American Jewish Personalities

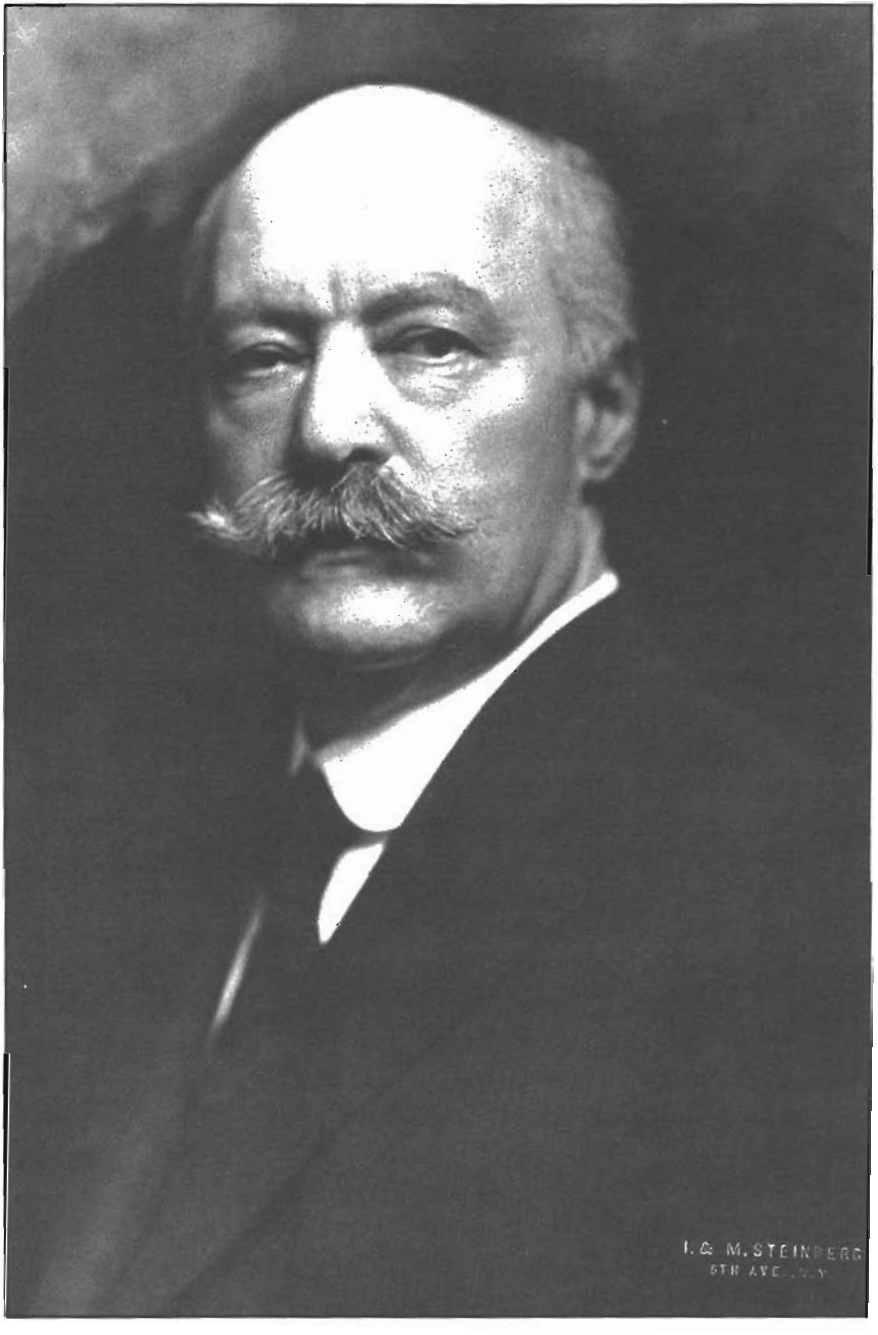
Dr. Samuel James Meltzer: Physiologist of the Rockefeller Institute

Adolph Meltzer

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 a mature man of thirty-three when he came to this country as a friendless and virtually penniless physician. While engaged in general practice, burdened with the handicap of learning a new language, he chose to pay for the privilege of using laboratory space and to engage in research. These difficulties notwithstanding, and in spite of the fact that he had no academic affiliation, he rose rapidly to a position of such eminence as a physiologist that the discriminating Simon Flexner chose him to head the Physiology Department of the new Rockefeller Institute, which he was organizing as a rival to the renowned Pasteur Institute and Kaiser Wilhelm Institute in Europe. Indeed, Meltzer accomplished the impossible.

He was born on March 22, 1851, in a small Jewish settlement near Panevezys, which is near Kovno in Russian Courland (now Lithuania). His father, a *melamed,* served as the community rabbi. As a boy Meltzer early showed an unusual talent for learning. He memorized long passages from the Talmud and demonstrated a precocious skill in *pilpul.*[2] Simon, his father, glowed with pride as learned men sought his elder son's help in the interpretation of difficult passages. Surely, he felt, the youngster was destined to be a sage in Israel. However, while still a youth, the boy was introduced to other literature which stirred his imagination. He began to demonstrate an eager desire for learning of all kinds. He read avidly and in secret—against his father's commands and despite vigorous disciplinary measures.



Samuel James Meltzer (1851–1920)

These bitter assertions of parental authority led to constant friction, and the boy began to hate his father. At nineteen, when he was married to Olga Leavitt, the sixteen-year-old daughter of a well-to-do merchant, he used the customary dowry money to leave his home and its intellectually oppressive environment. Intrigued by his readings in philosophical literature, he traveled with his young bride to Königsberg, the birthplace of Immanuel Kant. Here he entered a *Gymnasium* to begin his formal education and to learn the German language.[3]

Six years later, before proceeding to the University of Berlin, Meltzer sent his young wife and their two children home to her parents.[4] It was 1876 when he entered that prestigious institution, intent on making the study of philosophy his life's work. As a student he attracted the attention of the Jewish philosopher Herman Steinthal, an erudite scholar and a brilliant lecturer, active in social reform. Befriending the young student, the teacher took a fatherly interest in him, inviting him to his home and generally guiding his footsteps. He urged Meltzer to abandon the study of philosophy and undertake the study of medicine so as to be more certain of an acceptable material existence. Meltzer, who was in severe financial straits, was quick to follow this sage advice.

The medical faculty at Berlin, during the years that Meltzer attended the university, was perhaps the best in the world. Here our student came to the attention of Hugo Kronecker,[5] who had been a pupil of the great pioneer and master teacher of physiology, Karl Ludwig of Leipzig.[6] Like Steinthal, Kronecker was impressed by the sincerity and ability of this impoverished young man and became his dear friend, inviting him to his home and acting as his counsellor and guide.

The nineteenth century was a fruitful period for research and new discoveries, and as a result, especially as the century drew to a close, the world saw great changes in many areas of human endeavor. Some of these, naturally, pertained to health and medicine, and in consequence laboratory training in science and research techniques became an essential part of medical education.[7] A veritable scientific revolution was taking place, especially in Germany and France, attracting ambitious foreign students. The mastermind of the laboratory became the most revered of doctors.

It was natural that physiology, the study of normal function—how the various parts of the body work—should have first call on the

output of the laboratory. Physicians had to know the "normal" to better understand the aberrations induced by disease in order to treat these changes and, especially, to prevent them. Meltzer, then, had superb training in physiology, and in laboratory methods and procedure, but above all, he experienced the sympathetic guidance of an exceptional teacher who instilled in him a love for research—the road to new discovery and its potential for aid to mankind.

Meltzer conducted his first research as a student, and it was to Kronecker that he dedicated his dissertation for the Doctor of Medicine degree.[8]

In 1882, when he graduated from medical school, Meltzer was thirty-one years of age. He was offered several positions on the condition that he be baptized into the Christian faith, but he refused.[9] Instead, he undertook several voyages as a ship's doctor in order to accumulate funds before emigrating to the "Golden Land."

On July 1, 1883, Meltzer began practicing medicine in Harlem, then an affluent residential neighborhood of New York City.[10] He was to reside in this area for the remainder of his life. Meltzer's medical practice was very lucrative. Within two years he was able to send for his wife and his two children after ten years of separation.[11]

During this period of his life, despite the demands of his practice, and some twenty years before he was asked to join the faculty of the new Rockefeller Institute in 1902, Meltzer was drawn to the laboratory by his intense drive to engage in research. He paid for the privilege of using facilities at several places, including Columbia Medical School, Bellevue Hospital, and Harlem Hospital, as he carried out his ideas, usually at the expense of his sleep and his personal life. Recognizing and openly deloring the stagnant state of medical science in New York, he made urgent pleas for the formation of societies for the exchange of ideas and the promotion of knowledge.[12]

Meltzer's training, knowledge, and phenomenal memory, as well as his charm and compassionate character, were driven by a boundless energy. As his facility with English grew,[13] he made himself heard and admired as he got around to numerous societies. His mind was quick to grasp the essentials of a paper, and his retentive memory was sure to bring a broad knowledge into any medical or scientific discussion. He became well known to the medical profession as the bridge between the laboratory and applied medicine, the man who could explain what

was of practical value in new laboratory discoveries.

Meltzer entered practice in 1883 and joined the Rockefeller Institute in 1903. In those two decades he published some eighty scientific papers. The subjects he treated were about equally distributed between the clinical and the experimental. He was fifty-three years old when he was invited to join the new Rockefeller Institute.[14] In the latter half of his scientific life, the years of his association with the Institute, which continued until his death seventeen years later (1920). Meltzer published over three hundred papers. Moreover, he was remarkably fair, indeed generous, as a "chief"; many publications came out of his laboratory without his name.[15]

Although he was a most productive scientist, it was in the field of public relations that he excelled and where his influence was most strongly felt. He was an able "ambassador" for the Institute to medical greats at home and abroad, as well as to the practitioners of medicine in the numerous societies to which he belonged. He was especially popular with the younger men because of his progressive views and his helpfulness in directing their efforts. His theme was constant: "Understand the fundamental to develop the practical."

Because of his extensive travels and broad circle of acquaintances, his advice was often sought for faculty considerations. His correspondence was voluminous. He counted as his close friends eminent professors at such institutions as Johns Hopkins and Harvard, as well as many abroad. His friendship with Kronecker endured until his old teacher died.

Besides his important inspirational role in education, his contributions to clinical and to laboratory medicine were legion. Kronecker's influence directed Meltzer's lifelong interest in the function of the heart and lungs. He strove to educate the profession in the role of the involuntary (autonomic) nervous system, discussing such phenomena as cardiac standstill, arrhythmia, and shock. He was sought as 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 control of convulsions. He found a magic in the ability of magnesium sulphate (epsom salts) to control such seizures.[17]

In 1908 Meltzer devised a simple method of intratracheal insufflation, developed primarily to keep his experimental animals alive while

their respiratory movements were temporarily paralyzed by magnesium sulphate. This simple procedure was soon adapted as a means of giving anesthesia.[18] "Meltzer's method of intratracheal insufflation anesthesia" left the laboratory to aid humanity after nearly ten years of lively debate and spread rapidly across the world. It allowed the chest to be opened safely and made thoracic surgery possible. When the American Association for Thoracic Surgery was formed in 1918, Meltzer, "the renowned physiologist from the Rockefeller Institute," was elected its first president.

Meltzer was the first to recognize that asthma was an allergic disease. He suggested the use of oxygen in heart disease and advocated the wearing of face masks around patients with transmissable diseases. He instituted prolonged gastric feeding via nasal tube. He was the first to demonstrate the difference in the rate that substances are absorbed after injection under the skin, into the muscles, and into a vein. He demonstrated the avidity of fluid absorption from the peritoneal cavity in animals deprived of their kidneys, suggesting to the future that the peritoneum might be used for dialysis. These and other considerations demonstrate his boldness in adapting laboratory findings to the practice of medicine.

When endocrinology began to emerge as a new science,[19] Meltzer was soon recognized as an authority and made several basic discoveries in this field. He developed a sensitive biologic test for adrenalin, which contributed much to understanding the function of the pupil of the eye. As early as March 19, 1915, I. S. Kleiner and S. J. Meltzer read a very important paper before the National Academy of Science, demonstrating that after the injection of a surplus of sugar (glucose), the intravenous infusion of a strained emulsion of pancreas restored the blood glucose to normal.[20] (Insulin was not isolated until July 1921, over six years later.)

Meltzer retired from the headship of the 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.[21]

In its obituary, the *New York Times* said: "He possessed an idealism peculiarly fitting him for intensive laboratory studies, though perhaps not easily coinciding with the practical side of life." This sentence hinted at his attempt to organize an International Brotherhood of Phy-

sicians to help prevent the horrible slaughter and devastation called war. His heroic efforts toward that quixotic dream proved time-consuming, debilitating, unpopular, and futile.[22]

Notes

1. Leonard R. Rowntree, "Dr. Samuel James Meltzer: The Man Who Made Medical Meetings Interesting," in *Amid Masters of Twentieth Century Medicine* (Springfield, Ill.: Charles C. Thomas, 1938), chap. 20, pp. 355–381.

2. The technique of *pilpul,* used in the interpretation of the Talmud, involves certain rules of argumentation, supported by authoritative commentaries, that helped the young scholar develop a discipline that was to exert considerable influence on his research, his discussion, and his writing.

3. The usual age for entering the *Gymnasium* was eight or ten. He was a foreigner of nineteen and married!

4. Olga and the two children, a girl and a boy, joined him in America ten years later.

5. Isaac Asimov, *The Biographical Encyclopedia of Science and Technology* (Garden City, N.Y.: Doubleday, 1982), lists Leopold Kronecker, Hugo's brother and a famous mathematician, as a Jew who converted to Protestant Christianity in the last years of his life. We must conclude that Hugo Kronecker was born a Jew.

6. Karl Ludwig (1816–1895), said to have been "the greatest teacher of physiology that ever lived," was the director of the Physiological Institute of Leipzig. Osler called him "the Nestor of German physiologists. A man of enchanting personality," and noted that his students were to be found throughout the world.

7. According to William H. Welch, the great guiding influence of Johns Hopkins Medical School and a lifelong friend of Meltzer's, "the ten years ending 1890 were perhaps the most wonderful in the history of medicine."

8. Meltzer would swallow balloons and record the pressure changes during the act of swallowing. These recordings resulted in the Kronecker-Meltzer theory of deglutition. The experiments on which the theory was based were the first measurements of pressure changes in the esophagus, and Meltzer is regarded as the father of esophageal manometry.

9. W. H. Howell, "Biographical Memoir: S. J. Meltzer," in *National Academy of Sciences, 1923 Annual Meeting*, pp. 1–23. William H. Howell was professor of physiology at Johns Hopkins.

10. It is of interest that there was already a YMHA in Harlem. There was only one other physician.

11. Both children, Clara and Victor, became doctors.

12. He was instrumental in forming at least ten societies which he chaired, and he belonged to as many more. He was an active participant in all. He subscribed to some thirty-five medical and scientific journals which he read faithfully, and he helped found five new ones still extant.

13. Twice in his productive lifetime Meltzer was to encounter the formidable antagonist of a language barrier. He had to learn German when at nineteen he entered the *Gymnasium* in Königsberg. He had to learn English at age thirty-three when he began practicing medicine in the United States. Little wonder that he never lost his German accent.

14. Flexner offered Meltzer $1,000 a year, though he was later rather shamefacedly to claim that "it was fifteen hundred for a part time job." Actually he was put on trial. There were no guarantees of advancement, yet Flexner knew that the bait was right. "Heretofore," said Meltzer, "I have always paid to work in laboratories. Now you propose to pay me to work in them. Of course, I will come." He gave up a very lucrative practice.

15. In one list of eighty-five papers presented to Flexner, twenty-six did not bear Meltzer's name and only fourteen bore his name alone.

16. On one occasion the influential Kronecker offered to propose Meltzer for the Nobel Prize, but Meltzer modestly and earnestly begged him not to, considering himself unworthy.

17. This proved of great importance during World War I, which was fought on the manure-laden battlefields of France, rich in tetanus sports. Magnesium sulphate is still used to control the convulsions of eclampsia in pregnancy.

18. Ether was administered through a tube narrow enough to allow egress of (expired) air, administered (inspired) under enough pressure to inflate the lungs without overinflating them.

19. The term "hormone" was introduced in 1905.

20. It is ironic that Meltzer was slowly dying of diabetes and yet was so close to the discovery of insulin—just a short step away.

21. So far had he strayed from his father's religion. Cremation is anathema to Judaism. His brother Joshua, whom he brought over to America, became a lawyer and legislator in Bridgeport, Connecticut. Joshua remained a Jew and became a leader of Conservative Judaism.

22. The world was not ready then for such a noble gesture. The proponents of a similar movement today were recipients of the Nobel Peace Prize.

Adolph Meltzer, M.D., is the author of a biography of Samuel James Meltzer which will be published by the Society of Experimental Biology and Medicine.