obituary

Dorothy Wrinch was born in Rosario, Argentina, on September 13, 1894 and died very recently on February 17, 1976 at Falmouth Hospital (Massachussetts). She was a brilliant and controversial figure who played a part in the beginnings of much of present research in molecular biology.

Her father was Hugh Edward Hart Wrinch, an engineer, and her mother, Ada Soutar. She was educated at Surbiton High School and won a scholarship to Girton College, Cambridge, where she read mathematics—she was a Wrangler in 1916—and moral sciences. She was appointed to a lectureship in pure mathematics at University College, London, in 1918 and became the first woman ever to receive a D.Sc. from Oxford (1929). In the early 1920s she was one of a brilliant circle of mathematicians and physicists; among her friends were Dora Black and Bertrand Russell, whom she introduced to each other. In 1922, she married John William Nicholson, FRS, then a fellow of Balliol College, Oxford, and well known for his work on atomic structure. The marriage became more and more unhappy as his mental state deteriorated; it was finally dissolved in 1937 leaving Dorothy with one daughter, Pamela. From 1922 until 1939 Dorothy Wrinch lived mainly in Oxford, holding various research fellowships and a lectureship and tutorship in mathematics at Lady Margaret Hall and Somerville College. In 1939 she took Pamela to America where she met and married, very happily, Otto Glaser, Professor of Biology at Amherst, and spent the rest of her life in the USA, holding appointments in mathematics and physics at Amherst, Smith and Mount Holyoake until she retired to Woods Hole, which she greatly loved.

Until 1932, Dorothy Wrinch's research work was all in the field of pure mathematics, particularly classical analysis. In 1930, she turned towards biology and set herself seriously to study the facts of elementary biology and chemistry by attending courses in Vienna and Paris during her sabbatical terms. She then began to seek for mathematical solutions to the problems she found, particularly of the structure of chromosomes, including nucleic acids and proteins. It was the properties of protein films that first suggested to her that peptide chains should be polymerised into sheets, by links between CO and NH groups to which she gave the name 'cyclol'. Folding the sheets then gave her a beautiful series of closed octahedra and other solid figures, built of definite numbers, n, of amino acid residues; one series has the general formula $72n^2$. These provided an attractive explanation of many recent observations on proteins, for example, the limited number of sizes of protein molecules found by Svedberg's early ultracentrifuge measurements. When Bergmann and Niemann in 1937 deduced from chemical analysis that egg albumin had 288 residues in the molecule, the exact number required for the second member of the above series, 72×2^2, Dorothy Wrinch felt her hypothesis had been strikingly verified. The coincidence was extraordinary. Her infectious enthusiasm carried many with her: almost all the participants of the first Cold Spring Harbour Symposium on proteins in 1938 and, most notably, Irving Langmuir. Her explanation of the first X-ray evidence on the structure of insulin positively encouraged others to take up the study of protein crystal structures, W. L. Bragg and David Harker among them. (Bragg used her version of the insulin Patterson maps as one of the illustrations in his last book.)

Gradually and relentlessly, after the war, chemical and crystallographic work proved that protein molecules did not have the cyclol structure. Yet many of Dorothy Wrinch's geometrical instincts and deductions were, in general terms, correct. The structures of protein molecules are *not* based on simple parallel arrays of peptide chains, yet the packing of molecules within the insulin unit cell *is* octahedral in character, there are patterns of close packed units over closed surfaces in many spherical viruses, even the 'cyclol' link itself sometimes exists, for example in the ergot alkaloids. This pleased her—she found it very hard to give up the cyclol theory as a whole. She maintained to the end of her life a strong interest in crystallography and in biology; the book she wrote at the request of her crystallographer friends on *Fourier Transforms and Structure Factors* is still very useful. And in old age she came again to Oxford to talk over the structure of insulin.

I like to think of her as she was when first I knew her, gay, enthusiastic and adventurous, courageous in the face of much misfortune, and very kind. **Dorothy Crowfoot Hodgkin**

Dorothy Wrinch's early work was in pure mathematics, with occasional excursions into philosophy. She helped with the proofs of the 1920 edition of Whittaker and Watson's *Modern Analysis*. She wrote papers on mathematical logic in the tradition of Whitehead and Russell and, in the early 1920s, a number of papers on hypergeometric functions and problems in classical mechanics. She and I published four joint papers in the Philosophical Magazine on the theory of scientific method. I should like to put on record my appreciation of the substantial contribution she made to this work, which is the basis of all my later work on scientific inference.

We also had a joint paper on the seismic waves from the Oppau explosion of 1922, which was the first co-ordination of seismic data with the structure of the upper layers inferred from geological evidence by Suess.

Harold Jeffreys

Reports and publications

United States Department of the Interior: Geological Survey. Bulletin 1395-C: Stratigraphic Nomenclature of the Thirtynine Mile Volcanic Field, Central Colorado. By Rudy C. Epis and Charles E. Chapin. Pp. iii+23. (Washington, DC: Government Printing Office, 1974.) 50 cents. [191

Airports and the Environment. Pp. 290. (Paris: OECD; London: HMSO, 1975.) 40 francs; £4.40; $10. [191

Twenty-third Annual Report of the Australian Atomic Energy Commission, 1974/1975. Pp. 132. (Coogee, NSW: Australian Atomic Energy Commission, 1975.) [191

Selected References on Geodynamics for the Brazilian Territory, 1964 to 1974. (Geodynamics Project.) Pp. 131. (Sao Paulo, Brazil: Instituto Astronomico e Geofisico, The University, 1975.) [201

La Determination Pratique de l'Evaporation: Application a l'Afrique Centrale. Par C. Riou. (Collection Mémoires de l'ORSTOM, No. 80.) Pp. 236. 110 francs. Evaluation de l'Ecoulement Annuel dans le Sahel Tropical Africain. Par J. A. Rodier. (Travaux et Documentd de l'ORSTOM, No. 46.) Pp. 121. 44 francs. (Bondy et Paris: Office de la Recherche Scientifique et Technique Outre-Mer, ORSTOM, 1975.) [201

United States Department of the Interior: Geological Survey. Professional Paper 873: Cambrian and Ordovician Rocks of Southern Arizona and New Mexico and Westernmost Texas. By Philip T. Hayes. Pp. iv+98+plate 1. (Washington, DC: Government Printing Office, 1975.) [201

World Health Organization. WHO Food Additives Series, No. 8: Toxicological Evaluation of Some Food Colours, Thickening Agents, and Certain Other Substances. Pp. 89. (Geneva: WHO; London: HMSO, 1975.) Sw. fr. 12. [211

The Walter and Eliza Hall Institute of Medical Research Annual Review, 1974/1975. Pp. 168. (Melbourne: The Walter and Eliza Hall Institute of Medical Research, Royal Melbourne Hospital, 1975.) [211

Smithsonian Contributions to Zoology, No. 211: Revision of the Stonefly Family Nemouridae (Plecoptera): a Study of the World Fauna at the Generic Level. By Richard W. Baumann. Pp. iii+74. (Washington, DC: Smithsonian Institution Press, 1975. For sale by US Government Printing Office.) [211