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Historia Mathematica 40 (2013) 423–454

HISTORIA MATHEMATICA

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Robert Leslie Ellis's work on philosophy of science and the foundations of probability theory

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Available online 21 September 2013

Abstract

The goal of this paper is to provide an extensive account of Robert Leslie Ellis's largely forgotten work on philosophy of science and probability theory. On the one hand, it is suggested that both his 'idealist' renovation of the Baconian theory of induction and a 'realism' vis-à-vis natural kinds were the result of a complex dialogue with the work of William Whewell. On the other hand, it is shown to what extent the combining of these two positions contributed to Ellis's reformulation of the metaphysical foundations of traditional probability theory. This parallel is assessed with reference to the disagreement between Ellis and Whewell on the nature of (pure) mathematics and its relation to scientific knowledge.

Zusammenfassung

Ziel dieser Arbeit ist es, aufmerksam zu machen auf das grossteils vergessene Werk von Robert Leslie Ellis über die Wissenschaftsphilosophie und die Wahrscheinlich-keitstheorie. Einerseits wird in der vorliegenden Arbeit festgestellt, dass sowohl seine 'idealistische' Erneuerung der Baconischen Theorie wie auch sein Realismus bezüglich der natürlichen Spezies das Ergebnis einer tiefgreifenden Auseinander-setzung mit William Whewells Forschungsansichten waren. Andererseits wird nachgewiesen, inwiefern die Verbindung beider Positionen zu der Ellis'schen Umformulierung der metaphysischen Grundlagen der traditionellen Wahrscheinlich-keitstheorie beigetragen haben. Diese Parallelität wird hier im Hinblick auf die unterschiedlichen Auffassungen von Ellis und Whewell hinsichtlich der (reinen) Mathematik, auch in ihrem Verhältnis zu wissenschaftlichen Erkenntnissen, einer Prüfung unterzogen.

MSC: 60A99; 00A15; 01A55; 62A01; 03A05

Keywords: Robert Leslie Ellis; William Whewell; Nineteenth-century philosophy of science; Baconianism; Probability theory

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0315-0860/$ – see front matter
http://dx.doi.org/10.1016/j.hm.2013.07.003

0. Introduction

Both Robert Leslie Ellis's (1817–1859) work on philosophy of science and the foundations of traditional probability as well as its complex relation with that of one of the towering intellectual figures in the Victorian era, namely William Whewell (1794–1866) (e.g. Fisch and Schafer, 1991; Fisch, 1991; Snyder, 2006; Yeo, 1993), count as largely understudied issues in the history of nineteenth-century British philosophy and mathematics. The main goal of this paper is to fill this lacuna by explaining – what has become known as – Ellis's 'frequency interpretation' of probability (see Daston, 1994; Galavotti, 2007; Hacking, 1975, 127; Kilinc, 2000; Verburgt, submitted for publication-a, submitted for publication-c; Zabell, 2005, 120–121) as the result of the complex dialogue with, what he took to be, the 'idealist' and 'realist' elements in Whewell's thought.

After providing, in Section 1, an extensive biographical account of the life and 'career' of Ellis, Section 2 purports to consider Ellis's 'General Preface' to Bacon's *Philosophical Works* as the attempt to supplement the Baconian inductive method with an 'idealist' component that closely resembled Whewell's idea of 'consilience'. In Section 2.2 it is argued that both took the 'quasi-Kantian' character of their renovation of the method merely as a way to circumvent what they considered to be the excesses of strict Baconianism. The issue of 'realism' is discussed, in Section 3, with reference to the Victorian debate on natural kinds and classification; more specific, it is argued that Ellis's observations on bees' cells (Section 3.2) were formulated along the lines of Whewell's particular, theologically inspired, argument for '(arche)types' (Section 3.1). Section 4 provides a lengthy analysis of Ellis's two papers on probability theory. It is indicated how his critique of the metaphysical foundations of traditional probability theory can be understood as contributing to transforming them on the basis of his philosophical 'idealist-realism'. The concluding remarks (Section 5) set out to qualify this parallel by highlighting Ellis and Whewell's disagreement on the nature of (pure) mathematics and its relation to scientific knowledge.

1. Robert Leslie Ellis: 'His intellectual faculties were undoubtedly his most striking characteristics'[1]

In the eyes of his contemporaries Ellis was 'one who was promised to become a main prop' (Gibbins, 1860, 205) and he was 'familiar to many generations of Cambridge men as a prodigy of universal genius' (Newman 1956, 1177). From an early age, Ellis, who was born on August 25, 1817 in Bath, was educated at home in classics and mathematics for several years by two private tutors and his father, Francis Ellis (1772–1842) (see Ellis, 1866) – whose cultivated intellect and fondness of speculative inquiry are said to have been of great influence on Ellis's intellectual life. In his biographical memoir of Ellis, Harvey Goodwin (Bishop of Carlisle) wrote that 'in the year 1827, when he [Ellis] was about ten years old, he was doing equations, and reading Xenophon and Virgil' (Ellis, 1863a, xiv). In spite of this rapid progress, due to ill health Ellis was forced to disrupt his studies under the physicist and astronomer Reverend James Challis at Papworth St. Everard in Cambridgeshire in November 1834. Although it is clear from the *Alumni Cantabrigienses* that Ellis was administrated as a pensioner of Trinity College as early as July 10, 1834, his matriculation, at the age of nineteen, at Cambridge University was delayed until October 1836 (see Venn, 1944, 411; Panteki, 2004; Goodwin, 1863).

It was his teacher George Peacock (1791–1858) who first discovered that Ellis 'was very much in advance of the men of his year in mathematical acquirement [...] Ellis never read with the class [and] in fact, he did not need to kind of lecture which was adapted to [...] others; he required only that his reading should be arranged, and put in a form suitable for the Cambridge examinations' (Ellis, 1863a). As a pupil of his

[1] Goodwin (1863, xxxiii).