



**KARL SINGER**  
(1902-1956)

#### **OBITUARY**

Karl Singer was born in Austria in 1902 and died in Chicago in July 1956. At the time of his death he was Director of the Department of Hematology at Michael Reese Hospital and Associate Professor of Medicine at the University of Illinois Medical School in Chicago.

Singer obtained his medical degree at the University of Vienna in 1926. The foundations of his considerable clinical skill were laid by his hospital experience at the Franz Joseph Hospital in Vienna where he served as intern, resident and chief resident between 1927 and 1935. His early interests in medical school were in the biologic foundation of psychiatry. His research work in this area was reflected by a series of papers on brain chemistry.

The advent of liver therapy for pernicious anemia fired his fertile imagination with the potential of biochemical and pathophysiologic approaches to hematology which characterized his work from then on. A series of papers dealing with stercobilin metabolism and various aspects of pernicious anemia was published in this early period. A monograph on "The Physiology and Pathology of the Anti-Pernicious Anemia Principle" in 1936 was a major review which critically analyzed and synthesized pertinent literature. Singer never was happy writing review articles since he felt that such papers stole time from the performance of original work. However his other reviews, such as, "Problems of Erythrocyte Disintegration," "The Pathogenesis of Sickle Cell Anemia," "Thrombotic Thrombocytopenic Purpura," and "Abnormal Hemoglobins" always were models of lucid and stimulating thought and helped to orient many people in these areas.

With the advent of the Nazi regime in Austria, Singer was forced to flee his native country and came to Boston where he worked in the laboratory of William Dameshek between 1938 and 1941. Studies on hemolytic anemias with special reference to pigment output and the lysolecithin fragility test were published in his first few years in America. An important paper with Dameshek in 1941 documented and delineated the syndrome of "Symptomatic Hemolytic Anemia" in detail.

In the early 1940's Singer had recognized and pointed out the major significance of red cell life span determination in the study of hemolytic disease. Lacking clinical facilities at that time, he was unable to do such tests on patients. However, in spite of all difficulties, he carried on major animal research in basement laboratories and showed with Weisz (1945) that the life span of the red cell in the dog was normal after splenectomy, a most significant finding for the problem of splenic hemolysis.

Karl Singer's career may be said to have flowered after he accepted the position of Director of Hematology at Michael Reese Hospital in Chicago in 1946. Full of energy and sparkling with ideas, he soon attracted a number of young collaborators and many important papers began to appear. The problem of hemolysis in sickle cell anemia and pernicious anemia was clarified by the red cell survival time method. Thrombotic thrombocytopenic purpura was carefully studied. A rapid test for sickling was discovered, and the significance of the Coombs test was analyzed. The "aplastic" crisis in sickle cell anemia was described and a new red cell abnormality—acanthrocytosis—was described for the first time.

Together with Chernoff and his faithful collaborator and wife, Singer concentrated on the study of fetal hemoglobin in sickle cell anemia and worked out the one minute alkali denaturation test which has become the standard procedure for the measurement of the fetal pigment. Using this test he established the occurrence of fetal hemoglobin in a variety of hereditary and acquired disorders. A series of papers which helped to clarify and correlate biologic phenomena with clinical syndromes in this new field of hematology continued to flow from Singer's laboratory. Of particular significance were the papers on gelling of sickle cell hemoglobin, C-Thalassemia, S-Thalassemia, and the demonstration that fetal myoglobin was a different protein than adult myoglobin. Active work on clotting was also done in Singer's laboratory and a number of papers in collaboration with Ramoth were valuable contributions for better understanding of the newer hemophiloid syndromes. Karl Singer had little use for what he called "gold beaters" or investigators who hammered a small gold nugget into a large sheet of gold foil, e.g., wrote many papers on the basis of a single new fact. Each one of Karl Singer's papers made a new and significant contribution.

Singer's premature death deprives Hematology of one of its outstanding investigators. His great gift was a penetrating and clear mind that could focus quickly on the core of a problem. He was a tireless worker who read widely and always sought new approaches. He was an able clinician who was often called upon to advise on difficult diagnostic problems. His teaching was enthusiastic, clear and logical and popularized hematology as a specialty in his medical center. It has been pointed out that he was the first investigator in the field of the hemoglobinopathies to have formed a "school" of workers who have continued to work independently. In addition, Karl Singer helped many physicians all over the world with their problems in this rapidly developing field.

He loved to talk about a problem from many points of view and was most stimulating in these informal discussions when thinking out loud. Hours might be spent in debating the proper phrasing or emphasis of a paragraph in an article but everyone concerned and certainly the article profited from these deliberations.

Lily Singer, his wife, was his trusted and faithful collaborator from his resident days on. As a biochemist she was of major help and contributed significantly to most of her husband's investigations. They were an ideal team and complemented each other in many ways.

Of the honors bestowed on Karl Singer he was probably most appreciative of his membership in 1954 in the American Association of Physicians. Since his career had not developed in the conventional academic manner, appreciation of his scientific work by election to a Society of the most distinguished physicians of his adopted country meant a great deal to him. Everyone who knew Karl Singer misses him and his counsel. American hematology has lost one of its best!—*Arno G. Motulsky*