

John T. Edsall as tutor and teacher

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The course of my career could have been very different had I not been confronted by the administrative assistant who coordinated the Harvard undergraduate program in Biochemical Sciences. At the start of my sophomore year in fall 1958, I showed up to tell her that a family friend had recommended that my future career in medicine would be better served by preparation in chemistry than biochemistry, and that I wished to switch to chemistry. She frowned and said,

Oh Mr Eisenberg, you have been assigned to Dr Edsall as your tutor; I advise you not to switch until after you have gone to your first tutorial session and have met Dr Edsall.

This one sentence of career advice made an enormous impact on my life. My first tutorial session and many others were in Dr Edsall's spacious, book-lined 4th floor office, adjacent to his lab, with a fine view down Divinity Avenue from the Biological Laboratories. Despite the formal appearance of his erect posture, dark blue suit and gold watch chain, Dr Edsall seemed almost diffident in greeting me. His gray hair was abundant only at the back and sides, and he appeared to me then as quite elderly, though I now realize that he was some eight years younger than I am at present.

Dr Edsall placed my chair next to his at the desk, and explained that his format for our biweekly

tutorials would be to suggest readings, and my assignment would be to develop questions for our discussions. For starters, he asked me to dip into L.J. Henderson's book *The Fitness of the Environment*, and also to read the first two chapters from his newly published monograph with Wyman on *Biophysical Chemistry*. These are entitled 'Biochemistry and Geochemistry' and 'Water and Its Biological Significance' and were extensions of Henderson's ideas that the properties of certain elements and compounds make them particularly fit to support life. I later learned that Henderson had been Edsall's Harvard undergraduate instructor in biochemistry. Still later, I heard the story that when Henderson went off on a trip at the end of term without leaving a final exam for his students, his telegraphed response to a plea from a departmental secretary for an exam was, 'Tell the students to write about water.' With all this water in my early scientific training, surely it was no coincidence that my Oxford D.Phil. thesis was on hydrogen bonding in ice and that I spent the next two years with Walter Kauzmann coauthoring a monograph on *The Structure and Properties of Water*.

In some ways, tutorials with Dr Edsall were inviting and comfortable, and in some ways terrifying. Occasionally, tutorials were after dinner in his home on nearby Berkeley Street, where his wife Margaret would offer me grape juice and cookies, as Dr Edsall lit his pipe and settled into

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his easy chair next to his dog. One evening he took me to view some time-lapse biological films at the Biological Laboratories and introduced me to two youngish researchers, saying ‘Jim and Francis, this is my student Eisenberg.’ It took me a few minutes to realize I had just met Watson and Crick. But what was most important to me about that introduction was that Dr Edsall had defined me as his student. Apparently, a few months of tutorials had somehow established an educational or scientific link between us, of a sort that I had not previously encountered.

During most tutorials, Dr Edsall would shuffle through his correspondence while I was fumbling for adequate questions on that week’s assigned reading. He would often absent-mindedly mutter ‘Yes, yes, yes...’ in his deep voice as I asked my questions, sometimes continuing to mutter ‘yes’ after I fell silent, until suddenly he would say, ‘No. No, that is *not* right,’ and then he would stride to the blackboard to sketch a diagram or equation that would correct my misinterpretation. His memory was staggering, with all equations and constants from his head, which was also the source for the volume and page numbers for the articles he assigned me to read.

In tutorials and in the courses he advised me to take, Dr Edsall always emphasized scientific fundamentals. Though quite literary and humanistic in his own personal interests, and though focused on proteins in his lab, he invariably advised me to take an additional math or an advanced chemistry course when there was a chance for an elective. For graduate school, he steered me towards theoretical chemistry, saying he wished he had learned more quantum mechanics himself. At first, these studies seemed an unnecessary detour from proteins, and it was some years before I appreciated in my own studies of proteins that I gained much confidence from a solid grounding in energetics.

In the spring of 1960, I took Dr Edsall’s lecture course on Biophysical Chemistry. Looking over my class notes today, I see that the lectures started with the components of proteins and nucleic acids. Of course there was a unit on water and its properties, and a brief review of thermodynamics

emphasizing applications to solutions. Next, there was an extended segment on acid–base equilibria and polyvalent acids. The rest of the course was in one way or another on the structure of proteins, including a discussion of Sanger’s determination of the sequence of insulin, spectroscopic methods for probing structure, and the principles of X-ray analysis. The climax came when John Kendrew visited from the other Cambridge to lecture on the newly determined structure of myoglobin. The excitement of his stylish lectures was unforgettable, including a beautiful wire model of myoglobin that he carried in a custom leather suitcase.

After two years of tutorials, Dr Edsall gave me a choice of topics for my undergraduate thesis, to be researched and written during my final college year. I chose the project that could be conducted largely in his lab, a UV spectrophotometric study of human serum albumin and reduced carboxymethylated albumin. Dr Edsall read and commented on my thesis draft, and later condensed the thesis for a report to *Science*.

One learned much more from Dr Edsall in tutorials than simply scientific facts. First, there was his belief in fundamentals as the solid road to knowledge, as I have stressed above. Second, there was Edsall’s attention to the feelings and dignity of all people, which was evident every day. Students, researchers, and staff received the same respect as his colleagues. Several times when I came into his office from the lab to ask a question, I found Dr Edsall seemingly trapped at his desk by the janitor, leaning on his broom and expounding on the troubles of his old car, while Dr Edsall nodded, saying, ‘Yes, yes, yes...’ And third, there was the constant demonstration that a scientist can be involved constructively with the problems of the society around him. Elsewhere [*Protein Science*, 1, 1399–1401 (1992)] I have described some of Edsall’s many other activities including editorships of major journals, championing of the freedom of scientists to adopt unpopular political views, and writing on the history of biochemistry, environmentalism and conservation.

Continuously, since that first tutorial session, I have counted myself as privileged to have come

under the influence of a greatly humane, cultured and thoughtful person, John T. Edsall. His mentorship by example went far beyond providing the guidance and advice that fine advisers offer. To his tutees and students he seemed to personify the

unselfish search for truth that science is supposed to be. Seeing his pleasure in seeking answers to scientific questions and his focus on fairness to all those involved in the process was the best way to start out in science.