"A terrible piece of bad metaphysics"? Towards a history of abstraction in nineteenth- and early twentieth-century probability theory, mathematics and logic
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British symbolic logic and algebra: the limits of abstraction

This section contains these three articles:


The three chapters in this section explore the creation of (‘modern’) abstract logic and algebra from the viewpoint of (‘non-modern’) symbolic logic and algebra – or, put differently, they read the work of Boole and W.R. Hamilton through the lens of the work of Venn and Ellis, Gregory and Walton in order to expose the foundations of the former by means of the limits of the latter. What Venn, Ellis, Gregory and Walton could be said to have in common is a resistance to what connected Boole to W.R. Hamilton, namely, to paraphrase Venn, a study, not of things, but of the mind in thinking about things. The first article (chapter 7) provides a detailed analysis of those chapters of Venn’s Symbolic Logic in which he presented his so-called ‘non-conceptualist’ reformulation of the foundations of Boole’s extensional logic for syllogistics – something of which Venn himself thought as an alternative to ‘algebra of logic’ and Frege’s ‘mathematical logic’. The second article (chapter 8) discusses the contributions of Gregory and Ellis to algebra and geometry and their broader views on philosophy of mathematics and science with the aim of revisiting the characterization of the second generation of reformers of British mathematics.
found in Smith and Wise’s seminal *Energy and Empire*. It is argued that none of the features brought to the fore in their treatment of the work of Ellis and Gregory, namely ‘geometrical methods’ in mathematics and an ‘anti-meta-physical’, ‘non-hypothetical’ emphasis on ‘practical knowledge’ can be straightforwardly upheld; Gregory’s ‘symbolical algebra’ was connected to philosophical considerations underlying the Scottish Newtonians’ ‘abstractionism’ and ‘fluxional analysis’ and Ellis’s idealist reconstruction of Baconianism insisted on the central importance of ideal ‘principles of arrangement’ in the obtainment of scientific and mathematical knowledge (see also chapter 3 and 4). The third article (chapter 9) describes, in detail, the period of the complex history of British algebra and geometry between the publication of Peacock’s *Treatise on Algebra* in 1830 and W.R. Hamilton’s paper on quaternions of 1843. During these years, Gregory and Walton published several contributions on ‘algebraical geometry’ and ‘geometrical algebra’ which enabled them not only to generalize Peacock’s symbolic algebra on the basis of geometrical considerations, but also to initiate the attempts to question the status of Euclidean space as the arbiter of valid (geometrical) interpretations. At the same time, Gregory and Walton were very much bound by the limits of the abstractness of symbolic algebra that they themselves made explicit; their work was not and could not be the ‘abstract algebra’ (and ‘abstract geometry’) of W.F. Hamilton and Cayley which, to be sure, was grounded on a conception of abstraction in which mathematical objects exist as generalized constructions from certain pure a priori intuitions rather than as abstractions from empirically grounded quantities of number and magnitude.