Obituary: Tom Singleton’s legacy

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Tom Singleton’s legacy

Patrick Waterson & David Whitfield

In this short article we survey some of Tom’s work and pick out a few of the recurrent themes stretching back from his earliest work in the 1950s to his retirement in 1982. Further biographical details and observations are available in the article by Mary Edwards in the Festschrift devoted to his research (Ergonomics, 1995, Vol 38, No 3, pp431-436).

Tom Singleton was one of the key figures in the development of applied psychology and ergonomics in the UK following the Second World War. His long career involved periods both working in industry and academia as Professor of Applied Psychology at Aston (1965-1982). Within the Ergonomics Society his chairmanship of committees and involvement in a host of other activities did much to raise the profile of ergonomics within the UK and worldwide. Tom’s contribution to ergonomics encompasses a number of areas including studies of the effects of ageing on skilled performance, training, the nature of human error and, pre-eminently, systems ergonomics.

Tom shared many similarities with the other post-war pioneers of ergonomics (for example Hywel Murrell, Brian Shackel) in that his experience of industrial problems at first hand, and exposure to such figures as Sir Frederic Bartlett and Alan Welford, shaped the nature and course of his later research. Running through much of Singleton’s writing is an emphasis on the uniqueness of ergonomics in bringing together a range of disciplines including anatomy, physiology and psychology. He pointed out that the emphasis within the UK on the biological aspects of ergonomics distinguishes it from its American counterpart, human factors, where engineering and psychology continue to be more dominant sub-disciplines. One of the imperatives for this merging of disciplines was the need to tackle difficult applied problems and develop design solutions. This was often done under considerable time pressure and with limited resources. Early work had been stimulated by the work of the various wartime committees such as the Flying Personnel Research Committee (see The Ergonomist, April 2010), and the approach was translated later into industrial studies. Singleton’s work in this area focused initially on investigations of the skills of sewing machine and lathe operators. The emphasis on the application of research findings in ergonomics was also complemented by the view that design solutions needed to be sensitive to a range of influences cutting across biological and psychological disciplines. The onus on ergonomists was to understand the principles and methods used in these fields, without necessarily having specialist, detailed knowledge. Above all, ergonomics from Singleton’s point of view was a technology to be used, rather than theorising divorced from application:

“...ergonomics must be a technology; an overview of human biological sciences based on problems of man at work makes no sense unless something is actually done about people at work.” (Singleton, Easterby and Whitfield, The Human Operator in Complex Systems, 1967).

A similar theme in Tom’s work was the need to carry out research in naturalistic settings rather than the laboratory. He argued the importance of studying ‘real’ skills such as the use of machinery or more intractable areas such as management skills. The four volumes on The Study of Real Skills, produced in collaboration with others in the 1970s and 80s, complement his earlier work on system design during the 1960s. In both cases there is an emphasis on the need for systematic observation, often based on detailed task analysis, followed by careful analysis using methods and techniques such as decision matrices, flowcharts and methods for function allocation. Whether in the study of skills or system design, the emphasis is on reproducing as faithfully as possible the tasks or process under investigation. His work on systems analysis and the application of the techniques to the design of large-scale systems (e.g. his involvement in the Sizewell B Nuclear Power Station project), has been especially influential and represents one of the success stories of applied ergonomics over the last 30 years in the UK.

Tom’s early work within the shoe industry first alerted him to the need to understand the combined influence of management, technology and human–machine components on work and productivity. Ergonomists needed to be able to understand and apply aspects of wider social and organisational behaviour alongside aspects of traditional
ergonomics such as display and control design:

“...the basic contribution of the ergonomist is to the design of information interfaces [which] extend beyond the man-machine interface ...[and] include the documentation of the design itself, communication within the design team, between designers and suppliers, and between designers and operators.” (The Mind at Work, 1989)

What ergonomics lacked at the time was, as he put it, a ‘philosophy’, to provide an integrated perspective on work design. In a paper in the late 1960s, he describes the discovery of research on systems theory and the systems approach, largely from the USA, as a 'eureka experience'. Here was a theory or set of tools that would equip the ergonomicist to understand and analyse whole systems and organisations. These new ideas were initially greeted with some scepticism within the UK, particularly amongst members of the Ergonomics Research Society. Some members of the Society divided themselves along the lines of supporters of the 'knobs and dials' tradition and those who were perceived as 'systems men'. It is his credit and some testament to the influences of some of his books (e.g. Man–Machine Systems, 1974), that these schisms no longer exist and that systems ergonomics and the systems approach is firmly established within the UK and underpins contemporary ergonomics.

One of us visited Tom at his home in Rothbury in the late 1990s in order to interview him about the development of ergonomics over the years. The impression that came over was of a very sharp mind with an acute sense of the value of ergonomics research, particularly in terms of the potential it could make to the well-being of the individual and of society at large. Tom also felt that ergonomics still had a long way to go, particularly in establishing itself within the wider public and governmental sphere. The day at his house proved to be very informative and useful for the history that was being prepared. Tom's knowledge was impressive and matched only by his charm and modesty. He mentioned some of the influences on his work including the work of Alan Welford, Hywel Murrell, Alphonse Chapanis and Robert Gagné, amongst a number of others. At the same time he wanted to pay tribute to their influence on his intellectual development, particularly when they changed his own way of thinking about a problem. His view was that ergonomics had achieved a great deal in its short history, particularly in embracing the value of the systems approach and moving 'out of the laboratory'. Surely his main legacy is his contribution to establishing systems ergonomics within the UK.

William Thomas Singleton
1924-2010

William Thomas (Tom) Singleton, Emeritus Professor of Applied Psychology, Aston University, died 11 May 2010, aged 86. After wartime service in the RAF, he graduated from St Catherine’s College Cambridge in 1949, and began work in the Nuffield Unit on Ageing. In 1953, he joined the Shoe and Allied Trades Research Association (SATRA) to undertake research and development in operator productivity. He was appointed to a lectureship at the College of Aeronautics (now Cranfield University) in 1961, where he established the Ergonomics and System Design Laboratory, undertaking ergonomics and skills research. In 1965, he took up the newly established chair at Aston, responsible for a range of research in ergonomics and applied psychology, and postgraduate and undergraduate courses. He retired in 1982, but continued academic and advisory work for several more years.

Tom was Lancashire-born, on 3rd March 1924, to parents in the spinning industry, and spent his later retirement years in a very happy family environment in rural Northumberland. He was a dedicated family man, and is survived by Pamela, his wife of 60 years, five children, twelve grandchildren, one great-grandchild, and his sister.

Selected Publications

Deterioration of performance on a short-term perceptual motor task. In WF Floyd and AT Welford (eds), Fatigue. HK Lewis (1953)

The change of movement with age, British Journal of Psychology, 45, 166-172 (1954)

An experimental investigation of sewing-machine skill, British Journal of Psychology, 45, 166-172 (1957)

The training of shoe machinists, Ergonomics, 2, 148-152 (1959)

The Industrial Use of Ergonomics, DSIR Ergonomics In Industry Booklet, HMSO, (1963)


Ergonomics in system design, Ergonomics, 10, 541-548 (1967)


Human Aspects of Safety, Keith Shipton (1976)


Introduction to Ergonomics, WHO (1972)


The Body at Work, Biological Ergonomics, (ed), CUP (1982)

The Mind at Work, Psychological Ergonomics, CUP (1989)