

AGNES ELEANORA MILLER  
MA, PhD(Glas)

Agnes Eleanora Miller, known to friends and family as Nora, was born on 7 September 1898 at Dunipace, Stirlingshire. She was the eldest child of the Reverend William Douglas Miller and his wife Agnes Cameron Adam, a pupil of Sir Hubert Parry and a fine soprano singer and pianist. At the age of seven Nora moved with her parents and younger twin brothers, Burnet and Ted, to 57 Kirklee Road in Glasgow's West End. This was to be her home for over 50 years. Her brother Ian and sister Betty were born several years after the move.

Educated initially at Westbourne School for girls (1905-15) she then spent a year at Skerry's College before entering Glasgow University intending to study medicine. There she quickly came under the spell of Sir John Graham Kerr, FRS, Regius Professor of Zoology and later MP for the Scottish Universities. He was to remain her inspiration for the rest of her days. He instilled in her a love of comparative anatomy - then (as it was for much of the first half of this century) the principal preoccupation of University Departments of Zoology. She abandoned her plans for a medical career and graduated MA in 1920. Sir John invited her to become a demonstrator in the Department of Zoology and in 1924 she was appointed Assistant Lecturer, shortly after the historic move of the Department (and the Zoology component of the Hunterian Museum) from the Gilbert Scott Building to a new and purpose-designed building of its own. She was promoted to Lecturer in 1929.

In her research work, Miss Miller followed closely the interests of her mentor, Professor Graham Kerr, and so was concerned with the development of archaic vertebrates, and principally the lungfishes and sharks. Graham Kerr had brought with him to Glasgow from Cambridge a wealth of lungfish specimens collected on his expedition to the Gran Chaco of South America. Her early studies were on the erratic cleavage of the egg of the South American lungfish, *Lepidosiren paradoxa*, using some of this material. She later turned to problems of homology, starting with the vertebral column of the lungfish, and interpretation of the cartilaginous blocks present in the tail in relation to the centra of more conventional vertebrates. She concluded that the blocks were vestiges of an earlier segmented condition of the whole vertebral column. She went on to argue that *Palaeospondylus* - a fossil fish which had proved a long standing enigma since its discovery in the Achanarras Quarry near Thurso - was a larval lungfish, a conclusion boldly at variance with that of the palaeontologists.

After a long interval, she returned to archaic fish with a study of the evolutionary origin of paired fins in the sharks (selachians). She produced evidence that the pectoral fins of the actively swimming spiny dogfish (*Acanthias vulgaris*) showed vestiges of the clumsy paddle-like archipterygial fin as exemplified by the Australian lungfish *Neoceratodus*. The evolutionary relationship of the lungfish to the bony fishes and sharks is still being debated today.

Interspersed with her work on fishes, Miss Miller also studied the comparative anatomy and development of birds. Both her forays into this field were in collaboration with others. With Dr G H Edington she investigated the curious quill knobs that attach the secondary flight feathers to the ulna in some birds. For her colleague Dr Charles Parsons she completed after his death an account of the embryology of the curious South American hoatzin (*Opisthocomus hoazin*) which has enlarged the crop to accommodate a herbivorous diet and reduced the sternum and flight muscles accordingly. Its other interesting feature is that it has retained claws on two digits of the wing. Despite these aberrations its embryology proved surprising similar to that of the domestic fowl. Miss Miller was elected a Fellow of the Royal Society of Edinburgh in 1954.

Whereas nowadays the PhD degree is regarded as a rite of passage for the novice into a research career, in Miss Miller's case she left the submission of her PhD thesis (1962) until the brink of her retirement. Graham Kerr (like many of his contemporaries) was contemptuous of the degree and it was Lady Graham Kerr who persuaded Miss Miller to complete it. In the thesis entitled *Studies in Dipnoan Structure* she took issue with the German anatomist Professor H Held, an authority on the development of the axial skeleton in vertebrates, over the origin of the notochord sheaths. Held maintained that the sheaths resulted from reinforcement of connective tissue by outgrowths from the cells of the muscle blocks. Miss Miller exploited the slow-motion formation of the sheaths in *Lepidosiren* to show that the sheaths develop from the notochord itself. Her thesis contains a defiant gummed-in note refuting the influential opinion of J A Moy-Thomas (the pontiff of palaeoichthyology) that the archipterygium does not represent the primitive pectoral fin, and supporting the contrary view of Graham Kerr that the archipterygium developed primitively from a gill arch in the ancestral vertebrate.

It was as a teacher, first and foremost, however, that Miss Miller will be remembered. All students who were taught by her, all colleagues who taught her, have vivid recollections of her style. Her clarity of speech and construction coupled with her eye for relevant detail, her enthusiasm and above all her commanding presence ensured rapt attention on the part of her audience. After retirement from her lectureship at Glasgow University, she taught for a further four and a half years at Paisley College (now Paisley University) with equally fond reception.

She then spent a year in Australia, visiting family there and touring the marine stations. Many of the directors of these stations were her former pupils. She adored travel. In 1929 she had visited South Africa for the British Association Meeting there. In 1934 and 1935 she had worked at marine stations in Bermuda and Naples respectively. She became a keen diver (with helmet and weights!) and made one of the first underwater films in colour. She also visited Palestine in 1938. These travels brought her into contact with a surprising variety of people and she numbered among her friends Lord Rutherford, General Smuts and the anthropologist Margaret Murray. Unfortunately she did not manage to travel to South America to see the exotic objects of her scientific study in the wild and collect her own material. Absence from Glasgow was limited because both she and her sister Betty, a busy concert pianist, lovingly devoted 30 years to nursing their invalid mother.

Nora had many interests and talents. She was well-read and a competent linguist. She inherited musical talents from her mother; she had a beautiful singing voice, was an accomplished pianist and no mean organist. She was for many years a governor of the Royal Scottish Academy of Music and Drama. Many members of her family were ministers and the church was central to her life. At the Union of the United Free Church of Scotland and the Church of Scotland she staunchly continued her father's work in defence of Free Church principles and she became the central driving force of the Miller Memorial Church that sprang up among the red sandstone tenements of Maryhill and later moved to Drumchapel.

After her retreat in 1963, Nora and her sister, Mrs Betty Gordon, moved to Crieff. Her last two years were spent in a nursing home. Nora passed away on 23 March 1994 in her 96th year. She will be remembered with respect and affection by her family and by countless generations of medical, science and arts students who had the pleasure of being taught by her.

I am indebted to Mrs Betty Gordon, the Reverend David Miller and numerous colleagues for their reminiscences and help in writing this notice.