



Abu Bakr Muhammad Ibn Zakariyya al-Razi

Rhazes: A Pioneer in Clinical Observation

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In the Golden Age of Islamic science, Islamic scientists made significant advancements in philosophy, mathematics, and medicine. Scholars recognize al-Razi (865-925) as one of the leading figures of the Islamic Golden Age. Abu Bakr Muhammad Ibn Zakariyya al-Razi, known to the West as Rhazes, studied a variety of subjects, including philosophy, alchemy, music, and medicine, writing over 200 works on these subjects. However, even though he did not begin his study of medicine until the middle of his life, scholars primarily acknowledge him because of his developments in the field of medicine. Rhazes challenged accepted medical beliefs through his skepticism of certain Galenic practices, his definition of small pox and measles, and his perceptive research through clinical investigation, resulting in substantial improvements in medical beliefs and practice.

Rhazes contributed to medicine through his skepticism and resulting correction of certain beliefs of Galen, a renowned Greco-Roman physician of the second century. Galen's fame increased tremendously after he died. By the time of Rhazes, Western physicians and scientists widely accepted Galenic thought. Although he wrote

treatises on a variety of subjects, the scientific world especially takes note of his medical works. Scholars translated his works into Syriac, Arabic, and eventually Latin. As part of his medical theory, Galen believed that men of science should recognize the interconnection between philosophy and medicine, as he explained in his work *That the Good Physician Must Be a Philosopher*.¹

Rhazes challenged some of Galen's beliefs in his book entitled *Doubts about Galen*. Officially titled *Kitab al-Shukuk ala Jalinus*, this work succeeded in perpetrating Rhazes' views on the Galenic practices in question. Ironically, Rhazes actually considered himself a devout follower of Galen; he merely disagreed with Galen on certain points with respect to both medicine and philosophy. He said in his *al-Shukuk*, "[In writing this book] I am faced with opposing one who is in my eyes the greatest of men, and who has benefitted me more than any other person. It was through him that I was guided; I trod in his footsteps and drank of his knowledge as if from an ocean."² The fact that Rhazes respected Galen added even more credibility to his *Doubts about Galen* because Rhazes' admiration of Galen reduced the possibility of his criticizing Galen for ulterior motives other than pursuit of the truth.

In his *al-Shukuk*, Rhazes alluded to various areas in which he disagreed with Galen and often mentioned these areas only briefly,

¹ Wael B. Hallaq and Donald P. Little, *Islamic Studies Presented to Charles J. Adams* (Leiden: Brill, 1991), 113.

² Ibid., 109.

referring to entire treatises that he wrote on these topics. For example, while Galen believed that all coldness came from the earth's core, Rhazes reasoned that it must be otherwise, stating, "This, however, would necessitate that the earth be absolutely cold, and there is nothing colder than absolute cold. Thus it would be colder than ice, which is contrary to the sense [of touch]."³ Rhazes referred to the treatise he wrote discussing whether or not cold originates at the earth's core, entitled *That the Source of Cold Is the Center of the Earth*. Rhazes also disagreed with Galen on the processes of sight in the eye. "It is evident that sight results through the projection of shapes onto the eye. Galen is extremely partisan in what he has to say concerning this matter, both in the *Book of Proof* and his other works...."⁴ Rhazes constructed a sizable treatise on this topic titled *On the Mechanism of Sight*. Finally, Rhazes referenced his work *On the Climate of Underground Passages*, declaring, "I have explained in a separate treatise that the warmth which we feel in the winter in the water which comes from springs and from the air in deep places does not result because it is of itself warmer at that time than in summer. Rather we feel it is so because of the cold of our own bodies, just as we feel tepid water to be cold after being in the bath because of the heat of our bodies."⁵

Aside from the usefulness of Rhazes' corrections of Galenic

³ Ibid.

⁴ Ibid.

⁵ Ibid.

thought, the mere fact that he questioned a highly respected man of science revealed his proper scientific method and focus on the constant improvement of medicine and science. He said in *al-Shukuk*, “The practice of science and medicine does not allow that one surrender, as it were, to its preeminent practitioners, or simply accept what they say.”⁶ Rhazes’ methodical approach to medicine and his relentless pursuit of the truth benefitted him throughout his career.

Additionally, Rhazes advanced the field of medicine through his distinction between the diseases of smallpox and measles. Since smallpox and measles perversely affected the people of his time, Rhazes’ work proved very meaningful because it helped later physicians understand the two diseases more thoroughly and accurately. In his *Treatise on Smallpox and Measles*, Rhazes properly distinguished between smallpox and measles for the first time and provided a detailed description of the symptoms of smallpox. In his treatise, he included not only a description of the disease but also his opinions concerning the causes and proper treatment thereof. He stated in his introduction, “We will now begin therefore by mentioning the efficient cause of this distemper, and why hardly anyone escapes it; and then we will treat of the other things that relate to it, section by section...”⁷ Clearly, Rhazes considered himself sufficiently equipped with both the experience and

⁶ Ibid.

⁷ Abu B. M. Z. Rāzī, *Rhazes on the Small-Pox and Measles*, ed. William A. Greenhill (Birmingham, Ala: Classics of Medicine Library, 1987), 28.

the desire to give a comprehensive description of smallpox. Throughout his work he systematically attempted to achieve this goal.

Rhazes identified the signs of an imminent attack of smallpox as backache, fever, nightmares, and an itchy nose. He also recognized facial swelling, flushed skin, bloodshot eyes, a sore throat, and labored breathing as early symptoms. However, he qualified his description by differentiating between smallpox and measles. "...the inquietude, nausea, and anxiety are more frequent in the Measles than in the Small-Pox; while, on the other hand, the pain in the back is more peculiar to the Small-Pox than to the Measles."⁸ Additionally, Rhazes discussed the types of people more prone to smallpox and the types of people more prone to measles. He claimed, "Bodies that are lean, bilious, hot, and dry, are more disposed to the Measles rather than the Small-Pox...",⁹ stating that even if lean people did acquire smallpox the sores would appear either very mild or very severe.¹⁰ In a similar way, Rhazes believed that people who seemed "lean and dry, and of a cold temperament" would prove less susceptible to both diseases, and that even if they did develop a case of smallpox they would only develop a very mild case.¹¹

In addition to differentiating between smallpox and measles, Rhazes differentiated between the milder and more serious variations of

⁸ Ibid., 34.

⁹ Ibid., 33.

¹⁰ Ibid.

¹¹ Ibid.

the two diseases. If the sores caused by the illness appeared sizable, white, and relatively scarce, he deemed the case less severe. If the patient suffered from large and white sores that existed in great number, he evaluated the case as mildly severe.¹² He described the worst situation as the patient whose sores seemed “brought about with difficulty, and the patient is not relieved upon their eruption...”¹³ He also mentioned a particularly calamitous variation of the diseases in which the sores grew white and so large that they combined to cover large areas of the patient’s skin.¹⁴ Finally, Rhazes discussed those sores which appeared either discolored or very hard, asserting that they signified a malignant form of the disease.¹⁵

Besides describing the smallpox, Rhazes gave various instructions for the prevention of smallpox while describing his opinion concerning the cause of the disease. To prevent smallpox, Rhazes recommended drawing blood from children and adolescents who had never contracted the disease or who had suffered only from smallpox. Rhazes based his reasoning for this practice on his theory that the blood of humans experienced a maturation process, progressing from the blood of infants and children, which Rhazes compared to “must,” until it reached the stage of a young man’s blood, which Rhazes likened to

¹² Ibid., 71.

¹³ Ibid.

¹⁴ Ibid., 72.

¹⁵ Ibid.

“wine perfectly ripened.”¹⁶ In fact, Rhazes considered the cause of smallpox a process comparable to the maturation of the blood. “...and the Small-Pox itself may be compared to the fermentation and the hissing noise which take place in the must at that time.”¹⁷ Rhazes believed that the disease endangered children in particular because their blood had not matured and still had the potential of transformation into the second stage.¹⁸ However, Rhazes also reasoned that adult men who had contracted chicken pox in the past faced a higher risk for measles because he believed that the contraction of chicken pox inhibited the maturation of the blood, leaving adults who had had chicken pox with immature blood like that of a child.¹⁹ Rhazes further explained his view of why smallpox endangered its victims, saying, “...the blood, when it ferments, is inflated and increased, and Nature, according to the temperament of the patient, is endeavoring to expel all its superfluous parts to the surface or members of the body....”²⁰ Even though Rhazes’ explanations of his observations may seem elementary and unscientific, he nonetheless demonstrated proper scientific method by forming a hypothesis based on his observations.

Rhazes gave various instructions for the proper care and treatment of patients suffering from smallpox or measles. Concerning the

¹⁶ Ibid., 29.

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Ibid., 30.

²⁰ Ibid., 44.

diet of the patient, Rhazes recommended such drinks as yellow lentil stew, broth from veal and poultry, and acidic juices.²¹ Additionally, Rhazes gave detailed instructions for giving barley water to the patient in varying amounts and proportions to other ingredients based on the patient's condition, stating that "by means of these you will be able to thicken and cool the blood, so as to prevent the eruption breaking out."²² He recommended that the patient avoid sweet foods and melons, suggesting foods like buttermilk and fish instead.²³ For overweight people, Rhazes recommended sweetened plum juice and whey.²⁴ In his treatise, Rhazes also detailed medicines to alleviate ailments related to smallpox. The recipes for his medicines included natural ingredients such as red roses, barberries, white lettuce seed, lentils, and camphor.²⁵

In addition to providing dietary restrictions for smallpox and measles patients, Rhazes provided other advice for the care of the patient. For example, Rhazes suggested that the patient take a cold bath each day.²⁶ Additionally, Rhazes wrote an entire chapter on the correct attention that the doctor should give to the eyes, nose, and mouth of a smallpox victim. Rhazes explained how the doctor must take particular care to prevent the spread of pustules to these areas, using acidic liquids

²¹ Ibid., 37-38.

²² Ibid., 38.

²³ Ibid., 39.

²⁴ Ibid., 40.

²⁵ Ibid., 41.

²⁶ Ibid., 39.

such as rosewater and pomegranate juice to wash the endangered areas.²⁷

Rhazes' extensive research on the subject of smallpox and measles demonstrated his role as a pioneer in the field of clinical practice and observation. His career benefitted future generations of physicians because he documented his cases and observations that he had compiled throughout his practice. As demonstrated by his studies of smallpox and measles, Rhazes emphasized productive and practical research. For instance, Rhazes gained a tremendous amount of experience while directing two Persian hospitals. First, he became a director of a hospital in his native town of Ray. Eventually his fame grew to such an extent that the Caliph Al-Muktafi offered him a position as the head director of a new hospital in Baghdad, which became known as the Hospital Marastin.²⁸ Rhazes determined the site for the new hospital by placing pieces of raw meat in various potential sites, choosing the place where the meat decayed most slowly.²⁹ After the caliph died in 907, Rhazes resigned as the director at Baghdad and resumed his position in the hospital at Ray. He affected the population at Ray both as an accomplished physician and as a renowned teacher. When a person came to the hospital with either an illness or a question, that person passed through a hierarchy of students. If one group of students failed to assist

²⁷ Ibid., 51-53.

²⁸ George M. Goodwin and Samuel W. Lambert, *Medical Leaders* (Indianapolis: The Bobbs-Merrill Company, 1929), 69.

²⁹ Henry E. Sigerist, *The Great Doctors: A Biographical History of Medicine*, trans. Cedar and Eden Paul (New York: Doubleday & Company, Inc., 1958), 61.

that person, they referred the client to the next higher level of students until a student addressed his question or ailment. If none of the students successfully assisted the patient, Rhazes himself addressed the issue.³⁰

Rhazes' medical writings remain his greatest long-term contribution to the field of medicine. His written works greatly influenced contemporary and subsequent physicians. For instance, Meyerhoff and Johnstone described Rhazes' *Liber Almansoris* as "a short, practical textbook of Medicine, and its ninth part (*Liber Nonus*) enjoyed great repute and formed the basis of medical learning until late in the sixteenth century."³¹ More significantly, Rhazes wrote a comprehensive compilation called *Kitab al-Hawi* (also known as *Liber Continens*), a 25-volume collection of Rhazes' clinical notes compiled by his students after his death. Due to the nature of its origin, the *Liber Continens* seems extremely disorganized and incoherent. Because of the immense length of this work, scholars have not yet translated it into English in its entirety. However, even though the *Liber Continens* appears disorderly and not designed for reading as a whole, it succeeded in transferring Rhazes' wealth of experience and information to future generations of Arabic physicians.

Rhazes detailed a veritable wealth of cases in his *Liber*

³⁰ SS Amr and A Tbakhi, "Abu Bakr Muhammad Ibn Zakariya Al Razi (Rhazes): Philosopher, Physician and Alchemist," *Annals of Saudi Medicine* 27, no. 4 (2007): 305.

³¹ Max Meyerhof and Penelope Johnstone, *Studies in Medieval Arabic Medicine: Theory and Practice* (London: Variorum Reprints, 1984), 324.

Continens. One such case pertained to a man who suffered from heart palpitations. Rhazes stated that he observed that the man had an unusually strong pulse in both the aorta and the basilica vein. The patient told Rhazes that bleeding by another physician had not improved his symptoms, but that the consumption of hot food helped his case somewhat. Although Rhazes admitted that the question puzzled him initially, he nonetheless continued to seek a remedy. Rhazes stated that after conducting more research, "...I administered to him the musk-remedy, and I obtained such an improvement in this patient of such a kind that his condition as regards pulse changed to be the same as in asthmatic patients who have an (emphysematous) distention of the chest...."³² While cases like this one resulted in the recovery of the patient, Rhazes did not restrict his records to successful cases, choosing rather to include all cases from which he might learn. One such case involved a man who suffered from otitis and meningitis. While the man believed himself cured of both meningitis and otitis at the time he came to Rhazes, the man had still not recovered from certain symptoms after three days, and Rhazes identified possible signs of meningitis recurring in the patient. Although Rhazes suggested several different treatments, the man refused most of them, including a bleeding of the nose, a drink of vegetable juice, and "the mucilage of flea-wort."³³ The man's

³² Ibid., 335.

³³ Ibid., 335.

condition worsened the next day, quickly leading to his death. In this case, Rhazes markedly pointed out his differences with the doctors with whom the man had previously conferred. According to Rhazes, these doctors had told the man that the disease had paralyzed the left side of his face, but Rhazes asserted that "...the strong contraction of the right eye was due to a spasm in this region."³⁴ Even though the man's death might have reflected poorly on Rhazes' ability as a physician, he included this case in his notes anyway, demonstrating that he valued progress and learning from unsuccessful cases above presenting himself in a favorable light.

Surely, Rhazes personified clear and uninhibited progress in his field. As the first to seriously question Galenic practice and beliefs, he maintained an open mind with respect to accepted medical theory. Even though he highly respected Galen, Rhazes didn't allow his regard for the great scientist to blind him from seeing possible sources of error in Galen's writing. As the first to properly define smallpox and measles, Rhazes systematically sought to explain the causes and symptoms of the two diseases while exploring possibilities for the treatment and prevention of smallpox and measles. Through his research he may have also opened the door for future progress in the treatment of those two diseases. Finally, Rhazes proved himself an expert in the field of clinical investigation. He shared his research and experience through his medical

³⁴ Ibid., 335.

writings, influencing all the men of science who read his works and used them for instruction. Rhazes encouraged new thinking through his questioning of Galen, his definition of small pox and measles, and his extensive clinical experience, resulting in significant progress in medical science.