

What Can We Know of What the Romans Knew?

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In *What Did the Romans Know?* (2012) Daryn Lehoux paints a complex portrait of Roman intellectual life. Ethical, political, and cultural traditions inform the conventions of scientific inquiry and fact-making. He at once presents a broad network of intellectual artifacts – he examines a plethora of texts, such as by Cicero, Lucretius, Ptolemy, and Galen – and he offers a deep analysis of how ancient history may inform the philosophy of science, and vice-versa. A common thread through the monograph consists in attempts by philosophers, ancient and modern, to propound realism in the face of skeptical challenges, to assert that scientific theories are true and that it is possible to know that they are true. Lehoux adopts a pragmatist theory of truth and justification, and he argues that Roman philosophers, mathematicians, and physicians were justified in asserting the truth of their scientific theories.

In the following, I examine three components of Lehoux’s multi-faceted argument. First, I address his proof of the existence of the concept of natural law in the Roman period, well before the sixteenth century, its generally accepted *terminus post quem*. Lehoux divorces the terminology “law of nature” from what he takes to be the concept’s essential content, regularity in nature. Once the concept is free of its philological constraints, Lehoux argues that historians may justifiably take the account of planetary stations in Ptolemy’s *Almagest*, for instance, to function as a law of nature, even though the text does not label it a law as such. I attempt to bridge philology and content by analyzing Ptolemy’s accounts of law and reason in *On the Kritêrion and Hêgemonikon* and the *Harmonics*. I argue that an analogy comparing law and regularity in nature is consonant with Ptolemy’s epistemology and, therefore, despite the fact that Ptolemy does not use the phrase “law of nature,” the metaphor suits his philosophy of science. Second, I address in what way Ptolemy’s epistemology responds to the so-called “Skeptical challenge”, as Lehoux contends. Third, I examine Lehoux’s own response to the Skeptical challenge. Lehoux explores how the ancient historian may justify a realist rather than a relativist position, and I suggest that Lehoux’s historiography and philosophy of science are consistent only if we take his historiography, like his philosophy, to depend on a pragmatist theory of truth.

Laws of Nature

In his third chapter, “Law in Nature, Nature in Law,” Lehoux argues that the concept of a “law of nature” is not an invention of sixteenth- or early seventeenth-century natural philosophy as is generally supposed. The phrase itself, *leges naturae* or *foedera naturae*, occurs in Latin texts, and Lehoux analyzes passages from Lucretius’ *De rerum natura* and Vergil’s *Georgics* to

demonstrate that these authors not only include the phrase “law(s) of nature” but that they use it to denote strict regularity in nature, which Lehoux takes to be the concept’s essential content.

Lehoux acknowledges that pure philology would not persuade many, perhaps most, philosophers of science that a law of nature is an ancient rather than a modern concept. An intellectual history is necessary, and it must respond to philosophical investigations of the concept. Before challenging Jane Ruby’s and J.R Milton’s accounts of what constitutes a natural law, Lehoux distills their and others’ criteria into two:

- (a) They should be specific statements that such-and-such *is* a law of nature (as opposed to vaguer statements that there just *are some* laws of nature), and
- (b) The x in “x is a law of nature” should be descriptive, explanatory, and preferably mathematical. (Lehoux 2012, 64)

Lehoux notes that the first criterion, “the specificity criterion”, dismisses most of the ancient examples he has presented in the chapter. Lucretius and Vergil observe that nature, broadly conceived, behaves regularly, but they do not articulate specific laws. I would contend that one of the examples Lehoux presents might meet the specificity criterion. At *De rerum natura* 6.906ff., Lucretius states that a law of nature is responsible for the attraction between magnets and iron, and he proceeds to explain the attraction by means of atomism. Yet, even if this case meets the first criterion, it does not meet the second. The law is descriptive, but what is explanatory is not the law of attraction but the atomism underlying it. Moreover, the law is manifestly not mathematical.

Newton’s laws of motion customarily are taken to be archetypal cases of laws of nature, and Lehoux uses their notoriety to his advantage. He examines why it is that Newton’s laws are paradigmatic: “So what is significantly new in the *Principia*? There are three possible candidates: (1) Newton’s equivalence of *axioms* with *laws*: *axiomata*, *SIVE leges motus*. (2) The specificity of the phrase *laws of motion*. (3) The content of the laws themselves” (Lehoux 2012, 68). The first candidate is a lexicographical innovation, the second is philological, and the third concerns content. Lehoux maintains that what is essential to a law of nature is not lexicographical or philological, for these properties are superficial. Instead, it is the content – which Lehoux takes to be strict regularity in nature – that marks a law. If one takes the content to be the only essential property of laws of nature, then one may find examples that are laws even if they lack the philological and lexicographical features.

This content-based approach allows Lehoux to bring Greek texts into the conversation. As Lehoux notes, only one reference to a “law of nature” exists in the Greek corpus. The opening of the Hippocratic text *On Generation/On the Nature of the Child* reads “law governs everything” (in Lehoux 2012, 57). For a law that is descriptive, explanatory, and mathematical, albeit not labeled “law,” Lehoux looks to Ptolemy’s models of planetary motion and, in particular, his account of planetary stations. Lehoux argues that Ptolemy’s account at *Almagest* 12.1, H450-451, meets the content-based criterion no less than Newton’s laws.

It is true that Ptolemy never uses the phrase “law of nature,” but he does examine law, and the institution of the court of law, alongside his epistemological theory. In *On the Kritêrion and Hêgemonikon*, Ptolemy constructs an analogy juxtaposing judicial adjudication with the criterion of truth, the process by which a human being judges an object for the sake of knowing the truth. Although Lehoux addresses Ptolemy’s criterion in his fifth chapter, “The Embeddedness of Seeing” (see especially Lehoux 2012, 126-128), he does not address it in his discussion of Ptolemy’s (tentative) laws of nature. I hope to demonstrate that reference to *On the Kritêrion*, as well as the *Harmonics*, strengthens Lehoux’s argument, as it reintroduces the judicial metaphor. It is undeniable that Ptolemy does not discuss laws of nature *per se* but I will make the case that Ptolemy’s concepts of law and rational form, especially as manifested in the movements and apparent stations of celestial bodies, are analogous and that the metaphor afforded by the phrase “law of nature” is consonant with Ptolemy’s epistemology.

In *On the Kritêrion*, Ptolemy delineates one-to-one correspondences between the processes of adjudication in the law court and in the soul:

<u>Criteria</u>	<u>In the Law Court</u>	<u>In the Soul</u>
1. That being judged:	Act	What is
2. That through which it is judged:	Presentation	Sense perception
3. That which judges:	Chief magistrate	Intellect
4. That by which it is judged:	Law	Reason
5. That for the sake of which it is judged:	Social Harmony	Truth

In the judicial process, a magistrate brings a law to bear on an action in order to judge whether it accords with social harmony. In other words, the law is the means by which a magistrate passes judgment on an action. In the soul, the intellect judges an object by means of reason. As means by which an agent makes a judgment, law and reason are analogous. Where would the regularity in nature, such as Ptolemy’s account of planetary stations, reside in the epistemological schema? I would argue that it lies not in the schema itself but at its conclusion. It is not a component of the process of judgment; it is the result of the process, the complete, concluding judgment the intellect makes. At first glance it might seem that the regularity might be the object judged, but for Ptolemy this first category puts forward a problem to be solved, such as an object’s yet-to-be-determined size or weight. In the case of planetary stations, the problem to be solved is the manner by which a planet gives the appearance of a station, and the solution, arrived at by way of the criterion, is the geometrical account of how the planet moves along its epicycle, as articulated at *Almagest* 12.1, H450-451. Thus far, Ptolemy’s account of planetary stations does not seem to correspond to a law. Only reason, the means by which the agent makes the judgment, is analogous to law.

Reason, however, is not simply a property of human souls for Ptolemy. Acknowledging its broader, generic definition elucidates in what way Ptolemy’s account of planetary stations may indeed correspond to a law. In *Harmonics* 3.3 and 3.4 – transitioning from the study of

harmonics in music theory to psychology, astrology, and astronomy – Ptolemy defines reason as a cause that produces order and proportion in matter and movements. In *Harmonics* 3.3, he propounds a trichotomy of causes: “Now causes at the highest level fall into three kinds, one corresponding to nature and concerned only with being, one corresponding to reason and concerned only with being in a good way, and one corresponding to God, concerned with being in a good and eternal way.” Ptolemy divides reason into three subspecies: “For reason, in general and without qualification, is productive of order and proportion, while harmonic [reason], in particular, is [productive of them] in the class of what is heard, just as is imagistic [reason] in that of what is seen, and critical [reason] in that of what is thought” (Ptolemy *Harmonics* 3.3, D92, translation modified from Barker). In other words, reason produces a good form, order and proportion, in objects, whether they are audible, visible, or cognitive.

The power, or capacity, of *harmonia* is one form of the cause corresponding to reason. It produces a harmonic form in or among objects. Ptolemy explains in *Harmonics* 3.4 that, although this power exists to some degree in all self-moving objects, it exists to the greatest extent in objects with a complete and rational nature (τελειοτέρας καὶ λογικωτέρας φύσεως). According to Ptolemy, three sets of objects have the most complete and rational nature and, moreover, display this nature in their movements. In addition to musical pitches, they are human souls and celestial bodies:

These [movements], as we said, are those of things that are more complete and more rational in their natures (αὐτὰι δὲ εἰσὶν αἱ τῶν τελειοτέρων, ὡς ἔφαμεν, καὶ λογικωτέρων τὰς φύσεις), as among the divine are [the movements] of the heavens, and among the mortal [the movements] of human souls, most particularly, since it is only to each of these mentioned that there belong not only the primary and most complete (τελειοτάτης) sort of movement, that in respect of place, but also the characteristic of being rational (λογικοῖς). (Ptolemy *Harmonics* 3.4, D95, translation modified from Barker)

Among the most complete and rational of physical objects, celestial bodies display their rational nature in their movements. An account of planetary motion, therefore, is an account of their rational form. If one returns to *On the Kritêrion* and takes some liberty to interpret the judicial analogy as indicating that all reason – not only critical reason but also harmonic and imagistic – is analogous to law, then, I would suggest, an account of a rational form, celestial or otherwise, does correspond to a law. Ptolemy’s accounts of the rational movements of celestial bodies, including their stations, are analogous to laws, and one may justifiably consider them, metaphorically speaking, laws of nature.

The Skeptical Challenge

In the chapter “The Embeddedness of Seeing,” Lehoux characterizes Ptolemy’s and Galen’s theories of vision as responses to the so-called “Skeptical challenge.” Lehoux declares, “We will

see that both Ptolemy and Galen adopt identical strategies for meeting the Sceptical challenge, where they both put together detailed physical explanations of how *seeing* happens in the world, explanations that for them close off any potential inroads for the Sceptics” (Lehoux 2012, 107). It is important to examine in what way, if any, Ptolemy addresses skepticism. After all, Ptolemy does not explicitly discuss skepticism, as Galen does. The Pyrrhonist attack on the criterion of truth was robust in the second century, as Sextus Empiricus’ treatment of the subject attests, but when Ptolemy delineates his theory of cognition in *On the Kritêrion*, as well as in *Harmonics* 1.1, he does not address skeptical challenges. A.A. Long agrees:

No committed idealist or sceptic would be converted to materialism or empiricism by reading Ptolemy *On the Criterion and Commanding Faculty*. His essay not only omits any reference to Academic and Pyrrhonian attacks on the foundations of knowledge, it also avoids the slightest suggestion that any controversy attends an account of the criterion of truth. Never hinting at any of the battery of available arguments for or against scepticism, which were commonplace in his day, Ptolemy writes as if the only issue is to settle the relative criterial contributions of sense perception and intellect, from an implied basis of general agreement concerning human accessibility to how things really are. (Long 1989, 153)

If Ptolemy’s epistemological accounts make no reference to skepticism, in what way, if any, does his theory of vision respond to the Skeptical challenge?

Lehoux characterizes Ptolemy’s theory of vision as a robust challenge to skepticism mainly, it seems, because it is a physical rather than a representational theory. It is not that a human being creates representations of the external world; rather, the external world impresses itself upon a human being through the capacity of sense perception and its concomitant faculty of *phantasia*, the medium that transmits sense impressions to the intellect. Lehoux implies that the continuous, unbroken physical chain of contact from external object, through the senses and *phantasia*, to the intellect in Ptolemy’s theory bolsters it against skeptical assaults (Lehoux 2012, 127-129). It is important to note that Ptolemy’s epistemology is informed by several philosophical traditions – including the Platonic, Aristotelian, and Stoic – but the fundamentals of his criterion of truth, in particular the relationships among sense perception, *phantasia*, and the intellect, derive from Aristotle’s epistemology.

While Ptolemy does not explicitly address skeptical attacks, Aristotle does. In *Metaphysics* 4.5, Aristotle examines pre-Socratic challenges to the possibility of knowledge, and he argues that previous philosophers have fallen victim to a fatal mistake. They have identified being with the perceptual, external objects with appearances. Emphasizing the distinctions between the potential and actual, quality and quantity, and special and common sensibles – properties particular to one sense or perceptible by many senses – Aristotle divorces being and the perceptual and he affirms that it is indeed possible to know what is true. The concept of special sensibles is especially significant here. Aristotle argues that the skeptical claim that an object

gives rise to contrary appearances at a given time is in fact false. When the intellect examines sense impressions, it can acknowledge that the senses have authority over their special sensibles and, consequently, it will not err when judging what is true. Aristotle declares, “but concerning color sight [is authoritative], not taste, and concerning flavor taste, not sight; each of which never says at the same time concerning the same object that it is at once this way and not this way” (Aristotle *Metaphysics* 4.5.1010b16-19; cf. Aristotle *De Anima* 418a11-14). Because special sensibles do not give rise to conflicting appearances, they undermine the Skeptical challenge.

In *On the Kritêrion*, Ptolemy appropriates the theory of special sensibles and he affirms, “Certainly, on its own each of the faculties naturally tells the truth whenever it is concerned only with its own proper object...” (La16, translation modified from Liverpool/Manchester Seminar on Ancient Philosophy). The truth of special sensibles is foundational to Ptolemy’s epistemology. Because the senses transmit accurate impressions of external objects, knowledge is possible. Again, Ptolemy does not address skeptical attacks here, when describing special sensibles, or elsewhere, but because Aristotle articulates his theory of special sensibles as a defense against skepticism, one could argue that Ptolemy’s epistemology responds to the Skeptical challenge by extension from Aristotle. Although Ptolemy does not address skeptical attacks, aspects of his epistemological theory derive from accounts that do.

Eikos Muthos: An Impediment to Epistemic Progress?

Lehoux not only provides an expansive portrait of Roman science, but he also reflects on the nature of historical study and its relevance to the philosophy of science. Concerning the former, Lehoux examines the degree to which the historian can understand ancient scientific thought. After all, Lehoux’s portrait of Roman science is complex. Intellectual, social, and cultural factors contributed to the production of Roman scientific texts. How is it, then, that a historian can analyze and interpret, in the actors’ own terms, Ptolemy’s models of planetary motion, Galen’s pneumatic theory, and the “fact” that garlic is antipathetic to magnets? A pessimist might argue for complete incommensurability, that these theories are untranslatable to the modern perspective. More optimistically, a historian might suppose that through prolonged engagement with these texts she can become increasingly familiar with the several causes of ancient science, that she may slowly but surely gain understanding of the network of contributing factors, and that, therefore, she has the ability to construct an increasingly accurate portrait of ancient thought. Lehoux characterizes this impression as follows:

At the softer end, approximation, the historian or ethnologist can argue that long-term exposure to another culture can give one ways of seeing its terms, concepts, and categories that allow for at least proximate (and presumably also improvable) translation, and so over time I can come to find ways of understanding and explaining Galenic pneuma that do not necessarily imply that I have found some neutral third ground from which to view both

Galen's world and my own and through which to shuttle material back and forth. (Lehoux 2012, 231)

Lehoux acknowledges that, at best, a historical study approximates the truth. I would add that, if we admit progress in historical study, it is asymptotic. Even with increasing familiarity, it remains impossible to know for certain what a historical actor intended by a text. While this uncertainty is not a concern for the critical theorist, it marks the limit of inquiry for the intellectual historian.

I would like to suggest that this inherent uncertainty marks the history of science as an *eikos muthos*, a likely story. For an analogue, one may look to Plato's distinction between certain and likely accounts. In the *Timaeus*, Plato's principal interlocutor affirms that an account of the sensible realm, as opposed to the intelligible, is limited to a likely story. Timaeus prepares Socrates for his cosmological account with the following warning:

Don't be surprised then, Socrates, if it turns out repeatedly that we won't be able to give accounts concerning a great many subjects – on gods and the coming to be of the universe – that are completely and perfectly consistent and accurate. Instead, if we can come up with [accounts] no less likely than any, we ought to be content, keeping in mind that both I, the speaker, and you, the judges, are only human in nature. So we should accept the likely tale on these matters. It behooves us not to look for anything beyond this. (Plato *Timaeus* 29c-d, translation modified from Zeyl; cf. 59c6 and 68d2)

According to Plato, an account of the sensible realm is at most probable. Similarly, the historian may at most present a likely account of ancient scientific thought, but of what, then, would the historian have certainty?

Lehoux argues for the certainty of epistemic progress. Again, Lehoux does not limit history to the examination of historical texts. He applies the historical lens to contemporary, twenty-first-century sciences, and he asks, What position must the historian, or the historically informed philosopher, take on the debate over scientific realism? A significant hurdle to the realist is the pessimistic induction, the argument that because so many past "successful" theories have since been proven false, the success of current theories does not guarantee their truth, as in the future they, too, will likely be proven false. Lehoux takes the pessimistic induction as a serious worry for the realist, and he seems to formulate his position in response. He affirms that the philosopher must not privilege modern scientific theories simply because of their modernity. The philosopher may desire a transhistorical perspective from which to judge the relative truth of scientific theories, and the realist may desire some transhistorical criteria by which to judge the relative truth of scientific theories, but it is impossible to remove oneself from one's network of contributing causes – the intellectual, social, and cultural conditions, and prejudices, of contemporary science.

Lehoux implies that one may approach, although not assume, this transhistorical perspective by adopting a consistent, singular, historically informed methodology. In order to evaluate the relative truths of scientific claims, one must employ the same methodology when examining Roman and twenty-first-century scientific texts. The fear is that this approach will yield unadulterated relativism, and, indeed, Lehoux's realism seems to fight a constant battle with relativism. In the final chapter, "Worlds Given, Worlds Made," Lehoux ultimately gestures toward a pragmatist theory of truth. He quotes William James, one of the earliest proponents of pragmatism: "*True ideas are those that we can assimilate, validate, corroborate and verify. False ideas are those that we cannot....* The truth of an idea is not a stagnant property inherent in it. Truth *happens* to an idea. It *becomes* true, is *made* true by events. Its verity *is* in fact an event, a process: the process namely of its verifying itself, its *verifi-cation*" (in Lehoux 2012, 236; emphasis James'). Because a transhistorical perspective is impossible to achieve, Lehoux adopts an epistemology that affirms the situatedness of science. It seems that, for Lehoux, the only robust theory of truth is a pragmatist one.

Lehoux uses pragmatism to make a case for scientific realism. He contends that, with a pragmatist theory of truth, it is possible to accept epistemic progress without biasing modernity. He explains as follows:

Although a Jamesian theory would seem to want to conclude that pneuma and sympathy were once true, the fact that they are no longer true is not just a function of our adoption of a different worldview, but instead a function of the nontrivial fact that in the intervening 2,000 years we think we have had experiences that disprove them or render them useless or superfluous. Magnetism has built around itself a host of tests and theories that were not part of the verification process available to the Romans, and so magnets-as-sympathetic have been shown to be false. This fact may also allow for a (qualified) notion of something like epistemic progress, without the normally attendant triumphalism. (Lehoux 2012, 237)

When asserting epistemic progress, it is not necessary to privilege modernity. The passage of time is not the crucial factor but, rather, the accumulation of methods of justification. One need not assume a relativist position and judge the antipathy of garlic and magnets to be true for the Romans but false for us. According to Lehoux's realism, one may assert that antipathy is simply false, and he may do so because in the intervening period of time human beings have developed means of verification that were unavailable to the Romans.

It seems that a crucial point for Lehoux's argument is that it is not the case that the types of verification performed in the Roman period and the twenty-first century are simply different in kind. If it were, then the historian-philosopher would have no means to compare the relative merits of the two systems, and relativism would win its battle with realism. The question, then, is what criteria establish the superiority of the modern systems of justification over the ancient. Lehoux is unclear on this matter, but he seems to imply two: (1) the modern system is larger than the ancient, and (2) the modern is more rigorous than the ancient.

Concerning the first, Lehoux observes that the number of methods of verification has increased over time, and he implies that this increase, in and of itself, establishes epistemic progress. A greater number of methods, however, would not establish the superiority, or success, of modern methods over the ancient. It is easy to imagine many unsuccessful methods juxtaposed with a few successful ones. Lehoux's second implied criterion, the comparative rigor of the methods, is necessary to determine their relative merits. Lehoux gestures toward this criterion when characterizing the type of truth pragmatism allows: "But if, for the pragmatist, verifiability leads to variability, what kind of *truth* is that? The pragmatist answer is: the only kind we have. Truth is a stamp of approval that we give things as a way of saying that they meet certain – and most rigorous – criteria" (Lehoux 2012, 237; emphasis Lehoux's). Affirming epistemic progress – and the justifiability of considering certain ancient theories false and twenty-first-century theories true – Lehoux implies that today's methods of verification are more rigorous than the ancient.

While I do not know a single person who would disagree with this assessment, it requires justification. Lehoux seeks a criterion that is transhistorically indisputable, one that Ptolemy, Galen, or any other historical actor would accept, but would Ptolemy agree that astronomy today is more rigorous than in the second century? Would Galen concede the superiority of twenty-first century medicine? I believe that they would, but, this speculation aside, Lehoux's historiography could undermine his attempt to establish epistemic progress. If the historical enterprise is at most an *eikos muthos*, an approximate, albeit likely, account of the past, how can the historian-philosopher justifiably and definitively judge twenty-first-century systems of justification to be superior to the ancient ones? Perhaps Lehoux's pragmatism resolves the issue. The historian cannot know for certain that her account of Roman scientific theories is accurate, but employing the most rigorous criteria in the history and philosophy of science, one may, following James, validate, corroborate and verify that twenty-first-century science stands as an improvement on ancient science.

Conclusion

Lehoux's *What Did the Romans Know?* (2012) is an innovative and commendable exercise at the intersection of ancient history and the philosophy of science. I have attempted to reinforce significant portions of his argument against potential challenges, historical and philosophical, and I hope that Lehoux's monograph will inspire ancient historians and philosophers alike to consider the consequences of each other's disciplines for their studies.

Works Cited

- Aristotle. 1967. *Aristotle. De anima*. Trans. Ross, W.D. Oxford: Clarendon Press, 1961 (repr. 1967).
- . 1970. *Aristotle's metaphysics*, 2 vols. Trans. Ross, W.D. Oxford: Clarendon Press, 1924 (repr. 1970 [of 1953 corr. edn.]).
- Barker, Andrew. 1989. *Greek Musical Writings*, 2 vols., Cambridge: Cambridge University Press.
- Burnet, John. 1902. *Platonis opera*, vol. 4. Oxford: Clarendon Press (repr. 1968).
- Düring, Ingemar. 1930. "Die Harmonielehre des Klaudios Ptolemaios," *Göteborgs högskolas årskrift* 36, no. 1.
- Lehoux, Daryn. 2012. *What Did the Romans Know? An Inquiry into Science and Worldmaking*. Chicago: University of Chicago Press.
- Liverpool/Manchester Seminar on Ancient Philosophy. 1989. *Ptolemy: On the Kriterion and Hegemonikon*. In *The Criterion of Truth: Essays written in honour of George Kerferd together with a text and translation (with annotations) of Ptolemy's On the Kriterion and Hegemonikon*, ed. P. Huby and G. Neal, 179-230. Liverpool: Liverpool University Press.
- Long, A.A. 1989. "Ptolemy on the Criterion: An Epistemology for the Practising Scientist." In *The Criterion of Truth: Essays written in honour of George Kerferd together with a text and translation (with annotations) of Ptolemy's On the Kriterion and Hegemonikon*, eds. Pamela Huby and Gordon Neal, 151-178. Liverpool: Liverpool University Press.
- Plato. 1997. *Timaeus*, trans. Donald J. Zeyl. In *Complete Works*, ed. John M. Cooper, assoc. ed. D.S. Hutchinson. Indianapolis: Hackett Publishing Company.