

# One hundredth birthday of John Edsall

Charles Tanford

Tarlswood, Back Lane, Easingwold, York YO61 3BG, UK

We celebrate in a few months' time the 100th birthday of John Edsall. He was born in 1902, the year in which the peptide bond was first proposed and generally accepted [1], after which one could begin to envisage protein molecules in terms of the atoms they contain and the links between them. In other words, the entire history of structural protein chemistry, from its beginnings to the present-day marvels of automated proteomics, has unfolded in John Edsall's lifetime. And he has appropriately been acutely aware throughout his career of protein chemistry's historical setting, its theoretical background and its relation to society as a whole.

John Edsall joined the department of physical chemistry at Harvard Medical school in 1926, while still a third year medical student, under a program designed to give those who were so inclined a research experience to relieve the tedium of purely clinical studies. This particular department, with Edwin Cohn as its director, was a most unusual venture for any medical school, but it proved to be uniquely fitted to John Edsall's theoretical predilections. The partnership between Cohn and Edsall led (among other accomplishments) to a great textbook of protein chemistry, *Proteins, Amino Acids and Peptides as Ions and Dipolar Ions*, published in 1943 [2]. This book, as its title implies, concentrates on the physico-chemical features of proteins, especially on the macromolecular nature of protein molecules and the profusion of electrostatic charges on the molecular surface – it was the book from which many of us (including myself) first learned the fundamentals of protein chemistry.

Edsall's individual research projects in the laboratory were consistent with this emphasis on fundamental theory. He was among the rare breed of scientists who seek logical consistency and clarity rather than novelty. He did the kind of experiment that would wrap up a subject, complete the evidence, set the record straight. His first project was typical: jointly with Alexander von Muralt, who was a visiting fellow at Harvard, he set out to apply the exotic method of flow birefringence to the study of muscles [3]. In this technique one measures the tendency of particles in a flowing solution to orient themselves in the direction of the lines of flow, a tendency most pronounced for highly asymmetric (rod-shaped) particles. Edsall and von Muralt were able to show that the protein 'myosin', extracted from muscle, retained in solution the rod-like characteristic that the active contracting protein must surely have had in muscle itself – a clear indication that the mechanism of muscle contraction could eventually be explained on a molecular basis. (Of course, Edsall's 'myosin' cannot be equated with the protein we now call 'myosin'. It was not until after 1940 that the mixture of proteins in muscle cells began to be properly disentangled.)

In another early project Edsall used Raman spectroscopy (less than 10 years after Raman's initial report) to demon-

strate that amino acids in neutral solution are zwitterions – dipolar entities, simultaneously bearing positive and negative charges [4]. This fact and its obvious extension to proteins had been long disputed and, by some, only reluctantly accepted.

During the second half of his 'century', John Edsall has devoted most of his energies to public service. He was one of the founders of *Advances in Protein Chemistry* in 1944; he served as editor-in-chief of the *Journal of Biological Chemistry* from 1958 to 1968. His role at the interface between science and the public interest (some of it more narrowly between science and government) has been particularly significant.

Edsall is remembered especially for his courage and leadership during the fearful McCarthy era of the 1950s. Virtually unique among his colleagues, he spoke out publicly in a letter to *Science* [5]. He denounced intimidation on the basis of unfounded accusations that were not connected to scientific competence and that had in some cases led to revocation of research grants. He resolved that "I shall neither ask for nor accept funds from any Government Agency that denies support to others [on this basis]". And he did as he promised, returning the unexpended balance of his NIH grant to the agency.

In a similar vein, Edsall became an active participant in the case of supposed scientific fraud that involved the laboratory of David Baltimore in the early 1990s and testified in favor of the whistle-blower, Margot O'Toole, before the congressional subcommittee that investigated the matter. He wrote personal letters to Washington officials on the subject and published letters expressing his own strong personal views regarding ethics and scientific responsibility in *The Scientist* and in *Ethics and Behavior* [6].

Throughout his career – though often speaking for all of us – John Edsall has had only a single academic allegiance, always a member of one of the Harvard faculties. He was a tutor in biochemical sciences at Harvard College from 1928 to 1968, and chairman of the Board of Tutors from 1931 to 1957. He faithfully attended College functions: an enterprising photographer took his picture at Commencement in 1999, eagerly waiting to join the procession in a wheelchair, with a placard attached to proclaim him a member of the class of 1923 [7].

## References

- [1] Fruton, J.S. (1985) *Proc. Am. Phil. Soc.* 129, 313–370.
- [2] Cohn, E.J. and Edsall, J.T. (1943) *Proteins, Amino Acids and Peptides as Ions and Dipolar Ions*, Reinhold, New York.
- [3] von Muralt, A. and Edsall, J.T. (1930) *J. Biol. Chem.* 89, 315–350; 351–386.
- [4] Edsall, J.T. (1937) *J. Chem. Phys.* 5, 225–237, 508–517.
- [5] Edsall, J.T. (1955) *Science* 121, 615–619.
- [6] Edsall, J.T. (1994) *Ethics Behav.* 4, 239–247.
- [7] *Harvard Magazine* (1999) 101, no. 5.

E-mail address: candj@dial.pipex.com (C. Tanford).

Edsall, John, b. 1788; P., J. D., editor. Publication date. 1831. Publisher. Catskill [N.Y.] : Published for the author. Collection. bostonpubliclibrary; americana. Editor's preface signed: J. D. P. Includes an account of Edsall's experiences as a member of General Miranda's expedition of 1806 and as a sailor in the War of 1812. Addeddate. 2011-12-21 16:50:50. Call number. 39999055369555. Camera. Canon 5D. Edrich's hundredth hundred arrived in 1977 while batting against Derbyshire, a couple of weeks before Geoff Boycott reached the milestone in the more glamorous setting of an Ashes Test. Very sad news today to wake up on Christmas Day and to be told that John Edrich has passed away !! John's cousin Bill Edrich was one of the Middlesex twins who with Denis Compton brought joy and thousands of runs to Lord's in the immediate post-War years. Quite a character was Bill. John Edrich was my favourite cricketer growing up. The similarity of our names was one reason and another was that my first copy of Wisden - cricket's annual "bible" - was the 1960 edition costing 6d (two-and-a-half pence) in a jumble sale. It reported the 1959 summer when Edrich piled on the runs. Most read in Cricket. by John T. Edsall. Other editions. Want to Read saving? We'd love your help. Let us know what's wrong with this preview of The Origins of Modern Biochemistry by John T. Edsall. Problem: It's the wrong book It's the wrong edition Other.