage); secondly, any time during puerperal convalescence. In primary and secondary hemorrhage the blood may come from the uterus or vagina, and, not escaping, constitute internal or concealed hemorrhage, or it may appear externally, or the hemorrhage may be from the external genital organs.

1. ETIOLOGY OF PRIMARY HEMORRHAGE.

(a) *From the Uterus.*—The most common cause (in at least seventy-five per cent.) is imperfect contraction of the uterus. This deficiency in contrac-

tion is commonly due to atony ; *i.e.*, deficient energy of the muscular fibres. Atony of the uterus is most frequently met with in cases in which the uterus has either been abnormally distended, as by a large child, twins, hydramnion, or in which uterine energy has been exhausted by a tedious and difficult labor, by heavy loss of blood, or by previous uterine or other disease. Atony may also occur after precipitate labor, or after too rapid extraction of the child, especially of the second child in cases of twins, or when the fundus uteri has not been controlled by the hand on the abdomen during the expulsion of the child and placenta, or the control has not been continued sufficiently long after the labor.

This inertia of the muscular fibres may affect the whole uterus, or only parts of it, most frequently the placental seat and the cervix. Even complete paralysis of the placental seat has been observed (Rokitansky), in consequence of which this portion remains totally relaxed, and sags into the uterine cavity in the form of a polypus, with a corresponding depression on the outer wall of the uterus, and consequent profuse hemorrhage. This complete paralysis of the placental site is extremely rare, while insufficient contraction is quite frequent. In other cases, firm contractions of the circular fibres of the internal os, or of those of the tubal ostia may occur, while the rest of the uterus is relaxed. Many cases of so-called hour-glass contractions, in which the

middle of the uterus becomes constricted, have been recorded. I doubt the possibility of such an occurrence, as there are no circular fibres there, and the cervix becomes often so elongated during labor that its internal os could easily be taken for the middle of the uterus. The next most frequent cause of deficient contractions of the uterus is accumulation of coagula in the uterus, or retention of portions of placenta. In these cases contraction of the uterus is more easily brought on than in cases of atony; but the uterus is more likely to relax again than in cases of atony, in which it is more difficult to secure firm uterine contraction, but when secured, it remains, as a rule, contracted. A distended bladder or rectum, or clots in the vagina, may also prevent firm contraction of the uterus. These crowd the uterus from its normal position, or compress the orifice, and interfere with complete emptying of the uterine cavity.

A submucous polypus may give rise to severe hemorrhage, especially if the placental site enters over the surface of the polypus. The polypus interferes with firm contraction of the uterus, and if the hemorrhage comes from the surface of the polypus it cannot be arrested by the contractions of the uterus.

Inversio uteri (page 113) gives rise usually to profuse hemorrhage. Severe hemorrhage may follow laceration of the cervix, especially in cases of low placental attachment or placenta prævia. The lower

segment of the uterus is permeated by numerous large blood-vessels. This accident has been most frequently observed in cases of placenta prævia, after forcible dilatation of the os, or too hasty extraction of the child. But it may occur in a normal spontaneous labor. Rigby ("System of Midwifery") says: "Cases have occurred, where the os uteri has been artificially dilated, where the child was turned and delivered with perfect safety, and the uterus contracted into a hard ball, a continued dribbling of blood has remained after labor, the patient has gradually become exhausted, and at last died. On examination after death, Professor Naegelę has invariably found the os uteri more or less torn." When the laceration involves the uterine artery or other large blood-vessels, the hemorrhage may be so profuse that the patient will die in an hour or two. Several such cases have been recorded.

(b) *Hemorrhage from the Vagina or the External Genital Organs.*—When the uterus is firmly contracted and the hemorrhage continues the blood can only come from a laceration in the external genitals, the vagina, or cervix. In such cases we must first separate the labia and inspect carefully the external genitals. I have seen several cases in which treatment was directed against a supposed hemorrhage from the uterus, when a small tear near the clitoris or labia was the source of the blood. When the source of the hemorrhage is not found in the external geni-

tal organs the finger is introduced into the vagina and cervix to find the laceration. Usually it is easier to detect the source of hemorrhage with the finger than with the speculum. If the finger does not detect it a speculum is introduced. Profuse hemorrhage from the vagina is usually due to the bursting of a varicose vein or to the rupture of a thrombus. In some cases a septum dividing the cervix or vagina may be torn during the expulsion of the child and, when the septum is permeated by large vessels, cause profuse hemorrhage.

2. SECONDARY HEMORRHAGE.

(a) *From the Womb.*—All the same conditions which cause primary hemorrhage may cause hemorrhage at any time during the puerperal period, and in addition to these there are a few other causes. After the first twenty-four hours following labor retarded involution of the uterus stands in the same causal relation to secondary hemorrhages as deficient contractions to primary hemorrhages; in other words, it is the most frequent cause of secondary post-partum hemorrhage.

Involution of the uterus may be retarded, (1) by imperfect emptying of the uterine cavity, blood coagula, portions of placenta or membranes, or a polypus remaining behind; (2) by infection, and consequent decomposition of contents (infection having a paralyzing influence on the muscular fibres), endo-

metritis, metritis, and parametritis; (3) by previous diseases of the uterus; (4) by the exhausted condition of the patient from heavy loss of blood, puerperal fever, or a previous or intercurrent disease.

Another frequent cause of secondary hemorrhage is the dislodgement of a thrombus in a placental vein. This dislodgement may be caused by disintegration of the thrombus through infection, or by intra-uterine injections, or other manipulation in the uterine cavity, or by premature exertions of the patient. Nearly two months is required for the firm organization of these thrombi, and any imprudence during this time may dislodge a thrombus.

Disorders in the pelvic organs, malposition of the uterus, impeded discharge of lochia by obstruction of the orifice from coagula, portions of placenta or membranes, diphtheritic ulcers, excoriations of the cervix may also cause secondary hemorrhage. In addition to these local causes, hemorrhage may be produced by the cachectic state of the patient, or by mental excitement. After chills, even when the chills were not due to pelvic disorders, but to pleuritis, or intermittent fever, or other causes, hemorrhage often takes place. Winckel believes that in consequence of the general internal congestion the hemorrhage comes from the *locus minoris resistentiæ*, which is, in this case, the uterus. It seems to me more probable that a thrombus is dislodged by shaking of the body, and hemorrhage results. In this country malaria is

often accused of causing secondary hemorrhage, but in all the cases published to prove this theory the hemorrhage was more probably due to some other cause.

A rare cause of secondary hemorrhage is a so-called placental or fibrinous polypus of the uterus (free polypous hæmatoma). Sometimes blood-coagula firmly adhere to the placental seat, and more readily when a small piece of placental tissue has remained attached; the serum of the coagulum oozes away, and the remaining fibrine forms the groundwork of new deposition; successive layers of fibrine being deposited the tumor increases in size and takes the shape of a polypus; the base and pedicle consist of decidua, while the body of the tumor is formed by several layers of fibrine. The tumor may increase to the size of the fist, or even larger, but is not capable of organization. Sooner or later it comes away, the pedicle becoming detached, or after strong expulsive efforts of the uterus. If it gives rise to hemorrhage, it is easily recognized on examination by its friability, and can be readily removed. On superficial examination it often looks like a large piece of placenta, and the attending physician might be unjustly suspected of carelessness. A careful examination will show that the tumor consists only of fibrine deposited at different times.

A still rarer cause of secondary hemorrhage is

carcinoma developed at the placental site during childbed. H. Chiari (*Med. Jahrb.*, iii., 877) found carcinoma at the fundus uteri thrice in the same year, in women who died of cancer and its consequences within six months after labor. In these cases the labors had been spontaneous; repeated hemorrhages and evidences of endometritis had been the most marked symptoms during childbed, and had persisted to the end. A few days before death, pleuritis and lobular pneumonia occurred as complications. On autopsy, the uterus was found in each case enlarged to the size of the fist, from cancerous disease of its walls at the placental site, the growth extending through the whole thickness of the uterus to the peritoneum, which was found covered at this situation with fibro-purulent exudation. Cancerous deposits were also found in other parts of the genital tract, in the glands of the pelvis and in the lungs. Two of the women were of an age (twenty-three and twenty-four years respectively) at which cancer is of very rare occurrence; the third was forty-two years old.

A case came under my own observation in which death followed much earlier than in the above instances. I saw the patient fourteen days after spontaneous delivery. She was then suffering with repeated hemorrhages and presented marked evidences of endometritis. I removed some decomposing matter from the enlarged uterus, which I took

for débris of placenta. The patient did not improve and died some weeks after, symptoms of peritonitis and pleuritis developing a few days before death. On autopsy, the appearances were the same as in the above cases.

(b) *Secondary Hemorrhage* from the external genitals, from the vagina or cervix, is due to excoriations, erosions from diphtheritic ulcers, to sloughing off of dead tissue, or to the bursting of a thrombus vaginae, or a hæmatoma of the cervix which has formed during labor.

SYMPTOMS.

The local symptoms are: the discharge of blood and the abnormal condition of the uterus. The blood comes away in a gush or oozes out in a thin stream, or a large quantity of blood and clots is poured out in a gush intermittently, the patient being flooded with blood. The amount which escapes externally is no gauge of the actual loss of blood, as in uterine hemorrhages more or less blood always accumulates in the uterus and vagina, and if its free escape be impeded, so much blood may here accumulate that the patient dies from hemorrhage without visible loss of blood. To be sure that no hemorrhage has taken place, the uterus must be well contracted and in its normal position, and no discharge of blood from the vulva be present.

In uterine hemorrhages the uterus is flaccid, its

outline indistinct, the fundus near or above the umbilicus in the middle line or more frequently to one or other side. On the uterus being forcibly compressed a large quantity of blood and clots are expelled, or spontaneous contraction and relaxation of the uterus occurs, with each contraction a large quantity of blood and clots being discharged. When the hemorrhage takes place from the cervix or vagina, the uterus may be well contracted, but its fundus is high up near or above the umbilicus, and when pressed down a large quantity of blood and clots is forced from the vagina, the uterus remaining contracted and in its normal position until it is again forced upward by the accumulation of blood in the vagina.

The general symptoms depend upon the quantity of blood lost and the rapidity of the flow, and upon the constitution of the patient. Some patients bear a loss of two to four pounds, while this would be fatal to others. When external hemorrhage takes place, the patient soon feels anxious and calls attention to it; but internal hemorrhage may take place so insidiously that the patient feels at ease though a large amount of blood has accumulated in the uterus and vagina; usually, however, she complains of labor pains, pain in the back, and bearing down, with a desire to urinate. Then the effects of anæmia appear. The patient begins to yawn frequently, complains of darkness before the eyes, and strange noises in the ear, feels as though sinking through

the bed, cannot move her limbs, looks anxious and depressed, tosses her arms about, has headache, nausea, and vomiting, her respiration becomes accelerated 30 to 40, she asks for more air, insists on having the windows open, wants to get up or sit up, feels as if she would suffocate, has a sense of oppression on the breast, the heart action is weak, rapid, hardly perceptible, the face and lips pale, the features pinched, the whole surface cold, especially the extremities; then the breathing becomes noisy and laborious, pulse imperceptible, face and body covered with cold perspiration, partial or complete blindness sets in, the pupils are widely dilated and do not react to light, patient cannot swallow, refuses all help, wants to die in peace, and may die with symptoms of collapse or in convulsions; but the patient may still rally when no evidence of life except the heart-sounds are noticeable.

In secondary hemorrhage the symptoms are but seldom so acute, the hemorrhage being rarely so severe in any one attack, and though hemorrhage may repeatedly recur, the patient recovers from each attack. But these frequent bleedings sooner or later weaken the patient; she feels tired, complains of loss of appetite and constipation, œdematous swelling of the feet and legs appears, with pains in the back and abdomen, headache, and gradually all the other symptoms of anæmia manifest themselves.

TREATMENT.

(a) *Of Primary Hemorrhage from the Uterus.*—The best preventive of every uterine hemorrhage is good control of the uterus during the last stage of labor and for some time after, by external frictions. In every case of hemorrhage our first step must be to grasp the uterus, to bring it, when relaxed or out of its normal position, to contraction and into the normal position, then to look for the cause of the hemorrhage. If it be due to deficient contraction of the uterus, friction, rubbing, and kneading of the uterus through the abdominal walls are used, and if this does not readily cause uterine contraction, the fundus is grasped in the hollow of the hand, the thumb on the anterior and the other fingers on the posterior surface and firmly squeezed, the pressure being continued. I must take exception to Barnes' opinion as to the inexpediency of external manipulation of the uterus. He says (page 541): "Not only is kneading uncertain, most painful to the patient, and exhausting to the physician, but it entails a special danger. This severe handling of the uterus, attended by bruising of the tissues, is liable to cause metritis. I have seen cases of metritic puerperal fever which I could only assign to this cause."

On this subject my experience is very large, and I regard external manipulation of the uterus as not only the remedy above all others for every primary

uterine hemorrhage, but I use it extensively in every case of deficient contraction of the uterus. It is true, "the manipulation is painful to the patient and exhausting to the physician," but I have found it in my own experience, and in that of my colleagues in the Vienna lying-in wards, so harmless and beneficial that I would rather give up every drug of the Pharmacopœia than cease external manipulation. To accuse it of causing metritic puerperal fever is one of those hasty conclusions which we find nowhere so often as in the assignment of the sources of puerperal fever. I regulate the manipulation according to the emergency, and use only gentle friction when sufficient, but I do not hesitate to continue, or to cause to be continued, firm manipulation, alternating with firm pressure, for hours in cases of great emergency. I never saw the least harm follow, except lesions of the endometrium, if firm pressure was used while a metallic tube was in the uterine cavity. These manipulations require some caution. No firm pressure, only gentle rubbing should be made while a metallic tube is in the uterine cavity, and then the fundus uteri should not be pressed downward before it is firmly contracted, as inversion or prolapse might be produced.

I manipulate the second day also, if required, but later I would fear to dislodge a uterine thrombus; then I prefer vaginal injection to induce contraction of the uterus.

When the manipulation is sufficient to secure uterine contraction, a vaginal injection is given to remove the coagula from the vagina. When insufficient, or when the uterus relaxes again and again, the hand is introduced, but this should not be done unless other measures fail.

I consider the introduction of the hand into the vagina or uterus in hemorrhage more dangerous on account of possible infection than for the average case of turning. I therefore always disinfect thoroughly the hand and arm, even in cases where speedy help is needed. By this delay we may lose one patient in a thousand, but without this precaution we may poison a hundred. Meanwhile friction and compression of the uterus is continued by the nurse. The control of the uterus should be continuous; with one hand the fundus is supported, and the other hand is then introduced and the contents, as coagula, portions of placenta, etc., removed, and a polypus, if present, twisted off, if possible, and then firm friction and pressure used through the abdominal walls. During these manipulations the fluid for injection should have been prepared. For ordinary purposes an antiseptic solution is sufficient, and I prefer it at a temperature of 110° to 115°, though in Vienna cold water is used. I find hot water more efficient and more agreeable to the patient. In exceptional cases cold water is more efficient than hot to induce contraction and stop hemorrhage.

INJECTIONS OF ASTRINGENT SOLUTIONS.

It would be bad practice to use any astringent before the uterine cavity is thoroughly emptied of its contents; the injected fluid may not come in direct contact with the bleeding surface, blood coagula may be formed in great quantity, which prevent firm contraction and may decompose, and the introduction of the hand, if necessary, after the injection, may be very difficult on account of the rigidity of the vagina. In this country I have not yet had an opportunity to use styptic solutions. In the few cases which I saw in consultation, hemorrhage was easily arrested by external manipulation of the uterus combined with hot intra-uterine injections.

In Vienna I frequently used perchloride of iron, which there has been for nearly fifty years the chief remedy for all severe cases of hemorrhage. Next to external manipulation I consider it the most valuable hæmostatic. Many cases are recorded in which accidents, due to the use of perchloride of iron, have occurred. No such case has ever been observed in Vienna. It is probable that most of these accidents were caused by carelessness in administration. The use of this styptic requires some caution. The uterine cavity should be empty, and during the injection at least two fingers must be kept in the orifice alongside of the tube, so that the injected fluid can readily return and all the precautions given for intra-

uterine injections (page 292) exercised. For ordinary purposes enough liquor ferri is used to make the water wine-colored, and the strength increased according to indications. Any quantity can be injected if it is afforded facility of escape. Very strong solutions tan the uterine and vaginal surface to a high degree, so that all subsequent manipulation of the vagina is rendered very difficult, or extensive sloughing of the vaginal surface may follow; therefore these very strong solutions should be used only in cases of great emergency. I found the liquor ferri so effective and so harmless that I had no occasion to try other styptics. This freedom from injurious consequences, however, exists only immediately or for a short time after labor, later on it cannot be used with the same freedom. Even though the easy return of the fluid be secured, it forms blood coagula, which are not always easily expelled. Whenever styptics have been used immediately after labor, it is advisable to continue vaginal injections for some days, and to administer ergot to favor the expulsion of the coagula which have been formed in the uterus by the styptic.

Pieces of ice introduced into the uterine cavity have been found effective. In desperate cases the compression of the uterus between both hands, one in the vagina or uterine cavity, the other on the fundus, might be useful. During the whole time I never leave the fundus without control; if the hands are

too tired to make compression friction is used, which, if it do not stop the hemorrhage, will, at least lessen it.

Tamponing the uterine cavity has by some authors been successfully tried, but it is unjustifiable and useless to tampon the vagina.

(b) *Primary Hemorrhage from the Cervix, Vagina, or External Genitals.*—As in all these cases the hemorrhage is due either to a ruptured vessel or to laceration, the best treatment is to ligate the vessel or to sew up the laceration. This can easily be done in the external genital organs, but in the vagina or cervix it requires more assistance than is usually within easy reach. Manual compression, when it can be applied directly to the bleeding vessels, is often very effective. I succeeded in two cases of severe hemorrhage from the cervix in arresting permanently the hemorrhage by digital compression. But the bleeding surface cannot always be easily found with the finger, and the speculum is usually of little use as the visual field is soon obscured by the blood. Hot or cold water may be used, and ice is also often effective.

Styptics, though often effective, have the disadvantage of rendering any necessary subsequent manipulation, if the hemorrhage continues, very difficult, owing to the rigidity of the vagina, induced by their use. They are very useful when they can be applied directly to the bleeding surface, especially

when combined with pressure. It is usually better to apply the styptic through a speculum than to use it by vaginal injections.

Tamponing the vagina should be done only when we are sure that the tampon presses directly on the bleeding surface, and that no effusion of blood above the tampon takes place.

TREATMENT OF SECONDARY HEMORRHAGE.

From the Uterus.—When the hemorrhage is profuse, immediate exploration of the uterine cavity, under antiseptic precautions, is necessary, to find and, if possible, remove the cause. We must bear in mind that external manipulations and intra-uterine injections are not as harmless in these cases as they are immediately or a short time after labor, and the further the involution of the uterus has progressed, the greater the danger during their employment of dislodging a uterine thrombus or causing other accidents. Extreme caution in all manipulation is needed. Usually the hemorrhage is not profuse, and exploration of the uterine cavity is not called for, hot vaginal injections and the administration of ergot being sufficient to arrest it. If the hemorrhage should recur, then an examination is indicated. The hemorrhage can often be best controlled by an applicator, wrapped with cotton, which has been soaked in iodine or liquor ferri, introduced through a speculum.

For protracted bloody lochial discharge, or a constant sanguineous oozing and other slight hemorrhages, I find ergot, hot vaginal injections, and rest in bed very useful.

AFTER-TREATMENT.

After having arrested the hemorrhage we have often to combat the symptoms of acute anæmia. The patient must be kept perfectly quiet, in the horizontal position, on her back, the head low, and the pelvis somewhat elevated. Stimulants and narcotics are given according to indications. The patient must not only remain in bed until fully recovered, but every exertion or brusque movement in bed must be avoided.

In extreme cases of collapse I have seen the most wonderful results from bandaging the extremities with elastic bandages, by which the blood from the extremities is driven to the body and kept there for hours (auto-transfusion). In one case the bandages were kept on for thirty-six hours, and any attempt at removing them during this time brought on anew the collapse. If elastic bandages are not at hand, flannel or linen rollers can be used. In one case, of which I know, sudden death followed the removal of the bandages—the patient had large varicose veins on the legs. At the post-mortem an embolus of the pulmonary artery was found as the cause of the sudden death. Notwithstanding this danger, which can

be lessened by careful removal of the bandages, I would not hesitate for a moment in applying these bandages, if indicated, so surprising have been the results I have seen from the use of this measure. I consider it more effective than transfusion, which is a very pretty exhibition for a clinic, but has not yet given any encouraging results. Compression of the aorta and compression of the abdomen are sometimes of great and immediate effect in cases of collapse, especially when by paralysis of the sympathetic nerves of the abdominal viscera a great flux of blood to the abdominal viscera has taken place.

CHAPTER VII.

THROMBUS OF THE VAGINA AND VULVA.

THIS disorder consists in an effusion of blood into the cellular tissue of the vagina or vulva. The effusion may commence either in the peri-vaginal connective-tissue, and then extend downward to the vulva, or upward, behind the peritoneum; or it may begin in the vulva. It may occur suddenly, and form a circumscribed or a diffused tumor, from the size of an egg to that of a child's head, or a polypoid tumor with a thin pedicle; or the effusion may take place gradually into the neighboring areolar tissue. The extent of the tumor will depend upon the amount and seat of the effused blood. If the seat of effusion be at the upper part of the vagina, and the blood be considerable in amount, it may extend not only downward to the vulva, more often into the labia majora than into the labia minora, but also upward behind the peritoneum to the kidneys and diaphragm, and outward to the iliac fossa, and may even appear in front under the abdominal integuments. If the effusion begin at the lower part of the vagina or vulva, it then often extends to the

perineum, to the inside of the thighs, and even to the buttocks. The pelvic fascia does not interfere with the extension of the effusion, and the division, therefore, of thrombi into sub- and supra-fascial is useless. The effusion is generally unilateral, occurring with equal frequency on either side.

ETIOLOGY.

A thrombus may occur during pregnancy, either spontaneously or in consequence of direct injury or muscular strain, but it is of more frequent occurrence during or within a short time after labor; in labors terminated spontaneously, or in cases where the forceps have been used, and more frequently from rupture of a vein than of an artery. The predisposing causes are unknown. It occurs with almost equal frequency in primiparæ and multiparæ—about once in fifteen hundred cases of labor. Varicosities of the vagina and vulva are not regarded as predisposing causes. If a varix ruptures, the hemorrhage will usually be external. The effusion may not occur until after the birth of the child, though the rupture of the vessel usually takes place during the labor. Ruptured vessels, when of small size, often do not bleed immediately, or the pressure of the child, during labor, delays effusion. Extravasation may result from the dislodgement or falling out of a necrotic plug in a blood-vessel, especially if the vessel was severely contused during labor. Necrosis

of the plug is more often associated, however, with sloughing of the mucous membrane, both being subjected to the same violence. As the mucous membrane becomes displaced during labor, the contused vessel may afterward be covered by a portion the vitality of which has not been destroyed; in which case, when hemorrhage occurs, the blood cannot escape externally, and a thrombus is formed.

SYMPTOMS.

In a few cases the thrombus will form without causing pain, but, as a rule, pain from pressure upon the adjacent nerves, of a boring, lancinating character, radiating to the loins, legs, or back, are complained of in the affected parts. Usually these pains are very different from the pains of labor; when, however, a large vaginal thrombus is formed by the extravasated blood, the accompanying pains may greatly simulate labor pains. As the pains come on, or within a short time after, a swelling appears in the vagina or on the vulva; this tumor may be either hard and tense, if circumscribed, and containing many coagula, or soft and elastic, if more widely diffused. Fluctuation is distinct when there is a large cavity filled with blood. In other cases the connective-tissue is so extensively infiltrated with blood and coagula that fluctuation is indistinct. The skin becomes discolored, of a dark blue color, and if the tension be extreme, blisters form, the skin

gives way, and blood and coagula are discharged. The hemorrhage may be so profuse that symptoms of acute anæmia soon appear, exceptionally in cases without external hemorrhages. The rapid formation of the tumor, and the sudden appearance of the symptoms, are generally sufficient to distinguish a thrombus from œdema, abscess of the labia, pudendal hernia (of omentum, intestines, etc.), inflammation of the vulvo-vaginal glands or other local troubles, and from cystocele, rectocele, or varices. The tumor often ruptures on the second or third day, or it may suppurate; in some cases it becomes encysted, and remains for years without causing any disturbance. If suppuration take place, and prompt and appropriate treatment is not adopted, extensive inflammation, with resulting abscesses and fistulous openings, may occur. A large tumor may so obstruct the entrance of the vagina as to interfere with the labor, or with the discharge of the lochia, or it may cause constipation or dysury by pressure on the rectum or urethra. The prognosis is favorable when spontaneous opening without gangrene takes place early, and the hemorrhage does not recur; unfavorable, when the loss of blood is considerable, and sloughing extensive:

TREATMENT.

So little is known of the causes of thrombus that we cannot prevent its occurrence; but when early

recognized, and when the tumor is within reach, we may prevent its increase by the application of an ice-bag, or by pressure with the hand or a tampon. To relieve pain and mental distress, opium or digitalis is given internally. When the tumor does not increase, fomentation with aq. Goulardi or cold water cataplasms are advisable. Experience has shown that injudicious interference is more dangerous than the disease itself. A too early opening is liable to bring on recurrence of hemorrhage, and if there be a large accumulation of blood and coagula in the tumor, the bleeding vessel will be difficult to find. If the blood extensively infiltrates the areolar tissue, an opening will not materially aid its escape, and exposes the tissue to septic infection from contact with the lochia. It is best to leave small effusions alone, and not to interfere with large ones without special indication. Early opening is indicated when the tumor is so extensive as to interfere with the progress of labor, or to obstruct the vagina, rectum, or bladder, or when gangrene of the integumentary structures is threatened. An opening large enough to give full exit to the coagula should be made in the most dependent part. After removing the coagula any bleeding vessel found should be ligated, or the hemorrhage stopped by pressure, and the patient kept under close watch for some time after. A tampon is usually useless, and may do injury. The use of astringent lotions before the birth of the child is con-

traindicated, as they render the vagina rigid and unyielding ; after labor they should be used only when they can be applied directly to the bleeding vessel. A simple puncture of the tumor is dangerous, as the coagula remain behind and decompose, and if hemorrhage occur, the bleeding vessel cannot be found. Usually it is best to delay opening for two or three days, during which time the ruptured vessel becomes sealed, thus lessening the danger of a recurrence of hemorrhage. The tumor tends to spontaneous opening, usually on the inner side of the labia majora, and most often at the junction of the labia majora and minora ; or absorption begins in the tumor, by which its density is increased and its bulk diminished. If a tendency to absorption is shown, we should delay opening still further, especially if the tumor is caused not so much by accumulation of blood and coagula as by infiltration of the areolar tissue with blood. If, however, the integument shows signs of gangrene, or if there be a large accumulation of blood and coagula, or if signs of beginning suppuration come on, the tumor should be incised at once. Extensive gangrene of the skin or suppuration of the thrombus prolongs the disease, and adds to its dangers. A timely incision often prevents these complications. We must, however, bear in mind that there is great danger of septic infection if proper precautions are neglected. The opening must be made according to surgical principles, so that not

only blood and coagula are removed, but also that free drainage is secured.

Improved methods of treatment, by lessening the risks from hemorrhage and suppuration, have so greatly reduced the mortality of this disease that it is now only considered dangerous when the loss of blood is so great as to threaten life immediately, or when, later on, suppuration is so extensive and long continued that the vital powers become exhausted.

General treatment is also necessary. Perfect rest in bed and avoidance of all influences which might increase or renew the hemorrhage, stimulants, if necessary, and generous nourishment to sustain the patient's strength are chiefly indicated.

CHAPTER VIII.

LACERATIONS.

1. LACERATION OF THE PERINEUM.

DURING the bulging of the head the perineum is stretched from its normal length of three to four centimetres to sixteen to twenty centimetres, and cases have been recorded in which the child has been expelled through a central rupture of the perineum, without laceration of the fourchette or of the sphincter ani. With such an attenuation of the structures it is not surprising that rupture of the perineum so readily occurs. The laceration begins usually at the fourchette, and extends through the perineum, rarely in the middle line, being usually more or less oblique to the raphe; in rare cases the rupture begins in the centre, and extends forward and backward, or the laceration begins in the fossa navicularis. Such a case occurred in my own practice, a hand presenting at the rectum. I pushed it back, and succeeded in preventing a further rupture of the perineum. The skin near the fourchette or at the centre of the perineum is very often the first tissue to give way. The slighter degrees of laceration

occur more frequently when the head is born spontaneously ; but the worst cases, in which the rupture goes through both sphincters into the rectum and vagina, are produced almost exclusively by too hasty or awkward artificial delivery of the child. I have never seen rupture through the sphincter occur, unless under manual or instrumental interference. As the circumference of the head is greater than that of the shoulder or breech, a rupture after delivery of the head must always be due to awkward interference. When the head is delivered, there is no further occasion for haste ; it is much better to wait for the next pain to expel the body. Meanwhile, we can palpate the abdomen, to ascertain the condition of the uterus, and cleanse the eyelids of the child to prevent infectious matter, especially blennorrhagic secretion, gaining entrance to the eyes. In breech presentations rupture often occurs, though it can be more easily prevented in these cases than in head presentations, the perineum being so gradually distended, and to such a degree, by the breech and shoulder, that but little resistance remains for the head to overcome. The rupture occurs in these cases either when the breech is extracted, without regard to the curve of the parturient canal, and not kept close to the pubic arch, or when the head is extracted too hastily. In delivering the after-coming head, we need only use haste until the mouth appears above the fourchette, and this takes place before the great-

est circumference of the head appears in the vulva. When the mouth of the child is cleaned, premature inspirations do no harm, and a little delay in delivery at this time will often save the perineum.

The immediate consequences of a laceration of the perineum may often have been exaggerated; the greatest danger is that so many avenues are opened for the entrance of infection. The secondary inconveniences of the injury are usually more decided and more disagreeable. If the whole perineum has been ruptured, and the laceration has not been attended to, the physician will, sooner or later, have to face the double reproach of having first ruptured the perineum and then neglected the patient. And few of us take the same charitable view of the ruptures occurring in the practice of others, that we do in cases of our own manufacture. It is true that nature does considerable toward the repair of a ruptured perineum. In young and healthy women the frightful gaping of a complete laceration diminishes spontaneously during childbed to a considerable degree, and we hear physicians sometimes say that "the injury is not so bad after all," and that "nature repairs it remarkably well." Spontaneous repair is, however, very incomplete, except in the lesser degrees of laceration, where the skin only is ruptured. The greater the laceration the less complete will be spontaneous repair. The tendency to primary union is interfered with by the lochial discharge, with which

the edges are constantly bathed. Vaginal injections are very useful to keep the parts clean, but as every movement of the parts causes more or less separation of the lacerated edges, they interfere with repair.

PREVENTION.

The disagreeable consequences of a ruptured perineum have always been appreciated, and many articles, describing how this injury can best be avoided, have been written. The gist of all these opinions is that rupture of the perineum can usually be prevented, first, by supporting the perineum ; secondly, by retarding the progress of the head ; thirdly, by a combination of both methods. No special manipulation has yet met with general favor. I have tried several, and found the following, which has been in use for many years in the Vienna Lying-in Hospital, to be the best. The patient lies on her side (the left preferably), with the nates near the edge of the bed. The physician, after protecting the rectum with a towel, places his right hand, on its palmar surface, against the perineum, the thumb on one side of the vulva, the other fingers on the other side, leaving the fourchette free for inspection. The left hand is carried over the mons veneris, while the patient or the nurse, who should stand on the opposite side of the bed, lifts the right knee sufficiently to allow the introduction of this hand between the legs ; then the bulging head is grasped with the left hand, and kept

close to the arcus pubis. During a strong pain the left hand retards the progress of the head, and prevents its sudden expulsion, while the right hand supports the perineum, pressing it forward or retracting it gradually, according to indications. When the greatest circumference of the head is about to appear in the vulva, the patient is told not to press down during a pain, and to breathe freely or to cry out. If the pain has subsided, the patient is asked to press lightly, so that the head gradually advances. It is easier to prevent the occurrence of a rupture than to restrict its extension when once the fourchette is torn.

When the perineum is very tough and unyielding, or œdematous, or is the seat of syphilitic deposit, no manipulation can save it. In such cases an incision (episiotomy) in the middle of the edges of the labia minora is made when they are on the greatest stretch—a narrow-bladed, blunt-pointed bistoury is introduced, on the flat, between the head and the constricting ring, and then the knife is turned forward. Care must be taken not to incise too deeply, as a vessel might be cut and hemorrhage follow. A simple nick with the knife is often sufficient, spontaneous tearing usually taking place so as to give enough room for the passage of the head without rupture of the perineum. A rupture of the perineum is rarely a "linear cut," as Playfair says. Usually the edges are jagged, and often bruised, whereas a cut in the

labia unites of itself, or can be very easily made to unite. The most extensive ruptures usually occur in cases of forceps operations, as sufficient time is not given for gradual distention of the perineum, though the distention in these cases can be accomplished as easily and as safely as in spontaneous labor.

OPERATION.

If rupture have occurred (its frequency, according to Winckel and Olshausen, is about fifteen per cent.), the sooner the injury is repaired the better. Charpentier and a few others advise delaying the operation until after childbed, for no other reason apparently than to vary the monotony of general consent to immediate operation. At no future time are the conditions for primary union so favorable as they are immediately after labor. By the operation we lessen also the risks of infection and consequent suppuration.

Hecker estimates that twenty-four per cent. of puerperal affections are due to a lacerated perineum. Should primary union fail to occur, the details of the operation have not been properly carried out. The patient's position for the operation should be upon her side, with the nates near the edge of the bed, the thighs and knees flexed. The parts are cleaned, hemorrhage stopped, the torn and bruised edges are trimmed smooth with scissors, and brought into exact apposition. Two or three sutures, accord-

ing to the extent of the laceration, are then put in. The needles are introduced about one to two centimetres from the edge through the whole depth of the laceration, so that all the lacerated tissues are included, all clots are removed before tying the sutures, and the edges of the skin prevented from rolling in.

A physician might be excused for omitting the operation and trusting to spontaneous healing of the rupture when the sphincter ani is not involved in the laceration; but no excuse, except immediate danger to life, is valid for failure to operate when the rupture extends through the sphincters into the rectum and vagina. Spontaneous repair in such cases is so exceedingly rare that it is folly to expect it. The operation is best performed in the lithotomy position. The parts are cleaned, hemorrhage stopped, coagula removed, edges smoothed, and the laceration in the vagina and rectum first brought together with catgut or silk sutures, and then the perineum repaired, as in the former cases. A pillow is placed between the knees and the legs tied together. The sutures are removed on the ninth day. If symptoms of absorption of pus from an abscess in the perineum should appear, the sutures must be removed and free outlet given to the pus.

2. LESIONS OF THE EXTERNAL GENITAL ORGANS.

Slight lesions near the clitoris and on the labia minora are not rare in spontaneous and operative

cases. They may give rise to obstinate arterial or venous hemorrhage, or become the seat of diphtheritic ulcers. When near the urethra they are painful during micturition, easily becoming inflamed and causing dysury. Deep lacerations are rare, and usually the result of careless instrumental interference.

Hemorrhage must be stopped and the parts kept clean to prevent inflammation and diphtheritic ulcers.

3. LACERATIONS IN THE VAGINA.

(a) Superficial lesions here are very common, and if affecting a varix profuse hemorrhage may result. These lesions predispose to diphtheritic ulcers and greater absorption of irrigating fluids.

(b) Deep lacerations may give rise to hemorrhage, or to extensive infiltration with blood and lochia, and subsequent inflammation. The dangers of these lacerations are greatly increased when they communicate with neighboring organs.

These complications most frequently result from awkward manual or instrumental interference, or some pathological condition of the vagina. The lacerations are either longitudinal or transverse, and may cause serious consequences if extensive. They may communicate—

1. *With the Peritoneal Cavity.*—Here most frequently the laceration is associated with rupture of the uterus. Laceration of the vagina, communicating with the peritoneal cavity, without rupture of

the uterus, may occur, however, in spontaneous labor with narrow pelvis, the cervical orifice retracting over the head, which remains arrested at the superior strait; if now strong labor pains continue, the uterus may be torn from the vagina. In careless manipulation a blade of the forceps or a hand has been pushed through the fornix, or the uterus has been torn from the vagina by forcing the hand through the orifice, the fundus uteri not being supported by the other hand. The immediate symptoms are often the same as those of rupture of the uterus, subsequently symptoms of parametritis, peritonitis, prolapse, and incarceration of the intestines are developed. Reposition and retention of intestines by a tampon, arrest of hemorrhage by pressure or sutures are the first indications. Weak antiseptic lotions may be used, but styptics are not advisable.

2. *With the Bladder.*—In rare cases the lesion is produced by a sharp instrument or by the bones of the head after perforation, in which case urine flows off immediately after labor. Far more frequently the fistula is due to long-continued pressure from a large head in a narrow pelvis, a part of the vesicovaginal septum being so severely contused that it sloughs off after two to five days, and incontinence of urine results.

This accident is more likely to occur when instrumental aid has been too long deferred than from the proper use of instruments, and is, therefore,

very rare in city practice. Among the numerous cases brought to the Vienna clinic after fruitless instrumental attempts at delivery, not always made by skilful operators, I never saw a case of fistula. The cases of fistulæ all came from the country, and the women had been in labor two to four days before instrumental interference was resorted to. A fistula may also result from destruction of tissue by diphtheritic ulceration. When the edges of the fistula are not sloughy or diphtheritic, immediate suture is the best treatment. The requisite conditions for primary union are then most favorable. A fistula, the cure of which may later require great skill, can then easily be closed. Suture is also advisable when the edges are granulating; though perfect union does not always result, the opening is greatly diminished in size. Frequent antiseptic vaginal injections prevent diphtheritic ulcerations, and contribute greatly to primary union.

3. *Communication with the Rectum* is much rarer than the former lesions, except as a continuation of complete perineal ruptures. The communication may be the result of instrumental violence or diphtheritic ulceration. In exceptional cases a perforation in the fossa navicularis may occur, as before mentioned, during the delivery of the head. When the edges are fresh, sutures should be applied either from the vagina or rectum.

4. LACERATIONS OF THE CERVIX.

Slight lacerations are so common in spontaneous labors that we apply the name only to those lacerations which are deep and extensive. Great resistance of the tissue, rapid dilatation of the cervix, either by precipitate labor, premature use of forceps, or forced introduction of the hand, are the most frequent causes; injuries are sometimes inflicted by sharp instruments or the bones of the head after perforation. When there is a great disproportion between the size of the head and that of the pelvis, severe bruising of the tissue by the head, forceps, or hand may occur, especially when there are exostoses at the symphysis, promontory, or tubercula ileo-pectinea. From the sloughing or diphtheritic ulceration of these bruised tissues deep destruction of tissue, establishing communication with the neighboring organs, may result.

The laceration occurs, in some rare cases, in a transverse direction (annular, circular), and the child may be born through such a rent, or the whole lower portion of the cervix may be separated.

Longitudinal rents, either on both sides or on one side, are most common; rarely laceration may occur anteriorly or posteriorly, extending sometimes into the fornix. When the rent extends through the whole length, and through all the tissues of the cervix, it is called rupture of the uterus and treated as such.

A laceration of the cervix is more easily made out when the vaginal portion has re-formed than immediately after labor, when the tissues are very soft and bathed in blood. Primary and secondary hemorrhage, infiltration with blood or lochia, diphtheritic ulcers, and suppuration are often the consequences of these lesions.

Arrest of hemorrhage by pressure or suture and frequent vaginal antiseptic injections are indicated. Styptic injections can be only used when the rent does not extend to or involve the peritoneum.

5. RUPTURE OF THE UTERUS.

The researches of Bandl (*vide* my article on Rupture, *Am. Journ. of Obst.*, 1881) have acquainted us with the causes which most frequently lead to rupture of the uterus, and the prevention of this appalling accident has been made more feasible in consequence. But it is still of too frequent occurrence, and the premonitory symptoms are often overlooked or relief is afforded too late. The rupture is most frequently in the lower segment of the uterus, this being the part which is put to the greatest strain in difficult and protracted labors. The rupture may be either longitudinal or transverse and complete, with involvement of the peritoneum, or incomplete when the peritoneum remains intact. The symptoms of a complete rupture usually come on at once and are characteristic. They are shock, intense abdominal

pains, a sensation as of something giving way, sudden arrest of labor pains, hemorrhage, nausea and vomiting, small rapid pulse, cold skin, prolapse of intestines into the vagina. All these symptoms, with the exception of the changed pulse, may be absent at first and appear only after the delivery of the child. The prognosis is very bad; the patient may die at once from shock or hemorrhage, or later from a subsequent peritonitis or secondary hemorrhage.

A mortality of eighty-three per cent., as given by Jolly, is too small an estimate, as recoveries are more frequently recorded than fatal cases. Hoggenberger's estimate of ninety-five per cent. is probably more correct.

Incomplete rupture occurs less frequently than complete, according to Brennecke (8 to 100), and is produced by the same causes. The symptoms are often the same as for complete rupture, though sometimes of less intensity. In rare cases the symptoms are so insignificant that the accident is entirely overlooked, or discovered only by chance.

Effusion of blood under the subserosa very commonly occurs; subserous emphysema from air or putrid gases in the uterus is a rarer symptom. Emphysema, if present, may be detected by auscultation and percussion, and is considered a very ominous sign; it may rupture the serosa and cause sudden death (Dorn).

Treatment.—The treatment is symptomatic only.

To open the abdomen and sew up the rent, as has been proposed, would take from the patient the only chance of recovery. Our efforts must be directed to allaying the symptoms of shock, arresting the hemorrhage, replacing the prolapsed intestines and keeping them replaced, and preventing suppuration and peritonitis. The hemorrhage is best controlled by firm palpation through the abdomen, or bimanual compression with one hand in the vagina, the other on the abdomen. Styptic injections cannot be used in cases of complete rupture, and are dangerous in incomplete ones, producing, as they do, firm coagula under the serosa, the decomposition of which is apt to cause suppuration and peritonitis. After arrest of the hemorrhage, absolute rest, an ice-bag on the abdomen, and treatment of the other symptoms are indicated.

Drainage has been used with good result by some, but is rejected by others. Antiseptic vaginal injections, when given with precaution, may be of service to prevent a septic poisoning from the decomposition of the blood coagula, pus, and lochia.

CHAPTER IX.

INVERSION OF THE UTERUS.

INVERSION often begins with the sagging of a part of the uterine wall, most commonly at the placental side, into the uterine cavity, a depression on the outer, with a corresponding prominence on the inner wall of the uterus, forming (*depressio uteri*). This beginning inversion either remains stationary or progresses into a more or less complete inversion. Inversion is incomplete while the fundus uteri is still within the orifice, and complete only when fundus and body are in the vagina or presenting at the vulva.

Complete inversion may take place suddenly, or progress gradually from a depression or an incomplete inversion. This accident may occur spontaneously or from mismanagement of the third stage of labor, and is one of the greatest rarities in a lying-in hospital. In the Dublin Rotunda one case was met with in 190,000 cases of labor, and in the Vienna Lying-in Hospital but one case in 280,000 confinements was observed. Curiously enough, in the same ward at the latter institution, a second case occurred nine months after the first. Both cases have been

described, one by Breus (*Wien. med. Woch.*, 1882), the other by C. Fürst (*Gyn. Arch.*, xx.).

ETIOLOGY.

In inversion of any degree, deficient contraction of the corresponding part of the uterine wall is the primary cause.

It is certainly an error to suppose, as has been done, that the lower segment of the uterus first becomes relaxed and inverted, and that then the fundus is forced down and out by its own contraction. Contraction renders the uterine wall firmer, rounder, and thicker, qualities which make depression impossible, as may be seen with a rubber ball; the thinner and more flaccid it is, the more easily is it depressed.

The same causes which have been mentioned as predisposing to atony of the uterus also predispose to inversion. Depression at the placental site is far more frequent than at any other part of the uterus.

The chief cause of the higher degrees of inversion in spontaneous deliveries is the pressure of the abdominal muscles. The strength of this intra-abdominal pressure is demonstrated in cases when, after death, the uterus becomes inverted upon the expulsion of the child.

In both the cases of inversion at the Vienna Lying-in Hospital, complete inversion was produced by the pressure of the abdominal muscles.

1. Twenty-four years old ; labor (iv.) spontaneous, easy ; child, eight pounds. As the bedclothes were being changed and the patient lifted, her pelvis, the uterus with the adherent placenta, and a large quantity of blood suddenly presented at the vulva ; patient died ten hours after.

2. Twenty years old ; primipara ; labor spontaneous and easy ; child, seven pounds ; the same accident under the same circumstances ; patient recovered.

When hemorrhage takes place from inertia uteri, and blood accumulates in the vagina on account of obstruction of the vulva, the woman feels a strong desire to press down, and is apt to use the abdominal muscles. These two conditions may account for many cases of *inversio uteri*.

Artificial inversion can be brought about by firm pressure on the fundus uteri, when the uterus is relaxed, or by pulling on the cord or placenta, when the uterus is not well contracted.

Inversio uteri occurs, however, far more frequently spontaneously than through mismanagement.

SYMPTOMS.

In slight degrees, or when the inversion takes place gradually, the symptoms may be so insignificant that the accident is only discovered when, on hemorrhage occurring or the patient complaining of pressure on the bladder or rectum, an examination is made. With a sudden occurrence of the severer

degrees of inversion the symptoms are very striking, and resemble sometimes the symptoms of rupture of the uterus, and are abdominal pains so intense that the patient cries out, symptoms of shock, fainting, vomiting, rapid weak pulse, and cold extremities. The hemorrhage is usually profuse, but may be only slight when the placenta remains entirely adherent, or if the uterus contracts well after the inversion. The patient may die from shock or hemorrhage.

Crosse collected records of 109 fatal cases, and in 72 of these cases death occurred within a few hours after the accident. When the patient rallies from shock and hemorrhage, symptoms arising from the mechanical pressure of the tumor upon the bladder and rectum may appear. Repeated hemorrhages occur, and the tumor becomes inflamed and suppurates, or gangrene sets in and the patient dies from exhaustion and septic poisoning. Into the inverted cup of the uterus, the omentum, ovaries, or intestines may slip and become incarcerated. If the suppuration is confined to the superficies of the uterus, the patient usually recovers. Even after complete sloughing off of the gangrenous uterus recoveries have been recorded. The prognosis, though bad, is not now so unfavorable as it was formerly. Out of 54 recent cases only 12 patients have died. Spontaneous reduction of the inversion has been observed.

DIAGNOSIS.

Inversion of the uterus is so easily recognized in recent cases that a bimanual examination and the knowledge that such an accident may occur suffices for diagnosis. If a physician remembers this, he needs no further information about the quality of the presenting tumor. The cup-like depression of the uterus, or its entire absence in the hypogastrium, with the corresponding prominence felt in the cervix, or the tumor in the vagina or at the vulva, are so pathognomonic that a mistake is inexcusable. In exceptional cases, where there is such extreme abdominal tension that palpation is not of service, an examination per rectum gives sufficient information. To mistake the tumor for a polypus, the placenta, or the head of a second child, can only happen when bimanual examination has not been used. All other signs are unreliable, and mistakes have been made although these signs were known. The probe is also unreliable. It will pierce a puerperal, and even a non-puerperal uterus, without any noticeable resistance, and then give the false impression of a cavity between the tumor and the cervix.

TREATMENT.

Reduction of the inverted uterus is the first thing to be accomplished, and no time should be lost. If the placenta is still adherent, and can easily and

rapidly be separated, or if quick reposition of the uterus is impossible, the placenta should be separated first, otherwise reduction of the inversion first, and then separation of the placenta is preferable. The reduction is effected, in cases of complete inversion, by placing one hand on the fundus to prevent any lateral deviation, or to prevent rupture of ligaments or lacerations of the vagina, which might occur if we neglected this precaution ; the other hand grasps the tumor and reduces, first, the fundus, pushing it first gently upward toward the hollow of the sacrum, and afterward in the direction of the axes of the pelvic brim. When a depression has once been made on the fundus, the uterus often springs back spontaneously and with a snap. In cases of incomplete inversion reduction is facilitated if the fingers, by depressing the abdominal wall, can be put into the cup-like depression and its rim widened by extending the fingers. When the uterus is firmly contracted and the orifice constricted, pressure on the fundus would be useless. In such cases the fundus is grasped in the hollow of the hand, and with the tips of the fingers the parts nearest to the orifice, those which have been last everted, are *first reduced*. When a depression *has been effected on one side*, reduction is then very easy ; but forced reduction should not be attempted, as by waiting until *the swelling has been lessened we may easily succeed*. Denman regarded reduction as impossible after two

hours, now it can be reduced at any time after the occurrence. After reduction the hand should be kept in the uterine cavity until firm contraction of the uterus is present. In cases of simple depression the reduction is made by the hand, which is kept in place until the paralyzed part contracts and the adhering portion of placenta becomes separated by the contractions. After the reduction the symptoms of shock and anæmia must be relieved.

CHAPTER X.

ALBUMINURIA.

THIS affection of the kidneys rarely develops during childbed, it is usually a continuation of a disorder which has existed during pregnancy and labor. A large proportion of pregnant and parturient women suffer from albuminuria. The proportion is variously given as from twenty per cent. to thirty per cent. The reason for this difference in estimates may be that the urine for examination has not always been drawn off by catheter, as it properly should be. When this is not done, discharge from the vagina, which *often contains* albumen, becomes mixed with the urine. When the amount of albumen in the urine is small it does not give rise to any noticeable symptoms, and its presence is consequently not suspected either by the patient or by the physician, unless the urine be examined. When the quantity of albumen present is large, there is always œdema of the legs and often of the external genital organs. R. Moericke found albuminuria ten times as frequent during labor as during pregnancy.

Albuminuria during the pregnant and puerperal

state is due either to Bright's disease or to changes in the kidneys from pressure of the gravid uterus. On examination we find, as Leyden first pointed out, and Bartels and others have since confirmed, an alteration of the kidneys which is peculiar to the kidneys of pregnancy, and which differs from all other forms of morbus Brightii, acute or chronic. The kidneys are large, more or less œdematous, the pelves dilated, the surface smooth, of a pale or brownish-yellow color; the cut surface of the parenchyma pale, opaque; the cortical substance yellow, with more or less fatty degeneration; the epithelium of the convoluted tubules of Bowman's capsule undergoing fatty degeneration; the epithelium of the tubuli recti are little changed, and present no signs of inflammation; the change in the kidneys showing in its inception and course a great divergence from both acute and chronic nephritis. It is now almost universally admitted that this change in the kidneys is produced mechanically from the pressure of the pregnant uterus. It is not yet definitely settled as to whether a disturbance in the circulatory or in the secretory functions, or in both, is the cause of this morbid condition of the kidneys. Halberstma (*vide Eclampsia*) and many others claim that this affection is due to secretory disorders in the kidneys, while R. Moericke (*Zeitsch. f. Gebh. und Gyn. V., B. I., H.*) contends that circulatory disturbance (back pressure, retrostasis) is the proximate cause of most of the af-

fections of the kidneys occurring during pregnancy. In the examination of the urine of a large number of cases, the point which first attracted his attention was that in antepartum urine, even when loaded with albumen, few or no casts were found, while in the first specimen of postpartum urine the field would be strewn with thick and long casts, often six and even ten times as long as the diameter of the field. He claims that only a great change in the circulation could effect this. The high abdominal pressure of pregnancy is relieved by delivery; a large amount of blood then rushes rapidly through the renal vessels, in which, before, the blood was almost stagnant; the tubes, filled with casts and epithelium, are quickly washed out, and the urine comes heavily charged with this material. The urine will then progressively diminish in sp. gr., until in one or two days both albumen and casts have disappeared. No case of ordinary nephritis presents any counterpart to this. From statistics of Mayer and Litzmann, and from personal examinations, Moericke finds that, while albuminuria during pregnancy is rare—some 4.71 per cent.—during labor it is very frequent—40.78 per cent. to 43 per cent. This greater frequency during labor is due, according to him, to disturbance of circulation caused by the increased pressure in the abdomen during the pains, the diaphragm and abdominal muscles so strongly compressing all the organs that the flow of venous blood is almost en-

tirely arrested. That it is not caused by increased arterial pressure has been shown by the experiments of Frerichs, Rosenstein, and Burkhart, who tied the aorta, extirpated one kidney, and in other ways increased the arterial pressure in one or both kidneys without producing albuminuria. Of one hundred healthy women in whom labor was normal, or at least progressed without rise of temperature, the urine of each was examined during labor and for a few days afterward. In thirty-seven albumen was found, and in thirteen casts. In all but two the appearance of albumen and casts dated from the time of labor. In two there had existed some kidney affection earlier in the pregnancy. Moericke regards the nephritis in these cases as positively produced by the act of parturition, and cites the experiments of Weissberger and Perls on animals and the kidney complications of cholera to show how short a time is required to produce diseased action in the kidneys. He believes that casts do not necessarily imply structural change in the kidneys, but that they certainly point to some disturbance of nutrition and function. The cases he details would seem to corroborate the latter view, for within a very few days after delivery, in all these cases, the casts and albumen had disappeared. Hence he heads his article "Renal Affections," and not inflammations. Ten of thirteen cases were in primiparæ; in the other three, labor was slow and difficult, a rather

strong point in favor of his theory. "Now, if we explain the albuminuria, etc., of parturition by arrest of venous flow from the kidneys, it certainly is easy," says Moericke, "to apply the same reasoning to the renal affections of pregnancy." He does not claim that the uterus presses directly on the renal veins, but that the general abdominal pressure is sufficiently increased to impede the flow of venous blood. He argues against many other theories, such as pressure on the ureters (Haberstma), reflex vasomotor nervous action (Spiegelberg), increased renal activity (Peter, Schröder), and others. It is acknowledged that albuminuria is more frequent in primiparæ, and especially in cases of twins, Letzmann going so far as to say that the absence of albumen speaks positively against the presence of twins—no albumen no twins. Bamberger found in autopsies upon 2,430 cases of *mr. Brightii* 9.1 per cent. due to cardiac valvular disease, six per cent. to pregnancy, and 3.5 per cent. to pulmonary emphysema, all producing impeded venous flow from the kidneys. Frerichs and others loosely tied the vena renalis or the vena cava above the entrance of the renal vein, and in a few hours found albumen and casts in the urine. The impoverished condition of the blood during pregnancy, added to its impeded circulation, must deeply affect the nutrition of the kidneys.

Moericke ends his treatise with the remark that

treatment is of no avail in these cases, and that all the indications are in favor of premature delivery, especially as it was shown by Hofmeier that in these cases fifty-seven per cent. of the children are still-born, and of the remainder many are born at the end of the eighth or beginning of the ninth month. Schreiber (*Archiv für Experim. Pathol.*, xix., B. 3, H.) has shown that by artificial disturbances in the pulmonary circulation of males albuminuria may be produced. Further investigation is needed to settle this disputed question.

The albuminuria of pregnant and puerperal women deserves the greatest attention always, not only on account of the claim it establishes upon the general health, but still more urgently on account of its relation to eclampsia. Of pregnant or parturient women with morbus Brightii, fifty to sixty per cent. are attacked by eclampsia, while in those with other forms of albuminuria, eclampsia occurs in from ten to fifteen per cent. As yet we are not always able to recognize whether the albuminuria in a given case be due to morbus Brightii or to the morbid changes of the kidneys brought about by the pregnant and puerperal state; granular casts are not characteristic of any particular state or pathological change of structure of the kidneys. Robin has found that the albuminous urine in morbus Brightii, when brought in contact with the oxide of copper, assumes a beautiful reddish-violet color, and throws down more or less

flocculent black precipitate. The urinary albumen of pregnancy, when morbus Brightii does not exist, while it is readily coagulated by heat and nitric acid, does not exhibit any such reaction with the oxide of copper. This observation has not yet been widely confirmed. When repeated examinations of urine before and during pregnancy have failed to detect albuminuria, we can, as a rule, exclude morbus Brightii. There are, however, rare cases of advanced morbus Brightii in which neither albuminuria nor other symptoms of the morbid conditions of the kidneys can be detected during life.

SYMPTOMS OF ALBUMINURIA.

In grave cases of albuminuria we usually find œdema of the legs and external genital organs, which may often extend to the face and upper extremities, and here become most distinct after prolonged rest in the horizontal position. Other symptoms soon come on, as gastric disturbances, loss of appetite, nausea and vomiting, persistent headache, insomnia, nervous irritability, impaired vision, etc. These symptoms are so characteristic that our attention should be at once directed by them to the condition of the kidneys. In other cases, especially in the mild forms, the symptoms are not at all characteristic, and may even be entirely absent. In every case in which the condition of the puerperal woman

is not entirely satisfactory, the urine should be regularly examined.

TREATMENT.

Treatment should be begun as soon as the albuminuria is detected. We can do much to ameliorate or to prevent an aggravation of the disorder, although a cure cannot usually be effected during the pregnant state. Attention must be paid to the hygienic surroundings, and everything possible done to improve the condition of the patient, such as out-door exercise, proper clothing, well regulated diet, and a good sleeping apartment. Care should be taken that the functions of the skin, bowels, and bladder are properly performed. Sudden checking of perspiration may aggravate a slight affection. When the skin is kept in good condition, by the use of flannel, frictions, and hot baths, the cutaneous vessels are dilated, and by thus diminishing the blood-pressure, the renal organs are relieved, the skin also supplementing the excretory functions of the kidneys. This plan of treatment therefore agrees with both theories on the origin of albuminuria during pregnancy. Excellent results have been obtained during the pregnant and puerperal state by the use of hot baths. The patient is immersed up to the chin in water of a temperature of 100°, and hot water is added until the temperature is raised to between 108° and 112°. During the immersion, which should

last about half an hour, a copious perspiration breaks out on the head and face. The patient is removed and placed in bed, well wrapped up in blankets, and with only the face exposed ; free diaphoresis will usually continue for hours. The bath may be repeated daily, or once in two days, according to indications ; by this means anasarca is speedily removed and the amount of albumen lessened, often reduced to a minimum. The procedure is destitute of danger, neither inducing premature labor nor causing any affection during the puerperal state, if proper care be taken to protect the patient from exposure during transfer from one place to the other.

The food best suited to the patient is the diet usually ordered in cases of morbus Brightii, especially milk. The administration of diuretics and diaphoretics is sometimes indicated. Saline laxatives are often useful, through their action on the mucous membranes of the intestines ; they abstract serum by exosmosis from the blood, and relieve the overtaxed functions of the kidneys. Venesection is condemned by the best authors.

Albuminuria developed during the pregnant or puerperal state usually disappears within the first or second week of the puerperium ; in rare cases it is months before the albumen disappears and the patient recovers completely. It is not yet known if ever, and if so, how often, this albuminuria develops into morbus Brightii. When albuminuria is due to

morbus Brightii the disease continues its course, and leads, in some months or a year, to a fatal issue. In cases of advanced morbus Brightii death may suddenly occur during labor or childbed from failure of the heart. Albuminuria during the convalescence of a puerperal woman is of secondary importance, and is caused by infection. Lately, albumen has been found in cases of absorption of corrosive sublimate from vaginal and intra-uterine injections. Keller (*Arch. f. Gy.*, B. xxvi.) found albumen in ten out of twelve cases in which corrosive sublimate had been absorbed after injections.

CHAPTER XI.

ECLAMPSIA.

ECLAMPSIA is characterized by epileptiform convulsions during pregnancy, labor, or childbed, and is due to some morbid affection of the kidneys. An eclamptic seizure is distinguished from an epileptic seizure by the history, and the condition of the pulse and urine, both of which latter are more or less unaffected during an epileptic fit. The eclamptic convulsions, with their concomitant symptoms, are identical with uræmic convulsions in every respect. As it has been demonstrated that albuminuria is almost invariably present in cases of eclampsia, it has by many been taken for granted that eclampsia occurs only in pregnant women who are suffering from one or another form of Bright's disease, and the same explanation has accordingly been given of the origin of eclampsia as of that of uræmia, many authors regarding eclampsia as acute uræmia, on account of the sudden onset of all the very manifest symptoms of the latter disease. The most widely known explanations for uræmia are Frerichs', that uræmia is caused by the decomposition of retained

urea into carbonate of ammonia ; and Traube's, that uræmia is produced in hydræmic persons by a sudden increase of the pressure in the aortic system, whereby acute œdema of the brain is produced. A great amount of labor has been bestowed upon the elucidation of this subject ; nevertheless the results arrived at are far from being satisfactory. Romme-laere and Voit repeated and revised the experiments performed by others, and though they did not succeed in finally settling the question, obtained, however, some valuable results. They exposed the fallacies of Frerichs' and Traube's theories, and came to the conclusion that there was no particular substance which always produced uræmia, but that the retention of all the substances which should be eliminated by the kidneys would certainly produce it. Bartels, through clinical experience, arrived at the same results. Many obstetricians, though admitting the dependence of eclampsia upon some affection of the kidneys, dispute the identity of eclampsia and uræmia on the following grounds :

1. That eclampsia does not occur in all pregnant or parturient women who are suffering from Bright's disease ; in one hundred cases it occurs only in about sixty per cent.
2. That in many cases of eclampsia no disease of the kidneys can be demonstrated. Ingerslev collected records of one hundred and twenty cases in which no change in the kidneys could be found.
3. That there are cases of eclampsia with the

albuminuria so slight that it might be considered as the consequence of the convulsions. On the other hand, the relation between the attacks of eclampsia and the altered secretion of the kidneys is so obvious that it cannot be ignored. The discharge of urine is scanty, and more or less albuminous before and during the paroxysms. The decrease of albumen and the increase of urine after the attack are the most favorable symptoms in cases of eclampsia. Some authors, as before mentioned, hold that a venous stasis of the kidneys is present, brought about by pressure of the uterus; but it escaped their attention that the uterus, from its position, cannot cause such a pressure, and that no such stasis is found in the kidneys, which are, on the contrary, pale and anæmic. English and French obstetricians compromise this dilemma by suggesting other causes, which, in connection with some existing affection of the kidneys, produce eclampsia. The deteriorated blood, the sensitiveness of the nerves of the pregnant woman, and similar causes, one as untenable as the other, have successively been assigned. All these explanations have the same fault—that too much attention is paid to casual conditions, which may exist but are not constant accompaniments of eclampsia; furthermore, these theories do not at all suffice for the explanation of uræmia, as most of the conditions present in pregnant women do not exist in cases of uræmia.

No one of the theories cited gives any explanation of the insufficiency of the renal secretion, a phenomenon which is admitted by all to be of great importance. C. Braun goes to the other extreme, and lays too much stress on the results of post-mortem examinations. He found that of 20 fatal cases death was due to peritonitis in 5, and in 15 to morbus Brightii alone, and jumps to the conclusion that in eclampsia we find most constantly one or another of the three forms of morbus Brightii, as described by Frerichs, *i.e.*, hyperæmia, fatty degeneration, and atrophy of the kidneys. This is true in the fatal cases of morbus Brightii, but it is not true in the far larger number of cases which recover or die from other causes. We do not find any of the three forms above mentioned in all the cases in which pregnancy alone is the cause of the change in the kidneys, and in which, neither before nor after pregnancy can symptoms of the renal affection be found.

An explanation for eclampsia which will be satisfactory must hold good for patients of different constitutions, and, at the same time, take into account the change in the kidneys, otherwise, we must give a different explanation for every case. There are only two causes known, both of which invariably produce epileptiform convulsions; they are ligature of the cerebral arteries, and the retention of urine and its ingredients in the system, either by deficiency of the secretion from nephritis, or by mechan-

ical retention. As the changes of the kidneys in pregnant women are altogether different from those in nephritis, we have to accept a mechanical disturbance of the secretion of the urine as a pathological factor. It is surprising that the element of mechanical pressure from the uterus during pregnancy has only lately attracted attention, although it was known to Morgagni ("De Sedibus et causis Morb.," 1767): "Cum enim uterus crescens ureteres premeudo minus per hos facilem reddat urinæ defluxum, et quod sequitur non nihil in renibus eam moretur." It is also known that flexions of the uterus, parametric cicatrices, or exudations and carcinoma uteri may interfere with the discharge of urine through the ureters, and produce hydronephrosis and uræmia. A good description of the consequences of ligation of the ureters is given by Cohnheim (*Allg. Patholog.*, B. ii., 1882, p. 462).

He says: "Furthermore, it is true that in these experiments not all the pathological conditions are encountered which come under observation in patients suffering from kidney disease, but the most striking of them, as the disturbances of digestion and the grave nervous symptoms, coincide too surprisingly for any doubt to remain as to their dependence upon the retention of the urine." No use had been made of these facts until Halberstma (*Centralblatt für Med. Wissenschaft*, No. 21, 1871) broached a new theory, which he recently re-advocates (Volkmann's

Sammlung Klin. Vort., No. 212, 1882). Clinical experience and various other considerations led him to reject all other hypotheses as unsatisfactory. His theory implies that the discharge of urine through the ureters is hindered, either by pressure of the pregnant uterus or by catarrh of the ureters. Halberstma supports this theory by the changes found in the kidneys in several post-mortem observations, and the results of his experiments, by which he ascertained that if the ureters are compressed, for a length of 8 ctm., by a weight of 5 gms., the pressure of a column of urine 400 mm. in height is not sufficient to overcome the resistance. The objections which have been raised to this theory can easily be disposed of. Schroeder objects that it does not explain the inflammatory character of the changes in the kidneys. Leyden and others who have paid attention to the pathological changes in the kidneys agree that the condition of the kidneys during pregnancy shows no signs of inflammation, and Leyden says further, "or is the stagnation of the urine in the ureters the cause of it." Another objection (Klemwächter, *Zeitschr. für Geburtsh. u. Gyn.*, i. B., 3 H.) is that ovarian tumors, if this theory were correct, would cause eclampsia more frequently than they do. But in cases of ovarian tumors the ureters are more favorably situated, as they remain in their position, while in cases of pregnancy they are stretched and

have to follow the uterus in its extension. Even if the ovarian tumor should exercise pressure upon one ureter, the other ureter would vicariously assume its functions. The favorable effect of narcotics in cases of eclampsia has been ascribed to their influence in overcoming the irritability of the spasm centre; but narcotics can only lessen the symptoms of eclampsia, as antipyretics reduce fever in septicæmia, *i.e.*, without removing the cause. The danger from the first attack of eclampsia may be as great as after the tenth or twentieth if a free secretion of urine does not take place meanwhile. The theory of mechanical obstruction of the excretion of urine appears more satisfactory than any other. There are, however, some objections to Halberstma's conception of it. He lays too much stress on the pressure of the ureters by the pregnant uterus. This cannot well account for the very frequent cases in which eclampsia occurs after labor, and for the not rare cases in which eclamptic attacks set in and cease during the pregnancy without having induced labor. In these latter cases eclamptic attacks occur weeks, and even months, before labor; with a great quantity of albumen in the urine; in these cases the albumen, diminishing gradually after the attacks cease, has entirely disappeared in a few days and pregnancy continues to full term, when a living child is born. In the first class of cases eclampsia occurs after the pressure on

the ureters has been removed, and in the latter class all the disturbances disappear, though the pressure on the ureters is increasing.

Instead of accepting pressure as the universal cause, I believe it to be more in accordance with all the facts to regard the enlarging or contracting uterus as capable of producing stretching, flexure, or infraction of the ureters. This would better explain all cases. It would account for its great frequency in primiparæ, on account of the greater tenseness of the connective-tissue; would also account for the influence of the contractions of the uterus, and for the frequent cases in which eclampsia appears after labor, when a displacement of the ureters is very likely to take place. The *vis a tergo* of the urine is also, according to this conception, more likely to overcome the obstruction than if pressure were the cause of the resistance. In several cases of eclampsia, changes in the course of the ureters have been found, and if more attention were paid to this subject we would more often find either infection, infraction, stretching, catarrh, pressure, or some change by which the passage of urine through the ureters was impeded, and the changes in the kidneys peculiar to pregnancy brought about. Furthermore, it is known that the secretion of urine from the kidneys stops when the discharge encounters a resistance of five to six millimetres. In cases of abnormally distended bladder we need not look for ner-

vous influences, as the mechanical element is sufficient to explain the onset of eclampsia. In pregnancy the secretion of the kidneys is increased, and so the beginning of their insufficiency may escape attention, as cases of chronic nephritis will also do well for a while, notwithstanding the insufficiency of the kidneys, until the accumulation of non-eliminated ingredients of the urine is so great that it produces uræmic attacks. The hypertrophy of the heart, which is always present in pregnant women, may also contribute to the onset of eclampsia, as, according to Cohnheim (*l. c.*, p. 470), "the secretion of urine and its ingredients takes place regularly (in case of chronic nephritis) as long as the abnormally strong action of the hypertrophied heart lasts; as soon as the latter refuses, oliguria and retention of the ingredients of urine supervenes."

I have seen in all fifty-six cases of eclampsia in the Vienna clinic and here. The patients were of varying general condition, though most of them were strong and healthy; some were rather anæmic and ill-nourished, but in no case were there any signs of that morbid sensitiveness or the other conditions which are supposed to contribute or predispose to the occurrence of eclampsia. One patient had been previously treated for, and finally cured of, epilepsy. Though several parturients have come under my observation who suffered from epilepsy before and dur-

ing the pregnancy, in none of them did eclampsia occur.

In all the cases, with but one exception, the urine was scanty and albuminous during the attacks, the urine increasing and the albumen disappearing in all, with the exception of a few patients in whom chronic nephritis was present a short time after the attacks had ceased. None of the other theories would apply to the larger number of my cases. The mechanical theory is applicable to all cases which are not caused by morbus Brightii. As morbus Brightii of itself is sufficient to cause uræmia, we need not seek for other causes in these cases; the mechanical theory, however, is available also in these instances. Pregnant women suffering from morbus Brightii are more exposed to eclampsia, because the insufficiency of the diseased kidneys may be aggravated by alterations in the ureters. I therefore consider eclampsia as due to the same causes as uræmia, that is, retention of the urine and its ingredients, and it may be produced, first, and in the large majority of cases, by a mechanical obstruction of the ureters, whether the tissue of the kidneys is healthy or becomes secondarily changed by the mechanical obstruction. The mechanical obstruction is brought about most frequently by flexion, infraction, or stretching of the ureters. These are the more favorable cases, because the *vis a tergo* of the urine is more likely to overcome the resistance; less favor-

able, but also less frequent, are the cases in which obstruction is caused by pressure upon, or catarrh of, the ureters. An abnormally distended bladder, or a resistance in the urethra, will have the same effect as an obstruction in the ureters. Second, by morbus Brightii in a slight degree in combination with mechanical obstruction in the ureters. Third, by morbus Brightii alone, when the structure of the kidneys is so degenerated that insufficiency of the secretion ensues. These are the most unfavorable cases. During the course of eclampsia we will often not be able to decide which of the aforesaid causes is present, as the change in the urine is the same, and the hypertrophy of the heart, which is never absent in cases of chronic nephritis, always accompanies pregnancy. The result of ophthalmic examinations are available, as retinitis albuminurica is only found in cases of morbus Brightii, while in eclampsia from other causes amaurosis is caused by œdematous swelling or opacity of the retina.

TREATMENT.

However widely the opinions as to the cause of eclampsia may differ, it is universally admitted that the retention of the secretion of the kidneys is either the only, or at least the paramount, cause of eclampsia. Our attention must, therefore, be first directed to counteracting this disturbance. This can best be

done by increasing the secretion of the kidneys and by making use of the knowledge of the antagonism between the secretion of the skin and bowels and the secretion of the kidneys. Diuretics, sudorifics, and cathartics are therefore indicated. Liquor potassæ, infus. rad. scillæ, and digitalis deserve more confidence than other diuretics.

Hot baths (*vide* albuminuria) or wrapping the patient up in hot, wet sheets are our best means of stimulating the secretion of the skin, favoring the transudation of water and the ingredients of urine. The increased secretion of the bowels likewise relieves the overtaxed kidneys. Emetics are very useful for removing the mucus from the throat and lungs, and vomiting also lessens, as has been demonstrated by experiments, the injurious effects of the retention of the secretion of the kidneys. Narcotics, though they have no direct influence on the cause of eclampsia, relieve its symptoms, as antipyretics do those of septicæmia. Morph. inject., or chloral-hydrate per rectum, two grammes at a dose, repeated until complete narcosis is brought about, or morph. and chloral-hydrate together, but in smaller doses, are far preferable to chloroform.

The alarming symptoms which I have seen ensue after the use of pilocarpine would deter me from the employment of this remedy in comatose patients, who cannot eject accumulated mucus, and are thus exposed to the danger of suffocation. It

is very doubtful whether venesection ever has any beneficial effect, notwithstanding the many reports in its favor, and it is very often dangerous, as has been observed by Schroeder and others. I have never seen an indication for blood-letting, and it has been completely discarded in the Vienna clinics, where the results of treatment are far better than anywhere else. Some, who formerly were very strenuous advocates of blood-letting, now use it with much discrimination. Although eclampsia often occurs after labor, it cannot be denied that the termination of labor very often has the best effect. Very complete statistical tables show that the attacks terminate with delivery in one-third of the cases, in one-third they abate, and only in one-third do they continue unabated after labor. The indication to hasten the labor is, therefore, undoubted. But, on the other hand, it is a mistake to think that all danger is past when the labor is over, as the frequency of eclampsia after labor shows. Besides this, we should bear in mind that too active an interference has its own dangers, and that these are even greater than the dangers of eclampsia.

Eclampsia during pregnancy is not an indication for inducing premature labor. The attacks are to be treated in the same way as when they occur during and after labor, and will often disappear without inducing premature labor. Breus (*Archiv für Gyn.*,

B. xix., No. 2), others, and myself observed several such cases. When there are other complications, as, for instance, general anasarca, hydrops, ascites, etc., then premature labor should be induced. If great fear should be entertained in allowing pregnancy to continue after the attacks, premature labor might be induced without much condemnation, but it would be extremely unjustifiable to resort to any violent measures. With due precautions against infection the introduction of a bougie high up in the uterus is a reliable and safe procedure, and is also useful for increasing the pains during the first stage of labor. After the attacks are over, the treatment appropriate to kidney disease should be continued until the patient has completely recovered.

CHAPTER XII.

PHLEGMASIA ALBA DOLENS (WHITE LEG).

THIS complication of childbed was formerly considered by many as synonymous with crural phlebitis. Tyler Smith, for instance, says: "I believe that contagion and infection play an important part in the production of this disease. I look upon a woman attacked with phlegmasia alba dolens as having made a fortunate escape from the greater dangers of diffuse phlebitis or puerperal fever." More careful observation has shown that this is true only in the few cases in which uterine phlebitis extends to the crural veins, with subsequent symptoms of phlegmasia alba, and not for the majority of cases; where thrombosis of the uterine or pelvic veins has not preceded the phlegmasia, extensive thrombosis of the leg may exist without symptoms of phlegmasia alba, as symptoms of phlegmasia often appear before thrombosis takes place. Furthermore, it is known that this affection is not peculiar to the puerperal state. It has been observed in cases of phthisis, chlorosis, typhoid fever, dysentery, and more frequently in cases of cancer, not of the

womb only, but of cancer in distant organs, as the stomach or the mammary gland. It was also found that puerperal women, when exhausted from a previous disease, or who had lost considerable blood during pregnancy or labor, were more liable to this complication. No common cause could be found for all these cases, other than the altered condition of the blood, with excess in the amount of fibrine and serum (hyperinosis), which condition entails an abnormal tendency to coagulation of the blood in the vessels, with its consequences. As to the potency of this condition as a predisposing cause, no doubt exists, but what the exciting causes are is yet unknown.

SYMPTOMS.

The disease most frequently makes its appearance within ten to thirty days after labor, and is usually ushered in by more or less general disturbances, loss of appetite, general uneasiness, depression of vital powers, nausea and vomiting, rapid and weak pulse, one or more chills, elevation of temperature, and pains in the leg. In other cases no general prodromal symptoms appear, and the first, and often the only, symptom, is most excruciating pain or cramps in the calf or thigh. The temperature may be normal or only slightly elevated, and no change present in the condition of the affected limb, except extreme tenderness at the spot where the pains are felt.

One such case I saw the fourth day after labor. The disease may stop short at the prodromal period, or only a slight swelling in the limb follow, but usually within twenty-four hours the leg begins to swell either in the calf of the leg or in the groin. The swelling either remains localized or extends upward or downward. Before the swelling begins, the crural or saphenous veins can often be traced as thick, hard, knotty, painful cords, rolling under the finger; in other cases no thrombosis of the venous trunks is found, or it does not appear until later. The affected limb often attains double its normal size in circumference, is hard, tense, and unyielding on slight pressure; pitting can only be produced by long-continued strong pressure. The skin is of a whitish glazed appearance, active movement is impossible, and pressure, especially over certain spots, very painful. The patient is restless, sleepless, and complains of pain, thirst, and a "woody feel" in the affected limb. The left limb is more frequently affected than the right, owing to anatomical conditions, the primitive iliac vein being crossed almost transversely by the right common iliac artery; at the point of intersection a marked depression is found when the iliac vein contains a clot. The temperature during the acute stage ranges between 100° and 102° ; after the acute stage, which lasts from one-half to two weeks, the fever abates, the general disturbances subside, the pain becomes more bear-

able, and the temperature and pulse become normal. The swelling remains stationary for a week or two, then begins to gradually diminish; instead of the former hard, unyielding feeling, a baggy feeling is now present, and pitting is easily produced. All the symptoms undergo an improvement. But the least imprudence may bring on a new attack, or the other limb may become attacked. No cases have been observed in which the attack has begun in both limbs at the same time, but many are recorded in which both limbs were attacked successively. Not only a new attack, but sudden death from a dislodged embolus may be caused by an untimely use or careless handling of the limb. The natural tendency in this affection is to resolution and restoration of circulation. This takes about four to five weeks; sometimes months and even years pass before the limb can be used as before. Some of the veins may remain completely obliterated. In exceptional cases phlegmonous inflammation of the areolar tissue may occur, and terminate in circumscribed or diffuse suppuration, or even gangrene may follow. More frequently it is phlegmonous inflammation of the leg which leads to phlebitis, and consequent thrombosis. In such cases the inflammation is an extension of the inflammatory process from the genital organs to the parametrium, lig. lata, and through lymph vessels or pampiniform veins into the crural vein, or the inflammation passes along the perineum to the nates

and inner side of the thigh. Such a case is only a variety of puerperal fever.

TREATMENT.

Antiphlogistic treatment, formerly commonly used, has now been abandoned, as this disease is always associated with an impoverished condition of the blood. As the nature of the disorder is still unknown we can treat only the local and general symptoms. 1. Local. The limb is enveloped in cotton or a soft pillow, and kept somewhat elevated by raising the lower half of the mattress, so that all pressure is avoided and the return circulation facilitated. Hydropathic cataplasms, iodine, or ung. cinereum are useful during the acute stage. When the acute symptoms have subsided, the limb may be swathed in wet rollers, applied from the toe upward. This cannot be used during the acute stage as it might cause complete arrest of circulation. Blisters or other counter-irritants may be applied. Massage, as gentle friction, from the toe upward, is often very effective. The venous trunks must be avoided during manipulation; although the fear of dislodging an embolus by manipulation is founded more on theoretical supposition than on actual experience it is safer to be cautious. The leg must be kept at rest until the patient can move about without pain; the least active movement should not be allowed before. Many cases are recorded in which

premature exertion led to a sudden fatal issue. The patient should not walk about until all traces of the local disorder have disappeared. The limb may be bandaged in the morning, before the patient gets up, and the bandage taken off in the evening when she goes to bed. This is of great help, and can be continued until the limb is perfectly restored. In cases of phlegmonous suppuration the case must be treated as any other phlegmonous inflammation, and free outlet given the pus as soon as it is detected. General treatment is of equally great importance. To allay the pain and excitement, to improve the depressed vital powers, and to aid the impaired digestion are the points to which our attention must be directed. Easily digested food is usually more efficacious in reducing the temperature and regulating the pulse than medicine, especially when this medication is apt to interfere with digestion. Remedies to improve the appetite and digestion deserve, therefore, the preference over all others.

CHAPTER XIII.

RELAXATION AND INFLAMMATION OF THE SYMPHYSIS PUBIS.

RELAXATION.

A SLIGHT degree of relaxation of the symphysis pubis is physiological during the last months of pregnancy, especially in women who have had several children in rapid succession. This slight degree may gradually so much increase that walking becomes impossible. Usually, however, the high degrees of relaxation of the symphysis take place suddenly in consequence of some great physical effort and most commonly during labor. A narrow pelvis and a forceps operation may contribute to bring this accident about. But neither a narrow pelvis alone, nor combined with a forceps operation, can give rise to relaxation during labor when the symphysis has not been relaxed before. Complete relaxation often takes place in a roomy pelvis during an easy labor, while in a narrow pelvis the uterus may give way and the symphysis remain intact in a difficult and long-continued labor. In this country, where the pelves are excellent, this ac-

cident is as frequent as in Europe, where deformities of the pelvis are very common. From these observations we may conclude that flaccidity of the ligaments has at least as much to do with this complication as a narrow pelvis or a forceps operation. I have often applied the forceps at the superior strait, and sometimes used great force, and this accident happened to me only once, and then in a case in which I had not employed any very great force. I made several attempts with the forceps, and as I could no longer hear the foetal heart-sounds I perforated the head. Several obstetricians were present, who followed the operation with attention; neither they nor I became aware of this accident, and it was discovered by chance during childbed, on the patient complaining of severe pain during micturition. If I had not often before, intentionally, used great force in forceps operations, I might have thought that I had perhaps used in this case more force that was justifiable. But I had had several cases in which deep depressions upon the child's head, had been produced by the promontory without the slightest effect on the symphysis. And my experience agrees in this regard with that of other physicians. If we find complete relaxation of the symphysis in a case in which the forceps has been used, it would be too hasty to conclude that the relaxation was due to the forceps operation, especially when we do not find other signs indicating the use of excessive force.

Diagnosis.—Mistakes in the diagnosis are very common, not because the diagnosis is difficult but because this accident is comparatively rare, and other disorders with similar symptoms, as pathological conditions in the the genital system, or general debility, or nervous disorders, are far more common. When the attention is once directed to the symphysis the diagnosis is easily made. When the disorder comes on gradually, the first symptoms noticed will be inability to make protracted exertions, to lift weights, or to walk ; pain at every movement of the legs ; impossibility to raise the leg while in the recumbent posture. Upon extending and flexing the femur, the pubic bone is felt to rise or sink, and the pains to greatly increase. When the separation of the symphysis occurs suddenly, active movement becomes impossible or very painful. If the diastasis at the joint be considerable, it can be easily found out on examination—a finger can often be put between the bones. In a doubtful case a decision can be easily arrived at by fixing the symphysis pubis by a bandage ; if the symptoms are caused by some other disorder the bandage will not give the relief it gives in a case of relaxation. Relaxation may also take place in some of the other pelvic joints.

Treatment.—During pregnancy the relaxation cannot be cured, but a bandage relieves the symptoms and prevents further relaxation. After the usual

rest in childbed the patient may be allowed to get up when the severer symptoms of this affection have disappeared. Complete cure is effected sooner if the patient exercises moderately than if she remain in the recumbent position. An appropriate hip-binder of soft leather or strong cloth should be applied before any exercise is allowed. As this disorder is usually dependent upon, or associated with, general debility, tonic treatment is required.

INFLAMMATION.

The symphysis pubis being a joint with a construction similar to that of other joints, and containing synovial membrane and synovial fluid, we are not surprised to find that the same morbid changes may occur here as affect other joints. The most common pathological change in the symphysis, next to relaxation, is inflammation and suppuration, either primary or secondary, and produced by metastatic emboli. Inflammation of the symphysis during pregnancy is much rarer than relaxation, but more frequent during childbed, and results either from injuries inflicted during labor or from septic emboli. The first symptoms are pain in the symphysis, radiating toward the hips and thighs, and numbness in the leg; the pains are greatly increased by every movement, and even turning in bed from one side to the other may be very painful.

The patient has better control of her limbs than

in relaxation of the symphysis, but any exertion is more painful, and there is tenderness on pressure.

Suppuration is usually of metastatic origin, but may also appear first in this joint and give rise to metastatic abscesses in other organs.

When suppuration sets in the pains are increased, and general symptoms indicating absorption of pus may appear; pus forms about the mons veneris, and burrows along the vagina and down to the thighs; symptoms of dysury or tenesmus are common when the inflammation and infiltration are extensive. The cartilage of the symphysis becomes destroyed and the pubic bones denuded of periosteum. The ileo-sacral joints may become affected in the same way and lead to similar consequences.

The patient must be kept in bed until all symptoms of inflammation have disappeared, to prevent suppuration. If pus have formed, the abscess must be opened and treated as a suppurative arthritis.

CHAPTER XIV.

TETANUS AND TETANY.

TETANUS.

PUERPERAL tetanus, like traumatic tetanus, is characterized by tonic contractions of a particular group, or of all the voluntary muscles in intermittent paroxysms and with increased reflex irritability, consciousness being unaffected. A paroxysm may be brought on by sensory impressions, as touch, noise, etc. The disease begins with stiffness in the muscles of the neck or in the masseter muscles. The patient complains that she cannot turn her head, or has difficulty in opening her mouth, or of dysphagia, when the muscles of the pharynx are affected.

During a paroxysm the eyes are deeply set in their sockets, staring; the pupils small and irresponsive; the face either flushed and swollen or pale and livid, and the affected muscles rigidly contracted. Usually the contractions soon extend to the muscles of the trunk and extremities, especially during a paroxysm. As a rule, the muscles on the posterior surface are more powerfully contracted (opisthotonos)—so that the patient rests, during a paroxysm, on her head

and heels—than their antagonists (emprosthotonos). The painful contractions of the muscles and the intercurrent paroxysms cause restlessness and insomnia. The intellectual faculties, as a rule, remain unclouded to the last. The temperature may occasionally rise above or fall below the normal. The pulse is quick and small. The duration varies from one to eight days; few cases are protracted beyond the eighth day.

The patient may die during a paroxysm from asphyxia, or she may die from exhaustion produced by the repeated attacks. Though the disease may occur at any time after labor, the liability to it greatly diminishes after the sixth day, and is very slight by the end of the second week.

Hysterical convulsions may simulate the tetanic paroxysms; during a hysterical fit, however, consciousness and sensation are abrogated, and after the paroxysm is over the muscles do not remain contracted.

Etiology.—Whether the real cause of puerperal tetanus be an irritation of the sympathetic nerves of the uterus or some form of toxæmia is not yet known. Some of its predisposing causes are, however, known, as exposure to cold and wet, heavy loss of blood, difficult removal of placenta, induced abortion, and climate, as that of India, where puerperal tetanus is uncommonly frequent. The etiology of puerperal tetanus is not yet sufficiently known to

enable us to always differentiate it from symptomatic tonic convulsions, due to lesions of the nerve-centres, general nervous erythism, irritation of the spinal cord from abnormalities of the blood, or to direct irritation of a nerve or nerves. I have consulted the records of a number of cases, in addition to those cited in Garrigues' valuable publication (*Am. Journ. of Obstet.*, 1882) upon this subject. The majority occurred in country practice. In most of the cases one of the predisposing causes mentioned above was present. In lying-in hospitals this complication is extremely rare; one case only occurred in my service. The patient, twenty-eight years of age, multipara, was admitted to the hospital in the evening, October 17th. She had passed the whole previous night sitting in the cold on a stone staircase. The membranes had ruptured, before admission, with the first pains. In the morning of the 18th patient had a chill, temperature 102° ; in the afternoon the chill recurred, and temperature rose to 104° . Toward evening the orifice had dilated sufficiently to allow the application of forceps. Post-partum hemorrhage occurred on the 19th and 20th, temperature was normal, pulse 120; 21st, temperature 104° ; 22d, in the morning 97° , in the evening 101° , with symptoms of mania; 23d, temperature 95° ; 24th, temperature 97° to 98° , patient greatly excited at times, soon calming down, however, and then patient feels well, and has good appetite; 28th, complains of severe

pains in the upper jaw ; 29th, the mouth can be only opened to take liquid food, severe pains in both upper jaws ; 30th, the same condition ; 31st, the mouth cannot be opened at all, stiffness in the muscles of the neck, patient complains of mucus in the throat—she died later the same day from suffocation.

No characteristic morbid changes have yet been found on post-mortem examinations. The treatment can only be symptomatic ; we may relieve pain and quiet the nervous system by narcotics ; during the remissions bromide of potassium and strychnine have been found useful in some cases. Any morbid condition present demanding local treatment should be attended to, and the patient should be well nourished, if necessary by enemata.

TETANY.

This is a nervous affection, characterized by the paroxysmal occurrence of tetanoid contraction of the muscles of the extremities, with complete remission during the intervals. A paroxysm may be excited during the intermissions by compressing the chief arteries, veins, or nerves of the extremities, and the attack prolonged until the pressure is stopped (Trousseau's phenomenon) ; by slight percussion of the facial nerve—all muscles supplied by this nerve contract (facial phenomenon). The reaction to electrical and mechanical irritation of the nerves of the ex-

tremities is increased. A paroxysm is often preceded by tingling sensations, dragging pains, and stiffness in the extremities.

The tetanoid contractions usually begin in the upper extremities; the hand is drawn into a cuneiform shape, and flexed upon the forearm; the elbow-joint is also flexed, and the whole limb slightly adducted; the contractions extending to the lower extremities, the heels are drawn up, the toes flexed, the legs and thighs extended, and slightly adducted. Voluntary movements are impossible, and passive motion difficult; as the muscles relax the limbs regain their normal pose, or they may remain in any given position. The attack may begin in the upper extremities and extend to the lower, or *vice versa*, or may affect both simultaneously. In rare cases the muscles of the trunk, jaws, or pharynx are involved. The attack lasts from several minutes to several hours; at its close tingling sensations in the extremities are felt, the muscles relax, and all traces of the affection disappear until a new attack, the same day or on the next day, recurs. The disease lasts usually for some days, but may persist for years, and is not a very rare one. As predisposing causes we recognize pregnancy, childbed, and especially lactation, exposure to cold, irritation of the intestines (constipation, diarrhoea, entozoa). Several cases of tetany have recently occurred after extirpation of the thyroid gland. N. Weiss collects thirteen

such cases, and concludes that this affection is due to a disturbance in the vaso-motor innervation of central organs, induced by an irritation of the sympathetic nerves of the uterus, intestines, or thyroid gland. Recovery, and within a short time, is the rule; the persistence of the disease for years, or a fatal result, are exceptions.

Mild forms of tetanus and grave cases of tetany have so much in common as regards their predisposing causes, symptoms, and course, that one affection might easily be confounded with the other. Trousseau's phenomenon, the facial phenomenon, and the complete intermission of all symptoms are so characteristic of tetany as to suffice for diagnosis.

Treatment.—Blood-letting is not only useless, but is also injurious. If possible, remove all predisposing causes. During a paroxysm morphine, subcutaneously, is most useful. In the intervals bromide of potassium, combined with appropriate tonic treatment, is advisable.

CHAPTER XV.

PUERPERAL MANIA.

MENTAL disturbances are frequently present in cases of puerperal fever. When the symptoms of puerperal fever are characteristic, the derangements of the sensorium are always recognized as symptoms of puerperal fever, and treated as such. In cases, however, in which the symptoms of puerperal fever are of an irregular type, and the diagnosis is difficult, the mistake is often made of regarding the nervous symptoms as the disease, of which the other disorders present are merely symptoms. Care in diagnosis will always prevent this error being made. A temporary rise of temperature, accelerated pulse, and other symptoms may be caused by mental disturbances alone, but a continued high temperature, hot, dry skin, dry tongue, great thirst, and other symptoms of high fever always indicate the presence of some other pathological condition, the recognition of which may require great attention. In every case of puerperal fever mental disturbances are of secondary importance. Disturbances of the sensorium, independent of puerperal fever, are not very rare,

and occur most frequently during lactation, less often during the puerperal and pregnant states. Tuke found mental diseases existing in 28 pregnant, in 73 puerperal, and in 54 nursing women. Marcé records 27, 180, and 103 cases respectively during the different periods. The statistics of others give the proportion as 15 : 55 : 30 in the same order. The predisposing causes of mental diseases are: 1, Abnormal conditions existing before pregnancy or labor, as the neuropathic disposition or disturbances of the nervous system (hereditary taint); 2, exhausted constitution, loss of blood, pains, mental disturbance during labor or childbed.

When one of these predisposing conditions is present, a trivial cause may excite an attack.

Of all the mental disorders to which the pregnant or puerperal woman is liable none occur so often as mania. It so predominates in frequency over all other mental diseases occurring at this time that the term puerperal mania is often used indifferently to designate any mental disorder observed then. Puerperal mania does not differ in any essential from mania arising under other conditions.

SYMPTOMS.

The disease frequently manifests itself at the end of the first week, and is often preceded by premonitory symptoms, such as restlessness, loss of appetite, excitability, aversion to persons formerly dearly

loved, taciturnity or garrulity, morbid sensibility to all impressions. These symptoms are often not followed by an attack of mania, or they may be so slight as to be overlooked. Therefore it would often seem as though the disease had set in without premonition. During an attack of mania these symptoms become worse, and others are added to them. The patient becomes violent, being spurred on by the hallucinations which occupy her mind. She believes herself pursued, fears the touch or approach of the attendants, is convinced that they will poison or otherwise kill her, jumps out of bed, cries for help, refuses food and assistance. Any noise about her may excite her to violence. In other cases the patient is taciturn, morose, or mutters incoherently, laboring often under a fixed idea of a sensual or religious nature. The idea which determined the outbreak of the disease usually predominates over all others. In some cases the same word is repeated for hours.

When the stimulus of excitement is withdrawn the patient may relapse into a lethargic stupor, or return to an apparently normal condition.

The disease usually continues for a few days only, though it may last from three to six months. It only exceptionally continues for a longer time; when it does, the mind may remain permanently disordered.

Melancholia is much less frequent during the pu-

erperal convalescence than mania. It is more frequent during pregnancy or lactation than during the puerperal state. When it develops during pregnancy it often ceases with labor. During lactation it develops most frequently when lactation has had an exhausting influence on the system.

This form of insanity usually develops gradually. It begins with mental depression, accompanied by disturbed digestion and insomnia, and exercises an unfavorable influence upon the general health; on the other hand, a debilitated constitution renders the patient very liable to this form of mental disorder.

TREATMENT.

The prognosis of any form of insanity developed during the puerperium is more favorable than at any other time, the predisposing causes being more easily removed. These predisposing causes require our first attention. Melancholia during pregnancy is, as a rule, no indication for the induction of premature labor. During the puerperal state close examination is requisite to decide that the symptoms are due only to the mental disease, and that some form of puerperal fever or some pathological condition in the pelvis is not present. If we find a morbid condition anywhere, the treatment must be at once directed to its cure, and all predisposing causes to mental diseases removed as soon as possible.

The patient must be kept very quiet and carefully

guarded from excitement. Constant watch must be had upon her actions, and she must never be left alone for a moment, as quite unexpectedly a tendency to kill herself or her child may develop. When the patient is excited and violent, precautions must be taken to prevent injury to herself or others. Great attention must be paid to the improvement of her physical welfare. If she refuses nourishment, she must be fed artificially, this often requiring much patience and perseverance. During an attack of excessive excitement subcutaneous injections of morphine are useful. But on the disease itself morphine does more harm than good, and should therefore be avoided as much as possible. In private practice the use of morphine is unfortunately often the only means available to keep the patient quiet and protect her from injury.

Bleeding or any other debilitating treatment, at any stage or in any form of insanity during the pregnancy and puerperal state, is injurious, as it prolongs the disease. Drugs (with the single exception of the bromides) are of little use. Tonics and medicines which tend to improve the digestion are more efficient. Attention to the functions of the bowels, bladder, and skin, good air, and favorable surroundings are of greater importance. In cases in which the patient cannot receive proper attention at home, a short sojourn in an asylum often cures the disorder.

CHAPTER XVI.

DISTURBANCES OF SENSORY AND MOTOR FUNCTIONS OF THE LOWER EXTREMITIES AND BLADDER.

THESE disorders, often attributed to some unknown morbid condition of the nerves, are usually due to a mechanical lesion or an inflammatory process in the pelvis. Mechanical injuries of the nerves, most frequently of the sciatic or obturator, may occur during labor, from pressure of the head, instruments, or effusion of blood, and are usually slight, the effects passing off in a day or two. Inflammatory processes in the pelvis during childbed may affect any nerve in the pelvis, either directly or indirectly, by pressure from the infiltration of the surrounding tissue. The effects of inflammation are often very distressing, and are most distinct at the affected spot or along the branches of the nerves. The severity of the symptoms is usually in proportion to the extent of the inflammation, though in some cases slight morbid changes cause severe symptoms, or *vice versa*. Whenever the morbid

changes are very distinct and readily appreciated the cause for the existing nervous disturbance is easily recognized, and the symptoms are correctly interpreted. In cases, however, in which the morbid change is so slight that it can be detected only on careful examination, or is situated in parts where it is not suspected or cannot be made out, we usually content ourselves with the expression "nervous disturbance" (neuralgia, paresis), meaning thereby that the disorder is due to some unknown morbid condition in the nerves. We should bear in mind that the terms neuralgia and paresis express symptoms only, and give no explanation of the existing disorder, and should, therefore, not use these terms before we are satisfied that no gross morbid changes in the pelvis are present. Otherwise it may happen to us to pronounce a case as a neuralgia or a paresis, and another physician find a satisfactory explanation for the disorder in a lesion, or an inflammatory process in the symphysis pubis, in the sacro-iliac joints, or in the pelvic tissues. The symptoms of which the patient complains do not always give us a clew to the cause of the disorder, as the same symptoms may be caused by different affections, and the same affection often causes different symptoms in different patients. Therefore it is advisable to make a careful examination of the tissues and joints of the pelvis whenever a patient complains of pain or functional disturbances in the lower extremities or bladder. An exact

diagnosis is of great importance, because our therapeutical agents are most effectual when they can be directly applied to the affected region.

Nervous disturbances are sometimes due to the exhausted condition of the patient. For such cases tonic treatment is indicated.

CHAPTER XVII.

EMBOLISM AND APOPLEXY.

EMBOLISM OF THE PULMONARY ARTERY AND ITS MAIN BRANCHES.

THIS accident may occur from the disintegration of a thrombus by infection, as mentioned (page 97). An embolus may become detached from a venous thrombus of the genital organs or of the extremities, from different other causes. The most common cause is physical exertion, as turning about quickly, sitting up in, or getting out of, bed, laughing, straining at stool, stooping down, etc. I know of several cases in each of which the patient, provoked by the refusal of a request, turned petulantly about in bed, and died at once from embolism. Mental excitement may be as injurious as physical exertion. Some authors believe that clots in the right cavity of the heart or in the pulmonary artery are frequently a primary affection, but, as a rule, they originate during the death agony. In cases of severe anæmia, or asthenia, or morbid alteration of the endocardium, this complication may be primary, and the obstruction of the pulmonary artery the

secondary accident; but usually the reverse is the case. When the embolus is so large as to completely plug the main trunk of the pulmonary artery, death is instantaneous. When the obstruction is incomplete, or one of the main branches is plugged, the symptoms are intense dyspnoea, fearful gasping for breath, cyanosis, oppression of the chest, intense anxiety; weak, fluttering pulse; tumultuous and irregular movement of the heart, with cold, moist skin; the face pale, livid, and covered with a cold, clammy sweat, and in this state the patient may die.

If the obstruction be successfully overcome all the symptoms disappear, but the patient is left weak and exhausted for some days, and a second attack may follow and destroy life. If the embolus become lodged in one of the smaller branches of the pulmonary artery, the symptoms are the same in kind, but of less severity than when a larger branch is plugged, and recovery is the rule. The temperature is either considerably elevated or sub-normal. The after-results of the non-infected variety of emboli are not as dangerous as in cases in which the embolus is derived from an infected thrombus, metastatic abscesses or inflammatory processes being unlikely results. The lesions in the parenchyma of the lungs are those of mechanical obstruction only. Recovery in these cases is, as a rule, rapid and complete.

Treatment.—Prophylactic treatment is of the greatest importance. Whenever extensive thrombi

are visible, or their existence is suspected, every physical and mental effort must be carefully avoided, the patient kept longer in bed, and her attention directed to the danger of continued or hurried exertions. If embolism occur, the most urgent indication is to tide the patient over the danger of suffocation. Good air and stimulants internally and externally are the most efficacious remedies. After this danger is over, complete physical and mental rest is necessary to prevent a new attack.

APOPLEXIA AND EMBOLUS OF AN ARTERY.

This complication is much rarer than the previous, although diseases of the left heart are very common, while those of the right side are quite exceptional. Complications from diseases of the left heart are much rarer than one would expect, considering the great strain which is put on the heart during pregnancy and labor. As pregnancy usually takes place at an age when the compensatory energy of the heart is sufficient to meet even great demands, and the arteries are in a normal condition, dangers from heart disease only arise when the cardiac affection is advanced or the woman well on in years. The dangers are greatest during pregnancy and labor. Affections of the left heart, developed by septic infection, are more dangerous during childbed. Arterial embolism may be caused also by an infectious embolus which has passed through the pulmonary circulation.

When an embolus is detached from the valves of the left heart its consequences depend upon the size of the embolus and the situation and size of the vessel plugged. If it be arrested in one of the cerebral arteries, symptoms of apoplexy, varying according to the size and location of the obstructed artery, appear. When a peripheral artery becomes plugged, persistent pain, loss of pulsation, and coldness in the parts supplied by the artery plugged are the first and most prominent symptoms.

first, acute cerebral ischæmia, or secondly, a, resulting from mechanical obstruction of the pulmonary circulation. N. Senn has written ("Surg.," June, 1885) an interesting article on this subject.

Causes and treatment of this accident are discussed in the case of embolism of the pulmonary artery and its branches.

CHAPTER XIX.

ON PUERPERAL FEVER.

VARIOUS other names for this disease have at different times been suggested and used ; none, however, is more generally accepted or better understood. As every physician knows that the term puerperal fever is used to designate a definite combination of clinical symptoms and pathological changes, and is not loosely applied to any febrile disturbance occurring during puerperal convalescence, we may the more readily retain this most familiar term, which does not suggest any debatable theory.

1. NATURE OF PUERPERAL FEVER.

Nearly forty years ago Semmelweis stated, that every case of puerperal fever arose from the absorption of decomposing organic matter from lesions of the genital tract, and that the septic element was either introduced from without (hetero-infection) or originated in the generative organs (auto-infection). This theory denies the specificity of puerperal fever, and regards it as always originating from infection by septic material absorbed from lesions of the genitals by the vessels and lymphatics of the wounded

surfaces. An immense amount of labor has been given to the elucidation of this subject, and we are still no nearer a solution than was Semmelweis; his theory being now as generally accepted as it was formerly scouted. This theory has been so strongly confirmed by clinical, pathological, and experimental evidence that even those physicians who still believe in the specificity of puerperal fever concede that infection plays an important part in its production, and intrench themselves behind the assertion that infection is only one of several other possible causes.

The conviction is, however, so general that septic infection is the one cause of puerperal fever that investigations of its etiology are now narrowed down to the determination of the nature of the infectious matter. All efforts are now directed to determining whether the active agent of the decomposing matter is a microscopical organism (bacteria), or a chemical substance (sepsin-ptomaines, decomposing albuminoid matter), or both. While some authors define puerperal fever as schistomycosis (cleft fungus), others deny the importance of bacteria in producing puerperal fever, and contend that, although bacteria are often found, their presence cannot be demonstrated in other cases. It is known, further, that the same bacteria have been found in the secretions of wounds in subjects entirely free from febrile excitement, and also in abscesses occurring spontane-

ously in various parts of the body. And even if, with more perfected means of investigation, bacteria were always found, it would still remain uncertain whether they were the real malefactors or merely the carriers of the poison. The agency of bacteria in producing puerperal fever is still doubtful, notwithstanding the many emphatic assertions to the contrary. Of all the micro-organisms found in cases of puerperal fever, the chain-like micrococci are generally credited with the most baneful influence; the same organisms are also found in cases of erysipelas and diphtheria.

Our knowledge of the nature of the infecting matter is still very incomplete. We know only that infecting material is produced wherever organic tissues undergo decomposition. It may be derived from dead bodies, especially of those who have died of septic poisoning, and more readily within a short time after death than later, when putrefaction has set in.

Other sources of infecting matter are the secretions of suppurating wounds, of phlegmonous inflammations, of disintegrating neoplasms, the lochia and other fluids of diseased, and sometimes the lochia of healthy, puerperæ. All the possible sources of infection are not yet known. Supposed sources of infection, which were formerly accused of generating septic matter, have been found to be innocuous or of more than doubtful septic influence.

2. CLASSIFICATION OF THE INFECTIOUS MATTER.

Any attempt at systematic classification of a subject, the nature of which is still so little known, must seem premature. But the effects of infection may manifest themselves in such varying ways as to make it unlikely that all these various effects are due to the same kind of infection. Eminent German obstetricians, as Gusserow, Spiegelberg, and others, proposed the division of infectious matter into two classes: 1, septic poison, as bacteria, sepsin, or ptomaine, which, when absorbed into the system in large quantity, or of intense virulency, produces the symptoms of septicæmia (lymphatic and pyæmic form), with progressive phlegmonous inflammations; 2, poisoning by the germs of putrescence, which, suspended in the air, gain access to retained dead organic matter, blood coagula, portions of placenta, of membranes, or sloughing tissues, causing decomposition; the putrid products being then absorbed into the system produce general symptoms of wound fever, without any local affection other than parametritis.

Fritsch expresses about the same idea by his classification of infection into pathogenous and non-pathogenous. Winckel is also of the opinion that contused tissue, especially when the contusion has been so severe as to cause partial gangrene, may produce infectious material, which, when absorbed,

causes puerperal fever. These opinions seem very plausible, as it is known that germs of putrescence are everywhere floating in the air, and that the contact of these germs with dead organic matter will cause decomposition. But several well-founded objections may be made to this classification. 1. The adoption and exact application of antiseptic precautions have wonderfully lessened the frequency of all varieties of puerperal fever, alike of those supposed to be due to septic infection and of those believed to originate from local morbid alterations, and all forms of local affections have become less frequent and less severe. 2. If infection be propagated from one patient to another, the results of infection will differ in almost every case. Any variety of infection may be the result of a slight local affection, lasting only a few days, to the occurrence of puerperal fever of the mildest or the most malignant fatal type. On the other hand, a slight lesion of the examining finger, as a suppurating ulcer, a panarium, or a phlegmonous inflammation, may cause any form of puerperal fever. This observation has often been confirmed in country practice, where all other evil influence can be more easily excluded than in a lying-in hospital. Puerperal fever has occurred with hygienic surroundings, and its cause traced to the attending physician or nurse. 3. The influence of air in causing puerperal fever, as we shall see later, is more than doubtful, and even the believers in the

dualistic nature of the infectious matter, Fritsch and Winckel among others, either doubt or altogether deny its influence. 4. Clots, pieces of the membranes or placenta in a septic condition have been noticed to most readily excite puerperal fever when it is already prevalent from other causes.

These observations speak against the duality of the nature of infectious matter ; at the same time it is more than probable that several kinds of infectious matter, of varying degrees of virulency, exist in the same infecting source.

3. RELATION OF OTHER CAUSES TO PUERPERAL FEVER.

(a) Can Contused Tissues Cause Puerperal Fever ?

—Some authors ascribe to contused tissues an important part in the production of puerperal fever. This supposition does not agree with my experience and that of several other obstetricians of great practice. In the Vienna Lying-in Hospital my experience was large in difficult cases of forceps operations, turning, craniotomy, decapitation, and manual extraction, the difficulties being caused either by contracted pelvis, morbid changes in the genital tract, or by maltreatment of the uterus previous to admission. I met here several cases of morbid alterations in the cervix or vagina, requiring incision, dilatation, and the use of great and long-continued force. In most of these cases contusion of the tissues, and often to a

severe degree, was unavoidable; only slight local affections, with insignificant or no general symptoms, followed, if no previous infection had taken place, and if infection during operation had been prevented. The same observations were made by my colleagues in the other wards. Whenever severe general symptoms followed, these were never assigned to the contusion, our observations showing us that the cause lay somewhere else, and, as a rule, we succeeded in finding it. Even Winckel, Fritsch, and others, who believe that infection may be caused by contused tissues, are surprised when severe symptoms follow the contusion. With antiseptic precautions before and during operations, severe symptoms from contusion are the exception and not the rule, no matter what the after-treatment be. My experience of these contusions confirms Astley Cooper's remark: "Some persons cannot be killed, others cannot be touched," which is applicable to parturient women with this modification: The most severe contusion, without infection, very rarely proves fatal in a parturient woman, while a slight touch with an infected finger may kill her. But by this I do not mean that contusions are always harmless, and that we may inflict them without fear of evil consequences. I condemn too early or needless applications of the forceps, or any unjustifiable manipulation that may produce contusion, as much as any obstetrician does. Besides the shock which

extensive contusions are apt to cause, they, in my experience, predispose the parts very much to infection. A slight amount of infection, which would otherwise do no harm, becomes dangerous when brought in contact with dead tissues. Stagnant blood is a favorite habitat of bacteria, while circulating blood is their greatest enemy. No bacteria have ever been found in blood in circulation, though immediately after death they were found in great numbers in all the organs and in the blood itself (Fritsch). To prevent this great liability to infection is sufficient incentive to avoid in every possible way contusing the tissues, and, if they cannot be prevented, antiseptic precautions before and during the operation must be redoubled. I have, therefore, very little fear of contusions when careful antiseptic measures have been used before and during an operation, but I greatly fear the consequences of neglect of these precautions.

Operations involving contusion are only justifiable when the patient cannot be delivered otherwise, or if it be greatly probable that we may save the child. To expose the mother to the dangers of severe contusion, which can be avoided by resort to craniotomy instead of the forceps, when there is no hope of saving the child, is, I think, unjustifiable. Equipped with the results of my experience in the Vienna Lying-in Hospital, I have in several cases here used, with the best results, an amount of force,

involving contusions so severe as would formerly have been considered incompatible with a favorable result, and which I would myself have shrunk from inflicting without my previous experience.

Though the number of my operative cases here (about twenty) has been very small, they deserve some consideration, as they were very successful; in one case only a severe parametritis, without sup-puration however, followed, and even this parametritis I am inclined to ascribe more to the use of the colpeurynter than to the contusion. I have now discarded the use of this instrument altogether, as I am afraid that danger of infection from its use, which I have often seen occur in the Vienna Lying-in Hospital, might also exist in private practice in spite of all antiseptic precautions. I append short sketches of a few cases, showing the reasons for the use of great force, although the employment resulted in severe contusions.

CASE I.—Directed to me by Dr. Schnetter; primipara, twenty-nine years of age; several years married; splendidly built, with excellent pelvis. Pains in the back began January 13th, increased January 14th. I was called in the night of the 14th, and found uterine contractions occurring at intervals of ten minutes, the head in the pelvic cavity, os closed and high up on the left side. January 16th the same condition, though the pains had continued during the whole night. On the 17th orifice still closed, but within easy reach, with patient on her right side. I forced the index finger through the orifice, and dilated it so as to admit two fingers, because I thought the slow dilatation of the orifice might be due to

great resistance of the tissue. After six hours the condition of the os remained the same, notwithstanding regular contractions, which were very painful, but had no influence on the progress of the head; membranes ruptured. I tried to introduce Barnes' large bag, but could not keep it in place, as the head was so close to the orifice. I succeeded in bringing a part of the colpeurynter through, and stronger pains followed. After four hours the colpeurynter was removed; the pains continued, but had no influence on the orifice, which would now admit three fingers; the edges did not become firm during a contraction; the obstruction was now located in the lower segment of the uterus. After waiting two hours, as neither the pains nor the digital dilatation of the os had any influence on the progress of labor, and the patient was exhausted, active interference was demanded, although the edges of the os were alike thick, and great resistance from the lower segment of the uterus was to be expected. Dr. Schnetter, whom I called in consultation, agreed with me about the indication for interference and the expectation of difficulties. I applied the forceps, and made traction, pulling slowly for fear of rupture, but firmly, and dilating the os manually during a contraction. After several strong tractions I found that the force employed was having some influence on the progress of the head and on the dilatation of the orifice. This and the loud foetal heart-sounds encouraged me to continue. Traction after traction was made with slowly increasing force. At last I succeeded in delivering the head from the uterus, but my strength, which is considerable, gave out completely, and Dr. Schnetter delivered without difficulty the visible head. The child, of medium size, cried at once. The operation had lasted over an hour. I had never before encountered such resistance from the lower uterine segment. I rarely used so much nor such long-continued force. In my previous cases perforation had been indicated usually before my strength gave out. In this case I was induced to use more force,

because the patient was an only child, had been married several years, so this might be the only chance of her having a child, and the foetal heart-sounds remained strong and regular. After delivery the patient was confined to bed for five weeks with a severe parametritis; only a diffuse swelling in the left broad ligament was found, which disappeared, and patient recovered completely. In two other cases, one with Dr. Glück and one with Dr. Kudlich, I did not go so far, though I used great force, because repeated firm tractions had not the least effect on the progress of the head, and the foetal heart-sounds soon became weak and irregular. In both cases the cause of the protracted labors was premature rupture of the membranes and tedious dilatation of the lower segment of the uterus. After perforation of the head the extraction was easy. I do not dread any complication so much as this tedious dilatation of the lower segment after premature rupture of the membranes. The contractions are painful, but without effect, the patient becomes completely exhausted after two or three days and predisposed to infection, while the lower segment is still so unprepared that it offers the greatest resistance. This is very different from a morbid condition of the orifice, which can be overcome by operation.

CASE II.—Twenty years of age, primipara. The first pains the day before, in the morning; the orifice completely dilated, but not retracted over the head, which was engaged in the superior strait. Four hours later, when I saw her, with Dr. Glück, the same conditions were present, notwithstanding strong pains; in the meantime the patient in good condition, the heart-sounds loud. Dr. Glück applied the forceps, and used considerable force without any effect. Then I began to pull. After some very strong tractions I felt the head begin to move; this encouraged me to continue. At last I succeeded in delivering a healthy, lively boy. The mother had a temporary elevation of temperature on the third day, without any signs of local affection or any

further disturbance. Dr. Glück, who has been very successful in a large obstetrical practice, observed, and quite correctly, that it is questionable whether so much force as I used is even justifiable, notwithstanding the complete success of this case. I would not have ventured the use of as great force without previous experience, nor if the patient had been attended by a careless physician or a midwife. But in this case the most rigid antiseptic precautions were faithfully carried out by both Dr. Glück and myself.

CASE III.—Twenty years of age, primipara; eclampsia at beginning of labor. As the attacks continued at short intervals despite large injections of morphia, and as the head was in the pelvic cavity, I applied the forceps as soon as the cervix had dilated sufficiently to allow the introduction of the blades, expecting to cautiously and gradually complete the dilatation by traction. The resistance, however, was so great that after half an hour of very strong traction, without the least advance, I withdrew the forceps. Liquor amnii had escaped in great quantity during the use of the forceps. As the eclamptic seizures had diminished in frequency and severity, I waited four hours, until the orifice was so much dilated that the forceps were easily applied and the child delivered without much difficulty. The child was still-born, either from complete escape of the liquor amnii during the first forceps application or from the effects of eclampsia.

In all the other seventeen cases much force was used, and always with the same favorable results.

The good results I have had in contusions, when infection has been avoided, both here and in Vienna, would not be convincing upon this point, unsupported by the experience of other physicians with equally favorable results, nor if valid objections

could be urged against the acceptance of my views. An analysis of the arguments of those who oppose their adoption will show them to strengthen my position upon the subject. As an illustration, see the description of a case to which Winckel (*l. c.*, p. 331) refers as the strongest argument in support of his view (p. 326) that severe contusions may cause puerperal fever. In the case cited, Winckel, assisted by his father, applied the forceps at the superior strait, for contracted pelvis and great exhaustion of the parturient, and, after great difficulty, delivered a living child with a depression on its head from the sacral promontory. The mother died forty-eight hours after delivery. Autopsy revealed "a moderate amount of sero-sanguinolent fluid in the abdominal cavity and considerable congestion of the lamina parietalis and abdominalis, with moderate fibro-purulent deposits on several organs; this exudation most marked above the right half of the pelvic entrance. Uterus the size of a man's fist, covered with the same fibro-purulent exudation; its structure, with the exception of a gelatinous œdema, healthy, firm, pale; the inner surface without a trace of diphtheritic ulceration; the orifice and vagina without lesions; conjugate diameter, three and one-fourth inches."

It is surprising that the report of the autopsy does not mention the presence of contusion with partial gangrene, on which Winckel lays such great stress;

and the reader will probably agree with me that Winckel, his father, or the midwife, all of whom examined the parturient repeatedly during labor (iv.) which lasted from 6 A.M. to 10 P.M., may have infected the woman. Winckel denies the possibility of this, as neither he nor his father were attending any infectious disease, and the surroundings were hygienic. He affirms that the premature escape of the waters, the long-continued irritation of the cervix, the protracted and violent efforts of the uterus to expel the child, all together had produced metritis and parametritis; and the presence of gelatinous œdema of the uterus is for him, and I believe for him alone, sufficient proof of the correctness of his assertion. Every physician can recall cases similar to the following: A prominent lady in Vienna was attended, during confinement, by a midwife; the physician waiting in the parlor, as is there the custom, was called into the lying-in room to perform an episiotomy. The patient died in a short time from puerperal fever. The midwife threw upon the physician, and the latter upon the midwife, the responsibility for the infection. "*Qui dira?*"

(b.) *Can Puerperal Fever be Caused by the Retention of Blood Coagula or Portions of Placenta in the Uterus?*—Many physicians attach to these incidents the same importance as to contused tissues as regards the etiology of puerperal fever. From my

experience, and from that of others, I can see in these anomalies only predisposing and not efficient causes of this disease. Blood coagula or portions of placenta in the uterine cavity are apt to cause relaxation of the uterus and secondary hemorrhage, or they may be the direct result of deficient contraction of the uterus. Firm contraction of the uterus is the best preventive of infection from abnormal uterine contents. We know that when the uterus is firmly contracted large pieces of decomposing matter may remain in its cavity without giving rise to any general symptoms; while relaxation of the uterus is not only a consequence of infection, but also predisposes greatly to its occurrence. Therefore large pieces of placenta or clots should be removed, as they are prone to cause relaxation of the uterus. Whenever the uterus is firmly contracted, and remains so, we need not be anxious about blood coagula, or small pieces of placenta, or membranes left in its cavity. The smallest piece of placenta may become dangerous if infection have taken place, and the largest are innocuous if infection have been prevented. It is safer to let a well-contracted uterus alone, than to disturb it by a search for small shreds or clots in its cavity. Ahlfeld, who attributes most of the cases of puerperal fever to retention of coagula, or pieces of placenta, or membranes in the uterine cavity, and considers removal as always of prime importance, has

such poor results as to prevent his example being generally followed. If blood coagula were really as dangerous as some believe, no puerperal woman would escape infection, as there is in every uterus a sufficient quantity of blood coagula to poison the whole system. How often we see large coagula expelled from the uterus the fifth or sixth day, in cases running a perfectly normal course. Winckel's experience confirms this view. He records two hundred and twelve cases of precipitate labor. The probability of vaginal or perineal tears occurring, or of retention of blood coagula or pieces of placenta, is greater with these cases than with any other labors. In not a single one of these recorded cases of precipitate labor, when manual or instrumental interference had not been resorted to, did any affection traceable to infection develop, and least of all severe cases of puerperal fever. In all of the cases in which grave disorders resulted the cause could be traced to some form of manual or instrumental interference with the genitals. It evidently follows from these conclusions that we should not lightly, and never without proper antiseptic precautions, introduce a finger or the hand into the uterine cavity to poke about for pieces of placenta, membranes, or coagula. When their presence causes general or local symptoms then they should be removed, and the sooner the better.

(c) *Can Puerperal Fever be Caused by a Specific Blennorrhœa, a Previous Endometritis, or Vagi-*

nitis?—On reading, at the beginning of my practice, of cases in which blennorrhœa was supposed to have caused puerperal fever, I conceived a fear of this complication, which fear was, if anything, increased by my knowledge of the ability of blennorrhœa to cause endometritis, oöphoritis, or perimetritis. The first two cases of blennorrhœa during labor which I met with were in patients with the most favorable hygienic surroundings, so that all other noxious influences could with the greatest probability be excluded. If anything resembling a puerperal disease had occurred in these patients during childbed I might have concluded that the blennorrhœa had had something to do with it. The first patient, married three years, had been quite healthy before marriage, but had since suffered with endometritis and pain in the ovarian regions. Husband still has a chronic blennorrhœal discharge, persisting despite all treatment. After treatment for six months of the wife, her pains and discharge ceased and she became pregnant, when the discharge again appeared. No treatment was then resorted to, and at the second month she miscarried. She was again treated for three months, and again became pregnant; but this time went to full term without trouble. Delivery was accomplished with the forceps at the outlet, on account of sudden failure of contractions, which had before been so strong and painful that the patient was quite tired out though the labor had lasted only

eight hours. Childbed was most satisfactory in every regard. In the other case, also a primipara, I had no occasion to examine the patient before labor. I then discovered two small condylomata acuminata on the perineum. Labor and childbed were normal as regarded the pelvic organs. Unfortunately I did not clean the eyelids of the baby sufficiently, and after the first week ophthalmia of a severe type, with profuse purulent discharge, developed. At the same time the mother began to complain of sore nipples. By care and attention the danger to the eyes of the child was averted, but the mother, in the second week, developed symptoms of mastitis in both breasts simultaneously; several separate lobuli became involved, and suppurated despite treatment. Openings and counter-openings were made, but the affection lasted almost six weeks. In this case it seems probable to me that the mastitis was set up by the discharge from the eyes, as the sore nipples were treated from the beginning with attention; but the possibility of infection occurring from the ophthalmia while the child nursed had been overlooked. I reproached myself for the suffering of both mother and child, being due to insufficient cleansing of the eyelids. Though I cannot prove in this case a direct connection between the mastitis and the blennorrhœa, such a relation is possible, the blennorrhœic secretion causing inflammation not only of mucous membrane, but also of glandular tissues.

No case, however, has been yet observed in which blennorrhœa has caused the symptoms of septic poisoning in men or in non-parous women, while it is well known that the infectious material which causes puerperal fever can produce the same symptoms, independent of the puerperal state, when absorbed into the system. The difference between the puerperal and non-puerperal state, as regards the liability to septic infection, lies only in the wounded surfaces and excessively developed blood and lymph vessels of the former. No other difference exists special to the puerperal state. We are therefore not justified in claiming the possession during childbed of septic properties by a material which does not possess such in the non-puerperal condition. Since my first two cases, above given, I have seen several other puerperal women who had previously suffered from blennorrhœa, and in whom no complication followed in childbed. Though patients suffering from blennorrhœa are often sterile, they are not invariably so, and can often be cured. A previous blennorrhœa can only be dangerous when it produces an abscess in the pelvic organs, and this abscess opens, during labor or childbed, into the peritoneal cavity, or if absorption of pus from the abscess should take place. But these dangers exist also in abscesses brought about by direct injuries and other causes.

Previous Endometritis and Endocolpitis. — Of

these affections I hold the same opinion as regards their causal connection with puerperal fever as of blennorrhœa. They never cause septic poisoning during the non-puerperal state, and there is no reason why they should in the puerperal state. All the cases recorded for the purpose of establishing such a connection are not convincing. Take, for instance, Winckel's case (*Z. c.*, p. 188), No. 15, which he records as a case of high septic fever, in consequence of a previous endometritis, increased by the retention of membranes ; but any one who reads the description of the case will have difficulty in avoiding the conclusion that the manipulations of the attending student had more to do with the septic poisoning than the previous endometritis, especially if he bear in mind what Winckel, in a later publication, says about the retention of membrane. According to his experience, as before mentioned (page 191), he never saw severe septic poisoning from retention of membrane, except after manual or instrumental interference. The student may attend lectures every day on the importance of antiseptic precautions, but can learn them only by practice, and then, usually, only after numerous mistakes. Still less convincing is Winckel's case, No. 20 (page 248): colpitis, endometritis diphtheritica, produced during the labor by a previous endometritis catarrhalis ; metro-peritonitis beginning during the labor ; death the fifth day after labor. There was premature escape of waters, exces-

sive pains during the first stage, abnormal resistance of the orifice, which required incision, and a highly contracted pelvis, which made a difficult forceps operation necessary. To exclude with certainty infection from without in a case with so many complications requires a greater faith in the infallibility of antiseptic precautions than any disciple of antiseptics, with even better success than Winckel, can lay claim to.

(d) *The Relation of the Atmosphere to Puerperal Fever.*—It may still be remembered that before our present antiseptic era lying-in hospitals had been denounced because of the high mortality in them, and their suppression or removal to isolated healthful localities been urged. If an obstetrician were then asked what he demanded as the most important requisites for a new lying-in hospital, the answer would have been: If a lying-in hospital must exist, select a healthy site and build your hospital as far away as possible from other hospitals and their influences; and if this cannot be done, then let the woman suffer outside, rather than perish in the hospital. Now that the mortality and morbidity in these same lying-in hospitals, formerly deserving suppression from their high death-rate, is not any greater, or is sometimes even less, than in the best private practice, all the protests against lying-in hospitals and hospital atmosphere have been silenced. These results also effected such a revolution in the

views of obstetricians in regard to the influence of the atmosphere, that every obstetrician now considers good air a desirable, but by no means an essential, condition for a normal childbed. Our first and essential inquiry about any particular lying-in hospital, nowadays, is not directed to the atmospheric or telluric influences prevailing there; we are interested in nothing so much as the antiseptic precautions adopted, and how they are carried out, and from this knowledge alone we are able to make a correct estimate of the comparative hygienic conditions of the hospital. In private practice the same remark holds true. Puerperal fever follows the tracks of the infecting physician or nurse to different parts of the city and country, without being in the least influenced by the quality of the air. Longer sojourn of pregnant women in lying-in hospitals has no influence on the disposition to infection, even at times when puerperal fever prevails in the hospital. Winckel, like many other obstetricians, could not find a single case of septic disease of the genitals developing in women during a sojourn in the wards, or where the surrounding air could alone be considered as the cause or the bearer of the germs; in not a single case was there evidence of the slightest puerperal infection of the foetus. In large lying-in hospitals, with several wards intimately inter-connected, as, for instance, in Vienna, where each ward is connected with two others by large doors,

which are usually open, it has never been observed that the bad sanitary condition of one had any other influence on the others than that the infection often crept from one ward to the other (in weeks or months), not through the air, but by more tangible means. It is not rare for the mortality during a semester in one ward to be twice as large as in another, or *vice versâ*. Epidemics of puerperal fever in lying-in hospitals have repeatedly been stamped out by the simple change of the attendants.

Women confined without the hospital do not become infected when put among patients suffering from puerperal fever. A newly born child may lie in the same bed with a mother suffering from puerperal fever without being at all affected by breathing the foul air, but may suffer from septic poisoning when lesions in the umbilicus or somewhere else become infected; or if the child should inspire prematurely during labor, and decomposed liquor amnii or other palpable infecting matter should reach the lungs.

The mortality in many lying-in hospitals has been reduced from ten per cent. to less than one per cent., though the ventilation has remained the same, and lying-in hospitals with model ventilation have repeatedly suffered from the invasion of puerperal epidemics. In a room where a parturient suffering from septic infection has remained for some time, the liability of women in labor to septic infection

persists for days, although the room has been thoroughly ventilated and fumigated with sulphurous acid vapor (C. Braun).

The open treatment of wounds also demonstrates by its successful results the comparative innocuousness of hospital air *per se*. But it is possible that foul, stagnant air favors the increase of septic microorganisms, and deposits them on cloths or on instruments, as it does favor the rapid development of *pencilium glaucum*. It has been often observed that bad, stagnant air favors the spread of puerperal fever, but it is more than doubtful whether a case of puerperal fever can originate from bad air. I fully recognize the importance of pure air for puerperal women. The breathing of foul air weakens their system, and thereby predisposes them to infection. Every physician knows what wonderful effects are often produced by bringing an invalid puerperal woman from a small ill-ventilated room to a large, bright, well-ventilated one. I would, therefore, not continue to proclaim the comparative innocuity of bad air for a puerperal woman, if I had not so often seen and heard the air made responsible for the sins of commission or omission of the attending physician. If we throw too much of the burden of responsibility upon the air, it will too often render us inactive, when a little well-directed effort might have discovered a more offending and remediable cause.

The arguments which Lusk ("Text-book," 679) ad-

duces in support of his view of the relation between nosocomial malaria and puerperal fever, seem very plausible, and they would have convinced me if I had not already arrived at different conclusions from a much wider experience, gained in a great lying-in hospital, which is in every regard more unfavorably situated than is Bellevue Hospital. The Vienna Lying-in Hospital is enclosed on two sides by wards of the general hospital, in which wards all varieties of zymotic disease are treated. To the rear, and almost contiguous, is a large military hospital; in front, is a row of cesspools of an immense barracks, the stinking emanations from which can often be detected by smell in rooms of the lying-in hospital. Under the lying-in hospital runs a large sewer, in parts of which its contents must overcome gravity and travel uphill. And, as though all this were not sufficient, the site of the lying-in hospital was formerly a cemetery. It would seem as if human ingenuity had done its utmost to concentrate epidemic, telluric, and atmospheric influences upon this lying-in hospital, in which over nine thousand women are confined annually, and in which five hundred to eight hundred puerperal women are crowded summer and winter, often more than thirty in a single room, almost every woman before and during labor being examined by several physicians and students. When, under such conditions, the yearly mortality is less than one per cent., and sometimes only a half per cent.,

and these results are obtained for years in the same building, where, before Semmelweiss' time, a mortality of ten per cent. was not very uncommon, and where it has reached fifteen or twenty per cent., and has even gone higher, no one will be surprised at my skepticism when I hear that atmospheric or telluric influences in this, that, or the other lying-in hospital has caused puerperal fever. Very few of the thousand foreign physicians who have studied in the Vienna Lying-in Hospital are acquainted with all its unfavorable external conditions, as these conditions are hardly ever mentioned, or even considered, in connection with cases of puerperal fever.

Nosocomial malaria was formerly to surgeons, as the altered blood and nervous conditions of puerperal women to obstetricians, the key to every complication and accident. Now we hardly ever hear of nosocomial malaria. The same holds true for private practice. In many tenement-houses here the air is more mephitic than in some, even foul, lying-in hospitals, and puerperal fever occurs in these same tenement-houses only in the practice of midwives or in that of careless physicians; and is not in these same houses of relatively much more frequent occurrence than in the palatial residences of the rich.

Garrigues tells me that before adopting his occlusive bandaging during the puerperal state, he had used all antiseptic precautions without satisfactory success; Richardson in Boston, and several others

in different lying-in hospitals, have had the same experience. I have not the least doubt that these physicians are as perfect in applying antiseptic precautions as any physician can be. But this is not sufficient; the nurse, the cloths; and everything which comes in contact with the genitals of the parturient must be beyond suspicion, and not only during the presence, but also during the absence, of the physician the possibility of infection must be excluded. It may be possible that air which has no fatal influence in hundreds of other lying-in hospitals may have it in one. If I should find that with the antiseptic precautions customary in Vienna I could not successfully compete with Garrigues in a lying-in hospital, I would adopt at once his occlusive bandaging, needless and complicated as I now believe it to be. Not only in Vienna, but in every lying-in hospital in Europe, upon the adoption of the same antiseptic precautions, results which before were unheard of were obtained, and this effected in hospitals where, formerly, despite good ventilation and prompt isolation of the sick puerperal woman, the mortality was very high (six to twelve per cent.). To know these precautions is not sufficient; their exact performance requires much practice, simple as they seem.

4. MODE OF COMMUNICATION AND PROPAGATION OF
PUERPERAL FEVER.

All observations tend to show that the infecting matter is a *contagium fixum*, which is, as a rule, introduced from without into the system through lesions in the genital tract (hetero-infection). It cannot be denied that the poison can also originate in the system (auto-infection), as we know that the same diseases (pyæmia and septicæmia) may occur from spontaneous suppuration in an internal organ. Auto-infection must be extremely rare in childbed, as I have never seen a case. Obstetricians who are not strict believers in Semmelweiss' theory see many cases of the disease, while it is almost unknown to those who successfully use antiseptic precautions. The infecting matter is communicated by means of the examining finger, or by instruments, sponges, or linen used for cleaning the external genital organs. Fresh wounds are required for the absorption of poison, granulating wounds (unless scratched or newly injured), the intact skin, the mucous membranes (unless after loss of the superficial epithelium), or the respiratory organs do not absorb the infectious matter. A patient may have a suppurating, or even a sloughing wound, without suffering from any general symptoms; but as soon as the secretions of this wound come in contact with a fresh wound, symptoms of general infection may ap-

pear. The same is true of diphtheritis in the throat or erysipelas. A practitioner (*Am. Journ. of Obstet.*, 1884), while removing portions of decomposed placenta from the uterus was infected by it, and suffered in consequence from a phlëgmous inflammation of the arm. From this experience he concludes that infectious matter cannot cause puerperal fever, as only he, and not the patient, became poisoned. He was probably not aware that granulating wounds or a well-contracted uterus are sufficient guards against infection. Besides this, it is well known that not every patient with a fresh wound which comes in direct contact with infectious matter becomes infected. With septic infection, as with small-pox and other infectious diseases, some people are less, others more liable to infection, and this liability differs with different conditions in the same person. I have only cited the above case to show the frequency of hasty conclusions, which would be avoided if the writers would read more before rushing into print. That the septic poison is not of a volatile nature, and cannot therefore enter the system through the respiratory organs, is demonstrated by the experience of physicians and students working in dissecting-rooms. They may often look pale, suffer from lassitude, loss of appetite, respiratory oppression, a disposition to profuse perspiration and irregular chills, but never from distinct symptoms of septic poisoning, unless they have cut or scratched them-

selves with some infectious instrument, or in other ways brought infectious matter in direct contact with a fresh wound. That the general disturbances mentioned are due to the privation of pure air, and not to absorption of septic matter through the lungs, is shown by the experience of the men working in the great establishments near Paris where dead animals are flayed. An abominable stench, with more septic matter than is present in any dissecting-room, is developed there, and the laborer never suffers from any of the above-mentioned complaints. They look hale and hearty, much better than many mountaineers; they work in the open air, and not in close, ill-ventilated rooms. But as soon as a workman cuts or scratches himself, and brings infectious matter in direct contact with the fresh wound, he may develop the worst symptoms of septicæmia or pyæmia. The direct transfer of infectious matter by the attending physician has been proven so often, and so conclusively, that in cases in which we cannot discover the source of infection it is more logical to confess our inability than to attribute the cause to atmospheric, telluric, or some other equally improbable influence. Many hundreds of instances, observed in all parts of the world, are recorded, where the communication and propagation by direct contact, with the exclusion of every other influence, have been ascertained. As an example I choose the following record from the *Br. Med. Journ.* (December 2,

1882), because the author is quite unbiased and does not want to prove anything; he simply states the facts: "The following is an account of a recent epidemic of puerperal fever at Wigan. The first death from puerperal fever occurred on September 5th, and as October came on deaths from this disease became more numerous. I made an inquiry and came to the conclusion that the disease was being carried about by a midwife. As a brother practitioner had already warned her not to attend any more labors for a time, and I was under the impression that she continued her practice as usual, I called in the aid of the coroner, and requested him to hold an inquest in the next case that occurred; this he consented to do, and as another case was registered the same day, an inquiry was held and a post-mortem made. In all, 13 deaths occurred in about nine weeks, and of the 13 no fewer than 10 were attended by the same midwife. In these ten cases a medical man was only called in as the illness showed itself. With one exception the patients had normal labor; all were young, the average being under twenty-five years. Neither of the three medical attendants had met with cases of the disease immediately previously, and though Wigan has about fifty thousand inhabitants, other practitioners with extensive midwifery practice had not met with a case. The origin of the first case is unknown. The town at the time was specially free from scarlatina, erysipelas, and the like."

It not infrequently occurs that in the practice of a physician with cases of puerperal fever on his hands, only those women confined before his arrival escaped infection and consequent puerperal fever. If as much ingenuity was displayed in investigating the mode of infection as in finding new fanciful causes for the disease, ways and means of direct conveyance might be discovered which were not so much as dreamed of before. To minutely and accurately trace back the infection to its true source often requires considerable experience and much patient observation. Infection may occur when the physician is otherwise engaged, or is absent, from disregard of his most emphatic instructions, and all his most painstaking precautions thus rendered futile. The following case well illustrates this point: While sitting in the parlor I was summoned to the lying-in room, the patient complaining of the most intense pain; finding the uterus well contracted I made inquiries as to the cause of the pain, and was told that the nurse had anointed the external genitals with "something," and that since the severe burning pain had persisted. Fortunately enough this something proved to be nothing more dangerous than a ten per cent. solution of carbolized oil, which I formerly made use of in examinations. In another case something less indifferent might be used, and with more harmful effects, by such a nurse. I had particularly asked the patient not to

allow the nurse to touch the genitals, and also specially forbidden the nurse to do so. The reason for the disregard of my positive instructions was that the nurse "always smeared the parts to make them heal more rapidly," as she told the patient. In this case there was not the slightest tear of the perineum, and some of the oil had probably entered the vagina. Patients are very apt to submit to any manipulation proposed by an experienced (?) nurse, and in this way interference which the physician would never countenance occurs. Should the nurse be an "old and experienced one," her word is law to the patient.

5. SOURCES OF INFECTIOUS MATTER.

In this connection three points deserve special attention.

1. That although the most common sources of infectious matter (p. 178) are known to every physician, all possible sources are not yet known; for instance, many physicians still doubt or deny that diphtheritis or erysipelas can cause puerperal fever, because they have seen diphtheritis and erysipelas in normal childbed. In diphtheritis we have a putrid wound in the throat, and in erysipelas a phlegmonous inflammation. The secretions of either affection may produce septic infection when brought in contact with fresh wounds of the same patient, and do not infect the system at the place of origin

when the avenues to infection are closed. In Winckel's case (p. 244), students who had previously examined children suffering from diphtheritis attended a parturient, and she died the fifth day after an easy labor. At the post-mortem diphtheritis of the uterus, salpingitis, and general peritonitis were found. Still, other sources may exist which are not as yet suspected. Many obstetricians still look for other causes of puerperal fever instead of investigating the sources of infection. They should bear in mind that all other causes have been looked into by very able men for centuries without other than negative results, while the investigations of infecting matter have given, in a very short time, immense positive benefits. If all the sources of infection were known, and cases of puerperal fever were still to occur which could not be traced to infection, then we would be forced to search for other causes. As infection has been so often found to be the cause of puerperal fever in cases in which it was not at all suspected, it is logical to assume the occurrence of infection even when we cannot trace its source.

2. A source of infection may exist without manifesting itself to the sense of sight or smell. We will often hear a physician say, "Neither myself nor the nurse has come in contact with decomposing matter or infectious diseases, therefore, in this case of ours neither of us can have infected the patient," as if infectious matter were as easily discoverable as bed-

bugs. I will mention only a few instructive instances: A cook pricks her finger with a fork, or a patient receives a scratch of a pin, or a burn from the head of a lit match, or is stung by a fly, and an extensive phlegmonous inflammation follows which may end fatally; post-mortem examination shows death from septic poisoning. The most diligent investigation can often not discover the source of infection, and we must assume that the materies morbi was on the instrument or skin, and has gained access to the system through the lesion. Infection from the bite of a fly is easily understood, flies often crawling in decomposing organic matter. The attending physician or nurse may have been suffering, at the time of confinement, with a small ulcer or a slight suppuration, which has meanwhile healed and been forgotten, or they have dressed an ulcer or touched infectious matter and do not longer remember it. Under the nails or in the furrows of the nails, on sponges, linen, cloths, instruments, etc., some infectious matter may have dried in, to be later dissolved during the examinations and manipulations of the labor. An outsider will often, to our surprise, at once indicate the mistake when all our own efforts to discover the source of the infecting matter have been fruitless and we could detect no flaw in our manipulation. We look too often in the distance and do not see what is within easy reach. How few among us are able to judge our own cases of

infection with the same impartiality we show in the cases of others? (See Winckel's case, already cited, p. 188.)

We may be unable to find the link which connects the source of infecting matter with the place of infection, and we are then too often ready to deny this connection. Most instructive in this regard is Dr. R.'s case (Playfair, p. 598), which puzzled his contemporaries very much, but is now easily explained. Dr. R. had forty-five cases of puerperal septicæmia in his own practice in one year, while none of his neighbors' patients were attacked. To rid himself of the mysterious influence which seemed to attend upon his practice, Dr. R. 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 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 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." R. Harris (editor of the Am. edit.) adds: "Dr. R. had an ozæna, which in time much disfigured him from its effects 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 fever, was remarkably apposite, "Did he distil a subtle essence which he carried with him?"

As eminent an obstetrician as Meigs had no other explanation to offer for the origin of these cases than to accuse a meddling Providence, or to take refuge in the supposition of a subtle essence emanating from the doctor. Nowadays not even a church deacon would be satisfied with such an explanation. It is unnecessary to assume the distillation of a subtle essence, the pocket-handkerchief and the hands of the unfortunate physician being the connecting links between the source of infection and the infected wound. Had it not been for the great number of his cases it is very unlikely that Dr. R.'s ozæna would have been noticed. A few cases occurring at infrequent intervals in his practice could easily have been explained satisfactorily to his contemporaries, and perhaps even to us. Such an observation ought to teach us to be chary of our explanations of the cause of puerperal fever in any

given case, and that the source of infection may be hidden where we least suspect it.

The difficulty of tracing the sources of infection is familiarly illustrated by cases of erysipelas. We know that this disease always starts from an infected wound or scratch, and that it either is identical with some forms of puerperal fever or belongs to the same group. Although in this disorder the origin of infection can better be investigated than in a case of puerperal fever, we are often unable to find it. I have seen erysipelas start in several cases from bites of leeches, not only during, but also outside the puerperal state.

6. SEMMELWEISS' THEORY OF PUERPERAL FEVER THE ONLY CORRECT ONE.

With the adoption of Semmelweiss' views, a new era for the Vienna Lying-in Hospital began. Before that time, from 1834 to 1847 inclusive, the average mortality had been 8.75 per cent., and for the years 1842 and 1846, rose to 16.9 and 13.6 per cent. respectively. In all the years during which Semmelweiss' suggestions were in force, the average mortality did not exceed 2.5 per cent., but upon their rejection, in 1854 and 1855, the mortality increased again to 9.1 and 5.4 per cent. respectively. C. Braun ("Lehrbuch der gesam. Gyn.," 1881) claims that the introduction by him, in the summer of 1863, of Boehm's system of heating and ventilating effected

a sudden and marvellous improvement in the mortality of the hospital, and he says further (*l. c.*, p. 884): "I have now, from practical experience, arrived at the knowledge of the fact that the rapid and thorough prevention of putridity by adequate ventilation is to be regarded as a good preventive measure against puerperal fever; that it is not the number of patients in a lying-in hospital, nor yet the number of patients in a single room, but the deficient circulation of air, a fault which may inhere to separate compartments in the smallest maternities, which is the important feature in the spread of puerperal fever; that puerperal women are to be protected from childbed diseases not by isolated buildings and gardens, nor by walls, but by the permanent introduction of great quantities of pure, warm air. Before new buildings are built, greater attention than heretofore should be paid to the ventilation of the old structures, and, where this is found defective, a system should be substituted corresponding to the scientific requirements.

"After I had attained the salubrity of my clinic, by the construction of a very good heating and ventilating apparatus, and this same system had been introduced into the other Vienna hospitals, the Prague Lying-in Hospital, and several other foreign institutions, a new era for lying-in hospitals was opened."

We can see by his own statistics (*l. c.*, p. 883)

whether this ostentatious statement is borne out by the facts. During the four years, 1872 to 1875 inclusive, the average number of confinements being 3,302 yearly, Braun's mortality was 2.5 per cent., and this while his ventilating system was in perfect order, and in the same clinic where, under Semmelweiss, in 1848, 3,556 women were confined, with a mortality of only 1.2 per cent., and with no ventilating system at all. In his lectures on puerperal fever Braun never refers to Semmelweiss, but vaunts, *ad nauseam*, the merits of his ventilating system. It will become very apparent to any one who visited Braun's clinic ten years ago, and who visits it now, that the reduction in mortality from 2.5 per cent. to less than 1 per cent. was not effected by any system of ventilation, but is due to a more rigid carrying out of Semmelweiss' directions. Further evidence is not wanting. At the palatial Hôpital Cochin and Lariboisière in Paris, with every appliance of art and an abundant supply of fresh, pure air, the mortality often reaching, or even exceeding, ten per cent., was reduced, by the adoption of Semmelweiss' suggestions, to less than one per cent. Stadfeldt, by the same means, at the Maternity Hospital of Copenhagen, reduced the mortality from puerperal fever from 1 in 37 (1865-69) to 1 in 87 (1870-74).

Nosocomial malaria (?) caused the deaths of 28 out of 156 puerperal women confined in Bellevue Hospital, here, during 1872. Since the adoption of

greater cleanliness, the influence of nosocomial malaria has marvellously lessened, and will soon disappear altogether. Despite these convincing facts, C. Braun and others, who refuse to impartially consider the matter, credit these remarkable results to improved ventilation of lying-in hospitals, and not to the adoption of Semmelweiss' directions.

If a discussion of the theories we are about to consider were without practical value, it would be hardly worth our while to waste time upon it.

Every physician has a perfect right to his own theory. In questions of great practical consequence, however, no such liberty can be permitted. It is commonly supposed that intolerance is a sign of ignorance, and this is true in the majority of cases; but the best educated and most liberal man becomes as intolerant as the ignorant in matters of great importance, about which he has firm convictions, arrived at by what he deems conclusive evidence. The difference between the ignorant and the well-informed man lies in this—that ignorance is also intolerant in things of no practical value, or has firm convictions based upon assumptions only, which may eventually be found true, but as yet are merely hypotheses. We have become more tolerant in religious matters, not through the teachings of priests, but by the discovery that things which our forefathers considered as divine revelations, and for which they were ready to die, are only valuable his-

torical records. As the foundations of our convictions have been shaken, we no longer insist with the same firmness upon their correctness. The same obtains for medical matters. We allow any physician the greatest liberty in his view and treatment of a case of hysteria or the administration of some internal medicine, but the most liberal of us becomes intolerant in a case of luxation, and does not hesitate to denounce as an ignoramus or humbug a physician who proposes faith cure or some internal medicine for the luxation. Our intolerance as to the treatment of a luxation will cease at once when we have seen cases of luxation reduced by faith cure or medicine, and not before. For the same reason the upholders of the Semmelweiss theory, and, therefore, antisepticians, are intolerant in their views on puerperal fever. It is a question of vital importance, about which they have the firmest conviction, based upon most conclusive evidence. And nothing has been brought forward by their adversaries that can in the least shake this conviction.

As soon as antisepticians see cases of puerperal fever originate where infection can positively be excluded, their convictions will be shaken and the Semmelweiss theory rejected or modified. There is nothing very attractive to the physician in the Semmelweiss theory, so long as it does not indicate the measures by which infection can be prevented with absolute certainty and in every case. The conscious-

ness of having prevented infection in many cases, with its fatal consequences, hardly compensates him for the worry and anxiety he must undergo when an accident happens. Semmelweiss' theory is a blessing to patients, but quite another thing to the physician. The old obstetricians were helpless in the prevention of puerperal fever, but they never had a sleepless night from remorse. There is nothing but the hard evidences of fact, *la brutalité des faits*, which forces us to accept this theory. No theory has ever been supported by such irresistible facts contributed by physicians in all parts of the world. With all this we would still be at liberty to accept or to reject it, if it were not for the extraordinary results obtained in all lying-in hospitals by carrying out the directions given by Semmelweiss' theory. Under such conditions theoretical objections only are permissible, but no obstetrician is at liberty to turn a deaf ear to the directions given. If the whole theory were proven to be erroneous, there could never have been a more fortunate error, since it has led to such happy results. The influence of other theories is still so strong that this theory is not yet as universally and exclusively accepted as it merits.

I shall mention the best known of them, and show how weak their bases are, so that all the propping up of different authors cannot prevent them from falling to pieces.

Semmelweiss has given them their death-blow, and

nothing can now give them a new lease of life. If life and death did not depend on the decision, we might patiently wait, as they are about to die from old age or inborn weakness ; but the matter being so vital, we cannot too much hasten their overthrow.

7. OTHER THEORIES.

Of the various theories which have been in vogue and found adherents, the following are the most important :

(a) *Puerperal Fever is an Essential Disease, a Disease sui generis.*—The oldest, and formerly the most generally accepted, theory, and which still finds many defenders, is that puerperal fever is an essential disease, a blood disease, developed, like other zymotic diseases, by epidemic, endemic, and contagious cases ; that in this disease a modification of the general organism occurs antecedent to the local lesions, and consequently the local lesions are secondary—that is, they are the result of the disease and not the cause. Hardly more overwhelming arguments could be brought against this theory than its defenders furnish themselves, against their will and knowledge. What could be more convincing than the following passage in F. Barker's book (p. 466): "In different parts of the United States, both in the country and in the cities, numerous instances have been published, where a series of cases of this disease has occurred in the practice of one man, while

the other physicians in his vicinity have not had a case. Many such cases have been communicated to me, personally and by letter, from different members of the profession, but I need not multiply illustrations, as the number already published, amounting to hundreds, is sufficient to demonstrate the fact." Passages pointing the same moral we find in every text-book, and still Barker wants us to believe (p. 476) the following propositions: "1, There is a fever which is peculiar to puerperal women, and is, therefore, appropriately named puerperal fever; 2, the symptoms of this disease are essential, and are not the consequence of any local lesions, and it is as much a distinct disease as typhus fever, typhoid fever, or relapsing fever; 3, it belongs to the class of zymotic diseases, and results from some unknown blood changes; 4, we are as ignorant of the specific cause of these blood changes as we are of those which develop relapsing fever, scarlet fever, or any of the other essential fevers; 5, the determining cause of this may be either epidemic influences, contagion, infection, or probably nosocomial malaria," etc. Not a single sentence of these propositions can be accepted by any one who believes in Semmelweiss' theory. The reference to relapsing fever must be a *lapsus calami*, as every one knows that it is caused by the spirilli Obermeieri. But we may ask: What does the physician or midwife who infects the patients in different parts of the country or city,

where there was no puerperal fever before, carry with them? Do they carry endemic, epidemic, atmospheric, or telluric influences, the diseased condition of the patient, unknown causes for blood changes, nosocomial malaria, or something more tangible with them. We know that scarlet fever, small-pox, etc., originate only from scarlet fever, small-pox poison, etc., though we cannot always trace them. Of puerperal fever, however, we know that it comes not only from cases of puerperal fever, but that it can originate *de novo* in any place and at any time by the infection of women in labor, no matter how healthy the woman or place is, with decomposing organic matter. It is surprising that Barker should not have stumbled in his literary research on any of the numerous instances illustrative of the origin of puerperal fever, as they are recorded in every text-book. Tyler Smith says: "In another case a medical man was in constant attendance upon a patient suffering from gangrenous erysipelas, and between January 8th and March 22d he attended the labors of ten women; all had puerperal fever, and eight of the patients died." This was in a town of moderate size; no other practitioners in the place were known to have had cases of puerperal fever. Several hundred similar cases are recorded. Another well-known source of puerperal fever is (Playfair, p. 595) "influence of cadaveric poison. 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 theatre, 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 Semmelweiss, 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 1 in 10, while in the division solely attended by women the mortality never exceeded 1 in 34 ; the number of deaths in the former division at once falling to that of the latter as soon as proper precautions and means of disinfection have been used. Many other facts of a like nature have since been recorded, which render this origin of puerperal septicæmia a matter of certainty. 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, as much as possible, having anything to do with the conduct of dissections or post-mortem examinations."

This source of puerperal fever is so well established that in no lying-in hospital in the world is any one coming from a dissecting-room or a post-mortem examination, or suffering from an ulcer or phlegmonous inflammation on his finger, allowed to

examine a pregnant woman or a woman in travail before he is thoroughly disinfected.

If a non-parous woman becomes infected during a gynæcological operation, or a man during a surgical operation, they may exhibit the same symptoms as we see in a case of puerperal fever, and no physician can distinguish them from the symptoms of puerperal fever; and at the post-mortem we find the same pathological changes, no matter from what source the infection has taken place. Even newborn children may die of this disease as before mentioned. Many such cases have been recorded, though F. Barker never heard of one. In two hundred and eighty-one deaths of newly born children, Hecker found sixty-three per cent. of the deaths to be due to septic infection.

The origin, the symptoms, the course, and the pathologico-anatomical changes in every case of puerperal fever are essentially the same as we find in a case of septic poisoning. Where is there in these evidence of the specificity of puerperal fever? It is true that cases of puerperal fever greatly differ from each other, but not more than cases of septic infection. There is no type of puerperal fever which has not its counterpart in a case of septic poisoning. Of the numberless clinical symptoms which may be associated with a case of puerperal fever, none are constant but great prostration, rise of temperature, or its fall (in cases of collapse), frequent respiration,

and accelerated small pulse ; and, at the post-mortem, changed condition of the blood. In septic infection, which during life and at post-mortem may show as great a variety of clinical symptoms and pathological changes, none but the above-mentioned symptoms are constant. This has been again confirmed by the experiments of Orthman (Virchow's *Archiv*, 100 B., iii. H.) concerning the effects of putrid infection.

(b) *Puerperal Fever Caused by Zymotic Diseases.*

—Some authors, among others Athill, assert that the poisons of some zymotic diseases, as scarlatina, typhus, typhoid fevers, etc., become so changed by the conditions of the puerperal state as to produce puerperal fever. This assertion has often been made, but is not supported by any convincing observations. Neither have any cases of scarlatina, typhus, or typhoid fever produced by puerperal fever been observed. This correlation, however, exists between puerperal fever and the known sources of infection. The secretions of phlegmonous inflammations can cause puerperal fever, and the poison of puerperal fever can cause phlegmonous inflammations. As before mentioned, it is often very difficult to trace the source of puerperal fever in a given case, and mistakes in this regard have been frequently committed by the best observers. These mistakes should teach us to be careful in assigning the causes of puerperal fever. No other zymotic disease has more persist-

ently, and often with apparent truth, been accused of causing puerperal fever than scarlet fever, and even feeble attempts have been made to establish a correlation between puerperal and scarlet fevers. Helm, in Vienna, who first introduced the term *scarlatina puerperalis*, described this affection as a scarlatinoid eruption, which appears during the first days after labor, and does not affect the mucous membranes; is of an irregular type, sometimes on the arms, legs, etc., only; disappears and reappears again; has no connection with scarlet fever, never originated from scarlet fever, and may cause peritonitis, metrophlebitis, parametritis, and swelling of the spleen. Other physicians observed the same exanthem, but confounded it with scarlatina proper, while it is only a scarlatinoid eruption of the skin associated with, and symptomatic of, septic infection. As puerperal fever is only septic poisoning in some form or other, this eruption is often met with in severe cases of puerperal fever. Septic germs irritating the central nervous organs and causing vasomotor paralysis are supposed to be its histological pathogenesis. Its diagnosis from scarlatina may be very easy or very difficult. The absence of the history of prodromal symptoms of scarlatina, absence of throat symptoms, the range of temperature, the amount of constitutional irritation, the history of the development and decline of eruption, the character of desquamation, the duration and recurrence

help us to make the differential diagnosis. But as there are no pathognomonic symptoms for the one or other eruption, mistakes in the diagnosis cannot be always avoided. Continental physicians deny that puerperal fever can originate from scarlatina, while English and American physicians defend this causal connection. Braxton Hicks found, he believes, 37 cases out of 68 cases of puerperal fever to be caused by scarlatina. I have never seen a case of puerperal fever due to scarlatina, but I have seen several cases of puerperal fever and septicæmia with scarlatinoid eruption, and have also seen cases of scarlatina in childbed. Though the same chainlike micro-organisms have been found in scarlatina as in some cases of septic infection, no case is known in which septic infection was undoubtedly caused by scarlatina, and *vice versa*. When such supposed cases are recorded we can usually easily find an inaccuracy in the observation. Beside this, we know that scarlatina only and always comes from scarlet poison, while septic poisoning may originate in any place, at any time, and from different sources. Scarlatina and other zymotic diseases, however, may and do occur in pregnant and puerperal women, as gestation and childbed does not give immunity from these diseases. But these diseases run their proper course as such, and not as puerperal fever. At the same time it is possible for a patient suffering from some zymotic disease to have, in addition, upon the body

or clothes, infectious septic material, which can be transferred by the physician or nurse to a lying-in woman. For these two reasons pregnant and puerperal women should be kept isolated from patients suffering with zymotic diseases. Diphtheritis and erysipelas, however, are so like similar affections during the puerperal state that they cannot be considered as altogether different diseases. Diphtheritis of the vagina and uterus are very common in cases of puerperal fever, and the acute form of inflammation of the pelvic cellular tissue has been called by Virchow erysipelas malignum internum, on account of its resemblance to erysipelas. In both affections the same chainlike micro-organisms as are present in some cases of puerperal fever have been found. Numerous cases of puerperal fever, originating from diphtheritic or erysipelalous infection, have been recorded by unbiassed observers. The correlation of these affections with puerperal fever is fairly evident from the above considerations.

(c) *Changes in the Condition of the Blood as a Cause of Puerperal Fever.*—Some analyses of the blood of pregnant women had been made while chemistry was still in its infancy, and these inaccurate and incomplete analyses have served ever since as a sesame to all accidents during pregnancy and puerperium that could not otherwise be easily explained. As most of these disorders can now be better explained, we do not hear so much now of the

morbid changes of blood as we did some years ago. Some obstetricians, however, still cling with great tenacity to this old explanation, *vide* the following passage from R. Barnes' article on "Antiseptic Midwifery and Septicæmia in Midwifery" (*Amer. Journ. of Obstet.*, Jan., 1882): "The foundation of puerperal diseases is laid during gestation. With the completion of labor the conditions predisposing to disease gather strength. During the puerperal state fresh elements of danger accumulate. All these three states bring their contingent to the development of every puerperal disease. This proposition will become evident in its truth as we proceed.

"But we must start with a fundamental proposition which differentiates the diseases of the gravida from the diseases of the puerpera.

"The diseases of the gravida are diseases of high nervous and high vascular tension. The diseases of the puerpera are diseases of low nervous and low vascular tension. In the gravida the balance of osmosis is centrifugal; in the puerpera it is centripetal. The diseases of the gravida arise out of natural conditions exaggerated in intensity. Thus the most striking examples of high tension in excess are seen in the albuminuria and eclampsia and the hemorrhage of pregnancy. An active process of building is going on, and everything is made subservient to this work. But the moment this work is complete the reverse process of demolition, of carrying away

the refuse, is begun. Absorption and excretion, then, are the ruling energies. Of course an active absorption, commensurate with, and subservient to, the process of construction, goes on during gestation. But this is a very different thing from the absorption of the refuse-stuff which, having served its purpose, has to be cast out of the body. This refuse-stuff, if not duly excreted, may be as poisonous as are the elements of urine if not duly excreted. Hence we see that in pregnancy thrombosis, phlegmasia dolens, septicæmia, is extremely rare, whereas, during the puerperal state, they are common. Let us endeavor to trace the several factors which enter into the problem (of antiseptic midwifery).

“1. There is the blood of the gravida modified by the processes of construction and nutrition of the embryo and uterus. They are: excess of fibrin, diminished proportion of red globules, increased proportion of water, increase of white globules.

“2. There is the fall of nervous and vascular tension, involving a change in the dynamic state of the circulation.

“3. There is a period of comparative rest following labor, of preparation for the active processes of breaking up of the tissue used during pregnancy, now superfluous, and of casting out the refuse-stuff. This period may be stated to be about forty-eight hours. We rarely see evidence of self-empoisonment before the third day.

“4. At the end of the second day the process of disintegration of the uterus and the other organs has begun. An immense revolution is at hand. The proceeds of the disintegration of the uterus and other superfluous structures are rapidly taken up into the circulation, and ought to be as rapidly converted and excreted. Absorption revives. The lymphatic vessels and venules have come into active function. If the lymphatic system and liver, especially, fail to modify the waste-stuff brought to them, so as to fit it to enter the circulating blood, then this unprepared, unmodified waste-stuff is noxious, poisonous. Hence one form of toxæmia.

“5. But even assuming that the waste-stuff enters the blood mass properly prepared or digested, unless it be got rid of *pari passu* there will be accumulation of waste-stuff in the system. This is again a form of toxæmia. Hence there must be easily working excretory organs; the lungs, kidneys, skin, must be sound.

“6. Now, it is obvious that both the evils pointed out may coexist; that is, the conversion of the waste-stuff and the excretion may both be defective. Hence already we see a complex toxæmia, purely endogenetic, derived from no external source.

“We may summarize the forms of puerperal toxæmia under three heads. 1. The self-empoisonment resulting from the loss of balance between absorption of waste-stuff and its excretion. This may

be called endosepsis, since the poison arises in the system. 2. Self-empoisonment from absorption of the foul stuff of decomposition of the uterus. This may be called autosepsis, since the puerpera takes poison of her own making. This is what has been more especially called septicæmia. 3. Empoisonment from foreign sources. This may be called exosepsis."

This reads so much like a copy from an obstetrician of a century ago, that I could scarcely believe at first that it was written by Barnes. It is true that the foundation for all puerperal diseases is laid during gestation, according to the principle, *point d'argent, point de Suisse*. But what hinders the diseases of high nervous and high vascular tension and the diseases of low nervous and low vascular tension from annihilating each other, as did the famous Kilkenny cats, as they come so close upon each other, instead of producing or predisposing to puerperal fever? What have lung and kidney diseases to do with puerperal fever? Any modern antisepticist could safely give odds of 1,000 to 1 that he will confine any number of women, each of them suffering from some organic disease, with a smaller mortality and morbidity due to puerperal fever, than a physician who is ignorant of antiseptic precautions and careless about cleanliness will obtain in confining the same number of the most healthy and vigorous women. All diseases which weaken the system

predispose to puerperal fever, as marriage does to pregnancy; but neither of these two conditions is absolutely necessary, as we know, to have results. Even if this explanation of Barnes were as true, as it is not, we would need an explanation for his explanation.

(d) *Overcrowding in Lying-in Hospitals as a Cause of Puerperal Fever.*—More Madden supposes that in all large lying-in hospitals where a number of pregnant women are confined a specific puerperal sphere is necessarily created, and thus the germs of septicæmia are developed with a rapidity, and too often into a virulence, unknown under any other circumstances. The virus irradiates in occasional outbursts. This theory has been propagated by Kiwisch, Hecker, and others without being confirmed by any unbiassed observer. In contrast to More Madden they have found overcrowding dangerous only in small lying-in hospitals and innocuous in large ones. In C. Braun's clinic, 4,998 women were confined in the year 1864, with 1.1 per cent. mortality, and 3,884 in the year 1872, with 2.5 per cent. mortality.

(e) *Other Causes.*—Mental depression, first pregnancy, and many other conditions have here and there been accused of causing puerperal fever. All these conditions can predispose infection either by weakening the system or by prolonging the labor, but cannot alone give rise to puerperal fever.

All these theories are very convenient and con-

soling to the physician when a catastrophe has occurred in his practice, but they neither explain the nature of the disease nor are they of any practical use in the prevention or cure of a case of puerperal fever. Every physician can console himself; when he has been unfortunate with a case, it is not consolation he wants, but to know how to prevent a recurrence of the same misfortune. Teachers should therefore be very careful in propounding new theories about puerperal fever. The same test should be applied to new theories as to new remedies. Whenever their adoption does more harm than benefit they ought to be condemned at once. If a physician is so often told by men who ought to know better, that puerperal fever is often due to causes over which we have no control, he becomes too ready to shift the responsibility from himself to some unavoidable circumstance, and exhibit a "happy-go-lucky" indifference in this regard, with great injury to patients and finally to himself.

8. ON PREVENTION OF PUERPERAL FEVER.

In the prevention of this disease the obstetrician was formerly as helpless as a sailor in a skiff on the high sea without a compass. Now, equipped with the directions derived from Semmelweiss' theory, he enters the lying-in room with the same confidence as a traveller boards a Cunarder. The dangers are still the same, but we know them better and know

better how to avoid them. The chapter on prevention is the crowning glory of Semmelweiss' theory. All other theories put together have not done in a century as much to reduce the mortality as this does in a single year. A mortality of ten per cent., which was formerly not uncommon in the lying-in hospitals, is now unheard of, and a mortality of three per cent. is considered very high.

In this very city, where many physicians still believe in the specificity of puerperal fever, or are only lukewarm supporters of Semmelweiss' theory, Garrigues has shown by his excellent results the value of preventive measures. In a lying-in hospital where the mortality has always been high, and even reached 8.69 per cent. during the year 1883, Garrigues reduced it to less than one per cent. Though his predecessors were very able and very conscientious physicians, who did everything in their power to reduce the mortality, they were unsuccessful, either because they shared F. Barker's happy-go-lucky views about puerperal fever, or they used insufficient preventive measures.

Garrigues demonstrated that their failure was not due to uncontrollable influences, but to the deficiency of preventive measures. As acquaintance with the construction and working of a steamboat is not enough to make a good captain, so the knowledge alone of how to prevent puerperal fever is not sufficient. The best knowledge without practical ex-

perience will not save us from frequent mistakes. As yet we have no other standard for the preventive measures than success and simplicity. Simple measures are to be preferred to more complicated means, if equally reliable.

Prophylactic Measures.—It is easy to say, “Do this, or do that, and you will prevent puerperal fever,” but it is often difficult or impossible to carry out the prescription. To remove the curtains, carpets, furniture, to close up the sewer-pipes, to prepare the patient and the lying-in room for a capital operation, and many similar directions which have been given, may seem easy enough on paper, but will prove the reverse in practice.

Besides this, suggestions have no weight when they are not supported by excellent results; we pay little regard to the advice of those who cannot successfully advise themselves. If it had been proven that these measures were absolutely necessary, and that better results could be obtained by them than by the adoption of less complicated ones, there would be some sense in carrying them out; but nobody is willing to use a crane if he finds a simple lever sufficient.

In choosing preventive measures it is necessary to distinguish between what is desirable and what is essential; if we can have both, we take both. If we insist too much on the first, it may happen to us as to the traveller who directed his steps by the stars and fell into a ditch.

In the previous chapters I have shown, from the experience of others and by my own, that the infecting matter is not of a volatile nature, and that direct contact is required for its propagation. From these well-averred facts the conclusion has been arrived at, and confirmed by observation, that local disinfection of the genital organs, and of the palpable things coming in contact with them, is the only, or at least the most essential, measure for the prevention of puerperal fever, and that the greatest success yet obtained—five hundred confinements without a death—in a lying-in hospital has been obtained by local disinfection only. Experience has further shown that this disinfection can be effected by cleanliness, and by the use of some antiseptic lotions; and that it does not matter much which antiseptic lotion is chosen, provided that its use has been preceded by a thorough cleansing with soap and water, and the antiseptic lotion only used to give the finishing touch.

Perfection in disinfection is only attainable by training ourselves in the use of antiseptic precautions, and not by trying every day a new antiseptic lotion. The greater the danger of infection, the greater the precaution must be. Equipped with these instructions, we can prevent puerperal fever under the most unfavorable circumstances.

I do not claim that the prophylactic measures employed by me are perfect, or that they are the only

correct ones, but I prefer them because the same, or similar measures, have been tried on a large scale by others and myself, with the best results, and can be carried out by any physician, and in any place. As an antiseptic lotion I still use, for ordinary cases, a three to five per cent. solution of carbolic acid, and use corrosive sublimate only for disinfecting the hands after examining a case of puerperal fever, or for disinfecting a parturient who has been attended by a midwife.

After having taken off the cuffs and rolled up the coat-sleeves, I thoroughly wash the hands with soap and water, and disinfect them; or if the hand is to be introduced into the uterus, the whole arm to the elbow is bathed in a three to five per cent. solution of carbolic acid. As infectious matter may be present on the external genital organs or on the perineum, and by the examining finger be carried inside, I disinfect the external genital organs and the perineum with three per cent. carbolic acid solution before examination. For the examination I have discarded carbolized oil, not only because I read that its antiseptic effects are illusory, but more particularly because the oil might be, when not fresh, the habitat of some germs.

For all purposes I use boiled water, as Croton water is not free from germs. Before examination the hand is again dipped in a three per cent. carbolic acid solution. My examinations are few and far be-

tween, and before each the hand is freshly disinfected, and if the parturient, meanwhile, has had an evacuation from the bladder or bowels, the external genitals are again disinfected.

When the nurse has given an enema with effect, her duties, so far as they relate to the genitals of the parturient, end, and she is not allowed to touch them again without my permission, nor is she allowed to carry a sponge.

I would be less frightened by the bursting of a sewer-pipe during the labor, than by the use of a suspicious sponge or an unclean rag on the external genitals. In cases of instrumental labor I disinfect the instruments in boiling water and then in a five per cent. solution of carbolic acid, and introduce them without the use of carbolized oil. This I use only when the hand is to be introduced within the uterus, and then have it brought fresh from the druggist.

When the head of a child becomes visible, I disinfect the external genitals again, and protect the rectum with a towel. If during the bulging of the head the perineum becomes soiled, I wash it and disinfect it again. As it is my opinion that infection takes place most frequently from the external genitals, and almost invariably during the labor, I use great care in all my manipulations on the external genitals and perineum. When the child is born, the perineum and external genitals are inspected to see whether there are any lacerations, or contusions, or

hemorrhage from the external genitals; then the patient is placed on her back again, and the placenta is expressed by Credé's method. After this the external genitals are thoroughly cleaned by syringing with a three per cent. carbolic acid solution. I would rather omit drying the parts than use unclean cloths; meanwhile the contraction of the uterus is controlled from time to time by palpation through the abdomen. No cloths or rags are put on the external genitals or between the legs. I consider good contraction of the uterus the best preventive against absorption of septic matter from its cavity. Ahlfeld and some others object to Credé's expression of the placenta, as by this method portions of membranes or placenta are more likely to be left behind and cause puerperal fever. Ahlfeld's results by the expectant method are the best arguments in favor of Credé's manipulation. I am not in the least afraid of small pieces of membranes or clots in the uterus when the uterus is well contracted and if no infection has taken place; even infection in the uterus only becomes dangerous when the womb is not well contracted. A well-contracted uterus is almost proof against infection. If the pieces are large, or if they prevent the uterus from contraction, or cause hemorrhage, I remove them, but with the same antiseptic precautions as in introduction of the hand for turning or any other operation in the uterus.

I have often been surprised how carelessly the

hand is introduced within the uterus, during and after the third stage of labor, without previous disinfection of the arm, which comes in contact with the external genitals. When everything is in order the patient is put to bed and the genitals are left severely alone, if there is no indication for interference; nothing is put on the vulva or between the legs.

Prophylactic Injections.—When I find lesions or severe contusions of the perineum, external genitals, or the vagina or cervix, I use vaginal injections once a day with a three per cent. solution of carbolic acid, at a temperature of 106° to 110°.

Vaginal injections are not so harmless that they can be intrusted to the nurse for the first few days after labor. I use a fountain syringe, held about two feet above the bed. I syringe first the external genitals, and while the stream is running introduce the tube into the vagina, while with the other hand contraction of the uterus is controlled by gentle rubbing. I find that all contusions and lacerations heal more promptly when injections are given. The injections into the vagina are also very useful for removing clots in the vagina and for exciting uterine contractions.

Whenever the uterus is not well contracted, or the smell of the lochia is offensive, or the discharge from the uterus remains longer sanguinolent or more abundant than usual, I continue with the injections

for the first two or three days, and then intrust them to the nurse.

I wash the uterus immediately after labor with three per cent. carbolic acid solution only in cases in which the hand or instruments have been introduced into the uterine cavity, or if the foetus or the liquor amnii has become decomposed; or if there are clots in the uterus which cannot be removed by external manipulations, or if the uterus shows deficiency of contraction. Both vaginal and uterine injections are used with the precautions as given on page 290.

As a rule, I am satisfied with having syringed the external genitals and vagina. During the next forty-eight hours after labor I concentrate my attention, and that of the nurse, upon the condition of the uterus. I clean the external genitals myself by syringing them, and then let them alone if there be no indication for interference. The nurse is not allowed to touch them during this time. I would never approve of such a practice as More Madden recommends: "After the labor the functions of the nurse are most important in the prevention of septi-cæmia, and removal, by frequent sponging, of lochia and other discharges, the decomposition of which might give rise to auto-infection." I should call such a practice a straining at a gnat and swallowing a camel. I would sooner give a razor to a baby than give a sponge to a nurse in a lying-in room. When such manipulations are permitted, I do not wonder

that More Madden often sees auto-infection, or has, as before mentioned, to explain cases of puerperal fever by overcrowding in lying-in hospitals.

I am perfectly satisfied with a nurse who attends to the comforts of the patient and lets the genitals alone. I never reproach nurses for sins of omission, but often for sins of commission. Old and so-called experienced nurses are very hard to deal with. They are automatons performing certain actions, but incapable of learning new ones or omitting old ones. They have been, we are told, so often with this or that eminent physician, who found them to be perfection, that they cannot understand how anybody else can find fault with them. Nurses coming fresh from the training-schools are usually the best; they are well-informed in their duties, and, what is still more important, they gracefully accept any suggestion from the physician, while old ones often take it as an offence, no matter how politely the suggestion be given.

9. CLASSIFICATION OF PUERPERAL FEVERS.

There is no other disease of such protean character as puerperal fever, and the forms which it may assume are so varying that it has always been taken for granted that the widely differing forms of puerperal fever must be due to different morbid agents. Even with the knowledge that puerperal fever is due to infection only, we cannot dispense with all classi-

fication, as the symptoms and course of different cases are so dissimilar that they cannot be brought into a single group.

The symptoms which are most marked and distressing in one case are in another hardly noticeable, or totally absent, or superseded by different symptoms. With the exception of the change of pulse and change of appearance of the patient, there is no objective symptom which may not be absent.

Our knowledge of puerperal fever is, however, still so imperfect that no principle has been discovered upon which a good classification can be based. The nature of the infecting matter is almost unknown. The clinical symptoms and pathological changes very often do not correspond to each other; we often find in cases which seemingly showed the same clinical symptoms very different pathological changes, and in cases with very different clinical symptoms the same pathological appearances. Therefore it is no wonder that all attempts at classification made by obstetricians or pathologists have met with little success. We find in some books model classifications, but their fault is that in them love for truth is sacrificed to love for order. However seducing they may seem to the inexperienced, they cannot satisfy one who has some experience in clinical observations and post-mortem examinations. The classifications which have met with most favor have been those in which the classification was based upon the manner

in which the infection, and consequently the inflammation, began. Buhl, acting on this principle, gives the following classification :

1. Puerperal peritonitis without pyæmia (endometritis, salpingitis) includes those cases in which inflammation extends from the endometrium through the tubes to the peritoneum. This form is most frequent when there is no epidemic infection.

2. Puerperal pyæmia with peritonitis is developed when the infection gains access to the blood-vessels. The infection has its starting-point, by preference, at the placental site, where the endometritis produces ichorous destruction of the thrombi formed in the uterine sinuses. Thrombosis of the veins of the uterine walls, pampiniform and spermatic plexus result, and the process of embolism is established. Metastatic abscesses are formed in the lungs, spleen, kidneys, etc. Metastatic inflammation of the joints, serous cavities, superficial and intermuscular fasciæ, phlegmonous inflammations, and ulcerative endocarditis supervene, the spleen becomes enlarged ; putrefaction makes rapid progress after death.

3. Puerperal pyæmia with peritonitis arises when the poison is received into the lymphatics and connective tissue of the peritoneum. The lymph vessels are seen as yellow, dilated, varicose vessels, out of which, on section, pus flows ; the vicinity is infiltrated with pus, abscesses form between bundles of

muscular fibres, or so near the serosa that they appear as vesicles.

Spiegelberg, guided by the same principle as Buhl, distinguishes the following types :

1. Pure acute septicæmia when the poison is so abundant or so intense that it rapidly destroys the lymph and blood and paralyzes almost all organs.

2. Lymphatic septicæmia, or progressive phlegmonous inflammation, where the poison spreads in the connective tissue, carried by the lymph vessels to different localities.

3. Phlebotic sepsis, in which the poison enters the thrombi of the veins first, and is carried into the system by the veins.

Fritsch's classification is based upon the difference of the infecting matters :

1. Pathogenous infection, caused by certain septic schizomycetes, manifests itself (*a*) either as acutest sepsis without suppuration, (*b*) as infection with consequent suppuration and beginning peritonitis, (*c*) or suppurative peritonitis.

2. Non-pathogenous infection, caused by germs floating in the air and coming in contact with lesions in the generative organs, may occur (*a*) as vulvitis, colpitis, puerperal ulcers, (*b*) as parametritis. These disorders either remain localized or cause symptoms of puerperal fever. None of these classifications can, owing to our imperfect knowledge of the disorder, be more than a temporary makeshift.

A good analogue to the different types of puerperal fever is a phlegmonous inflammation of the limbs caused by infection of a wound, as this affection is the same disorder and is brought about by the same cause as puerperal fever, which is only a phlegmonous inflammation in the generative organs. In the limbs we can better observe the course of infection and the changes brought about by inflammation. There we see the result of infection manifest itself usually in one of the three following types :

1. In the most acute form, where the whole system is invaded by the poison in the shortest time, and the patient dies before very marked local or general symptoms can develop.

2. In less acute form, in which we can follow the effects of infection along the course of the lymph vessels to the nearest large group of glands. The inflammation either stops there, or suppuration in the glands, connective tissue, lymph vessels, and veins occurs, and the poison may be thence introduced into the system.

3. In the more chronic form, when the inflammation either remains limited to the primarily infected place or appears in the next group of glands. The process either stops short without causing general symptoms, or it continues, and absorption of pus from suppuration in the primary affection or the glands occurs, with the symptoms of pyæmia.

Spiegelberg's classification would best correspond

to these forms, if we bear in mind that in any of them the infection may be introduced into the system by the lymph vessels as well as by the veins. Spiegelberg himself admits that it is very rare to find his types pure, and that a transition from one to the other is so frequent that no exact demarcating line can be drawn. As long as exact classification is impossible, it serves our purposes quite well to distinguish three types of puerperal fever, and to classify them, according to the intensity of infection, as (1) the most acute, (2) the acute, and (3) the more chronic forms of puerperal fever.

1. Acutest forms : Sepsis foudroyante, malign progressive sepsis, erysipelas malignum internum are synonyms. In this class of cases the poison is of such virulency or is absorbed in such quantities that all organs become paralyzed, and the patient dies within the first twenty-four or thirty-six hours before any characteristic symptoms or marked pathological changes have time to develop. Extreme prostration and greatly accelerated small pulse are often the only symptoms. Pain is either absent or only of a slight degree. The temperature may be normal, slightly elevated, very high, or below normal. Young and vigorous women, when stricken down with this form, may die before the physician becomes aware of the impending fatal issue. The same symptoms, or rather absence of symptoms, have been observed after ovariectomies or other surgical

operations, the patients dying very soon after the operation from infection. Formerly such accidents were attributed to shock or other causes. Fortunately these cases are now very rare, and may always be prevented by the use of antiseptic precautions.

2. Acute Forms: This class includes the great majority of cases of puerperal fever. These are the cases which first suggest themselves to us when we hear of a case of puerperal fever. This group includes the greatest variety of forms, from a slight morbid affection to cases so severe as to greatly resemble cases of the preceding type. The poison is of lesser virulency; though often fatal, not invariably so, and treatment may often do much. The infection takes place most frequently through the lymph vessels, or through lymph vessels and veins, and less frequently through the veins alone.

Clinical Symptoms.—What Machiavelli said of tuberculosis four hundred years ago applies as well to puerperal fever: "The beginning of the disease is hard to recognize but easy to cure, but the fully developed disease is easy to recognize but hard to cure." We have no pathognomonic symptom by which the inception of the disease can be recognized with certainty. Notwithstanding the absence of characteristic local and general symptoms of the onset, it is extremely rare for the disease to begin so insidiously that it cannot be suspected before it has made any considerable headway. There are cer-

tain symptoms which, though not pathognomonic, should put us on our guard, because they usually usher in the disease. If we disregard or misinterpret them, we will often be surprised by the unexpected onset of the disease. The mistake may easily happen when the patient does not complain, or if she or the nurse attribute the symptoms to some other cause. A disregard of these signs, which are called premonitory symptoms, is in this disease of more serious consequences, because our treatment is more efficacious in the early stages than later.

Premonitory Symptoms.—It is true the premonitory symptoms of puerperal fever are less reliable than those of any other disease, as they are common to many other disorders, as irritation of the bowels from constipation or gas in the intestines, irritation of the nipples or breast, impeded discharge of lochia, and other physical and mental disturbances. But if we keep a constant watch for their appearance we will not often be surprised by the actual symptoms of puerperal fever, and the complete absence of premonitory symptoms is the most favorable symptom we can wish. We often hear that puerperal fever has, in a given case, set in without any premonitory symptoms. This is usually a mistake. The symptoms have been either overlooked or misunderstood. The most common premonitory symptoms are: The fagged appearance of the patient, acceleration of pulse, headache, tenderness of the uterus, rise of

temperature, loss of appetite, meteorisms, sleeplessness, and great thirst. When all these symptoms are present, there is not, as a rule, the least doubt of the inception of puerperal fever. A reasonable doubt can only exist when only one or several of these symptoms are present. Though each of these symptoms may be produced by other causes, it is extremely rare for many of them to occur simultaneously from other causes, and we will usually err on the safe side if we refer these symptoms to the one cause, *i.e.*, infection, and assume that puerperal fever is present. It is well to know, however, what other causes may also produce the same symptoms.

1. Changed appearance of the patient: The day after labor she looks tired and fagged out, as though she had not recovered from the strain to which she had been subjected, although she has slept and does not complain. The effects of labor-pains differ with different women. Some recover very soon from a difficult labor, while others feel the effects of an easy labor for a longer time. Quick recovery is always a good sign.

2. Pulse: The rate and strength of the pulse is an important symptom during childbed. The pulse may be accelerated by hot drinks, excitement, anæmia, vitium cordis, and many other causes, or may normally be more frequent or weak. Slow pulse is a very favorable sign, and an unaccountable accel-

eration of pulse is always suspicious, and often one of the first signs of beginning puerperal fever.

3. Rise of temperature: The second or third day after labor the temperature so often rises to 100° that it is considered physiological; above 100° is always abnormal, and the more suspicious the sooner it appears after labor. Disturbances in the intestines, soreness of nipples, beginning inflammation of the breast, mental excitement, and other disorders may also elevate the temperature above normal, and it always requires careful examination to find the real cause.

4. Tenderness of the uterus: When the patient complains of tenderness only on pressure this tenderness may be due to long-continued and firm friction during or after the expulsion of the placenta, which has been necessary on account of deficient contraction of the uterus. This tenderness will disappear very soon on the application of cold-water compresses, without causing any other trouble. If the tenderness continues or increases after the second day, it is due to beginning endometritis and metritis from infection.

5. After-pains in a primipara, or continuing or increasing in multiparæ after the second or third day, often denote infection.

6. Headache is very common with patients who may have suffered from headache before, from anæmia or other causes, after heavy loss of blood, or if

temperature, loss of appetite, meteorisms, sleeplessness, and great thirst. When all these symptoms are present, there is not, as a rule, the least doubt of the inception of puerperal fever. A reasonable doubt can only exist when only one or several of these symptoms are present. Though each of these symptoms may be produced by other causes, it is extremely rare for many of them to occur simultaneously from other causes, and we will usually err on the safe side if we refer these symptoms to the one cause, *i. e.* infection, and assume that puerperal fever is present. It is well to know, however, what other causes may also produce the same symptoms.

1. Changed appearance of the patient: The day after labor she is tired and fagged out, as though she had recovered from the strain to which she had been subjected, although she has slept and does not complain. The effects of labor-pains differ in different women. Some recover very soon after difficult labor, while others are exhausted for several days. The effects of labor-pains are more marked in women who have covered a long period of pregnancy.

2. *(The text is obscured by a hand in the foreground)*

eration of pulse is always suspicious and that one of the first signs of beginning puerperal fever

3 Rise of temperature: The normal rise that may appear after labor the temperature is not considered physiological unless it is always abnormal, and the more suspicious is the rise if it appears after labor. Indications of the disease are soreness of nipples, beginning tenderness of the breast, mental excitement and that the temperature may also elevate the temperature above normal and it always requires careful examination to find the real cause.

4 Tenderness of the uterus: When the patient complains of tenderness that is present during pregnancy or during labor may be due to long-continued and late contraction during labor after the expulsion of the placenta which is necessary on account of deficient contraction of the uterus. This tenderness will disappear on the application of cold water or any other means. If it continues after the delivery of the child it is a sign of puerperal fever. The severity of the disease varies rapidly fatal cases, and in mild cases jumps from mild to the gravity of the affection.

the patient is suffering from constipation, indigestion, physiological swelling of the breast, or some other disorder. If the pulse and temperature are normal the headache disappears, or is much relieved by cold-water compresses.

7. Loss of appetite and meteorismus may be due to indigestion, especially when the patient has indulged her appetite beyond her digestive powers. In a case of twins (the first child delivered by forceps, the second by turning and extraction) I found on the next day considerable meteorismus; pulse 100 and very weak. Though the temperature was normal and patient did not complain, I felt anxious and called the family physician, who found the conditions quite satisfactory, as the pulse had never before been better, and as the patient told us that she had taken two quarts of milk within a short time. The subsequent normal course of childbed showed that my anxiety was needless. Good appetite I consider, under all conditions, as a most welcome symptom.

8. Thirst is often due to free perspiration, or to heavy loss of blood or other fluids. Its absence, like a restful night, is a good sign. If any of these symptoms are present we must be on our guard, and not be too easily satisfied with the explanation that the patient or nurse gives for them. We may calm the apprehensions of the family, but not relax our own vigilance. When forty-eight hours after

labor have passed without the appearance of any of these symptoms, we need not feel anxious if one or the other should afterward appear.

Actual Symptoms.—After the appearance of one or several premonitory symptoms, a chill, more or less severe, sometimes only a slight horripilation, is usually the first alarming symptom. The chill is due to sudden rise of temperature, and usually does not occur when the rise of temperature is more gradual. A chill may also be produced by some other cause, as, for instance, from exposure after profuse perspiration, and is therefore not a pathognomonic sign of the beginning of puerperal fever. With the chill, or shortly after, the symptoms which have ushered in the disease increase in severity, and others are added. Pain in the abdomen over the uterus and its adnexa, increased by pressure, rise of temperature, acceleration of pulse and respiration, general uneasiness, want of appetite, and great thirst are commonly present. The pain may be intense or slight, pass off in a few hours or continue for days, and increase in severity. Sometimes, even in the worst cases, pain is very slight or totally absent. Thirst, loss of appetite, and general uneasiness usually correspond to the height of temperature. The temperature is usually a gauge of the severity of the disorder, though sometimes, in rapidly fatal cases, it does not rise above 100°, and in mild cases jumps to 104°, out of proportion to the gravity of the affec-

tion. As a rule, the temperature is very high during the whole disease, with slight remissions in the morning and exacerbations in the evening, or the reverse. A spontaneous considerable remission, when not caused by collapse, is a very favorable sign of the abatement of the disease. The pulse is weak, thread-like, easily compressible, 120 or over. A pulse above 130 is very ominous.

Meteorismus, abdominal tension, and acceleration of respiration are usually in proportion to the severity of infection. Meteorismus, however, may exist without the slightest peritonitis, as general peritonitis with considerable exudation may be present, though the abdomen is flat and not tender on pressure. Meteorism is often due more to the paralysis of the muscular coat of the intestines than to the accumulation of gas. The acceleration of respiration is, in severe cases, often out of proportion to the meteorismus, and is an ominous sign. All these symptoms may abate or disappear in a day or two, and an attack which caused great anxiety at its onset may turn out to be a slight disorder only. If the symptoms continue unabated, and others develop, the danger increases, and with every day of continued unfavorable symptoms the chances of recovery diminish. After-pains in primiparæ, their return or increased severity in multiparæ, indicate that the uterus is not well contracted. This relaxation is commonly due to paresis from infection and œdema-

tous swelling of the muscular tissue, and is usually preceded by severe endometritis, and often followed by secondary internal or external hemorrhage. When the symptoms of a severe puerperal fever are fully developed, the stomach is usually very irritable, with consequent nausea and vomiting. Vomiting either stops soon or continues during the whole course at intervals. The patient at first vomits the contents of the stomach with mucus, then a bilious matter or coffee-ground fluid. Vomiting of the biliary matters contained in the duodenum and the stomach, and of the sero-feculent matters which rise from the intestine, is explained by the paralysis of the muscular coat of the intestine, caused by the peritoneal exudative process and the fixation of the intestine by plastic exudation. It commences at the duodenum and the stomach, the peritoneal covering of which generally remains unattacked. Diarrhoea is caused "by the exudative process, and the consequent irritation of the intestinal muscular coat, which forms a counterpoise to, and even counteracts, the paralysis at some points" (Rokitansky). Constipation is less frequent, and may resist all purgatives. The skin is yellowish, covered with profuse perspiration and consequent miliaria (alba, crystallina, or rubra), or is hot and dry, sometimes with an irregular scarlatina-like eruption. General peritonitis is so commonly present, and its symptoms so prominent, that the term puerperal peri-

tonitis is often used to designate this group of symptoms.

Primary peritonitis is, however, exceedingly rare. Though the pain from peritonitis disappears soon, or is allayed by narcotics, and the patient complains only of shortness of breath, as the respiration is 30 to 50 per minute, every motion is painful, and the patients keep the legs drawn up to relax the abdominal muscles. They show in their countenance and position anxiety and extreme suffering, and are unable to make the least motion, so great is the prostration. In other cases of general peritonitis all its symptoms are absent. Pneumonia, endocarditis, and more frequently pleuritis supervene. Pulse, 140 to 160. Face pale, bedewed with moisture, lips blue, lips and hands tremble when they touch anything. The tongue is usually covered with a thick, yellowish-white coating, which later on becomes brown and shrivelled with indentations of the teeth; the tongue and teeth are covered with sordes; there is unquenchable thirst, and the extremities are cold. Sensorium becomes affected, the patient manifests torpor and indifference to everything around her, or becomes comatose; in other cases she will be delirious, or very sensitive to the slightest impression. This *ensemble* of symptoms will frequently simulate typhoid fever, and is often diagnosed as such. The lochia are not altered, or are very malodorous, the external genitals swollen and œdematous, and con-

tusions and wounds converted into diphtheritic ulcers. Enlargement of the spleen can only be discovered when the meteorismus is not very great. When most of the described symptoms are present, fatal issue is the rule, and recovery the exception. The patients usually die within the first or second week, but they may rally from the most unpromising conditions, as others may die when they seem to be out of danger. Recovery is either rapid and complete, or after a more or less interrupted or protracted convalescence, depending upon the morbid changes in the abdominal and pelvic organs. It sometimes takes years before the last traces of the disease have disappeared. Fortunately these severe cases are very rare in the practice of physicians. Between the slight affections and the fatal cases there are numerous varieties. Many subdivisions might be made of this acute form, and still all cases not be included. Nearly every case shows some peculiarities which are not found in others, and in no single case are all the symptoms combined.

Prognosis.—Hard as it is to recognize the onset of puerperal fever, its prognosis is often still more difficult. Sometimes slight attacks are ushered in by severe symptoms, while fatal cases often begin and continue with very slight symptoms. The most reliable guides for forming the prognosis are—1, the time of beginning of the symptoms; 2, the general condition of the patient; 3, the condition of the

pulse and temperature. An early inception and an unfavorable condition of the patients are more ominous symptoms than a moderate rise of temperature or moderately accelerated pulse. When two or three days have passed after labor, without the appearance of any premonitory symptom, then it is extremely rare that, without a great imprudence, a mishap will occur.

3. The more chronic forms: This group comprises the numerous cases in which the effects of infection do not develop with such rapidity as in the former cases, either because the infecting matter is of lesser virulency, or because the invasion of infection takes place slowly or in intermissions. 1. When the infection is less intense or its progress slow, the inflammation spreads gradually from tissue to tissue, and we observe the same symptoms and course, though of less intensity and rapidity, as in the former group, to which these cases form the connecting link. In this group of cases it is not the intensity, but the duration of the disorder, which causes anxiety. The long continuation of the fever, though it be of only moderate degree, and the confinement to bed, interfere with the digestion and appetite, and more gravely undermine the health than a severer fever of short duration. 2. In the cases in which infecting matter is absorbed only in intermissions, there is more or less remission of all symptoms in the intervals. Each absorption is usually followed

by a chill, with exacerbation of all symptoms, and then an abatement or even complete remission of all symptoms takes place. The infecting matter is contained either—*a*, in a diphtheritic ulcer of the genital tract, in decomposing matter in the uterus or vagina, in an abscess of the peri- or parametrium, or of a lymph sinus, most frequently under the serosa of the uterus; or, *b*, in an infected thrombus of a vein. *a*. The first variety of periodical absorption of infecting matter is most frequently met with in cases in which either more or less general uneasiness or only a slight febrile movement in the first days after labor had been present. In such cases we are apt to think that no morbid change in the pelvis has resulted during these slight disorders. While we have regarded all dangers as over, a diphtheritic ulcer in the genitals or an abscess in a lymph vessel has formed, or suppuration in the connective-tissue has occurred, or pieces of placenta or clots in the uterus have undergone decomposition and have become the source of infecting matter. These are the cases of which we are often told that the infection has not occurred before the second or third week. The infection has occurred during the labor, only its manifestations have appeared later.

The severe forms of these cases do not differ either in their symptoms or course from cases of pyæmia (chronic form of septicæmia) after a surgical operation. Metastatic abscesses form in the internal or-

gans, in the joints (shoulder and knee most frequently), in the subcutaneous tissues of the limbs, etc. General peritonitis is not always present, and, if present, is of a mild degree. Peri- and parametritis are frequently associated with, or have preceded, this disorder.

The milder forms of these cases may so much resemble a form of malaria that even by experienced physicians mistakes in diagnosis have been made. Repeated chills with exacerbation, and then rapid and complete remission of all manifestations, are the most prominent symptoms. The temperature may fall in a single day from 104° to 98° , and no morbid change in the pelvic organs be found, the abscess from which the absorption takes place being so small that it cannot be detected on the most careful bimanual examination. The older physicians called these disorders *intermittens maligna puerperalis*. The danger lies not so much in the number of chills and exacerbations as in the frequency and intensity of the exacerbations. If the patient has time to recover from one attack before another occurs, and the appetite is good, she may pull through a great number of attacks, while a few severe attacks in quick succession may destroy all chances of recovery. At any period of the disease an attack, with absorption of so much greater a quantity of infectious matter may occur, that the symptoms of acute septic infection appear, and the case may end fatally. It is not rare

for cases of puerperal fever to begin with the symptoms of acute infection and end with the symptoms of pyæmia, or a case which began with the symptoms of pyæmia to end with the symptoms of acute infection. The change of a case from one group into another occurs so often, and usually so unexpectedly, that no strict line of demarcation between the two can be drawn.

b. Absorption from an infected thrombus: A thrombus may become infected, and undergo disintegration in a placental, uterine, or pelvic vein, or in a vein in the lower extremities; or suppuration in surrounding tissues may cause thrombosis of the vein and subsequent disintegration of the thrombus. Deficient contractions of the uterus, endometritis, colpitis, diphtheritic ulcers in the genital canal, decomposition of decidua, clots, detritus of placenta or membranes, heavy loss of blood, exhaustion of the patient, premature exertion, or some imprudence are the predisposing causes. If a large embolus becomes detached from a disintegrating thrombus, the patient dies from the mechanical effects of the embolus before symptoms of infection can develop. If the embolus is smaller, so that it can pass the main branches of the pulmonary artery, the subsequent symptoms depend upon the intensity and quantity of the infecting matter. If the poison is of great virulency death may ensue, with symptoms of acute sepsis or typhoid fever. In the majority of cases

the disease will resemble pyæmia of different degrees of intensity or intermittens. The symptoms of this disease appear, in exceptional cases, during the first two days after labor; but usually they are preceded, for a week or two, by endometritis, colpitis, diphtheritic ulceration, slight general uneasiness, lassitude, slight febrile reactions, profuse perspiration, until suddenly a chill, followed by the symptoms of infection, and often associated with secondary hemorrhage, distinctly ushers in the disease.

After each attack, if the infection is not very intense, a remission of all symptoms follows, but each successive embolism is followed by an exacerbation of the symptoms.

The emboli give rise to abscesses in the tissues to which they have been carried; most frequently (seventy-five per cent.) in the lungs, often with subsequent fibrino-purulent pleuritis.

According to the size and number of emboli in the lungs, symptoms of dyspnœa, cough, pains, or lobular pneumonia are the result. With very small emboli there may be no subjective or objective symptoms in the lungs. When the emboli pass through the lungs they may become arrested in the kidneys (fourteen per cent.), spleen (twelve per cent.), liver (eight per cent.), eyes or joints (shoulder, elbow, knee), or subcutaneous connective tissue.

Each embolus may be the source of other emboli.

The peritoneum may become affected. In 16 cases out of 39 the peritoneum was found more or less involved, and in 4 cases there was distinct peritonitis. During life it is very hard to find the thrombus in which the disintegration has taken place, and examination must be made carefully lest other emboli be dislodged by the examination. Even at the post-mortem it often requires close attention to find the offending thrombus.

The symptoms and course of the disorder from this source of infection resemble so much the former variety that during life it is often impossible to distinguish one from the other.

When we find suppuration in the genital organs, or a peri- or parametric inflammation, we may assume that infection is due to absorption of pus. On the other hand, if the patient did not suffer from any affection in the pelvis, it is probable that infection resulted from a disintegrated thrombus. Post-mortem examination alone gives reliable information.

Cases of this variety still more often than those of the former simulate intermittens. And when only one attack occurs, it is usually taken for a paroxysm of intermittent, and if, after a dose of quinine, no attack recurs, the physician is usually satisfied that he has cured a case of malarial fever.

10. PERIMETRITIS AND PARAMETRITIS.

Synonyms : Pelvic peritonitis, pelvic cellulitis, pelvic phlegmonous inflammation. Both forms of inflammation are so often combined during the puerperium, and their symptoms and course are so much alike, that they may be considered together. Pelvic peritonitis is very common outside of the puerperium, while parametritis is extremely rare, except after gynecological operations. The etiology of both affections is infection before or during labor ; therefore it is most frequent when puerperal fever prevails. The infecting matter is either of lesser virulency, or is absorbed in lesser quantity, or its effects have remained localized. Peri- and parametritis may also be the remains of a general infection after recovery from a puerperal fever with general peritonitis. The use of antiseptic measures during labor has lessened the frequency and intensity of these affections, but not in the same proportion as of puerperal fever. Experience has shown that it is more easy to prevent the more virulent than the milder forms of infection. Especially in difficult obstetrical manipulations, where contusion of the tissue is unavoidable, a slight amount of infection may result in extensive inflammation, as contused tissues are more liable to infection.

Peri- and parametritis are often met with in private practice, where the severe forms of infection are

much less frequent than in lying-in hospitals. From my experience I must consider peri- and parametritis as abortive forms of, or residua after recovery from, puerperal fever. Whenever puerperal fever prevails in a lying-in hospital or in private practice, we meet most frequently with these affections, and the better the antiseptic precautions during labor are carried out the less often we find them.

If different parturients become infected from the same patient, one may suffer from chronic septicæmia, another from acute septicæmia, and a third from peri- and parametritis. A case of peri- or parametritis may change into a case of chronic or acute septicæmia, especially after exposure or imprudence. For these reasons I believe that peri- and parametritis should be classed with puerperal fever. Whenever a case of peri- and parametritis occurs, infection has been prevented in a severe, but not in a slight, degree. These may occur in the practice of the most experienced antisepticist, though less often than in that of the inexperienced. With all our wide experience in the use of antiseptic precautions, we are not yet able to prevent slight infection with absolute certainty in every case. It is therefore premature for Winckel to affirm (p. 219) that in case No. 18 (p. 227) "infection could with certainty be excluded," especially as it was a difficult forceps case. The symptoms and course of peri- and parametritis depend upon the intensity of infection.

They may set in with all the symptoms of a beginning puerperal fever. When, however, the infection is not of severe degree in either quality or quantity, or timely appropriate treatment has been resorted to, all the dangerous symptoms abate or disappear in a few days, and we may flatter ourselves that the patient has entirely escaped injurious results. But it is rare for no trace of the past disorder to remain. Instead of rallying in a short time, the patient may remain ailing and sickly, the temperature and pulse indicating some pathological change. In other cases the onset of this disease is so insidious that it is often not recognized sufficiently early, the local and general symptoms being so slight as to escape attention or be misinterpreted, particularly when no pathological changes in the pelvis are found on bimanual examination, because no swelling has yet formed or the exudation is so high up behind the peritoneum that it cannot be reached. Peri- and parametritis usually originate during the first few days after labor, and a subsequent imprudence or exposure develops the latent inflammation into an active extensive process. Exposure or imprudence acts on these cases as oil on fire. It is extremely rare to find these affections in a puerperal woman who did not show some sign of a local or general infection during the first three days after labor; but we find these disorders developing very often when fever or abdominal pain was present during the first days of

childbed, and the patient later exposed herself to noxious influences, or had been in any way imprudent. The inflammation usually begins with diffused swelling or thickness, which becomes gradually more circumscribed, hard, and distinct. The uterus is firmly fixed, or only somewhat less mobile, or may be displaced to one or other side. When the swelling is considerable, symptoms of dysuria and tenesmus are often present. The lower limb of the affected side is kept flexed to relax the muscles of the fossa ilei.

A correct diagnosis of this disorder can be made only by repeated bimanual examination. We are often surprised to find a large swelling in the ligamentum latum, around the uterus, behind the uterus, between uterus and bladder, or around the ovaries, of which a day or two before we could not find a trace. The parametritic infiltration may pass along the ligamentum latum to the fossa ilei, and be felt there as a large tumor through the abdominal walls.

In severe cases of peri- and parametritis the symptoms are so characteristic that a correct diagnosis is, sooner or later, very easy. In the milder cases, however, where there is only slight intermittent fever, general uneasiness, or indefinite malaise complained of, and no definite changes in the pelvic organs are found, a correct diagnosis can only be made after repeated and careful bimanual examination. The perimetritic matting together of pelvic

viscera often gives rise to misleading impressions of lumps or tumors. The prognosis depends upon the extent of inflammation and the condition of the patient. In rare cases the inflammation sets up septicæmia or pyæmia, but recovery by resolution, or the occurrence of suppuration is the rule. Large tumors may be absorbed in a short time, and small ones remain unchanged for months and years. The patient may be up and about, but the least unusual exertion or imprudence brings on an attack of acute inflammation; they complain of pains in the pelvis, suffer from constipation from mechanical obstruction, feel weak, and digestion is impaired. When the infiltration tends to resolution, the fever and other symptoms of the disorder soon abate, the swelling becomes less tender, contracts, is more circumscribed, harder, and disappears sooner or later, either completely or leaves adhesions, cicatrices, or indurations behind.

If suppuration occur the case is rendered much more unfavorable and protracted, and is usually owing to some imprudence or to the exhausted condition of the patient. In such cases the pulse remains weak and more frequent, the temperature shows exacerbations and remissions as in hectic fever, appetite is lost, distressing pains and repeated chills are not rare. Fluctuation is obtained easily only in cases in which the tumor has increased above the pelvic brim in the direction of the iliac fossa, or

else where we can produce the wave with one hand and feel it with the other, or where only a thin layer of tissue intervenes between the finger and the fluid. But in most cases the intervening layer of tissue is thick enough to make recognition of fluctuation very difficult, and œdematous swelling about the infiltration often gives the misleading feel of fluctuation. Tumors formed by the matting together of the pelvic viscera have often been mistaken for accumulation of pus in the cellular tissue. By repeated abdominal palpations, conjoined with vaginal examination, or by the use of an exploring needle, if in no other way, the differential diagnosis can be made. The prognosis depends upon the general condition of the patient, upon the seat of the abscess, and upon treatment. If general peritonitis does not supervene, recovery usually takes place. The pus either finds outlet spontaneously or by artificial opening, or is absorbed, or becomes encysted. The danger lies in the protracted drain of the suppuration on the system, especially when the pus is so deeply seated that free evacuation cannot be secured, or if long, tortuous fistulæ have formed which are very slow to heal. The long-continued suppuration may lead to amyloid degeneration of vital organs and the patient die from exhaustion. When the abscess forms in the loose retroperitoneal connective tissue of the iliac fossa it opens, or can be opened, at the ligamentum Poupartii or anywhere along the pelvic brim.

Abscesses formed in the uterine half of the broad ligaments, or in the anterior or posterior connective tissue, are more apt to take a chronic course, considerable thickening of the neighboring connective tissue occurring. The abscesses may open into the vagina, rectum, bladder, or uterus, or in exceptional cases into the peritoneal cavity, setting up general peritonitis. After free evacuation of the pus, retraction of the suppurating cavity and final cure soon result. As long as free outlet to the pus is not given, danger of acute or chronic septicæmia exists. The pus may become encapsulated, and in this way rendered innocuous.

11. ENDOMETRITIS PUERPERALIS.

It was formerly thought by most pathologists and obstetricians that the mucous membrane of the uterus was completely shed during the puerperal state, and the submucous connective tissue left bare. Now it is known, as Rokitansky declared before, that only the outer portion of the cell layer of the decidua is cast off; while the inner layers, with the entire glandular tissue, remains to cover the whole endometrium, including the placental site. But this denudation is sufficient to facilitate absorption of infectious matter, and endometritis is, therefore, very common. It occurs either as a distinct affection, or as a symptom of puerperal fever. Cases in which

endometritis is present, but the patients suffer or die from other symptoms of puerperal fever, cannot be considered as endometritis, though this is sometimes done. In these cases we always find the effects of general infection, though the endometrium may seem, on superficial examination, to be alone affected, and the endometritis is only the most prominent symptom of puerperal fever. When the symptoms of general infection predominate over the symptoms of the local disorder, we speak of puerperal fever associated with endometritis. When there are only slight or no general symptoms present, then the case is considered as endometritis.

The inflammation is caused either by introduction of infectious matter into the cavity or by direct extension of inflammation from the vagina. The endometrium becomes swollen with pronounced infection, and tinged with extravasated blood from ruptured vessels. Later we find softening, sloughing of the mucosa, which becomes covered by a layer of fetid, brownish-colored, decomposing decidua, or by a membranous covering not differing essentially from a diphtheritic exudation. The discharge is offensive, brownish, or sero-purulent. The inflammation may remain limited to the endometrium, or extend to the muscular tissue, as metrophlebitis, metrolymphangitis, or as diphtheritic or phlegmonous inflammation of the uterine walls.

(a) METRITIS DISSECANS.

This affection is an exfoliative inflammation of the inner layers of the uterine tissues, in which not only the mucous membrane, but also the contiguous bundles of muscular fibres are shed. If it affects the whole uterus, a sac, representing a complete cast of the uterine cavity, consisting of mucous membrane and of a considerable layer of muscular tissue, comes away. The inflammation may remain limited to a part of the uterine cavity. A diphtheritic or phlegmonous inflammation, starting from the endometrium, isolates a large layer of muscular tissue, which becomes detached in a variety of shapes. This same process may occur independent of the puerperium, and several cases have been published in which complete casts of the uterine cavity, consisting of mucous and muscular tissue, have been cast off by patients with the symptoms of acute endometritis and metritis.

Garrigues has published (*Archives of Medicine*, April, 1883) several cases of metritis dissecans in childbed.

I have in my possession a specimen weighing 185 grammes, 40 ctm. long, and in some parts 10 ctm., at other parts 4 ctm., broad. In places it is 2.5 ctm., at others only 0.5 ctm., thick, and the cast consists of muscular tissue only. It came from a patient who was confined six years ago. The labor

was very complicated. In childbed severe endometritis, with symptoms of general infection, developed. The temperature ranged between 102° and 104°. The twenty-first day after labor this piece, which had been detected floating in the uterine cavity during the intrauterine injections a week before, came away, and the patient quickly recovered. The patient, who is now thirty-nine years old, has not since been pregnant, and the menses appeared this year for the first time.

In all the cases of metritis dissecans during the puerperal state of which I have heard, antiseptic intrauterine injections had been used for endometritis. It was very probably owing to these antiseptic intrauterine injections that the inflammation was kept localized and the cast-off pieces remained so well preserved.

Similar cases have been described by Rokitansky and others, but in these the metritis dissecans had been followed by fatal general infection, and the cast-off pieces had undergone gangrenous decomposition.

The dangers from metritic dissecans are general infection or destruction of a part of the uterine wall, whereby subsequent pregnancy is prevented or rendered very hazardous.

(b) DIPHTHERITIC ULCERS.

The effects of infection appear sometimes as diphtheritic ulcers, so called from their resemblance to

the morbid changes in diphtheritis, from which they do not differ essentially. They are thick patches covered with a yellowish or dirty-grayish coat, intimately connected with the underlying tissue, which is infiltrated; the surrounding tissue is swollen and darkly congested. These ulcers may occur at any part of the genital tract, from the perineum to the fundus uteri; they show a predilection for the placental site, and for those parts in which an abrasion, laceration, or contusion during labor has taken place. They are also apt to occur in places where the lochia collect, as in the fourchette. When they affect the endometrium, the uterine wall becomes flabby, soft, pulpy, and serous infiltration or endometritis dissecans may follow. In the uterine cavity a thick, dirty-grayish fluid is present. These ulcers are either associated with puerperal fever or give rise to general infection, or they may remain as localized affections, especially under appropriate treatment. They occur not rarely in lying-in hospitals, even at times when there are no severe puerperal cases present, and may be the vanguard or rearguard of a puerperal epidemic. The ulcers may become dangerous by leading to extensive destruction of tissue, necrotic endometritis, or putrescence of the uterus, or to general infection. The symptoms of the ulcers depend upon the intensity of infection, and may be so slight that their presence is only revealed on local inspection. The diagnosis of

diphtheritic ulcers can sometimes be made by the touch; usually local inspection is necessary.

12. PUERPERAL MALARIA.

Certain chronic forms of puerperal fever were called, as before mentioned (p. 260), by the older physicians *intermittens maligna puerperalis*. For the same cases F. Barker proposed, and several physicians here accepted, the term *puerperal malaria*, with the difference that he erroneously believes that they depend upon malarial poison, while the older physicians correctly enough connected them with puerperal fever. Of the many cases of which I have either read or heard as cases of puerperal malaria, in not a single instance was there convincing proof that the disease was due to malarial, and not to septic, infection. I am sure that in every fatal case of so-called puerperal malaria some morbid change due to septic infection would have been found if a careful post-mortem examination had been made. Fatal results from malaria poisoning are extremely rare, even in places where malaria prevails, while cases with the symptoms of malaria, but belonging to some forms of puerperal fever, quite commonly end fatally everywhere. I saw several cases in the Vienna Lying-in Hospital which simulated malaria, although there is no malaria in that city or in the country about. When these cases proved fatal the post-mortem examination always revealed morbid changes

due to some form of septic poisoning. An instructive case is recorded in the *Am. Journ. of Obstet.*, January, 1880, p. 140: "The symptoms which developed subsequently suggested the described form of malaria poisoning, but at the end of two weeks the patient died from septicæmia. At the autopsy a supplementary lobe of the placenta was found, about the size of a half dollar. It was not continuous with the main placenta, and when that was thrown off the portion remained behind, and gave rise to the symptoms which accompanied the septic poisoning that killed the patient." There is little doubt that, if this patient had recovered, the case would have gone on record as puerperal malaria.

The following case (*l. c.*, p. 140) illustrates well upon what flimsy grounds the diagnosis of puerperal malaria is often based: "The patient did very well for twenty-four hours; there was no hemorrhage, but the pulse remained 90 to 105. Her temperature on the morning following her labor was 102°, and for the next six days the temperature and pulse remained elevated. Septic poisoning was suspected, but the lochia were without noticeable odor, there was no lacerated surface, and the opinion was reached that the patient was suffering from malarial poisoning, and accordingly quinine was given freely. On the seventh day temperature and pulse were about normal, and she did very well until the six-

teenth day, when a profuse hemorrhage occurred. The patient was thoroughly ensanguinated, and her pulse was rapid and weak. A careful examination revealed no ulceration or laceration to account for the hemorrhage; it came on suddenly, while the woman was standing on the floor." It would be interesting to know how, in such a typical case of puerperal fever, the opinion could be entertained that the patient was suffering from malarial poisoning. Does the physician really believe that the odor of the lochia is all the difference between septic and malarial poisoning. How convenient this would be? It seems to me that the diagnosis in this case was made à la Bouillaud, who once entered his clinic with the words: "The patients on the left side we will bleed to-day, and those on the right purge."

Malaria can, and does, attack puerperal women, but not nearly so often in this city as is supposed. And in every fatal case of supposed puerperal malaria it is 1,000 to 1 that we have to do with septic, and not malarial, poisoning. Statistics of lying-in hospitals in malarious regions confirm this opinion. Malaria may predispose to puerperal fever by exhausting the constitution of the patient, but malaria itself is as rarely fatal in puerperal women as in other individuals.

13. TREATMENT OF PUERPERAL FEVER.

As the infection takes place only through lesions in the genital tract, and the first morbid changes usually appear at the place of infection, it is evident that local treatment is of primary importance. In only exceptional cases is the poison of such virulency that death occurs before distinct local or general symptoms have time to develop. As a rule, the invasion of the disease is more gradual. The poison is either slowly absorbed from the place of primary infection, and carried by the lymph vessels or veins into the circulation, or the infection spreads from one layer of the affected tissue to the next, with corresponding morbid changes. Appropriate treatment does much to remove or to neutralize the infecting matter in the primary focus, or to arrest the progress of inflammation. The sooner we recognize the occurrence of infection, the better we can counteract it. When the infection has made considerable headway treatment is far less efficacious. Therefore it is very important to detect its first beginning, the more so as the spot from which infection has arisen is usually very accessible. It is not true that infection usually begins in the uterus, except in cases in which the hand or instruments have been introduced within the uterine cavity. The infection usually arises from the vulva, or vagina, or vaginal portions of the uterus, parts which are most exposed to infection.

As there are no local or general pathognomonic symptoms of the occurrence of infection, it is advisable to begin treatment whenever we have reason to suspect that infection has taken place in the vulva, vagina, or vaginal portions of the uterus, because the treatment, when carefully applied, is never injurious. But the same does not hold true for cases where it is suspected that the infection had its origin in the uterine cavity, because infection does not begin there as often as is commonly supposed, and treatment of the uterine cavity is not without risk, even in the most careful and experienced hands. It should, therefore, never be undertaken unless when clearly indicated (p. 294).

All treatment not directed to the removal of the sources of infection and the prevention of continued poisoning remains inefficacious.

Remove the cause and you have removed the disease is true only for the beginning of infection. The good results obtained by this, that, or the other treatment can be read of in any text-book.

Fortunately not all cases of puerperal fever are fatal, and many patients survive both the disease and the "treatment." By the use of local antiseptic measures not only in prophylaxis, but also as a curative means, the most excellent results are obtained. Until quite recently the most commonly used antiseptic was carbolic acid, in solutions varying from two to five per cent. Corrosive sublimate has been

found so much more efficient that it has supplanted carbolic acid in most lying-in hospitals. The use of corrosive sublimate requires much greater precautions than does that of carbolic acid; it is more readily absorbed and more poisonous, cases being recorded of death following vaginal injection of a 1 to 2,000 solution. The use of corrosive sublimate frequently causes a toxic nephritis, with albuminuria as the first, and often the only, symptom.

The strength of antiseptic vaginal or intrauterine injections must be regulated by the morbid changes found in the genital tract. For extensive and pronounced morbid changes we have to use stronger solutions, and repeat them oftener than for milder forms. If the changes are localized as diphtheritic ulcers, and the remedies can be applied directly to them, we may use tincture of iodine, chloride of zinc (ten per cent.), and other remedies which could not be used so strong for vaginal, and still less for intrauterine, injections. Bougies of iodoform (5 to 10 gms.) introduced within the uterine cavity have been found very effective in cases of endometritis and metritis. As the material for general infection is usually supplied by morbid local disorder, the local treatment is continued as long as there is any pathological change in the genital tract which can be cured by local applications. But it would be useless, and even injurious, to use antiseptic vaginal or intrauterine injections in cases without pathological

change in the genitals, and where the infecting matter is contained in a septic thrombus, in a lymph sinus, or in a pelvic abscess, or when the local affection is cured and only general symptoms are present. When the septic poison has once entered the general system, general symptoms appear which require our attention as much as the local affection. Unfortunately we have no specific remedy for the disease. Of the numerous drugs which have been recommended and used as such, not a single one deserves confidence. The only thing we can do is to combat the symptoms. We know that the disease runs a definite course, and that the longer the period we tide the patient over, the greater are the chances of recovery. Opinions differ much as to how this can best be effected.

When the disease is fully developed, the final result depends usually more upon the constitution of the patient and upon the intensity of infection than upon treatment. Upon some leading principles, however, all obstetricians are in accord. There are : to sustain the vital powers of the patient, and to combat the dangerous symptoms. In combating the symptoms we must bear in mind that they are not the disease, and that we may suppress them entirely without lessening the severity of the disease. For instance, high temperature and frequent pulse are usually the most prominent and most dangerous symptoms. We may succeed in bringing them both

down to normal, and still the patient die from the disease, and many patients die after the attending physician concludes from the condition of the pulse and temperature that all dangers have been overcome. This must not, however, lead us to the belief that it is useless to combat high temperature and frequency of pulse, but merely that the conditions of the temperature and pulse should not absorb all our attention. Experience has also shown that all the internal remedies which are useful in reducing temperature and the pulse-rate, as digitalis, antipyrine, etc., have little or no effect on the course of the disease. It would, therefore, be imprudent to use dangerous remedies for the sole purpose of reducing the temperature and pulse. No drug is so generally used as quinine. It would seem in some cases as though quinine and salicylic acid had an effect upon the disease itself, besides their favorable influence upon the temperature. Therefore they should be tried in every case, but not in the beginning of the disease, as they are apt to suppress or to mask the symptoms, and thus lull the physician to an inactive and false security. And furthermore, in the beginning of the disease, the local treatment is more effective and direct than internal medication can be. To continue with large doses of quinine (1 to 2 gms.), of salicylic acid (5 to 10 gms., in divided doses, daily), or of other drugs for days and weeks is more injurious than useful. We can very soon see whether the

medicines have a favorable effect or not. If the good effects do not appear soon they will not appear later, and the stomach, the condition of which requires special care, rebels against the long-continued large dosing, especially when the medicines are irritating. Small doses of quinine (0.2–0.3 gr.), two or three times daily, usually agree better with the patient, but their effect is not as striking as that of large doses. I have found salicylate of sodium (5 to 10 gms. in 150 aquæ, within twenty-four hours) less irritating to the stomach, as it is more soluble, more agreeable to the patient, and just as effective as salicylic acid. Veratrum, aconitum, and other dangerous medicines cannot be recommended, the dangers to the patient from their use not being counterbalanced by beneficial effects.

A good effect on the temperature, and sometimes also on the disease, I have seen result from the use of cold baths or cold packs. When cold baths are indicated the patient is put in a bath of 95° to 90°, and kept there for ten to fifteen minutes, while the temperature of the water is gradually reduced from 95° to 75°. Then the patient is put to bed, wrapped up in blankets, and stimulants given according to indication. Frequent sponging of the patient with cold water is often a good substitute for a cold bath.

For cold packs the body and thighs of the patient are wrapped in sheets wrung out in cold water. When the sheets become heated (after ten to fifteen

minutes) the patient is transferred to a fresh bed. This procedure is repeated, if it does not exhaust the patient too much, until the desired fall of temperature is effected.

Systematic affusion of the patient, with water at first of 85°, gradually reduced to 75°, as practised by G. Thomas in high fever after ovariectomies, has been used and recommended by some obstetricians. Alcohol, in the form of milk punch, or with eggs, or as whiskey or brandy, rum, champagne, or any form agreeable to the patient, may be given with good results, and as much administered as will agree with the patient; it acts in all forms of puerperal fever not only as a stimulant, but also as an antipyretic and narcotic, and sustains the vital powers by retarding tissue-waste. Cold or warm drinks, according to the inclination of the patient, may be freely given. No therapeutical agent is, however, more beneficial than judicious nourishment for sustaining the vital powers. So long as we succeed in feeding the patient, the worst symptoms may not be as dangerous as a slight one becomes when assimilation of food is very poor. Therefore those internal medicines which do not impair the digestion, or, better still, those which are apt to improve it, are preferable to others which have a contrary effect, no matter what their supposed effect on the disease may be.

Feeding per rectum is a poor makeshift, and

should be resorted to only when the stomach is so irritable that no food can be taken. No detailed directions for sustaining the vital powers can be useful in every case, as each one must be treated on its merits. Knowledge of the constitution and of the idiosyncrasies of the patient and experience in the treatment of exhausting diseases are the most reliable guides.

All the specifics proposed for this disease are now discredited. The antiseptic remedies internally are ineffectual in small doses, and in large doses poisonous. Some good results are recorded after the internal or subcutaneous administration of carbolic acid in doses of 1 to 15 drops.

Many of the therapeutical agents, as venesection, purgation, emesis, etc., which were formerly much valued as eliminatives of the *materia peccans*, are now rejected; they have been found either useless or injurious.

General Peritonitis.—This complication is considered the most frequent and the most prominent symptom of puerperal fever. It is more than a symptom, it is a part of the disease—the extension of the morbid affection of the genital organs to the peritoneum. Peritonitis appears either simultaneously with the disorder in the genitals, or after the morbid affections in the genital organs have subsided or entirely disappeared. In the latter case the disease is then localized in the peritoneum. There-

fore by combating the peritonitis we combat not only the most prominent symptom, but a part of the disease, or the whole disease itself. The great importance of the treatment of puerperal peritonitis is therefore evident. The first indication is to check the inflammation. Many therapeutical agents have been found useful for this purpose.

1. Narcotics: Opium, morphine, chloral hydrate, cannabis indica, etc., are invaluable when the pain is severe. The amounts of these given, and time of continuance, must depend upon the case; the patient should be made comfortable and kept so. When no longer indicated their use should be stopped.

2. Cold (*a*) in the form of ice-bags, a large one in the middle, or two small ones, one to either side. It adds to the comfort of the patient if the bags are so suspended that their whole weight does not rest on the sensitive abdomen. Care must be taken that the integument does not become frozen. An ice-bag on the head is often beneficial (*b*), in the form of a rubber coil, through the lumen of which a current of ice-water passes; (*c*) in the form of water cataplasms, especially when an ice-bag cannot be borne, though they soon become warm; they abstract heat by the evaporation of water in a slow but agreeable manner. To change the cataplasm too often disturbs the patient too much.

3. Warmth: Cold applications often do not agree with torpid or anæmic patients, while warm-water

cataplasms or poultices are found pleasant and beneficial.

4. Counter-irritation: Tincture of iodine, turpentine, blisters. I prefer turpentine sprinkled on a large piece of wet flannel, covered with oiled silk, in the form commonly known as turpentine stupes.

5. Blood-letting: Venesection is in all cases injurious, though less so in vigorous patients. Local blood-letting by leeches to the abdomen may be useful. In Vienna I applied leeches—twelve to twenty—several times with marked effect; the pain, though often very severe, ceasing quickly, and the inflammation subsiding after their use. It is, of course, questionable whether this was due to the local abstraction of blood or to the mildness of the attack, as mild attacks may be ushered in by very severe pain, which often ceases spontaneously in a short time. It has been observed by others and myself that pain continuing after the application of leeches is an ominous sign.

6. Purgatives: In mild attacks with great meteorismus a purgative often gives great relief. Calomel has also antiseptic properties. Caution is required in the use of purgatives, as the inflammation might be increased by them or profuse and exhausting diarrhœa follow. If it were not for this danger purgatives would have a more extensive application, as the old belief in their diminutive power has apparently some foundation; dogs suffering from

artificial septic or uræmic toxæmia overcome the poisonous effects when profuse diarrhœa sets in.

Purgatives are most urgently indicated when there is an accumulation of fecal matter.

7. Ointments: Unguentum cinereum and salves of iodine have been found useful before the septic nature of puerperal fever was known, or before the antiseptic properties of these remedies had been appreciated. I am fond of conjoining the use of ung. ciner. with the application of cold or warmth to the abdomen.

8. To relieve distressing meteorismus, enemata of turpentine are given. A rectal tube favors the escape of the distending gases, or an aspirator may be used, the needle introduced through the abdominal wall.

9. As an *ultimum refugium* the operation of opening the abdomen and washing out the cavity with some warm antiseptic lotion has been resorted to in some desperate cases. The results so far have not been encouraging.

A general peritonitis, not induced by septic infection of the genitals, may occur in the puerperal as in the non-puerperal state, and from the same causes; not as frequently, however, as is commonly supposed.

Treatment of Peri- and Parametritis.—Severe attacks of these affections require the same treatment as beginning cases of puerperal fever. Being easy

of recognition they are usually early diagnosed, and therefore properly treated. The milder degrees, giving only trifling symptoms, often escape observation, are consequently neglected, and are aggravated by some imprudence or exposure of the patient. For all cases of peri- and parametritis rest in bed and good nourishment of the patient are the most important remedies. These contribute more to the resorption of the effusion than any other means. Numerous remedies have been recommended, for internal and external use, to hasten the resorption of the effusion. Tincture of iodine, turpentine stupes, or other counter-irritants, and unguent. cinerei are useful not only during the acute but also during the chronic stage of inflammation. Massage of the abdomen and hot vaginal injections are often very effectual in hastening resorption. Large swellings with pseudo-fluctuation often disappear in a short time. When there are unmistakable signs of accumulation of pus, surgical interference should not be delayed. Too long a delay in surgical interference may be as evil in results as a premature search for pus with a trocar or exploring needle. When, on conjoined manipulation, fluctuation is found, the exploring needle is introduced until the groove is filled with pus, a sharp-pointed curved bistoury is slid along its gutter, and an opening made which is afterward enlarged by a dressing forceps. The abscess cavity is completely washed out and a

drainage tube inserted. Fistulous tracts opening through the abdomen should be given a counter-opening into the vagina.

14. ANTISEPTIC VAGINAL AND INTRAUTERINE INJECTIONS.

These injections on their introduction were as indiscriminately lauded and censured as any other newly-proposed remedy. By some they have been praised as the most valuable therapeutic agents for preventing or curing puerperal fever, and by others absolutely rejected as useless and injurious. The truth, arrived at by large experience, is that these injections are very valuable agents under certain conditions; but that indiscriminate or careless use, especially of intrauterine injections, is more injurious than beneficial.

1. Vaginal injections: The advantages of these injections are so great, and the dangers attending their use are so easily avoided, that they should be always used when there is an indication for them, as, for instance, blood coagula, infecting matter, pathological changes and lacerations in the vagina. The injections are also useful to stimulate contraction of the uterus during childbed. Accidents, as introduction of infectious matter, entrance of air or fluid into a vein, forcing the fluid through the uterus and Fallopian tubes into the abdominal cavity, and poisoning from absorption of the injected fluid, can

happen only with careless manipulation. To avoid these accidents a fountain syringe is used, the bag elevated about two feet above the level of the patient, the vulva first syringed, and while the stream is running the tube is introduced, its point being so large that it cannot enter the open mouth of a vein; the constrictor cunni and the levator ani are pressed a little backward with the tube or a finger, so that the injected fluid may easily return. At the same time, with the other hand gentle friction or firm pressure on the uterus is employed to control its contraction. Poisoning from absorption of the injected fluid may occur when too strong a solution, or a weak one in great quantity, has been used, especially when there is extensive laceration in the vulva, vagina, or cervix, or if a quantity of the irrigating fluid is retained in the vagina by contraction of the constrictor cunni and levator ani. This danger is avoided by using weak solutions (a two per cent. carbolic acid, or a 0.03 per cent. corrosive sublimate) when large quantities are to be used. When strong solutions are used the irrigating fluid should be let out by depressing the constrictor cunni, and the vagina afterward flushed out with boiled water.

Poisoning from the irrigating fluid might also occur when the disinfecting remedy has not been thoroughly mixed with the water. This happened once to me, when I carelessly put a teaspoonful of carbolic acid directly into the bag of the fountain

syringe. Although I shook the bag, I burnt my fingers and the external genitals of the patient, as the carbolic acid had mostly gravitated to the bottom and came out in great concentration. It is possible that some of the cases of poisoning with weak solutions have occurred in the same way. I now prepare and thoroughly mix the solution before I pour it into the bag, and use hot water (100° to 110°) as a better solvent of carbolic acid and corrosive sublimate. During the first forty-eight hours after labor I give the vaginal injections myself, and after this intrust them to the nurse, if she be clean and reliable.

2. Intrauterine injections: A distinction must be made between intrauterine injections immediately after labor and intrauterine injections during child-bed. (a) Immediately after labor the dangers attending this manipulation are: introduction of infecting matter, entrance of air or passage of the irrigating fluid into an open vein or through the Fallopian tubes, poisoning from absorption of the fluid, and shock. All these dangers can be as easily avoided by the use of proper precautions as in vaginal injections. A fountain syringe, and no other, should be used, held about two feet above the level of the patient, and with a thick finger-tube of zinc or glass bent to conform to the pelvic axis. After having carefully disinfected the hands, and the arm of the hand which introduces the tube, the external

genitals and the vagina are disinfected, while the nurse controls the contraction of the uterus by gentle rubbing, and presses the fundus gently downward to bring the os within easy reach. Then the tube, with the stream running, is introduced along two fingers through the cervix, and the fingers kept in the orifice to secure a free escape of the irrigating fluid; now the other hand can control the contractions of the uterus by gentle rubbing through the abdominal walls. No firm pressure should be made on the uterus when the tube is within its cavity, as otherwise the tube might injure the endometrium. In choosing the irrigating fluid we must bear in mind that the danger of its absorption is greater here than in vaginal injections, on account of the large absorbing surface and of the many large open veins, especially when the uterus shows a tendency to relaxation. The solution must, therefore, be weak, according to the quantity to be used. One to three quarts of a two per cent. carbolic acid, or of a 0.03 per cent. corrosive sublimate, solution can safely be used. After the irrigation the fluid must be pressed out of the uterus and vagina. When stronger solutions are used it is advisable to flush out the uterine cavity with boiled water, which is poured into the bag before it is empty to avoid entrance of air into the tube. With these precautions no accident can happen, and the uterus can be safely washed out when it is indicated, as, for instance,

after the introduction of the hand or instruments into the uterine cavity, after artificial separation of the placenta, after an exhausting labor, when there are clots in the uterine cavity, or the amnion or meconium have become decomposed, or the foetus has undergone decomposition, or when the uterus shows a tendency to relaxation.

This comparative harmlessness of intrauterine injections exists only so long as the vaginal portion is not yet restituted and thrombi are not yet formed in the placental veins. With each day after labor the dangers of intrauterine injections increase, and are in proportion to the narrowness of the orifice of the uterus.

(b) Intrauterine injections during childbed: All the above-mentioned dangers, in a higher degree, are present, and, in addition to these, there is the danger of dislodging a thrombus. Accidents have happened to experienced and careful obstetricians. Therefore it would be unjustifiable to resort to intrauterine injections at once in every case of puerperal fever, especially as the infection commonly begins in the vulva or vagina. In the few cases in which infection starts in the uterus from decomposing matter within its cavity, the results of intrauterine injections are very striking, and they should be used whenever a distinct indication is present, but not otherwise.

The most frequent accidents recorded as occurring

from their use are dislodgement of thrombi or passage of the fluid through the Fallopian tubes into the abdominal cavity, with subsequent symptoms of shock or collapse. Divers contrivances have been devised to avoid these accidents. When the cervical canal is so wide that two fingers can be introduced into the cervix and kept there alongside the injecting tube, the fluid easily returns. With narrowing of the cervical canal the dangers increase. Catheters, *à double courant*, of various modifications, have been recommended for use in such cases. I prefer a strong glass tube, bent to the pelvic curve, introduced only after disinfection of the vagina, and while the stream is still running, along one or two fingers and not beyond the internal orifice for fear of dislodging a thrombus. The syringing of the vagina elevates the uterus so much that the orifice is hardly accessible. This difficulty can be overcome by gently pressing the fundus down with the other hand, or the nurse may be allowed to do this. If we bear in mind the difficulties and dangers of intrauterine injections, we will omit their use unless a positive indication for washing out the uterine cavity exists, as in cases of severe endometritis, diphtheritic ulcers, metritis dissecans, or decomposing matter in the uterine cavity. The danger of forcing the irrigating fluid into a vein or through the Fallopian tubes during an injection immediately after labor can be avoided by controlling the contractions of the uterus

by external manipulation, but this manipulation is dangerous when thrombi have formed. As cases of shock from these injections have been recorded, they must be made slowly and carefully, and without the use of any force. Intrauterine injections during childbed always require great caution and some experience. I have used drainage of the uterus and permanent irrigation of the uterus without obtaining any satisfactory results; I found them more injurious than useful, and cannot, therefore, recommend these measures.

15. PATHOLOGICAL CHANGES.

The pathological changes do not vary as widely as do the clinical symptoms. In the great majority of cases several or all the following groups of morbid changes are found: 1. Inflammation of the genital mucous membrane, as vulvitis, colpitis, endometritis. 2. Inflammation of the uterine parenchyma, of the subserous and pelvic tissues, the inflammation being either circumscribed or diffuse, with lymphangitis and pyæmia. 3. Inflammation of the peritoneal covering of the uterus and its appendices, pelvic peritonitis or diffuse peritonitis. 4. Uterine and pelvic phlebitis, with formation of emboli and consequent pyæmia. Pathologists have attempted to classify puerperal fever according to the anatomical changes present, and with no greater success than has attended the efforts of the clinicians. The classi-

fications of this kind proposed by Buhl and Spiegelberg seem very attractive, but little is gained by setting up cases of puerperal fever which are the exception, and not the rule, as types of the disease. The same obtains more or less for other classifications. Better knowledge of the pathological changes is required before a satisfactory classification is possible. For practical purposes it is sufficient to know what morbid changes are usually found associated with certain clinical symptoms.

1. In the acutest cases. Neither macro- nor microscopical examination reveals in these cases any very pronounced morbid change. The blood is thin, fluid, shows little or no disposition to coagulate, and undergoes rapid decomposition (dissolution of blood). We find also œdematous swelling and softening of the uterus, with gelatinous œdema of the subserous and of the connective tissue, parenchymatous turbidity of the liver, spleen, and kidneys, and beginning lymphangitis; some turbid serum may be found in the pelvic cavity; all the organs undergo rapid decomposition. In short, the same morbid changes as are found in cases of intense and rapidly fatal septic infection after ovariectomy or other gynecological or surgical operations.

2. In acute cases. Some of the rapidly fatal cases (death within the first five days) present somewhat more distinct morbid alterations than are found in the former class, where death occurs in from six to

thirty-six hours after labor, and forms the connecting link between the two classes. In the great majority of cases, however, belonging to this category, very pronounced local and general morbid changes are developed. These usually begin at the point of infection, as vulvitis, colpitis, endometritis, or as diphtheritic ulceration. Either the poison is directly carried into the circulation by the lymph vessels and veins from these primary sources, and sets up morbid changes in distant organs, or the inflammation spreads by contiguity from layer to layer of the tissues. Rokitansky, from whom I quote, gives the best description of the morbid changes found in this variety of the disease:

“The dead subject presents a remarkable disfiguration of the countenance, tumefaction and discoloration of the external genitals, excoriation, ulceration, destruction of varying character, various vaginal discharges, tympanitic distention of the abdomen, a livid erythema of the common integument at different parts of the body, white and often large coalescing, miliary vesicles of the thorax and abdomen; yellow, greenish, bilious, feculent, chocolate-colored fluids escape from the mouth. The abdomen presents in most cases, even if the peritoneal inflammation has been slight or entirely absent, a tympanitic distention of the intestines; the symptoms are most developed in general peritonitis. The entire intestine is so much distended by gases that it causes pressure

upon the uterus, and forces the epigastric contents of the abdomen, with the diaphragm, into the thorax as far as the fourth, or even third, rib. The firmer the exuded (plastic) matter, the more firmly the intestinal coils and the other abdominal organs are agglutinated to one another and to neighboring organs.

“Among the exudative processes affecting the serous membranes the most frequent in occurrence, next to that of peritonitis, are pleuritis, pericarditis, less frequently exudations in the synovial bursæ. The exudations are very copious, fibrinous, and purulent.

“The entire intestinal tract is generally involved; it is but slightly reddened, and commonly exhibits a thin, watery, serous, or viscid, gelatinous, gelatino-purulent, or genuine purulent product. The submucous cellular tissue is more or less infiltrated; the exudation is rarely of a firm fibrinous or croupous nature; a black softening of the mucous membrane of the fundus ventriculi or of the œsophagus, or of both at the same time, which is indicated during life by the vomiting of black coffee-ground-like matter, is of frequent occurrence.

“Fibrine is sometimes found deposited on the valves of the heart in the shape of vegetations, without the demonstrable occurrence of previous pericarditis.

“Severe jaundice is always dependent upon py-

æmia, and never upon an appreciable derangement of the liver.

“The coagulable lymph is chiefly contained in the lower segment of the abdominal pelvic cavity, but also in the lateral parts of the abdomen, between the mesentery and in the vicinity of the large epigastric viscera, within spaces that have become more or less circumscribed by adhesions. It not infrequently causes, especially on the surface of the liver, shallow depressions, and gives to the superficial layers of this organ, if of a purulent and sanious character, a greenish, and to the spleen a blackish, tinge.

“The reddening and vascularity of the parts are generally inconsiderable, but most evident at those parts which are free from pressure, and occur in the form of narrower or broader striæ. The membranes of the intestinal canal are all tumefied, the interstitial cellular tissue infiltrated, the layers easily distinguishable and friable.

“The intestine generally contains, in addition to a large quantity of gas, a yellow, serous, feculent fluid, which mounts up to the duodenum and stomach.

“This fluid is in part a product of an exudative process that occurs in the greater part of the intestinal mucous membrane.

“The duodenum and stomach may also be found to contain a copious amount of yellowish-green or intensely green biliary fluid.

“Almost all organs appear in a state of relaxation, owing to moistening or imbibition of the tissues with the attenuated serum of the blood, which readily transudes through the vasular coats, and from the same cause pale or discolored by the coloring matter which transudes with the serum. In the abdomen we find that the kidneys and liver are chiefly altered by softening, pallor, or pale red discoloration, œdema and imbibition, relaxation and friability of their tissues. In the thoracic cavity the lungs are chiefly affected by these and similar deviations. All the serous membranes and the lining membrane of the vessels are infiltrated with serum, and are more or less reddened, and the serous cavities contain various quantities of a transuded, pale, or dark red serum. The spleen is frequently tumefied, the lungs reduced in size and denser, in consequence of the upward pressure exerted by the intestines, the inferior lobes of dark purple color, and in a condition of passive hyperæmia.

“Puerperal inflammations. Puerperal inflammation of the uterus by itself always appears as an exudative process, affecting primarily the raw exposed surface of the uterus to which the placenta has been attached, and is therefore always, as regards its original seat, an endometritis.

“Puerperal endometritis. This lesion varies greatly both in reference to the plasticity of its product and to the condition of the diseased tissue, and in indi-

vidual cases or in epidemics. The series is almost endless, but we may consider genuine uterine croup, on the one hand, and the so-called genuine putrescence of the uterus on the other, as its extremes; the existence of this great variety in form compels us to limit our descriptions to the most prominent types.

“In certain cases we find the internal surface of the uterus lined by a yellowish or greenish dense exudation of greater or less thickness and extent, either in small patches or investing the entire uterus, and either firmly or loosely agglutinated, and occasionally partially or entirely detached from the subjacent tissue, so as to appear corrugated or plicated. The uterine mucous membrane under the lymphatic coating is found reddened, tumefied, and slightly softened; the free parts are discolored and invested with a dirty reddish or brownish secretion, and with remnants of the deciduous membrane. The exudation generally interpenetrates largely the exposed raw tissue of the placental portion of the uterus, and causes it to assume a peculiar ulcerated appearance. This is uterine croup. In other cases the exuded matter is a gelatinous, purulent, dirty yellow, loose, and easily detached layer, beneath which the internal stratum of uterine tissue appears spongy, infiltrated, and soft, and may be easily detached in the shape of a dirty yellowish-red, or partly greenish and brownish pulp. The internal surface of the

uterus presents, in addition to the lymphatic exudation, a glutinous secretion of a similar tinge. Again, the internal surface of the uterus may not present a trace of coagulable lymph, but be invested by a purulent, sanious, and much-discolored exudation, beneath which we find the uterine mucous membrane infiltrated, in more or less extensive or circumscribed patches, with a similar product, and it may either be easily removed in the shape of a thin and much discolored pulp, or has already become detached, and is mixed up with the contents of the uterus in the shape of friable discolored flocculi. In the place of the destroyed tissues we occasionally discover the products of a reactive process in the shape of a more or less consistent sanio-purulent secondary exudation. Again, the internal layer of the uterus may be covered with a thin, opaque, or more dense, pale green or brownish, or dark chocolate or coffee-colored product, beneath which it is converted, to a greater or less depth, into a loose, infiltrated, fetid pulp, of a similar tint. This condition has been termed putrescence of the uterus.

“There are numerous degrees of transition between the forms described, and they not unfrequently become complicated with one another in such a manner that a process of a malignant nature follows one that is accompanied by a secretion of plastic lymph. The anomalies presented by the uterus are either direct reflexes of the processes in question, or occur as acci-

dental complications. To the former appertain paralysis of the uterine fibres and impeded involution in various degrees. Varying with the time of occurrence after labor, or the intensity of the puerperal infection, the womb will be found of greater or less size, more or less relaxed, collapsed, and softened; certain districts, containing a large amount of cellular tissue, as the lateral edges and the cervix, are infiltrated with a pale yellow, sero-gelatinous, or sero-purulent fluid. The external surface of the uterus exhibits numerous shallow depressions, caused by the pressure of adjacent distended coils of intestine. Among the accidental complications we include sanguineous engorgement (apoplexy) of the neck of the uterus, sloughs of greater or less extent, which occur chiefly at the neck and vaginal portions of the uterus, and also in the vagina and the external genitals, associated with malignant exudative processes.

“Puerperal uterine dysentery. The appearances presented by the inner surface of the uterus vary according to the intensity of the disease. In one case it is uneven, nodulated, and invested by a dirty reddish or brownish fetid secretion; the projecting parts of the mucous membrane are covered with a grayish-yellow, or firm greenish, exudation, here and there presenting a furfuraceous exfoliation, and the subjacent mucous membrane itself is generally converted into a yellow slough; the entire surface may thus, in the advanced degrees, present an appearance

exactly resembling the impetiginous condition of the intestine in dysentery. In another and more advanced degree the internal layer of the uterus is found degenerated into a brownish-black, friable, loose, or detached mass; the uterine cavity contains a fetid matter, resembling coffee grounds; the uterine tissue is flabby, pale, discolored, and more or less infiltrated with the sanious matter (dysenteric putrescence of the uterus). This affection is often seen combined with true dysentery, or with a dysenteric process of the mucous membrane of the colon.

“Peritonitis puerperalis is a very common puerperal disease; in rare cases it actually constitutes the primary and only puerperal exudative process. It more frequently merely simulates this form, the processes with which it was originally associated retrograding, becoming insignificant, or actually ceasing after discharge of their products has been effected. Puerperal peritonitis is not unfrequently limited to the peritoneal covering of the uterus and its appendices, with more or less distinct congestion, and a thin partial lymphatic exudation, or a more abundant and extensive layer of a viscid and consistent, or loose and fluid secretion; the disease may involve the peritoneum of the entire hypogastric abdominal region, the whole parietal and intestinal peritoneal laminæ. The products of these processes vary very much; they may be firm, yellowish-gray concre-

tions ; loose, yellowish, membranous, grumous, gelatinous, or fibrinous bands, which glue the intestines to one another, or to the parietes of the abdomen ; or they may be yellowish or greenish-yellow, thin, seropurulent, or thick, purulent, dirty green, and brownish-red, hemorrhagic, thick, opaque sanious effusions, the result of septic peritonitis ; but in general peritonitis the effusion is generally extremely copious, whatever be its particular variety. The products of the peritoneal inflammation correspond in character with those of the exudative processes affecting the internal surface of the uterus and of metrophlebitis, whether the latter occur coincident with or precede the peritonitis."

Very frequently the exudation looks like scrambled eggs, and sometimes resembles coagulated milk ; these latter cases were formerly ascribed to the metastasis of milk, and the resulting processes supposed to be due to some derangement of the lacteal secretion.

"Inflammation of the veins and lymphatics of the uterus. Both, and especially phlebitis, are important puerperal diseases. Uterine phlebitis is generally primary, and originates in the open mouths of the veins at the insertion of the placenta. It either remains confined to a small area, or involves the greater part of the uterine or spermatic venous system. It may extend upward through the vena cava to the right auricle, or downward, along the iliac and the crural veins to the cutaneous veins of the lower

extremity, producing symptoms of phlegmasia alba dolens. Metrophlebitis undoubtedly occurs as the sole and primary disease in some cases, but in the vast majority of instances it is complicated with exudative processes of the internal surface of the uterus. This combination is commonly present from the first, or the phlebitis supervenes upon and is induced by the exudative process, or phlebitis may give rise to a single or repeated exudative process. Uterine phlebitis often runs a rapid course, with intense typhoid symptoms, and proves fatal by inducing uterine paralysis; or it advances more slowly when circumstances prevent general infection, and may then prove fatal by resulting secondary destruction. Inflammation of the uterine lymphatics occurs less frequently than does phlebitis, and is generally complicated with the latter. The lymphatics of the uterus, and particularly those of the lateral and posterior segments, of the ovaries, and of the Fallopian tubes, are distended and varicose, their coats pale and opaque, the lining membrane dull and furred, and they contain a yellowish or yellowish-green, purulent fluid. Inflammation of the veins and lymphatics is generally the source of metastases in the most varied tissues and organs, as well as of exudative processes in serous and mucous membranes during the latter stages of puerperal disease."

3. In the more chronic cases. On post-mortem ex-

amination of cases of puerperal fever, the symptoms of which had not appeared until the second or third week after labor, or in which the symptoms had assumed a pyæmic form, a disorganized, putrid thrombus, or an abscess from which repeated septic absorption had occurred, is found. In some cases no further distinct morbid change in the abdomen than a decomposing thrombus, or an abscess under the serosa of the uterus, or in a lymph sinus elsewhere, is present. Metastatic abscesses, however, are very commonly found in all or several internal organs, in the joints, and in the subcutaneous tissues of the limbs. In other cases the same morbid changes as in the previous class may be found in the pelvis and abdomen, or traces merely of a prior morbid process, as the agglutination of the intestines with each other, or with neighboring organs, or residua of para- and perimetritic inflammation. In the great majority of cases, however, the same lesions are found as in cases of pyæmia after surgical operations.

4. In cases of peri- and parametritis. Inflammation of the pelvic peritoneum and of the connective tissue about the uterus, between the ligamenta lata and under the peritoneum, owing to the proximity of these structures to the site of primary infection, very commonly occurs.

The morbid changes vary according to the intensity, extent, and duration of the inflammation, and are usually most distinct in chronic cases. We find

either a diffuse œdematous infiltration of the connective tissue and congestion of the peritoneal covering, or purulent infiltration or collection of pus in different parts of the pelvis; the pelvic viscera are often found agglutinated by more or less firm adhesions. This agglutination may give, during life, the impression of a parametritic abscess or of a solid tumor in the pelvis.

If suppuration have occurred and the pus opened into one of the neighboring organs, as the rectum, vagina, bladder, or the uterus, fistulous tracts communicating with one or the other of these organs will be found, or sinuous openings in the abdominal walls, if the abscess have opened externally. When the abscess has opened into the peritoneal cavity, circumscribed or general peritonitis is present. Where the suppuration has been long continued, we find amyloid degeneration of the spleen and kidneys, and evidences of hydrops and anæmia.

CHAPTER XX.

MORTALITY OF PUERPERAL WOMEN.

THE Puerperal Fever Commission appointed by the Berlin Society of Obstetrics and Gynecology gives the percentage of deaths due to puerperal causes in women of child-bearing age as from ten to fifteen per cent. That this high mortality is not exclusively due to the more general employment of midwives in Germany is shown by the statistics of this country, where most women are confined by physicians, and where the mortality is at least as high as in Germany. The United States Census of 1870 gives the percentage as 6.5 per cent. of all deaths in women. And this ratio is doubled, as shown by statistics, if we exclude the deaths in women before or after the child-bearing age. Life insurance companies' statistics give a still larger percentage ("System and Tables of Life Insurance from the Experience and Records of Thirty Life Offices," by Levi W. Meech). Of 2,182 insured women, 197 (9.03 per cent.) died from puerperal causes. Between the ages of nineteen and twenty-nine years, 18.3 per cent., and between the ages of twenty-nine and thirty-nine years, 13.5 per cent. of

all deaths were due to puerperal causes. Geographical situation was without influence upon the percentage, it being the same north or south of $36^{\circ} 30'$.

Some of these deaths may have been wrongly attributed to puerperal causes, but these would be greatly outnumbered by the deaths attributed to malaria, peritonitis, pleuritis, and other diseases which were really due to puerperal causes. Large statistical tables show that almost seventy-five per cent. of the deaths during childbed are caused by puerperal fever and its consequences.

The former great difference between results in lying-in hospitals and private practice (in 1,000 cases of labor, 40 deaths in hospitals to 8 deaths in private practice) exists, with improved antiseptic resources, no longer ; and for some hospitals the difference is even the other way. The mortality from puerperal fever in private practice is really larger than is usually acknowledged. We often hear that such and such a physician has attended several hundred confinements without a death from puerperal causes, but on further investigation we often find that several of the women died from causes indirectly produced by puerperal fever.