The Reception of an Empirical Medical Theory: Galen’s Crisis Theory in the Arabic Commentaries on the Hippocratic Aphorisms

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ABSTRACT
The Arabic Commentaries on the Hippocratic Aphorisms presents an opportunity to examine how a few important medical ideas, originally from Greek and translated into Arabic in the 9th Century, were transformed by later medical writers in the course of their own medical practice. These Commentaries are a corpus of texts representing twelve authors that span several centuries, gathered and edited in Manchester, by P. E. Pormann and his team. The present article examines the concept of medical crisis from Galen and how it came to be understood differently in time, as medieval authors consciously critiqued Galen and departed from him. Arabic authors both simplified it and elaborated on it. As an example of the latter, there is the development of battle, siege, and “body politic” imagery in the description of the relationship between patient, disease, and doctor. The richness of the developed imagery strongly indicates that medieval commentaries are not just derivative from the earlier text, but can contain useful and creative insights that advance scientific understanding.

Keywords: Galenic medicine, commentaries, battle imagery

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Introduction

Before examining the Arabic medical commentaries as indicated by the title of the present article, I shall begin by considering the object from the Collection of Instruments of the Institute for the History of Arabic and Islamic Sciences that is most closely connected with the topic of my paper. It is the astrolabe, made by al-Khamāʾīrī, Inventory No. A 2.31 (F. Sezgin, 2010, p.100).

The Astrolabe Example (See Figure 1)

This astrolabe, which has many typical features, was made in 626/1228, by the prolific Andalusian Muslim astrolabe maker, Muḥammad ibn al-Futūḥ al-Khamāʾīrī, from Seville. However, it has some unusual features, including Latin labels: The Arabic names for the Zodiac Signs, and the month names were re-engraved two centuries later, and the reverse has a scale for converting between Islamic and Christian calendars. This was to meet the needs of a multicultural Andalusian society.

On the front, the net-like rete rotates around a pivot that represents the North Celestial Pole to depict any desired configuration of the sky, at any time of day or night. The off-center circle represents the Sun’s path along the Zodiac, and the pointers correspond to major stars. Underneath, the stationary grid provides a coordinate system for locating the sun and the stars with respect to the local horizon and meridian. Each latitude requires its distinct plate with a grid. (Astrolabes usually contain several interchangeable discs for use in several latitudes. This one has five). The circle to which the grid converges is the zenith, the point directly overhead.

On the back, there is a scale for converting from calendar date to solar longitude. With that figure, the user then returns to the front of the astrolabe to find the corresponding point along the Zodiac circle, and then places the sun in the desired position in the sky. For example, if the sun is 30 degrees above the horizon, the rete can be turned so that the point corresponding to the sun’s longitude is at 30 degrees. There are also scales for measuring seasonal days instead of equinoctial days, as well as for measuring the angle of the sun’s shadow.

Astrolabes were used to solve a number of complicated problems in spherical trigonometry, merely by moving scales and aligning rules. In effect, all of the complicated mathematics that involves spherical trigonometry has been encoded into the scales of the device, leaving very little effort for the user to perform calculations. Some astrolabes have a scale on the back for determining the ʿṣalāt al-ʿaṣr, the afternoon prayer that is the most difficult to calculate. The majority view of the Islamic legal schools is that the ʿṣalāt al-ʿaṣr begins when the length of an object’s shadow equals its own length plus the length of its shadow at noon of that day. This can actually be determined more precisely using the astrolabe by a series of operations, if the astrolabe has a cotangent scale on the back, which is absent here.

Astrolabes and Medical Practice

Astrolabes are not usually thought of in connection with medicine, since the former concerns the celestial realm of astronomy, and the latter, the mundane arts of healing. However, there was a connection, which would have been obvious to most pre-modern people—even though it is lost to us—and it has to do with medical timekeeping, and the astrological dimensions of early medical practice.

There are at least two uses the physician could make of the astrolabe: one makes minimal use of astrology, and the other involves astrology explicitly.

1) The physician could use the astrolabe to tell the time, day or night, in order to mark the precise moment of a change in the patient’s condition. This time was referenced to the starting time of the illness, so that the physician could count the days of the disease and mark the progress of the patient through them accurately. For example, the series of the critical days could be counted with reference to the starting point (Galen, 1825, K.795.9–18; 2011, Cooper ed., pp. 142–145). The
The astrolabe could be used to check whether the actual crisis comes earlier or later than expected, and any disparity could be used to adjust the patient’s regimen.

2) The physician could use the astrolabe astrologically to determine the Ascendant of the illness, based on when the disease began. The Ascendant is the starting point of the system of astrological Houses, which is a grid in the natal chart used to determine the effects of the planets on the life of the person. The physician could thus use the “natal chart” of the disease, treating it as if it were a living entity, as an additional aid in prognosticating its future course for the patient. Galen gave an example in his *Critical Days* (Galen, 1825, pp. 911–912; 2011, Cooper ed., pp. 338–341). I do not know of many descriptions in the medical literature of this actually being done, however. It may have been merely one of those doctrines that medical students learn, but discard in actual medical practice. The moon’s progress, and not the sun’s, had a much more significant effect on the illness, since it was the supposed cause of the critical days, and so physicians tracked it carefully. The critical days were thought to depend on the moon’s aspect to the starting point of the illness. It must be noted, however, that the more detailed astrological prognosis was theoretically possible. There were other aids for the physician, such as lunar almanacs, to help him do this. These are best known from medieval Europe (Carey, 2004), but they were also used in Islam. (https://muslimheritage.com/calendars-almanacs-islamic-civ/)

1. Tables and Figures

![Astrolabe, made in 626/1228, by Muḥammad ibn al-Futūḥ al-Khamāʾīrī](F. Sezgin, 2010, p.100)

2. Discussion

Now, let’s turn to the Arabic medical commentary tradition, where some of these astrological ideas are useful in showing how the commentaries changed medical concepts that had been inherited from the Greek tradition, added to some, and deleted others from the discussion. I begin with Galen’s crisis theory in Arabic. This has led me to a project that investigates the development of the “body politic” metaphor in the successor cultures to the Greek, primarily the Arabic and Latin traditions.

The medical crisis and its associated critical days were among the diagnostic and prognostic tools employed by physicians in the Hippocratic-Galenic tradition. The crisis, as defined by Galen, was a range and cluster of symptoms that indicate that the patient’s body had attempted to expel the disease from his body (Galen, 1825, vol.9, pp. 769–770; 2011 Cooper...
ed., 96–7; and Galen, 1825, vol.9, pp. 550–768). These symptoms include: fever, sweating, tremors, etc. The crisis is nearly always a stressful experience for the patient, involving much bodily exertion. A successful crisis results in complete expulsion of the disease-producing substances and recovery, while incomplete crises could result in prolonged disease or even death. Signs of the character of the crisis were sought in the patient’s sputum, urine, and excrement. Galen described how to do this in the Critical Days, and in greater detail in the Crises (Galen, 1825, vol.9, pp. 550–768). The critical days were a series of days on which to expect a crisis, based on the crisis’s empirically observed patterns. Galen connected the critical days with astrology, however, there was an important strand of medical thinkers who sought to minimize that connection, including the group of commentators that I shall presently discuss. So, my present research considers how the important medical concepts of crisis and critical days entered the Arabic medical tradition, and took on lives of their own.

This analysis is two-fold:

1) Analysis of the initial translations, the work of Hunayn ibn Ishāq. Although such analysis can reveal interesting transformations of medical ideas as they crossed from Greek into Arabic, as I have demonstrated in a series of articles, this is insufficient by itself, since it considers only the initial Arabic forms of the concepts, before they have been employed by generations of physicians in empirical practice (Cooper, 2011 “Galen and Astrology”; Cooper, 2014; and Cooper, 2016).

2) Contextual investigation, as in the Canon of Ibn Sīnā, or the Mujiz of Ibn al-Nafīs, or, to be considered here, the Arabic Aphorisms commentaries. (Cooper, 2016 “Medical Crises and Critical Days”) It is essential to consider the ways the concepts were integrated within the larger medical conceptual system.

I have published considerable work of the first kind, on Galen’s treatises Critical Days and Crises, and this has given me the basis on which to investigate the second kind.

Why should the historian of medicine consider the transformations of Galenic crisis theory at all? Crisis theory was important for the history of medicine for two main reasons: a) Galen’s treatise On Critical Days influenced astrological medicine, and was thus a motivating factor in the development of mathematical astronomy. And, b) Galen’s treatise On Crises influenced empirical science. For both of these reasons crisis theory formatively shaped the history of science, by driving the development of astronomy and planetary theory on the one hand, and by encouraging the careful observation of empirical indicators in patients’ illnesses, on the other.

The latter treatise, On Crises, has several significant features to its empirical approach to nature and science, which put it in a position to influence other fields. They include: 1) A detailed empirical discussion of a complex medical phenomenon; 2) A demonstration of how to recognize natural signs that bear on the patient’s health; and, what counts as a sign?; 3) A detailed description of the precise temporal profile of a biological phenomenon, and a demonstration of how to introduce the time dimension to a medical phenomenon in a precise way. Galen shows how such temporal profiles could be used to classify and diagnose crises; 4) A paradigm of diagnosis, prognosis, and therapy, that was very commonly used by doctors.

My current research, from which the present paper is an excerpt, examines selected terms from the history of crisis theory in the Aphorisms Commentaries, to see what they meant for the commentators, and by comparing those meanings with earlier senses, show how, in the course of their studies and practice of medicine, these commentators introduced new terms and definitions along the way.

2.1. Arabic Commentaries on the Hippocratic Aphorisms

I have already examined the Canon of Ibn Sīnā and the relevant writings of the 13th Century Ibn al-Nafīs, and have a sense of how the definition of crisis shifted away from Hunayn’s original 9th C. translation (Cooper, 2016 “Medical Crises and Critical Days”). I have been reading through the Arabic Commentaries on the Hippocratic Aphorisms for further evidence of shifting away from Galen. This corpus of texts was prepared as a five year project, funded by the
European Research Council, and directed by Peter Pormann at the University of Manchester. They are now available as scholarly editions in open-source computer files for word searching and study. The results of this project are useful for the history of Arabic medicine, because the Aphorisms were the most widely read and commented upon of all the Hippocratic corpus. They shaped medical theory and practice, and have even influenced popular culture (Pormann and Joosse, 2012).

There are more than a dozen of these commentaries, extant in over 100 manuscripts. The commentaries were more than just vehicles for elucidating the Aphorisms to readers. As was the case with Galen, whose commentary on this text was one of the first and most influential, later commentaries often expressed the commentators’ original views and theories, taking their criticism of the text as a point of departure. It used to be thought that the production of commentaries, in both the Latin and Arabic worlds, was a symptom of intellectual decline, by a culture unable to create new scientific treatises. (Ahmed, 2013) There is enough scholarship now, by those who have examined the commentaries carefully, to thoroughly refute that view. In both East and West, commentaries were the places of critical and creative engagement with the ideas in the text commented on, and also for the advancing of new ideas and conceptions. They were also vehicles for the transmission of new ideas across cultures. A noteworthy example of the latter is the influence of Ibn Rushd’s famous commentaries on Aristotle as major vehicles for the introduction of the latter author into medieval Europe. The entire issue of the journal Orients, vol.45, no. 1-2, 2017 is devoted to articles about the project. The editions that resulted from the project may be found through the following link: (http://hummedia.manchester.ac.uk/schools/salc/subjects/clah/projects/arabiccommentaries/List-of-Scholarly-Editions.pdf)

The subject that I shall discuss is battle and military imagery in the description of illness and its therapy. In Galen’s discussion of medical crises in his treatise Critical Days, he introduces some battle terms, as follows, first the Greek passage, then Ḥunayn’s Arabic translation.


(2.2. Translation (from Arabic)

“So, I maintain that one of the things that excites, disturbs and disquiets nature, is the paroxysm (ὁ παροξυσμός) of the fever. It does not let nature rest when it (nature) quiets (ἡσυχάζειν) and settles down, but it moves and excites it, as though it urges it (nature) to come out to battle and to the struggle (tastadʿīhā ilā ‘l-mukhārijati wa-‘l-muḥārabati / της εἰς διαμάχην προκαλούμενος), and because of this the crisis occurs in acute illnesses in the odd (days).”

2.3. Commentary of Ṭāhir ibn Ibrāhīm al-Sinjārī

Now, let’s look closely at a couple of passages from one of the commentaries, to illustrate some developments of the crisis concept in the Arabic tradition. Ṭāhir ibn Ibrāhīm al-Sinjārī (fl. 12th C?), who lived a generation or two after Ibn Abī Ṣādiq, (“The second Hippocrates”). I shall consider two passages, and point out the battle imagery. The passages from the Aphorisms reproduced below are given without textual apparatus. Interested readers can consult the full textual edition for this information. Chapter 2 of al-Sinjārī’s commentary is found here: http://dx.doi.org/10.3927/52132350.
2.4. Passage I: Hippocrates, Aphorisms, 2.13

“When a crisis occurs, the night before the exacerbation (παροξυσμός) is generally uncomfortable (δύσφορος), the night after more comfortable (εὐφορωτέρη).” (Hippocrates, Vol. IV, Loeb Classical Texts, Cambridge, MA: Harvard University Press, 1959, pp.110–111).

2.5. Commentary, al-Sinjārī

“Hippocrates stated: On whomever the crisis comes, the illness causes him difficulty (yaṣʿubu / δύσφορος) in the night before the paroxysm (nawbatu ‘l-hummā / παροξυσμός) of the fever in which the crisis comes. And then in the day after it becomes light (akhaffa / εὐφορωτέρη), for the most part.”

“The explanation of the crisis: It is a fierce battle (malḥama), and a conflict (maʿraka) between the natures. Moreover, it is a great change (taghayyurun ʿāẓimin), and a struggle (jihād) that occurs between Nature and the disease. The meaning of his statement “His illness causes difficulty in the night before the paroxysm of the fever” is that the third night is more difficult than the fourth, and the sixth night more difficult than the seventh, and so on, according to this pattern. The night before the night of the crisis, Nature attacks (taqūmu) with extreme vehemence (ghāyata ‘l-qiyāmi) in the battle (fī ’l-mujāhidati) in order to do what’s necessary. And it sends (tursilu) humors to the (affected) places (of the body) that are inclined to it, such as residue to the bowels, urine to the kidneys/bladder, and sweat to the surface of the flesh. And the humors spread out from the principal organs to the lesser organs. At that time the patient is found to be strongly agitated, worried, anxious, involved in Nature’s battle, in which he is concerned. In the night of the crisis, Nature rests, and the burden becomes lighter for him (I.e. the patient). As for specifying it to the night rather than the day, this is because the patient is idle in himself (then), and he is not present for it for the greater part of its (i.e. the crisis) being occupied with him, and there is no one who quiets down in the face of it. Moreover, it is the character of night, that sleep (occurs) on account of joining with Nature in this. And it is customary in sleep that the heat reverts toward the interior of the body, and the natural faculties prevail (istīlāʿa) in the battle (muqāwama) with the disease, and they evacuate them, because of his struggle (jihād), and the concoction becomes stronger, so that unrest and worry increases, and the night is difficult for the patient. And after this, the disease becomes easier to bear.”
2.6. Passage II: Hippocrates, Aphorisms, 2.23

“Acute diseases come to a crisis in fourteen days.”

2.7. Commentary, al-Sinjārī

“The doctors decided that the times of acute illnesses follow the motions of the moon. Just as with the moon, its beginning and its waxing, as well as its finishing (i.e. its reaching full moon) and its waning (each) approach a fourteen day interval, likewise with acute illnesses the times of the four become complete in a fourteen day interval. When the crisis comes, it resolves either in a sound (condition) or toward a better condition than the illness, or toward destruction. And the crisis is a change that occurs suddenly in the acute diseases. And it warns of Nature’s conquest (qahr) of the disease, or of the disease’s conquest of Nature. So, if Nature conquers (qahrat) the disease in a healing manner, the crisis will be complete and perfect, and it will bring about health. And, if it is not a complete victory, it will be a better condition than the disease, and farther from destruction. However, if the disease conquers (gahara) Nature, if the conquest is complete, he (i.e. The patient) is brought to destruction. And, if it is not complete, the condition (resulting) from it is better than destruction, and worse than the disease. And he (i.e. Hippocrates) means by acute diseases those whose increasing continues from the beginning of the disease to its end. Nature does not cease to fight with the diseases that occur in this form, from the beginning of the disease to its end. And whenever its climax is delayed from the 14th day to the 17th, or what is less than this, from the 9th to the 11th, to the 4th, to the 7th. And if the crisis occurs between these days, such as the 3rd and the 5th days, the crisis will not be this good. And Hippocrates calls these diseases “acute” without qualification. And the diseases that begin with slackness and then increase in intensity, and then slacken, and then become more intense, these he did not call absolutely acute. And crises (occurring) from the 20th to the 40th day, he did not call them absolutely acute.”
3. Comments

Galen employs only one expression for battle (διαμάχη), which Ḥunayn renders by two Arabic words: mukhārija and muḥāraba. In Sinjārī’s commentary however, there are several words for struggle, battle, conquest, etc. Here, malhama (“severe battle”); ma’raka (“conflict”); jihād (“struggle”); taqūmu ... ghāyata ‘l-qiyāmi (“attack fiercely”); mujāhida (“conflict / struggle”); qahr/qahara (“to be victorious”). In Passage I there is further battle imagery, in the use of the term tursīlu (“to send; dispatch”). The body sends humors, like a general sends troops and armies, to assist in the struggle. A more familiar context for this word refers to the Prophet Muḥammad, who was sent as a Messenger (rasūl) of God. The major turn toward battle imagery seems to have begun in Ibn Sīnā’s Canon, and the tradition is continued by Sinjārī.

4. Shifts away from Galen

This is but one example of a development in Galen’s crisis theory. Galen tended to situate crises within an astrological context, with supernatural and astral causes. I have argued, however, that he did this to reach his readers, many of whom were sympathetic to Stoicism, and it is unlikely that he himself adhered to such a scheme (Cooper, 2011).

Sinjārī and Ibn Sīnā before him moved away from supernatural or astral causation through personifying Nature as a general commanding an army, battling against the disease. Nature for them is not an abstraction, but is an inherent capacity of the patient’s body to restore its health. This represents an episode in the general moving away from supernatural causation in medicine, which had astrological associations toward an emphasis on the actual physical interactions between bodies and natural substances. Expressed another way, adherents of the more scientific natural astrology began to win the battle with adherents of the more divinatory judicial astrology. (Cooper, 2011) The planets still have influences, but they were instead the actual physical warming, drying, etc. of the humors, rather than the more metaphysical supposed effects of the planets on earthly beings. For example, Ibn al-Nafīs (13th C.), and some of the Aphorisms commentators strove to render the crisis doctrine in more physical terms and in a form more compatible with Islamic theology. Ibn al-Nafīs showed how the lunar light warmed or cooled the patient’s humors, which in turn affected the disease, rather than some vague astrological power from the configurations of the stars (Cooper, 2016). There was a parallel shift occurring in Latin Europe at about the same time, but I see no need to draw a causal connection between them. It may be more plausible that these similar shifts were invited by the reading of similar thinkers, whether Greek or Arabic or both.

Ḥunayn originally translated the Greek term κρίσις (“crisis”) with the Syriac term buhrān (“trial, test”), a word that already had a long history in Syriac translations of Greek medicine. Ibn Sīnā in the Canon was the first to define buhrān as synonymous with fasl (“division”). It seems that he may have been unaware of the word’s Syriac origin, and possibly either assumed that the word was originally Arabic with the roots b-h-r, for which the verb bahara means “to cut; to divide,” or he interpreted the word contextually, as “separation.” The Greek word κρίσις has “division” as one of its senses, however, neither Ḥunayn nor others before Ibn Sīnā (as far as I know) introduced that sense into the discussion.

In addition to conceptual shifts, there were simplifications to the numerical aspects of the theory. Galen had devised a “medical week” of 6 35/48 days (6d 17h 30m), slightly less than a complete seven days, based on the supposed interaction of the monthly sidereal and synodic courses of the moon, from which all of the critical days series could be derived. (Cooper, 2014)

However, in harmony with existing trends in astronomical theory, as reflected in Ibn al-Haytham’s Doubts about Ptolemy, Ibn Sīnā based his critical days series on the interactions of actual physical bodies, employing the synodic period, which measures the period between conjunctions of sun and moon—i.e. interactions of actual physics bodies, and discarding the sidereal month. The problem was that Ptolemy mainly, but Galen also, based parts of theories on reference points in space that had no connection to any physical body. For example, the sidereal month measures the time required for the moon to return to the same point along the ecliptic—an abstract point in space that has no connection to any physical body. That part of Galen’s theory, based on a fictitious point, had to go. Galen had employed an average of the moon’s sidereal and synodic motions to arrive at his “medical week”. Ibn Sīnā noticed that he could get nearly the same results using the
synodic period alone. Since Ibn al-Haytham in his *al-shukūk ‘ala Baṭlamyūs* (“Doubts about Ptolemy”) (Ibn al-Haytham and Sabra, 1990) had challenged the Muslim scientific community to find models that accounted for observations using physical bodies that behave according to consistent physical laws, and removing all “fictitious” reference points, thinkers had been revising astronomy along his lines. An example of an astronomical phenomenon that Ibn al-Haytham objected to was found in Ptolemy’s model for the moon. Ptolemy, empirically led by his observations, replaced the true apogee of the moon’s epicycle by the mean apogee as the point from which the lunar second anomaly is to be counted (Saliba, 2007, p.143), namely, the prosneusis point. It is located on the moon’s epicycle diametrically opposite to the center of the world, and so it is a constantly moving reference point, oscillating without being caused by a physical body.

This shift in medicine is an example of the larger trend of moving away from counting astrological influences from the geometrical configurations of the planets in the sky (oppositions, quartiles, sextiles, etc.)—as if three planets in a triangle pattern, for example, had some special additional power—and instead counting real influences from the supposed physical properties of the planets. An even more egregiously offending example is the astrological system of Lots, which are determined by determining differences in planets’ ecliptic longitude and locating that point on the natal chart. These actually amount to points in the middle of space, which are supposed to exert influence on the native subject.

The increased use of battle imagery in medicine is a reflection of the introduction of the “body politic” metaphor into philosophical discussions in Arabic, at least since al-Farabi wrote his “translation” of Plato’s *Republic* (al-Fārābī, 1985). Plato and al-Farabi drew upon the analogy of body and city to discuss features of the city and its political life, and al-Farabi introduced more medical imagery to his discussion than Plato had. Most famously, Plato divided the city into three classes of people, who correspond to the head, chest, and abdomen of the human body. And, the best known of these classes corresponds to the head—the Philosopher Kings, who govern and are governed by reason (Plato, 1997).

The metaphor was imported into medical discussions in order to derive insights about the body, its health and disease, from features of the city, which is the opposite direction to that followed by the philosophers. There was already a move in that direction in al-Farabi’s treatise, which may have influenced medical thinkers. Physicians were interested in the metaphor in order to describe the relationship between the disease, the patient, nature and the physician.

While there is some battle imagery in Galen, there is much more of it in the commentaries, apparently following Ibn Sinā’ī’s *Canon*, where it is actually emphasized in the description of the crisis in connection with the body politic image. The patient’s body was conceived of as a city, ruled by nature as a benevolent king, under assault by an enemy from outside, the disease. Nature, perhaps like Plato’s Philosopher King, sees to the needs of the city and defends it. The crisis is described as the combat between King Nature and Enemy Disease, and the outcome decides the fate of the City/Patient. For example, in the *Mūjiz* of Ibn al-Nafīs, the body is described as a besieged city: “... and the illness is likened to an enemy besieging (bil-ʿadūw al-bāghī) a city, which is (in turn) likened to the body, and nature is likened to the power (sulṭān) that protects it.” (Cooper, 2016, p.44).

Galen had further described the crisis as a judgment issued on the patient by a supernatural judge, with a lethal crisis being a death sentence. The courtroom metaphor appears in al-Sinjārī’s commentary, stripped of its supernatural associations, and personifying the entities at struggle over the patient (Cooper, 2016, p.44). Al-Sinjārī compares the disease and nature to two courtroom adversaries (*khašmān and ʿudūl al-muzkāt wal-lāmuzkāt*), with the doctor is a judge (*qāḍī*). Al-Sinjārī thus retains the idea of “judgment”, but now the physician is the judge, and not God or nature, and this is consistent with the overall shift away from supernatural forces that affect the patient. Al-Sinjārī’s point was: A quadi can’t reach a judgment without an advocate, just like a physician can’t determine the character of the illness without the critical indicator signs.

**Conclusion**

It should be clear from these passages and the brief discussion that commentaries are a rich source for studying the creative scientific developments of post-classical Islamic civilization. Medicine in particular was subject to conceptual
developments, as generation after generation of thinkers and practitioners employed it, and accumulated ever more empirical knowledge of diseases and of human physiology.

The above discussion is part of a larger book-length project that explores how the medical uses of the “body politic” metaphor unfolded in the writings of Muslim physicians during the period 800-1400 CE, and how it was subsequently imported into European medicine in conjunction with the translations of Arabic medical authors from Arabic into Latin. That project also charts the gradual move away from considering Nature as an intelligent entity whose cooperation is essential to the healing process, to treating it as a purely material, soulless thing, with the doctor assuming all of its former roles and functions. For example, Ibn al-Nafīs in the 13th Century suggested that Nature exercises *ijtihād* (independent reasoning) when deciding how to respond to the disease, but by the time of the notorious American doctor, Benjamin Rush (1746-1813), some physicians were ignoring Nature completely, and using brute force, “heroic” treatments. The high mortality rates of their patients should have been a clue that an important element of healing had been forgotten.

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