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How-many-ness and rank order – towards the deconstruction of ‘natural number’.

Pope, Sue (ed.), Proceedings of the British Society for Research into Learning Mathematics (BSRLM). Proceedings of the British congress of mathematics education, BCME-8, University of Nottingham, UK, April 14–17, 2014. London: British Society for Research into Learning Mathematics (BSRLM). 33-40 (2014).

Summary: This paper concerns a philosophical, but highly practical, issue arising at the interface between mathematics and education, and I claim that mathematics education offers insights where mathematical philosophy has ground to a halt. More specifically it concerns the two related but distinct concepts of how-many-ness (alias quosity) and rank order, whose separate identities are traditionally obscured by the language of ‘number’. (Sometimes they are called ‘cardinal number’ and ‘ordinal number’. More often they are wrapped up together as ‘natural number’.) The teacher of young children has the advantage over the philosopher that she works with people before they have acquired all the prejudices of their native language, and we shall build on the analysis of counting by *R. Gelman* and *C. R. Gallistel* [The child’s understanding of number. Cambridge, MA: Harvard University Press (1986; ME 2015b.00177)], concluding that ‘natural number’ as normally conceived is something of an illusion, for only quosity has the properties expected of ‘number’, while rank order is a mere quality.

Classification: E20 F30 D20 E40

Keywords: mathematics and philosophy; foundations of mathematics; natural numbers; number concepts; cardinality; cardinal numbers; ordinal numbers; quantity and quosity; counting; numerals; addition
<http://www.bsrlm.org.uk/BCME8/BCME8-05.pdf>