

# A TRIBUTE TO JOHN W. SEVERINGHAUS, M.D. (MAY 6, 1922 - JUNE 2, 2021)

by

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John W. Severinghaus, M.D., is the Leonardo da Vinci of Anesthesiology. More than any scientist before him, he brought scientific rigor to understanding how anesthesia affects breathing, gas exchange, and acid-base balance. His curiosity, creativity, and elegance of thought were like that of da Vinci. He discovered centers in the brain where breathing is controlled, elucidated how humans adapt their breathing to high altitude, and developed technology to measure these alterations. His gift to medicine of acid-base analysis technology probably deserved a Nobel Prize.

In reflecting on why John was so influential, several things stand out. First and



foremost, he had an absolutely insatiable curiosity. He demanded a sense of wonder and a drive to solve problems based on his experiences and insights. In addition, John trained and inspired several generations of physician-scientists who have carried on his tradition of rigorous science, curiosity about how the universe works, and an unequalled spirit of generosity and hope.

Here are some of my many fond recollections of working with John:

He always seemed to be traveling, which for a mere mortal might have been exhausting. For John, it was invigorating. He would appear in his office even after international travel around 6:30 a.m. or earlier, full of new ideas generated at some conference. He often had ideas about the next experiments to conduct in the lab or during a trip to White Mountain Research Station.

John, it seemed, could write a full-length research paper in one sitting, and it would be perfect with completed figures and citations. To this day, I don't see how he did it. Rarely did he suffer the fate so many of us have to endure with endless re-writes, letters of rejection, or requests for revisions. I think that when a journal editor saw a paper coming from John, it was a no-brainer to accept it, knowing that John's pen always had an outsized impact. Oh, how we all long for that kind of grace!

John was a tinkerer. Although his lab looked like a garage full of junk most of the time, it contained amazing stuff: old home-made blood-gas electrodes, various mercury-filled tubes and flasks, miles of errant wires, a huge stash of magnetic tape from experimental data, and even the O.R. mass spectrometer. John was the world's best Mass Spectrometer Repairman. We all knew that when it came to rebuilding these washing-machine-sized contraptions, there was nobody better.

I remember working with John in the O.R. on a few occasions when I was a resident. A patient asked me who John was, impressed with his explanation of how anesthesia worked. After John had left, I told the patient, proudly, that Dr. Severinghaus was probably the smartest and most famous anesthesiologist in the world. Even at that early stage in my career, John inspired that kind of awe from me!

On another O.R. day with John, he came in to give me a lunch break. When I returned, there was a smell of an electrical fire in the air. The patient was stable and safely asleep. It wasn't actually a fire, but John was holding a soldering iron, and smoke was rising from a piece of equipment that was undergoing an intricate electronics repair.

Trips to high altitude with John were really special. He continued to come with us to White Mountain long after his official retirement. His last visit was made around 2015, at age 92 or so.

One trip that I remember quite well involved bringing along the washing-machine-sized mass spectrometer, about a dozen large gas cylinders, a huge blood-gas machine, and all manner of ancillary equipment, like breathing circuits and pneumotachs. All of this material was flung into the back of a pick-up truck from

the UCSF motor pool. I remember that the ride to the Barcroft Lab was particularly bumpy that year, and the vibrations and impacts caused problems in just about all of the equipment.

John basically spent the next week fixing everything that broke during the trip. The blood-gas machine was the most vexing; it misbehaved and necessitated multiple readings of precious blood samples. John did an elaborate set of calculations to compensate for the passage of time while correcting the various errors. Mere mortals would have simply given up and thrown away the samples, which were soon reduced to traces of blood film at the bottom of the syringes.

John was my scientist hero for almost 40 years. I am deeply grateful for his example and inspiration.