ON THE CONSTRUCTION OF SMALL LYING-IN HOSPITALS: WITH REFERENCE TO SEPTIC INFECTION.*

BY W. P. MANTON, M. D., DETROIT, MICHIGAN.
Visiting Physician to the Detroit Woman's Hospital; Consulting Gynæcologist to the Eastern Michigan Asylum; President of the Detroit Gynæcological Society, Etc.

The subject to which I invite your attention to-night was suggested to my mind some months ago by a conversation with members of the staff of the Woman's Hospital.

You are all aware that this institution has in contemplation the erection of a new building in which shall be the best modern arrangements for the care of pregnant and lying-in women and their offspring.

The question was discussed among some of us as to whether it was advisable to put up a pavilion separated from the main hospital, in which all cases of so-called "puerperal fever," etc., might be placed, or whether isolating rooms might not be arranged in some part of the building itself.

My own opinion has been that the pavilion system, while admirable for general hospitals and barracks, is wholly unnecessary in small lying-in institutions; and I have thought that the discussion of this subject,—although perhaps somewhat hackneyed,—might not be wanting in interest and profit to most of us.

In the case of the Woman's Hospital the question of expense is an important one. The main building must be as complete and perfect in its arrangements as the funds will allow, and the erection of a pavilion, which, at most, would probably not be

* Read before the Detroit Medical and Library Association, and published exclusively in The Physician and Surgeon.

used over two or three times a year, would necessitate the further expenditure of several hundred dollars.

As this question of expense, however, does not particularly concern us, I shall pass on to the discussion of the main point, —septic infection.

Up to within the last forty years, one of the most prevalent and fatal scourges known to affect human beings was the so-called "puerperal fever." Woman after woman died, the civilized world around, until, in some localities, a time was reached when it was little less than suicidal to become a mother. In those days the profession went about in mourning, as it were, helpless, hopeless, and utterly unable to account for or cope with the terrible distemper. Here and there during this sombre period, feeble points of light appeared in the darkness of night, flickered, cast a waning halo, and went out.

In 1770, White saw in lying-in hospitals the habitat of "puerperal fever," and traced its source to foul matter generated in the individual's organism, or conveyed there by the putrid-laden air.

The celebrated Gordon, of Aberdeen, advanced still stronger opinions not many years later, and here and there like theories were stated.

In 1848, however, the blow was struck that opened the eyes of the profession to a new light, but even for years afterwards its vision was dimmed, for it saw not clearly,— but "men as it were trees, walking."

It is unnecessary for me here to rehearse the achievements of that great man and keen observer, Semmelweis. You all know of his struggles, victories, failures and final death; of the criticism, ridicule and contumely heaped upon him by his fellow-countrymen and others. So great was the aversion to Semmelweis' theory, so against nature for a man to accept the dictum that the mischief was owing to his own dirty fingers or unclean instruments, that I believe, had it not been for the uncontrovertable experiments and tests of Pasteur, Tyndall and Lister, even with the clearly enunciated propositions of Semmelweis before our eyes, we should to-day still be groping in the dark.

It is to guard against this same "puerperal fever" that the pavilion isolation of patients was introduced first, I believe, by Tarnier. By granting that isolation in such cases is desirable or even necessary, we acknowledge that the disease is contagious and liable to become epidemic. But in order to clearly understand the philosophy of isolation, and the treatment of the con-

dition, we must not fail to appreciate what the disease really is, and as the term puerperal fever means pyrexia in a lying-in woman, we must drop it from our vocabulary as having no etymological significance in describing the disease or diseases which we have in mind, and apply right names to the conditions present. "For," as Robert Barnes has recently said, "as fevers of various kinds may assail non-puerperal persons, so they may assail puerperæ. We must, therefore, abandon the attempt to find one definite puerperal fever, and we must recognize the clinical truth that there are puerperal fevers."[1]

The investigations of a large number of observers have now placed it beyond dispute that the disease so fatal in the past, and so dreaded by every accoucheur, was no other than blood poisoning, surgical or wound fever, septic infection.

These observations have also shown that the source of the infection is *direct*, that is to say, from external sources which can be traced, or *indirect*, also called auto-infection, where the source is from within the organism but which it is not always possible to locate or explain.[2]

The number of believers in self-infection is, however, gradually decreasing year by year, for the real cause of infection has been indisputably proven to be nearly always introduced from without.

I say nearly always, for there is a class of cases, namely, those in which the woman suffers from disease of the uterine appendages where the infection may and does originate within the organism. This condition has been admirably described by Grigg,[3] who believes that puerperal disease from such source is far more frequent than is generally supposed, the paucity of post-mortem examinations on women dying in childbed, being responsible for this. The stand taken by Kaltenbach,[4] who is an advocate of self-infection, is that the microbes which exist in the genital secretions before labor develop their energy or virulence after that act has taken place.

Now, as Winter[5] and others have found in the vaginas of healthy women staphylococci and streptococci, etc., the same organisms, and indifferentiable from those found in septic

[1] *British Medical Journal*, March 16, 1889.

[2] THORN: *Sammlung Klinische Vorträge*, Number CCCXXVII.

[3] *British Gynæcological Journal*, Volume II, 1887, page 264.

[4] *Centralblatt für Gynäkologie*, Number XXVII, 1889.

[5] *Zeitschrift für Gebustshülfe und Gynäkologie*, Band XIV, 1888, page 443.

peritonitis, metritis, etc., and which (streptococci) Legrain[6] has also discovered in the vagina of a syphilitic woman suffering from subacute vaginitis, it is difficult to understand how these germs can acquire their virulence unless from some external source. As a matter of fact, Szabo[7] has shown that the nearer to the external world the parturient canal is injured the more frequently does puerperal disease result, a point hardly in favor of the auto-infection theory. Moreover, in cases where the disease originates higher up in the genital tract,—as most of the micro-organisms are found in the lower third of the cervix and vagina, and have no power of locomotion,—it is hard to account for their presence above unless we grant that they have been carried upward on fingers or instruments. As far as the ordinary lying-in case is concerned then, we may at once concede that all her dangers from septic infection lie from without; that though she may be a hot-bed[8] for the generation of germs,—if these germs have not become contaminated by outside matter, she is practically safe.

From this it is obvious that the first duty of an institution is to protect its patients from infection. This result can be obtained only by the most careful observance of cleanliness,—cleanliness of the building in general, but particularly of the lying-in room—the accoucheur, the nurse, the clothing, instruments and utensils employed, and last, but not least, of the patient herself. To aid in this we make use of antiseptics; but as I have already presented this subject for your consideration

[6] *Journal des Soc. Scient.*, Number XXXIII, 1888.

[7] *Archiv für Gynäkologie*, Band XXXVI, 1889, page 77.

[8] Thomen investigated the lochia of normal puerperæ (seven cases) and found that,

(1) Vaginal lochia contain, in normal conditions, innumerable germs of different kinds (Doderlein). In three cases streptococci were found in the vagina.

(2) Microörganisms are most numerous in the vicinity of the introitus than in the upper third of the vagina.

(3) The number of microörganisms in the vagina is considerably larger during the first days of child-bed than immediately following labor. (During menstruation the number of bacteria is larger than before).

(4) Lochia from the cervix was sterile in two cases—in one case the number of bacteria was exceedingly small,—in two more inconsiderable, while in another they were abundant.

(5) Lochia from the cavum uteri was sterile in four cases, but in the remaining three there were different microörganisms,—among which the streptococcus was found twice.—*Archiv. für Gynäkologie*, Band XXXVI, Hefte II, page 231.

I will not dwell on it at the present time.[9] Without the most scrupulous care in all details the most perfect architectural design in building would avail little or nothing. As soon as a patient develops septic infection, or any disease which is known to be contagious, she should be isolated. Now the statements which have already been put forward make it plain that isolation means simply separation,—that is, out of *contact*. I hold, therefore, that a patient placed in a room separated by a plastered brick-wall from other lying-in women is as isolated as if placed in a pavilion, provided all contact between the sick and the well can be prevented.[10] This may be readily accomplished by having all doors of communication between the two parts of the building on another floor, or at least on another hall, and prohibiting nurses in attendance on sick puerperæ from visiting or coming in contact with other nurses or well puerperæ. Utensils, instruments, washing, etc., should also be disinfected and cleansed by themselves.

The walls of lying-in rooms and hospital wards or isolating chambers should be well plastered and painted, and the floors constructed of well-matched hardwood lumber,—to admit of thorough washing and disinfecting. As little furniture as practicable should be in any of these rooms, and all upholstery, hangings, etc., entirely done away with. Water closets should be placed as far as possible from maternity and lying-in wards, and should be frequently inspected to insure their sanitary condition. The ventilation should be as perfect as possible and to assist in this an open fire-place in each room is recommended.

Light, air, and cleanliness, these three are the *sine qua non* in the prevention of septic infection, but the greatest of these is cleanliness.

But it was not my intention in preparing this paper to enter into a discussion of architecture. I had in mind simply the idea that unless the cases in any maternity are conducted on what is known as the modern antiseptic midwifery principle, pavilions and isolating rooms will be built in vain, for, as Kucher[10] has so sensibly remarked, "immunity from puerperal fever does not depend upon location but upon the care taken to prevent septic contact."

[9] "Antiseptic Midwifery," *Northwestern Lancet*, January 15, 1888.

[10] In the discussion of this subject I refer only to small maternities where not more than fifty to one hundred women are delivered annually.

[11] "Transactions Ninth International Medical Congress," Volume II, page 390.

Appended are paragraphs taken from the letters of several distinguished foreign teachers of midwifery which I have received since commencing this article.

Professor Credé, Leipsic: I am certain that infected patients can lie beside and be cared for along with healthy puerperæ without infecting them, provided all contact between the sick and well can be wholly prevented,—that is, I believe the common atmosphere to be devoid of danger, and only the direct contact of their secretions on new and fresh wounds in the healthy to produce infection. As it is, however, impossible for attendants to absolutely avoid such contact, it is prudent to place the sick in partly or wholly *disconnected rooms*, and to provide them with entirely *separate nurses, and especially washing, etc.* In my institution the hospital department was arranged in this way in the third story of the building.

Professor F. Winckel, Munich: I allow all puerperal fever patients, *excepting those affected with puerperal erysipelas*, to remain with the healthy lying-in women. Separation in these cases is unnecessary; those affected with *erysipelas*, however, *must positively be placed in a separate room—and best in a separate building.*

Professor Olshausen, Berlin: The safest way is, of course, to place the sick puerperæ in a special building,—(pavilion or barrack), and I would strongly recommend this in planning a large hospital. Yet undoubtedly it is quite sufficient if the sick puerperæ remain in the same building but separated as far as possible,—and the attendants kept from the well puerperæ. It is so in Halle, where the sick puerperæ are removed to the gynæcological department. In Berlin they are taken to the septic station.

Professor Leopold, Dresden: In my clinic there are three different lying-in rooms, two for healthy women only, and one for the sick, that is, such as are received infected into the clinic. These latter are at once placed by themselves and are delivered by a special physician and midwife. Although these three lying-in rooms are in one large building, it would be better if the sick, that is those infected, could be placed in a small separate pavilion, where they could be delivered and afterwards remain. Having the lying-in rooms in the same building saves much time for physicians and midwifes, but the danger of contagion is very great, and the isolation of attendants is maintained only at the expense of great pains. I would therefore recommend

that besides the lying-in room for healthy parturients, there be also a pavilion in which *all* sick patients be confined.

Professor Alexander R. Simpson, Edinburgh: Believes that it is the best arrangement to have a ward for puerperal cases apart from the main building. Edinburgh maternity does not possess this advantage, but in cases of a suspicious nature the patient is, of course, isolated in a special room in the building.