Science without Borders: Alexander von Humboldt's Concepts in Today's World

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Proceedings of the Humboldt-Kolleg
Varna, September 18 – 21, 2019

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SECULAR SCIENCE IN MESOPOTAMIA AND GREECE

Markham J. Geller

Keywords: *Babylonian medicine, cuneiform medical treatises, Pre-Socratic philosophical doctrine, semiotics of signs and symptoms*

Abstract: *One popular perception is that Babylonian medicine was not actually a science but was dominated by religious thought, with the active presence of gods in human affairs, including disease. According to this thinking, the line between Babylonian medicine and magic was blurred, making it hard to distinguish between the activities of doctors and exorcists. The usual consensus is that the Greeks refreshed everyone's thinking about the cosmos by removing religion and the gods from theories of natural science. The common assumptions are questioned here, based on a recently published ancient catalogue of Babylonian medicine listing some 90 cuneiform medical treatises known by their opening lines. This highly unusual cuneiform tablet organises the data into sequentially numbered component chapters – a record of an ancient medical library much more systematically organised than the much later Hippocratic Corpus.*

Changing basic perceptions of ancient science represents a major challenge, particularly when fixed ideas are shared by several disciplines.[1] Since the beginning of the 19th century, an idealising vision of the so-called "Greek miracle" still persists, combined with the notion that Babylonian thought was essentially mythological and religious, an intellectual cul-de-sac which had little or no impact on the development of early Greek philosophy. One popular perception is that Babylonian medicine was not actually a science but was dominated by religious thought, with the active presence of gods in human affairs, including disease. According to this line of thinking, the line between Babylonian medicine and magic was blurred, making it hard to distinguish between the activities of doctors and exorcists.[2] In any case, it is possible to argue that Babylonians had little faith in physicians or healers, in a world in

[1] Many of the ideas in this paper were developed during the course of the ERC Advanced Grant Project BabMed (2013 – 2018), and particularly resulting from collaboration with Cale Johnson.

[2] One of the main advocates of this position is Scurlock 1999, arguing for the 'physician' (Akkadian *asû*) being considered as an apothecary, with the exorcist (Akkadian *āšipu*) taking the lead as healing professional.

which the righteous were thought to suffer while the wicked were rewarded.[3] The usual consensus is that the Greeks refreshed everyone's thinking about the cosmos by removing religion and the gods from theories of natural science. I would like to question some of these common assumptions.

This biased image of Babylonian versus Greek medicine is reinforced by Herodotus, whose remarks are still taken seriously. Herodotus insisted that his contemporary Babylonians had no real doctors or medicine, but simply reclined in the street waiting for layman's medical advice.[4] This extraordinary view is contradicted by a recently published ancient catalogue of Babylonian medicine listing some 90 cuneiform medical treatises known by their opening lines. This highly unusual cuneiform tablet organises the data into sequentially numbered component chapters (or 'tablets'). In essence, this record of an ancient medical library is much more systematically organised than the much later Hippocratic Corpus, since all anatomically based treatises are listed in a strict head-to-foot sequence, while all general pathologies are listed separately.[5] The point is this: comparisons between the Hippocratic corpus and 'Oriental' (i.e. Babylonian and Egyptian) medicine have stressed the religious component of earlier medicine which was fundamentally overtaken by the more rational approach of the Greeks. However, such a system based primarily on theology, that is, on divine or demonic personal intervention into the patient's medical condition, would not require much emphasis on *technē* and methods of treatment; the emphasis would rather be on prayer and exorcism, which is clearly not the case. The highly systematic character of Babylonian medicine, as known in later periods, requires a different kind of evaluation and analysis.

This type of evidence also runs counter to a widely-held view that ideas within Babylonian culture were transmitted in a 'stream of tradition' which did not adapt easily to change or innovation over time, combined with an inherent resistance to new modes of thinking.[6] By roughly 750 BCE, Babylonian

[3] This evaluation of the Mesopotamian world view is based on an assumption that the pessimism expressed in the Akkadian literary text, *Ludlul bēl Nēmeqi,* was highly influential within Mesopotamian society; in this composition, the speaker despairs of being healed by physicians or exorcists or diviners, but only the god Marduk can save him. For this text, see the recent edition of Oshima 2014. See Annus, Lenzi 2010: 35, 37.

[4] Herodotus (I, 197), see now Geller 2018: 29 for a discussion of this passage.

[5] See Steinert 2018 with in-depth contributions from Cale Johnson, Strahil Panayotov, Eric Schmidtchen, and the present writer.

[6] The 'stream of tradition' argument was forcefully advocated by A. L. Oppenheim in his seminal work, *Ancient Mesopotomia* (1977). Much of what Oppenheim proposed is still valuable and useful, but the argument needs to be revaluated in the light of the large number of recently published texts from the first millennium BCE, which indicate innovation and changes in views, although the stream of tradition retained strong influences, even in late

scholarship (largely in the realms of medicine and astronomy) had managed to develop various alternatives to millennia-old causal theories expressed through mythologies and theologies.[7] In the cuneiform medical treatises of the Royal Library of Nineveh, for instance, diseases that had previously been viewed in terms of ghosts, demons and deities were now viewed through observation-driven models of causation of illness.

By the 8th century BCE, Babylonian medicine served as an example of a discipline which consistently moved away from theological models in favour of analogies based on the natural and social world. Healing strategies gradually shifted their allegiances from exorcism and formal incantations towards astronomy and astrology and computation, which were essentially godless disciplines; planetary influences replaced divine intervention. The long history of observational norms eventually evolved into a system based upon clinical observation of changes in human anatomy, combined with some awareness of the properties of plants and drugs, and a systematic approach to therapy utilised a theory of natural elements (heat, cold, aridity, moisture); similar concepts were refined and developed further within Greek science and medicine (e.g. that plants had *dynameis* or powers). The fact that Hippocratic medicine was rooted in the Pre-Socratic philosophical doctrine is well known,[8] but that Babylonian medicine followed these same models has not yet been adequately recognized.

As Francesca Rochberg and others have pointed out, Babylonians recorded their observations and resulting predictions (or inferences) in the form of a loose causality of associated ideas expressed in the fixed form of a statement 'if P then Q',[9] which probably arose from the predominant influence of legal

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periods of Mesopotamian thinking. Nevertheless, late Babylonian texts adopted modes of reasoning which can be compared with early Greek science; see Rochberg 2004.

[7] The classic example of this change is the abandoning of the cosmic view that celestial bodies were guided in their movements by the personal whim of the wisdom god Ea, whose *uṣurtu* 'scheme' controlled the heavens. Similarly, the Pre-Socratics removed the gods and their mythology from their toolkit, and in doing so, various mechanical factors or processes, such as proto-elements or roots of the natural world, were pressed into service – rather than deities and myth – as pieces of their explanatory model (cf. Most 2016). Babylonian medicine (and later forms of magic) shows similar patterns of drawing analogies from the natural world.

[8] See Lloyd 1973, and for the latest edition of Pre-Socratic texts, see Laks, Most 2016.

[9] See Rochberg 2010. Babylonian science in general relied upon implicit theory which was hardly ever committed to writing, in contrast to philosophy, which was a purely Greek invention. One working assumption is that early Greek science adopted views which already existed but are not easily recognisable in Babylonian tablets, since Babylonian scholarship relied upon juridical casuistic models ('if P then Q') rather than the more didactic genres of Greek theoretical treatises known from Greek philosophy. At the same time, rhetoric (which had no place within a Babylonian curriculum) helped formulate the literary genres of Greek science.

codes within the Babylonian school curriculum.[10] The dominant influence of legal reasoning even within medical diagnosis can be seen in the following example from the Babylonian Diagnostic Handbook (cf. Scurlock 2014: 53).

symptoms **traditional diagnosis**

If (a patient) is sick in the night and healthy in the morning: It is "Hand of Urash",
because of (*ashu*) the wife of (another) man.

causal factor (borrowed from jurisprudence)

What at first appears to be assigned to a 'religious' cause (the hand of the god Urash) has a more worldly explanation based on a specific idiom borrowed from legal tradition (the word *aššum* = 'because of').[11] The term *aššum* indicates the cause of an action which will determine the verdict, such as someone being found guilty because he stole property. In this recipe, the word *aššu* points to an illness presenting itself because of the patient's sexual encounter with another man's wife. Furthermore, the common diagnostic description of disease caused by the 'hand of a god' (as in the above example, the god Urash), or alternatively, disease being frequently attributed to the 'hand of a ghost', originally no doubt indicated personal divine or demonic interference in the patient's illness. However, over the course of time, these terms had evolved into non-personal labels for specific diseases, used in conjunction with technical disease terminology. We find a later tendency to replace earlier 'religious' terms for disease, as a 'hand of a specific god', with technical disease names, like a term for a skin condition.[12] This was driven by the need for greater precision and accuracy, although various factors, including professional conservativism, did not allow for the complete abandonment of traditional terminology. This is why the expression 'hand of a god' or 'hand of a ghost' remained in usage, even though the meaning behind these terms had changed.

Francesca Rochberg has also argued forcefully that in certain regards the concept of 'nature' (*physis*) was uniquely Greek, not shared by any earlier

[10] Some 400 examples of copies of Hammurabi's Law Code have been found in school archives, making it the most often copied of any ancient Babylonian text. I am grateful to Cale Johnson for this observation.

[11] Chicago Assyrian Dictionary A/2, 466.

[12] This argument was put forward in Geller 2015: 204 – 205, with examples, but the argument has not been followed up or refuted so far.

scientific community (Rochberg 2018). In fact, the Greek term *physis* referred in earlier periods to individual 'characteristics' of an object and only later to the 'natural environment' in an abstract sense. In order to determine whether Babylonian science ever thought in these same terms, it is important to recognize that Babylonian scholarship was not adept at coining new terminology but relied upon an inherited traditional vocabulary, which could nevertheless be applied to new concepts. For example, the Babylonian term *šiknu*, 'physical state', was often applied in late explanatory texts to explain the 'properties' of medical plants and stones.[13] As such, the Babylonian term *šiknu* corresponds to one meaning of *physis* as a 'characteristic' or 'nature' of something, which is not so very distant from a more abstract meaning of nature known to the Greeks.

Babylonian medicine (including recipes, etiological 'incantations', diagnostic lists of symptoms, and medical procedures) has not generally been investigated for the scientific thinking and orientation behind this vast corpus of texts. Babylonian medicine offers a comprehensive and extensive array of technical vocabulary, drawn from ancient glossaries of *materia medica* and diseases, as well as a rich array of explanatory medical commentaries.[14] On the conceptual level, diagnostics and the prognostic predictions are based upon the semiotics of signs and symptoms, which at one level apply to the human body but then by extension to the cosmos in general, as a universal feature of ancient science from this region. Moreover, compound medical recipes involve sequential ordering and combining of solid and liquid ingredients within a rudimentary chemistry (much like cooking recipes); the principles involved in creating such recipes were based upon theory and hierarchies of concepts about the physical environment, which were never effectively explained within Babylonian technical literature.

Furthermore, contrary to common perceptions in secondary literature, there is little magic within Babylonian medicine. The so-called medical 'incantations' (Akkadian *šiptu*) mostly lack the characteristic adjurations, conjurations, appeals to divinities, descriptions of demons, and other signatures of Babylonian magic; 'medical incantations' were aimed at defining the cosmos in which disease originated and was to be treated. Medical 'incantations', like

[13] See Stadhouders 2011 and Stadhouders 2012 for an edition and translation of the explanatory plant list, *Šumma šikinšu* (lit. 'a plant, its characteristic'); a model citation would read, 'if a plant's nature (*šiknu*) is similar to plant B, its name is X'. See also Schuster-Brandis 2008 for an edition of similar explanatory stone lists known as *Abnu šikinšu* (lit. 'a stone, its characteristic').

[14] A volume of Akkadian medical commentaries is soon to be published by John Wee. See also the Yale Cuneiform Commentaries Project (https://ccp.yale.edu/).

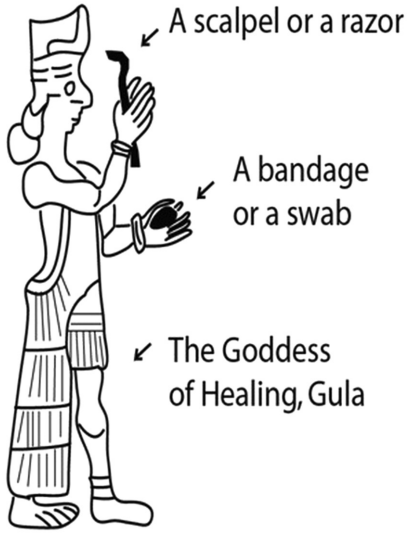
the counterpart medical 'rituals,' were medical procedures which explained the conceptual basis and function of the recipes. Here are two examples of such explanatory 'theory' imbedded in Babylonian medical texts:

1). A 7th century Babylonian text from Nimrud against skin lesions (*simmu*) reads:

> The lad being afflicted groans and the maiden being afflicted thrashes about. [The moon god] Sin noticed it by himself, [the gods] Ea, Enlil, and Belet-ili became worried by it. Sin opened his mouth speaking, 'We [the gods] placed *simmu*-lesions in the land, after we created mankind we bound up life and death with it. O universal *simmu*-legion, [the god] Anu has created you so that you seize the body of both man and god. The one bound up in flesh...., [the gods] Ea and Belet-ili have determined your destiny.'..... **[O Gula], healer among the great gods, [bring instruments] of healing, your scalpel and prescription**. (Geller 2000: 338)

The purpose of this historiola within a medical prescription is to explain the primordial (and intractable) nature of skin disease, created at the same time as man, and to press the healing goddess Gula to arrive with her recipes and scalpel in hand. This latter phrase allegorises Gula's arrival in terms of the usual tools of human therapy – recipes and scalpels – rather than incantations or magical rituals.

In fact, other medical incantations go further, warning the patient to get healed before Gula arrives with her scalpel, hinting at the inherent dangers of surgery, as in the following medical incantation for ailing eyes, our second example of explanatory 'theory' within an incantation:



2) Incantation. Eyes with the porous blood vessels, why have you been blurred by chaff, thorns,....-fruit, or river algae? Why have you been blurred by clods or twigs in recesses? Rain down here like a star, keep falling here like a meteor, **before the flint (-knife) and scalpel of Gula reaches you**![15]

The specific problem expressed here is that the eye which has become clouded with foreign matter must be cleansed by its own tears before the

[15] This text comes from a forthcoming edition of Mesopotamian eye-disease texts from S. Panayotov and the present writer, to be published by de Gruyter (Berlin), planned for 2020.

doctor arrives with his scalpel. There is nothing magical in this incantation, but it is down-to-earth in its depiction of medical practice. Both of these examples, of skin lesions and bloodshot eyes, come to the same conclusion. These passages describe physical symptoms which are exposed to the risks of surgical treatments; better to be healed before the surgeon arrives. But there is no magic in these medical incantations.[16]

The aim of this paper is to argue for a new framework for assessing the early phases of scientific thinking, which culminated in the emergence of Greek rational medicine, but this should be combined with a fresh view of systematic rationalities characteristic of cuneiform medical sources from Mesopotamia.[17] Medicine represents the most multi-faceted discipline within Mesopotamian intellectual culture, borrowing concepts and methods from jurisprudence, astronomy, mathematics, and divination, while formulating rational propositions and approaches. Future studies need to investigate the *science* behind Babylonian medicine by comparison with early Greek philosophy. This cannot be achieved by limiting the inquiry to ancient medicine (e.g. Babylonian and Hippocratic medicine), since comparisons of these two systems of medicine – while important – are insufficient to provide answers to the deeper questions about scientific method, rationality, and analogical reasoning. The overall question is whether the highly systematic and theoretical basis of Babylonian thought may have made a significant (although largely unacknowledged) contribution to early Greek philosophy, while Greek emphasis on theory may have influenced the late Babylonian curriculum.[18] The answers to this question will probably challenge long-held views of the primacy of Greek thought, which developed without reference to the broader

[16] The figurative allegories occurring within medical incantations were etiological and explanatory (in a theoretical sense) rather than magical (see the examples given in Collins 1999), in stark contrast to the older venerable tradition of Babylonian healing rituals and incantations with frequent appeals for divine intervention and assistance.

[17] One of the key debates within early Greek science involved the role of observation as opposed to sheer reasoning (Lloyd 1979, Most 2016). Although Babylonians had no category of theoretical tractates within their conservative curriculum, nevertheless they contributed detailed observations of the movements of heavenly bodies over centuries which were later incorporated into Greek astronomical theory. Babylonians also produced a *Diagnostic Handbook* listing some 15,000 observations of symptoms. Greek scholars analysed the existing data without recreating it. It may even be that precisely *because* Babylonian scholarship was known in antiquity for recording phenomena, this reputation may have spurred some Greek theorists towards new methods based upon logic and analogy and away from observation.

[18] One must, however, take into account the historical context of technical knowledge within each sphere of influence, bearing in mind the non-institutional character of Greek philosophical schools in contrast to the highly centralised academic culture and common curriculum of Babylonian academies.

intellectual context in which science and philosophy were able to develop and thrive.

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Markham J. Geller
University College London
m.geller@ucl.ac.uk
Freie Universität, Berlin
mark.geller@fu-berlin.de