

This Week's Citation Classic®

Marshall W A & Tanner J M. Variations in pattern of pubertal changes in girls.

Arch Dis Child. 44:291-303, 1969.

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This paper reported a mixed longitudinal study of the physical changes of puberty in 192 healthy girls of the Harpenden Growth Study. Pictorial standards for stages of breasts and pubic hair were given and the variations and interrelationships between the various events were described [The *Science Citation Index*® (SCI)® and the *Social Sciences Citation Index*® (SSCI)® indicate that this paper has been cited in over 315 publications since 1969]

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In 1948 I was invited by the then Ministry of Health to establish a long-term longitudinal study of the growth of healthy children in Harpenden, a small town just outside London. R.H. Whitehouse joined me, and we began measuring and photographing the children every six months, or every three months during the pubertal growth spurt (more details are to be found in references 1 and 2). The material steadily accumulated; then in 1956, we moved to the Institute of Child Health, eventually to establish there a full-scale Department of Growth and Development with the aid of a massive grant from the Nuffield Foundation. W.A. Marshall, a medical graduate with a recent PhD in the seasonal control of reproductive behaviour

in ferrets, was the first to join us in this expansion.

The majority of the Harpenden children were studied over part or all of the age range 5 to 16 years, so that our material was particularly rich over puberty. Indeed, this had been the reason for my writing *Growth at Adolescence*,^{3,4} the first edition of which appeared in 1955. By the late 1960s, however, the volume and the longitudinality of the data had much increased, so Marshall and I set ourselves to analyse it more fully in two papers, the one discussed here and its companion for boys.⁵

I think the paper has been so frequently cited because it was a normative study of what happens in healthy adolescent girls. There was an excellent normative study before, made by Earle Reynolds and Janet Wines⁶ at the Fels Research Institute, and excellent studies since, both in Zurich and in Stockholm, but ours was the only one in the period 1950-1980. Also our photographs were of better quality than others, and it was this fact that led to our photos of the stages of pubertal development in breasts and pubic hair being widely reproduced and adopted. (Much later, these stages got referred to in the US as "Tanner stages," a wildly inappropriate attribution, since all we did was to tidy up Reynolds and Wines, who themselves took their descriptions from the German literature of the 1930s and earlier.)

In 1977 Marshall left to take up the Chair of Human Sciences at the University of Technology in Loughborough, where he built up one of the largest and most active schools of human biology in Europe. He remained particularly interested in growth and was engaged in a detailed study of the growth of immigrants to the UK, in relation to their degree of acculturation, when ill-health sadly forced his retirement earlier this year.

1 Tanner J M. *A history of the study of human growth*. Cambridge: Cambridge University Press, 1981. 499 p

2 Tanner J M & Whitehouse R H. *Atlas of children's growth: normal variation and growth disorders*. London: Academic Press, 1982. 206 p

3 Tanner J M. *Growth at adolescence*. Oxford: Blackwell Scientific, 1955. 212 p

4 *Growth at adolescence*. Oxford: Blackwell Scientific, 1962. 325 p

5 Marshall W A & Tanner J M. Variations in the pattern of pubertal changes in boys. *Arch Dis Child* 45:13-23, 1970 (Cited 250 times)

6 Reynolds E L & Wines J V. Individual differences in physical changes associated with adolescence in girls. *Amer J Dis Child* 82:529-47, 1948