

## Cecil K. Drinker: Pioneer Lymphologist

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This special issue of the journal *Lymphology*, devoted to the lung, is dedicated to the memory of Cecil K. Drinker (see Figure 1) (1). Drinker's name is probably vaguely familiar to most readers, but he should be much better known. In a very real sense, he is the founder of modern lymphology. To the pulmonary physiologist, Drinker is especially revered as the pioneer lung lymphologist (2).

The Drinker family is descended from Philip Drinker, an Englishman, who came to the American colonies in 1635. His grandson moved to Philadelphia, Pennsylvania, toward the end of the 17th century where the Drinkers became staunch Quakers.

Cecil was born in Philadelphia in 1887 and raised under almost idyllic circumstances on the campus of nearby Haverford College. In 1905 his father, a mining engineer and a lawyer, became President of Lehigh University at Bethlehem, Pennsylvania.

Drinker was the third son of six children (four boys and two girls); all of whom were more or less prominent in their chosen fields, including Catherine (3), and Philip, an engineer, who was largely responsible for the development of the Drinker respirator, the iron lung.

Cecil Drinker received his Bachelor's degree at Haverford College in 1908. He entered the University of Pennsylvania Medical School from which he graduated in 1913 at the head of his class. He achieved the highest academic level of any student that had ever attended that medical school and, of the four major senior class prizes, he won three.



Fig. 1 Professor Drinker, at his home at Falmouth Massachusetts, at the height of his career in the early 1940's (4)

He married Katherine Rotan, who graduated from the University of Pennsylvania Medical School a year after him. She worked closely with her husband and was well known in the field of industrial medicine (4).

After graduation, Drinker was a Resident in Medicine at the Peter Bent Brigham Hospital

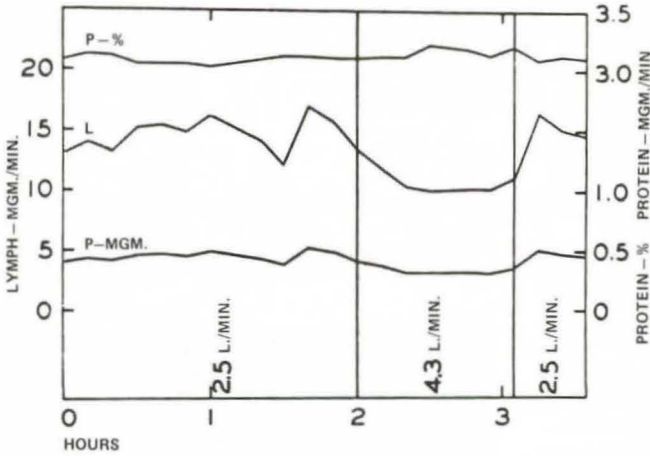


Fig. 2 An example of one of Drinker's first published experiments on lung lymph flow (L), lymph protein concentration (P-%), and total protein flow (P-MGM). The graph shows the slight depression of lung lymph flow during increased positive pressure ventilation in an open-thorax, anesthetized dog (9).

in Boston after which he was a research fellow with Professor A.N. Richards, University of Pennsylvania, and with Prof. W.H. Howell, in the Department of Physiology at Johns Hopkins University in Baltimore. In 1916 he joined Harvard Medical School in Boston as Assistant Professor of Physiology under Walter B. Cannon.

In 1923, when the Harvard School of Public Health opened, Cecil Drinker became Professor of Applied Physiology; a post he retained until his retirement in 1948. He also served as Dean of the School from 1935 to 1942.

In 1926, he took a sabbatical leave year with Professor August Krogh in Copenhagen, Denmark, where he worked on capillary permeability in the web of the frog's foot (5). The results stimulated his interest in lymphatics and their role in extracellular fluid and protein balance (6). He believed that experiments should be simple with a minimum of apparatus and done only after careful planning and with meticulous attention to details. Drinker was brilliant, imaginative but an erratic scientist. He made friends and enemies with equal ease. According to his sister's account (3), he was either adored or hated by everyone who knew him. There seemed to be no middle ground. His personal life was beset with many frustrations, difficulties and disappointments. It is a testimony to his superiority as a scientist that he published nearly 250 papers and books.

Cecil Drinker is well-known in several areas of scientific work, including the fields of industrial health. He and Katherine founded the *Journal of Industrial Hygiene* in 1919 (4). But his greatest contributions were in the field of lymphology beginning in 1931 (7) and culminating in the Lane Medical Lectures given at Stanford University in 1942 (8).

Within lymphology, his most important contributions dealt with the lung. In 1942, he and Madeleine Warren published the first of a series of experiments of fluid balance in the dog lung (9). To accomplish his experiments, Drinker made tiny glass cannulas into which he inserted a fine wire loop dipped in dry heparin to prevent clotting. He used these cannulas to obtain lymph from fine vessels at the hilum of the lung in the open-thorax, anesthetized dog. An example of one of his early experiments on lung lymph flow is shown in Figure 2. Later, he recommended cannulating the right lymph duct at the base of the neck as a means of obtaining predominantly lung lymph without opening the thorax. His major textbook, *Pulmonary Edema and Inflammation*, appeared in 1945 (2). It was the standard reference in the field for more than a quarter of a century just as his 1941 epic, *Lymphatics, Lymph and Lymphoid Tissue* (written with Joseph Yoffey) was already the standard text for lymphology (10).

Drinker viewed the lung lymphatic system (indeed, the lymphatic system everywhere), as



means of sampling interstitial fluid. Ever since his original work, lung lymphology has been concerned almost exclusively with fluid and protein exchange in health and disease. Thus, all of the papers in this special issue deal with fluid balance and eight of the 12 make use of lung lymph as a measure of transcapillary fluid flow and interstitial fluid composition.

Katherine Drinker died in March 1956 of chronic leukemia, whereupon Cecil Drinker, already in poor health and infirm with congestive heart failure stopped working and died four weeks later on April 14, 1956. I regret that I never met Professor Drinker. He died before I ever saw a lymph vessel. I hope he would have been pleased to have this volume on lung lymphology dedicated to him.

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