



Obituary: Sir Roger Bannister (1929–2018)

Sir Roger Bannister died on March 3, 2018, at the age of 88. For most, it is for his iconic achievement of 1954, running the first sub-four minute mile, that he will be remembered. Even today, it is impossible to watch footage of that achievement and not be moved by his grace and determination - qualities that he embodied throughout his life. But, as he would often say, it was his scientific work that made him proudest, and we, in the autonomic field continue to be the beneficiaries of that work.

He was born in Harrow, on the outskirts of London on 23 March 1929; attended school in Bath and Hampstead, before being accepted on a scholarship to Exeter College, Oxford in 1946. There he studied physiology while participating in university athletics. After graduating, he moved to St Mary's Hospital, London for his clinical studies, where as a medical student, his preparation for the sub-four mile began with "interval training" during lunch breaks and skipped obstetrics lectures.

In 1954, months after his landmark accomplishment, he retired from competitive athletics to devote himself to his medical studies. That same year, he was lead author on two back-to-back manuscripts in the *Journal of Physiology* based on his MSc thesis, one on the carbon dioxide stimulus to breathing in severe exercise (Bannister et al., 1954), and the other, on the effects on exercise performance of adding oxygen to inspired air (Bannister and Cunningham, 1954). This research, begun while a student at Oxford, he would later state was undertaken not because of his athletic interests but because of his academic fascination with the neurological control of respiration - a harbinger of his later career choice.

He completed house-physician and house-surgeon jobs from 1955 to 1957, training under the renowned hypertension expert, Sir George Pickering, after which he undertook national service in 1958. He requested posting to Aden (now Yemen), in part to investigate recent deaths among the military recruits due to heat exhaustion. He used this experience in extreme heat to formulate research studies on thermoregulation carried out in a heat chamber at the London Hospital for Hygiene and Tropical Medicine. In experiments investigating anhidrotic heat exhaustion, which were published in the *Lancet* in 1960 (Bannister, 1960), research subjects were required to sit naked in a climate chamber maintained at 92–95 °F for 3–6 h while receiving intermittent intravenous injections of a pyrogen - a lipopolysaccharide derived from *Salmonella abortus equi*. One of the four research subjects, who in the manuscript were identified by their initials only, had the

initials R.B. He later stated that he (perhaps wisely) "stopped the experiment when his body temperature reached 103°F."

In 1959, he began his training in neurology the National Hospital, Queen Square. He was appointed to the consultant staff at the National Hospital in 1963 and at St. Mary's Hospital in 1964. In 1968, he established a Clinical Autonomic Laboratory - initially "a little larger than a broom cupboard" and equipped with a pediatric tilt-table, salvaged from the radiology department of the neighboring Greater Ormond Street Hospital. This laboratory, possibly the first of its kind, is the model for the many clinical autonomic laboratories that exist throughout the world today.

His work and publications laid the foundations of clinical autonomic neuroscience. We continue to revisit and build on this landmark body of work, some published over 50 years ago, on topics such as the pathophysiology of the disorder we now call pure autonomic failure (then called idiopathic orthostatic hypotension) (Bannister et al., 1967), the treatment of orthostatic hypotension (Bannister et al., 1969), cerebral autoregulation in autonomic failure (Thomas and Bannister, 1980), the pathology of multiple system atrophy (Spokes et al., 1979), denervation supersensitivity in autonomic failure (Bannister et al., 1979), laryngeal abductor paralysis in multiple system atrophy (Bannister et al., 1981), and acute autonomic neuropathy (Hopkins et al., 1974). Topics that even today inform autonomic clinical practice and the autonomic neuroscience research agenda.

He edited the widely read general neurology text book, *Brain's Clinical Neurology*, later called *Brain and Bannister's Clinical Neurology* through several editions, and, of import to all students of the autonomic nervous system, *Autonomic Failure: A textbook of Clinical Disorders of the Autonomic Nervous System*. This text, for decades, the only comprehensive text on the autonomic nervous system, is an essential item for the bookshelves of anyone with more than a passing interest in the autonomic nervous system. Now in its 5th Edition, the book is co-edited by his protégé and long-term collaborator, Professor Emeritus Christopher Mathias.

His dedication to family and community was extensive. He donated half of the royalties from his 1955 biography, *The First Four Minutes*, to the Amateur Athletic Association, considering it improper to benefit financially from his amateur running. He became the first chairman of the Sports Council between 1971 and 1974. While chairman, he spearheaded the introduction of a radio-immunoassay to detect illicit

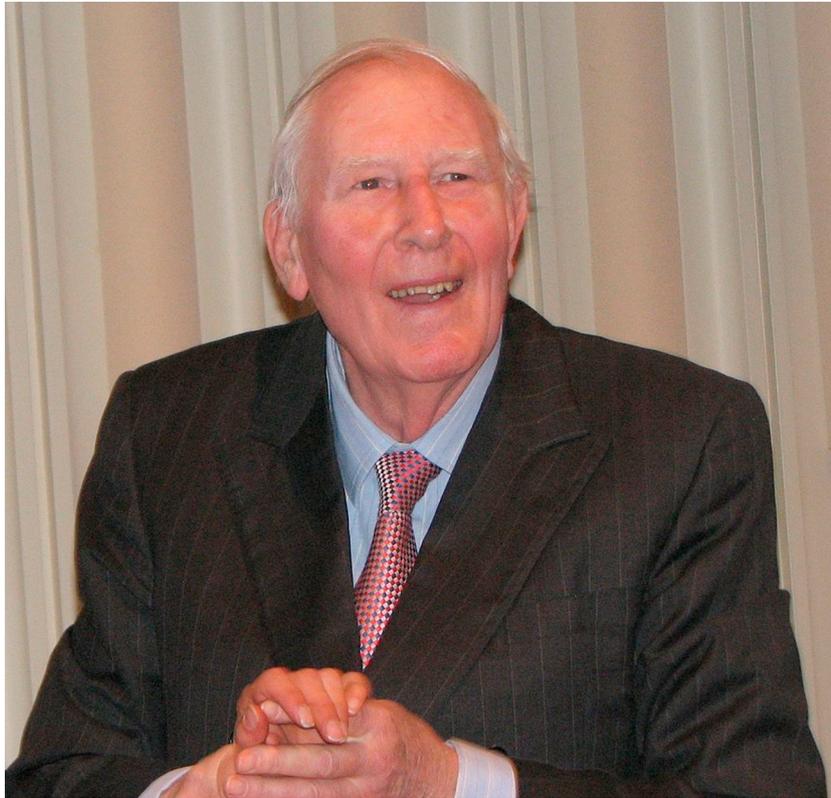
use of anabolic steroids in athletes and led a campaign entitled for Sport for All, a public awareness campaign to encourage exercise. And, in 1985 he returned to Oxford as master of Pembroke College, a position he held until 1993. He was a generous host. All who visited him, whether at the National Hospital or Oxford were touched by his

hospitality, dignity and, above all, modesty.

A reviewer of his autobiography, *Twin Tracks* (Bannister, 2014), wrote in the *Evening Standard*, “one reaches the final page feeling, if anything, even more impressed by Bannister.” Looking back through the pages of his life, we can only echo that sentiment.



Sir Roger Bannister, 1953.



Sir Roger Bannister, 2009.

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