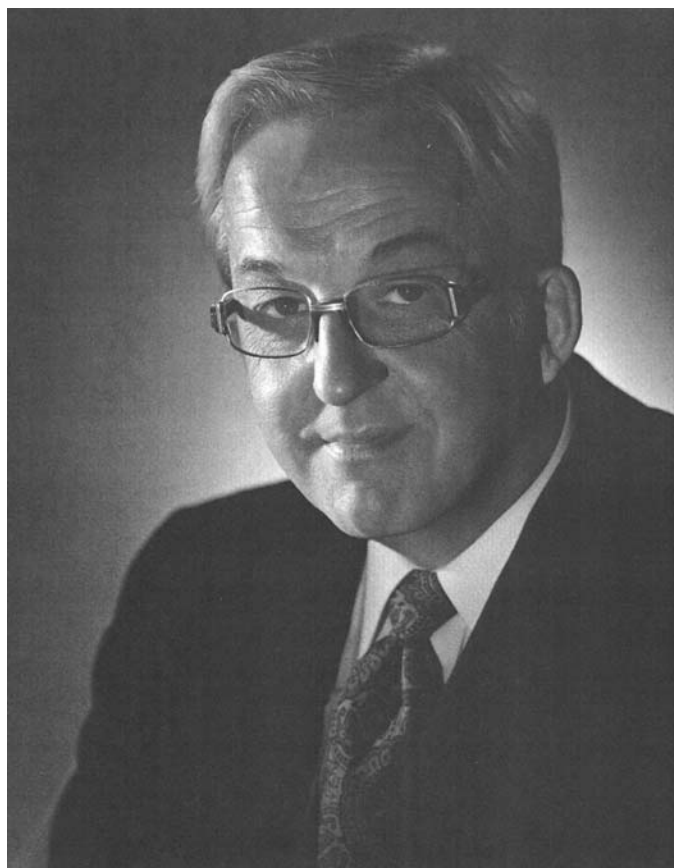


*Robert F. Borkenstein 1912–2002*<sup>1</sup>

## Obituary



Professor Robert F. Borkenstein, inventor of the Breathalyzer and a leading light in the development of alcohol impaired driving research and legislation, passed away at his home in Bloomington, Indiana, on August 10, 2002. He was 89. His life is an example of the impact that the application of science at its best can make in people's everyday lives, changing attitudes and behavior, and ultimately saving lives.

Bob Borkenstein was born in Fort Wayne, Indiana on August 31<sup>st</sup>, 1912. Finishing high school at the onset of the Great Depression, he missed the opportunity to attend college, but helped support his family by working in a variety of jobs, eventually securing a position as a photographic technician. He developed considerable

skill in this field, and soon demonstrated the innovative, problem-solving temperament which would characterize every challenge he subsequently took on, developing and improving on equipment, procedures and processes in the emerging field of color photography. The skills he developed in optics and photography led to the invention of several other devices, including a color comparator, which made a significant contribution to the war effort.

It was Borkenstein's proficiency and expertise in photography that led to his involvement with the Indiana State Police (ISP), whose troopers he assisted with documenting and photographing traffic accidents and other investigations. He so impressed the officers he worked with that when the State's first criminological laboratory was established in Indianapolis in 1935, he was consulted on its design and operation, and a year later formally went to work there first as a civilian technician, rising through the ranks to director of the laboratory and Captain, retiring in 1958. He then went on to join the faculty at Indiana University's Police Administration Department which evolved into today's Criminal Justice Department, rising to the rank of professor. He joined the General Section of AAFS in 1967, and was elected fellow in 1969. He taught and researched at IU until becoming too ill to work in 1997.

Seminal work on the measurement of alcohol in breath had been conducted in Sweden in the early 1930s, but the challenge of developing a portable breath alcohol testing device had been taken up by Professor Rolla Harger at the Indiana University Medical School in Indianapolis, leading to the invention in 1938 of the Drunkometer. Harger turned to ISP and its crime lab director, Lt. Robert Borkenstein for assistance in evaluating this device in the field. Borkenstein immediately saw the value of this device, but recognized its limitations in terms of portability and robustness, making it difficult to use in the field. Employing his knowledge of optics and photometry from his early photographic training, he designed a unit consisting of "two photocells, two filters, a device for collecting a breath sample, and about six wires," which was reliably accurate, simple to use and robust enough to use in the field. Thus, the Breathalyzer was born. Borkenstein patented the device in 1954, and described its use in the scientific literature in 1961. Royalties from the patent were donated to the Indiana University Memorial Foundation.

Borkenstein remained involved with development and innovation in breath testing technology and alcohol related traffic safety issues for the remainder of his career. Not satisfied with the invention of a device with which to measure breath alcohol, he aggressively pursued the implementation of stricter standards under which it would be statutorily illegal to drive—the so-called illegal per se standards. Critical to the success of this effort was a demonstration of a quantitative relationship between breath alcohol concentration and driving impairment. Borkenstein initiated what be-

<sup>1</sup> Much of the detail in this brief memorial of Professor Borkenstein comes from a lengthy article on his life and work, written by his close friend and colleague Doug Lucas (Lucas DM, *Forensic Science Review* 2000;12(1/2):2–21).

came known as the “Grand Rapids Study” for the city where it was conducted. This was an ambitious, case-controlled epidemiological study involving approximately 8000 accidents. The study resulted in the “Grand Rapids Curve,” a plot demonstrating the increasing risk of accident involvement with increasing breath alcohol concentration. A breath alcohol concentration of 0.08g/210L (“0.08%”) was identified as the limit above which all other contributing factors became subordinate to the effects of alcohol, and was correlated with a three-fold increase of alcohol related crash risk compared to the sober driver.

Remarkably, Bob Borkenstein’s achievements were accomplished without the benefit of any formal science education beyond high school. However, his innate curiosity and thirst for knowledge led him to accumulate credits at Indiana University, graduating with an AB degree the same year he retired from ISP. His contri-

bution to the field of traffic safety toxicology led to acknowledgment in the form of an honorary doctor of science degree from Wittenberg University in 1963, and an honorary doctor of laws degree from Indiana University in 1987. In 1974 he received the prestigious Widmark Award from the International Council on Alcohol, Drugs and Traffic Safety (ICADTS), an organization he helped found, and numerous other awards and honors over the years. He established at IU, the Center for Studies of Law in Action, through which hundreds of students have been trained in medico legal applications of breath alcohol testing and program administration, in a program that continues today.

Barry K. Logan, Ph.D.  
WSP Forensic Lab Services Bureau  
2203 Airport Way, South, #360  
Seattle, WA 68134-2027