



a history of medicine in pictures

by George A. Bender

painting by Robert A. Thom

Semmelweis: Defender of Motherhood

PREGNANT WOMEN among the poor in Vienna in the 1840's feared the great lying-in wards of Vienna's General Hospital, the Allgemeine Krankenhaus. This was a charity institution, and among its rules was: in return for privileges of obstetrical treatment and care of her child, the expectant mother must agree to allow herself to be used for instruction of medical students and of midwives during her labor and convalescence. But women's dread stemmed not so much from lack of privacy and modesty as from the black cloud of death that seemed to hang over the hospital—especially over the First Obstetric Clinic. No published statistics were needed for people living in the crowded streets of Austria's capital city to know that, as women in pregnancy approached term and entered the great stone hospital, there was a one-in-ten chance—sometimes one-in-five—that they might never return home alive. Childbed fever, scourge of motherhood, decimated the wards with frightful regularity, sometimes rapidly striking down all mothers in rows of a dozen beds. Often, women sought to avoid the hospital until their babies were born; other women, upon admission to the hospital, begged to be assigned to the Second Obstetric Clinic, wherein, for some unknown reason, chances for survival were much greater. In Vienna's great hospital, as in most institutions throughout Europe of that day,

women in labor indeed passed through "the valley of the shadow of death." In all too many instances, newborn infants, too, suffered and died of an ailment exhibiting at necropsy pathologic changes identical with those which took the lives of their mothers.

It was in this First Obstetric Clinic that a young physician named Semmelweis began his life's work. It was to be a short career, loaded with work, brilliant in deductions and results therefrom, but fraught with frustrations, opposition, and heartache. Sinclair, a biographer, wrote: "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."

Ignaz Philipp Semmelweis was born July 1, 1818, in Buda, "only separated by the Danube from Pest, most populous and flourishing of all the Hungarian towns." He was fourth of seven children of a merchant. His early life seems to have been happy, but due to somewhat faulty preliminary bilingual education, he was always to have difficulty with speaking and with writing. While this was to prove a handicap in later years in conveyance of his ideas to the world of medicine, his mind was left clear to accept only what was to be seen, to discard dogmatic theories, and to reach logical deductions from experience and from independent judgment.

After beginning his medical education at the University of Pest, Semmelweis went to Vienna, capital of the Austrian empire, and completed his undergraduate work, receiving his doctorate in medicine from the University of Vienna, April 21, 1844. Semmelweis then took special courses in obstetrics, receiving the degree of Master of Midwifery, August 1, 1844. Previously, he had registered with the Director of the Clinic, Klein, at the Lying-in Hospital as aspirant for the post of Assistant, when a vacancy should occur. He did not receive this appointment until nearly two years later, but, as aspirant, he had access to the practice of the clinic without responsibilities of the office. During this time he became associated with leading young professors at the University—the clinician, Josef Skoda; the dermatologist, Ferdinand von Hebra; the pathologist, Carl von Rokitansky; and the professor of legal medicine, Jakob K. Kolletschka. From work in the laboratories of these men, Semmelweis learned far more about gynecology and obstetrics than he did from the stern and tedious Klein, strict adherent to past tradition who owed his position, not to professional excellence, but to political connections. In Rokitansky's autopsy room, Semmelweis studied bodies of women who died of gynecologic or obstetric disorders, laying the foundation for his superior knowledge in this field. November 30, 1845, Semmelweis passed examinations and received his doctorate in surgery.

On February 27, 1846, Semmelweis was appointed Assistant in the First Obstetric Clinic. In the great Allgemeine Krankenhaus of Vienna, the Lying-in Hospital was so large it was divided into First and Second Clinics. In the First Clinic, medical students were trained, and there they routinely examined patients; in the Second Clinic, only midwives were trained.

Well prepared for administrative and teaching responsibilities by two years' experience as aspirant, kindly and sensitive Semmelweis was deeply concerned and depressed by the high mortality from puerperal fever which devastated patients in wards of the First Clinic. In one year (1846), 459 of 4,010 women admitted to the First Clinic died. That was mortality of 11.4 per cent for the year; and in some months, deaths rose to 18 per cent. At the same time, in the Second Clinic, physically a duplicate of the First, where apparently the same conditions prevailed, except for differences in teaching midwives, only 105 of 3,754 women patients died—mortality of 2.7 per cent. Also, there were fewer deaths among women delivered at home; and even among those who, unable to reach the hospital in time, were delivered in the street. Despite unfavorable surroundings, a far higher proportion of these women, and their babies, survived than of their sisters under hospital conditions.

Semmelweis examined, again and again, traditional theories of the cause of puerperal fever—among them, seasonal influences, miasmas (poisonous air), fear, constipation, delayed lactation; but to his inquiring mind, none of these explained satisfactorily either the cause of the deadly fever, or why more women died in the First Clinic than in the Second and at home.

More and more of Semmelweis' time was spent in the necropsy room, in his search for reasons for these deaths. Always, he found the same pathologic changes, indicative of systemic "blood poisoning." Frequently, when mothers died following long and difficult labor, their babies died too—and the tiny bodies revealed pathologic changes similar to those found in their mothers. Day after day, however, professors and medical students alike habitually visited the necropsy rooms in the early mornings, proceeding directly therefrom to the obstetric clinic, and to routine examina-

tion of women in labor and in convalescence.

Semmelweis, not calloused to death's visitations, tried many measures: women's positions in labor were changed; foreign students were barred from the wards—but these measures had no effect and deaths continued to occur.

Semmelweis' activities evidently irritated Professor Klein, his superior. Suddenly, on October 20, 1846, Semmelweis was demoted, and his predecessor, Breit, was reappointed Assistant for two years. Depressed and discouraged by this humiliation, Semmelweis considered going to England or to Ireland. However, in February, 1847, Breit was appointed Professor of Midwifery at the University of Tübingen. On March 20, Semmelweis, restored to his position as Assistant, returned to the deeply disturbing and puzzling problem of deaths of so many mothers in his clinic. Semmelweis found no answer—until the sudden death of his friend, Kolletschka: a small scalpel wound, incurred during a necropsy, led to infection, culminating into systemic blood poisoning, and to death. Necropsy performed upon Kolletschka's body revealed pathologic changes identical with those of women dying of puerperal fever. The truth came then to Semmelweis—Kolletschka died of poisons entering his body through the wound from the body of a patient who came to necropsy; Semmelweis and his students were routinely examining wounded genitalia of women patients with hands that came directly from examining bodies of patients coming to necropsy! Therefore, he, and his students, as well as hundreds of other teachers and students of obstetrics, were carrying "cadaveric poisoning" directly to their patients on their unwashed hands! Mothers sickened and died in rows because they were examined in rows! Death visited the Second Clinic less often because midwives did not attend necropsies; and they examined their patients far less frequently than did medical students.

Semmelweis checked the records. They seemed to bear out his theory. He decided to put his idea to practical test: every medical student and physician wishing to examine women in his wards was required to wash his hands—not merely in soap and water, but in chlorinated lime solution, thoroughly scrubbing with clean sand until odors of the dissecting room were removed. Only then might doctors and students examine patients.

As might be expected, such precautions were resented; protests were raised both by colleagues and by students unacquainted with reasons for such precautions (antiseptics was not to be understood for another two decades); but results were dramatic. While in April, 1847, 57 women, or 18 per cent of obstetric patients, died, the number fell, in June, 1847, after introduction of Semmelweis' procedure, to six deaths, or 2.38 per cent; and, in July, to three deaths, or 1.2 per cent.

Semmelweis felt that, at last, he had discovered

the cause of puerperal fever: poison originating in cadaveric putrescence, carried to healthy patients by physicians and students themselves. Then, one week, the death count again shot up alarmingly. Of twelve women in a ward, eleven sickened and died, despite precautions. Shocked, the conscientious Assistant checked all factors and made another startling discovery: the woman patient first in line when students entered the ward had a foully discharging cancer of the uterus. Though his students had scrubbed their hands upon entering the ward, they had not done so between patients. Could it be that examiners might carry infection from live patients, as well as from cadavers, to well mothers? Semmelweis acted again: his students were required to wash in chlorine solution after each examination. Now, strenuous objections were raised, and these no doubt reached the ears of Director Klein—but again, the death count went down. An experience with a patient having an open wound further convinced Semmelweis that such infection could be air-borne from patient to patient. He then insisted on isolation of patients with such wounds, and further, on cleanliness of everything coming in contact with patients.

His University friends soon were convinced that Semmelweis had found the answer. They urged him to publish his findings and to speak before medical groups; but though he could be sternly positive in his teaching of students, Semmelweis refused to write, and was diffident about speaking. His medical associates, Hebra, Skoda, and others, wrote or spoke in his behalf, though, incredible as it seems, Semmelweis' fellow obstetricians failed to recognize his discovery. Instead of adopting his methods, they scorned and belittled him, and fought reforms he sought to effect. Among leaders of this opposition was his own director, Klein, who vented his resentment, March 20, 1849, by refusing to reappoint Semmelweis. As might be expected, practices in the Clinic, under his successor, reverted to Klein's methods, and again, hundreds of mothers admitted to the First Clinic died of puerperal fever.

Shocked and depressed by this poor reward for his life-saving efforts, Semmelweis tried for eight months to secure appointment as privatdozent, or instructor, in obstetrics, only to receive, October 10, 1850, an appointment grudgingly given him, so limiting his activities as to be absurd. Without even saying good-bye to his friends, Semmelweis, five days later, fled Vienna and returned to Budapest.

His home town was none too good a place for the young physician to begin again—Hungary was suffering the consequences of defeat of the 1848 revolt against Austrian rule. However, May 20, 1851, Semmelweis received appointment as honorary senior physician, without pay, in the obstetric division of St. Rokus Hospital in Pest.

the picture Hungarian physician Ignaz Philipp Semmelweis, while Assistant at the First Obstetric Clinic of Vienna's great Allgemeine Krankenhaus in 1847, discovered means of preventing puerperal fever: he insisted that physicians and medical students wash their hands in antiseptic solution before entering obstetric wards and again before examining each patient. His rule was much resented and opposed—but hundreds of mothers' lives were saved. Though his doctrine was proved repeatedly, both in Vienna and in Budapest, most of his contemporaries opposed it; and, both depressed from worry and broken-hearted from disappointment, Semmelweis died at age 47, of blood poisoning, the infection he had fought so valiantly to prevent in others.

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Conditions were deplorable, but he began at once to put his doctrine into effect—and again, deaths from puerperal fever declined.

Despite the fact that Semmelweis' amply proved ideas were unacceptable to his Viennese colleagues, publications and letters written by his friends and students began to find acceptance elsewhere, notably in England, in Scotland, and in Ireland. In Hungary, he was allowed to go on with his life-saving procedures—not, however, without occasional stubborn resistance. He was appointed Professor of Theoretical and Practical Midwifery at the University of Pest in July, 1855. The obstetric wards there were miserable and inadequate—but, despite this, Semmelweis' procedures again reduced the death toll markedly.

By this time, concern for the death of so many young mothers because obstetricians would not embrace his doctrine, preyed on Semmelweis' mind. His personality was changing. Described a few years earlier in Vienna as "of more than medium height, broad and strongly built, with round face, prominent cheek bones, high forehead and thin hair, fleshy and dextrous hands," Semmelweis in Budapest was becoming eccentric and less thoughtful of other persons, and had the appearance of an old man.

Two events changed Semmelweis' life for a time, and he was happier. Now 38 years of age, he married, June 11, 1857, 18-year-old Marie Weidenhofer; and in the same year, his friend, Markussowsky, editor of *Orvosi Hetilap*, a weekly medical journal, invited him to write. In the fall of 1857, Semmelweis at long last was persuaded, perhaps goaded by the many attacks on him, to put his doctrines and proofs into written form. In 1861, his great volume came off the press, entitled: *Die Aetiologie, der Begriff und die Prophylaxis des Kindbettfiebers* (The Cause, Concept, and Prophylaxis of Childbed Fever). This book, in spite of its being somewhat disorganized and difficult to follow, is one of the most moving, best documented, and closely reasoned books in the history of medical publications. In it, Semmelweis refuted old and silly theories regarding puerperal fever and backed his doctrine with innumerable statistics. However, if Semmelweis hoped that his book would convince his adversaries, he was sorely disappointed. Stubborn resistance continued; and mothers continued to die in obstetric clinics of the world. Semmelweis grew more impatient, excited, and violent. Added to his other perturbations, death of his first two children further depressed him. In 1862-1863, he published a series of open letters in which he accused leading obstetricians of bad faith and of murder. His friends sought to get his mind into other channels by urging him to turn to gynecologic practice—and, because he applied his ideas of antiseptics to surgical as well as obstetric patients, his practice was eminently successful. But the cries of dying mothers haunted his

dreams. Colleagues whom he attacked, in return attacked him. The strain became too much. In July, 1865, Semmelweis showed signs of serious mental derangement. His wife and friends placed him in a sanatorium in Vienna, where he became even more violent. But, ironically, it was not insanity that was to defeat him. On August 13, 1865, at the age of 47, Semmelweis died of blood poisoning, the very infection he had fought so valiantly to protect parturient women from contracting. Deadly bacteria gained admission to his body through a small finger wound received during one of his last operations. Ironically too, just the day before Semmelweis died, Joseph Lister of Glasgow, acting on conclusions he had reached on reading certain publications of Louis Pasteur of Paris, for the first time used carbolic acid in treating wounds of a patient with compound fracture.

Semmelweis' doctrine was about twenty years ahead of the medical world's thinking: Pasteur was to demonstrate that germs caused infection, multiplied, and spread from victim to victim, rather than generating spontaneously within the body. Lister's experience with surgical antiseptics was to confirm the principles Semmelweis applied to obstetric patients. Within a few years, physicians who had opposed him were to reverse themselves to declare that Semmelweis had been right. Though Oliver Wendell Holmes, of Boston, in 1843, had published a purely theoretical treatise "On the Contagiousness of Childbed Fever," he did not campaign for reform, as did the Hungarian obstetrician.

Ignaz Philipp Semmelweis died at the dawn of a new age in surgery and in obstetrics. Thanks to his work, and to that of other leaders in medicine during the third quarter of the nineteenth century, pregnant women entering hospitals were no longer virtually condemned to die of puerperal fever.

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