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William Whewell's philosophy of architecture and the historicization of biology

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ABSTRACT

William Whewell's work on historical science has received some attention from historians and philosophers of science. Whewell's own work on the history of German Gothic church architecture has been touched on within the context of the history of architecture. To a large extent these discussions have been conducted separately. I argue that Whewell intended his work on Gothic architecture as an attempt to (help) found a science of historical architecture, as an exemplar of historical science. I proceed by analyzing the key features of Whewell's philosophy of historical science. I then show how his architectural history exemplifies this philosophy. Finally, I show how Whewell's philosophy of historical science matches some developments in a science (biological systematics) that, in the mid-to late-nineteenth century, came to be reinterpreted as a historical science. I comment briefly on Whewell as a potential influence on nineteenth century biology and in particular on Darwin.

1. Introduction

The work of William Whewell (1794–1866) on historical science has received some attention from historians and philosophers of science (Guillaumin, 2005; Hodge, 1991; Ruse, 1976; Snyder, 2006). Whewell's (1830; Whewell & von Lassaulx, 1842) work on Gothic architecture has been discussed to a limited extent in the context of history of architecture (Buchanan, 2013; Eastlake, 1872; Pevsner, 1972; Smith, 1994; Yanni, 1997). These discussions have been conducted separately.

In this paper I argue that Whewell intended his *Architectural Notes on German Churches* to help found historical architecture as a Whewellian historical science. The book not only discusses the methodology of historical architecture, but engages in historical scientific practice. I begin (section 2) with a sketch of Whewell's philosophy of historical science. Section 3 demonstrates the key elements of Whewell's philosophy of historical science via an analysis of Whewell's architectural work. The place of *Architectural Notes* in the development of Whewell's thought has not been widely recognized. Section 4 illustrates Whewell's philosophy of historical science by reference to developments in mid-nineteenth century British biology. I conclude (section 5) with reflections on the potential historical importance of Whewell's historical work with respect to biology.

This paper engages with Whewell as a philosopher who is analyzing the methodology of historical science, targeting in particular the role of causal reasoning in reconstructing the past. Whewell provides an entrée into the nature of historical reasoning, given epistemic challenges particular to historical science that enables us to sidestep framing assumptions that pervaded twentieth-century discussions of historical science. Though there has been some excellent recent work that avoids this framework (for example, Cleland, 2002, 2011; Tucker, 2004; Turner, 2007), debates about the nature and status of historical science have largely concerned the fit of historical science to the covering law model of explanation (for example, Goudge, 1961; Hempel, 1942; Ruse, 1971). At issue in these debates was how causal content can be used in forming historical explanations and testing historical claims, given that past events are highly contingent, non-repeatable, and not in themselves the subjects of general causal laws. As will be seen, Whewell's philosophy analyzes causal reasoning in historical science in the absence of general laws about contingent historical claims.

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2. Whewell's philosophy of historical science

In Whewell's philosophy, science relies on Fundamental Ideas: core principles in terms of which all experience and knowledge is organized.[1] Whewell organized his *The Philosophy of the Inductive Sciences* (1840, 1847a, 1847b, 1858, 1860) in terms of a classification of sciences based on each science's reliance on distinct Fundamental Ideas. Whewell grouped together historical sciences as those sciences that concern the idea of historical causation:

> "Force is the *cause* of motion, because force at all times and under all circumstances, if not counteracted, produces motion; but the cause of the present condition and elevation of the Alps, whatever it was, was manifested in a series of events of which each happened but once, and occupied its proper place in the series of time. The former is *mechanical*, the latter *historical*, *cause*." (Whewell, 1847b, p. 654).

Whewell then sketched the task of the historical sciences.

> "Every occurrence which has taken place in the history of the solar system, or the earth, or its vegetable and animal creation, or man, has been at the same time effect and cause; - the effect of what preceded, the cause of what succeeded. By being effect and cause, it has occupied some certain portion of time; and the times which have thus been occupied by effects and causes, summed up and taken altogether, make up the total of Past Time. The Past has been a series of events connected by this historical causation, and the Present is the last term of this series. The problem in the palætiological sciences, with which we are here concerned, is, to determine the manner in which each term is derived from the preceding, and thus, if possible, to calculate backwards to the origin of the series." (Whewell, 1847b, pp. 654–655).

In Whewell's view, non-historical science ultimately progresses to the discovery of causal laws (Whewell, 1858, pp. 127–128). Historical sciences do not directly target causal laws; rather, the aim is knowledge about a specified past series of occurrences. Historical scientists posit that there has been some one story in the world, involving a single set of events that has an ordered continuity. The challenge is to establish facts about this story of past events, processes, objects, and states of affairs, and about past causal relationships. How to go about discovering such facts? Whewell described three components of historical science (1837, p. 488).

First, a classificatory component requires historical scientists to delineate the target phenomena and develop terminology to describe the phenomena. This is not a trivial task. For example, in developing a classification of geological strata (Cambrian, Ordovician, and so forth), geologists had to establish that strata occurring at different locations and under different conditions are meaningfully the same (Whewell, 1837, pp. 532–533).

The second, ætiological component draws on disparate non-historical sciences to investigate the limits of permanent causes. The third component reconciles these contributions to form a *theory of the facts* that expresses what must have transpired in the history of the target phenomena.[2] Whewell was less explicit than could be hoped as to the precise form of such a theory of the facts. Indeed he wrote that there is no extant complete theory of the facts in any palætiological science, and expressed doubts about the ability of historical science to produce any complete and satisfactory theory (Whewell, 1840, p. 122). Whewell tied his skepticism to his conviction that key historical phenomena have had supernatural causes (Whewell, 1837, p. 588; 1840, p. 164). However, Whewell did seriously entertain origins hypotheses and require that they be rejected on scientific or philosophical rather than theological grounds. For the most part, historical speculation about origins of species, planets, and other entities had been conducted in a haphazard manner. Whewell likely hoped his philosophical explication of historical science would assist the organization of the historical sciences. At the time, the sciences that target the past were in nascent stages of professional, methodological, and theoretical development (Tucker, 2004). Nonetheless, some successful historical theorizing had been achieved, and Whewell himself sketched a theory of the facts about the history of Gothic architecture (Whewell & von Lassaulx, 1842 - see section 3 below).

The theory of the facts expresses claims about what must have happened, and includes causal content, but not about what must happen between any token events of a given type. On Whewell's view the full development of a non-historical science results in formulation of laws of permanent causes. A non-historical science "if perfected, would be a demonstrative science dealing with general cases …" and would express "what always must be under given conditions" (Whewell, 1837, p. 548). Whewell explicitly contrasted such laws with the causal knowledge expressed by the historical sciences, "an ætiological view having reference to special facts" (Whewell, 1837, p. 548). These facts express "what is and has been, and why it has been" (Whewell, 1837, p. 548). On Whewell's view, the most advanced historical sciences produce theories that involve particular facts about the past and causal information about why those particular facts obtain.

Twentieth-century debates about historical scientific methodology would turn on this issue: how can the historical scientist make causal claims about past particular states of affairs, except by reference to some generalizable principle that can be formulated as a causal law (Goudge, 1967; Hempel, 1942; Ruse, 1971)?

A historical theory of the facts can link particular past occurrences in terms of singular causal relationships. The key to reasoning about these singular past relationships is a relationship that can be termed historical causal dependence. Historically causally dependent properties are necessarily shared because they co-occur as a result of shared history – not just similar type of origin story, but a shared particular past event story. Claims of historical causal dependence posit that an event story exists in the past of the cited entity or entities, where the relevant events constitute a single set with a continuous order. It is not necessary to reconstruct the complete set of events directly in order to reason about dependence relations that exist among entities that descend from the single story.

[1] Laura Snyder (2006) has recently provided an excellent overview of Whewell's philosophy of science, focused on his debates with John Stuart Mill and his purpose of enacting social reform (Snyder, 2011). Her analysis draws on prior work on the crucial role of the Fundamental Ideas (Buchdahl, 1971; Butts, 1965; Laudan, 1971; Snyder, 1994). See also (Ducheyne, 2009; Fisch, 1991).

[2] The components are not to be practiced in strictly linear fashion, though each component depends on some degree of advance in the preceding component. Whewell presented the basic tripartite division in terms of distinct branches of palætiological sciences in his *History of the Inductive Sciences*, for example in the case of geology: 1. Phenomenal geology, dealing with classification and laws of phenomena; 2. Geological dynamics, concerning the ætiological component; and 3. Theoretical geology (sometimes called physical geology). In the *Philosophy of the Inductive Sciences*, Whewell avoided the use of the term "dynamics" as a stage or auxiliary component of the palætiological sciences, explaining that "dynamics" suggests that all the causes expressed by historical sciences are of the same, simple mechanical type (Whewell, 1840, p. 102). Whewell there described the ætiological stage as a separate body of science. In the *Philosophy* Whewell also shifted away from the analogy of geology to astronomy that he made in the *History*, comparing the two progressions Kepler: Galileo: Newton and Phenomenal: Dynamic: Theoretical.