

JAMES DUNCAN ROBERTSON
BSc, PhD, ScD, FIBiol

James Duncan Robertson was born in Glasgow on 16 January 1912, the son of James Robertson, a local Headmaster and Phemie Helen Hunter Muir, a school teacher. He was the eldest of four children who included two brothers and a sister. On 18 June 1947, he married Isobel Mary ('Elma') Lamont Leitch, a geographer whom he met while both were lecturers at Glasgow University. Known to his family as Jim, James was affectionately and almost universally known to his colleagues as 'J D'.

On his father's side, he was descended from Shetland merchants and fishing folk, on his mother's side from Ayrshire farmers. From annual holidays in Shetland, he developed interests in the sea and the life it contains, in islands and in birds. He attended Rutherglen Academy, Glasgow, from 1917 to 1924 in the Junior Section and from 1924 to 1929 in the Secondary School, emerging as Dux medallist in 1929.

The same year he entered Glasgow University and studied for the BSc Honours degree in Zoology under Professor (later Sir) John Graham Kerr. He graduated in 1933 and spent a further two years as Robert Donaldson Scholar in the Zoology Department. During this time, he forged friendships which enabled him to indulge his passion for islands as a member of the student Canna Expeditions of 1936 and 1937. These expeditions numbered several future eminent medical entomologists among the participants, notably Alexander Haddow (later Administrative Dean of the Faculty of Medicine, Glasgow University), and Douglas Bertram and Russell Lumsden (later professors at the London School of Hygiene and Tropical Medicine). J D, however, concentrated on freshwater life and oligochaete worms.

From Glasgow he moved to Cambridge University where he held a Carnegie Scholarship and graduated PhD in 1937. He continued as a Carnegie Research Fellow for a further year in Cambridge, before returning to Glasgow University as Assistant (Lecturer) to Edward Hindle, who had replaced Graham Kerr as Regius Professor of Zoology. J D remained here until 1941, when he left for war service in the Royal Army Medical Corps. From 1941 to 1944 he was stationed in West Africa, from 1944-45 in Italy and from 1945-46 in India. He was commissioned in 1943, became Captain in 1944 and Major in 1945. After returning to Glasgow in 1946 as Lecturer under Professor (later Sir) Maurice Yonge, he was promoted to Senior Lecturer in 1952, Reader in 1962 and Titular Professor in 1964. He was awarded the Cambridge ScD in 1962.

J D Robertson was a distinguished animal physiologist whose interests centred around problems of ionic and osmotic regulation in invertebrates and lower vertebrates. He was elected FRSE in 1952. Under Graham Kerr (who was a keen microscopist) he was encouraged to study the calciferous glands of earthworms, using histological techniques, but on moving to Cambridge his approach changed. There Sir James Gray had set up a renowned school of experimental biology which contrasted markedly with the 'dynastic' school of zoology based on comparative anatomy and embryology, to which Graham Kerr belonged. J D came under the influence of C F A Pantin and J A Ramsay who had an interest in the composition of body fluids. Pantin had lambasted the romantic notion of A B Macallum that blood is essentially an evolutionary descendant of sea water and that the concentration of salts in the blood of animals represented the amounts present in the aquatic environment when the group evolved in remote geological times. J D's work was to add further disproof by showing that environmental factors exert physiological constraints on aquatic animals and that departures from environmental concentrations in the blood of invertebrates and aquatic vertebrates are adaptive to these constraints.

While in Cambridge he collaborated with David A Webb, future Professor of Botany at Trinity College, Dublin, in developing methods for the microestimation of inorganic ions in sea water and in the body fluids of invertebrates. These methods were to stand him in good stead for the rest of his scientific career. Calcium ions were his particular favourite, and he chose well - the role of calcium ions as messengers in the cell is now one of contemporary biology's obsessions.

After returning from Cambridge to Glasgow as a member of the teaching staff, J D introduced Cambridge comparative physiology to the Zoology Department there. He managed to complete an important contribution to *Biological Reviews* on 'The function and metabolism of calcium in the Invertebrata' before being called up into the armed forces. Back in Glasgow after the War, he found Professor C M Yonge sympathetic to the disruption of his physiological research and happy for him to take two years leave from teaching duties. This period he spent working on ionic regulation in invertebrates at the Millport Marine Station, the Plymouth Laboratory and the Stazione Zoologica in Naples.

In the 1950s and 1960s, his interests expanded to include the lower chordates - tunicates, cyclostomes and fishes. He continued Graham Kerr's involvement with the question of conquest of the land by early vertebrates, and the debate over whether vertebrates originated in a marine or a freshwater environment. He also became more interested in muscle and published reviews on ionic regulation and osmoregulation in crustaceans and molluscs. His work embraced some bizarre and exotic animals. He had a particular fondness for the jawless hagfish, *Myxine glutinosa*, which feeds on dead or dying fishes, burrowing into them with its rasping tongue. If dropped into a two-gallon bucket of water, the hagfish will convert it to slime in a few seconds; it is therefore not the easiest of animals to work with! Other survivors of bygone eras whose osmotic and ionic constituents J D took an interest in were the horseshoe crab (*Limulus polyphemus*) and the coelacanth fish (*Latimeria columnae*). The discovery of living coelacanths in the waters around the Comoros Islands off Madagascar in the 1950s resurrected an ancient lineage of fishes believed to have died out 64 million years ago. In the academic year 1977-78, J D was able to spend a sabbatical working at marine stations in Drøbak (Norway) and Roscoff (France).

On physiological grounds, J D argued for a marine origin of the vertebrates and in doing so his views came into conflict with those of the eminent American palaeontologist, A S Romer, who in the 1950s had postulated a freshwater origin. In particular from his work on the hagfish and on elasmobranchs (sharks and rays) J D rejected the view that the glomerular kidney (which we ourselves inherited!) was a freshwater adaptation that arose in some protovertebrate. His now widely accepted conclusions on these matters were the subject of a masterly review presented to the Society in 1989. After his official retirement in 1982, he continued to work in the Zoology Department as Senior Research Fellow for the rest of his life.

During war service in the RAMC, J D also managed to be involved in research - but of a different kind. The influence of his Canna expedition colleagues lingered on and he became a medical entomologist with the Malaria Field Laboratory. His studies on mosquito-borne disease resulted in a paper on the *Plasmodium* gametocyte threshold for infection of *Anopheles* mosquitoes but a vast amount of survey work undertaken in collaboration with W H R Lumsden was never published; a copy of their 1945 document on *Malaria in Malaya* has been deposited in the Glasgow University Archive. J D retained a lively interest in malaria for the rest of his days, regularly attending research seminars on the subject in a University Department which became noted for parasitology.

In addition to his research work, J D was responsible for undergraduate teaching in general zoology and was for many years in charge of the Higher Ordinary (Second Year) class, as well as advanced classes in comparative physiology. In 1965 a new laboratory was completed on the roof of the Department Museum to accommodate his expanding physiology interests. A long line of postgraduate students gained higher degrees under his supervision.

On more than one occasion, J D took charge of the Glasgow Zoology Department during Professor C M Yonge's absence on sabbatical leave and he was called upon to do so again in the interregnum between Yonge's resignation in 1964 and the appointment of David Newth to the Regius Chair in 1965. He served as External Examiner in Zoology in the Universities of Nottingham, Leicester and Newcastle and in Medical Biology in the University of Aberdeen. In 1966 he was instructor on the renowned Marine Invertebrate Course at the Woods Hole Marine Laboratory, Massachusetts.

J D was fortunate enough to be an academic in times before university committees proliferated, as he did not relish them. He served on several occasions, however, on the Council of the Scottish Marine Biological Association (now the Scottish Association for Marine Science) and was Treasurer in their expansionist period when the laboratory moved from Millport on the Clyde to Dunstaffnage near Oban. For many years he was on the management board of Calderpark Zoo. He served on the Council of the Royal Society of Edinburgh from 1964 to 1969, becoming Vice-President from 1967 to 1969.

Outside the laboratory J D was a keen angler. He particularly enjoyed fishing for sea trout in the West Loch at Tarbert, close to his wife's family home and for salmon in the nearby River Add. He was a founder member of the University Angling Club and regularly joined them at Carbeth Loch which he had helped to restock. He was an accomplished pianist who enjoyed entertaining family and friends, especially with popular music from the 1930s and 1940s. He had a most astonishing musical memory; he could return from a Ginger Rogers/Fred Astaire film with all the tunes in his head and sit at the piano playing them for hours. He was a member of the Royal Philosophical Society of Glasgow, the Glasgow Natural History Society and the Scottish Ornithologists' Club. He was also a member of the Church of Scotland and a regular churchgoer, latterly at South Church, Bearsden.

On 22 December 1993, James died suddenly while Christmas shopping in Glasgow. Sadly Elma had passed away before him in the summer of 1986. They are survived by their two daughters, who carry on the scientific tradition. Ailsa, the elder, became a statistician, and Norna a research physicist. After Elma's death, J D derived much pleasure from the company of his daughters and grandchildren on their annual holiday in Shetland.

There are few people about whom no one speaks ill, but J D was undoubtedly one of these. The Scottish word 'douce' (sober, gentle, sedate) admirably sums up his character. His even temper, sympathetic ear and quiet sense of humour endeared him to us all. When in 1982 he announced his retiral at the age of 70, it came as a surprise to many to learn that he had reached retirement age. His activity and youthful appearance belied his years. He was able to carry on doing what he had always loved doing until the end. How we envy him.

I warmly thank Dr Norna Robertson, Professor Russell Lumsden, Dr Kenneth Lockey and my colleagues in the Zoology Department at Glasgow University for their recollections and help in compiling this notice.

KEITH VICKERMAN