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The Use of Antiseptics in Obstetric Practice.

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[*Reprinted from the Boston Medical and Surgical Journal of January 27, 1887.*]

BOSTON:
CUPPLES, UPHAM & CO., PUBLISHERS.
Old Corner Book Store.
1887.

THE USE OF ANTISEPTICS IN OBSTETRIC PRACTICE.

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Professor of Obstetrics, Harvard University.

SINCE Lister announced, in 1866, the value of antiseptics in surgical practice, the whole method of operating has been changed, and the accounts of the results daily obtained by surgeons in our large hospitals, as well as in their private practice, seem almost incredible when compared with the results reported by even those same surgeons only a few years since.

What the use of antiseptics has done for surgery it is now doing for obstetrics, and the object of this paper is to present as clearly as possible the value to be derived from their use in obstetric practice, as shown by the results obtained in the Boston Lying-in Hospital.

As early as 1847, Semmelweiss declared that puerperal fever owed its origin to the absorption of decomposing organic matter, and was only a form of pyæmia. In 1860 he modified [1] this statement by the admission that, while still being pyæmic in character, it might also arise from the decomposition of the lochia, blood-clots, necrosed or placental tissue. With a view of preventing its invasion, he recommended the use of disinfectants. His theories and recommendations were received with ridicule, and it is only within a few years that it is admitted that in his teachings were the first foreshadowing of the true nature of this dreaded disease.

It was not until Lister, realizing the significance of

[1] "Die Ætiologie, der Begriff und die prophylaxis des Kindbett-Fiebers."

Pasteur's investigations, had announced (1866) his views on antiseptic surgery, that Stadfeldt, in Copenhagen, endeavored to introduce the same method of prophylaxis in obstetric practice.

The reform has come about slowly, and the chief hindrance has been in the fact that the profession do not agree as to what is meant by the somewhat vague term, puerperal fever. The famous discussion,[2] which took place in the Obstetrical Society of London in 1875, on the relation of puerperal fever to the infective diseases and pyæmia, is still fresh in the memory of the members of this Society, and the result of the discussion was successful rather in bringing forward a distinct and fair statement of the various views held by the speakers, than in obtaining any expression of a positive united opinion of the leaders in the obstetric practice of that day. Nor would the history of the gradual change, which has occurred in the profession with reference to this subject, be complete without an allusion to the discussion [3] which took place before the New York Academy of Medicine in December, 1883, and February, 1884, the main interest in which centred in the addresses of Drs. Fordyce Barker and T. G. Thomas, the former claiming that puerperal fever was a distinct disease, developed like other zymotic diseases, and the latter pronouncing it to be unquestionably a form of septicæmia.

There can now be no question that the weight of evidence is in favor of those who claim that what was formerly known as puerperal fever is septicæmia, identical in its origin, course, and results with the surgical septicæmia, which was formerly so dreaded in the surgical wards of hospitals, and in the private practice of surgeons. It is, moreover, now clearly recognized

[2] Transactions of the Obstetrical Society of London, Vol. XVII.
[3] American Journal of Obstetrics, March, 1884.

that all puerperal inflammatory affections, such as ovaritis, cellutitis, metritis, peritonitis and the like, owe their origin to infection.

Those, however, who were willing to admit the truth of these statements were in doubt, until the appearance of Koch's work on bacteria, as to the probable source of the infection, and were, until Koch's monograph on the subject was made public, inclined to accept the theory long ago advanced by Semmelweiss that the infection might either come from outside the patient, or owe its origin to spontaneous generation within. The announcement of the discovery of bacteria, and the important part which they played in various morbid processes turned the attention of obstetricians to what the bacteriologists were doing in the laboratories of Europe and this country, and to-day it is unquestionably admitted by many leading obstetricians that the infection in these cases must come from without.

That we may at the outset clearly understand just what the bacteriologists claim, the following brief statement, kindly furnished me by Dr. Harold C. Ernst, the Demonstrator in Bacteriology in the Harvard Medical School, must be of value:

"Innumerable investigations have shown, as one of the best established facts of medical knowledge, that the suppurative processes, and many of the acute diseases known as 'infectious,' are due to the activity of the lower forms of life known as 'bacteria.' This is especially the case with that class of affections which may be called 'maladies following wounds.'

"It may be considered proven by the experiments which have been made to determine the fact that, in the healthy human organism, there exist no bacteria. On the skin and mucous membrane they are constantly present, and in great variety, but, so long as these sur-

faces are intact, the most virulent organism known will do no harm. So soon, however, as there is a solution of continuity, and the bacterium is able to gain an entrance into the tissues of the body, just so soon does damage begin, provided the organism be possessed of pathogenic powers in the first place.

"The first condition necessary for the hurtful activity of bacteria to become manifest is that there should be a solution of continuity — a wound of the skin or mucous membrane. The second condition is that rather indefinite state of affairs called susceptibility of the system or of the part, such susceptibility being a lowering of the vitality, a depression of the blood-supply, or some more minute change in the cells, which it is beyond our power as yet to definitely describe.

"The classical work upon such diseases as are here spoken of is that of Koch in his 'Wund-Infections Krankheiten' ('Traumatic Infective Diseases of the Skin.' — Sydenham Society). It was this work which first made known the comparative ease with which different varieties of bacteria can be separated from each other, and which gave the great impulse to investigation which has built "bacteriology" into a science, and has given us the precise methods by which we have learned what we at present know in regard to the infectious diseases.

"One class of these infective diseases are those of which Koch speaks in the book just mentioned, and includes those morbid processes complicating injuries and operation wounds, that is, septicæmia, pyæmia, progressive inflammation and suppuration, and erysipelas, and, for nothing is more distinctly a wound than the lacerated surface of a uterus after parturition, puerperal fever.

"In the light of our present bacteriological knowl-

edge, the terms pyæmia and septicæmia no longer retain their original signification, for, in Koch's words, pyæmia does not arise, as was at one time believed, from the entrance of pus into the bloodvessels, and septicæmia is not putrefaction of the living blood. These terms can now be used only as collective terms for a number of symptoms which, in all probability, belong to different diseases, that is to say, are produced by the activity of different bacteria. It is only by the observation of these bacteria that one can say with scientific exactness what special form of pyæmia, or septicæmia, may be under observation. That this is distinctly true is proven in the one direction by Koch's observation of the bacillus of mouse-septicæmia, which is fatal to house-mice, and has no effect upon field-mice or rabbits; of pyæmia, septicæmia, and erysipelas in rabbits; and in the other direction by the investigations of Rosenbach, Passet, and others, by which there are shown to be several varieties of bacteria which are active in the production of the suppurative and inflammatory processes in man.

"To what has been said in regard to septicæmia and pyæmia, puerperal fever forms no exception. In spite of Pasteur's work upon the subject, the best investigations show without a doubt that puerperal fever must be considered to be a name given, for convenience, to a group of symptoms which represent the effects of an attack upon the system by one *or more* varieties of bacteria. The disease is eminently a traumatic wound disease. A woman passing through the puerperal state with no untoward symptoms has never been found to have bacteria in the system, whilst those attacked by 'puerperal fever' are invariably found to have bacteria in the tissues, bloodvessels or lymphatics of the affected parts. The two conditions necessary for the entrance and growth of bacteria

are present in the parturient state in a preëminent degree.

"The uterus after parturition is, like any other wounded surface, exposed to the air passing over blood and organic débris, especially exposed to putrefaction and the entrance of bacteria, whilst the profound modification of its tissues, bloodvessels and mucous membranes furnishes the second favorable condition for their growth, after they have obtained an entrance.

"The bacteria make their way in from outside. They are not born from nothing in the uterine tissues. There is no spontaneous generation about it. The vagina contains bacteria in health like the mouth, and, like the bacteria in the mouth, those in the vagina do no harm. Even in a diseased state the ordinary putrefactive bacteria do not change their character, and puerperal fever and peritonitis do not result from their presence. It is only by the entrance of the pathogenic bacteria — and sometimes of more than one variety of these — that a disturbance is produced. These pathogenic varieties are *brought* to the uterus. They are not there in the first place, and they are brought by the air or some other less usually suspected method of conveyance. The varieties of bacteria, which have thus far been especially connected with puerperal fever are:

"(1) Rather long cylindrical filaments, appearing especially in rapidly fatal septicæmias.

"(2) Streptococci, or micrococci, occurring in chains, common in the milder forms of septicæmia.

"(3) Diplococci, micrococci occurring in pairs, and especially where there is suppuration.

"(4) Micrococci in irregular masses.

"Any or all of these forms may be found in a single case, and there is no doubt that these will be

finally resolved into a more distinct and numerous classification.

"The problem is unquestionably how to keep these bacteria out of the body. Without their entrance there will be no puerperal fever or septicæmia."

The above statement gives us concisely the present belief of the bacteriologist as to the ætiology of puerperal septicæmia. The practical results of an application of this theory, and how the problem is being solved is well shown in the clinical history of the Boston Lying-in Hospital.

This hospital, after being closed for lack of public support, was reopened January 1st, 1873. Since that time 3,337 women have been delivered, and the study of puerperal septicæmia, as it has appeared at that hospital, has been one of the greatest interest. During the first year only 160 women were confined, of this number one died, the death being due to puerperal septicæmia. From that time, however, septic infection has been more or less prevalent in the hospital, despite every effort made to prevent its occurrence. On three occasions (November 13th to December 9th, 1879, September 13th to October 30th, 1880, and May 7th to May 28th, 1883), the hospital has been closed; and, before being reopened, every ward has been fumigated and new beds provided. Whenever the hospital was thus closed there followed a period of comparative immunity from septicæmia. For a longer or shorter time the daily temperature would either be normal or much lower than usual. The freedom from anxiety was, however, of short duration, and gradually, despite every precaution we could adopt, the temperatures would begin to run higher and higher; the lochia would become offensive; the tenderness, more or less marked over the abdomen, would reappear, and soon another patient would fall a victim to puer-

peral fever, and another period of anxiety would begin. During the ten years preceding 1884, the hospital was rarely free from septic disease of one form or another; and, while the visiting physicians were endeavoring in every way possible to protect the patients from septic infection, they were constantly endeavoring to save the lives of those who gave evidence of septic poisoning. In looking back over the records of those years it seems wonderful what success crowned their efforts. An examination of the figures, to which attention will be called later, will show that a very low death-rate was maintained, considering the percentage of septic cases. When we consider the almost constant presence of septicæmia in the hospital a death-rate of 3.04 per cent. from septic causes, in 2,661 confinement cases, which occurred from January 1st, 1873, to December 31st, 1884, must be considered very low.

Dr. W. L. Richardson and Dr. Henry Tuck comprised the visiting staff from the date of its opening until January 1st, 1878, when Dr. A. D. Sinclair succeeded Dr. Tuck, who then moved to New York. Dr. Sinclair resigned at the close of his term of service, March 31st, 1883, and the vacancy was filled, January 17th, 1884, by Dr. Wm. E. Boardman. The office of assistant physician has since 1877 been filled successively by Drs. Samuel Howe, W. E. Boardman, and Charles M. Green. The various changes which have been made, in the attempts to rid the hospital of septicæmia, have been the results of careful study and observations on the part of the visiting physicians, and after many anxious consultations on the subject. As one septic case occurred after another every effort was made to avoid any possibility of contagion from a patient presenting symptoms of septic infection to another. Isolation of suspected cases; the employment

of extra and special nurses; the assignment of different house-physicians to the infected and to those whose convalescence seemed normal; the use of every possible precaution to insure cleanliness; the providing of individual bed-pans, syringes, etc.; constant attention to ventilation and improvement in the drainage, were among the methods adopted. Many of these changes seemed to promise improvement, which however, was always found to be temporary. From the very outset the staff were a unit in the belief, even then not generally accepted, that the views of Semmelweiss were correct, and our object was to prevent the introduction of septic material from without, and the prevention of the absorption of septic material originating within the uterus and generative tract. With this latter end in view we soon began the use of vaginal injections, hoping to keep disinfected those parts especially exposed to the lochial discharge, which seemed to us one great source of danger within the patient herself. These were subsequently not unfrequently combined with intra-uterine injections, hoping thereby to also render innocous the clots, and placental débris within the uterine cavity. All these attempts proved futile, although occasionally it did seem as though some new method of procedure which we adopted was at last to offer the long-sought-for relief. The respite was, however, only temporary, and still the mischief went on. In fact, it not unfrequently happened that, when, out of sheer despair, one of the staff would give up the use of injections, the results he obtained seemed to compare favorably with those reported by his colleague who thought himself, by continuing their use, more conservative.

In the middle of the winter of 1883 and 1884 corrosive sublimate was first tried, not only as a vaginal douche but also for the disinfecting of the hands of

the attendants. A very decided improvement followed this method of procedure, and again the outlook was more cheering. Still septicæmia remained with us, but in a more modified form and the death-rate fell decidedly, as will appear from the tables which are presented with this paper.

Then came the announcement of Robert Koch's investigations of bacteria, and it seemed at last as though a better day for obstetric practice and for the hospital was coming. Garrigues, in New York, had adopted the new theory, and had already made public the efforts which he was making in the New York Maternity, and the results he was obtaining. We determined to change our whole system.

Heretofore, following the theory advanced by Semmelweiss, we had been trying to prevent the introduction within the system of those elements which, whatever they were, would produce disease, and also to prevent those elements, when generated within the system, from doing harm. In other words, we had been dreading and fighting attacks from within, as well as from without. We now determined no longer to fight a foe within, which existed only in a false theory, but to accept the theory of the bacteriologists, and prevent the entrance of the foe from the front. If, as we believed, the investigations of the bacteriologists had led to a correct theory, namely, that puerperal septicæmia was the result of the introduction from without of bacteria within the body of the patient, and that it was impossible for a case of septicæmia to be autogenetic in its origin, the problem of prevention became at once a comparatively simple one. How best to solve the details of the problem was, of course, a matter to be determined by experiments.

The vaginal injection during the convalescence, from which, when we adopted its use, we had hoped

so much, now seemed to us to be possibly, in one way, a source of as much harm as good and was therefore discontinued. We endeavored to disinfect, as thoroughly as possible, the generative tract at the beginning of labor, lest the dreaded bacteria might already have found a resting place, and was only waiting an opportunity to infect the system, wherever a break of continuity should admit of its entrance; during the progress of the labor, we never allowed the patient to be touched by the attending physician or nurse without the use of disinfectants; and during the convalescence we applied a disinfected pad, which should still further act as an effective barrier to the entrance of these dreaded germs, until the period of danger was passed.

Stadfeldt,[4] in Copenhagen, had, as early as 1870, recommended in obstetric practice the use of carbolic acid as a disinfectant; and Tarnier, in a paper read (1881) before the International Medical Congress, advocated the use of the bichloride of mercury. Other practitioners subsequently recommended other disinfectants, such as thymol, chloride of lime, permanganate of potassium, biniodide of mercury, and many others less known and less valuable as disinfectants. In the Boston Lying-in Hospital, we had for many years used carbolic acid, and since 1884 we had been experimenting with the corrosive sublimate. The relative expense of the two, and the admirable results which Garrigues had already reported,[5] induced us to select the latter as the disinfectant to be used. A pad, somewhat similar to that introduced by Garrigues into the New York Maternity, was adopted, except that we substituted what is known as absorbent waste instead of oakum, experience having taught us

[4] Stadfeldt. Des Maternités, Copenhagen, 1876.
[5] New York Medical Record, December 29, 1883.

that the smell of oakum was itself deceptive, and had often disguised the odor of the lochial discharge.

The method which we adopted in the fall of 1885 was as follows:

On her admission to the hospital, if time allows, the patient is given a bath. In every case the genitals and the surrounding parts are washed with a solution of the bichloride of mercury ($\frac{1}{3000}$). A basin containing the same solution and a nail-brush is placed on a stand side of the bed. The physician and nurse in attendance disinfect their hands every time they have occasion to examine the patient or touch the neighborhood of the vulva. The examining finger is smeared with an ointment made of one part of the oil of eucalyptus and seven parts of vaseline. A vaginal injection of the corrosive sublimate solution is given at the beginning of labor, and this is repeated, when circumstances permit, at the end of the first stage. As the head distends the perineum and is expelled, the parts are kept clean, when occasion requires, by the use of charpie dipped in the mercurial solution. After the birth of the child, no undue haste is made to bring about the expulsion of the placenta. This is effected, if possible, by Crede's method of expression, great care being taken not to introduce the hand within the vulva, if such a procedure can be avoided. The perineum is carefully examined, and if there is sufficient laceration to require sutures, the parts are washed with the corrosive sublimate solution, after which the edges are brought together by means of carbolized cat-gut sutures, some powdered iodoform being subsequently applied over the seat of the laceration. The vaginal injection is repeated, and the antiseptic pad is applied, being pinned at the four corners to the abdominal binder by means of safety-pins.

During the convalescence the pad is changed as often as occasion requires, the nurse taking care to thoroughly disinfect her hands before removing the pad. Each time the pad is changed, the parts around the vulva are sprayed with the mercurial solution by means of a hard-rubber sprinkler, made by the Davidson Rubber Company to fit their syringes, which are the ones used in the hospital. It is usually necessary to change the pad during the convalescence about as frequently as it was formerly necessary to change the napkins which the patients wore before the pad was introduced. If it is necessary to use a catheter to empty the bladder, that instrument is, of course, to be disinfected, as well as the hands of the person using it. Care is also taken, before introducing the catheter, to wash the parts in the neighborhood of the meatus with the disinfectant, in order to avoid the introduction of blood, vaginal or uterine discharges within the urethra.

The use of the antiseptic pad is continued until the patient sits up, or until all danger of septic infection has passed. Whenever the mother has given birth to a putrid child or a partially-decomposed placenta, an intra-uterine injection of the corrosive sublimate of the same strength is given at the close of the labor, in addition to the vaginal one already alluded to. Should it be deemed advisable to give an intra-uterine injection, it is safer, after washing out the uterine cavity with the mercurial solution, to then, without removing the nozzle of the syringe, inject a few ounces of a solution of carbolic acid ($\frac{1}{40}$) of the same temperature (112°). By this method, any danger of mercurial poisoning (which sometimes, though rarely, follows the use of corrosive sublimate as an intra-uterine injection) is avoided.

In case it is found necessary to use instruments during

the delivery, care is taken to disinfect them by means of a solution of carbolic acid ($\frac{1}{40}$). The same solution is used for the needles, needle-holder, etc., which may be required for sewing up any perineal laceration. Carbolic acid is used in these cases, in preference to the bichloride of mercury, on account of the corrosive action of the latter on the instruments. If, for any reason, it is necessary to introduce the hand within the uterine cavity, great care is taken to thoroughly disinfect the arm, as well as the hand of the operator.

The antiseptic pad is made as follows: A strip of Canton flannel (19 × 4¼ inches) is placed upon a table, with the soft side uppermost. On the centre of this is laid a piece of carbolized cotton (11 × 4½ inches), about half an inch in thickness when not compressed. Over the centre of this is a piece of oiled muslin (9 × 4 inches). On this is placed the pad itself, which is made of what is known as absorbent scrap or waste done up in cheese-cloth, and of a size sufficient to cover the oiled muslin, and about half an inch in thickness, before it is wet or compressed. This pad, before using, is dipped in a solution of corrosive sublimate ($\frac{1}{3000}$) and dried. Whenever a pad, with its binder, is removed and a fresh one substituted, the old pad, including the Canton flannel, oiled muslin, etc., is burnt up.

Formerly, the patients were delivered indiscriminately in different wards, with a view of scattering the patients through the hospital, in order that each nurse might have an equal experience in the care of the cases. Since, however, the new method has been introduced, the labor is kept in one ward until that is filled up, and then passed to the next, the patients, as a rule, remaining in the ward in which they are confined until their discharge from the hospital. As soon as a ward becomes vacant, it is thoroughly fumigated by the use of sulphur-fumes, and the walls are washed

down with soapsuds and carbolic acid. The weather permitting, the windows are opened and the ward thoroughly aired before it is again opened for the reception of patients. In case any patient has been confined in the ward, whose convalescence has been in the least suggestive of septic infection, the walls, after being thoroughly washed with soapsuds and carbolic acid, are wiped over with a solution of carbolic acid ($\frac{1}{40}$).

Since the fall of 1885 the above has been the method in which antiseptics have been used in the hospital. The results have demonstrated, beyond the possibility of a doubt, the great value of such prophylaxis. In critically examining the results it must be remembered that the drainage, ventilation and hygienic condition of the hospital have been unchanged; the nurses, house-physicians and medical staff are virtually the same, and the patients are from the same class in the community as before the introduction of the present method of conducting the cases. The only change is in the manner of using the antiseptics during the delivery, and the more frequent disinfecting of the wards than was formerly the custom.

During the present year there have been three deaths, but in no case could the fatal result be ascribed to septic infection, as is readily seen from the following brief record of the cases:—

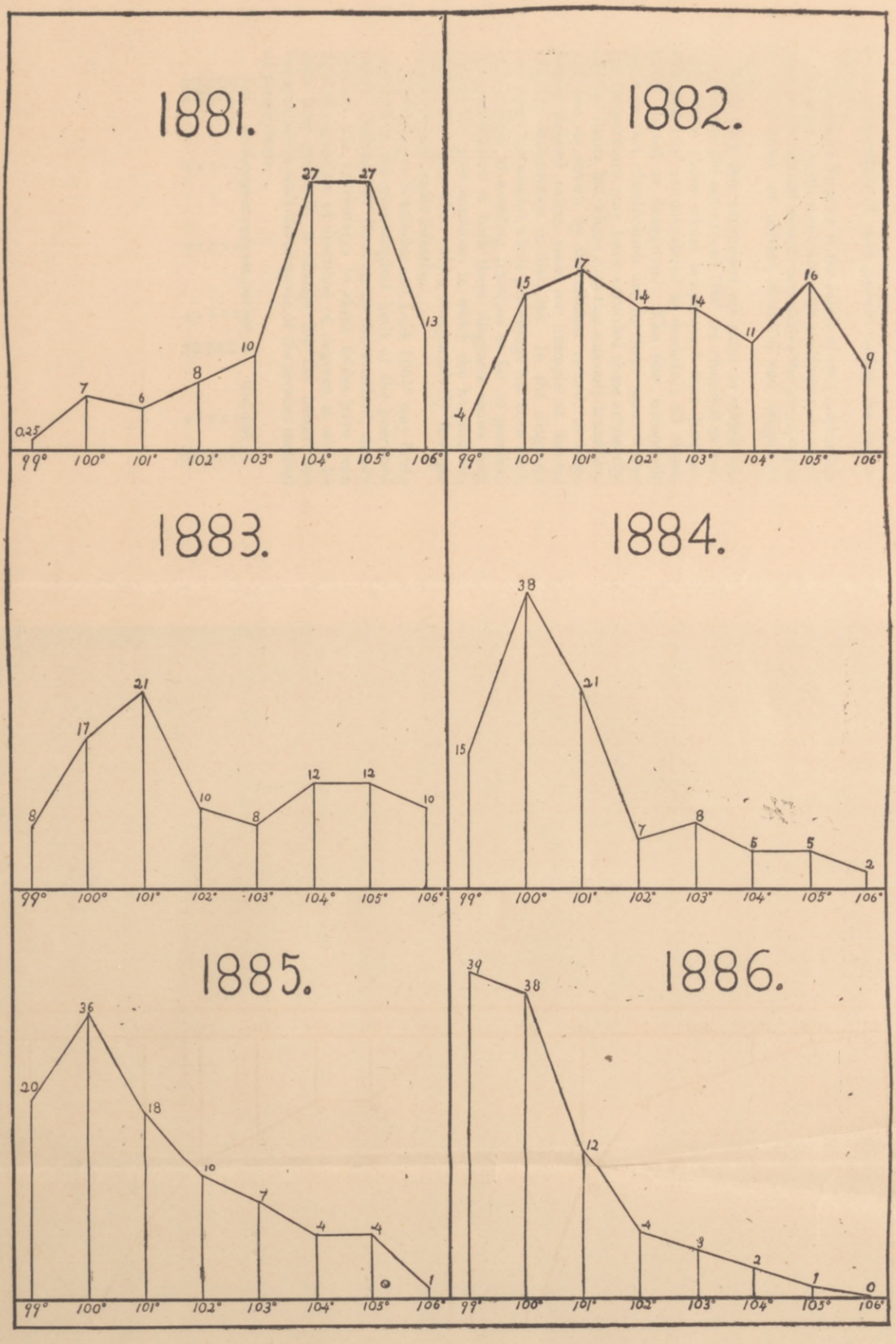
Case I. (Service of Dr. W. E. Boardman.) A. S., single, aged twenty, primipara, entered the hospital January 28th. Nervous, despondent. Rigidity of os. Early escape of liquor amnii. Labor, preceded for ten days by an almost constant aching pain in lower abdomen and sacral region, lasted over thirty hours. Girl, weighing seven and six-tenths pounds, delivered alive with forceps. Patient died three hours later of shock and exhaustion.

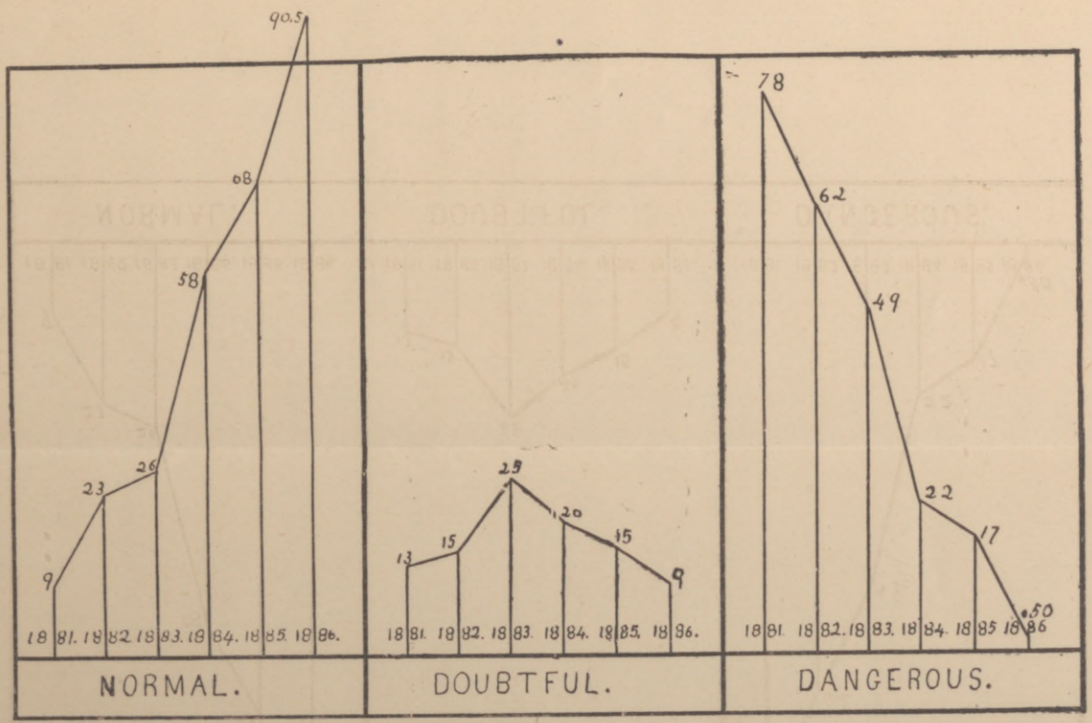
Case II. (Service of Dr. Wm. L. Richardson.) M. G., married, aged forty-two, twelfth pregnancy, entered the hospital November 6th, being about six and a half months pregnant. For two months previous to entrance, headache, partial blindness, vomiting and diarrhœa. On entrance, stupid, speech unintelligible. Urine scanty, containing albumen, blood, fine granular and hyaline casts. Manual dilatation and version. Male child, delivered, weighing three pounds, which lived a few moments. Pilocarpin. Patient remained unconscious and died eighteen hours after entrance.

Case III. (Service of Dr. Wm. L. Richardson.) L. M., married, aged twenty-four, primipara, entered the hospital November 20th, about eight and one-half months pregnant. Three convulsions before entrance. Unconscious, breathing stertorous. Urine scanty and containing albumen, blood, coarse and fine granular and hyaline casts. Cervix rigid. No signs of labor. Manual dilatation, attempted by Dr. Richardson, unsuccessful. Barnes' dilators failed. Male elastic catheter introduced with a view of inducing labor. Convulsions continuing, visiting physicians unavoidably absent, Dr. C. M. Green, failing to effect manual dilatation, incised the os uteri and delivered, by version, a still-born male child, weighing six pounds. The mother died during the extraction.

With a view of presenting as clearly as possible the results of the various attempts to protect the patients from septicæmia the two diagrams accompanying this paper have been prepared. These diagrams are the result of an analysis of the temperature charts and clinical records of all the cases (1780 in number) which have occurred in the Boston Lying-in Hospital during the last six years.

The first diagram, based on an examination of the temperature charts, gives the percentages of the max-


1881.
0.25
7
6
8
10
27
27
13
99° 100° 101° 102° 103° 104° 105° 106°
1882.
4
15
17
14
14
11
16
9
99° 100° 101° 102° 103° 104° 105° 106°
1883.
8
17
21
10
8
12
12
10
99° 100° 101° 102° 103° 104° 105° 106°
1884.
15
38
21
7
8
5
5
2
99° 100° 101° 102° 103° 104° 105° 106°
1885.
20
36
18
10
7
4
4
1
99° 100° 101° 102° 103° 104° 105° 106°
1886.
39
38
12
4
3
2
1
0
99° 100° 101° 102° 103° 104° 105° 106°


90.5
68
58
26
23
9
18 81. 18 82. 18 83. 18 84. 18 85. 18 86.
NORMAL.
25
20
15
13
9
18 81. 18 82. 18 83. 18 84. 18 85. 18 86.
DOUBTFUL.
78
62
49
22
17
0.50
18 81. 18 82. 18 83. 18 84. 18 85. 18 86.
DANGEROUS.

imum temperature of each patient during the convalescence.

The second diagram is the result of an examination of the same charts, combined with a reference in some cases to the clinical records and shows the percentages of the number of normal, doubtful and dangerous cases.

With very few exceptions all cases in which the temperature did not exceed 100° are classified as normal: while those whose temperature rose between 100° and 102° are considered as doubtful; all others being classed as dangerous. The few exceptions made in this classification are in those cases where the temperature may have exceeded these arbitrarily selected limits, but where such rise was only transitory and due, as shown by the clinical record, to some clearly defined cause, such for example as mental emotion, indiscretion in diet, etc. In the diagrams and tables the nearest whole percentage has been used, with a view of avoiding fractions as far as possible. An examination of both these diagrams shows very clearly the poor condition in which the hospital was during the time when only a comparatively few patients escaped septic infection.

According to Schröeder and Lusk 100½° may fairly be taken as the physiological limit of the puerperal state. Taking 100° however as the standard, simply because the percentages in these tables have been figured regardless of fractions of degrees, it will be seen how gradually a change for the better was brought about until the adoption of the present method of prophylaxis.

1881	Percentage of cases not over 100°,			8	Over 100°,	88.
1882	"	"	"	19	"	81.
1883	"	"	"	25	"	73.
1884	"	"	"	53	"	48.
1885	"	"	"	56	"	44.
1886	"	"	"	77	"	22.

The experience of the New York Maternity has been in many respects so strikingly similar to that of the Boston Lying-in Hospital, that a table showing the results in the two institutions cannot fail to be of interest. In the New York Maternity, as appears from this table, puerperal septicæmia was making sad havoc among the patients until October 1st, 1883, when Dr. H. J. Garrigues, one of the Visiting Obstetric Surgeons, determined to adopt the method of prophylaxis[6] which, without any material change has continued in use to the present time, and which is in the main identical with that used in the Boston Lying-in Hospital, since October, 1885.

New York Maternity Hospital.	No. of patients.	Deaths from all causes.	Deaths from sepsis.	Per ct. of all cases.	Per ct. of sepsis.
Oct. 1, 1882–Oct. 1, 1883	429	34	26	7.92	6.06
Oct. 1, 1883–Oct. 1, 1884	505	7	3	1.38	.59
Oct. 1, 1884–Oct. 1, 1885	541	4	1	.75	.18
Oct. 1, 1885–Oct. 1, 1886	463	4	1	.86	.21
In Sept., 1883, the last month before the adoption of the new method of prophylaxis.	51	10	8	19.60	15.69
Boston Lying-In Hospital.					
Jan. 1, 1881–Dec. 31, 1881	259	8	6	3.09	2.31
Jan. 1, 1882–Dec. 31, 1882	288	17	16	5.90	5.55
Jan. 1, 1883–Dec. 31, 1883	242	14	11	5.78	4.58
Jan. 1, 1884–Dec. 31, 1884	310	6	5	1.93	1.61
Jan. 1, 1885–Dec. 31, 1885	308	4	2	1.29	.64
Jan. 1, 1886–Dec. 31, 1886	373	3	0	.80	.0

The results which followed this use of antiseptics in

[6] Antiseptic Midwifery, H. J. Garrigues, 1886.

the Boston Lying-in Hospital were so satisfactory that on December 3d, 1885, when I attended, in her first confinement, the wife of a physician in this city I determined to use the same general method of procedure. From that time to the present I have always adopted this form of practice. The results have been as striking as in the hospital. With the single exception of a patient who was delivered April 17th, 1879, and died a few days later of puerperal septicæmia I have been fortunate enough to escape in private practice any fatal results from this dreaded disease.

The convalescence, however, since this use of antiseptics has been free from offensive lochia; there has been a marked freedom from any tenderness over the uterus or its appendages; less complaint has been made of after-pains, and the general range of the temperature has been much lower, rarely exceeding 99°. The labor is conducted the same as in the hospital, except that the vaginal douche at the end of the first stage is omitted, nor is a bath of course essential at the outset. All the nurses who have recently graduated from the Lying-in Hospital are familiar with the methods of making the pads and providing the necessary arrangements. Many also of the older graduates have come back for a visit to the hospital and for instruction as to the new method of procedure. In all cases, however, a few words from the physician beforehand will be sufficient to enable the nurse, however inexperienced she may be in the use of antiseptics, to obtain the materials, properly make the pads, and carry out the details of this method. Until recently it was necessary to buy the various articles of which the pad is composed at different places, but Messrs. Leach and Greene now keep all these materials in stock, and have also the pads all prepared and done up in packages of a dozen, for those who do not care to take the trouble

of making them. It is only necessary to dip the pad itself in the corrosive sublimate solution, and subsequently to dry it. In the antiseptic tablet, manufactured by John Wyeth & Brother, of Philadelphia, after a formula of Dr. Charles M. Wilson, we have a very convenient form of ordering the mercurial solution. The addition of one of these tablets to three pints of water at once furnishes us with a solution of the required strength. For an average case between four and five dozen pads are sufficient. Should the patient prefer to make the pads the following materials will be required: four yards Canton flannel, five yards cheese-cloth, three-fourths yard oiled muslin, one pound absorbent cotton waste, one pound carbolized cotton. In either case fifty antiseptic tablets will be sufficient.

The discovery of Koch and the investigations of other bacteriologists have produced practical results, which must be apparent to any one familiar with the reports of many of the Lying-in Hospitals in Europe and America. The adoption of similar methods of prophylaxis in private practice can only be a question of time. The germ theory, upon which this practice is founded, is new and to a great extent contains much yet to be investigated. Sufficient, however, is known to have already produced results which demonstrate the fact, that, to a further study of the germ theory, we must look for still greater advances in that preventive medicine, which is so rapidly reducing human morbidity as well as human mortality. The advocates of the use of antiseptic obstetrics in private practice will unquestionably meet with opposition on the part of many, who will quote their own experience as evidence that puerperal septicæmia is a disease of extreme rarity in private practice. This may be true, but judging from my own observation in consulting

practice I am convinced that it is not as rare as would appear from the statistics of private practice which so frequently appear in our medical journals or in the records of medical meetings. Many physicians do not follow up their cases, and the number of visits after the birth of the child is frequently very limited. Cases which thus pass from observation are considered successful by the physician in attendance at the delivery, though it may happen that subsequently they are attended by some other physician during a long and troublesome, if not fatal illness. A somewhat extended dispensary service has taught me the truth of this observation.

Kucher, in his admirable book on "Puerperal Convalescence and the Diseases of the Puerperal Period," reports that the statistics of life insurance companies[7] show that of 2,182 insured women, 197 (9.03 per cent.) died from puerperal causes, and that statistical tables indicated that nearly seventy-five per cent. of the deaths during childbed are due to puerperal fever. Even if the danger from septic infection be as slight, as some would have us believe, should we neglect to use every known precaution to reduce even that danger to a minimum? The experience of those who have investigated this subject and practically tested this method of treatment has demonstrated, that absolute asepsis means absolute freedom from puerperal septicæmia, and that the occurrence of puerperal septicæmia means the absence of absolute asepsis.

[7] System and Tables of Life Insurance from the Experience and Records of Thirty Life Offices. Levi W. Meech.