Homer William Smith: A Remembrance

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As we approach the 100th anniversary of his birth, it is appropriate to reflect, even if necessarily briefly, on the man, Homer W. Smith, and his accomplishments, in whose name we each year honor an outstanding renal physiologist/nephrologist. Smith, as he liked to be called, was born January 2, 1895, and died in his sleep of a cerebral hemorrhage on March 25, 1962 (1). In the intervening 67 yr. this remarkably talented man not only became the dean of renal physiology but emerged as a truly polymathic figure whose writings and contributions encompassed evolution, philosophy, religion, and music. For him, science and philosophy were inseparable and he was preoccupied not only with the origin of life and its evolution over the millennia from the simplest to the most complex forms, but also with the meaning of life, consciousness, and man's place in the universe.

Robert F. Pitts (Figure 1) who obtained his MD working in Smith's laboratory and who was the first Homer W. Smith Awardee, wrote Smith's Biographical Memoir for the National Academy of Sciences (2). In it, he summarized Smith's work on the kidney thus:

His death brought to a close what has been aptly termed the Smithian Era of renal physiology. For over thirty years he had dominated his chosen field in a way that few if any have dominated other fields. His personal investigations, his broad and inclusive concepts, the methods of study of function which he developed and popularized, the texts which he wrote, and the many investigators and students of medicine whom he trained or influenced established him as the acknowledged master of all things renal. Although not a physician, he has been widely recognized by clinicians for his contributions to an understanding of functional alterations in renal disease as well as by physiologists for his contribution to knowledge of the functional properties of glomeruli, tubules and the renal vascular bed.

New data that he questioned or a new hypothesis that he did not support had no chance of general acceptance. The most notable example of this was the countercurrent hypothesis for urine concentration proposed by Kuhn and Wirz. When faced with compelling evidence, he finally acceded, but even in his belated acceptance of the hypothesis stated his displeasure that the thin limb of the loop of Henle changes its function "for no better reason, apparently, than the circumstance that it has turned a corner. But, I suppose I can get used to that too" (3).

Born in Denver, young Homer was raised in Cripple Creek, CO, a small mining town. His youth was marred by two events. His mother died when he was nearly 7, and he was raised by his father and five considerably older siblings. In addition, he stuttered so badly that it drove him into silence and introspection. By the time he was 30, he had overcome his handicap and was a flawless speaker. As a boy, he was interested in natural history and collected minerals and insects. When he became a teenager, his father built a shed in back of their house where he could indulge his passion for experimentation in physics, electricity, microscopy, and biology. He liked gadgets.

He obtained his AB from the University of Denver in 1917 and shortly afterward joined the Army. He was assigned to a chemical warfare unit under the supervision of E.K. Marshall, who went on to become a renowned renal pharmacologist at Johns Hopkins. After the war, Smith entered graduate school at Johns Hopkins School of Hygiene and Public Health and in 1921 received an ScD in chemistry, a field that interested him for the remainder of his life. After work in the research laboratories of Eli Lilly and Company and a fellowship in Walter B. Cannon's laboratory at Harvard, he accepted the Chairmanship of the Department of Physiology at the University of Virginia. Three years later, he became Professor of Physiology and Director of the Physiological Laboratories at New York University School of Medicine, positions he held until his retirement in 1961. At N.Y.U., he continued his interest in cell biology, body fluid composition, urinary excretion, and comparative renal physiology and further developed and exploited in dogs and humans the renal clearance concept.

Van Slyke had devised the clearance formula in studies of urea excretion in dogs, but it remained for Smith and colleagues to conceptualize clearances as we now understand them: the minimal volume of plasma required to supply the quantity of some substance excreted in the urine per unit time. In order to quantify renal excretion into its three basic mechanisms: filtration, reabsorption, and secretion, Smith and his associates recognized that it was necessary to find a substance suitable for measuring the GFR. He and his colleagues identified inulin for this purpose at
the same time as did A.N. Richards and colleagues (4,5). They also recognized that the clearance technique could be used to measure RBF and identified suitable substances for this purpose as well as for determining the tubular maxima for the secretion or reabsorption of certain substances.

Shortly after he arrived in New York, two clinicians, Herbert Chasis and William Goldring (Figures 2 and 3), asked Smith's help in interpreting puzzling data on urea excretion by patients (1). This was the beginning of a long and fruitful collaboration between Smith and physicians on clinically relevant issues. He recognized the importance of and encouraged the training of clinicians in the basic sciences. The summers during these years he spent at the Mt. Desert Island Biological Laboratory in Salsbury Cove, ME, directing research in the Kidney Shed and writing.

His students and associates over the years were many and have had distinguished careers of their own (Figure 4). Although it is unfair to name only a few, they included Berliner, Bradley, Chasis, Farber, Goldring, Levitt, Pitts, Schreiner, Shannon, and on and on. It is through these and many other physicians and basic scientists with whom he worked or influenced that he made his greatest contribution to science.

His three books on the kidney were extremely important and influential (Figure 5). Robert Berliner has written (6) that he was attracted to kidney research when he read Smith's 1937 work The Physiology of the Kidney (7) while recuperating from pneumonia. This work was greatly expanded into his truly monumental The Kidney: Structure and Function in Health and Disease, published in 1951 (8). The knowledge he displayed of all aspects of renal function in the normal and pathologic states has never been rivaled, and "the Green Bible" remained the standard reference work for at least two decades. His Principles of Renal Physiology, published in 1956, was equally helpful for those whose time and interest were limited (9).

Smith wrote four other remarkable books (10-13): Kamongo, published in 1932, The End of Illusion, published in 1935—both adventure novels—Man and
morality, and their connection to science were major themes in these four books.
I would like to close with some of Smith's own words; however arbitrarily chosen. I quote from *Man and His Gods* (12):

As an intelligent creature he explores his world, and here is the first value that is uniquely his: he is more intelligent than any other creature, and from intelligence fired by curiosity comes knowledge, and from knowledge comes power and the manifold satisfactions by which he surpasses all his fellow creatures. This sequence has led him to abandon the forest and the cave for purposes and plans. But the need for knowledge has burdened him with the ethic of truth: to lie willingly to himself or others, to adhere to that which is suspect, however tentatively he holds to truth, is to forfeit his opportunity and jeopardize his dreams. This is the essence of all philosophy: to cherish truth for its uniquely human value, to search for it, to test and retest it by conscious effort, to communicate it, to be guided by it, to base upon it all purposes and plans.

But he who has purposes and plans must make a choice; no other can make it for him. A proper view of man finds no place for a priori "should" or "ought" or any categorical imperative, but only for this, that if a man so acts, that is his action, and his alone. This is the essence of all morality: a man is responsible for the consequences of whatever choice he makes. The degree to which he recognizes this and acts accordingly is a measure of his biological maturity.

REFERENCES