Samuel James Meltzer, M.D.

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ADOLPH MELTZER, M.D.

> The winner is he who gives himself to his work, body and soul. No one ever had a more inspiring life than Dr. Meltzer so far as life was concerned in scientific endeavor and efforts on behalf of other investigators. For this poor Russian emigrant accomplished the impossible.
>
> Leonard R. Rowntree[1]

Samuel James Meltzer was born in a small community near Kovno, Russia. He was born of poor peasant stock. His father, Simon, was a Hebrew teacher who served as the local rabbi. James, as he was later to be called by his family, showed an unusual talent for learning as a child, memorizing long passages of the Talmud. This concentrated study, which often involved certain rules of argument, supported by numerous authoritative commentaries called "*pilpul*," helped the young scholar develop a discipline destined to influence his research, discussions, and writing.

Early in youth he sought other literature, which stirred his intellectual curiosity and raised his stern father's ire. At nineteen, he married Olga Levitt, the daughter of a well-to-do merchant, and used the customary dowry money to leave the oppressive environment of his home. Intrigued by his reading in philosophical literature, he and his young bride moved to Konigsberg, the birthplace of Immanuel Kant. There he entered a Realgymnasium to begin his formal education. Upon graduation in 1875, he decided that the study of philosophy would be his life's work. His young wife and their two children returned to her parents' home, and he proceeded to the University of Berlin.

The year was 1876, and Meltzer was 25 when he enrolled in this prestigious institution. He attracted the attention of the philosopher Steinthal, a brilliant lecturer, who took a fatherly interest in the young scholar, invited him to his home, and guided his footsteps. He urged Meltzer to abandon the field of philosophy in favor of medicine to ensure material advantages for his family, for as a Jew, he could never attain the chair in a German university. Moved largely by financial considerations, Meltzer followed this sage advice.

During the latter half of the nineteenth century the world saw great changes with the invention of sophisticated motors that employed fossil fuels and electricity. Wonders of communication and transportation were introduced. Some changes benefited health. The scientific laboratory that became part of the medical school was the natural child of this dynamic mechanical age. William H. Welch called the ten years ending in 1890 "perhaps the most wonderful in the history of medicine." A veritable scientific revolution was taking place, especially in Germany and France, and the doctor was the mastermind of the laboratory.

The medical faculty at Berlin during Meltzer's years was perhaps the best in the world. He came to the attention of Hugo Kronecker, who had been a pupil of Ludwig, the famous teacher of physiology at Leipzig. Like Steinthal, Kronecker was impressed with Meltzer's sincerity and ability, and he invited him to share family meals, and acted as counselor, friend, and guide. Meltzer dedicated his dissertation for the Doctor of Medicine degree to Kronecker and with him completed the thorough investigations that led to the Kronecker-Meltzer theory of deglutition.

When he was graduated from the medical school in 1882, Meltzer was 31 years old. According to Howell, he was offered several positions on the condition that he be converted to the Christian faith, but he refused. Instead, he made several voyages as a ship's doctor, saving enough money to come to "the golden land of opportunity." He started to practice medicine in the Harlem section of New York City on July 1, 1883, and he resided there thereafter. In this relatively suburban and well-to-do section, Meltzer established a very lucrative practice. Within two years, he could send for his wife and children after ten years of separation. Following in his footsteps, Clara and Victor, his children, both became physicians.

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[1] Leonard R. Rowntree, "Amid Masters of Twentieth Century Medicine." Springfield, IL, Charles C Thomas, Chap. 20 ("Dr. Samuel J. Meltzer"): pp 355–381, 1938. Dr. Samuel J. Meltzer (1851–1920) (The man who made medical meetings interesting.)

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The desire to engage in research drew him to the laboratory. He paid for the privilege of using facilities at several places, including Columbia University Medical School and Bellevue and Harlem Hospitals. For 20 years, until he was tapped by Flexner for the Rockefeller Institute in 1903, he carried on his extensive medical practice and his laboratory research at the expense of sleep and of building up his personal fortune.

His training, knowledge, and phenomenal memory, as well as his charm and compassion, marked him for success. Fortunately, he had boundless energy. As he became more at home in his facility with English he made himself heard at numerous societies. He subscribed to 35 medical and scientific periodicals which he read faithfully. He quickly grasped the essentials of a paper and brought this broad knowledge into discussions. He became known to the New York medical community for providing the bridge between the laboratory and clinical practice. He rapidly acquired a reputation for pinpointing what was of practical value in new laboratory discoveries. At that time conservative doctors questioned the expense and time consumed by the elaborate laboratory methods coming into vogue, which seemed far removed from the pressing problems of the practice. Meltzer deplored the stagnant state of medical science in New York and urged that societies be formed for an exchange of ideas and dissemination of knowledge.

After 20 years, it was natural for him to attempt to stir up interest in a society for stimulating experimental work among young men entering the field of biology and medicine. On January 17, 1903, eight New York scientists met in Dr. Graham Lusk's house for a preliminary meeting. They unanimously endorsed Meltzer's views. At the first official meeting on February 25, 1903, at the Physiology Laboratory of the Columbia University College of Physicians and Surgeons, the charter membership was increased to 19, and by the end of the year the new Society for Experimental Biology and Medicine had 55 members.

This society, so close to Meltzer's heart, absorbed so much of his interest and time that it became known as the Meltzer *Verein.* Its membership included many men of national repute who were to remain his lifelong friends. Although it began as a New York City society, by the end of the year there were 22 nonresident members, five of whom were from Johns Hopkins, the most prestigious medical school of the day: Eugene L. Opie, who was later to replace Ewing at Cornell, William Howell, William H. Welch, W. G. McCullen, and Harvey W. Cushing.

Meltzer set a high standard for his *Verein* associates. Between 1903 and 1919 he contributed some 60 articles to the *Proceedings,* dealing primarily with laboratory demonstrations; his was the first such demonstration presented before the Society at the opening session, "An Experiment to Show the Difference between the Simple Cutting of the Cervical Sympathetic and the Removal of the Superior Ganglion." This started an illuminating series on the role of adrenaline, particularly in pupillary action. His interests were varied, including such fields as anesthesia, resuscitation, shock, pharmacology, toxicology, ion antagonism, gastroenterology, vagal stimulation, tetanus, experimental pathology, and glycosuria. His last contribution, presented to the *Proceedings* in 1919, was entitled "Experimental Pneumonia Produced by *Streptococcus hemolyticus.*"

In the two decades between entering practice and joining the Rockefeller Institute, he published about 80 papers, 32 of them between 1898 and 1903.[2] The material was about equally distributed between "clinical" and "experimental."

Twice in his lifetime Meltzer encountered a language barrier. He had to learn German when at 19 he enrolled in the Gymnasium at Konigsberg. Then, at the age of 33, he had to learn English when he started his New York practice (small wonder that he never lost his German accent). Through 1903, he had written 23 papers in German but only 5 were in the last five and most prolific years.

Meltzer was 53 and a highly successful practitioner when he joined the Rockefeller Institute. He had already achieved renown in the medical community. He was elected to membership at the first annual meeting of the American Psychological Society (1888) in Philadelphia, even though he had no academic affiliation. In 1890 he served as Chairman of the Section of Physiology at the Tenth International Medical Congress, and in 1892 he was admitted to the elite Association of American Physicians. He was the prime mover in formation of the Society for Experimental Biology and Medicine in 1903, the year he joined the Institute.

Flexner offered Meltzer $1000 a year, though he later, shamefacedly, claimed it was $1500 for a part-time job. Actually, he was put on trial. There were no guarantees of position or advancement, yet the clever Flexner was aware that the bait was right. "Heretofore, I have always paid laboratories to be permitted to work in them," said Meltzer, "now you propose to pay me to work. Of course, I will come."

Meltzer served the Institute well. He was formally made head of the Department of Physiology and Pharmacology on July 9, 1907. He proved to be a capable executive, pressing for better facilities for the new laboratory and for strengthening the education of its personnel. He was genuinely concerned with the welfare of his staff members as well as with their scientific accomplishments.

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[2] Meltzer's papers in large measure attest to his popularity as a speaker. His solicited contribution to the first volume of at least six journals was undoubtedly a factor in their success. All but one of the six are extant.

VOLUME I

1889—*Midizinische Monatsschrift* (B #16)
1896—*Journal of Experimental Medicine* (B #42)
1898—*American Journal of Physiology* (B #56, #60)
1903—*Proceedings of the Society for Experimental Biology and Medicine* (B #101)
1908—*Archives of Internal Medicine* (B #17)
1909—*Journal of Pharmacology and Experimental Therapeutics* (B #188, #195)

During his 17-year association with the Rockefeller Institute (until his death), Meltzer published some 300 papers. He was a remarkably fair chief. In a list of 85 papers from his laboratory presented to Flexner, 26 did not bear his name and only 14 were in his name alone.

Although he was a most productive scientist, it was in the field of public relations that he excelled and exerted a strong influence. He was a popular and able ambassador for the Institute to the medical "greats" at home and abroad and to medical practitioners represented in about 25 national scientific societies in which he played an important role. He helped to form several and chaired at least 10.[3] He was especially valued by the younger men because of his progressive views and his willingness to help and direct them. He constantly emphasized this theme: "Understand the fundamental to develop the practical."

Meltzer's talent for speaking interestingly on general subjects added to his popularity. On December 15, 1906, he gave the fifth Harvey Lecture at the New York Academy of Medicine, entitled "The Factors of Safety in Animal Structure and Animal Economy." "The living body," he said, "is like a machine. The structures and the functions of the animal mechanism are provided with factors of safety." The paper was printed in five different journals, and the term "factors of safety" gained immediate and universal acceptance and has by now become a byword.

His advice was often sought regarding candidates for faculty positions. He had a wide correspondence. His close friends included eminent scientists in such institutions as Johns Hopkins and Harvard. His friendship for Kronecker endured until his beloved old teacher died. On one occasion the influential Kronecker offered to propose him for the Nobel Prize; Meltzer begged him not to, considering himself unworthy.

Besides his important and inspirational role in education, he made numerous contributions to clinical and to laboratory medicine. His work on deglutition as a medical student under Kronecker's aegis established him as the "father of esophageal manometry." Kronecker also influenced Meltzer's lifelong interest in cardiopulmonary physiology. He emphasized the role played by components of the autonomic nervous system, discussing such phenomena as cardiac standstill, arrhythmia, and shock. He was an authority on problems related to resuscitation from toxins, asphyxia, and electric shock and served on three national committees devoted to these problems. His interest in toxicology led him to investigate the causes and the control of convulsions. His discovery that magnesium sulfate could control this phenomenon proved important in World War I, being fought on the manure-laden battlefields of France. This compound is still used to control the convulsions of eclampsia. In 1908 he devised a simple method of intratracheal insufflation, developed primarily to keep alive experimental animals with respiratory paralysis induced by magnesium sulfate. After nearly a decade of debate this simple procedure was adopted for intratracheal anesthesia; ether was administered through a tube narrow enough to allow egress of expired air and thus prevent overdistention of the lungs, yet under enough pressure to inflate the lung. Meltzer's method of intratracheal insufflation anesthesia spread rapidly throughout the world. It was a factor in the birth of both thoracic surgery and anesthesiology as specialities. When the American Association for Thoracic Surgery was formed in 1918, the renowned physiologist from the Rockefeller Institute was elected its first president.

Meltzer was the first to recognize and report asthma as an allergic disease. He led Willy Meyer to do the first operation on an infant with pyloric stenosis. He advocated the use of oxygen in heart disease and the wearing of face masks by those treating transmissible disease. He instituted prolonged gastric feeding in a child, probably the first on record. He demonstrated for the first time the difference in absorption between subcutaneous, extramuscular, and intravenous injections. He investigated the role of the lymphatics and demonstrated the avid absorption of fluid from the peritoneal cavity in nephrectomized animals, a forerunner of the use of the peritoneum for dialysis.

Endocrinology began to emerge as a new science. Meltzer, recognized as an authority, made discoveries in this field such as a sensitive biologic test for adrenaline and contributed appreciably to the understanding of pupillary action. On March 19, 1915, I. S. Kleiner and S. J. Meltzer

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[3] The following list of Meltzer's societies is probably incomplete. The first 10 bear an asterisk to indicate he served as president, and his dates of office are noted. His role as founder is also acknowledged.

*1. The American Physiological Society (APS). Elected to membership at the first annual meeting, December 1888; president, 1911–1913.
*2. The Society for Experimental Biology and Medicine (SEBM), founder and first president, 1903–1905 (the Meltzer *Verein*).
*3. The American Gastroenterological Association (AGA). Meltzer was the first president (1903–1904) who was not a founder.
*4. The Harvey Society, for which Meltzer chaired the formative meeting. Founder and president, 1906 (second meeting).
*5. The Association for the Advancement of Clinical Investigation (AACI). Founder and first president, 1901 ("The Young Turks").
*6. The American Society for Pharmacology and Experimental Therapeutics (ASPET). Founder, 1908.
*7. The American Brotherhood for the Furtherance of International Morality. Founder and first president, 1915.
*8. The Association of American Physicians (AAP). President, 1915.
*9. Federation of American Societies for Experimental Biology (FASEB). Founder; first chairman of the combined conference committee that recommended this organization; first chairman of executive committee; president, 1913.
*10. The American Association for Thoracic Surgery (AATS) Founder's Group. First president, 1918.
11. The American Pharmacological Society.
12. The Association of American Pathologists and Bacteriologists.
13. The American Society of Naturalists.
14. The German Imperial Academy of Natural Science.
15. The National Academy of Sciences.
16. Fellow, American Association for Advancement of Science.
17. New York Academy of Science.
18. New York Academy of Medicine.
19. The Society of Biological Chemists.
20. The Society for Experimental Therapeutics.
21. The American Philosophical Society.
22. The American Association of Anesthetists.

read a significant paper before the National Academy of Sciences, demonstrating that in a subject injected with a surplus of glucose the intravenous infusion of a strained pancreas emulsion restored the blood glucose to normal.

Meltzer retired as head of his department on June 30, 1919. He died on November 7, 1920. Funeral services were conducted in the auditorium of the Ethical Culture Society; his body was cremated. The *New York Times* obituary read: "He possessed an idealism peculiarly fitting him for intensive laboratory studies, though perhaps easily coinciding with the practical side of life." This sentence hinted at his attempt to organize an International Brotherhood of Physicians to band together, pooling knowledge and resources, to help war victims regardless of conflicting ideologies. The world was not ready, and his efforts proved frustrating, time-consuming, and futile.