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edited by

Ludmilla Jordanova

and

Roy Porter

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Revelation and the cyclical cosmos of John Hutchinson

Geoffrey Cantor

It has become something of a commonplace to consider the eighteenth century as the 'age of empiricism'. It is widely believed that during this period British natural philosophers followed Newton's method of observation and experiment, and that they rejected other sources of knowledge. This attitude is supposed to have permeated all fields of thought, even theology, where men turned their backs on the Bible and employed empirical arguments to support either their natural theology or their deism. While there may be some truth in this perspective, examination of the primary sources indicates not only that a considerable number of natural philosophers believed in revelation, but also, and more surprisingly, they consciously attempted to construct their science on the text of the Bible. Although some work has been done to elucidate the scriptural underpinnings of eighteenth-century science, historians have yet to ascertain the extent and depth of this relationship. In geology and cosmogony the connection is, perhaps, most manifest and it has already attracted some attention. Following Collier's pioneering study, some historians (such as David Kubrin) have examined the biblical cosmogonies of Thomas Burnet, William Whiston, and others. Another example is the article by Michael Neve and Roy Porter which explores the relationship between scripture and fieldwork in the geology of Alexander Catcott (1725-79). Yet Catcott was not unique in emphasising scripture as the major source of knowledge of the natural world. Many other writers throughout the eighteenth century adopted a similar approach. Whether these writers formed a 'movement' has yet to be ascertained, but many of those writing after about 1730 looked to

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John Hutchinson (1674–1737) as their mentor, even if they were sometimes embarrassed by his polemics against Newton. There has been a tendency to ridicule Hutchinson's views; Leslie Stephen dismissed Hutchinson and his followers as 'whimsical writers, in whom a lawless fancy supplies the place of sound reasoning and enquiry'. Nevertheless, Hutchinson was certainly an influential figure in British science and in geology in particular. His works deserve serious consideration not only because of his wide influence, but also because the example of Hutchinson refutes many commonplaces about eighteenth-century science, such as the supposed dominance of empiricism and the rejection of revelation as a legitimate source of natural knowledge.

This paper attempts to analyse Hutchinson's writings, particularly his cosmogonical theory, in terms of his epistemological and linguistic theories. The paper comprises four sections. In the first, I discuss Hutchinson's theory of knowledge and attempt to define the roles he attributed to both empiricism and revelation. The second is a wide-ranging study of the differences between the 'Hutchinsonian' and 'Newtonian' world views, concentrating on Hutchinson's cosmogony. In the third, Hutchinson's views about language are analysed. Finally, some tentative connections are made between the language of the Bible and Hutchinson's theories in both science and theology.

I. Hutchinson's theory of knowledge

The starting point for any discussion of Hutchinson's theory of knowledge is his attitude towards the Bible, and, in particular, the Old Testament. He considered that the Bible contained the word of God and that every word of scripture was perfect and contained the true and accurate description of nature's processes [C. xxix, H. 28, L. 90]. However, he also believed that in

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6 Square brackets are used to signify references to The philosophical and theological works
the hands of man the scriptures had become debased and their true meaning obscured. For during biblical times the Jews had understood the Bible's full significance but subsequently had lost this knowledge which was intimately bound up with the original form of the Hebrew language. This corruption occurred at several related levels; they had lost their moral, social, and religious fidelity, their understanding of the physical universe and their knowledge of the unadulterated form of the Hebrew language. Instead, in order to assist the reading of the Bible they added 'points', i.e. dots, to distinguish different pronunciations of six consonants, and also the massorhetic signs which introduced symbols for vowel sounds. With this degeneration of the written language, symbolised by such events as the 'Confusion of Tongues' [H. 56] and the loss of the physical theories (to be discussed in section 11) inherent in the original text, men rejected revelation as the primary source of physical knowledge and instead framed fantastic hypotheses. According to Hutchinson, the only way in which complete knowledge of nature (and of morality) could be obtained was through the scriptures. However, he conceded that revelation was only one source of knowledge and that very limited aspects of the physical system could be ascertained by other means, for example, through the senses [H. 85]. By contrast, he considered that the cardinal mistake of modern philosophers was their complete rejection of the method of revelation and their total commitment to other sources for their knowledge of nature.

In order to obtain the complete account of the natural world contained in the scriptures, Hutchinson had first to purge the Hebrew Bible of all errors of human origin, in particular, 'points' had to be eliminated. He had also to develop a sophisticated philological apparatus to interpret the Bible once it

of the late truly learned John Hutchinson, Esq., 12 vols., London, 1748-9. The code letter, which corresponds to the convention used in the index (volume 12), should be interpreted as below. Shortened titles are given followed by the volume number:

A = Moses's principia, part I, i.
C = Moses's principia, part II—Introduction, ii.
D = Moses's principia, part II, ii.
F = Moses's Sine principia, iii.
G = A new account of the confusion of tongues, and The names and attributes of the Trinity of the gentiles, iv.
H = A treatise of power essential and mechanical, v.
I = Glory or gravity essential and mechanical, vi.
K = The covenant of the cherubim: so the Hebrew writings perfect, vii.
L = The religion of satan, or antichrist, delineated, viii.
P = Glory or gravity, the second or mechanical part, xi.
Q = An inquiry . . . into the first temple of God built by Solomon, xi.
S = A treatise on mining, xii.

Hutchinson considered that the events at Babel were of religious significance and not related to the proliferation of languages [G. 11-12]. Cf. G. Steiner, After Babel: aspects of language and translation, London, 1975, pp. 57-62.
had been reduced to the original string of Hebrew consonants. In section III we shall discuss the way in which Hutchinson attributed meanings to these signs. However, one aspect of his semantics relates directly to this theory of knowledge, and can be approached through the following problem. There are many references in the scriptures to entities, such as cherubim, of which we have no immediate experience. How, then, can we understand this aspect of the Bible? Hutchinson claimed that we do not have intuitive knowledge of these entities [H. 19, L. 25]; instead, he appealed to what he called the method of comparison [C. xxiii]. Thus to form ideas of unobservable beings and their attributes we extrapolate from our ideas of material objects which we attain from our sensory experience. This mental process of comparison, which played an important role in Hutchinson's theory of biblical exegesis, emphasises the dependence of man's understanding of the scriptures on ideas derived through the senses. These dual aspects of his epistemology underscore his intention of reconciling science and theology in a constructive manner. Indeed, he considered that religions which fail to establish connections between revealed knowledge and natural knowledge would not last for long [C. xxxviii].

Sensory knowledge also played a more general role since Hutchinson subscribed to a broad-based empiricist psychology. He considered that 'our Senses were appointed Centinels to perceive and convey Ideas readily to us' of the material world, and ideas about matter and its motion in particular [P. 4]. In denying that the mind is supplied with innate ideas, which he linked with the philosophy of the atheist, Hutchinson considered that we attain essential aspects of our knowledge through experience by way of our senses. God had provided us with sensory apparatus in order to give us a further means of understanding the physical world and also to enable us to move around it with safety. Thus our sense of vision permits us to ascertain the position of bodies and their motions. While it may be inadequate to label Hutchinson simply as an empiricist, his theory of mind falls within a general empiricist tradition. Furthermore, he encouraged the empirical study of natural phenomena and he certainly made observations, if not experiments, in many branches of science, most particularly in geology. While Newton was 'living in a Box, peeping out at a Window, or letting the Light in at a Hole', Hutchinson claims to have made numerous observations and to have collected thousands of fossils during his travels in order to illustrate the great processes described in the Bible [H. 239-44].

The information from sensory knowledge was, however, circumscribed by three limitations. One of these was that the sense of vision gives us information only about macroscopic bodies, whereas the particles of the

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8 Hutchinson used the word 'Ideas' to refer to thoughts in general and he did not employ Locke's distinction between simple and complex ideas.
9 Cf. Neve and Porter, op. cit. (2).
universal fluid, which is the cause of all motion (see section 11), are beyond our perception. If we could see the particles of this fluid then our minds would be overloaded with ideas [P. 8]. Secondly, the limited range of our sensory apparatus implies that for a full understanding of the hidden operations of the world-machine and for our spiritual and moral sustenance we must turn to revelation. Finally, our senses can deceive us; for example, when we are fooled by conjuring tricks [P. 16]. In such instances our reason must prevail. This brings us to the third aspect of Hutchinson's theory of knowledge, the role of reason.

Throughout most of Hutchinson's writings the terms 'reasoning' and 'knowledge' were used in a pejorative vein to refer to the theory of knowledge adopted by free-thinkers. Such people, who committed the sin of pride, denied revelation and instead believed that 'they can discover all Divinity and Philosophy out of their own Heads' [L. 115]. By proceeding in this fashion they were led into error and atheism and were thus destined to hell. In this context reason and revelation were considered by Hutchinson to be allegorised historically by the biblical account of eating at the tree of knowledge [H. 47]. However, within his own theory of knowledge, reason, or what he usually called 'deduction', played an important role. Far from conflicting with revelation it was reason which made full study of the scriptures possible. The principal role of reason was to make inferences from the Bible—the fundamental 'data' of Christianity—about the physical world. Furthermore, reason not only allows us to study the natural world by comparing material things (e.g. fossils), but it also permits us, with the aid of the Bible, to make inferences from sensory data to the unobservable realm [H. 20, L. 18, 34-5]. Thus, in the method of comparison, deduction is the way in which we forge links between natural and revealed knowledge. Hutchinson acknowledged, however, that after the Fall deductions made by man can never be entirely free from error.

A further role for reason also involves the fourth and final aspect of Hutchinson's theory of knowledge, what he called 'relation', which may perhaps be translated as narration: that is, the writings of others. Reason allows us to assess the probability that any written account is true: 'we must set forth the Author's opportunity of knowing, abilities and means to know, interestedness, disinterestedness and capacity of relating what they saw or know' [P. 156]. Hutchinson's own assessment of other writers ranged from those whom he cited in support of his own position to those who were positively incorrect or plainly ignorant. Among those favourably cited were many German, French and Dutch Protestant theologians who flourished in the first half of the seventeenth century, while the villains of the piece on

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both theological and scientific grounds were Philo and his modern followers Isaac Newton and Samuel Clarke. Yet even the views of enlightened man were far inferior and more fallible than revelation. Thus free-thinkers were mistaken in pinning their faith on the writings and beliefs of other men. Indeed, one of the greatest dangers that Hutchinson saw facing both divinity and science was that the supporters of man-made systems of thought bent all evidence to suit their own trivial purposes [D. 198, H. 128].

In summary, Hutchinson’s four sources of knowledge were (a) revelation, (b) relation (the narrative produced by men), (c) sensation, and (d) ‘deduction’. The first category stands apart from the others on account of the importance and breadth of the knowledge it conveyed and also owing to its infallibility. Hutchinson considered these four sources of knowledge to be intimately related while he believed his opponents adopted one of the last three to the exclusion of the others and of revelation in particular. It must be stressed that for Hutchinson the choice of knowledge sources was a matter of prime importance. At stake was not merely our knowledge of the physical universe but also the possibility of redemption. Anybody who failed to follow his or her own path to knowledge was, in Hutchinson’s opinion, destined not merely to atheism but to hell.

II. Hutchinson’s cosmogony and his rejection of Newton’s system

In discussing Hutchinson’s cosmogony, a functional distinction needs to be drawn between the processes involved in creation (as related in Genesis, and the recreation of the world during the Flood), and the post-creational state which involves the continuous cyclical action of a self-sustained world-machine. We shall concentrate principally on the latter set of processes. However, since this state represents the final condition of the creative process which Hutchinson discussed at length in Moses’s principia [A], we must consider in outline Hutchinson’s interpretation of the opening verses of Genesis. These verses, he considered, contained not only the true account of creation but also all the information, unobtainable in Hutchinson’s view from other sources, which man requires in order to understand the formation of the world.

God created ex nihilo both the particles of inert gross matter, (which were to form the substance of earth, water and other macroscopic bodies) and also the far subtler atoms comprising the ‘heavens’. These two substances were initially in a confused state and were probably located in different spheres, with the gross water particles tending towards the centre and the subtle fluid on the outside. Next, God endowed this subtle fluid in the form of ‘spirit’, which Hutchinson considered to be identical with air, with motion and thus activity. This moving air (or ‘spirit’) dried the earth and produced movement in its parts. Interestingly, Hutchinson alludes to the
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alchemical process of incubation as being analogous to the way in which the sphere of gross water particles was caused to solidify and differentiate. In the third verse of Genesis, Hutchinson encountered the action of 'light'. He argued that 'light' was a further modification of the subtle fluid which constituted 'spirit'; this time, however, the fluid was in a thin, expansive and moving state. This new activity compressed the gross matter into the shell of the earth which was both inscribed and circumscribed by uncondensed layers of water, while at both the centre of the earth and enclosing the system was the subtle fluid. God then caused the 'spirit' to expand, thus separating the passive gross matter into strata. This expansion also caused the earth's strata to undulate and crack; mineral veins were produced by this action and the waters were caused to circulate. At the extremity of the system the rarified subtle fluid came to form the firmament. Penultimately, God populated the world with all the necessary plants and animals, each containing its own kind of seed. Lastly, of course, came man.

The geological features of the earth were not discussed in much detail in Moses's principia [A, C, and D]. However, in a posthumously published work, *A treatise on mining* [S], Hutchinson dealt with specific geological formations, particularly strata, and such problems as the existence of fossils on mountain ranges. In this undated work he does not attempt to relate geological evidence to the text of Genesis, but considers that at the time of Noah's flood the power of gravity was suspended and the earth became dissolved into the waters. This catastrophic action by water and the subsequent deposition of strata largely accounts for the present state of the earth.

During the creative process, God acted as the prime mover but used the subtle atoms of 'spirit' and 'light' as intermediate causes which moved the particles of gross matter. After the creation, God no longer fulfilled this role but the operation of the world was maintained by the mechanical (i.e. contact) action of the universal subtle fluid (see section III). In place of God, the sun now acted as the source of all motion: the fluid being moved by the sun and in turn moving the particles of gross matter. This fluid, which composed the heavens, was capable of three modifications: fire, light and spirit. The fire at the sun squeezed out particles of the fluid in the form of light, which moved away from the sun towards the enscribing firmament. During this journey the motion of the particles gradually decreased and on reaching the firmament this motion was reduced to zero. There the particles congealed into larger groups, or what Hutchinson calls 'grains', which constitute the third modification of the fluid, that is, spirit or air. Once congealed into grains of spirit, the fluid travelled back from the firmament to the sun where it was broken down into its constituent particles by the fire and these were then once more projected toward the firmament. Thus

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11 M. C. Jacob suggests that Hutchinson may have been drawing on the alchemical tradition.
a cyclical process occurs in which the quantity of the fluid is conserved. Furthermore, the process is self-sustaining, requiring no divine intervention. From this brief description of Hutchinson's cosmogonical theory we can see why he likened the operations of nature to that of a giant machine.

In order to appreciate Hutchinson's theories of matter and of power, an initial three-fold distinction will be helpful. Firstly, God exists (see section III for discussion of Hutchinson's use of the word 'Aleim' which for simplicity I shall translate as God), in whom infinite power resides. Secondly, there is the universal fluid, constituted of invisible, inactive small particles which have been endowed by God with mechanical power and thus motion, which is conserved. Finally, there are particles of gross matter which likewise are inactive and not endowed with any intrinsic powers but instead are moved by impulses supplied by the subtle fluid. In section I we saw that man's senses only give him information about gross matter and its movements while knowledge of God and of the world-machine composed of the subtle fluid can be obtained only from revelation.

The above distinctions show that real power resides only in God who imparted some power, but only of a mechanical variety, to the world-machine. This mechanical power is then transmitted by impulse between inactive particles of matter. According to Hutchinson, particles of both gross matter and of the universal fluid have only the properties of 'Solidity, Figure and Dimension [equivalent to extension?] [H. 94], but possess no means of affecting other particles except by contact action. In arguing for the importance of contact action and against action at a distance, Hutchinson pointed out that it is more to God's glory that he employs intermediate agents since mechanical action alone is comprehensible to man. Moreover, had God employed occult qualities, man could not distinguish between God's operations and those of the devil. This brings us to Hutchinson's central objection to Newton's natural philosophy. Before turning to this, it should be noted that Hutchinson emphasised, even over-stated, the differences between his natural philosophy and that of Newton. By contrast, writers like Samuel Pike sought to reconcile 'Newtonian' science and the type of scriptural exegesis advocated by Hutchinson.12

According to Newtonian dynamics, it is natural for a body once set in motion to continue moving. Thus Newton offered no efficient cause of either motion in general or planetary motion in particular. Furthermore, he associated with particles of matter certain active principles, such as gravitational attraction, by which one piece of matter affected another at a distance.13 For Hutchinson, both inertial motion and action at a distance

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13 For discussions of theories of matter and motion held by Newton and his followers, see Schofield, *Mechanism and materialism*, op. cit. (3); Thackray, op. cit. (5); Metzger, op. cit. (5);
implied the existence of some power lodged in matter since neither form of motion was explained on the Newtonian system by contact action [H. 96]. Yet, by lodging power in gross matter, Hutchinson believed that Newton had destroyed the fundamental distinction between God and the passive matter He had created. By endowing matter with power and thus by making it God-like, the Newtonians did not reconcile science and religion, but instead, according to Hutchinson, perverted each. Hutchinson complained that active powers in matter were mere fantasies not only because the Newtonians offered no evidence for their existence, but because the biblical description of nature left no room for such powers and instead attributed the motions of bodies to mechanism (see below). Furthermore, Hutchinson considered that any philosopher who attributed activity to matter would be led to ‘Doubt the Veracity of the History of Creation and Formation and consequently’ the existence of God [H. 101].

In Hutchinson’s cosmogony the immediate cause of all motion was the subtle fluid which filled all space. By contrast, the vast majority of Newton’s universe was void space, the total quantity of matter being only enough to fill the metaphorical nut-shell. Yet void space conflicted with the scriptural account which stated that the universe was full [P. 23]. By admitting void Newton had been forced to equate God with space, or, as Hutchinson expressed the matter, Newton had ‘patch[ed] up a God to constitute Space’ [H. 147]. This, however, was the God of the heathens and not the true God since the Bible stated that He is separate from the physical universe but He could both perceive and exert His power at any point in space [H. 25, 184]. Moreover, by equating God with space Newton had once again impugned the basic distinction between God and the physical universe; he had limited God’s power by requiring Him to act, and thus to be present, in every part of space [H. 148–9, 184–5].

Hutchinson was well aware of Newton’s ambivalent attitude towards subtle fluids and of his refusal to accept a plenum, which Hutchinson interpreted as an inevitable rejection of the mechanism described in the Bible. Newton’s ether, which has sometimes been conflated with Hutchinson’s universal fluid, was unacceptable on three counts. Firstly, it still permitted


void space and action at a distance, both of which were patently inimical to Hutchinson. Secondly, the ether, unlike all other fluids, had the property of offering no resistance to moving bodies. However, argued Hutchinson, if it did not resist, then neither could it act as a mover to impel gross bodies [H. 201]. Finally, and most importantly, by lodging power and activity in the ether itself, Newton had in effect turned the ether into his God [H. 136, 189]. Once again Hutchinson's objection turned on his need to maintain a sharp distinction between inactive matter and a powerful God.

Another issue on which Hutchinson's theories of the cosmos and of matter differed radically from Newton's concerned the conservation of matter and motion. Hutchinson considered that subsequent to the Creation the quantity of both matter and motion was conserved. His physical universe was circumscribed by the firmament where light particles congealed into spirit while at its centre the fire of the sun turned the grains of spirit back into light. In this closed system no matter or motion was either created or destroyed. The perfection of the world-machine in Hutchinson's theory contrasts dramatically with the Newtonian world view in which the quantity of motion was continually decreasing. This had important implications for both physics and theology; in particular, the specifically Newtonian doctrine of providence demanded God's immediate supervision of every part of the universe.15

What also impressed Hutchinson was the existence of numerous physical processes which offered close analogies to his cyclically-operating machine. Thus, for example, in both the circulation of the blood and the hydrological cycle matter moved continuously in a closed circular path while motion was maintained by a form of fire [H. 23]. A further analogy, of some contemporary significance, which Hutchinson found most impressive, was the steam engine. Here gross matter underwent a cyclical process analogous to the one performed by the universal fluid in the world-machine. Thus fire in the boiler (analogous to sun) of the steam engine caused water (analogous to 'spirit', the universal fluid in the form of grains) to be rarified into steam (analogous to light, the moving particles of the universal fluid) and to circulate. At another part of the system, the condenser (analogous to the firmament), steam was condensed into water again [P. 41, 71-85].

Hutchinson utilised the cyclical operation of the world-machine in order to explain a wide range of celestial and terrestrial phenomena. The following few examples will, I trust, suffice. The earth and other planets are caught between the outward flux of the light particles and the return flow of spirit

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towards the sun. These motions of the universal fluid cause the earth both to rotate on its own axis and to be carried round the sun [H. 8, 31]. Likewise, the motion of all terrestrial objects, including plant and animal growth and even human locomotion, was explained by the competing forces of expansion by light and of compression by spirit [P. 47–68]. In this manner, although the specific details were often rather vague, Hutchinson offered explanations in mechanical terms for many of the phenomena which Newton attributed to gravity, attraction and active principles.

Hutchinson disagreed with Newton not only over specific scientific issues, but more importantly he believed that Newton had approached the interrelation of science and theology in the wrong way. Instead of working down from the scriptures he had started with observations and had attempted to infer from them knowledge of a higher order. Yet, as discussed in section 1, such a method could not lead to an understanding of how the world was created, the number of persons in the God-head, the immortality of the soul, and so on [L. 21–2]. Indeed, this method was bound to lead to the heresy of unitarianism. For Hutchinson, Newtonian natural theology was indistinguishable from the heathen worship of nature. Natural theology forced men to place too much emphasis on their own (fallible) reasoning and too little on God’s words. Yet since neither Newton nor Clarke knew Hebrew, when they turned to the word of God they could only work from erroneous translations. Moreover, Hutchinson found the arguments of the natural theologians trivial and derisory; for example, he was bemused by Newton’s argument\footnote{17} that the fact that we have two arms, two legs, etc., was clear indication of providential design [H. 154, I. 99]. Hutchinson believed that the universe was providentially designed but he denied that man could make inferences about God merely from observing His creation. Only once a man had gained salvation could he know the essence of God [H. 63], but Newtonian natural philosophers, owing to their rejection of revelation, were destined to damnation, not salvation.\footnote{18}

\footnote{16} Hutchinson claimed that ‘our Souls do not move the Parts of our Bodies; and the Brutes which have no Souls, move the Parts of their Bodies without them’ [H. 190]. This way he appears to circumvent the problems inherent in dualism, but he fails to appreciate the further problems which his solution raises.


\footnote{18} Despite Hutchinson’s extensive disagreements with Newton, recent studies of Newton’s unpublished writings have exposed a number of areas of agreement. See, for example, Kubrin, op. cit (15); B. J. T. Dobbs, \textit{The foundations of Newton’s alchemy or 'The hunting of the green lion'}, Cambridge, 1975, chapter v; J. E. McGuie and P. M. Rattansi, ‘Newton and the “Pipes of Pan”’, \textit{Notes and Recs. Roy. Soc. Lond.}, 1966, xxi, 108–43. Newton and Hutchinson were also both interested in the language of the Bible and in assessing the significance of Solomon’s Temple.
III. Hutchinson's theory of language

A recurrent concern among fundamentalists has been the analysis of biblical Hebrew in order to comprehend the hidden meaning of the scriptures. The cabbalistic schools of medieval Spain provide an early example. A fascinating and more recent example is Benjamin Lee Whorf who became interested in linguistics through his study of biblical Hebrew which he, too, believed contained the true, but cryptic, meaning of the Bible, obtainable by attributing a specific inherent meaning to each letter of the Bible. There were also many in the eighteenth century, including Hutchinson, who shared this preoccupation. A considerable proportion of his published writings are concerned with linguistics, and he developed a sophisticated, but ultimately untenable, theory of the Hebrew language which, it is suggested, played a major role in his world view. It would, in fact, be difficult to over-estimate Hutchinson's concern with language; even the very act of creation by God was a linguistic process. God made the world-machine 'not with a Hammer but with a Word' and fixed the parts together 'not with Iron, but by a Command' [A. 16, D. 175]. Unlike the natural theologians who used such metaphors as the divine artificer or clockmaker, Hutchinson's God was the divine linguist or penman. Thus, as recorded in Genesis, God gave different names to fire, light and spirit. The fact that He had named them differently implied to Hutchinson that they were not separate entities but merely modifications of the same fluid.

For Hutchinson the language of the Bible was perfect. The Hebrew words not only convey precisely the ideas of things, but there is also an exact correspondence between the words of the language and reality [A. 16, C. xxix, H. 28, L. 90]. Furthermore, this correspondence involved two distinct levels of reality, the physical and the spiritual; for example, the same Hebrew word signified both the natural light and the ineffable light [C. xxvii]. As discussed in section I, Hutchinson's empirically-based psychology implied that we can know only those objects which we have experienced. In order to decipher the Bible, we must infer the indirect significance of words from their material signification by means of the method of comparison [H. 9]. Thus the scriptures are capable of two parallel interpretations each of which is true; for example, in Genesis, prior to the formation of man, one description refers to the physical creation, the other to God's activity.


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[A. 16]. Hutchinson considered that after the 'Confusion of Tongues', appreciation of this dual form of discourse was lost and so the heathens worshipped material objects themselves without realising that these objects were meant as signs signifying spiritual entities. Thus, the lion, one of the emblems representing Christ, came to be worshipped by the Egyptians [K. 389]. In other words, the heathens in their worship overlooked the fundamental distinction, discussed in section II, between the spiritual and physical realms.

Central to Hutchinson’s linguistic theory were two procedures which he used to establish relationships between the meanings of different Hebrew words.21 One enabled him to assign a range of meanings to a specific Hebrew word, while the other connected different Hebrew words having the same ‘unpointed’ consonants. We shall examine in turn these two procedures.

In discussing any particular Hebrew word, Hutchinson usually cited the definitions given in Hebrew lexicons together with the biblical passages in which the word occurred. In this manner he was able to generate a wide range of associative meanings. Consider, for example, the sixth verse of Genesis which reads in the King James’ version: ‘And God said, Let there be a firmament in the midst of the waters ...’. Concerning the Hebrew word ‘raki’ (רָקָי), here translated as firmament, Hutchinson refers to the concordances of Marius of Calasio (1621) and Kircher (1607) in which the word is taken to signify not only the firmament but also the expansive condition of some substance. The full range of this associative meaning is not denoted by any single word in the English language (‘because we have no Idea of it’), but Hutchinson renders it as ‘Expansion’ [A. 29–36, D. 265–7]. It is this semantic connection between the firmament and expansion which underpins the functions attributed to the firmament in Hutchinson’s cosmogony. Thus in his discussion of the creation, the ‘spirit’ was expanded to form the firmament. Likewise, in the subsequent operation of the world-machine ‘spirit’ (or air) has the property of expansion.

A further example is the word ‘khoved’ (ךַּוָּד), which, according to some of the dictionaries Hutchinson consulted, means ‘to make heavy’. He extended this meaning to include ‘to gravitate’. The same word, in its unpointed form, also signified in some dictionaries the idea of glory, in the sense of glorifying a king [I. 5–6]. For Hutchinson glory and gravity thus became related through language. Furthermore, they were also connected conceptually since light was the cause of gravitational attraction and light, in a metaphorical sense (or what Hutchinson called ‘emblematically’), was the glory emanating from Christ. Similarly, in Christian art, glory was represented by light rays radiating from the head of Christ [I. 266]. While Christ

21 Neither form of argument is generally valid. However, Hutchinson probably hit on some linguistic relations which are today considered significant.
was linguistically and conceptually related to the universal fluid in the form of light, the other two modifications of the fluid represented the Father (fire) and the Holy Ghost (spirit or air). Thus the theological Trinity had its counterpart in the world-machine. Furthermore, Hutchinson pointed out that in the Bible several different words were used to signify, say, light. This, too, he considered significant since each of these words indicated a distinct condition or mode of action of the light. Similarly the different terms used to refer to Christ indicated each of his different ‘Offices’ [C. xix, D. 358, P. 46]. Hutchinson considered that by solving linguistic problems of this type ‘one Sense of each Word will run through the Whole, and the Science of Nature and Theology would strengthen each other reciprocally’ [C. xxii].

The second procedure concerns Hutchinson’s belief in the perfection of the Hebrew language. He considered that when words contain similar arrangements of ‘unpointed’ consonants, the things they signify must be related conceptually. The example I would like to discuss concerns some of the central concepts in Hutchinson’s cosmogony. He analysed three similar Hebrew words:

- שם (shem) - a name
- שם (shem) - he placed, put, disposed
- שמים (shamaim) - the heaven(s)

In their ‘unpointed’ Hebrew form (first column) the words are similar and in the first two cases identical. Hutchinson considered these three words semantically interrelated if not conceptually congruent. Consider first the relationship he posited between ‘sam’ and ‘shem’. He considered the first of these words to be a noun: the place or the space. Thus ‘the Place and the Name are the same’ from which he argued the proposition that ‘Substance and Space are the same’ [D. 79, G. 258]: a doctrine with a Cartesian ring about it.

Of even greater significance is the relationship he established between ‘shem’ and ‘shamaim’ since this provided the crucial link between God’s creative act and the subsequent function of the world-machine. The semantic connection is best illustrated in the following speculative passage in which he suggested that ‘the Heavens were called by the Word used for [the] Names of the Trinity . . . and perhaps, שם which the translators have rendered Name, Gen. xi’4, might be an Image, or Representation of the Heavens, or of some Branch of Condition or Power in them’ [D. 102]. Thus in his own writings the two words were frequently interchanged; thus Hutchinson’s translation of Psalm 19 reads: שם שמים the Names declare the Glory of God . . . ’ [F. 207–8]. The implications of this semantic relationship can be seen with respect to Hutchinson’s cosmogony as discussed in section II. We can now appreciate Hutchinson’s rationale for considering the Trinity in the God-head to be analogous to the three conditions of matter in the
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heavens (i.e. fire, light and spirit), since both were signified by the same Hebrew characters. Furthermore, just as the spiritual Trinity has one essence, so, by analogy, the three forms of matter in the world-machine are of one substance [F. 198].

The form of linguistic analysis employed by Hutchinson extended also to his method of deciphering emblems, hieroglyphics and even architecture. Thus, for example, Solomon's Temple and its ornaments, as related in the first book of Kings, were constructed on the same principles as the universe itself but on a microcosmic scale. For Hutchinson the Temple's structure represented the world-machine and the descriptions of each of its parts were emblems for the components and processes in the macrocosm [Q. 1–86]. In adopting this approach, Hutchinson may be seen to be drawing on the widespread seventeenth-century concern with symbolism relating to alchemical emblems, Egyptian hieroglyphics, and the attempts to frame a natural language. However, while Hutchinson may have adopted the techniques of the Cabbalists and Rosicrucians, my interpretation of his works distances him considerably from the magical tradition. Indeed, despite some residual elements of alchemy, he explicitly rejected a mystical approach to religion, in which, for example, miraculous power was vested in the Hebrew name for God [K. 74].

For Hutchinson, the post-biblical dissociation of science and theology was intimately bound up with the loss of the original Hebrew language. Only in the semantics of the Hebrew language did words represent reality, while in all other languages words had only conventional significance. In the translation of the Bible into Greek, Latin and other imperfect languages, the rich layers of meaning were destroyed since these other languages differed from Hebrew both syntactically and semantically. Hutchinson appears to have had a strong sense of the cultural relativity of language [H. 129]. Even individual Hebrew words, such as ‘God’ (see below), lost their original signification in translation and instead took on different meanings, which were associated with beliefs prevalent among the heathens who spoke imperfect languages. In science, too, ‘senseless Words’ were employed, which failed to signify any of the real entities which were adequately described in the Bible. Indeed, Hutchinson complained that among contemporary philosophers ‘nature’ had become a ‘Cant Word, without any Signification’ [L. 40, 144]. Furthermore, Hutchinson maintained that the current theories in science and theology were false because their proponents, and in particular Newton and Clarke, were dependent on erroneous translations of the Bible since they were unable to understand Hebrew.

22 See, for example, Scholem, Major trends, op. cit. (19); M. David, Le débat sur les écritures et l'héroglyphe en XVIIe et XVIIIe siècles et l'application de la notion de déchiffrerment aux écritures mortes, Paris, 1965; J. Knowlson, Universal language schemes in England and France, 1600–1800, Toronto and Buffalo, 1975.
One language which Hutchinson utterly rejected was mathematics. In this he opposed Newton, Descartes, and their followers who emphasised the role of mathematics in the analysis of nature. Hutchinson, who claims to have had a good grounding in mathematics, accepted that God had framed the world according to specific proportions. This is related in Isaiah, xl, 12, but other scriptural passages, such as Jeremiah, xxxi, 37,23 assert that man must not measure the heavens and earth otherwise he would be disowned by God. Since the Bible is true, Hutchinson claimed that 'there can be no Application of Mathematicks' [H. 226]. Yet his discussion of mathematics did not rest solely on biblical texts. Among his other objections to using mathematics to describe nature were the following:

(a) There were major disagreements among astronomers over celestial distances and magnitudes. Hence, far from being a precise language, mathematics was riddled with error and uncertainty.

(b) He rejected the view that mathematics was an important modern innovation and instead pointed out that the ancients had an excellent grasp of mathematics. This knowledge had been lost during the 'Confusion of Tongues' (sic) and was readily rediscovered in the seventeenth century.

(c) Hutchinson pointed out that mathematics was applicable equally to arguments with either true or false premisses. Newton (whose diagrams in the Principia Hutchinson likened to 'Cobweb[s] of Lines and Circles to catch Flies in' [H. 222]) had tried to construct his picture of the universe on mathematical principles. This, considered Hutchinson, was the wrong way of proceeding since he should have started with the biblical description of the world-machine and then attempted to set these in a mathematical form. Hutchinson suggested the type of explanation involved. According to his theory, the radiation from the sun decreases with distance; thus the motive power of the outer planets is less than the inner ones.

In this section, I have attempted to show that Hutchinson's analysis of the Bible was founded on a rational programme involving a sophisticated theory of language. Moreover, whatever the shortcomings of his linguistic and physical theories, the above discussion casts considerable doubt on the claim by Leslie Stephen and others that Hutchinson was merely a capricious crank.

23 Isaiah, xl, 12: 'Who hath measured the waters in the hollow of his hand, and meted out heaven with the span . . . '; Jeremiah, xxxi, 37: 'If heaven above can be measured, and the foundations of the earth searched out beneath, I will also cast off all the seed of Israel . . . .'
IV. The role of language in Hutchinson's cosmogonical theory

An interesting problem area, and one deserving further analysis, is the role which language plays in scientific theorising. Benjamin Lee Whorf has even suggested that we 'dissect nature along lines laid down by our native languages. This fact is very significant for modern science, for it means that no individual is free to describe nature with absolute impartiality but is constrained' by language. While such speculations cannot be accepted at face value, we can, perhaps, attempt to answer a much more restricted question about the influence of language on scientific theory: was Hutchinson's cosmogonical theory affected by the language of the Bible? Before turning to this question we should note that Hutchinson did not propose his scientific theories in isolation from contemporary ideas. His discussion of the creation process did not differ radically from some of the other cosmogonies discussed by Collier, and he was certainly familiar with the writings of John Woodward, William Whiston, and many others. Thus Hutchinson should certainly be viewed in this intellectual tradition from which he drew many of his concepts. However, while the role of language should not be over-stated, certain specific aspects of his scientific theories, and particularly his discussion of the post-creational state of the physical universe, indicate the influence of linguistic considerations.

It is reasonable to suppose that Hutchinson was socialised into the English tongue at an early age and then 'dialogued' with Hebrew, not in the form of a spoken language, but as a set of symbols, a form of code from which he deciphered a particular message. The method he used to decipher this code also affected his translation of the Bible. For example, as discussed in section III, Hutchinson turned to various dictionaries in order to generate the range of meaning of any particular Hebrew word. In emphasising this point, I wish to deny the suggestion that Hutchinson's cosmogonical theories were simply 'read out' of the unpointed Hebrew text. To the contrary, Hutchinson's interpretation of the Bible was mediated through complex conceptual and philological structures.

The following considerations show the ways in which Hutchinson's cosmogony was shaped by the Bible.

(a) Hutchinson's investigations of the natural world were centred on deciphering the text of the Bible. Hutchinson was, of course, not unique in employing this source for knowledge about the creation of the world.
Less typical is his insistence that the Bible should be used to discover the physical processes of the world in its post-creational state.

(b) In trying to explicate the message of the Bible, Hutchinson was aware that certain words could not adequately be translated into English. Thus at the lexical level certain 'hebraic' elements entered into the description of his physical theories. His use of unfamiliar theory-laden words such as ‘the Names’, ‘Gravitor’, etc., which makes his prose difficult to read, stems from this problem of translation. (This raises the yet unanswered question of whether Hutchinson’s close study of Hebrew is reflected in his obscure style.)

(c) Grammatically, the connection appears to be quite strong. A recurrent example concerns words with the Hebrew ending ‘im’, which Hutchinson believed always signified plurals. Thus, he argued, since the word for water (‘maim’—Genesis, I, 2) displayed the plural form, there must be two regions occupied by water, one inside the sphere of earth, the other beyond it [A. 17]. Similarly, he related the plural form of the word for heaven (‘shamaim’—Genesis, I, 1) to the three modifications of the universal fluid. Most significantly, he employed in his writings the word ‘Aleim’ (usually spelt ‘Elohim’) instead of ‘God’, since it too has a plural ending in Hebrew. He argued that those who ignored this grammatical point and instead translated ‘Elohim’ as ‘God’ or ‘Deus’ committed the heresy of attributing creation to a single being, whereas the scriptures were explicit about the Creator’s plural—indeed tri-personal—nature. These three examples illustrate how Hutchinson’s theories were affected by Hebrew grammar. Many other examples could be cited.

(d) Through the loose procedure of eliciting different English meanings of the same ‘unpointed’ Hebrew word, Hutchinson generated conceptual links within his physical theory. While Hutchinson chose only to emphasise certain of these connections, they existed in the text and in the linguistic tools that he used. Thus the key concepts of ‘glory’ and ‘gravity’—and thus light as the cause of gravitation—were related through the word for firmament.

(e) His method of seeing a relationship between the meanings of words with similar Hebrew consonants also established specific concepts in his physical system. In particular, the example discussed above of ‘sam’–‘shem’–‘shamaim’ explains the relationship between several concepts central to Hutchinson’s theory of the post-creational state of the universe.

In this paper, I have discussed Hutchinson’s programme in natural philosophy in which he emphasised the Bible as the primary source of scientific knowledge. He did not entirely reject empiricism but attributed a specific and limited role to it. In order to decipher the message implicit in the biblical
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text, Hutchinson employed a number of ingenious methods of linguistic analysis. In this final and rather speculative section, I have suggested that while the language of the Bible was not the sole source of Hutchinson's science, it is justifiable to claim that linguistic considerations significantly fashioned his physical theories.

This paper does not take us far in solving the more general problem of the relationship between revelation and empiricism in eighteenth-century geology. In the case of Hutchinson, we see that revelation and empiricism were related in a complex and subtle fashion. Moreover, taken together with other recent studies, we may perhaps appreciate more fully the diversity of approach available to the eighteenth-century geologist.

Additional bibliography


