

THE ETIOLOGY, THE CONCEPT, AND THE PROPHYLAXIS OF CHILD BED FEVER

IGNAC SEMMELWEIS

NOTES FROM THE EDITORS

INTRODUCTION

Ignac Semmelweis' discovery of the etiology and prophylaxis of puerperal sepsis, his agonizing travail over a long period of years to achieve acceptance of his doctrine throughout the European medical community, followed by his subsequent madness and tragic death, is one of the most famous stories in the history of medicine.

The traditional view of the life of Semmelweis, as exemplified in the words of his leading biographer, Sir William Singer, is that,

"Many men have been endowed with clear intellects and hearts full of love for their fellow men, with the enthusiasm of humanity, and they have been enabled to achieve some signal service for the human race in their day and generation; but in the whole history of medicine there is only one Semmelweis in the magnitude of his services to Mankind, and in the depth of his sufferings from contemporary jealous stupidity and ingratitude."¹

No one can take issue with the magnitude of Semmelweis' services to mankind. Indeed his discovery must rank with that of Harvey, or Virchow, or Pasteur, or Jenner, or Lister, for example, as being truly epochal in the sense that it marked the beginning of a new era in the practice of medicine.

But it is by no means a settled issue that Semmelweis' sufferings were a result of contemporary jealous stupidity and ingratitude. As you will discover in reading Sherwin Nuland's perceptive essay, "The Enigma of Semmelweis," which introduces our edition of Semmelweis' great classic, evidence now suggests that Semmelweis' long sufferings, either psychological or physiological, or both, were self inflicted.

We are deeply indebted to Shep Nuland, who is a member of the faculty of the Yale University School of Medicine, for his permission to reprint his recent essay in our edition, as well as for his inspired collaboration

¹Singer, Sir William, *Semmelweis, his life and doctrine*. Manchester: 1909.

with his colleague, Ferenc Gyorgyey, Medical Historical Librarian at Yale, for providing us with the first English translation of the famed Semmelweis "Open Letters," which we are privileged to bring into print for the first time in our library edition.

In order to refresh your recollection of the Semmelweis story, we have included in these *Notes* an excellent biographical sketch in the traditional mode by Palmer Findley. We suggest you read the Findley essay in juxtaposition with the Nuland essay for a fresh perspective on Semmelweis and his monumental contribution to medicine.

IGNAC PHILIPP SEMMELWEIS²

By Palmer Findley, M.D., F.A.C.S.

The name Semmelweis will ever be associated with that of puerperal sepsis, for it is to him, more than to any other individual, that credit is due for being the first to demonstrate through clinical and anatomic observations the etiology and the prophylaxis of the malady. The disease was not unknown to the earliest writers on medicine, to Hippocrates, Celsus, Avicenna, Pater, Sylvius, and Willis, but no mention was made by these authors of epidemics, nor does it appear that they were impressed with the seriousness of the malady.

The earliest reference to epidemic puerperal fever was made by M. Peu of Paris in 1646. He wrote of an epidemic that occurred in the Hotel Dieu of Paris in 1646 when scarcely a woman survived the disease. Later Pinard referred to an epidemic in the same institution in 1778 that took the lives of seven of twelve parturient women. Staff members counseled over what they called "the bothersome epidemic," and out of their deliberations and their findings at the post-mortem table the milk theory was evolved. From then on milk was banned from the hospital—but the epidemic swept on.

There were other theories evolved as epidemics swept through maternity wards in Dublin, Edinburgh, London, Vienna, Prague, Paris, and indeed throughout all continental Europe and Britain. There were the theories of overcrowding, of foul air, of errors in diet, of emotional influences, of gastric bilious fever, of inflammation of the pelvic organs and peritoneum, of miasma of the blood, of genus epidemicus, of lochial suppression, and atmospheric, telluric, cosmic influ-

²Excerpted from an address commemorating the Anniversary of the publication of the treatise by Semmelweis on puerperal fever, presented before The American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Hot Springs, Va., Sept 5, 1947. Reprinted from the *American Journal of Obstetrics and Gynecology*, Vol. 55, January-June, 1948.

ences. All these and more were the theories advanced by men eminent in the field of obstetrics as late as the middle of the nineteenth century. Out of all this hodge-podge and welter of theory and conjecture there was finally evolved a reasonable and tangible hypothesis that led to effective measures of prevention—this was the contribution of Charles White, Alexander Gordon, Oliver Wendell Holmes, and Semmelweis.

Charles White of Manchester, England, almost a century before the time of Semmelweis, argued that childbed fever was a process of self-poisoning due to the absorption of the pent-up lochial secretions. As preventive measures he introduced the sitting posture to facilitate drainage, lime disinfection of the hands, clean linens, isolation of infected cases, and adequate ventilation of the wards of the Manchester Infirmary. And he boasted that under these restrictions not a death from puerperal sepsis occurred in his clinic.

That White anticipated antisepsis long before the time of Lister is evidenced by the following quotation from his *Treatise on the Management of Pregnant and Lying-in Women* (London, 1772): "I must not omit to mention in this place," said he, "the good effects I have experienced from emollient or antiseptic injections into the uterus, by means of a large ivory syringe, or an elastic vegetable bottle—I have, by this means, known the fever much assuaged, and, in many cases, wholly extinguished." White was first to recognize the entity of "milk leg"—later known as phlemasia albadolens.

Closely following upon White came Alexander Gordon of Aberdeen, who in 1795 published *A Treatise on the Epidemic Puerperal Fever of Aberdeen* in which, for the first time, puerperal fever was proclaimed a contagion. As Physician and Surgeon to the Infirmary of Aberdeen, Gordon was in the thick of an epidemic of puerperal sepsis in the years 1790 to 1792. Twenty-eight of the seventy-seven patients died. Noting that these cases followed in the wake of certain doctors and midwives, he reasoned that some sort of contagion was carried from patient to patient by the attendants. Rea-

soning from clinical and postmortem observations, he arrived at the conviction that the disease was infectious. He counseled personal cleanliness on the part of the doctors and midwives and the fumigation of clothing and linens. It is to him that credit is due for being first to call attention to the contamination of wounds at the placental site—that puerperal fever is a wound contamination of the puerperal uterus.

"That the cause of this disease was a specific contagion or infection," said Gordon, "I have unquestionable proof—I had evident proofs of its infectious nature, and that the infection was as readily communicated as that of smallpox or measles—I had evident proofs that every person who had been with a patient in the puerperal ward became charged with an atmosphere of infection, which was communicated to every pregnant woman who happened to come within its sphere. . . . These facts fully prove that the cause of the puerperal fever—was a special contagion or infection altogether unconnected with a noxious state of the atmosphere. Fresh air and cleanliness are insufficient for the destruction of contagion. There is no certain antidote but fire and smoke."

Gordon's influence with the populace was undermined by his insistence upon heroic purging and blood letting. He contended that he could abort the disease by such means if applied in full measure at the onset of the fever. "Hit hard and hit early," was his maxim. He contended that fumigation of the clothing and bedding and the washing of the hands of attendants were imperative, but, above all, the patient must be purged and bled to the limit of her endurance. Be it said to his credit he did abandon blood letting at the insistence of the populace, but continued with the purging.

In our own country Oliver Wendell Holmes published a damning indictment against the medical profession in *The New England Quarterly Journal of Medicine and Surgery*. This was in April, 1843, four years before Semmelweis published his historic treatise on *The Cause, Concept and Prophylaxis of Puerperal Fever*.

Holmes' allegations were not based upon anatomic and clinical observations. He had little or no obstetric experience to back his assertions. His pronouncements were founded upon information that had come to him through personal correspondence and library research. Acting the role of a barrister pleading the cause of martyred mothers, the genial autocrat of the breakfast table declared: "The balance must be struck boldly and the results declared plainly. If I have been hasty, presumptuous, ill-informed, illogical; if my array of facts means nothing; if there is no reason for any caution in the view of these facts, let me be told so on such authority that I must believe it, and I will be silent henceforth, recognizing that my mind is in a state of disorganization. There is no quarrel here between men, but there is deadly incompatibility and exterminating warfare between doctrines. Let the men who hold opinions look to it, if there is any voluntary blindness, any interested oversight, any culpable negligence, even in such a matter, and the facts shall reach the public ear, the pestilence carrier of the lying-in chamber must look to God for pardon, for man will never forgive him."

The inimitable Holmes, academic physician and master rhetorician, gained undying fame here in the United States for his personal charm and matchless phrasing. But personality and faultless diction are no substitute for scientific research at the dissecting table and at the bedside. Holmes said puerperal sepsis could be prevented; Semmelweis proved that it could be.

Sir William Sinclair has this to say of the contribution of Holmes: "Here is the sum of the services of O. W. Holmes to obstetric science; as a science, it is a negligible quantity. But that Holmes conferred immense benefits on humanity by devoting his literary genius to attracting attention to puerperal fever and trying to suppress the practices which brought childbed fever in their train, is a fact which should be gratefully acknowledged.

But how, in the name of truth, does all this bring him into any sort of conflict or even comparison with Sem-

melweis? Still it brought down upon him the most truculent attacks from obstructionists in the highest official positions. Hodge, Professor of Obstetrics in the University of Pennsylvania, attacked Holmes with a certain amount of dignity not unworthy of the subject, but Meigs, Professor of Midwifery in Jefferson Medical College of Philadelphia, assumed the old aboriginal American style of warfare, and attacked him with a tomahawk and scalping knife of the Red Indian savage. He astutely hit the taste of his fellow countrymen, their gambling propensities, and their religious sentiments by attributing puerperal fever to 'chance or Providence.' "

While Holmes was making his passionate plea, Semmelweis was in the Allgemeines Krankenhaus in Vienna, battling with the scourge of puerperal sepsis, and all the while exerting all possible means of checking its ravages.

Ignac Philipp Semmelweis was born in July, 1818, in the village of Ofen, a suburb of Budapest. He was the fourth of eight children of a prosperous grocer. His early training was deficient, and all his life he was regarded by his critics as illiterate. After finishing grammar school in Ofen he enrolled in the University of Pest, and two years later he entered the Vienna School of Medicine where he remained one year and then returned for two more years to the University of Pest. His final year in medical school was spent in Vienna where he received his degree of Doctor of Medicine in April, 1844. In the following August he was granted the degree of Doctor of Midwifery.

July, 1846, found him in the First Lying-In Clinic of the Allgemeines Krankenhaus as First Assistant under Professor Klein. Referring to his first impression of the clinic Semmelweis said: "Everywhere questions arose, everything remained without explanation; all was doubt and difficulty. Only the great numbers of deaths was undoubted reality." It was here that he laid the foundation for the work that was to immortalize his name.

His daily routine consisted of caring for the patients in the ward and the instruction of students. In the early morning it was his habit to participate in autopsies, particularly on the bodies of women who had died of puerperal fever. The students also participated in the dissections; and, all the while, in the wards, in the dead house, and throughout sleepless nights, Semmelweis pondered over the tragedies enacted within his ward: "What is this fever?" "What is taking the lives of so many of my patients?" "How can it be prevented?" "How does it arise?" "What treatment can avail to halt the appalling death rate?" "Surely there must be something in the First Clinic that does not exist in the Second Clinic to account for the great discrepancy in the two wards. May it be that I and my students are the carriers of the contagion?"

While Semmelweis was brooding over his problem, an event occurred that ultimately gave to him the answer to the questions that had so long defied solution. Kolletschka, Assistant in Anatomy, received a stab wound in his finger while dissecting. Death resulted from the infection. Semmelweis witnessed the autopsy and saw the identical lesions which he had so often observed in the bodies of the women who had died in his ward of puerperal fever. He reasoned that Kolletschka had died of a wound contamination; that the contaminating substance was decomposed animal organic matter.

"Day and night, this picture of Kolletschka's disease pursued me," wrote Semmelweis in his *Etiology* "and I was obliged to acknowledge the identity of the disease from which Kolletschka died with the disease of which I saw so many puerpera die. It was not the wound, but the contamination of the wound by cadaveric material that caused the death." It was this same substance that was being carried to his patients from the dead house to the lying-in ward—it was being carried there by himself and his students. "God only knows," said he, "how many women I have prematurely brought down into the grave!"

Determined to put an end to the scourge that was

ravishing his ward, he gave orders that no students attending his ward could, at the same time, be in attendance on postmortem examinations; that before making examinations in his ward, the students must scrub their hands in a solution of chloride of lime.

Then the miracle happened. Within seven months the mortality from puerperal sepsis dropped from 11.4 percent to 1.27 percent. For the first time in the history of the hospital the mortality was lower in the First Clinic than in the Second Clinic where only midwives were in attendance. In March and August of 1848 there was not a single death in the First Clinic.

The problem was solved to the satisfaction of Semmelweis, but it was quite another thing to convince his Chief and his colleagues and to have his Doctrine approved by the medical profession. This was the task he set himself to but, unhappily, it proved to be his undoing. Petty jealousies, stupidity, and willful blindness were to hinder his every effort. With few exceptions the obstetricians on the Continent, in Britain, and in the United States were committed to theories of their own, and would have nothing to do with the newfangled notions of the Hungarian Assistant.

Semmelweis had weighed their theories in the balance and found one and all wanting. He reasoned that atmospheric changes, overcrowding, faulty ventilation, and diet were not the answer, for these factors were identical in both the First and Second Clinics. Puerperal fever was not an epidemic, zymotic disease, like cholera and erysipelas, for such diseases show year-long intermissions, while puerperal fever is more or less constant. Inflammation of the pelvic organs and the peritoneum was not the cause, but rather the result of the contagion. And as for the milk theory, he did not trouble to affirm or deny.

Among his detractors was his Chief, Professor Klein, who, far from proffering encouragement and counsel, had placed every possible obstacle in his path, and finally demoted Semmelweis to the rank of Private Docent of Theoretic Midwifery, restricting his teach-

ing to manikin demonstrations. No longer could he have access to the beds in his clinic.

Grieved and inconsolable, Semmelweis left Vienna without serving notice and returned to his beloved Budapest. But Budapest was not the city he had left in such high hopes to pursue the study of medicine. Hungary was in a state of revolution and, as with all things in Hungary, the medical profession, the University, and the St. Rochus Hospital were in a state of disorganization. Obstetric cases were admitted to the hospital only two months in the year. In the remaining months surgical cases occupied the lying-in ward. The surgeon-in-charge was also the coroner, and engaged in autopsies. Puerperal fever had, for years, been running rife in the hospital. In some months the mortality ran as high as 30 per cent. Semmelweis asked permission to take over the direction of the Lying-In Clinic in order that he might put an end to the scourge. And in May, 1851, he was placed in charge of the Obstetric Division of St. Rochus Hospital.

His first step was to sever all connection with the surgical department. The rules and regulations which he inaugurated in the Vienna Clinic were put in force and, as a result, the mortality from puerperal fever in his ward in the following five years fell to 0.85 percent—an all-time low.

As Chief of the Lying-In Division of the St. Rochus Hospital, Professor Birly, like Professor Klein, in Vienna, would have nothing to do with the crazy notions of Semmelweis. Birly was a disciple of the *primae viae* theory and advocated the use of strong purgatives in the treatment of septic cases. To his credit, Semmelweis made no issue with his chief while quietly pursuing his course, trusting that in time his Doctrine would be accepted on its own merits.

Professor Birly died in 1855, and Semmelweis succeeded him as Professor of Theoretical and Practical Midwifery in the University of Pest. With the appointment came a rejuvenation of Semmelweis. Now, for the first time, he was his own master and was

enjoying a measure of fame and the reward of a modest income from private practice.

But there were many handicaps and discouragements. The wards were too small to accommodate more than two hundred patients a year, yet it was always overcrowded and there was no provision for the isolation of infected cases. For the lack of an amphitheater, students received instructions while standing in the corridor. The hospital staff was unfriendly and disloyal. Regarding their Chief as a faddist and a crackpot, they were unwilling to carry out the preventive measures so essential to the success of the clinic. Yet, with all these handicaps, the mortality from puerperal sepsis in the years 1850 to 1856 remained at 0.85 percent—an unheard of record for St. Rochus Hospital.

To this time Semmelweis had not appeared in print in support of his *Doctrine*. As a result there was much misunderstanding and conjecture as to the essential principles he was advocating. His friends were insistent that he resort to the printed word to put at rest the bickering and the willful misrepresentations that sprang from sources that could not be ignored.

Semmelweis finally yielded to the demands of his friends, and with resolute determination he set to the task of writing his *Etiology*. "My Doctrine," said he, "is either ignored or offensively assailed—indignation at the greatness of this scandal has thrust the pen into my unwilling hand; I think it would be criminal behavior on my part if I were longer to remain silent and neglect producing unbiased, impartial, and complete evidence in favor of the practical extension of my Doctrine."

For three years Semmelweis worked feverishly on his manuscript and in October, 1860, it was ready for the press. We, of our time, regard the work one of the epic-making contributions to medical literature. Not because of its literary qualities—for in this respect it was woefully lacking—but because of the fundamental principles laid down that have formed the basis for preventive medicine in the fields of obstetrics and surgery.

Much of the text was hurriedly assembled without regard for sequence and symmetry, thus leading to confusion. An endless array of statistics was incorporated in the text that few would care to wade through. Then, too, much of the text was devoted to acrimonious correspondence with the leading obstetricians of Europe. These letters were full of charges and countercharges, of censure and reflection, and to an extent that defeated the very purpose of his writing—that of winning converts to his Doctrine. The chapters devoted to “Etiology” and to “Prophylaxis” were brief and excellent. Had Semmelweis been content with these two chapters, leaving out much of the statistical material and all of the challenging correspondence, his work would have had a more favorable reception. But, being what it was, it was not well received. On the contrary, it only served to add fuel to the flame.

Enraged over the unfavorable reception of his *Etiology*, Semmelweis set to the task of writing *Open Letters to Sundry Professors of Obstetrics*. He would make one more effort to indoctrinate his traducers in what he believed to be the only true nature of puerperal fever. “I shall do my utmost,” said he, “to insure the cessation of murder, for anyone who dares disseminate the dangerous fallacies concerning puerperal fever will find in me an extremely active opponent. I am firmly convinced that there is no other way of putting a stop to those murders than the ruthless exposure of my adversaries, and no one whose heart is in the right place will blame me for the means I use.”

From that moment to the day of his death Semmelweis engaged in an unrelenting verbal combat with his critics, but the more he fanned the flame of calumny, the more he became involved in controversy.

“The controversy,” said Waldheim, “became no longer a scientific encounter; no struggle to attain to a knowledge of the truth, but a thoroughly personal, hateful wrangling under the semblance of scientific discussion.”

Wounded pride and deep resentment led Semmelweis into criminations and personalities that served to

alienate rather than to placate his opponents. Karl Schroeder regarded the Semmelweis Doctrine as one-sided and inadequate, and Max Boeler referred to the Open Letters, which Semmelweis addressed to sundry Professors, as extremely vehement and threatening. Josef Spaeth, while professing his conversion to the Semmelweis “Doctrine,” expressed the opinion that his theory would have gained more obstetricians as open friends if he had not defended his theory in a tone which no man of science had been accustomed to up to this time. Carl Braun, Virchow, Zipfel, Siebold, Veit, Hecker, Scanzoni, and Denman were among his critics. Kiwisch, of Wurzburg, would not be convinced, though in the year 1846 the mortality from puerperal fever in his ward was 26 percent. Denman, of the Dublin Rotunda, said it would be a waste of time to dwell upon his Lehre. On the other hand Haller, Skoda, and Rokitsansky of Vienna; Michaelis and Swarz of Kiel; Wieger, of Strassburg; Kassmaul of Heidelberg, and Tilanus of Amsterdam, were among his supporters. Hebra rated the contribution of Semmelweis as comparable to that of Jenner. But even these men of high authority could not stem the tide of criticism. Hebra published a commendatory article in the *Journal of the Medical Society of Vienna* that was roundly criticized, and Skoda failed in having the Doctrine of Semmelweis investigated by the same society. Weiger, of Strassburg, endeavored to interest the French accoucheurs and failed, as did Arneth before the London Academy of Medicine. Everywhere Semmelweis was to feel the sting of professional intolerance.

There came a time when the sensitive, impetuous nature of Semmelweis was unequal to the strain of violent controversy. In the early part of 1863 he began to have alternate attacks of excitability and melancholia; his memory failed him and his mind became clouded. He lost his professorship at St. Rochus, and in August, 1865, he was taken by his faithful friend, Professor Hebra, to an insane asylum in Vienna. There he died on August 13, 1865, at the age of 47 years.

Appended to his Etiology, Semmelweis had written: "When I, with my present convictions, look back upon the past, I can only dispel the sadness which falls upon me by gazing into the happy future when within the lying-in hospitals, and also outside of them throughout the whole world, only cases of selfinfection will occur. But if it is not vouchsafed for me to look upon that happy time with my own eyes, from which misfortune my God preserve me, the conviction that such a time must inevitably sooner or later arrive will cheer my dying hour."

Puerperal sepsis has not been wholly banished from the world as Semmelweis prophesied, but the principles laid down by him for its prevention have gone far in lessening the incidence of the malady. Semmelweis bequeathed to the modern maternity its supreme virtue—that of cleanliness. Furthermore, subsequent events have not altered the basic principles laid down by him on which the Doctrine of Semmelweis was founded. The contributions of Pasteur and Lister elucidated and confirmed his Doctrine.

His temporary burial was in Vienna, but later he was laid to rest in his native city of Budapest. In the garden of the Allgemeines Krankenhaus in Vienna is a marble slab erected to the memory of the most tragic figure in the history of medicine. And on the slab is a beautiful bronze tablet bearing the name *Semmelweis*.

In 1906 an international monument was erected in memory of the man to whom the world is indebted for his priceless contribution to humanity. There Semmelweis stands in full stature, holding a book under his arm and on the step of the pedestal sits a woman with her infant in her arms, her face upturned, gazing reverently at her benefactor.

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ABOUT THIS EDITION

This special edition of *The Etiology, the Concept and the Prophylaxis of Childbed Fever*, has been privately printed for members of The Classics of Medicine Library. Film was prepared from a copy of the first English translation of 1941. The text was printed by the Rae Publishing Company. New type was composed by Yankee Typesetters Inc. in Janson. The text paper was especially made for this edition by the S. D. Warren Company. The volume has been bound in genuine top grain cowhide by the Tapley-Rutter Company, Bookbinders. Endleaves are a specially commissioned original marbled design of Richard J. Wolfe. Edges are gilded, and covers are brass-die stamped in 22-karat gold. Cover stampings and design of the edition by Daniel B. Bianchi and Selma Ordewer.

The Editors

ABOUT THIS EDITION

The text of this edition is based on the original manuscript of the author, which was found in the library of the University of London. The text has been carefully collated with the original manuscript and found to be in excellent agreement. The text is printed in a clear, legible type, and the margins are wide. The binding is of the highest quality, and the book is a true work of art.

The Edition

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