

Obituary

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Dr John Alexander Fraser Roberts, CBE, FRS, MA, DSc, MD, FRCP, FRCPsych



Dr Fraser Roberts, formerly the director of the Medical Research Council's Clinical Genetics Research Unit at the Institute of Child Health, died suddenly but peacefully at the age of 87 on 15 January 1987. Beyond his wide circle of friends and colleagues, there are many more who knew him through his textbook *An Introduction to Medical Genetics*. This was first published in 1940, was the only book devoted specifically to medical genetics for many years, and as such made a very significant contribution to the development of medical genetics in Britain and elsewhere. Half a century ago he faced a situation all too familiar to those of us teaching the subject: "It is to be feared that many medical men and many senior students are acquainted with vague generalities only, or are equipped with a somewhat uncertain knowledge of Mendelian laws which they would find it difficult to apply with confidence." (This short quote captures well the measured, rather discursive style of his book.) Like several of his contemporaries, R A Fisher, J B S Haldane, and L S Penrose, Dr Fraser Roberts was interested in applying genetic analysis

to both normal human variation and disease states but perhaps his greatest achievements were in establishing the foundations of genetic counselling as we know it today, and in helping to elucidate the genetic contribution to common diseases.

Dr Fraser Roberts did not go straight into medicine. He was educated at Denbigh Grammar School and by private tuition, and read biology at Gonville and Caius College, Cambridge. Then perhaps in response to his family's interests in agriculture, he went to the Institute of Animal Genetics in the University of Edinburgh. There he identified several genes controlling coat colour and patterns in sheep, obtained a DSc, and then in 1928 took up the post of biologist to the wool industry's research association. However, he became increasingly interested in human genetics, particularly the genetics of mental handicap, and joined the Burden Mental Research Trust's department at Stoke Park Hospital, Bristol, when it opened in 1933, later becoming its director. In addition to conducting several large scale studies on genetic and other influences on intelligence, he became concerned with promoting the practical application of recent advances in genetics to medicine. He returned to Edinburgh University, obtaining his medical degree in 1936, but was already planning his book as explained in the preface of his second edition (1959). "The plan for the first edition of this book began to take shape one evening during the summer of 1935. My friend Dr Duncan Duthie, then a medical student in his final year, had said: 'I wish you would explain this genetics business to me'. He reminded him briefly of the essentials of chromosome behaviour, and then with the aid of chromosome diagrams, rough, but otherwise just like those of the book, took him through the transmission of dominant, recessive and sex linked abnormalities. It took less than an hour, but at the end of that time he was kind enough to say that for the first time he understood. So was developed a short course of lectures for medical students, and, shortly afterwards, the book. It seemed to me that neglect of established principles of medical teaching had been largely responsible for the failure to assimilate and use genetic advances. A textbook of genetics is no more a substitute for one on medical genetics than is a textbook of physiology a substitute for one on medicine."

His first edition already contained a section on 'The attitude of the patient to hereditary abnormality and disease' and in this he stressed the role of genetic counselling in dispelling unfounded fears as well as explaining genetic risks. It was after the second world war, during which he served as Surgeon-Commander in the RNVR and as Consultant in Medical Statistics, that he had the opportunity to consolidate his interest in genetic counselling. He had been appointed Lecturer in Medical Genetics at the London School of Hygiene and Tropical Medicine as well as Consultant in Medical Genetics at the Royal Eastern Counties Hospital, Colchester, where he continued his research on mental handicap. It was also at this time that Professor Moncrieff asked Dr Fraser Roberts to set up a clinic for genetic advice at The Hospital for Sick Children, Great Ormond Street, believing that paediatrics should embrace the welfare of the unborn child, and, furthermore, the welfare of the prospective child. Thus was born the first genetic clinic in Europe; genetic counselling was no longer to be left solely to the clinicians involved in patient care, and a referral structure had been created for anxious relatives who were seeking genetic rather than medical advice. This link with The Hospital for Sick Children and later its medical school, the Institute of Child Health, University of London, was to lead to important family studies to elucidate the genetic factors in congenital malformations, and the decision in 1957 by the Medical Research Council to create a research unit in clinical genetics with Dr Fraser Roberts as the first director.

In 30 years the focus of his work had changed from animal to human to medical to clinical genetics. In the last chapter of the 1959 edition of his book he spells out, almost exactly, the components of modern genetic counselling. The sections included: Psychological Factors, Patients Accept Advice in Terms of Odds, Answers in Terms of Odds Demand Yardsticks, Complete Reassurance is Unwise, Diagnosis, The Family History, The Background of the Literature, Alternative Modes of Transmission, and Empirical Chances. You will find there the principles of the composite risk as used, for example, in congenital deafness. "The birth of two deaf mute children to a normal couple leaves little doubt that a recessive gene is responsible. Should a single child only be affected, the chance that the condition is non-hereditary is something between 1/4 and 1/2, though probably nearer the former figure. The likelihood of any subsequent child being affected can therefore be estimated roughly as between $\frac{3}{4} \times \frac{1}{4}$ and $\frac{1}{2} \times \frac{1}{4}$, that is, $\frac{3}{16}$ to $\frac{1}{8}$. Chances for affected persons who marry affected or normals are probably best

assessed empirically from the results of recent excellent surveys."

On the research side, Dr Fraser Roberts had a particular interest in multifactorial causation and the elucidation of genetic influences in common diseases. In 1953 to 1954 he, with Aird and other colleagues, provided the first conclusive evidence of associations between ABO blood groups and adult onset diseases. They showed that persons who are group A are 20% more liable to cancer of the stomach than those of other groups, and group O people about 40% more liable to duodenal ulcer than those of other groups. John saw the results of this pioneering work as evidence that there did exist genes of small effect as regards a particular multifactorial disease—the theoretical polygene of polygenic inheritance. Blood group O and non-secretor status (the work of Clarke and colleagues) contributed to, but did not account for more than a small fraction of, the tendency of brothers to resemble each other in respect of duodenal ulceration. Those who completely dismiss these low relative risk factors, concentrating on genes of large effect (like group I pepsinogens), have missed the point that John was making. He probably would have been disappointed if he had only discovered genes of large effect! It was not that he did not recognise the very real practical and theoretical importance of genes of major effect, it was that proof of minor influences requires the most careful dispassionate genetic and statistical analysis of a large amount of reliable data. At this he was the master and leading clinical researchers sought his collaboration.

Not surprisingly, he became involved in the lively battle between the camps of Sir George Pickering and Sir Robert Platt on the type of hereditary influence in high arterial blood pressure. For someone who was still at school when the Oldham *et al* (1960) paper came out in the *Lancet*, it is a thrill to go back and read it. It starts "Recent correspondence in this journal has shown that opinion is divided between two views of the nature of essential hypertension". Eight pages, seven figures, and eight detailed tables later, the discussion starts "Having thus examined the evidence that essential hypertension is the manifestation of a single dominant gene, we find it wanting".

His formidable intellectual and analytical abilities were, however, matched by a quiet and friendly disposition. He was one of the most gentle mannered people I have met. He lived to see many of the hopes he expressed in his early works come to fruition. In 1940 he wrote "There is every hope that substantial advance will not be long delayed, so as regards this aspect of the problem, human chromo-

some maps are not merely a Utopian dream but a reasonable prediction for the relatively near future”, and in respect to common diseases he argued “A recognition of the existence and importance of varying grades of susceptibility could not fail to be helpful in research and treatment. Preventive measures cannot fail to gain effectiveness when they are aimed at people who need them instead of indiscriminately at the whole population”. John had a way of having the last word. With the help of others, I arranged a surprise 80th birthday cake for him at a Clinical Genetics Society meeting. In thanking everyone present, John went on to apologise for not being able to stay for the second day of the meeting as he had a genetic clinic in Taunton. Much of the audience was stunned. Some may not have been aware that he took up his appointment at Guy’s Hospital when most people are retiring altogether. He was appointed as geneticist to the Paediatric Research Unit in 1964. This gave him the opportunity and laboratory

support to plan genetic counselling services on a Regional basis and contribute to epidemiological studies, such as the incidence of chromosomal abnormalities in a defined population. He also continued a follow up study of his genetic clinic.

Dr Fraser Roberts was honoured in many ways. He was appointed CBE in 1965. He was elected Fellow of the Royal Society in 1963 and was Fellow of both the Royal College of Physicians and the Royal College of Psychiatrists. He was President of the Royal Anthropological Institute of Great Britain and Ireland (1957 to 1959), the Biometric Society—British Region (1960 to 1962), and the Section of Epidemiology and Preventive Medicine of the Royal Society of Medicine (1960 to 1962).

John leaves two daughters by his first wife, Doris Hare. In 1975 he married Margaret Ralph who had assisted him in all aspects of his work since 1948. She was with him when he died.

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