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HISTORY OF PUERPERAL INFECTION

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UNIVERSITY OF NEBRASKA

COLLEGE OF MEDICINE

BY

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History of Puerperal Infection

This disease has been known under various names since the days of Hipp., but the name "Puerperarum febris" was first conferred upon it by the British physician Thos. Willis in his work "De Febricus" published in 1680. In 1691 Richard Morton in his "Pyretologia" introduced the term as "febris puerpera" to apply to the acute febrile disease which seized lying-in women and produced a high mortality. This term was translated into the vernacular by Edward Strother in 1750.⁽¹⁾ For many years child-bed fever has been a common designation by both the profession and the laity and is still in common vogue. J. Whitridge Williams further comments on the more recent terminology in the following words: "Under the heading of puerperal infection are now included all the various morbid conditions which result from the entrance of infective microorganisms into the female generative tract during labor or the puerperium. The older term, "puerperal fever", is at once too vague and misleading, and for many reasons should be discarded and in the first place it suggests the old idea of the essentiality of the affection so strongly urged

by the late Fordyce Barker, and takes no account of the various etiological factors that may be concerned. Moreover it emphasizes the febrile phenomena of the affection, instead of laying stress upon its infective nature and consequent responsibility of the obstetrician and his assistants. Again, "puerperal septicemia" and "puerperal sepsis" which are often used as synonymous terms, are hardly less satisfactory, inasmuch as in many instances the infection results in perfectly localized inflammatory processes, to which such terms cannot be applied without violating the established rules of diction."⁽²⁾

Puerperal infection should be considered as an acute infection of the female generative tract producing an acute inflammation of the uterus and its surrounding structures and in the strict sense of the term should be applied to an acute febrile condition occurring early in the puerperium with the pathologic picture of acute endometritis, which usually becomes associated with myometritis, salpingitis, parametritis, pelvic peritonitis, septicemia, septicopyemia, or pelvic abscess.⁽³⁾

Any writing, from however obscure a source, which calls strongly and truthfully the attention

of the medical profession to the still deplorable ravages of puerperium infection, cannot fail to be in some measure beneficial.

There is probably no field in medicine at the present time that offers a more humane, urgent, encouraging and simple application of preventive medicine than does puerperal infection. Not only is the profession being constantly reminded of this through their literature and meetings, but the laity also is being informed of the needless death of many mothers yearly, through daily newspapers and leading magazine articles written by physicians, scientists and laymen. These articles usually point out the preventive aspect and place the blame, in a very large percentage of the cases, upon criminal negligence in aseptic technique of the physician or his assistants, or both.

Today in our country--excepting Chile and maybe one or two others--the death rate from puerperal fever is higher than in any civilized land. And this eighty-five years after Semmelweis^{melweis} showed how simple it is to guard all these young women from ruined health and from dying. Every year in our country this sickness so ghastly, yet so simply

preventable--wrecks the health of maybe 100,000 and kills 7,000 or more outright. Paul de Kruif⁽⁴⁾ in a leading ladies magazine calls this "today's saddest medical scandal" and suggests that women at their club and other gatherings, bring to the attention of all a physician whose delivery should ~~not~~ be complicated by this disease.

The frequency of puerperal infection is variously reported by statisticians, but all reports agree that pregnancy and its complications is the the second greatest cause of death in women from fifteen to forty-five years of age, tuberculosis alone showing a higher mortality rate; and of all deaths referable to pregnancy and its complications puerperal infection is responsible for the greatest number.⁽⁵⁾

J. O. Polak⁽⁶⁾ states that six or seven of every 1000 women confined die from causes directly related to pregnancy, labor and the puerperium, and of these deaths 30% to 43% can be credited to infection.

In an analysis of puerperal deaths in 1927 covering twelve states (N. H., R. I., Md., Va., Ky., Mich., Wis., Minn., Nebr., N. D., Wash., and Ore.), there were 2,650 puerperal deaths re-

ported. Of this number 1,076, or 41% was due to
(7)
infection.

Dr. J. W. Williams of Johns Hopkins states that puerperal infection is lowest in the larger cities because of good hospitals. It is next lowest in rural communities because the patients often deliver before the doctor arrives. It is highest in the small cities because every doctor thinks himself as good an obstetrician as anyone
(8)
and often does great harm.

Adair finds that the mortality from puerperal infection is higher in the negro than in the white race--probably due to a lower level of racial
(9)
resistance in the blacks.

The Nebraska State Bureau of Health Division of Vital Statistics records on puerperal deaths follows:

	1926	1927	1928	1929	1930
Total	179	170	161	152	147
P. Inf.	57	71	68	79	65
P. Phleg.					
Embol.					
Sudden	17	16	10	15	10
Death					

These statistics show that puerperal infection stands considerably higher among various causes of puerperal deaths.

The history of puerperal infection abounds with the names of many of the brightest lights in medical literature. Many of these fought determinedly and bitterly for their stand and one especially should be remembered as one of the world's greatest martyrs. All must have been imbued, not so much with a scientific mind, but more so with a humane and kindly soul for these countless sufferers and victims of this dread scourge. In reviewing the views and struggles of these great men, whom all practitioners of today should have some knowledge of, one is reminded of the words of Lloyd Roberts.

"Too often do we forget those who first force their way along unknown paths which in the future become well-frequented thoroughfares; who first point out to what important ends such paths may lead, who persevere through weal and through woe, through opposition and calumny; who never falter in their struggle along the paths they see dimly traced before them or even when they must needs grope blindly along the absolutely unknown; too

often is the honor due to these pioneers pushed into the limbo of obscurity by the very weight and magnitude of the chain, the initial links of which they themselves had helped to forge." (Lloyd Roberts--1902).---

Puerperal infection has probably occurred almost as long as women have given birth to children. In the primitive practices of savages untouched by civilization are found many evidences that puerperal infection existed among them and that measures of prevention were used; for example: isolation of the parturient and puerperal members of the tribe, cleansing both the child and the mother in a stream after labor, fumigations of the vulva with aromatic herbs, fumigation of the apartment after the puerpera left it, washing the belly with banana wine and other similar procedures. This disease is mentioned in the Ayur Veda of Surruta, 1000 B. C. Hippocrates in 400 B. C. described cases of it so accurately that they could be well read in the modern classroom. He mentions epidemics of the fever. Celcus and Galen describe it, and historic references to it throughout the middle ages are numerous. (10)

The first authentic report of an epidemic of puerperal infection was given by Hervieux, which (10) occurred in Leipzig in 1652-65.

The first lying-in ward was established in Paris at the Hotel Dieu, and here the great obstetricians, Maricean, de la Mott, Portal and Pen obtained their experience. Maricean in 1660 tells of an epidemic in this ward causing two-thirds (10) fatality to the women delivered.

In 1651 William Harvey, writing of this disease, states: "For it often befalls a woman (especially the more tender sort) that the after purgings being corrupted and grown noisome within, do call in fevers and other grievous symptoms. For the womb being excoriated by the separation of the after-burden (especially if the separation were violent) like a large inward ulcer, is cleansed and mundified by the liberal emanations of the after purgings. And hereupon we conclude of the welfare or danger of a woman in childbed according to her excretions. If any part of the after burden be left sticking to the uterus the after purgings will flow forth evil-scented, green and as if they pro-

ceeded from a dead body; and sometimes the courage and strength of the womb being quite vanquished, a suddaine Gangrene doth induce a certain death."

In the same article, "Of the Birth," he mentions the case of "A very honourable lady" in child-bed falling into a fever (by reason no after-purgings came from her) whereupon he dilated the cervix with an iron instrument and "immitted an injection" by a little syringe whereupon black, clotted, and noisome blood did issue out even to some certain pounds weight, whereby she received present ease." In another case finding mild injections ineffective, Harvey added a little Roman vitriol, which caused the uterus to contract strongly; but after the use of an anodyne and milder applications the uterus did relax its orifice again and excluded the sharp liquor which had been injected together with a putrid matter; whereby the patient was in short
(1)
time restored."

It is interesting and enlightening to quote Francis Maricean as found in his book "Diseases of Women With Child (1668) in the Chapter on "Suppression of the Lochia and Accidents which follow thereupon."
(11)
He states that such a con-

dition, usually occurring on the fourth or fifth day following delivery produces an acute fever, great pain in the head, breast and loins, and a suffocation and an inflammation all over the lower belly, which becomes swelled and blown up causing difficulty in breathing, choking, palpitation, syncope and fainting, convulsions and often death if the suppression continues, or if the patient escapes she is subject to an abscess of the womb and afterwards cancer or great disturbances in the belly because of the nearness; and also possibly gout, sciaticas, lameness or inflammation, and abscesses in the breasts.

He gives the causes of loenial stoppage as a great looseness (diarrhea), strong passions of the mind, great fear or grief, or any anger or swoonings, as they may cause the humours to turn inward suddenly. Great colds causing the vessels and pores of the womb to contract, use of astringent remedies, cold drinks producing condensing and thickening of the humours and hindering their easy flow, and strong and frequent bodily agitations which rarify and dispense the humours are also thought to be caustive.

To bring the lochia down he advises that the women avoid all "perturbations of the spirit which may stop them, let her lie in bed with her head and breasts a little raised, keeping herself very quiet so that the humours may be the easier carried downwards by their natural tendencies; let her observe a good diet, somewhat hot and moist; let her rather use boiled meats than roast: and if there be anything feverish let her use broths only, with a little jelly and let her avoid all bindings." He then continues to advise the avoidance of cold drinks, and advises the use of decoctions from swallows, pellitory of the wall, etc., and purges, also fomentations and emollients to the abdomen, injection of the womb with herbs, rubbing and hot bathing, and cupping of the thighs, and bleeding from foot and arm.

In his same book in the chapter on "Of Inflammation Which Happens to the Womb After Delivery," he adds as causative factors (in addition to lochial stoppage) bruises, blows, falls and especially from being too rudely handled in a bad and violent labor, or by the falling out of the womb after labor, faulty conception, retained parts and

by the great swathes and napkins used by the midwives and nurses to keep the belly in place (as they say).

Mariceau finds this a very dangerous disease and most of the women to whom it happens die. Such a condition, he states, is evidenced by undue swelling and heaviness of the abdomen, difficulty in making H₂O and going to stool or pain attendant thereto, due to the inflammation being spread to the bowels and bladder, fever, shortness of breath, vomiting, hiccough, convulsions, and in the end death, if not cured. There is then the great danger of resulting abscess or cancer formation as also pointed out in "Lochial stoppage," and she will lead a "miserable and languishing life the rest of her days."

In addition to the treatment recommended for lochial stoppage he advises the removal of any retained parts.

In Great Britain and England we find an early and intelligent interest manifested in puerperal infection. Up until the time of Semmelweiss' great discovery we find that several practitioners and obstetricians here leading in this field of medicine. This can be largely ascribed to two things, namely, the continual peace, or at least

immunity from disorganization within their own boundaries by war, and the early ascertainment of the physician over the midwife in obstetric matters. Both conditions presented much greater difficulty on the Continent for many years. On the whole in the United Kingdom the etiology of puerperal infection was early assumed to be contagious as compared to the epidemic theory of the Continent. We find references occasionally of "epidemics" of puerperal infection in the English literature, but the term as used in England did not connote atmospheric-cosmic-telluric influences; it indicated rather the occurrence of a considerable number of cases within a certain area, and limited to a more or less definite period of time.

Following the aforementioned work of William Harvey we find mention of John Burton, M. D., (Of York) an antiquary and man midwife, and the "Dr. Slop" of Laurence Sterne's "Tristram Shandy," who attributed the cause of this disease to inflammation of the uterus, and advocated "plentiful but proper bleeding" as absolutely necessary in its treatment." While W. Swellie thought it was due to an inflammation of the uterus or lochial

obstruction and Edward Foster, Assistant Master of the Rotunda Hospital of Dublin (1772-1775), was
(1)
of the same opinion.

In 1768 Denman, in his first essay on "Puerperal Fever" called attention to the possibility of the carrying of infection from patient to patient by attendants. This had previously been
(11)
mentioned by Alexander Gordon.

Wallace Johnson in 1769 makes mention of the greater prevalence of the fever in the hospitals than in the private homes, and thinks fresh air
(1)
is a most essential antiseptic.

In 1772 Nathaniel Hulme stated that while some authors have termed it an obstruction or suppression of the lochia, others after pains, and in the north of Great Britain "the weed," he is clearly of the opinion that puerperal infection is as much an original and primary disease as the ague, quinsy, or any other complaint incident to
(1)
the human body.

Charles White's important communication on puerperal fever appeared in 1774. White, the friend and fellow student of John Hunter, the distinguished surgeon and great obstetrician, was founder of the

Infirmary of the Manchester School of Medicine, now known as the Royal Infirmary, and of the Lying-in Charity, now St. Mary's Hospital. He gives the cause as a putrid atmosphere, or too long confinement of the patient in the horizontal position, which produces an absorption of "putrid or acid matter" by the lymphatics of the uterus and vagina. He advocated head elevation and getting the patient out of bed early to facilitate drainage. He stated that by attention to the hygienic and obstetrical principles laid down he never lost a case by "the puerperal miliary low nervous, putrid malignant or milk fever." Here we find the beginning of prophylactic treatment. ⁽¹⁾

In Adams' book, "Chas. White and Puerperal Fever" ⁽¹²⁾ he gives White's teaching. White in particular draws attention to the part played by retained lochia producing puerperal sepsis. Foul air and surroundings, filthy bedding, as well as retention of lochia and excreta, are, in his opinion, the primary causes of the appearance of this disease. The danger does not arise from the smallness of the quantity of the discharge, but from its stagnation whereby it becomes putrid, and in this state is absorbed into the circulation. Just as Semmelweis later ascribed puerperal

infection to putrefaction, so we find White at this time regarding it as a putrid fever.

White held so strongly to his belief in the damage of retained discharges that, just as surgeons the world over today practise free drainage and place the patient in a favorable posture, so he recommended that as soon after delivery as possible the patient be made to sit up or be placed in a reclining position to the end that discharges from the womb gain free exit and are not retained so as to undergo putrefactive changes; and what is more that she get up in about two or three days at the latest.

White, in short, demonstrated seventy years before Semmelweis how to guard against and prevent that self-infection which the latter regarded as forming the residuum of cases of puerperal fever which he was powerless to prevent. White claims to never have lost a single patient of puerperal infection in twenty years--even though some cases occurred in his practice due to non-observance of his rules.

White recognized long before Sir James Simpson (1850) the close analogy between the fever that followed surgical operations (and ulceration of wounds), and the fever to which lying-in women are liable.

Seventy years before Semmelweis the English school of obstetricians was showing how to combat puerperal fever with success at least equalling that of Semmelweis, and Charles White of Manchester, developing the practice of his father, Thomas White, was the leader in the
(12)
revolution.

White's system was that of absolute cleanliness in all the surroundings of the patient. We see the first real influence of White's teaching from Robert Collins' Rotunda Hospital, Dublin report from 1826-1833, long before Semmelweis, of which we will deal more fully later.

Thomas Kirkland in his Treatise on Childbed fevers, etc. in 1774 concludes that Puerperal Infection may arise from inflammation of the uterus or abdominal viscera, in consequence of hasty delivery (trauma and lessened resistance), from absorption of blood or other putrid matter from the uterus, from inflammation of the breasts, from absorption of acid milk, and from re-
(1)
tention of excrement. In general his views were similar to those of White.

In his "Observations On Puerperal Fever," published in 1790 Dr. Jos. Clarke described the appearances at six autopsies of it as an inflammation, but not mortification, of the omentum or peritonium in all cases,

with a similar condition of the broad ligaments, caecum and sigmoid flexure in some of them, and with a foetid-fluid in the peritoneal region and a glueing of the intestines to each other. He recommends ward disinfection and rotation of their use. He does not advise venesection and was opposed to the use of ipecac as advocated by the Royal Medical Society of Paris. (1)

In 1793 Dr. John Clarke gave a brief account of several epidemics in Great Britain from 1760-1788. (1)

Alexander Gordon, a very careful and intelligent observer and practitioner, in 1795, tells of several severe epidemics in London and Edinburgh. He was of the opinion that the disease is inflammatory in its beginning and only "putrid" in its course and is curable by extensive bleeding in the early stages only. Of its relation to erysipelas he says, "I will not venture positively to assert that the puerperal fever and erysipelas are precisely of the same nature; but that they are connected, that there is an analogy between them, and that they are concomitant epidemics, I have unquestionable proofs." He thought it a disease "which principally affects the peritoneum and its products and the ovaria." He further believed it to be infectious and was often conveyed by midwives, and in one instance by himself.

In addition to disinfection of the chamber and fumigation of the apparel, "the nurses and physicians who have attended patients with puerperal fever ought carefully to wash themselves and to get their apparel properly fumigated before it is put on again." This is the first reference to disinfection of the attendants for prevention that Spencer was able to find in the literature. (11)

Thus Harvey laid the foundation of the study of this disease by recognizing the large internal wound produced by the separation of the placenta as the starting point, and Gordon advocated prophylactic measures to prevent its infection. The British rejected the milk metastasis theory early and limited the source of infection to general infection from foul air or local infection of the uterine wound. They also noted the connection with erisipalis and the conveyance by attendants as stated by Denman and Gordon. Their numerous epidemics gave them good opportunities to study and describe puerperal infection. (1)

They had not discovered the Causa Causans; that was left for the following century. Yet Charles White in 1773 and Gordon in 1795 had advanced far into prophylactic treatment which was carried a stage further by O. W. Holmes and Semmelweis, later to be perfected by the researches of Pasteur and Lister.

White in his "Treatise on the Management of
Pregnant and Lying-In Women etc." ⁽¹³⁾ gives among others, the following case histories:

"Being called to Ashton, a town in this neighborhood, to see a patient, as I was talking with Mr. Greaves, an ingenious young surgeon of that place, a corpse with a white sheet thrown over the coffin was carried through the streets to be buried. Concluding from this circumstance, that it was a woman who had died in childbed, I inquired into the nature of her disorder. He informed me she died of a puerperal fever. Her name was Ann Leek, a poor woman, about 35 years of age. The particulars were as follows: He was called to her in the middle of the eighth month of her third pregnancy, for a flooding which was so violent that the blood ran through not only the bed, but even the floor, into the room below; but by taking plentifully of the bark she recovered and went to her full time, when she was delivered by a midwife on the 16th of November 1772 and had a very easy natural labor.

He heard no more of her till the 23d, when he found her with a very quick pulse, brown dry tongue, and delirious. She had a great number of petechiae,

and her stools, which came from her involuntarily, were very offensive. Her friends informed him that she was seized a few days after her delivery with a shivering fit, succeeded by vomiting and looseness, and complained much of her belly. She died upon the 24th, being the ninth day from her delivery.

Upon inquiries into the most probable causes of her death, Mr. Groaves informed me that the room she lay in was intolerably offensive, owing to a vessel containing about four gallons, kept there as a reservoir for all the urine of the family, which was emptied once a week, for the use of the dyers, but never was cleaned."

In another instance he reports: "Hannah Norbury of Blakely, a small village, about three miles from Manchester, aged twenty-seven, was delivered of her first child by a midwife in the neighborhood, on the 4th of March, 1773, as she sat upon the knee of an assistant. She had an easy natural labour, and the placenta came away without difficulty. She was of a corpulent habit, but had enjoyed pretty good health, except a trifling cough she had been troubled with for about eighteen months; and at the latter end of her pregnancy she had been for the most part costive. During her labour she complained of the headache which

continued afterwards. She was kept in a continual sweat and never once sat up in bed, till the third day in the afternoon, when she got out of it, for a little while; the child was applied to her breasts this day for the first time, the lochia were almost stopped, and she had a shivering fit in the evening succeeded by a burning and sweating fit. On the fourth day her breasts were a little troublesome, but by rubbing with a little oil they grew easy. On the 5th had another shivering fit. On the 5th had a stool which was the first she had had since the day before her delivery. On the 8th she was seized with a bilious vomiting, and a looseness; her urine was high coloured and muddy, and she coughed much in the night. She had a delirium but her husband observed that it was only at such times when she lay upon her back, but that when she lay upon her side she was quite free from it.

On the 9th she remained much in the same state. In the evening I was applied to, and ordered her tartar emetic and calx of antimony, which puked her, and eased her stomach and bowels.

On the 10th I saw her for the first time. Her pulse was small and beat 176 strokes in a minute; her voice faltered; she was sometimes delirious;

her eyes were red and looked wild, and she said her head ached. She did not make any complaint of her belly, but when I laid my hand upon it, below the navel, in any part of the hypogastric region, it was so exceedingly tender that she could scarce bear me to touch it, but about the navel and above it, she made not the least complaint though I pressed ever so hard. Her bed was placed within half a yard of the fire; and her friends informed me that she sweated much since her delivery, that her only food had been meal or goat gruel, given warm with a little wine in it, and once it was mixed with a small quantity of malt liquor. I ordered her the salt of wormwood and juice of lemons in the act of effervescence, and gave her to drink buttermilk posset, which she had before asked for, but it had been denied. The lochia were stopped except a little brown water. She had not much milk but the child continued to suck her. On the 11th I saw her again; her pulse were so small and quick as not to be counted, she had convulsive spasms, and was not able to speak or take any medicines. She had only one stool this day and no vomiting.

On the 12th, stools and urine came from her in-

voluntarily, and she died in the evening.

Remarks: I must observe that the room in which this woman lay had no door to it, nor were there any curtains to the bed; therefore I believe there could not be much putrid air except which was confined under the bed clothes. The mismanagement chiefly consisted in keeping her in a horizontal position, for three successive days without once sitting up in bed, in permitting her to be seven days without a stool, in her being too much heated by the fire, too many bed clothes, and drinking warm liquids with wine in them; in sweating too much, and not being allowed any cooling ascescent drinks.

Dissection: The uterus was something larger than my fist, of a natural colour but flaccid; upon cutting it open the inside appeared black but I easily wiped off the blackness, which seemed to be nothing more than some remains of the spongy chorion and some particles of blood. Her family being very averse to any further examination, I was obliged to desist."

As previously stated we see the first influence of White's teaching from Robert Collins' Rotunda Hospital report covering a period of seven years as Master of this institution (1826-1832). With our present existing knowledge and satisfaction over more recent accom-

plishments it is hard to believe that Collins' work was written nearly one hundred years ago, it sounds so modern.

Collins was also a firm believer in fresh air and thorough ventilation as was White.

Collins reports: Of 10,735 patients delivered in the Dublin Hospital subsequent to this period (institution of disinfecting methods), only 53 died, nearly in the proportion of 1:136, the lowest mortality on record. That is 0.53 % mortality and this not from puerperal infection. There was not one death from that disease. I doubt if even today with our full development of asepsis any French, German or Austrian maternity hospital can show better figures. And this was thirty years before Pasteur founded the science of bacteriology and established the microbic nature of infection, thirty-five years before Lister introduced his antiseptic methods into surgery and 150⁽¹²⁾ more years before Semmelweis.

Now let us turn to Collins' own work on this subject containing the result of 16,654 births occurring in the Dublin Lying-in Hospital during a period of seven years commencing November 1826.⁽¹⁴⁾

Puerperal fever accompanied by low typhoid symptoms, so prevalent in hospitals is seldom met in practice among

higher class in Dublin, but does occur as such among the lower classes but not to the same extent as in the hospitals. While in London and Edinburgh it frequently proves fatal to females in the upper ranks. This disease is likewise known to appear with great violence at the same period in situations very remote--ie. in 1819 it was epidemic in Vienna, Dublin and Glasgow. In 1829 in Paris it was extremely fatal, while at the same time in London and Dublin it was prevalent to a considerable degree.

This disease also became epidemic in one hospital on several occasions when typhus fever prevailed in the city, and at other periods when erysipelas was frequently met with. It commenced in our hospital once as follows: A patient was admitted with a bad attack of typhus fever and placed in a ward that night and removed to a separate apartment in the morning, where she died shortly after. The two females who occupied the beds adjoining hers on either side in the ward were attacked by puerperal fever and died.

Puerperal fever was first epidemic in the Dublin Lying-In Hospital in 1767, about ten years after its establishment, and had further epidemic in the following years: viz: 1774, 1787, 1788, 1803, 1810, 1811, 1812, 1813, 1818, 1819, 1820, 1823, 1826, 1828, and 1829. The

mortality was not great in some but was high in others. Collins then mentions that he did not lose a case during the last four years of his mastership at this institution from this disease.

He notes that the onset of puerperal fever is usually from one to three days following delivery, sometimes before, immediately, or a few hours after, and at other times not until the seventh or eighth day after delivery. The ordinary symptoms he describes are cold shivering fit, acute abdominal pain, tenderness over the lower abdomen on pressure and a rapid pulse which varies from 120 to 140. In some instances the abdominal pain was not preceded by the chills. In the very early stage the tenderness is most acute over the uterine region, but rapidly diffuses over the entire part of the abdominal cavity and the abdomen becomes distended. He describes the course as rapid, with death a frequent outcome on the second, third or fourth day.

Collins found that about one-half the cases were in primiparae. He did not find that those with tedious, fatiguing labors were particularly liable to attacks and the frequency in primiparae, who had not their health impaired by previous labors, seemed to disprove that it occurred most in those with weakened constitutions.

He emphasizes the vital importance of prevention to those physicians who have charge of hospitals, which is best impressed by the notoriously fatal result of this disease when it is prevalent. He learned that scrupulous cleanliness of the wards seemed to check an epidemic in the hospital when under Dr. Clarke but failed when instituted by Dr. Cabott in a later instance. During an epidemic under his mastership at the Rotunda Lying-In in 1829, he curtailed the admittance of new patients to a minimum, closed the wards in rotation and while so vacated he had all bedding placed on lines in them, removed all straw from the ticks, then tightly closed all exits and filled the ward with condensed chlorine gas, generated from chloride of lime and water, for forty-eight hours. This was followed by a creamy paste of chloride of lime and water on the floors and woodwork for at least forty-eight hours more. The woodwork was then painted and the walls and ceiling washed with fresh lime. The bedding was all thoroughly washed and stoved in a temperature of 120 to 130 degrees. Thus the ward was thoroughly clean for the entrance of new patients. Ventilation was always properly cared for so that no vitiated air might accumulate. The straw in the ticks was removed after use by every patient and was

renewed in a freshly washed tick followed by the above chlorination, painting and stoving if there was even any suggestion of puerperal infection. While the segregation of such suspicious patients was always practiced and deemed of vast importance from the time of the institution of this procedure until the termination of his mastership, Collins did not have a fatality from this disease in the Rotunda Lying-In Hospital of Dublin.

As mentioned previously in the work of Adam on Charles White, so also here we find Collins' own statement that out of 10,375 deliveries during this period there were only 53 deaths, which is a proportion of 1:186, the lowest mortality perhaps on record in an equal number of similar classes of females.

He continues by stating that the facts here detailed are strongly calculated, not only to lead us to suspect, but even to prove, that this fever derived its origin from some local cause and not from anything noxious in the atmosphere.

Collins' ideas on treatment are of interest as he is of the opinion that the extreme difference of opinion and very opposite measures recommended for treatment arise from treating every variety of puerperal infection as one and the same disease, whereas there is

perhaps not any other disease which exhibits a greater diversity of character in different situations and even in the same situation at different periods. He advocates that the patient should be seen instantly upon being attacked and visited at least two times each day following. When an attack seems threatening a draught of castor oil with as much oil of turpentine was given. He says this often acted favorably on the bowels, producing early and frequent relief, especially if there was air in the bowels. If the patient would not stand bleeding he used the lancet, but he favored the use of three to four dozen leeches, followed by a warm bath. If the patient became exhausted from leeching he had flannels wrung out of hot water placed over the abdomen and then when there was a recovery from the leeching he had recourse to hot baths. But when there was still abdominal tenderness he held that bathing and leeching every four, five or six hours was urgent. Following the castor oil the bowels were controlled by mercury, given as four grains of calomel plus four grains of ipecacuanha powder every two, three or four hours. If the stomach would not stand ipecac pills he substituted one-fourth grain of opium. He held that general bleeding, except in the presence of a strong pulse and highly inflammatory symptoms, was detrimental. Blistering

of the abdomen following leeching was thought to be beneficial.

Dr. Collins described the morbid appearances as including an effusion of varying character and quantity in all cases. In some, where the effusion was scanty the intestines were glued together by lymph. Most of the effusion he found in the abdomen, but at times varying amounts were found in the thorax. The peritoneum usually showed a great increase in vascularity and there did not seem to be any inflammation below this membrane. The uterus often appeared normal, but at times was found to be soft and flabby. The ovaries were often enlarged, inflamed and easily broken.

A review of some of his cases are interesting and enlightening.

(A Practical Treatise on Midwifery, containing the result of sixteen thousand, six hundred and fifty-four Births occurring in the Dublin Lying-in Hospital during a period of seven years commencing November 1826. By Robert Collins M. D. Late Master of the institution. Published by Haswell Barrington and Haswell, 293 Market Street Philadelphia, Pa. 1838.)

Case I. J. D. aged twenty-five was delivered of her second baby (a boy), on the 11th at seven-thirty P. M. after a severe labor of ten hours. She was attacked at

five A. M. on the twelfth with shivering, accompanied by acute pain in the abdomen, when she was ordered to be well stuped and to have four drams of castor oil, with the same quantity of oil of turpentine.

9:00 A. M.-Medicine has operated freely; pain in abdomen continues , particularly distressing in the uterus region. Four dozen leeches to be applied where the pain is most acute, and afterwards to be placed in a warm bath; to have four grains of calomel with as much hippo every third hour.

9:00 P. M.-The pain continuing distressing, three dozen leeches were again applied at eight o'clock, followed by a warm bath. Pulse 120; tongue moist and clean; uterus continues hard and enlarged, but much less sensible to pressure than in the morning; complains much of pain in her loins and crampish sensations in her legs, powders to be given every second hour.

13th 9:00 A. M. -Pulse 114; tongue tolerably moist and clean, abdomen soft, she still however complains much on pressure being made over the uterus, which remains hard and enlarged; bowels repeatedly opened; has taken nine powders since the commencement; drank four quarts of whey; expresses herself relieved.

Powders to be continued; three dozen leeches over the uterine region to be repeatedly stuped.

7:00 P. M.-Pulse 130; tongue moist, rather loaded in the centre; abdomen soft, but very tender on pressure; uterus somewhat softer; took four powders since morning and had a warm bath at 8:00 o'clock, from which she experienced some relief; drinks freely.

Powders and stupes to be continued.

14th, 9:00 A. M.-Pulse 126, a abdomen full but soft, and little sensible to pressure, except over the uterine region; took six powders; bowels frequently opened; mouth affected by mercury; drank two quarts; slept about one hour; still complains of crampish sensations about her hips at intervals.

Powders to be continued every third hour; warm bath.

10:00 P. M. -Pulse 120; tongue cannot be protruded; abdomen soft and free from pain, except when pressed immediately over the uterus; took three powders; bowels but slightly affected, has considerable tenesmus, stools occasionally tinged with blood.

Powders to be continued and abdomen frequently stuped;

15th, 9:00 A. M.- Pulse 108; complains much of soreness of her mouth; abdomen soft but puffy; uterus somewhat softer and less distended, still very tender under pressure; took three powders; bowels frequently opened; slept little; drank two quarts; gums much affected.

Omit powders.

10:00 P. M. -Pulse 103; mouth extremely sore; abdomen soft; little or no pain on pressure; bowels frequently affected; stools watery scanty, mixed with blood, and passed with pain; drank two quarts; complains of weakness and want of sleep.

To have every second hour a pill containing equal parts of blue pill and Dover's powder.

16th, 10:00 A. M. -Pulse 114; tongue cannot be protruded; abdomen rather puffy but free from pain on pressure; bowels six times affected; discharges free from blood and passed with less pain; took six pills; drank two quarts; no sleep; mouth very sore, but little salivation.

Omit pills;

This woman continued to recover favorably and was dismissed well on the 23d.

Case II--Aged twenty-two, was delivered January 11 at five A. M. of her first child, after a labor of three hours. She was attacked on the 12th, at 1:00 P. M. with violent pain in the abdomen. Four dozen leeches were instantly applied; she was ordered to be diligently stiped and to have four grains of calomel with as much hippo every third hour.

5:00 P. M. -Pulse 140; extremely feeble; countenance indicative of the greatest distress; tongue moist at edge

but loaded in center; pain continues so acute that she cannot bear the pressure. She had taken the night preceding the attack, a calomal and hippo powder, and an oil draught the following morning; has had but one motion today, but the bowels acted extremely well after delivery;

To have one ounce of castor oil with as much oil of turpentine immediately; three dozen leeches to the abdomen, followed by a warm bath.

9:00 P. M. -Pain on pressure much relieved; experienced great benefit from the leeches and bath; bowels acted freely; pulse 140, more distinct;

Continue powders every second hour, with diligent staping; if the pain should return the abdomen is to be blistered.

13th, 10:00 A. M. -Pulse 140, feeble; tongue dry and loaded; abdomen soft and much less painful on pressure; feels better; slept two hours; blister was put on at twelve last night in consequence of a return of the pain; bowels three times opened; has had eight powders since the commencement; drank two quarts during the night some of which was frequently rejected;

Quit powders; to have four grains of calomel every second hour and the inside of her legs and thighs diligently rubbed with strong mercurial ointment; to be constantly staped; to have chicken broth in small quantities; also

the effervescing mixture.

9:00 P. M. -Pulse 140; tongue dry and loaded; abdomen soft; complains little of pain on pressure; bowels three times opened; took three calomel powders and vomited after each, when pills containing five grains of calomel and a quarter grain of opium were substituted, of which she has taken four. vomiting not so frequent; feels easy and says she has no pain; countenance still expressive of distress;

Continue pills, ointments, stupes and effervescing mixture.

14th, 10:00 A. M. -Pulse 132, more steady; abdomen more full but not very tense; complains little of pain on pressure; feels much distress when she coughs and weakness; took six pills; bowels three times freed; slept three hours; drank three quarts; vomited three times; about one ounce of mercurial ointment has been consumed in frictions since yesterday; breathing difficult; countenance distressed.

Continue pills and ointment; warm bath; to have three draws of castor oil, with as much oil of turpentine.

11:00 P. M. -Pulse 126, tongue parched; abdomen full; complains much of pain on pressure; bowels twice moved; discharges watery and green coloured; took four pills; drank three quarts; vomiting constant, in consequence of which

she was given at eight o'clock one grain of opium in a pill.

Opium pill to be repeated; to have the saline effervescent mixture, with the addition of fifty drops of tincture of opium to eight ounces; to continue her pills, ointments and stupes.

15th, 9:00 A. M. - Pulse imperceptible; strength rapidly sinking; extremities cold; drinks largely; vomiting incessant with hiccough; took six pills and eight ounces of the mixture; bowels three times opened; complains much more of pain on pressure; abdomen more distended.

Calomel and opium pills to be continued, with one grain of solid opium with every second pill. Stupes, wine and water for drink.

16th-She expired at four o'clock. P. M.

This was an unfortunate young unmarried woman. On dissection, about a pint of straw coloured fluid was found in the abdomen, with a copious deposition of lymph in various parts, particularly in the uterus. The intestines were distended with air, and extremely vascular; the peritoneum everywhere was as if injected with red wax; the uterus was healthy.

While attending a medical society meeting O. W. Holmes became interested in a discussion that arose regarding a reported case of a physician, who following the examination of a body dead of puerperal infection had himself died in less than a week, apparently in consequence of a wound received at this examination; and in addition several women whom he attended at confinement in the meantime were all attacked with puerperal infection.

This interest on the part of Dr. Holmes led to a thorough investigation of the literature and experiences of practitioners both in the U. S. and abroad and **resulted** in the reading of his memorable (15) essay on "The Contagiousness of Puerperal Fever" before the Boston Society for Medical Improvement. It was also printed, at the request of the same society in the "New England Quarterly Journal of Medicine & Surgery" for April 1843. This was a journal of very limited circulation and was extinct within a year. In addition the few copies that were struck off separately were soon lost sight of among his friends and the Essay therefore was not fully brought before the profession.

Hugh L. Hodge, M.D., Professor of Obstetrics at

the University of Pennsylvania in his work "On the Non-Contagious Character of Puerperal Fever" of Oct. 11, 1852, and Chas. D. Meigs, M.D., Professor of Midwifery & Diseases of Women and Children at the Jefferson Medical College of Philadelphia, in a series of letters addressed to the students of his class under the title "On the Nature, Signs & Treatment of Child-bed Fevers" (1854) were both opposed to the doctrine set forth in Holmes' Essay. This led to a considerably prolonged and heated argument.

In his attacks on his opponents Holmes was of the opinion that that was probably the best way he would ever have of being of service, and stated that he "would rather rescue one mother from being poisoned by an attendant than claim to have saved forty or fifty patients to whom I had carried the disease."

He avoids all discussion of the nature of the disease known as puerperal fever and the stale philology of the word "contagious" and bases his argument on numerous unquestionable and unequivocal facts. It is not pretended that the disease is always, or even, it may be in the majority of cases, carried about by attendants; only that it is so carried in certain cases. That it may have local or epidemic causes, as well as

that depending on personal transmission, is not disputed.

As a practical application of the problem Holmes addressed the following question to the president of one of the principle Insurance Companies of the time, leaving Dr. Meigs' book and his Essay in his hands at the same time.

Question: "If such facts as Robertson's cases were before you and the attendant had had ten, or even five fatal cases, or three, or two even, would you, or would you not, if insuring the life of the next patient to be taken care of by that attendant, expect an extra premium over that of an average case of childbirth?"

Answer: "Of course I should require a very large extra premium, if I would take the risk at all."

Holmes gives the point at issue in this gravely important argument as follows:

Affirmative.

"The disease known as P. F. is so far contagious as to be frequently carried from patient to patient by physicians and nurses."--O. W. Holmes, 1843.

Negative.

"The result of the whole discussion will, I trust,

serve, not only to exalt your views of the value and dignity of our profession, but to divest your minds of the over-powering dread that you can ever become, especially to women, under the extremely interesting circumstances of gestation and parturition, the minister of evil; that you can ever convey in any possible manner, a horrible virus, so destructive in its effects, and so mysterious in its operations as that attributed to puerperal fever."--Professor Hodges, 1852.

"I prefer to attribute them to accident, or Providence, of which I can form a conception rather than to a contagion of which I cannot form any clear idea, at least as to this particular malady."--Professor Meigs, 1852.

"- - - in the propagation of which they have no more to do, than with the propagation of cholera from Jessore to San Francisco and from Mauritius to St. Petersburg."--Professor Meigs, 1854.

Holmes mentions that the facts are too generally known and accepted to require any formal argument or exposition, that there is nothing new in the positions advanced and no need of laying additional statements before the Profession. But upon turning to two works, one almost universally, and the other extremely appealed to, as authority, he sees ample reason to overlook

this objection. He finds that in the last edition of Dewees's Treatise on "Diseases of Females" it is expressly stated: "In this country under no circumstances that puerperal fever has appeared hitherto, does it afford the slightest ground for the belief that it is contagious." In the "Philadelphia Practice of Midwifery" not one word can be found in the chapter devoted to this disease which would lead the reader to suggest that the idea of contagion had ever been entertained. It seems proper therefore to remind those referring to these works that there may possibly be some sources of danger that they have been slighted or omitted, quite as important as a trifling irregularity of diet, or a confined state of the bowels.

Following a reiteration of the affirmative in the argument Holmes states:

1. All forms of puerperal fever are not equally contagious or infectious.
2. It is not known whether the mode of infection is by way of the atmosphere about the physician, or by a direct application of the virus to the absorbing surfaces by his hands.
3. Contagion need not always be followed by puerperal fever.

4. The disease may be produced and variously modified by many causes besides contagion and more especially by epidemic and endemic influences.

Dr. Holmes was a believer of the "contagion theory" so popular in Great Britain and Ireland and obtained much of his information, as well as his support from this part of the world, from men whom had, and were having a wide direct experience with puerperal infection in its many aspects.

He cites Dr. Gordon of Aberdeen (1795) as follows: "I arrived at that certainty in the matter, that I could venture to foretell what women would be affected with the disease, upon learning by what midwife they were to be delivered, or by what nurse they were to be attended during their lying-in, and almost in every instance my prediction was verified."

He continues by reference to a long series of cases, lasting through an interval of one-half a century. in England where successive cases appeared in the same individual's practice. He then refers to a similar series of cases occurring in the United States. These conditions would clear up when the practitioner discontinued his practice but were often prone to return upon his assuming his duties again--even after a complete change of

clothing. He noted that many cases followed in the wake of puerperal infection autopsies or in instances where the physician went from a case of erysipelas to a delivery. In citing a series of cases in Massachusetts he found that many of the cases of puerperal infection were very distant apart in the practitioner's locality, that many followed apparently normal labors and that the young as well as the more aged; and the healthy, as well as the weak were often attacked. One instance is mentioned of a Dr. stopping this disease in his practice by a changing of clothes and washing his hands in chloride of lime solution between each patient.

Upon a study of records he found the death rate from puerperal infection to be higher in hospital than in home deliveries and found that in the former instance they averaged about five to every one thousand births and miscarriages in England, while in the latter instance they were far from common, some men having very extensive home practice without ever encountering a single case.

Holmes mentions instances where the disease appears to have been conveyed by a process of direct inoculation, for example: Dr. Campbell of Edinburgh states that in October 1821, he assisted at the post-mortem examination of a patient who died of puerperal fever. He carried

the pelvic viscera in his pocket to the class room. The same evening he attended a woman in labor without previously changing his clothes; this patient died. The next morning he delivered a woman with the forceps; she died also and many others were seized with the disease within a few weeks, three shared the same fate in succession. Then in June 1823 Dr. Campbell assisted some of his pupils at the autopsy of a case of puerperal fever. He was unable to wash his hands with proper care for want of the necessary accommodations. On arriving home he found that two patients required his assistance. He went without further ablution or changing of his clothes; both these patients died with puerperal fever.

He advises of the dangerous and often fatal wounds received in post mortem examination of patients who died of puerperal fever and the possibility of the spread from patient to patient by sponges which can be assumed, due to the well known instances of abscesses occurring on the hands of the washerwomen who have washed clothes contaminated by puerperal fever patients in Vienna.

He quotes Dr. Rigby as follows: "It is to the British practitioner that we are indebted for strongly insisting upon this important and dangerous character of puerperal fever." Foremost among these men are found

such names as Gordon, Jno. Clark, Denman, Burns, Young, Hamilton, Haighton, Good, Walter, Blundell, Gooch, Ramsbotham, Douglas, Lee, Ingleby, Lacoek, Abercrombie, Alison, Travers, Rigby and Watson. At this time a few continental writers had adopted similar views.

Holmes then suggests the following preventive measures, which we must remember were not products of his own study or experience but were the results of his study of the literature on the subject and his information acquired from the active practitioner here and abroad, especially in the United Kingdom.

1. If expecting to attend a delivery never take an active part in a puerperal fever post-mortem examination.

2. If present at such post-mortems use thorough ablution, change every article of dress and allow an elapse of twenty-four hours or more before attending a case of midwifery. It may be well to extend the same precautions to cases of simple peritonitis.

3. Similar precautions should also be taken after attending an autopsy or surgical treatment of erysipelas.

4. On the occurrence of a single case of puerperal fever in his practice the physician must consider the next delivery, unless some weeks have elapsed, as in

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danger of being infected and it is his duty to take every precaution to diminish her risk of disease and death.

5. If within a short period two cases of puerperal fever happen close to each other in the practice of the same physician, the disease not existing or prevailing in the neighborhood, he would do wisely to relinquish his obstetrical practice for at least one month and endeavor to free himself, by every available means, from any noxious influence he may carry about with him.

6. The occurrence of three or more closely connected cases, in the practice of one individual, no others existing in the neighborhood and no other sufficient cause being alleged for the coincidence, is prima facie evidence that he is the vehicle of contagion.

7. It is the duty of the physician to take every precaution that the disease is not introduced by nurses and other assistants, by making proper inquiries concerning them, and giving timely warning of every suspected source of danger.

8. Whatever indulgence may be granted to those who have here-to-fore been the ignorant causes of so much misery, the time has come when the existence of a "private pestilence" in the sphere of a single physician

should be looked upon, not as a misfortune, but a crime; and in the knowledge of such occurrences the duties of the practitioner to his profession should give way to his paramount obligations to society.

O. W. Holmes' work, just referred to, overshadows all other American writers and by many has been compared to and given priority over that of Semmelweis of which we shall soon review.

(16)

Sinclair, a strong and loyal proponent of Semmelweis sums up Holmes services to obstetrical science as follows: "As science it is a neglectable quantity. But that Holmes conferred immense benefits on humanity by devoting his literary genius to attracting attention to puerperal fever and by trying to suppress the practices which brought childbed fever in their train, is a fact which should be gratefully acknowledged." And later "All that Holmes wrote was true, as case records, though not much of it was new; apart from the cases he only restated in eloquent language the old and obsolescent opinions."

There is no doubt that Holmes' information was second hand and that he was a strong supporter of the "contagion" school of Great Britain as opposed to the epidemic theory paramount on the Continent during his

time. His work was done and presented in an admirable manner and while not striking at the heart of the question it was of inestimable value and the object of the saving of thousands of precious lives.

Kneeland, a contemporary of Holmes, maintained (1846) that puerperal fever was contagious, and that it is propagated from one patient to another in the wards of a hospital. Epidemics of puerperal fever are almost always the effect and not the cause of the contagion. (16)

The scene now shifts from the United States and Great Britain, the stronghold of the contagionists, to the mainland of Europe where the theory of epidemicism held sway and where the progress of obstetrics had been held in obedience by the relative importance and prominence of the midwife as compared to the physician in this field. It will be remembered that in Great Britain especially the medical men had displaced to a large extent, the midwife.

On the continent puerperal infections had been one of the direct scourges for years and in most instances they were unable to cope with the situation, largely due to their theory of its causation. Such was the state of affairs when Semmelweis decided to take up the study of medicine.

He is one of medicine's martyrs and in the future will be one of its far shining names, for every child-bearing woman owes something to him. (17)

In the history of Midwifery there is a dark page, and it is headed "Semmelweis!" What man could close his eyes to the powerful impression of his book? Even now at the present time there are whole pages of his deductions which might stand in the most modern work. And the annihilating logic of his statistics! We younger men for whom antipathies were unthinkable, to whom the reading of course tirades about "genius misunderstood" was only tedious, we often find it incomprehensible that the logical conclusions of the doctrine of infection were nowhere drawn; I mean the local treatment; it was the keystone of the arch, the crown of the whole structure The efficient application of disinfection midwifery owes without doubt to surgery, most certainly it ought to have been reverse. If the conclusions and councils of Semmelweis had been followed, then the truth of his doctrine would have been demonstrated in the compelling language of statistics and so perhaps Obstetrics would have stood in the forefront of the greatest advance in Medicine which has been since physicians and physic came into existence. (18)

In the whole History of Medicine we find a clear record of only two discoveries of the highest importance in producing direct and immediate blessings to the human race by the saving of life and the prevention of suffering. These were the discoveries of Edward Jenner and Ignaz Phillip Semmelweis. In neither case did the discovery fall from Heaven; in neither was there a grasping of Promethean fire; about neither can we speak of inspiration. The discovery of Semmelweis was possible only for a man who had undergone prolonged and laborious preparation, who had directly observed, and had reflected without preconceptions, whose intellect was kept rather alert and keen because of the warmth of his human sympathy. The heart of Semmelweis was wrung by witnessing around him the suffering and death of thousands of the miserable victims of some baleful agent, which had eluded the efforts of generations of investigators to comprehend it.

"Consider," says Carlisle, "how the beginning of all Thought worth the name is Love; and the wise head never yet was, without first the generous heart."

The record of the steps which led up to the establishment of the "eternally true" etiology of puerperal fever is not only of engrossing interest as history,

but it must remain of perennial value as an example of the application of logical method in working from the known to the unknown in Medicine. We trace the emancipation and then observe the positive stride from the known to the unknown which works the final discovery as nearly unique in its magnitude in medical history. Whether it was equalled or excelled by that of Edward Jenner is a question which does not concern us for the present; but in any case there can be no question of the greater human interest, in the pathos and the tragedy of Semmelweis' story.

The story concerning the controversy of Semmelweis' "Doctrine" is also full of interest, and it is of permanent value from the psychological point of view. We have to contemplate the application of detestable controversial methods: the use of misrepresentation by false suggestion and of insult by disdainful silence, the affectation of exact and encyclopaedic knowledge to conceal shallow ignorance, the confident assertion of inaccuracies verging on falsehood, the assumption of official dignity in place of condescension of ratiocination, the nauseating syncophony of henchmen and aspirants for promotion, the tergiversation, feebleness and inconsistency of superfluous participators in the controversy; and always opposed to all these uncomely things, patient earnest argument based upon irrefragable evidence, occasionally relieved by a touch of irony or a narcotic illustration; and through all the note of wistful appeal for the adoption of measures which would bring to an end the heartless sacrifice of human life.

I have been unable to find a more admirable, extensive and interesting source of information regarding Semmelweis and his work than the book "Semmelweis,"

His Life and His Doctrine," by Sir William J. Sinclair, M. A., M. D., late professor of Obstetrics and Gynecology in the University of Manchester, (16) from which I have secured a large part of the following material.

Ignaz Phillip Semmelweis was born in Budapest in the middle of July, 1818, of middle class parents.

Education in this Hungarian-German community was at a low ebb at this time, but finally after two years at the University of Pesth Semmelweis entered law school in Vienna. This proved disappointing and while attending an anatomy lecture with a medical student he suddenly decided on medicine as his life work.

He received his M. D. degree from the University of Vienna in April, 1844, and having taken special interest in obstetrics and gynecology he prepared for and received his Master of Midwifery degree from the same institution in August, 1844. He at once applied for an Assistantship in the First Obstetric Clinic of the Great Vienna General Hospital and was appointed July 1, 1846. In the meantime his predecessor, Dr. Breit, had decided to remain on, and contrary to custom he was re-appointed. Semmelweis remained at this hospital as an aspirant and during the following two years had free access to the clinic and pathology Department and made good use of his time in a study

of the bodies of women who had died from obstetrical and gynecological diseases and operations. In this he was greatly aided by his ever steadfast friend, Rokitansky, the local, and one of the world's greatest pathologists. This preparation permitted him to enter on his assistantship with a groundwork of theoretical and scientific knowledge and practical experience seldom, if ever, exceeded.

He was at once attracted by the dreaded, highly fatal, prevalent and nearly ever-present disease of puerpal infection. To this he devoted all of his time; in the library, dead-house, and at the bedside. He could not find any of the etiologic factors in the hundreds of cases that he treated in vain.

Some of the various doctrines of the etiologic of puerperal infection during this time, and preceding were:

1. Lochial suppression theory brought to England from the Mauricean French School by Swellie and then thence over Western Europe.

2. Milk-fever theory as taught by Boer, who had been in England, where it had many supporters.

3. A combination of one and two above.

4. Gastric-bilious fever theory of Charles White

and Denman of England.

5. Inflammation theory--affecting various organs; advocated by William Hunter and Bandelocque.

6. Contagious theory which was strongly supported in England and the United States, and thought to be due to an unknown something (divinum aliquid) producing local lesions.

7. Variable theory, i. e. zymotic diseases, such as scarlet fever, etc., which produced puerperal infection and the original disease lost all of its characteristics.

8. Wound--fever theory.

9. Genius epidemicus theory, an atmospheric--cosmic--telluric condition, which held sway in France and Germany especially.

10. Miasmatic theory, a special injurious entity.

11. Spontaneous origin theory of Virchow (1861) and Barnes (1875).

12. Injury theory i. e. subinvolution, chilling, errors of diet, emotional and blood changes.

In general the etiologic theories prevalent at the time Semmelweis began his work were:

1. Epidemic theory on the Continent.

2. Contagion theory in Great Britain and United States.

We can readily see that before Semmelweis could

begin a satisfactory study of this condition he must unlearn many of his earlier teachings.

Semmelweis was at once aware that when the disease was rampant in the Vienna General Hospital the rest of the city may be absolutely free from it. He therefore decided against the epidemic theory. He also found that while the patients were of the same class and health in both the First and Second Obstetric Clinic, as was also the methods of medication, ventilation, diet, laundry, etc., and that the personell of each staff compared favorably, the frequency of the disease and the death rate was greatly higher in the First Clinic, where medical students were taught than in the Second Clinic where midwives were taught. The cases in the First Clinic were in rows, while those in the Second Clinic were usually scattered. While the disease was highest in primiparae, whom had long labors and during the school term, and seldom if ever occurred in patients coming to the First Clinic following "Street-Birth", or in premature labor as they were seldom, if at all, examined.

At the time that he again resumed his post as Assistant (February, 1847) his old friend, Kollerschka, the professor of medical jurisprudence at the Univer-

sity of Vienna, died following a knife wound of the finger at an autopsy which produced a lymphangitis and phlebitis in the same upper extremity and culminated in a pleurisy, peritonitis and meningitis, and in a few days preceding death a metastasis in one eye.

He said, "In the excited condition which I then was it rushed into my mind with irresistible clearness that the disease from which Kolletschka had died was identical with that from which I had seen many hundreds of lying-in women die." Therefore, he thought it was due to cadaveric material carried into the vascular system, which the teaching system of the time gave ample opportunities to spread, especially in the First Clinic by the medical students, due to the wide use of cadavers, followed by inadequate, or no washing of the hands, and no disinfection before examination of the parturient and puerperal women thereby allowing an absorption of the cadaveric material into the genital tract. He next reasoned, "then why not destroy the cadaveric material on the hands by washing and chemical agents?"

To destroy cadaveric material on the hands Semmelweis began using chlorina liquida about the middle of May, 1847, but soon substituted the less expen-

sive solution of chlorinated lime. This led to a reduction of mortality from 11.4% to 3% in the same period of the preceding year in the First Clinic, nearly as low as the 2.7% mortality of the Second Clinic. In the following year the mortality dropped to 1.27% in the First Clinic compared to 1.33% in the Second Clinic; the first time in the history of the institution that Division I had been lower than Division II in puerperal infection deaths, as Division II had always been low due to the less frequent contact of the midwives with cadavers as compared to the frequent examinations and dissections by the medical students in Division I.

This disinfection was only used at the beginning of the ward rounds and the hands were washed in soapy water only between each patient on the assumption that the cadaveric^{material} was the sole cause and was thereby removed.

But in October, 1847, a woman suffering from cancer of the cervix, was admitted to the Labor Ward and placed in bed number I, where the daily visit of the staff and students always began. In a few days the twelve succeeding women confined were attacked by puerperal infection and eleven died from it. Semmel-

weis at once saw the fallacy of cadaveric material ~~per~~se as the sole cause and instituted complete disinfection between each patient also.

Semmelweis had also noted that when the First Obstetric Clinic was under Boer, his methods of cleanliness and patience, learned mainly in Great Britain from Denman, kept the mortality from puerperal infection to 1.3% during his thirty-three years incumbency, and in his last year of tenure of office it was 1.8%. He absolutely refused to teach midwife pupils by practice upon the cadaver. Mainly for this reason he was succeeded by Klein in 1823, who became Semmelweis' chief and detestable opponent. During Kleins' first year the mortality rose to 7.8%. The only difference between these two periods was the introduction of cadaveric poison into the lying-in wards of Division I.

Semmelweis also noted that when an attendant took an active part in post mortems his mortality from puerperal infection increased. Due to his great activity in this field he realized how many women he had prematurely consigned to the grave.

In the fall of 1847 Semmelweis' Doctrine was at last complete: "Puerperal fever is caused by decomposed animal organic matter conveyed by contact

to pregnant, parturient or puerperal women without regards to its origin, whether from the cadaver, or from a living person affected with a disease which produces a decomposed animal organic matter.

Such friends as Hebra, Skoda, Rokitonsky and Kussmaul, and the more intent and observing students of medicine took every opportunity to spread this doctrine. They were greatly outnumbered by antagonists who through professional jealousy or misinformation or misrepresentation fought bitterly and in many instances dishonorably against it. Foremost among these were Klein and his adherents, who also fought successfully against a reappointment of Semmelweis so that he retired as Assistant of the First Division on March 20, 1849, discouraged, despaired, and broken.

(4)
Paul de Krüf in his "Saver of Mothers" states that the "firing of Semmelweis from this position in Vienna for making his mother saving discovery is one of the dirtiest blots on the whole record of medical science."

Bitter, Semmelweis returned to Budapest in 1850. In May, 1851, he took charge, as an unpaid honorary, senior physician, of the Obstetric Department of St. Rochus Hospital, where puerperal infection prevailed as in Vienna, He at once instituted his usual methods with very gratifying results. He continued in this capacity for six years.

In July of 1855 his ambitions were crowned by being appointed professor of Theoretical and Practical Midwifery in the University of Pesth. Even with the opposition of an unfriendly, disloyal and unclean staff in an inadequate institution the mortality from puerperal infection dropped to the unprecedented level of 0.39% by a firm adherence to his principles of prophylaxis. At the same time among many of the leading obstetricians and in many of the largest lying-in hospitals his teachings were entirely forgotten, or ignored, in the face of their continued fatalities. Everywhere, except in Great Britain and Ireland, he saw evidence of the unfortunate mistaken belief that he had declared cadaveric poison was the only cause of this disease.

The Doctrine met with a more hearty reception where White and Collins had already proven the worth of cleanliness, ventilation and chlorine disinfection and fumigation.

In 1856, Tarnier, a young medical graduate in the Maternite in Paris, unknowing of Semmelweis' discovery exactly, worked along similar lines, in the same scientific spirit and inspired by the same humane desires and aspirations, and ultimately reached the same conclusions. (16)

By the fall of 1857 Semmelweis was convinced that the truth did not make any way for itself, and that the amount of progress had not been made which was necessary for the welfare of mankind. He therefore resolved and prepared to publish a book on puerperal infection which was based on his own experiences. This work, exhaustive but poorly written, in German, was published in 1860, entitled "Die Aetologie, der Begriff und die Prophylaxis des Kindbettfiebers."

Translation of the teachings from this work, by Sinclair are:

Puerperal fever is not a contagious disease, but puerperal fever is conveyed from a sick to a sound puerpera by means of a decomposed animal organic material.

I maintain that puerperal fever, without the exception of a single case, is a resorptive fever produced by the resorption of a decomposed animal organic material. This is, in the overwhelming majority of cases, brought to the individual from without, these are the cases which represent child-bed fever epidemics; these are the cases which can be prevented.

In rare cases the decomposed animal matter which when absorbed causes child-bed fever is produced within the limits of the affected organism.

The sources of the decomposed animal organic material which conveyed from without, causes puerperal fever are all diseases-- if only the disease in its progress produced a decomposed animal organic material-- only the decomposed animal organic material as a disease producer has to be taken into consideration. What the object actually represents is of no importance; it is the degree of putridity that has to be considered.

The carrier of the decomposed animal organic material is everything that can be rendered unclean by such material and then come into contact with the genitals of the patient.

Puerperal fever is therefore not a species of disease (ei. a specific disease) but a variety of pyaemia. I understand by pyaemia a blood poisoning produced by a

decomposed animal organic matter. This disease can be produced in a normal healthy puerpera by a disease which is not puerperal fever.

There are no epidemic influences capable of producing puerperal fever. epidemic, that is to say atmospheric cosmic, telluric influences. If it were produced by such epidemic influences it could not be prevented. It is not bound up with any season in particular. The medical profession in England regards puerperal fever as contagious. That puerperal fever is not contagious is my belief.

But puerperal fever is conveyable--but only from those infected women who produce decomposed material. After death it is conveyable from every cadaver of a puerpera to a healthy individual when the cadaver has reached the necessary degree of decomposition.

The task of prophylaxis of puerperal fever must consist in preventing the access of decomposed material from within the organism, and the removal as quickly as possible from the organism of such a material so as to prevent its resorption.

All pathological anatomy and even surgical work in the curriculum should be finished before the practice of midwifery begins.

The conveyer of the decomposed matter may also be the air. Hence free ventilation is necessary so as to

prevent the development of a puerperal miasma. Isolation rooms should be provided.

As regards "self-infection", if decomposed material has actually been produced in the individual it must be at once got rid of by cleanliness and injections so as to prevent resorption as far as possible.

(12)

Adam⁽¹²⁾ defending the English stand takes issue with Sinclair: "Except for Semmelweis' doctrine of decomposition animal organic material, the only serious difference between the English school as represented by obstetricians at the end of the 18th century, and Semmelweis in the middle of the 19th century, is that one believed in contagion and the other in conveyance. Instead of showing as he ought to have done, that with our present knowledge of puerperal fever there is a distinction without a difference, Sinclair solemnly and unbelievably emphasizes that the distinction is all-important.

From 1774 to 1840 no British writer claimed puerperal was a specific disease. While some pointed out the close relationship of this condition with erysipelas, others with scarlet fever and others again--like Charles White -- with jail fever, or--like Collins and earlier workers in Dublin--with typhus, not one claimed all cases were erysipelas, or scarlet fever, or typhus. Nor was Semmelweis original in his demonstration that students and those attending lying-in women might convey the disease to her.

Gordon of Aberdeen in 1795 had recognized that those in contact, or in attendance upon, cases of puerperal fever might convey the condition to others in the puerperal state, and O. W. Holmes, as is well known had, prior to Semmelweis emphasized this danger in 1843. What is that but conveyance? As I have pointed out the doctrine of self-infection admitted by Semmelweis goes back to Charles White.

The disease was an intoxication set up by decomposed animal matter to Semmelweis, but to the contagionists it was an infectious condition, or conditions. Yet Sinclair in 1909 preferred to err with Semmelweis rather than to embrace the truth with his fellow obstetricians in Great Britain."⁽¹²⁾

Following the publication of his work Semmelweis fought viciously for the recognition of his Doctrine and attacked many of his leading opponents unmercifully by his Open Letters. But few saw the light, or refused to, and even as late as 1863 a clear divergency of opinion existed.

Broken and insane Semmelweis was placed in an insane institution in ^{Vienna Pest.} Vienna in 1865 and died on August 17, 1865, a victim to that other disease whose identity with puerperal fever he was the first to recognize, to the prevention of which in midwifery, gynecology and sur-

gery he devoted his energies as a teacher. He contracted the blood poison causing his death from a knife slip wounding his finger at his last operation.

In discussing the forerunners and contemporaries of Semmelweis, Sinclair points out, as already mentioned, the relative importance of the physician over the midwife in Great Britain and Ireland as compared to the Continent. He is of the opinion that the position that the practitioner held in the United Kingdom soon produced a considerable contingent of scientific obstetricians, as pioneers of progressive midwifery. They wrote books and published innumerable pamphlets in the cause of advancing obstetrical science. Many of them gave to the world their experience in dealing with puerperal fever and their opinions on its etiology and prophylaxis. Therefore the medical profession in England had come very near to the most modern practice in relation to puerperal fever. Their theory of contagion was erroneous but their prophylaxis was excellent. Hence they were prepared to receive the Semmelweis news brought to them by Routh.

Sinclair believes that the contemporaries of Semmelweis in America made few and unimportant contributions to this work and after stating what he calls the sum and substance of Holmes paper, which we have already called attention to, he continues that he does not see how this

could bring him (Holmes) into any sort of a conflict or comparison with Semmelweis.

Following the, as yet indefinite, conception of wound fever, came a further true advance in the demonstration of the identity of the morbid anatomy in patients dying after surgical and obstetrical wounds. This step we owe to Cruveilhier, Simpson and others.

Next came the discovery and description of phlebitis and lymphangitis, a grand piece of progress, for which we are chiefly indebted to Cruveilhier and Robert Lee.

A still further step in establishing the nature of puerperal infection was the discovery of thrombosis and embolism by Virchow, Kirkes, Cohnheim, and many others.

Then came the researches into the potency of septic poisons--researches as to the production, diffusion and influence of bacteria. Leaders in this field were Lister, Klebs, Billroth, Heiberg, Orth, and others of less, but equally important prominence.

The foundation of bacteriology was one of the most obvious advances in science relating to puerperal infection. The supplementary knowledge which Markusovszky prophetically declared to be essential to the complete understanding of puerperal infection was soon to be revealed.

Pasteur discovered the streptococcus in a case of puerperal infection in 1860. Shortly following this Maryhofer discovered vibriones (bacteria) in the air of

lying-in wards and later in the lochia of sick puerpera. He therefore reached the conclusion that the examining finger and not the atmosphere introduced the organisms and that the air was innocuous. Soon after this Dr. Hausmann (1868) discovered vibriones in the lochia of healthy puerperae and also in the vaginal secretions of pregnant women. He then argued that the pathogenic nature of the vibriones was disproved.

Then followed a vast amount of bacteriological observations connected with midwifery lasting over a period of forty years and leading up to the variety of opinions regarding the hemolytic streptococcus.

The most important researches on bacteria have been those of Lister and his followers, undertaken with a practical object in view. The results have been equally wonderful and valuable. These results go to justify the belief that pyemia is a septic disease and that puerperal pyemia may be almost, if not altogether, prevented by the application to delivery of the practice based on antiseptic principles.

The great event after the publication of the work of Pasteur was the epoch-making address of Professor Lister of Glasgow, "On the Antiseptic principle in the Practice of Surgery" in August, 1867. It was the result of years of experiment and reflexion frankly based on

the work of Pasteur. His aim was to prevent the access of disease-bringers.

Finally the work of Waldeyer, Breslau, Doleris of Paris (working under Pasteur), Doderlein of Munich, and others working specifically on puerperal infection led to the culmination of all ascertained knowledge up to 1900.

(12)

Adami gives the summation of the present day bacteriological conclusions regarding the etiology of puerperal infection as follows:

1. Putrefaction is essentially caused by bacteria, so that conveyance of decomposed animal organic material meant always the conveyance of bacteria.

2. Not all organisms that set up decomposition of animal organic material are by any means necessarily pathogenic.

3. Not every case of conveyance of cadaveric material will, therefore, produce infection of the puerperal uterus, or other wounded surface.

4. The organisms which most frequently produce terminal infections, which therefore are most frequently present post-mortem are members of the streptococcus group; these at the same time are the commonest saprophytes on the skin and mucous membranes of the body.

5. So long as the skin and mucous membranes are intact, for so long may streptococci and other microbes

of a highly virulent nature persist on unbroken surfaces without producing disease.

6. The organisms which in an overwhelming majority of cases set up and are found associated with puerperal fever are members of the streptococcus group, and of these the overwhelming majority are the hemolytic strains. As with wounds in general, other organisms may be present and may preponderate or be practically in pure culture in the blood and tissues, to the exclusion of the streptococcic group; notably the staphylococci, B Coli, strains of the Pneumococci, and B Pyocyaneus.

7. Streptococci, both hemolytic and non-hemolytic and the other microbes above mentioned, may be present in the vagina of the pregnant woman. These organisms explain "self-infection". That every puerperal woman does not suffer from wound fever is probably due to the bacteriocidal action of the effused blood and to the strongly acid and inhibitive, if not actually bacteriocidal, properties of the vaginal secretion.

8. Stagnation lochia, without free drainage is known to favor bacterial multiplication and infection of the placental site. Hence the sound wisdom of Charles White's principle of womb drainage. The argument that early sitting up favors uterine thrombosis is not valid. Such thrombi are of bacterial origin and proper drain-

age, by preventing infection, prevents thrombosis.

9. Not only do streptococci vary greatly in virulence **but** hemolytic activity may be increased at a rapid rate by the passage through animals in a series; that is to say, during their sojourn in the body of an animal there may be a definite increase in their virulence. Further, growth in confined spaces under favorable conditions favors an increase in virulence.

10. No bacteriologist of standing for the last fifteen years has seriously supported the view that there is a "distinct" species of streptococci, i.e. streptococci erysipelatas. In other words it is accepted that the streptococcus which produces erysipelas in one individual may produce peritonitis, and other forms of infection in other individuals. There may well, therefore, be a correlation between the frequency of the cases of erysipelas in a district and the frequency of cases of puerperal fever.

11. Similarly, the scarletinal sore throat, as also the diphtherial, is characterized by a most abundant local growth of streptococci, usually hemolytic in character. Several observers have thus held that a streptococci is a cause of scarlet fever, just as prior to the discovery of B. diphtherial the same organism was held to cause diphtheria. This local growth of streptococci

obtains in other zymotic diseases in which the throat is affected. Wherefore we can understand the relationship that has been suggested between these diseases and puerperal fever.

We admit therefore that what holds for other streptococcal diseases also holds true for the origin of puerperal fever, its ways to originate: (a) from a previous case of puerperal fever either directly or through intermediation of a third person; or (b) from a previous case of suppurative or other disease, not puerperal fever but like means of conveyance; or (c) it may be of autogenous origin, due to saprophytic organisms which possess or acquire exalted virulence and gain admission to the unprotected placental site.

Therefore in the face of a widespread source of causitive organisms, the streptococci, on the human body, Charles Whites' teaching of cleanliness of the patient, her surroundings, and of womb drainage, the incidence of puerperal fever could be reduced to a negligible minimum. He does not refer to cleanliness of the attendant, but in view of the other statements he surely holds that to be of vast importance, and Semmelweis admits that the British had hand disinfection prior to his time.

Adami continues: The British obstetricians, and not Semmelweis, first gained control over puerperal fever. They introduced free ventilation, absolute cleanliness, laid stress upon disinfection, realized

the value of ~~an~~ antiseptics before Lister by many years, recognized the worth of chlorine and chloride of lime, introduced disinfection of the hands, and drainage of the puerperal wound. They would have no truck with the epidemic, i. e. atmospheric, cosmic, telluric theory of origin, and therefore saw the condition was preventable and so must be prevented.

The able author of "Charles White and Puerperal Fever" further feels that Semmelweis deserved to be held in grateful remembrance, and given a place in the temple of fame, not for his enunciation of a new and true theory--for his theory was quite erroneous, nor again as the originator of a sound practice in the prevention of puerperal fever--for in not one single point was his practice original; but for his demonstration as timely as it was heroic, of the wrong, not to say deadly nature of the treatment in vogue prior to the re-introduction of rational methods at the end of the 18th Century.

He (Adami) is of the opinion that the real pioneers in the reduction of puerperal infection were the British obstetricians of the latter half of the 18th Century in London, Manchester, Edinburgh and Dublin. Chief among these are men like Denman, Kirkland, the Whites, Young, Ould and Clarke; and among these assuredly Charles White takes first place.

On the other hand Garrison in his "History of
 (17) Medicine" states that Semmelweis is the true pioneer
 of antiseptics in obstetrics, and while Holmes ante-
 dated him by five years in some details, the superi-
 ority of his workover that of his predecessor lies
 not only in the stiff fight he put up for his idéas
 but in the all-important fact that he recognized
 puerperal fever as a blood-poisoning or septicemia.

(16)
 Sinclair maintains that Semmelweis introduced
 autisepsis as a prophylactic measure into both ob-
 stetrics and gynecology, using chloride of lime. This
 measure was rigidly practiced in Budapest in obstetrics,
 gynecology and surgery from 1858 onwards. This, he
 says, is of great interest inasmuch as it proves that
 before the work of Pasteur was known, and before Lister
 introduced his methods of preventing wound-fever, and
 long before anyone else thought of routine antiseptic
 midwifery Semmelweis had inaugurated it.

While all of this discussion regards the intro-
 duction of antisepsis by the English group of obste-
 tricians and Semmelweis is still carried on we find
 no mention by these modern authors of the use of
 Laborraque's solution. In turning to a work pertain-
 (19)
 ing to this by Thomas Alcock we learn that in 1819
 the Society for the Encouragement of National Industry
 in France, declared as a subject for competition the making

healthy the art of the catgut maker, this question was proposed in the following terms: "To find a chemical or mechanical process to remove the mucous membranes of the intestines used in the manufacture of gut-strings, without employing maceration and to prevent putrefaction. To describe the manner of preparing intestines by insufflation."

After many experiments M. Labarraque conceived that he had succeeded in revolving the problem and the Report of the Council of Health, printed in 1820, alludes to it as having succeeded in destroying all putrescency in the workshops for the manufacture of catgut.

This was performed by the use of the so-called chlorurets of Oxide of Sodium and of Lime. This mode of arrest of animal decomposition was soon applied to the treatment of dead bodies in the morgues and dissecting rooms, and subsequently for the purification of the air in hospitals, on ships, etc. and the treatment of wounds of various sorts, in France. Among the latter conditions so treated is mentioned ulcer of the uterus by the injection of this solution therein.

The Doctrine of Semmelweis has triumphed beyond measure and lies at the foundation of all of our

practical work today. The only apparent change being the opinion regarding "self-infection."

One direct consequence which we can trace to the Semmelweis discovery is that the safest place for the working-class women to be confined is within a well conducted lying-in hospital; and of no institution can that be said with more truth and confidence than of the Gebarhaus of Vienna at the present time--the birth place of Semmelweis' "Doctrine."

Further proof that this disease, so often due to criminal negligence on the part of the attendant, is preventable is pointed out by Paul de Kruif in the Ladies Home Journal of March, 1932⁽⁴⁾ in citing Dr. De Lee's good record at the Chicago Lying-In Hospital where he has had only one death from childbed fever in 25,212 deliveries. He says that Dr. De Lee tells of outbursts of puerperal infection at the present time in Class A hospitals in the United States, but that they are generally kept secret by the profession. ~~for lying-in due to the vast army of organized present.~~ He suggests that maternity wards should be separate units from the general hospital and until such is the case he believes it is safer to be delivered at home.

In the same article Dr. De Normandie of Boston, is said to advocate that every case of puerperal infection should be legally reportable and we would then know who

is responsible. There are sixteen states in the Union that have such a law at present, and unless proper measures are instituted by the profession there is no doubt but what legal measures will eventually compel the careless and negligent general practitioner and obstetrician to take the proper precautions and assume the necessary "aseptic conscience" that the conscientious and capable men in the field of obstetrics have always taken pride in, and feel it their bounden duty to do; since the gradual, but sure advance of the Art of Medicine has proven the preventive aspect of this needless Murder as Semmelweis called it.

BIBLIOGRAPHY

1. Spencer, Herbert, R., M. D., B. S., Lond. fellow of Royal College of Physicians. Emeritus of Obstetrical Medicine in the University College, London. Consulting Obstetrical Physician to the University College Hospital. "History of British Midwifery from 1650-1800". pub. by J. Bale, Sons and Danielsson, London, (1927).
2. Williams, J. Whitridge, M. D. Professor of Obstetrics, Johns Hopkins University, "Text Book of Obstetrics." pub. by D. Appleton & Co., N. Y. & London, 1927.
3. Sage, Earl, C. B. Sc., M. D., F. A. C. D., Obstetrical Notes for Juniors, 1930.
4. Kruif, Paul, P. H. D. Formerly on Staff of Rockefeller Institute, Ladies Home Journal, "Saver of Mothers." Ladies Home Journal, March, 1932.
5. Davis, C. H., "Obstetrics and Gynecology in General Practice." J. A. M. A., 9-28-1929.
6. Polak, J. O., "Puerperal Mortality and Morbidity." J. A. M. A., p. 1438. 11-9--1929.
7. Holmes, Mussey and Adair, "Factors and Causes of Maternal Mortality." J. A. M. A., p 1440. 11-9-1930.
8. Williams, J. W., "Discussion on Dr. Watson's Paper." Am. J. Ob. & Gyn., p. 434, Vol. 19-1930.
9. Adair, Fred, "Discussion on Dr. Watson's Paper."

- Am. J. Ob. & Gyn. p. 434, Vol. 19-1930.
10. De Lee, Joseph B., A. M., M. D. Prof. Ob. N. W. Med. School, etc., "Principles and Practise of Obstetrics", published by W. B. Saunders Co., Philadelphia & London (1913).
 11. Mauriceau, Francis, "Diseases of Women with Child." pub. by Andrew Bell--London (1697)--3rd. Edition.
 12. Adami, J. George, C. B. E., M. D., F. R. S., Vice Chancellor of the University of Liverpool, "Charles White of Manchester (1728-1813), and the Arrest of Puerperal Fever." pub. by the University Press Liverpool, England, (1922).
 13. White, Charles, F. R. S. "A Treatise on the Management of Pregnant and Lying-in Women, and the Means of Curing, but more especially of Preventing the Principle Disorders to which they are Liable." Printed by Edward and Charles Dilly, in the Poultry, London, England, (1773).
 14. Collins, Robert, M. D., Late Master of the Dublin Lying-in Hospital, "Practical-Treatise on Midwifery, containing the Result of Sixteen Thousand Six Hundred and Fifty-four Births occurring in the Dublin Lying-in Hospital during a period of seven years commencing Nov. 1826." pub. by Hoswell, Barrington

- and Haswell, 293 Market St. Philadelphia, Pa., (1838).
15. Holmes, O. W., M. D. "The Contagiousness of Puerperal Fever," in his "Medical Essays" pub. by Houghton and Mifflin, Co., Boston, Mass. (1911).
 16. Sinclair, Sir. Wm. J., M. A. M. D., late Professor of Obstetrics & Gynecology in the University of Manchester, "Semmelweis, His Life and Doctrine." pub. by the University Press, 34 Cross St. Manchester, England. (1909).
 17. Garrison, F. H., M. D., "History of Medicine," pub. by J. B. Saunders, Co., Philadelphia and London (1929).
 18. Fritsch of Breslau, M. D., "Pathologie und Therapie des Wochenbetts." (1884).
 19. Alcock, Thomas. "An Essay on the Use of Chlorurets of Oxide of Sodium and of Lime as powerful Disinfecting Agents, and of the Chloruret of Oxide of Sodium, more especially as a Remedy of Considerable Efficacy in the Treatment of Hospital Gangrene, Phagedenic, Syphilitic and Ill Conditioned Ulcers. Mortification; and Various other Diseases." pub. by Burgess & Hill, London, England. (1827).

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