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Abū Bakr Muḥammad ibn Zakariyyā al-Rāzī's Doubts about Galen: The Case of Medical Crisis Theory

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ABSTRACT

The Iranian born Abū Bakr Muḥammad ibn Zakariyyā al-Rāzī (853-925 CE /239/40-313 H) was one of the earliest and finest examples of an empirical scientist, one who was attentive to data and skeptical of the theories he heard. Al-Rāzī was known for his iconoclastic approach to the solution of scientific or medical challenges, such as his brute force method for determining the best location for the new Baghdad Hospital—observing rotting meat. Furthermore, his critique of Galen (*al-šukūk 'alā Ğālīnūs*) shows his deep understanding of ancient Greek science—and was an early example of an important Arabic tradition of critiquing and correcting the sciences of the Greeks. One such theory was Galen's theory of the medical crisis, which was closely interwoven with diagnosis, prognosis, and therapy. Between Ḥunayn ibn Isḥāq and Ibn al-Nafīs (d. 1288 / 687 H), Galenic crisis theory underwent significant changes in Islamic medicine. Al-Rāzī is of interest because he represents the earlier period of critique and revision of Greek medicine. This paper will consider several examples of al-Rāzī's empirical approach to medicine, along with his critique of Galen that illustrate his understanding and revision of Galen's crisis theory. Influential examples of his data collecting are found in two works that will be referred to in this paper. First, by extending the case history tradition of the Hippocratics (which marked the beginnings of scientific medicine to begin with), his compilations of case histories are models for all generations (*Kitāb al-taǧārib*). Second, his *Kitāb al-Ḥāwī* compilation is a testament to his skill at collecting important passages from earlier authors. His example was later followed by other physicians, among whom was Moses Maimonides (Mūsā ibn Maymūn, d. 1204 CE). The *Kitāb al-Ḥāwī* was also a gift to posterity, since some of the quoted works are no longer extant.

Keywords: Muḥammad ibn Zakariyyā al-Rāzī, medical crisis theory, Arabic medical case histories, *Epidemics*, Galen in Arabic

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1. Introduction

This paper discusses the physician and philosopher, Abū Bakr Muḥammad ibn Zakariyyā al-Rāzī (b. 1 Šaʿbān 251 / 28 August 865; d. 5 Šaʿbān 313 / 26 October 925) and his role in the transformations of Graeco-Arabic medicine during the Abbasid period. Al-Rāzī was one of the earliest and finest examples of an empirical scientist, one who was attentive to his own observations and skeptical of the theories he received. His medical methodology is found in his case histories. To proceed, I shall sketch al-Rāzī's intellectual and historical background. Next, I shall place the present paper in the context of my broader research. After a brief description of my methodology—which is to compare al-Rāzī's case histories to those of his own stated models, the *Epidemics* of Hippocrates—I then explain the preceding Galenic theories which will be considered in that analysis. I shall note features that are absent from al-Rāzī's case histories, as well as those features that are added.

The present paper is intended to be a section of a chapter of a book project, tentatively titled: *Under Pagan Stars: Greek Medicine and Astrology in Medieval Muslim and Christian Societies*. The book investigates much-debated questions about the reception of Greek science in Islam, focusing on medicine and astrological elements that often accompanied the practice of medicine. By astrology, I do not mean the superstitious, talisman, or amulet-connected astrology of the streets and markets, but astrology-astronomy as the mathematical science that was part of the highest level of sophisticated science acquired from the Greek tradition, in particular from Ptolemy. The project aims to show how the relationship between astrology and medicine changed over time, and even paved the way for the general acceptance of Greco-Arabic medicine.

Strictly speaking, of course, astrology is inconsistent with Islam—unless the planets are understood to be mere signs of what God ordains and not independent powers. The latter was an argument presented in order to reconcile astrology with Islam. The problem was this: Galenic medicine employed astrology for diagnosis and prognosis, both key parts of medical practice. How could medicine ever be accepted in Islamic society, imbued as it was with reprehensible astrology? In the book, I argue that Muslim physicians, by reconceptualizing medicine, made astrology into an essential tool of medicine, which continued until the modern era in both East and West.

2. Abū Bakr Muḥammad ibn Zakariyyā al-Rāzī

Al-Rāzī was known for his iconoclastic approach to the solution of scientific or medical challenges. For example, when choosing the best site for a new Baghdad hospital, rather than using the ancient theories, such as the *Airs, Waters, Places* of Hippocrates or Aristotle's *Meteorology*, he used a brute force method that relied on immediate experience and minimal reasoning. Pieces of fresh meat were placed at each of the possible candidate locations for the hospital, and some time was allowed to pass. The site that had the least corrupted meat was then chosen as the hospital site (Ibn Abī Uṣaybiʿah, 2020, 11.5.3). Furthermore, his critique of Galen reveals his deep understanding of ancient Greek science—and was an early example of an important tradition in the Islamic World of critiquing and correcting the sciences of the Greeks.

Al-Rāzī represents the generation of thinkers who critically examined the translated legacy of Greek science. Some expressed their views in a new genre called *šukūk* ("doubts"). Al-Rāzī's treatise *al-šukūk ʿalā Ǧālīnūs* ("Doubts about Galen") is one of the best known of this tradition. (See the recently published edition and French translation by P. Koetschet (al-Razi, 2019). Another famous example appeared a century later: Ibn al-Haytham's *al-šukūk ʿalā Batlamyus* ("Doubts about Ptolemy"). The purpose of these treatises was to critically assess an author or set of doctrines from Greek, to determine how much to keep, on which to continue the scientific investigations of that discipline, and how much needs to be "rectified" (*istidrāk*). To rectify means to fix the science internally, so that it is consistent either with itself or with the rest of the sciences generally. For example, Ibn al-Haytham critiqued Ptolemy's mathematical astronomy for being inconsistent with physics (Aristotle's). Al-Rāzī takes Galen to task for, among other things, stating facts about fevers, supposedly derived through Galen's scientific observation, but which do not hold up to al-Rāzī's own observations ("Irreproducible results"). This is akin to the procedure followed in any kind of research, which we learned in graduate school as we prepared our dissertations—reviewing prior research before we present our own original work.

The *Fihrist* of al-Nadīm lists at least three works by al-Rāzī that may be considered to belong to the "doubts" genre. *Doubts about Galen*; *Doubts about Proclus*; and another with a longer title: *Concerning the Extent to which it is Possible to Correct/Rectify Judicial Astrology according to the views of the Natural Philosophers, and Who among them does not Maintain that the Planets are Alive*. (*Maqāla fī miqdāri mā yumkinū an yustidrāka fī aḥkāmi 'n-nuğūm ʿalā raʾyi 'l-falāsifati 'ṭ-ṭabīʿiyīna wa-man lam yaqul minhum inna 'l-kawākibi aḥyāʾ*) (al-Nadīm, 1970, 709; and al-Nadīm, 1871-72, 302).

3. Doubts about Galen

Al-Rāzī reports in several places in his *Doubts about Galen* that he observed patients whose conditions developed as Galen said they would, and many whose conditions did not, although the factors were practically the same. Al-Rāzī's position as hospital director gave him access to far more patients than Galen could have seen. He was director of the Rayy Hospital (Ibn Abī Uṣaybiʿah, 2020, 11.5.7) and then director of the ʿAḍudī Hospital in Baghdad, which he helped to build (Ibn Abī Uṣaybiʿah, 2020, 11.5.3). The logical point here is that, given the same initial conditions and the same factors at work to produce changes in the patient's condition, it is impossible to arrive at both one state and its opposite. Therefore, either something must be wrong with the theory about the development of the disease or we are missing relevant information. In another place, he states that he sought to develop a new regimen for acute diseases so that he would avoid the usual mistakes in treatment.

One such theory was Galen's theory of the medical crisis, which was closely interwoven with diagnosis, prognosis, and therapy. Between Ḥunayn ibn Isḥāq, who translated Galen's treatises on these subjects, and Ibn al-Nafīs (d. 1288 / 687 H), Galenic crisis theory underwent significant changes in Islamic medicine (Cooper, 2018, 27-54). Al-Rāzī is of interest because he represents the earlier period of critique and revision of Greek medicine.

4. Methodology of the Present Paper

As medicine is a vast subject, I was strategic in my selection of which medical doctrines to examine. Thus, I chose the Hippocratic-Galenic doctrine of the crisis (*buḥrān*) which is connected with astrology. My rationale was that as astrology was a controversial subject in every period, and especially so in Islam, I would be likely to find enough written material to make a sound evaluation. Over the past few years, I have done soundings of the medical literature from different centuries in preparation for this project, looking at specific doctrines to see how they changed over time, after entering Arabic discussion. There were important shifts away from Greek conceptions of the relationship between doctor, patient, disease, and nature that more resemble those of modern medicine, and indeed were the foundations upon which medieval European medicine was built.

5. al-Rāzī's Case Histories

According to Galen, the crisis is an important, but traumatic event in the healing process: the body's effort to expel the disease. The astrology came in after Galen noticed that the crises tended to come on a specific pattern of days. Galen wrote a treatise, the *Critical Days*, where he unified medicine and astrology, providing the latter with a scientific legitimacy (Cooper, 2011). He elucidated how the moon affects the timing and quality of crises. Moreover, Galen showed how casting the natal chart of a disease, based on the time when it is "born," provides the doctor with a powerful prognostic tool for how the disease will unfold over time (Galen, 2011, K 910,16 – 911,10, Cooper ed., 338-339). Later doctors elaborated greatly on this idea, until astrological forecasting became an essential part of medical practice (Cooper, 2013; Pennuto, 2008). These theoretical, and especially astrological, features are precisely what al-Rāzī rejects, as we shall see.

Examples of al-Rāzī's data collecting are found in two works. First, by extending the case history tradition of the Hippocratics (which marked the beginnings of scientific medicine to begin with), al-Rāzī's compilations of case histories (*Kitāb al-tağārib*) were models for all generations (Millán, 1999; Millán, 2000; Millán, 2010). Second, al-Rāzī's *Kitāb al-Ḥāwī* compilation is a testament to his skill (or that of his students) at collecting important passages from earlier authors.

His example was later followed by other physicians, among whom was Moses Maimonides (Mūsā ibn Maymūn, d.1204 CE). The *Kitāb al-Ḥāwī* is valuable for another reason, as some of the quoted works have not survived.

There are some 2,000 cases from al-Rāzī's notes, still in manuscripts, and relatively unstudied. Only someone with access to hospital patients, such as al-Rāzī in his positions as hospital director (in Baghdad and then in his native Rayy), could have obtained such quantities of observational data. He even attempted to group similar cases together, as one would expect of a scientist using inductive reasoning to arrive at patterns and causes. For the present paper, I have analyzed 33 of these cases that were published nearly a century ago by Max Meyerhof, as a sample (Meyerhof, 1935). For the present, I am assuming that they are representative examples of the 2,000 cases.

What features do they all have in common? Is there anything unusual about them? In general, al-Rāzī avoided Galen's crisis theory—which is strange, because that theory became an essential part of medical treatment in Islam and the West. In addition, the post-Hippocratic doctor intervened more actively with the patient than did the *Epidemics* doctor. Moreover, when he intervened, he performed many of the functions that Galen taught that the crisis was supposed to do. The following three cases, selected from the 33, illustrate this.

6. al-Rāzī's Case Histories

6.1. Case 11 [See Appendix, 8.1]

Case 11 describes a successful treatment of a girl who apparently initiated her disease by ignoring al-Rāzī's previous instructions. My analysis draws on Greek medical principles not mentioned in this passage. The first part of this account is what occurred before the doctor examined the girl and was obtained by questioning. The girl had drunk camel's milk against the doctor's caution, with the result being that she became bloated. This indicates that al-Rāzī had seen her before and told her not to drink camel's milk, which he knew was unhealthy for her temperament. She then took a remedy, without having been bled nor purged, and thereby she developed a continuous fever, and suffered four attacks of smallpox—a disease that al-Rāzī was an authority on, having written a treatise showing how to distinguish between it and measles. At this point, al-Rāzī was consulted. He treated her eyes with antimony powder rubbed with rosewater, which prevented the smallpox from affecting her eyes. Then, he administered barley water (a kind of thin gruel) which provided nourishment without being difficult to digest. However, this had little effect on the fever.

Al-Rāzī then conjectured that the fever's heat remained because the putrid humors that were causing the disease had not been completely expelled via purging, and so were still causing trouble. Al-Rāzī decided not to purge, however, at least not aggressively, since she was too weak. Instead, he gave her dried apricots at daybreak and barley water at noon over a two-week period. This resulted in two natural evacuations per day and the disease eventually becoming cleared. However, the doctor continued to observe the patient for 50 days, noting that her urine showed signs of complete concoction by the 40th day, indicating that the disease had been completely overcome and expelled.

Note that no crisis is mentioned here, although some of the features of the classical Galenic crisis do appear. In a case such as this, Galen arranged therapy to prepare the patient for the crisis, which is a climactic event, whereby the patient's body casts off the disease, including the fever in particular. Because the crisis is often traumatic, she must be prepared to be strong enough to endure it, so that she does not expire from its traumatic symptoms. In al-Rāzī's description, however, the fever subsided without mentioning the crisis. However, al-Rāzī offered the hypothesis that some of the disease-producing substance remained in the patient. This residue, Galen would explain, was the result of an incomplete crisis (Galen, 2011, K 776,6 – 776,11, Cooper ed., 108-109). As such, al-Rāzī continued with gentle treatment until the signs of concoction appeared in the urine. For Galen, signs of concoction were indicators that the complete crisis had occurred, and that the body had "cooked" (i.e., neutralized) and evacuated the malicious humors. They could appear in the urine, excrement, sputum, or other discharge from the head or from swellings in general. In the present case, they appeared in urine as sediment (Galen, 2011, K 786,6 – 12, Cooper ed., 126-129).

In effect, al-Rāzī was using parts of Galenic crisis theory, without employing the concept of "crisis" per se. This is probably because Galen's notion of crisis was too general for al-Rāzī. Al-Rāzī, as we've seen, while relying on simple theory, was more concerned with his own direct observations. For him, the empirical fact that the fever remained after the initial treatment and vanished after additional treatment, yielding corroborating signs in the urine, was the most important feature, not how to classify it as a particular type of crisis. As we shall see, al-Rāzī knew very well what a crisis is.

6.2. Analysis of Case 24 [Appendix, 8.2]

Case 24 concerns a little boy, the son of Ibn Sawāda, who suffered from a "yellow bile fever," i.e., a fever caused by an excess of yellow bile, which was concentrated in his throat. While the disease was mild at first, on the fourth day, a sudden and ultimately lethal change occurred. The boy began to pass blood in his urine and green and bloody bile in his excrement. The change took al-Rāzī and his team ("we") by surprise. They then conjectured that he had drunk something poisonous. By that afternoon, both urine and stools were black (usually a lethal sign in Hippocrates), and he died on the morning of the sixth day. Al-Rāzī's postmortem hypothesis was that his disease was a malicious form of measles, which had attacked his vital organs.

My comments: Galen would have noted that this sudden change was a crisis—in particular, a bad crisis, since it occurred on the fourth day, the first of the critical days. I'm surprised at al-Rāzī's expression of surprise and his jump to suggesting that the child drank something lethal. However, given al-Rāzī's apparent rejection of the Galenic crisis theory, he attempted to find other explanations.

6.3 Al-Rāzī's Own *Epidemics* Analysis in a Hippocratic Style [Appendix, 8.3]

The third case I wish to consider is an extended analysis of a case, not of his own patient, but drawn from the classic medical literature. In fact, al-Rāzī reviews the very first case history of the Hippocratic text, *Epidemics* Book I, that of Philiscus. First, he recounts the history slightly more expansively than in the original Greek—that was due partly to the Arabic translation he was relying on, although he intersperses some explanation. He then presents his analysis that is twice as long, and which employs Hippocratic concepts, especially the crisis and the critical days. In particular, he cites Hippocrates's doctrine that when symptoms of a crisis occur, but the disease does not actually reach crisis, this indicates one of two courses. Either 1) the death of the patient in the near future or 2) that the disease will last longer than originally expected. In the latter case, this indication is strengthened if there are also some signs of healing. In the present case, the malignancy of the disease was indicated by the fever not subsiding after the perspiration, rather becoming more violent, and the boy passed dark-colored urine on the third day. These are symptoms or indicators of a crisis. However, no crisis occurred, so the sleeplessness, delirium, and thirst were indicators of death by the sixth day. According to Galen, a crisis, if it had occurred, would likely be happen on the fourth day, which is the first major critical day. However, al-Rāzī says nothing about a crisis. The signs of the boy's loss of strength included the nosebleed, which is also a sign of concoction. What was especially lethal was the second acute attack on the fifth day. Al-Rāzī notes that this demonstrates that one should not rely on an intermittent period of calming, thinking that the patient is on the mend. (That comment suggests that this analysis was composed for students.) He concludes by observing that everything else is consistent with other major Hippocratic texts, the *Prognostic*, the *Crises*, and the *Critical Days.*

Why did al-Rāzī produce this full analysis of a Hippocratic case? I can think of two possibilities. Either: 1) To show his own mastery of the medical theory, in order to advertise himself as a teacher or doctor (however, as we saw earlier, he departs from these theories in his own clinical work), or 2) as an educational tool for students, in order for them to learn medical theory. The fact that al-Rāzī's analysis treats only the first patient suggests that this was meant as an example of what could be done with patients' histories after the fact, unless other such analyses are found among al-Rāzī's cases.

It is curious that only Hippocrates is referred to here, with Galen not being mentioned at all. Perhaps al-Rāzī was drawn to the simple clinical clarity of the Hippocratic *Epidemics*, preferring them to the more complex theories and

greater verbosity of Galen, just like later generations who rejected Galen in favor of Hippocrates. For example, during the European Renaissance, some doctors thought that Hippocrates discovered medicine, but that Galen had corrupted it with too much theory.

7. Conclusions

To me, the most striking feature about these accounts, which they share with the rest of the 33, is that there is no mention of crises or critical days, although these accounts share several other features with the *Epidemics*, al-Rāzī's model, and al-Rāzī intervenes to perform the functions of the crisis. Fevers are mentioned, and even specified using the Galenic system of classification. Al-Rāzī demonstrates that he knows what crises and critical days are, as in the third passage, as well as the fact that they appear in several passages from the ancient tradition that are excerpted in the *al-Hawi*.

In all of the 33 accounts, al-Rāzī reports his interventions—applying bleeding, purgatives, emetics, etc. This contrasts with the Hippocratic case histories, which sparingly report the doctor's interventions. Al-Rāzī's interventions, moreover, have the very curious feature of being precisely where, in Galen's scheme, the activities of Nature, especially the crisis, would be found. It seems as if al-Rāzī is doing the work of Nature, e.g., what the crisis was supposed to do, according to Galen. That is what is curious here, suggesting deliberate omission of crises and replacing it with therapy.

Al-Rāzī seems to scrupulously avoid the concept of the medical crisis, preferring to deal with observed symptoms free from this Galenic paradigm. We can conclude from this that he would *a fortiori* reject all astrological influences, since they are at an even higher level of abstraction than the crisis. The fact that al-Rāzī accepted alchemy was probably due to its empirical character, which was much closer and controllable than the stars in astrology were.

Why was he so against the crisis? As I have not yet been able to find an explanation from his own writings, I am left to conjecture that it was because the crisis was less useful as an explanatory concept for al-Rāzī than his raw observations. He may have been seeking a replacement concept for the crisis. Of course, only a careful reading of the 2,000 case histories will prove my point, although it is usually harder to conjecture why something is absent than to account for its presence in an ancient text.

From my soundings in the history of Islamic medicine mentioned earlier, I have noted a shift away from Nature as healer toward the physician as healer, more of what we would recognize today as the role of the doctor. I am surprised to discover that al-Rāzī was already moving in that direction, so much earlier than I had thought.

8. Appendix

The translations reproduced below are from the Meyerhof article. The Arabic texts may be found there.

8.1. Case XI [Meyerhof, 338-339] (Bodleian, Marsh 156, Fols. 241v. -242r.)

The daughter of al-Ḥusain Ibn ʿAbdawaih had drunk camel's milk as usual, without asking my advice. When she became bloated with air after the milk, she took the musk-remedy without having previously submitted herself to a venesection or to purgation. She developed a continuous fever, and there appeared on her body the symptoms [fol. 242 r.] of smallpox; she had, in fact, four attacks of smallpox one after another (37). When the smallpox began and she consulted me, I took care of her eye[s], and strengthened it [them] with antimony-powder rubbed in rosewater, and nothing appeared in her eye (38), although its surroundings were very severely affected. All the people who were near her, wondered at this astonishing fact that her eye was saved.

I applied to her for some time barley-water and the like, and (p. 339) her nature did not show any change as is so frequent a consequence of this disorder. There remained some residue of hot fever, and I supposed that this might be because the remainder of the (ill-natured) humours had not been expelled by the usual purgation; I could not venture to

obtain an evacuation at once because of the weakening of her forces. So I confined myself to administering to her dried apricots (*naqūʿ*) at daybreak and barley-water at noon during a fortnight. This procured her two evacuations a day, and she was completely cleared of the disease. The complete concoction of the urine (39) appeared after forty days, and her recovery was complete at the end of fifty days. [M. Meyerhof's Translation; altered]

8.2. Case XXIV [Meyerhof, 343-344] (Bodleian, Marsh 156, Fol. 243r.)

The little son of Ibn Sawāda had a yellow bile fever from his throat. On the fourth day in the morning he began to urinate blood and to pass with the stool green and bloody bile, resembling water in which fresh meat had been washed; his strength decreased suddenly. We were baffled because his malady had been slight and benign and then had changed in one night to this acuteness and severity; we supposed that he had drunk something (harmful). When the afternoon came, he had a quite black micturition and equally black stools. He died in the early morning of the sixth day. He had had from the beginning a malign form of measles, prone to attack the internal organs (54).

8.3. Al-Rāzī's Analysis of *Epidemics* I, Patient 1 [Meyerhof, 347-349] (Bodleian, Marsh 156, Fols. 244r.-244v.)

Epidemics: The first patient of the first Book (68) This man had a burning fever with great heat during the whole of one day; thereafter he perspired greatly during the night, without this perspiration checking his fever or bringing him any relief. On the contrary, during the whole of this night and on the second day the symptoms of his disease grew worse. After this, he received an enema on the day in question, had a motion and was better during the whole of the following night and half of the third day. Near the end of this day the fever recurred with violent thirst, dryness of the mouth and sweating, which did not relieve the fever at all, also with delirium and hallucinations, and the patient during the course of this night passed dark-coloured urine. Thereafter he had some relief in the night preceding the fifth day and during the first half of this day. Then he discharged from his nostrils a few drops of blackish blood, and he passed urine in which were suspended particles like semen virile of varied shape, roundish and other forms, which did not form a deposit. The patient's condition was still serious during the whole of the night preceding the sixth day; this night his limbs became cold and were to be warmed only with difficulty, he slept very little, passed blackish urine and had delirium. On the morning of the sixth day he was speechless and had cold perspiration. Later, about the middle of the day, his extremities became greenish, and he died. Throughout the course of the disease his perspiration was cold, his respiration deep and broken.

In this patient the symptoms of malignancy were evident from the beginning of the first night as shown by the fact that he perspired constantly but had no relief from his fever. Hippocrates says that in the event of symptoms of a crisis being present without the coming of a crisis, these symptoms either announce death -and this if they are accompanied by symptoms of fatal prognosis -or predict a long course of the disease-this latter in the case of their being accompanied by symptoms [fol. 244 v.] of healing. When this patient's fever did not relax after the perspiration but became more violent and malignant on the second day and the sufferer passed dark-coloured urine on the third day, all this confirmed the indications of malignancy. I mean to say, after the symptoms of the crisis there appeared still another symptom announcing death and confirming and corroborating the first. I mean by the first the fact that the fever was not relieved by the perspiration; this was followed by sleeplessness, delirium and thirst. When, on the fourth day, the symptoms became more definite and he passed blackish urine, this indicated two features, viz., firstly, that the disease had reached the (vital) spirits (*arwāḥ*) because they were affected already on the second and third day, and, secondly, that his death would occur by way of the (vital) spirits. The fourth day is similar to the sixth and seventh, except if the acuteness is very great and the symptoms indicate death, when it is likely to occur on the sixth day. When he reached the sixth day and the attack came on with severe symptoms and he died on this day, it was confirmed that his crisis had presaged the occurrence (of his death) on this day. He had passed blackish urine on the third and fourth days, and this indicates extreme malignity and acuteness; for if the intensity and violence (of the fever) appears in two subsequent attacks, this is a strong indication of the acute character (of the fever). When this was followed, on the fifth day, by trickling of blood from his nostrils, this was a sure

sign of dwindling of his strength. Had his strength been greater and the violence of his malignant symptoms less, his death would have been delayed until the eighth day. His mental condition supplied an indication of the confusion of his intelligence, as it has been described (by Hippocrates) in the *Epidemics*, and the cold perspiration throughout the course of the disease lessened his strength but not the power of the disease. The second acute attack which seized him on this occasion, is an indication that one must not rely on an intermittent calming down (of the symptoms) if there is not at the same time an improvement in the causative crisis; for the acute attack is likely to recur in such cases. Consequently, the symptoms occurring in this observation have all been mentioned, except the urine in which a spermatoid formation was suspended. All the other observations are in accordance with the contents of the books of the *Prognostic*, the *Crisis* and its *Days*.

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