Annals of Science
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/tasc20

William Whewell, natural theology and the philosophy of science in mid nineteenth century Britain
Richard Yeo a
a School of History, University of New South Wales, Sydney, Australia, 2033
Published online: 22 Aug 2006.

To cite this article: Richard Yeo (1979) William Whewell, natural theology and the philosophy of science in mid nineteenth century Britain, Annals of Science, 36:5, 493-516
To link to this article: http://dx.doi.org/10.1080/00033797900200341

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the “Content”) contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at http://www.tandfonline.com/page/terms-and-conditions
William Whewell, Natural Theology and the Philosophy of Science in Mid Nineteenth Century Britain

RICHARD YEO

School of History, University of New South Wales, Sydney, Australia 2033

Received 16 February 1979

Summary

This article aims to reveal the moral and theological dimensions of William Whewell's philosophy of science. It suggests that, in addition to an internalist account of Whewell's method and epistemology, there is a need to view his philosophy of science (and knowledge) within the intellectual context constituted by the assumptions of natural theology. It argues that writers of natural theology saw man's ability to know the world as an indication of his special place in nature, and that epistemological theories were therefore invested with moral and theological significance. Whewell's work is interpreted as an attempt to dissociate natural science from Utilitarianism and empiricist philosophy: he sought to promote a philosophy of science which guaranteed the principles of natural theology and the values of Christianity. But the idealist epistemology which he proposed was criticized by both scientists and theologians. In 1853 (in his book Of the plurality of worlds), again within the framework of natural theology, Whewell attempted to justify this epistemology by affirming the metaphysics of a Christian Platonism. From this position, Whewell defended natural theology against the metaphysical scepticism of both Henry Mansel and the positivists.

Contents

1. Introduction .......................................................... 493
2. Natural theology and the philosophy of knowledge ............... 495
3. The moral and theological context of Whewell's philosophy of science 498
4. Scientific and theological reaction to Whewell's work. .......... 503
5. The Plurality of Worlds Debate: natural theology and Whewell's idealist epistemology ........................................... 505
6. Natural theology versus nescience: Whewell versus Henry Mansel... 512
7. Conclusion .......................................................... 514

1. Introduction

Throughout his academic career, William Whewell, the Master of Trinity College, Cambridge, was the object of many witticisms. Most of these were aimed at the apparent brusqueness of his manner, but others concerned the nature of his intellectual endeavours. Sydney Smith epitomised the latter when he remarked of Whewell that 'science is his forte, and omniscience his foible'.1 Indeed, Whewell's range of interests was extensive (if not promiscuous), and even in an age when men could still pass freely between the disciplines, the breadth of his activity was rather unusual. In their undergraduate days, John Herschel and Charles Babbage shared

Whewell’s broader interests and discussed them at ‘philosophical breakfasts’.² But although his colleagues appreciated the metaphysical nature of his inquiries, they often wished that Whewell had confined himself to one section of science. In fact, Whewell’s practical scientific activities were limited, and as his career progressed, he became more involved in epistemology and moral philosophy, losing contact with recent scientific advances. By the middle of the century, when increasing specialization was apparent in intellectual life, Whewell retained his earlier commitment to ‘universal knowledge’,³ and would still have described himself as one who twisted the results of science into metaphysical speculations.⁴

The comprehensiveness of Whewell’s thought raises problems for modern scholars, just as it bemused or baffled his nineteenth-century contemporaries. In twentieth-century studies, Whewell has received attention by virtue of his dispute with J. S. Mill over the philosophy of science and, in particular, the logic of induction. There is now a significant body of literature which applies critical philosophical analysis to this debate, and Whewell’s position on various issues of method and epistemology has been greatly elucidated.⁵ A second area of study has been concerned with the philosophical lineage of Whewell’s work, especially with the relative influence of Kantian and Platonic thought. Two extensive books, both written by non-English academics, have been devoted to this theme.⁶ However, these studies rarely take any serious account of Whewell’s moral and theological ideas and the intellectual context in which they arose.

Of course, the neglect of such topics does not in itself prejudice the validity of the two approaches discussed above. But there is a danger that certain areas of Whewell’s work will be abstracted too sharply from the rest of his ideas. Thus, as Andrew Belsey has recently complained, there has been a tendency to treat Whewell’s theological interest as an unfortunate and disturbing element in his philosophy of science.⁷ Further, although it is important to delineate the intellectual influences which acted upon his thought, our understanding of Whewell would be seriously impoverished if we simply assumed that he was dominated by the desire to construct a systematic philosophical system, or that he was trying to be either a thorough Kantian or a consistent Platonist. Thus, in addition to the specialist critiques of Whewell’s philosophy of science there is a need to consider the moral and theological dimensions of his epistemology. This article attempts to supply these dimensions by treating Whewell’s thought within the context of nineteenth-century British natural theology.

² T. Forster to W. Whewell, 24 December 1841, in I. Todhunter, William Whewell, D.D., An account of his writings (2 vols., 1876, London), vol. 1.6. The correspondent was probably Thomas Ignatius Maria Forster, a psychological and physiological writer. The full quote given by Todhunter is interesting: ‘We have all made some advances in mere physical science, but in metaphysics, as far at least as I am concerned, I am not conscious of having advanced one single step, since the period when you and I and Herschel and Babbage used to meet at our Sunday morning’s philosophical breakfasts in 1815’ (pp. 5–6).


⁴ Whewell to J. Herschel, 1 November 1818, ibid., 29. For Charles Lyell’s attitude to this, see ibid., vol. 1.112.


Most recent works on the history of nineteenth-century British science refer to the subject of natural theology. Such a reference is essential because the vocabulary of natural theology constituted much of the style and rhetoric of scientific communication in the period. Natural theology proclaimed the harmony of science and religion, and in this sense it was a useful apologetic on behalf of science against conservative religious criticism. But its more general influence meant that concepts such as final cause, design, law, miracle and Providence were integral components of scientific discussion. Indeed, a number of scholars have argued that the teleological assumptions of natural theology provided the intellectual framework in which scientific thinking occurred. This suggestion militates against a simple bifurcation between misguided clerical scientists and progressive secular scientists: both may have been influenced, in positive and negative ways, by the tradition of natural theology.

But apart from its more obvious connection with substantive scientific theories, natural theology may have also provided a context for significant discussion of the methodological and epistemological features of both scientific and theological knowledge. From this perspective, questions concerning the limits and use of reason, the grounds of knowledge, the role of hypotheses and imagination and empiricism versus idealism were not esoteric ones—they were part of the broad nineteenth-century British debate on man's place in nature.

2. Natural theology and the philosophy of knowledge

In describing the intellectual temper of mid-nineteenth-century Victorians, Walter Houghton remarked that although they questioned many traditional values, their doubt 'never involved a denial of the mind as a valid instrument of truth'. There was a belief in the existence of ultimate truths in all areas of knowledge, an abiding trust in the capacity of mind to find them, and a faith in the possibility of intellectual certitude. These generalizations certainly apply to the men of science in this period. The majority of them were convinced that careful research would reveal the underlying laws of nature, the principles which actually guided the process of creation. But, as a corollary to these assumptions, there was a deep concern with questions of method and epistemology: the ability of man to attain truth was thought to depend upon the manner in which reason was employed, upon the observance of proper methods of inquiry.

The major writers of natural theology shared this interest in method and epistemology. They regarded the faculty of reason as a Divine gift which enabled man to comprehend the Divine creation. Indeed, they viewed man's place in nature as primarily defined by this capacity to understand the world: man was the

---


Interpreter of Nature. But this status carried a moral obligation to use the intellect in the pursuit of truth in all areas of knowledge. The duty to know the world was conceived in terms of the Biblical injunction to subdue the earth and have dominion over its creatures. Intellectual indolence and the ignorance it perpetuated were condemned as violations of God's will. Furthermore, while it was imperative that this sacrosanct gift of reason be employed rather than neglected, it was essential that it should not be abused. Like any other part of God's providence towards man, it had to be exercised with scrupulous care. The realization of man's potential for attaining truth was thought to depend upon the adherence to methods of inquiry which were not only intellectually justifiable, but morally respectable. Further, epistemological theories about the foundation and limits of reason were intimately connected with theological ideas about the appropriate relationships between man, God and nature. These assumptions meant that discussions on method and epistemology were part of a wider debate involving moral, social and religious considerations.

Discussion of epistemology entered in a subtle way into the arguments of natural theology. Exponents of this subject wanted to move from the physical to the spiritual; they hoped to disclose moral purposes reflected in the material world. The argument from design epitomised this project. But in order to do this they needed to assume (and possibly demonstrate) the unity of the moral and physical spheres of creation. This was a serious problem because if design could only be perceived in the physical world it would be difficult to maintain that the Creator of nature was also responsible for man's intellectual and spiritual character. Recognizing this problem, Whewell wanted to prove that 'the Creator and Preserver of the world is also the Governor and Judge of men; that the Author of the Laws of Nature is also the Author of the Law of Duty'.

In response to this problem, some writers acknowledged the need to embrace psychological evidence within the design argument. They hoped to reveal examples of design in the mind so that man's mental nature could be seen as part of the Divine order manifested in the physical world. But this task was not an easy one; it involved philosophical and religious dilemmas relevant to the question of man's place in nature.

To begin with, Christian religious and moral values were invested in the Cartesian dualism of mind and matter. The mind of man, its intellectual and moral faculties, were regarded as immeasurably superior to, and qualitatively different from, the inert, lifeless matter of the physical world. This distinction supported values associated with free-will and moral responsibility. But because of this ontological gulf between mind and matter, it was difficult to define the points of contact which would demonstrate the unity of creation. Furthermore, these presuppositions meant that it was impossible to accept the empiricist position which resolved the dichotomy...
between moral and physical spheres by reducing mind to the level of matter. The determinism and materialism entailed by this approach would have contradicted the Christian belief in man's unique spiritual nature. Nor was the solution advanced by German Romantics open to British natural theologians, because the extreme idealist philosophy dissolved the distinctions between man, God and nature, and challenged the authority of Revelation. Consequently there was a tension between the logical requirements of natural theology and the demands of Christian metaphysics. Writers of natural theology had to establish a relationship between the physical and moral spheres which ensured the validity of inferences from the material to the spiritual. But in accepting this task, they had to avoid the twin errors of materialism and pantheism. Therefore, they needed to affirm the unity of physical and moral spheres without implying genetic continuity; they needed to assert the harmony of mind and world without suggesting identity or reductionism.

When this problem was confronted there was often a transition from psychological to epistemological discussion. That is, it was in the course of seeking a psychological answer to the problem of the mind's relation to the world that an epistemological answer emerged as a viable solution. When illustrating the accommodation between man's psychological needs and the provisions of his environment, some writers argued that the ability of the mind to know the world was in itself proof that God had adapted one to the other. This conception of design avoided the difficulties associated with psychological discussion because it could envisage the mind as epistemologically related to, rather than genetically derived from, the world. In this sense, the idea of man as the Interpreter of Nature resolved the dichotomy between the physical and moral spheres of creation.

This use of epistemology is apparent in some of the major works of natural theology. For example, Thomas Chalmers, writing in his Bridgewater Treatise, found an impressive example of design in the harmony between subjective mental concepts and objective reality. There was a consonance between certain abstract ideas and the structure of the world. This was most obvious in the case of mathematical notions which derived solely from the mind's inner resources but subsequently proved to be accurate descriptions of the tangible world. Chalmers enlisted the support of Herschel, who had noted that abstract knowledge of conic sections preceded its application to astronomical data.\textsuperscript{17} For Chalmers, this fact indicated the 'intervention of a Being having supremacy over all... who had adjusted the laws of matter and the properties of mind to each other'.\textsuperscript{18} Thus the ability of the human mind to comprehend the processes of nature demonstrated the unity of the Divine creation. And, in manifesting 'the adaptation of the intellectual to the material order of things', by the success of his speculations, man was 'but filling up an essential part in the universal harmony' of the world.\textsuperscript{19} For nineteenth-century natural theologians, man's ability to know the world was the measure of his special place in creation. Herschel reflected this opinion when he asserted that the universe was incomplete before the appearance of man. The true purpose of creation was fulfilled only when man comprehended the majesty and harmony of nature.

\textsuperscript{17} J. Herschel, \textit{A preliminary discourse on the study of natural philosophy} (1830, London), 18-34.
\textsuperscript{18} T. Chalmers, \textit{On the power, wisdom and goodness of God as manifested in the adaptation of external nature to the moral and intellectual constitution of man} (2 vols., 1835, London), vol. 2, 159.
\textsuperscript{19} B. Powell, \textit{The connexion of natural and divine truth} (1838, London), 203.
the last lines of his undated poem, 'Man the Interpreter of Nature', Herschel exclaimed:

Say! was the WORK wrought out! Say, was the GLORY complete?
What could reflect, though dimly and faint, the
INEFFABLE PURPOSE
Which from chaotic powers, Order and Harmony drew?
What but the reasoning spirit, the thought and the
faith and the feeling?
What, but the grateful sense, conscious of love
and design?
Man sprang forth at the final behest. His
intelligent worship
Filled up the void that was left. Nature at length
had a soul.20

3. The moral and theological context of Whewell’s philosophy of science

Whewell’s epistemological ideas also belong to this theological context. In his early notebooks and sermons, and in his Bridgewater Treatise, he attempted to use the philosophy of knowledge as evidence for natural theology. In recognizing this, one reviewer observed that ‘Mr. Whewell gets a glimpse of no law, without a reverent perception of the powers, functions and endowments of the intellect which traces it; and in observing these, he is led constantly upwards to the mightier intellect, which framed man and the universe. Of all the philosophy he teaches, that which seems most emphatically his own, is the philosophy of mind’.21 After adducing evidence of design from astronomy and physics, Whewell devoted the third section of his Bridgewater Treatise to the religious significance of man’s knowledge of nature. He drew a parallel between the process of discovery in science and that involved in deciphering an unknown language. In both cases, there was a transition from discrete facts to an understanding of the relationship between them which gave meaning to the whole.22 By grasping these general laws of nature man was comprehending ‘the language in which the book of nature is written’.23 This language was the expression of God’s thoughts, and man could read it in so far as he shared some affinity with the Divine Mind.24 Whewell therefore believed that man’s ability to understand the laws (and thoughts) of God implied a threefold harmony between the mind of God, the mind of man and the laws of nature.

There were also strong moral and theological dimensions in Whewell’s major works. Indeed, these can be interpreted as sophisticated responses to the need for a philosophy of science which guaranteed the principles of natural theology and the values of Christianity. He wanted to proclaim the virtue of scientific knowledge without accepting empiricist epistemology; he wanted to dissociate science from utilitarian philosophy.

20 Herschel, ‘Man, the interpreter of nature’, in Essays from the Edinburgh review, with addresses and other pieces (1857, London), 737.
21 ‘Whewell’s astronomy and general physics’, British magazine, 3 (1833), 589.
22 Whewell (footnote 14), 304–307.
23 Whewell, notebook of 1825, quoted in Todhunter (footnote 2), vol. 1, 363.
Whewell’s concern with this problem was apparent in early correspondence with his Cambridge colleague, Hugh James Rose. Rose was not sympathetic towards physical science because he believed that it was producing a concentration upon external facts to the detriment of moral and metaphysical speculation, while at the same time encouraging a pragmatic attitude towards all knowledge. In replying to this critique, Whewell attempted to affirm the moral and intellectual value of the natural sciences. To some extent he was successful, for, in referring to Whewell’s Bridgewater Treatise, Rose acknowledged that ‘the most... which has ever been said for these sciences, as they can affect the human mind, has been said by one whom I can never name without the strongest emotions of respect and regard’. Whewell was able to promote an image of science which was free of pragmatic and irreligious connotations because he espoused an epistemology which emphasized the spiritual character of mind.

One of the intellectual contexts of Whewell’s philosophy of science was the nineteenth-century reaction against Utilitarianism. The British Idealist movement is usually viewed as one which began with the English Romantics and consolidated itself in the writings of T. H. Green and F. H. Bradley. But another episode in the development of this movement was the Cambridge reaction of the 1830s against the philosophy of Locke. Adam Sedgwick, Julius Hare, Frederick Maurice, Connop Thirlwall and Whewell were the major figures in this campaign. These writers strove to weaken the dominant position of Locke’s philosophy in the Cambridge curriculum because they regarded it as the principal intellectual foundation of a sensationalist epistemology which had infiltrated contemporary speculation on ethics, language and the philosophy of science. They saw this sensationalist (and in their view materialist) theory embodied in important and influential documents of the period. In the field of ethics, William Paley’s Principles of moral and political philosophy espoused a utilitarian system which denied the existence of an innate moral sense or faculty. Secondly, in the philosophy of language, the conventionalist theory of John Horne Tooke, which traced the meanings of all words to simple sensations and concrete objects, was quickly accepted by James Mill and other utilitarian writers as a vindication of the materialist account of mind. And thirdly, in the philosophy of science, an empiricist approach which reduced all knowledge to experience was powerfully advanced in the work of J. S. Mill. For the Cambridge thinkers, all these areas were battlegrounds in their fight against Locke.

25 Rose was a High Church theologian and editor of the British magazine.
26 H. J. Rose. The tendency of prevalent opinions about knowledge considered (1826, Cambridge), v-vi. 3-11.
28 Rose, An apology for the study of divinity (1834, London), 12; see also p. 48 for criticism of the physical sciences.
29 See, for example, F. Copleston, A history of philosophy (8 vols., 1962-67, New York), vol. 8, part 1. 171-190.
31 For criticism of Paley see A. Sedgwick, A discourse on the studies of the University of Cambridge (1834, Cambridge), 57-67, 126-142; and W. Whewell (ed.). Butler’s three sermons on human nature (1848, London), ix-x, xxvi-xxvii.
epistemology and its manifestation in Utilitarianism. The underlying error in the works they rejected was a depreciation of the metaphysical aspects of knowledge and the spiritual character of the human mind.

In dedicating his *Philosophy of the inductive sciences* to Sedgwick, Whewell referred to their common enemy as the ‘ultra-Lockian school’. He saw his own work as part of ‘that Reform of Philosophy’ which had been necessary since the ascendancy of Locke’s epistemology in England. Whewell wanted to attack the empiricist theory which traced the origin of all knowledge, including scientific knowledge, to sensory experience. Against this view, he argued that the mind was not simply passive in the act of cognition; rather, it actively contributed ideas which gave intelligible form to sense-impressions. Moreover, he claimed that generalized knowledge only occurred when sensations were informed by mental conceptions.

Central to Whewell’s philosophy of science was the notion of ‘Fundamental Ideas’. These metaphysical ideas, such as Space, Time and Cause, gave rise to ideal conceptions which played a major role in human thought. The fundamental ideas were inherent rather than innate to the mind; while not derived from experience, they did require experience to unfold them; but they also served to organize experience. They were not objects of thought, but laws of thought. The fundamental ideas were the mind’s contribution to the act of cognition.

Whewell acknowledged the similarity between his fundamental ideas and Kant’s *a priori* categories. Indeed, he granted that sections of his work dealing with the ideas of Space and Time ‘were almost literal translations of chapters in the *Kritik der Reinen Vernunft*’. But he did not regard himself as a submissive disciple of Kant, and rebuked G. H. Lewes and Henry Mansel for failing to see the novel points of his position. Whewell wanted to go further than Kant by proposing additional fundamental ideas as the foundation of knowledge in the mechanical, chemical and biological sciences. And in expanding the number of fundamental ideas, he urged that the quality of necessary truth, rather than being limited to mathematics and geometry, could be expected in the physical sciences. While conceding that experience and observation alone could support contingent, but not necessary truth, he argued that certain physical facts, when informed by a fundamental idea, could be seen as necessarily true.

Whewell also diverged from the original Kantian thesis by postulating the gradual emergence of *a priori* ideas. The most novel aspect of his theory was the contention that contingent truths could be apprehended as necessary truths during the historical development of a scientific discipline. While strenuously upholding the need for a philosophical distinction between contingent and necessary truth, Whewell contended that the intuition of self-evident axioms was progressive, rather than immediate. The fundamental ideas, the source of intuitive axioms, were not innate, and so necessary truth was not instantly perceived; the fundamental ideas were only disclosed through the mind’s experience of the world. But in emphasising

---

34 Ibid.
36 Ibid., 66–67.
37 Ibid., vol. 2, 677.
40 Whewell (footnote 33), vol. 1, 54–78.
the progressive intuition of necessary truths, and in admitting their dependence upon observation, Whewell did not imply that they were derived from experience. Although necessary truths emerged in the course of scientific investigations, they could not be proved by experience, but rather supplied the conditions for a general interpretation of experience.\textsuperscript{41}

Whewell's philosophy of science presented the highest levels of physical knowledge as dependent upon metaphysical ideas provided by the mind. This theory offered an alternative to the empiricist school, in which Whewell detected an exclusive emphasis upon experience. Further, in his opinion, this idealist epistemology not only permitted a better account of science, but supported a more adequate view of man, because it avoided the materialist implications of an extreme sensationalist philosophy. The stress upon the role of intuitive, metaphysical concepts in knowledge ensured a spiritual conception of mind which reinforced the Christian notion of man's special place in creation. Therefore, Whewell's work made it possible to defend the validity of natural science within a philosophy of science which satisfied the requirements of a Christian natural theology.

But, while urging the importance of the metaphysical component of knowledge, Whewell did not neglect the need for empirical observation. He stressed the interdependence of ideal and empirical elements in all thought, and aimed to delineate the intimate relationships between ideas and sensations, between subjective and objective factors.\textsuperscript{42} Whewell argued that there could be no rigid separation of theory and fact: there was 'a mask of theory over the whole face of nature'.\textsuperscript{43} He also attenuated any severe dichotomy by proclaiming that 'a true theory is a Fact; a Fact is a familiar Theory'.\textsuperscript{44} In this manner, he was able to qualify the division which rested upon the equations of objective knowledge with physical truth and subjective knowledge with moral truth. Indeed, he believed that the progress of truth, both physical and moral, could be embraced under one law of discovery based upon the history of scientific thinking. And while drawing his data from 'the most certain and stable portions' of existing knowledge,\textsuperscript{45} he expected that this study would offer 'some general analogies which belong to the essence of truth, and run through the whole intellectual universe'.\textsuperscript{46} Thus he viewed his work on the philosophy of science as part of a general philosophy of knowledge. In particular, he wished to extend the analysis to moral and theological knowledge, and, in his capacity as Professor of Moral Philosophy, Whewell began to move in this direction. In the first of his \textit{Introductory lectures on moral philosophy}, the conviction behind this broader project was clearly stated: 'Inquiries into the nature of truth, the means and methods of its discovery, and the philosophy of science, even though they set out from the study of physical science, . . . cannot fail to exercise a strong and favourable influence upon our studies with regard to moral truth, moral science, and the true philosophy of human life'.\textsuperscript{47}

\textsuperscript{41} Whewell (footnote 38), 347–349. See also R. E. Butts, 'Necessary truth in Whewell's theory of science', \textit{American philosophical quarterly}, 2 (1965), 161–181.


\textsuperscript{43} Whewell (footnote 33), vol. 1, 42.

\textsuperscript{44} \textit{Ibid.}, 40.

\textsuperscript{45} \textit{Ibid.}, 1.

\textsuperscript{46} \textit{Ibid.}, 3.

\textsuperscript{47} Whewell, \textit{Two introductory lectures on moral philosophy} (1841, Cambridge), 28.
Like other members of the anti-Lockean school, Whewell wanted to replace utilitarian ethical systems with a theory which held moral ideas to be irreducible, rational and intrinsic to the nature of man. Furthermore, he hoped to show that an intuitive theory of ethics was consonant with the principles of physical science. He therefore rejected the contention that there was a natural alliance between utilitarian ethics and the development of science since the seventeenth century. By underlining analogies between the progress of moral and material knowledge, Whewell sought to diminish any absolute distinctions between them. The emphasis upon intuitive ideas (as well as empirical facts) in his philosophy of science, made it possible to claim that an idealist theory of ethics conformed to the general principles of human knowledge. Again, there was theological significance in this epistemology. It meant that the harmony of moral and physical truth, demanded by natural theology, could be affirmed without reductionism; both moral and physical knowledge were obtained by the one process and this intellectual unity indicated a more comprehensive unity in the mind of God.

This analysis of the nature of knowledge went beyond physical and moral science to embrace concepts which were directly relevant to theology. The idea of Final Cause, a fundamental idea like those of Space and Time, and the conception of a First or Supreme Cause, a modification of the fundamental idea of Cause, fell within the compass of Whewell’s philosophy of knowledge. These ideas made it possible for man to rise from a study of nature to an awareness of God. In defending this claim, Whewell stated that: ‘The Ideas which we necessarily employ in the contemplation of the world around us, afford us the only natural means of forming any conception of the Creator and Governor of the Universe’. 49

Whewell believed that man’s rational knowledge of God and his scientific knowledge of the world, depended upon the one intellectual process: that which involved the continual interaction of ideal and empirical elements. This position enabled him to avoid some of the criticisms of the design argument. Addressing this issue in his Bridgewater Treatise, Whewell was able to admit that neither the idea of design, nor the inference to Designer, were founded upon strict logical reasoning: ‘It is not therefore at the end, but at the beginning of our syllogisms, not among remote conclusions, but among original principles, that we must place the truth, that such arrangements, manifestations, and proceedings as we behold about us imply a Being endowed with consciousness, design, and will, from whom they proceed’. 50 Similarly, the idea of First Cause was ‘not extracted from the phenomena, but assumed in order that the phenomena may become intelligible to the mind’; as such, it was a necessary idea, like ‘the ideas of Space, or Time, or Cause in general’. 51 These ideas, and the knowledge they allowed, were not a priori, but were unfolded from the mind by experience. And by consistently stressing this need for both ideas and experience, Whewell was able to demonstrate the affinities between theological knowledge and other forms of human belief.

In the above discussion it has been suggested that Whewell’s philosophy of science can be viewed as part of a wider attempt to establish a philosophy of knowledge which confirmed Christian values associated with man’s special place in

48 Ibid., 31, 42. On Whewell’s moral philosophy, see J. B. Schneewind, Whewell’s ethics, American philosophical quarterly monograph, 1 (1968), 108–141.
49 Whewell (footnote 33), vol. 1, 634.
50 Whewell (footnote 14), 344; also Whewell (footnote 33), vol. 1, 622–623.
51 Whewell (footnote 33), vol. 1, 706.
nature. The main points can now be summarised. Whewell sought to dissociate science from Utilitarianism and empiricist philosophy. In his writings on ethics, language and the philosophy of science, he espoused an idealist epistemology which stressed the importance of intuitive mental concepts. By underlining the metaphysical component of knowledge, this theory supported a spiritual conception of man. And in emphasizing the role of both ideal and empirical elements in all thought, it allowed a natural theology which demonstrated the intimate relationship between physical and moral knowledge.

4. Scientific and theological reaction to Whewell's philosophy of science

Although an acceptance of idealist epistemology could be recommended on these grounds, Whewell's philosophy of knowledge evoked suspicious reaction from both scientific and theological writers in Britain. For example, in commenting upon Whewell's ethical writings, J. S. Mill warned that a reliance upon intuitive philosophy could lead to a priori speculation about the physical world. In fact, this was the continuing problem for Whewell: the tension between his idealist epistemology and his commitment to the physical science. There was always the danger that Mill's prediction would be fulfilled. On the other hand, Whewell sought to avoid this situation by insisting upon the interdependence of thought and experience, by maintaining a balance between idealism and empiricism. However, his critics doubted the stability of this equilibrium, and, noting the Kantian affiliations of his work, feared that it might move in the direction of post-Kantian German philosophy. This possibility entailed the most serious implications for British science and religion.

In reviewing Whewell's Philosophy, one writer with an eye for historical irony was startled to find 'that the doctrines of Kant and Transcendental Philosophy are now promulgated from the university which educated Locke'. Whewell's scientific colleagues also displayed this feeling of surprise and tension. Although many of them probably sympathized with his attack upon sensationalism, they believed that his theory, with its stress upon the creative contribution of mind, would endanger the ontological status of scientific laws and concepts. John Herschel and Richard Jones expressed this concern, and Jones hoped that their friend could be dissuaded from a position which might 'lead to scepticism as to all things exterior to us and all their relations'. This view was put more bluntly by Chalmers, who said that, in spite of Whewell's opinion, he would 'persist in regarding the whole of the intermediate space between ourselves and the planet Uranus as an objective reality'. In general, the critics feared that the idealist aspect of Whewell's work might produce a speculative Naturphilosophie similar to that advocated by Friedrich Schelling.

The anxiety aroused by Whewell's work was not confined to the realm of physical science. It was argued that his acceptance of the Kantian conception of Time and

53 A. de Morgan, 'The Philosophy of Inductive Sciences', Athenaeum, no 672 (12 September 1840), 707.
55 Chalmers, 'Morell's modern philosophy', North British review, 6 (1847), 307.
Space would undermine the 'whole fabric of human knowledge'; it would vitiate that natural theology which Whewell sought to maintain because it failed to guarantee a philosophical realism. If the arguments of natural theology were to have validity, the concepts of design, law and order had to refer to a reality beyond the mind; they could not be interpreted as mere subjective categories imposed upon the world. It was also quickly observed that Kant himself had rejected the argument from design.

Apart from these theological difficulties, Kant’s epistemology was seen as a direct threat to Revealed Religion. The British quarterly review, for example, claimed that there was nothing in modern Rationalism which had not been sanctioned in the writings of Kant: the necessity for Revelation had been ignored and man was said to be self-sufficient in the knowledge of his moral duty. This concern was also voiced by the Dublin University magazine, in its review of Whewell’s philosophy of science. Again, the ultra-rationalist character of Kant’s religious ideas were observed, and the reviewer concluded that ‘The moral results of this theory—which, we need not say, are in every theory the most important results—are proved both by reasoning and experience to be such as cannot be contemplated without dread…’ Given this judgement, Whewell was advised to think very carefully before he undertook to ‘popularize the whole of Kant in the cloisters of Cambridge’.

In the nineteenth-century debates over the philosophy of knowledge, theories were not only assessed in terms of their logical coherence, but in terms of their moral and theological consequences. It was therefore not unusual that Whewell’s work should be scrutinized for these wider ramifications. Indeed, a number of writers saw favourable theological potential in his epistemology. Writing to Robert Wilberforce in 1845, Henry Manning exclaimed: ‘Surely divine truth is susceptible, within the limits of revelation, of an expression and a proof as exact as the inductive sciences. Theology must be capable of a “history and philosophy” if we had a Master of Trinity to write them’. Similarly, Adam Farrar proposed that ‘a true philosophy of the action of the intellectual faculties in reference to religion might be obtained by transferring to it the analysis which Dr. Whewell has given of their action in reference to science’.

Nevertheless, although the possibilities of extending Whewell’s analysis to theology may have been exciting, there were also extreme dangers. Yet again, the Kantian element in his thought was distrusted. British commentators viewed the German idealist philosophy of the early nineteenth century as the inevitable consequence of Kant’s epistemology. When considered from a religious and theological perspective, the results of this Kantian legacy were profoundly disturbing. The critics did not make subtle distinctions between the systems of...

57 ‘Whewell’s philosophy of the inductive sciences’, Dublin University magazine, 17 (1841), 203.
58 ‘German philosophy and (Christian) theology’, British quarterly review, 2 (1845), 310–313.
59 (Footnote 57), 206.
60 Ibid., 201.
62 A. Farrar, A critical history of free thought in reference to the Christian religion (1862, London), 39. In fact, John Daniel Morell (1816–1891), a philosophical and historical writer, told Whewell that he had attempted to apply an idealist philosophy of science to theology in his Philosophy of religion (1849, London) (see Morell to Whewell, 20 December 1848, Trinity College, Add. ms. c. 89, no. 172). But the intuitive religion which Morell espoused was precisely the kind which British commentators rejected (See Yeo (footnote 9), 300–317).
Fichte, Schelling and Hegel, but they were generally appalled by the growth of an Absolute Idealism in which mind, nature and God were identified. They believed that this position had subsidised extreme intuitionism in religion and blatant a priori speculation in science. In Sedgwick's view, German philosophical and theological thought presented similar problems: Hegel's philosophy of science was complemented by D. F. Strauss's philosophy of religion. Whereas Hegel ignored the experiential component of science, Strauss denied the historical foundation of Christianity. Both sought to derive all knowledge from a priori ideas of the mind in a manner which challenged the necessity of empirical observation in science and the status of Revelation in religion. 63

Whewell was certainly aware of the problems which an idealist epistemology could entail; and he recognized the difficulties involved in translating a foreign philosophy into English culture. Writing to Richard Jones in 1837, he admitted that 'it is hardly possible to introduce foreign metaphysics in the lump, and that we must read German writers for some other purpose than that of substituting German metaphysics for English'. 64 Again, in 1839 he told Jones that he was resolved not to adopt any German 'fancies', but that he would 'see what light their speculations will throw upon mine'. 65 But even with this cautious attitude to German thought, Whewell's attempt to establish an idealist philosophy of science in Britain was fraught with problems. As noted above, the critics doubted his ability to maintain a stable reconciliation between empiricism and idealism, and they were anxious about the religious implications of post-Kantian thought. Behind these objections was the charge that Whewell's epistemology could not guarantee the philosophical realism essential to both science and natural theology. Yet this was precisely what Whewell was striving to do: he wanted to show that 'Man is the Interpreter of Nature, Science the right interpretation'. 66 But in order to proclaim this realist philosophy of science he had to justify an epistemology which relied upon intuitive conceptions of fundamental ideas. Whewell recognized this difficulty and referred to it as 'the ultimate problem of all philosophy'. 67

5. The Plurality of Worlds Debate: natural theology and Whewell's idealist epistemology

Whewell's struggle with this dilemma has been analyzed by Robert Butts. In discussing Whewell's theory of necessary truth, Butts suggested that he became dissatisfied with the Kantian view, which asserted that experience confirmed laws of certain forms simply because experience could not take place in any other forms. In contrast with this epistemological solution, Whewell needed a metaphysical solution capable of providing an ultimate ground in which both ideas and facts could be resolved. According to Butts, Whewell found an answer to this problem in the seventeenth-century Platonic rationalism which made God the source of both

63 A. Sedgwick. A discourse on the studies of the University of Cambridge with additions and a preliminary dissertation (1850. Cambridde and London), cdxxi-cdxxiv. cdcc-cccii.
64 Whewell to Jones, 12 July 1837, in Todhunter (footnote 2), vol. 2, 257.
65 Whewell to Jones, 14 July 1839, in ibid., 280-281.
66 Whewell (footnote 33), vol. 2, 443.
67 Whewell to Herschel, 11 April 1844, in ibid., 676.
thought and things: the constitution of the human mind, and its fundamental ideas, corresponded to the structure of the world because both were Divine creations.\textsuperscript{68}

It is possible to interpret Whewell's book, \textit{Of the plurality of worlds}, as a framework for this justification of his philosophy of knowledge. Published anonymously in 1853,\textsuperscript{69} this work has reinforced the image of Whewell as a controversialist and intellectual gadfly. Until recently, the entire mid-nineteenth-century debate which surrounded it had been neglected. However, J. H. Brooke has now argued that the conflict between Whewell and David Brewster over the question of rational life on other planets might disclose deeper cleavages within the subject of natural theology; and also that Whewell's denial of plurality was a disguised form of attack upon naturalistic theories of evolution.\textsuperscript{70} In a sense, the following discussion is complementary to this analysis, but it concerns the philosophy of science rather than the substantive scientific theories. That is, Whewell's rejection of the plurality of worlds is seen as an important aspect of his defence of an idealist epistemology. In asserting the unique place of man in the universe, he was able to rationalize the notion of a close affinity between the mind of man and the mind of God. And by affirming this intellectual empathy, he hoped to justify an epistemology which depended upon the validity of intuitive mental concepts. He attempted to deny the plurality of worlds and vindicate his philosophy of knowledge by urging the Christian conception of man's unique relationship with God.\textsuperscript{71}

However, in order to reject the idea of a plurality of worlds, Whewell had to qualify some of the basic assumptions of traditional natural theology. The possibility of life on other planets was linked with the principle of plenitude and the doctrine of final causes.\textsuperscript{72} In summarizing the position of his opponents, he offered an eloquent statement of these convictions:

\begin{quote}
It is sometimes said, that it is agreeable to the goodness of God, that all parts of the creation should swarm with life: that life is enjoyment; and that the benevolence of the Supreme Being is shewn in the diffusion of such enjoyment into every quarter of the universe. To leave a planet without inhabitants, would, it is thought, be to throw away an opportunity of producing happiness.\textsuperscript{73}
\end{quote}

From this perspective, the prospect of vacant stars and wasted planets was intolerable. Matter was made for life and planets without life would be devoid of

\textsuperscript{68} Butts (footnote 41), 173–180. Whewell was not the only writer to support a scientific realism by an appeal to this form of the design argument. David Wilson has shown a similar connection in the thought of Sir William Thomson (Lord Kelvin), noting also that Kelvin was influenced by the Cambridge theological traditions which Whewell represented. See his `Kelvin's scientific realism: the theological context', \textit{The philosophical journal}, 11 (1974), 41–60.

\textsuperscript{69} There was also a larger unpublished edition of 1853 which is now held in Trinity College Library, Cambridge. See below (footnote 91).


\textsuperscript{71} But this was one of the contentious issues in the debate: Brewster and Chalmers, for example, did not believe that Christian doctrine was incompatible with the existence of rational beings on other planets (see Brooke (footnote 70), 237–238, 252–258). For Whewell's religious beliefs in relation to this issue, see Whewell to J. Stephen, 4 November 1833, in Todhunter (footnote 2), vol. 2, 392–394.

\textsuperscript{72} For the philosophical background see A. O. Lovejoy, \textit{The great chain of being} (1960, New York).

\textsuperscript{73} W. Whewell, \textit{Of the plurality of worlds: an essay. Also a dialogue on the same subject} (2nd ed., 1854, London), 334.
However, Whewell argued that this extreme principle of plenitude ignored the actual state of affairs on earth; it overlooked large areas of the globe which did not contain life. To the proposition that Nature does nothing in vain, he replied by suggesting that waste, in the sense of unrealized potential or abortive design, was the rule rather than the exception. The fertility of plants and animals was far greater than the resources necessary for their existence; in many cases, the majority of offspring could not survive. The universe was full of the 'rudiments of things'. Given this more realistic picture of nature, Whewell was not surprised that only one of the planets was a seat of life.

These observations were a direct assault upon the teleological tradition of natural theology which conceived Divine design in terms of practical adaptation. On this view, lack of discernible purpose amounted to absence of design; and, in challenging this assumption, Whewell threatened the intelligibility of the universe. Moreover, by underlining the prodigal and abortive features of creation, he disturbed the cheerful image of nature usually associated with the principle of plenitude. His evidence indicated that the 'superfecundity' of nature, often praised by natural theologians, did not ensure a plenitude of existence, but demanded the sacrifice of potential life. The Malthusian theory which described this situation was embarrassing to an optimistic natural theology. Whewell had no easy solution to the problem of evil, but he was able to show that the popular notion of plenitude, together with the traditional concept of final cause (that is, as teleological adaptation), could not be accepted as the sole criterion of creation.

Although Whewell's strictures conflicted with one school of natural theology (represented by Brewster), they were not alien to all exponents of this subject. In fact, the orthodox teleological conception of design had been criticized by important writers such as Baden Powell, John Tulloch and James McCosh. By about 1850, there was a noticeable emphasis upon the notions of law, order, symmetry and harmony as the grandest principles of Divine creation. This was a significant development, because in the early decades of the century these concepts of design had been less favoured due to their affiliation with the morphological theories of the French paleontologist Etienne Geoffroy Saint-Hilaire. Most English scientists preferred the more strictly teleological school of Georges Cuvier, Geoffroy's opponent. As late as 1845, Sedgwick felt that Geoffroy's views 'shut out all

74 See for example D. Brewster, More worlds than one: the creed of the philosopher and the hope of the Christian (1854, London), 183–196.
75 Ibid. (footnote 73), 330–334.
76 Ibid., 331. Alfred Tennyson had made similar observations in his poem 'In memoriam', of 1850, For a detailed study see S. Gliserman, 'Early Victorian science writers and Tennyson's "In memoriam": a study in cultural exchange', Victorian studies, 18 (1975), 277–308, 437–460.
78 See B. Powell. Essays on the spirit of the inductive philosophy, the unity of worlds, and the philosophy of creation (1855, London), 135–137; J. Tulloch. Theism: the witness of reason and nature to an all-wise and beneficent creator (1855, London), 171–173; and J. McCosh and G. Dickie, Typical forms and special ends in Creation (1856, Edinburgh), 1–9, 30–44.
argument from design and all notion of a Creative Providence'. Thus Whewell probably recorded the prevailing attitude when he registered an unfavourable opinion of Geoffroy and praised the work and character of Cuvier.

By the time Whewell came to write his Plurality of worlds in 1853, this situation was changing; and, in 1857, when Baden Powell reviewed the literature of natural theology, he was pleased to note a recognition of morphological concepts as the highest indication of a Supreme Intelligence. The major stimulus for this development seems to have been the work of Richard Owen, the distinguished comparative anatomist.

Owen argued that the various classes of vertebrate animals were templates of an ideal Archetype of the vertebrate skeleton. In support of this claim he produced evidence of 'homological' relationships in organic nature: that is, correspondences between organs in different animals, such as that between the arm of a man and the wing of a sparrow. He cast these propositions within a neo-Platonic framework, affirming that the ideal exemplar for the vertebrate animals existed as an idea in the Divine Mind.

Owen's work had important implications for natural theology. In particular, it affected the traditional concept of teleology: his anatomical theories militated against the extreme doctrine of final cause which searched for practical purpose in every feature of animal structure. Owen offered examples of organic structures which, although serving an adaptive function in one animal, also existed in other animals without discernible purpose. Furthermore, he claimed that teleological assumptions could not account for the striking resemblances throughout the vertebrate kingdom which were not necessary for the survival of individual animals. He then argued that these aspects of creation had to be either ascribed to chance or explained in terms of a wider Unity of Plan. Yet, in spite of these criticisms, Owen's position allowed for a reconciliation of teleology and morphology: evidence of final cause could be seen in the modification of the general Plan for the special needs of individual organisms. In this way, Owen's scientific research improved the status of morphological concepts within natural theology.

A favourable attitude towards morphology was important for Whewell's case against the plurality of worlds: it allowed him to argue that the notion of final cause was too limited to stand as the model for all creation. By appealing to Owen's work he was able to claim that 'many parts of the structure of animals, though adapted for particular purposes, are yet framed as a portion of a system which does not seem, in its general form, to have any bearing on such purposes'. Once this particular lack of

---

81 Quoted in J. Clark and T. Hughes (eds.), Life and letters of the Reverend Adam Sedgwick (2 vols., 1890; Cambridge), vol. 2, 86. See also Whewell (footnote 33), vol. 1, 629.

82 Whewell, History of the inductive sciences (3 vols., 1837, London), vol. 3, 468–478. During the 1830s Powell was one of the few English writers to praise the work of Geoffroy (see Powell (footnote 19), 128–134). However, the Scottish situation may have been different; see E. Richards, 'The German romantic concept of embryonic repetition and its role in evolutionary theory in England up to 1859' (Ph.D. thesis, 1976, University of New South Wales), 178–186.


86 Ibid., 9, 84–85. See also his Instances of the power of God in his animal creation (1864, London), 18; and Owen to Whewell, 31 October 1837, Trinity College, Add. ms. a 210 no. 54.

87 Whewell (footnote 73), 318.
purpose was acknowledged, it became possible to assert that the planets need not support life: their existence could be part of a wider plan independent of anthropomorphic notions of utility. Whewell contended that the grandeur of mountains, the symmetry of animal skeletons and the magnificence of the planets did not serve any practical use or function; instead, they could exist in order to fulfil laws of beauty entertained by the Divine Mind. Again, the opposition between teleology and morphology could be attenuated.

At another level, Owen's ideas suggested a case for the special place of man in nature which strengthened Whewell's epistemology. The appeal to morphology, sanctioned by Owen's research, supported an argument for man's intellectual significance: the ability of mind to comprehend the archetypes of creation confirmed man's special character; the adaptation of mind to world was the grandest form of teleology. Thus man's intellectual nature became a reason for his unique place in the universe. Furthermore, his ability to grasp the fundamental principles of the Divine plan suggested an affinity between the mind of man and the mind of God. In his *Plurality of worlds*, Whewell was able to emphasize this intellectual relationship as a major reason for denying the plurality of worlds and as an important defence of his philosophy of knowledge.

Since his sermons of 1827 and his Bridgewater Treatise of 1833, Whewell had been concerned with the analogy between Divine and human minds. But in the *Plurality of worlds* he returned to it with renewed vigour. However, his full discussion of this topic did not reach the public because Sir James Stephen, his advisor during the preparation of the book, regarded portions of the original draft as too metaphysical for a wide audience.\(^8\) Stephen reminded Whewell that many English readers would be suspicious of metaphysics, especially German metaphysics.\(^9\) Whewell accepted this advice and deleted the offending sections. Nevertheless, he compressed a significant part of the original discussion into one chapter of the published version without altering the substance of the argument. It is important to recognize that he did publish the essence of these metaphysical speculations, and that he considered them crucial to the debate on the plurality of worlds.\(^10\) Furthermore, given his longstanding interest in these non-scientific topics, his discussion of them in 1853 cannot simply be interpreted as a convenient return to theology in order to solve epistemological problems.

Whewell claimed that the laws which man detected in the universe were the laws by which God had ordered the creation. Because it required intellect to delineate such laws, men were 'irresistibly led to suppose that these laws must have been present to the Divine Intellect, before they were apprehended by the human Intellect'.\(^11\) When laws could be expressed in mathematical form Whewell was convinced that man had deciphered the language in which the Supreme Mind spoke to human minds. He also argued that the capacity of man to discern these laws indicated that his mind was of the same nature as the mind of God.\(^12\) This conviction,
in turn, supported a belief in the special significance of man and vindicated his denial of the plurality of worlds.

Whewell freely acknowledged this position as a revival of the Platonic theory of Ideas—the notion that objects and laws of nature reflect archetypal ideas in the Divine Mind. However, he contended that this doctrine now rested upon scientific evidence as well as philosophical reasoning; he adduced the recent work of Owen as empirical confirmation of the existence of archetypal ideas which were the organizing principles behind organic nature. Indeed, Owen himself had suggested this interpretation of his research by arguing that the discovery of an ideal exemplar for the vertebrate animals proved that a knowledge of that archetype and all its modifications had prior existence in the Divine Mind. Whewell then claimed that man, in recognizing this archetype, was truly sharing in the original thoughts of the Deity. And, by perceiving beauty in the order and symmetry of natural laws, man was sharing in the aesthetic values of the Creator.

It is therefore possible to view Whewell’s thought as a return to the Cambridge Platonism of the seventeenth century; to the conviction that human reason is a reflection of a universal and Divine Reason. In one of his strongest statements of this position Whewell argued that man could ‘discover truths, to which all things, existing in space and time must conform. These are conditions of existence to which the creation conforms, that is, to which the Creator conforms; and man, capable of seeing that such conditions are true and necessary, is capable, so far, of understanding some of the conditions of the Creator’s workmanship. In this way, the mind of man has some community with the mind of God…’

Given this broad empathy between Divine and human minds, Whewell did not think it strange that man should exist only on one planet. Indeed, in an earlier paper he suggested that the ‘Idea of Man’, like other fundamental ideas, could serve to render a number of facts comprehensible, by idealising them. He was therefore prepared to speak of ‘the Idea of Man as the principal Object in Creation; to whose sustenance and development the other parts of the Universe are subservient as means to an end…’ This belief in the affinity of Divine and human minds also offered a solution to Whewell’s philosophical problems; it provided a metaphysical basis for his epistemology. The fundamental antithesis between ideas and facts, between form and matter, between mind and world, could now be resolved. Whewell was able to claim that the ideal and empirical aspects of knowledge had their ‘common source in the Deity, and in the relation borne to Him, both by our own Minds, and by the Universe’.

Most reviewers of the *Plurality of worlds* were dissatisfied. For the present discussion the most relevant comments were those which focused upon the
epistemological assumptions implicit in Whewell's statements. In particular, a number of writers objected to his remarks about the inconceivability of non-human intelligence as an argument against the existence of other rational beings.\textsuperscript{99} James Stephen, for example, could not understand 'why the limits of my conceptions should be supposed to be also the limits of possibility or of probability'.\textsuperscript{100} Another reviewer appreciated the wider relevance of this issue: its connection with the debate between idealism and empiricism. Writing in the *Westminster review*, this critic observed that many remarks from the anonymous author of *Plurality* betrayed more sympathy 'with the principles of the "Philosophy of the Inductive Sciences" than with those of the "System of Logic"'.\textsuperscript{101} Indeed, in this latter work, J. S. Mill was severely critical of Whewell's views on the notion of inconceivability as a test of truth.\textsuperscript{102} And furthermore, the empiricist philosophy was thought to be perfectly consonant with the prospect of a different physics, geometry and logic in different worlds. Whewell could not tolerate this possibility because he was trying to defend an idealist epistemology which guaranteed the universal validity of man's fundamental ideas.\textsuperscript{103} He attempted to justify this epistemology by affirming the intimate relationship between Divine and human minds: he rejected the plurality of worlds because he feared that it would injure this special relationship between man and God, thus qualifying the privileged status of human knowledge.\textsuperscript{104}

Whewell's twentieth-century critics have also been dissatisfied with this theological foundation of his epistemology. However, apart from any logical weaknesses (and these are beyond the scope of this article), his philosophy of knowledge was a very significant contribution to the British form of idealism. Whewell attempted to repudiate empiricist philosophy without sacrificing the empirical dimension of physical science. At the same time, he was anxious to dissociate himself from Continental idealist thought which endangered philosophical realism. He rejected both the *a priori* science and the pantheistic religion which stemmed from German idealism and hoped to avoid these consequences by emphasizing the interdependence of intuitive and empirical elements in all knowledge. Moreover, he believed that his idealist philosophy of science could confirm a Christian conception of man's place in the universe. In the context of the intellectual debates of the 1860s, this position was significant: it allowed Whewell to defend the speculative powers of reason against positivism and the critical Kantianism of Henry Mansel.

\textsuperscript{99} Whewell (footnote 73), 40–41, 125–136, 373; and (footnote 91), 328.
\textsuperscript{100} Stephen to Whewell, 3 November 1853, Trinity College, Add.ms.a.216 no. 139. For similar criticism, see H. Smith, 'The plurality of worlds', *Oxford essays* (1855, London), 134.
\textsuperscript{101} 'Contemporary literature', *Westminster review*, 61 (1854), 593.
\textsuperscript{103} Whewell (footnote 73), 113–115; and (footnote 91), 279.
\textsuperscript{104} Whewell did admit the possibility of *animal* life on other planets (see (footnote 73), 112, 118). However, he did not concede the existence of intelligent, moral beings on other worlds, even if these were *inferior* to man. To grant this would have been to allow the notion of degrees of rationality which would threaten his commitment to the absolute character of truth. I am not suggesting that Whewell's argument was flawless; indeed, it was circular. His confidence in the universal validity of human conceptions was dependent upon his previous belief in the empathy between Divine and human minds; but he then used this assumption to assert the special status of man, a status which explained his unique position in the universe and weakened the probability of a plurality of similar moral and intellectual beings. See (footnote 79), 118–130.
6. Natural theology versus nescience: Whewell versus Mansel

In his *Moral and metaphysical philosophy* of 1862, F. D. Maurice said that it was unfortunate for Kant's reputation in England that the 'transcendental' aspect of his philosophy had been more influential than the 'critical'. Indeed, most writers neglected Kant's strictures regarding the possibility of metaphysical knowledge and emphasized the creative, rather than the regulative, function of *a priori* ideas. But the critical side of Kant's work was not ignored by all English philosophers. Perhaps the most notable exception was Dean Henry Mansel, author of the Bampton Lectures for 1858 on *The limits of religious thought*.106

In these lectures, Mansel sought to underline the limits of reason in the area of religious and theological speculation. His critique derived from an application of Sir William Hamilton's 'philosophy of the unconditioned' to theology. Unlike most British writers, Hamilton exploited the critical facet of the Kantian system and stressed the relativity of knowledge. While following Reid in affirming the mind's direct knowledge of phenomena, he argued that this could not extend to direct acquaintance with mind-in-itself or matter-in-itself. Things were only known as they were related to our experience; only knowledge of the 'conditioned' was possible; knowledge of things-in-themselves, of the 'unconditioned' or the Absolute, was impossible.107

Taking up the question of religious thought, Mansel argued that the mind was disqualified, by the very conditions of knowledge, from the comprehension of an Infinite Being. Following Hamilton, he defined the Infinite, or Absolute, as something existing out of all relations. Then, on the assumption that the Deity could be identified with the Absolute, he concluded that man was unable to form a clear conception of such a Being. He attempted to show that whenever the human mind ventured into speculations concerning the nature of God as Infinite Being, it inevitably involved itself in contradictions.108 But he also claimed that the inability of mind to comprehend the nature and attributes of God did not imply his non-existence. 'In this impotence of Reason', said Mansel, 'we are compelled to take refuge in Faith, and to believe that an Infinite Being exists, though we know not how'.109

James Martineau, the Unitarian philosopher and theologian, was greatly alarmed by Mansel's lectures. He linked Mansel's views with those of the positivists, referring to them both as doctrines of 'Nescience', a philosophy which declared that the limits of human mental powers prevented man from reaching metaphysical or theological knowledge.110 Martineau seized upon this distrust of the intellectual faculties as the common feature of 'a Religion which exaggerates the functions and overstrains the validity of an external authority, and a Science which deals only with objective facts, perceived or imagined'.111 In this analysis, Mansel was associated

107 I have relied upon the exposition in J. Passmore, *A hundred years of philosophy* (1968, Penguin), 32. For Hamilton's discussion of his position in relation to the views of Kant, Schelling and Cousin, see his 'M. Cousin's course of philosophy', *Edinburgh review*, 50 (1829), 194–221.
with such unlikely allies as Auguste Comte and Herbert Spencer.\footnote{112} For Martineau, the two groups were united by their depreciation of the metaphysical components of knowledge and by their fixation upon external authority of Biblical testimony or sensory experience. Both groups denied the validity of natural theology.

Writing at the close of the nineteenth century, John T. Merz suggested that the work of Mansel, together with that of Darwin, did most to bring about the separation of scientific and theological debate in Britain.\footnote{113} In the light of recent scholarship, this analysis probably exaggerates the extent to which Darwin undermined natural theology. But if Darwin weakened the arguments from design in nature, Mansel did far more; he challenged the efficacy of human reason and its ability to deal with metaphysical questions raised by science and theology. Although less obvious than the impact of Darwinism, Mansel's lectures were a serious threat to the status of natural theology as a rational foundation of religious belief. Thus, Goldwin Smith suggested that the only conclusion to be drawn from Mansel was that all works of rational religion should be discarded 'except the Bampton Lectures for 1858, which will be preserved to prove to us that Natural Theology does not exist'.\footnote{114} In a sermon of 1859, Whewell extended this criticism, warning that Mansel's doctrine must be rejected, not only 'because it makes Natural Theology impossible, but because it makes Revealed Theology equally impossible. If we cannot know anything about God, revelation is in vain. We cannot have anything revealed to us if we have no power of seeing what is revealed'.\footnote{115}

Mansel's critique highlighted the theological aspect of Whewell's philosophy of knowledge. In 1860, two years after the Bampton Lectures, Whewell published his Philosophy of Discovery, and the new sections in this work can be seen as a reply to Mansel. In these sections, Whewell tried to summarize the 'Theological Result of the Philosophy of Discovery',\footnote{116} which had been foreshadowed in his Plurality of worlds. He considered Mansel's views in a chapter on 'The Philosophy of the Infinite', and began by complaining about the lack of a clear definition of the Absolute in the writings of Hamilton and Mansel. If they were referring to Schelling's concept of an Absolute in which both thought and things were united and identified then Whewell agreed that such a notion was incomprehensible. But he noted that they included other concepts, such as 'the Infinite', within the category of Absolute or Unconditioned. In his opinion, the notion of Infinite, although one of great abstraction, was an appropriate object of human thought: the success of mathematical inquiry which depended upon this concept was testimony to the fruitful manner in which it could be employed. Although the mind could not form an image of the Infinite, this did not exclude the concept from processes of reasoning.\footnote{117} But apart

\footnote{112} J. Martineau. 'Mansel's limits of religious thought', in Martineau (footnote 110), vol. 3, 117–142 (p. 134).
\footnote{114} G. Smith. Rational religion and the rationalistic objections of the Bampton Lectures for 1858 (1861, Oxford and London), 76. See also C. Remusat. Philosophie religieuse (1864, Paris), 69–89. Remusat was surprised to find an English theologian undermining English natural theology.
\footnote{115} Whewell. Sermon. 16 October 1859, quoted in Todhunter (footnote 2), vol. 1, 341.
\footnote{116} Whewell (footnote 58), 374. For his discussion of this theme see chs. 29–32.
from these objections, Whewell was anxious about the theological implications. He observed that

One of the consequences which is drawn by the assertors of the doctrine that we cannot know anything about Infinity, is that we cannot obtain from science any knowledge concerning God: And I have been the more desirous to show the absence of proof of this doctrine, because I conceive that science does give us some knowledge, though it be very little, of the nature of God.\footnote{Whewell (footnote 38), 325; also 376.}

Whewell therefore agreed with Martineau’s assessment of Mansel’s work as a doctrine of Nescience—a theological positivism which denied the possibility of reaching philosophical knowledge of God. Against this view, he reaffirmed his commitment to natural theology: that is, to the ability of man to gain knowledge of God through the study to nature, to a belief in the harmony of physical and religious truth. Furthermore, he was able to meet the critical Kantianism of Mansel with the Christian Platonism advocated in the \textit{Plurality of worlds}. He admitted that man’s knowledge of God was limited, but his own philosophy of science led him to reject Mansel’s scepticism. According to Whewell, the human mind was capable of supplying fundamental ideas which made the phenomena of nature intelligible; and, by comprehending the laws of nature, man was understanding something of the nature of God because he was sharing, to some extent, in Divine knowledge.

It should also be noted that, in both the \textit{Plurality of worlds} and the \textit{Philosophy of discovery}, Whewell stressed the historical dimension of human knowledge. In the course of man’s intellectual history, the scope of knowledge had expanded; new sciences had been formed and old sciences extended; new fundamental ideas had emerged as the foundation of new knowledge.\footnote{\textit{Ibid.}, 315–319, 350–353, 372–375, 385–399; and (footnote 91), 302–309.} For Whewell, this progressive understanding indicated a Providential plan and suggested that man’s life on earth was one not only of moral probation but also of intellectual trial, a struggle to achieve his potential for sharing in Divine truth.\footnote{Whewell (footnote 73), 118–125, 137–138, 306–370 and (footnote 91), 302–309. I cannot deal fully with the historical dimension of Whewell’s though, but it is interesting to consider him as sharing the Providentialist philosophy of history outlined by Julius and Augustus Hare in their \textit{Guesses at truth} (1838); and more recently, in D. Forbes, \textit{The liberal Anglican idea of history} (1893, Cambridge). For this suggestion, see Schneewind (footnote 30).379.} In short, he believed that the most profound evidence for natural theology derived not simply from science but from the philosophy of scientific knowledge: not only the study of nature, but also the study of mind, gave knowledge of God and his relationship with man. Given these convictions, he felt confident in defending the validity of natural theology against both secular and religious forms of Nescience.

7. Conclusion

In summary, this article has attempted to reveal the moral and theological dimensions of Whewell’s philosophy of science and its relationship with his natural theology. Whewell believed that man had a duty to study the world, and he defended the efficacy of reason against the opposition of clerical conservatives by affirming the assumptions of natural theology. The major writers of this subject saw man’s ability to know the world as the measure of his special place in the universe. Man was the Interpreter of Nature: his comprehension of the laws of nature suggested a
Whewell, Natural Theology and the Philosophy of Science

consonance between mind and world and therefore indicated the unity of the physical and moral spheres of creation. These convictions meant that questions of method and epistemology had moral connotations. In considering these topics, Whewell hoped to establish a philosophy of science which guaranteed the assumptions of natural theology and the values of Christianity: the affinity of moral and physical knowledge, and the spiritual character of the human mind. He proclaimed the religious and intellectual value of natural science while repudiating the empiricist philosophy of science promoted by the utilitarians. He stressed the role of metaphysical concepts in physical knowledge, and offered an idealist philosophy of science which might satisfy the requirements of a Christian natural theology.

However, this epistemology was criticized by religious and scientific writers in Britain because they distrusted its Continental affiliations and feared that it might engender a priori science and Pantheistic religion. Whewell recognized these dangers and tried to justify an idealist epistemology by grounding it within the metaphysics of a Christian Platonism. This theological metaphysics, which emphasized the close relationship between Divine and human minds, was presented in his works on The plurality of worlds and The philosophy of discovery. In rejecting the possibility of rational life on other planets, Whewell confronted important assumptions of traditional natural theology. But his idealist epistemology may have strengthened natural theology against its opponents in the second half of the century. It challenged the positivist account of science without impugning the validity of scientific knowledge; it also met Mansel’s scepticism by claiming that man, in comprehending the laws of nature, was understanding something of the nature of God. In this sense, an idealist natural theology could defend the validity of metaphysical speculation in both science and theology.

Whewell’s work reveals a deep concern with the moral, theological and metaphysical dimensions of the philosophy of science. During the first half of the nineteenth century this concern was shared by a significant number of British scientists and theologians. However, by the 1860s, with the increasing specialization and professionalization of intellectual life, the debate between science and religion was beginning to lose its social basis. Whewell’s work was perhaps the last (and most sophisticated) testament to the early Victorian belief in the unity of truth. The Metaphysical Society, founded in 1869, can be viewed as an attempt to salvage the dialogue between scientific and theological thought. But the need to institutionalize this debate portended its disintegration. And with this perspective, it is interesting to note that Cardinal Manning, a member of this society, believed that a solution to the problem of two intellectual cultures could be found in Whewell’s philosophy of science:

And this position of Whewell is, after all, only a disinterring of the Scholastic Philosophy, fragrant as fresh earth. It is St. Thomas Aquinas in a Cambridge gown... If the Scholastic Philosophy had never been disintegrated:

if the two elements of reason and of sense, which are the conditions of all knowledge in the human subject, had not been violently sundered, and after their separation falsified by exclusive theories of the opposing schools of intuition and of sense, a great part of our discussions would have been impossible.\textsuperscript{122}

Acknowledgements

I would like to acknowledge the comments of an anonymous referee. For access to the Whewell papers, I am grateful to the Librarian and staff of Trinity College, Cambridge.

\textsuperscript{122} Quoted in A. W. Brown, The metaphysical society: Victorian minds in crisis, 1869–1880 (1947, New York), 78–79. Manning made this statement in his paper entitled 'A diagnosis and a prescription', delivered to the society on 10 June 1873.