

## The Medical Framework

This book presents a critical edition and translation of Abū Bakr Muḥammad ibn Zakariyyā' al-Rāzī's *Maqāla fī l-Faṣd* together with its Hebrew translation, *Ma'amar baHaqqaza le'al-Rāzī*. Before introducing the author and the treatise itself, it is essential to briefly outline the medical framework that is reflected in this work. The foundations of this theory were laid in ancient Greece during the fourth century B.C., a time when both the profound value of health and the inherent human vulnerability to disease were acknowledged as fundamental aspects of life.<sup>1</sup> This early emphasis on health spurred the development of sophisticated medical thought, with Hippocrates emerging as the revered 'father of medicine,' whose fame and enduring influence extended across geographical, religious, and linguistic boundaries.<sup>2</sup> The extensive *Hippocratic Corpus*, compiled over several centuries, established foundational medical principles that were elaborated by subsequent generations.<sup>3</sup>

Building upon this early Greek foundation, the Hellenistic period (330–30 B.C.)<sup>4</sup> witnessed significant developments in medical knowledge and practice. As only a few original treatises from this era survive, most of our understanding of its medical advancements comes from fragments preserved by later authors.<sup>5</sup> This period also witnessed the emergence of pharmacology as a distinct field. With the conquest and growth of Alexandria as a central trading hub, herbs and spices from Africa and India became more widely available, contributing to the development of this area of investigation for authors like Theophrastus (c. 371–278). The investigation of new substances continued to expand, particularly in the botanical and medical writings advanced by the school of Herophilus. Moreover, the anatomical discoveries of Herophilus and Erasistratus further contributed to the development of new surgical techniques and instruments, with Alexandrian surgeons gaining particular fame for their skills in treating fractures and dislocations.<sup>6</sup>

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1 Holmes, *Medicine*, pp. 554–555.

2 Pormann, *The Cambridge Companion to Hippocrates*, p. xiii.

3 Pormann, *The Cambridge Companion to Hippocrates*, p. 19.

4 Nutton, *Ancient Medicine*, p. 156.

5 Nutton, *Ancient Medicine*, p. 140.

6 Nutton, *Ancient Medicine*, pp. 141–142.

Grounded in the Aristotelian framework of four primary qualities and four elements, the *Hippocratic Corpus* offered a coherent system of medical theory and practice. According to this theory, disease was attributed to states of excess or deficiency; treatment aimed at restoring balance; and diet and exercise were viewed as crucial for enabling the body to counteract potentially harmful imbalances. The *Corpus* posited that the body's natural temperament made it continuously susceptible to imbalance, with each temperament associated with specific physical and psychological conditions. Furthermore, as noted in the Hippocratic treatises like *Epidemics* and *Airs, Waters and Places*, external factors affected the body.<sup>7</sup> Physicians had to be acquainted not only with the patient's individual constitution, but also with the season, winds, weather, geographical location, the sun's cycles, and the cosmos in general.<sup>8</sup>

Among the central aspects of Hellenistic medicine is humoral pathology, i.e., the doctrine of the four humours. The concept was introduced by Hippocrates of Cos (mid-fifth century B.C.) in his treatise *On the Nature of Man*, later adopted and further developed by Galen of Pergamon (129–c. 216 A.D.), who became the most influential of the Greek physicians<sup>9</sup>—as Temkin puts it, “no physician after Galen was comparable to him.”<sup>10</sup> Even though the origins of the doctrine of the four humours can be traced back to the Hippocratic school of medicine, it was Galen who emphasised the four humours—yellow bile, blood, phlegm, and black bile—as *the* Hippocratic humours, together with their association with the Aristotelian qualities,<sup>11</sup> where fire was hot and dry, air was hot and moist, water was cold and moist, and earth was cold and dry.<sup>12</sup> There was also a fifth element among the celestial bodies, namely *aether*, which was considered more divine than the earthly elements, and which was believed to exist in all living creatures in the so-called innate heat and in the semen, credited with the power of generating life.<sup>13</sup>

To better understand how these fundamental substances were central to health, it is important to examine the nature and characteristics attributed

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7 Nutton, *Ancient Medicine*, p. 145.

8 Nutton, *Ancient Medicine*, p. 75.

9 Pormann & Savage-Smith, *Medieval Islamic Medicine*, p. 9. According to Siegel, the notion of the four humours can be attributed to Pythagoras (530 B.C.) and his school, which are considered the originators of this concept. However, the Hippocratic treatises were not consistent regarding the number of the humours. Additionally, Praxagoras considered there to be nine or ten humours (Siegel, *Galen's System of Physiology and Medicine*, p. 216).

10 Temkin, *Galenism*, p. 125.

11 Brain, *Galen on Bloodletting*, p. 6.

12 Temkin, *Galenism*, p. 103.

13 Brain, *Galen on Bloodletting*, p. 6.

to each of the humours. The four humours each possessed a pair of primary qualities: yellow bile is hot and dry, blood hot and moist, phlegm cold and moist, and black bile cold and dry.<sup>14</sup> These qualities also defined the four elements with which the humours were associated: yellow bile with fire, blood with air, phlegm with water, and black bile with earth. Each humour was further linked to a specific temperament: yellow bile with the choleric, blood with the sanguine, phlegm with the phlegmatic, and black bile with the melancholic temperament. Finally, the humours were associated with the four seasons: yellow bile with summer and autumn, blood with summer and spring, phlegm with winter, and black bile with autumn.<sup>15</sup> Notably, yellow bile, blood, and phlegm are actual components of the body, whereas black bile was posited to complete the harmony of four.<sup>16</sup> The prevailing understanding was that the humours themselves were not inherently harmful, but that illness arose from their excess or deficiency. While a mere imbalance did not necessarily lead to illness, sickness occurred when an excessive amount of a humour settled in a specific area. Although health was generally considered the normal state of the body, the third book of the *Aphorisms* suggests that perfect health, not disease, was the rarity, highlighting the inherent fragility of human well-being. Some authors broadened the notion of health to include a permissible degree of imbalance—only when such imbalance became excessive did illness manifest.<sup>17</sup>

Among the humours, blood was considered the most well-tempered,<sup>18</sup> both as a humour of its own and a balanced mixture of all the humours.<sup>19</sup> Its primary task was to serve as nutrition for the body.<sup>20</sup> In Galen's physiological system, food from the stomach underwent digestion, or concoction, in the liver, transforming into nutritious blood that was then distributed via the veins to nourish the body.<sup>21</sup> Phlegm was recognised as a corrupt moisture, apparent in various body fluids. Yellow bile was understood as a foam generated during blood formation in the liver, with half of it flowing with the blood, and the other half settling in the gallbladder. Black bile was seen as a dark substance that, similarly to yellow bile, was produced during blood formation in the liver, half of

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14 Brain, *Galen on Bloodletting*, pp. 6–7.

15 Siegel, *Galen's System of Physiology and Medicine*, p. 218.

16 Brain, *Galen on Bloodletting*, pp. 6–7.

17 Nutton, *Ancient Medicine*, pp. 80–81.

18 Brain, *Galen on Bloodletting*, p. 8.

19 Siegel, *Galen's System of Physiology and Medicine*, p. 217.

20 Brain, *Galen on Bloodletting*, p. 123.

21 Nutton, *Ancient Medicine*, p. 233.

it remaining in the blood, while the other half ended up in the spleen. Accordingly, the blood flowing in the veins was a mixture of blood, yellow bile, and black bile.<sup>22</sup>

According to Nutton (2004), early texts like *Nature of Man* refer to black bile as ‘the so-called black bile,’ suggesting that the concept was not initially widespread. Over time, diseases came to be attributed to black bile, and it gained status as a distinct humour rather than just a type of bile, despite never being observed in its pure form. Its existence was seemingly confirmed through empirical observations of the body, such as the dark colour of warts and moles, the appearance of dark blood in scars, and dark vomit, which were taken as evidence that the body contained a dark and mysterious substance, the antithesis of life-giving blood, which was seen as its complete opposite.<sup>23</sup> Nutton also suggests that bile and phlegm received more attention than other bodily fluids, likely due to their apparent visibility and straightforward association with illness. Their unappealing appearance often coincided with ailments such as a runny nose, coughing or spitting sputum, and cloudy urine—all conditions readily linked to disease. Consequently, it was logical to assume that a coarse substance could obstruct the flow of air throughout the body or cause arthritis by settling on a joint. Bile, being visibly present in vomit and diarrhoea, naturally led to the idea that it could damage internal surfaces and bodily processes, much like it disrupts digestion. Furthermore, both these substances were observed to occur seasonally.<sup>24</sup>

Underlying Galen’s entire system was the fundamental belief that Nature was the creator and controller of all living things, and that health resided in maintaining a natural balance.<sup>25</sup> As Tallmadge May (1996) explains, ‘Nature’ was understood as “the primary essence which is the basis of all bodies that are generated and decay.”<sup>26</sup> Through his anatomical experiments, Galen sought to demonstrate the wisdom of Nature, or the Creator. Echoing Plato and Aristotle, he believed that every part, from an insect’s eye to any other component of a living being, was intentionally created for a specific purpose. Even the smallest structures were designed with their proper function in mind, along with a precise balance of elements, qualities, or humours that facilitated that specific function.<sup>27</sup> In Galen’s view, disease was an unnatural state of the body, a dis-

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22 Pormann & Savage-Smith, *Medieval Islamic Medicine*, p. 44.

23 Nutton, *Ancient Medicine*, p. 84.

24 Nutton, *Ancient Medicine*, p. 80.

25 Brain, *Galen on Bloodletting*, p. 7.

26 Galen, *UP*, May’s introduction, p. 10.

27 Nutton, *Ancient Medicine*, pp. 234–235.

ruption of this harmonious equilibrium between the four humours and their associated qualities.<sup>28</sup> A too hot patient needed to be treated by cooling, a too dry patient by damping, and so on.<sup>29</sup> Consequently, the function of medicine, as he stated in *On Treatment by Venesection*, was “both to restore all the natural functions of the parts of the body when they have been corrupted, and to preserve them once they have been restored.”<sup>30</sup>

As the humours flowed in the blood, phlebotomy became a central means to restore the balance between the humours. Even though it was Galen who became a pioneer in applying phlebotomy to treat a wide variety of diseases,<sup>31</sup> the procedure had been used for a long time by various civilisations. Garrison (1913) describes phlebotomy as one of the oldest and most common therapeutic devices, used by ancient Egyptians, Babylonians, and native Americans, who used fishbones, thorns, sharp stones, and horns as instruments for phlebotomy and cupping. Moreover, phlebotomy is even mentioned in the Talmud.<sup>32</sup> In other words, despite having been used for a long time by various civilisations, it was Galen who established the antique tradition of phlebotomy as a fashionable practice,<sup>33</sup> that he used to treat both physical and psychological conditions: illnesses in the parts, sciatica, rheumatism, insanity, melancholia,<sup>34</sup> hepatitis, angina, ophthalmia, and epilepsy, and according to his records, he successfully treated a patient suffering from *anorexia nervosa* as well.<sup>35</sup> Apart from phlebotomy, Galen used diet, cupping, and purging to rectify humoral imbalances.<sup>36</sup> He understood that different methods had different effects, with phlebotomy primarily emptying the veins, while fasting emptied the entire body. However, phlebotomy was faster to conduct and provided immediate results, while fasting took a long time and was more challenging for the patient.<sup>37</sup>

Galen also emphasised the importance of a proper diet. Yet, his understanding of diet extended beyond just food and drink, encompassing a person’s entire lifestyle, including exercise, sleep, and environmental influences. He recog-

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28 Brain, *Galen on Bloodletting*, p. 4.

29 Brain, *Galen on Bloodletting*, p. 7.

30 Galen, *Cur. Rat. Ven. Sect.*, p. 71.

31 Garrison, *The History of Bloodletting*, pp. 8–9, Brain, *Galen on Bloodletting*, p. 145.

32 Garrison, *The History of Bloodletting*, pp. 1–3.

33 Brain, *Galen on Bloodletting*, pp. 1–2.

34 Garrison, *The History of Bloodletting*, p. 10.

35 Brain, *Galen on Bloodletting*, p. 129; 133.

36 Pormann & Savage-Smith, *Medieval Islamic Medicine*, pp. 43–44.

37 Brain, *Galen on Bloodletting*, p. 122.

nised that consuming unsuitable foods could lead to illness, and a proper diet could maintain and restore health. In his works, he connected the properties of foodstuffs to the four humours and their associated qualities, categorising them as either heating, cooling, moistening, or drying, and noting their ability to thicken or thin the humours. Following the approach of his predecessors, Galen also classified foodstuffs based on their digestibility, strength, and suitability for human consumption.<sup>38</sup> He considered white meat, poultry, and fish to be more easily digestible than red meat, and believed that pork, due to its resemblance to human flesh, was the easiest meat to digest. For the sick, he recommended white wines, soups, barley broth, and gradually reintroducing their regular diet. Despite the enduring validity of much of his dietary advice, he almost entirely prohibited consuming fresh fruit, regarding them as a frequent source of illness.<sup>39</sup> Alongside a proper diet, Galen emphasised the importance of physical exercise and bathing in moderation.<sup>40</sup>

Regarding the balancing of humours, Savage-Smith (2013) argues that in practice, they were less central to therapy than the term ‘humoral pathology’ implies.<sup>41</sup> Firstly, therapy itself was not necessarily based on directly addressing humoral *imbalances*, but involved administering simple drugs based on their *qualities* (warm, cold, dry, moist) to counteract perceived symptoms; there was no direct ‘humoral justification’ for these therapies.<sup>42</sup> Secondly, the practical application of humoral theory in therapy was problematic because blood vessels, as mentioned above, carried a mixture of humours (blood, yellow bile, and black bile—and for some medical authorities even phlegm), implying that procedures like phlebotomy would remove multiple humours, making it impossible to selectively adjust the balance of a single humour.<sup>43</sup> However, when resorting to drugs, Galen aimed to correct imbalances by using a substance with a quality opposite to the nature of the disorder. He primarily studied simple drugs and observed how they affected the body through one of the primary qualities. He also recognised a category of drugs proven to be efficient by experience, even though it was difficult to assign any specific quality to their

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38 Nutton, *Ancient Medicine*, pp. 240–241.

39 Nutton, *Ancient Medicine*, p. 241.

40 Nutton, *Ancient Medicine*, pp. 241–242.

41 Savage-Smith, *Were the Four Humours Fundamental to Medieval Islamic Medical Practice?*, p. 103.

42 Savage-Smith, *Were the Four Humours Fundamental to Medieval Islamic Medical Practice?*, p. 92.

43 Savage-Smith, *Were the Four Humours Fundamental to Medieval Islamic Medical Practice?*, p. 98. This inability to isolate and restore the balance of individual humours, according to Savage-Smith, is evident in the medical literature.

activity. These composite drugs could target specific *humours*: for instance, phlegmagogues could be used to draw out phlegm, and cholagogues to expel excess bile.<sup>44</sup>

In addition to the humoral theory, ancient physicians worked with other key physiological ideas. Another fundamental concept in the Greek medical theory was *pneuma*, of which Galen identifies three types: vital pneuma, that is generated in the heart and in the arteries, produced from the inhalation and vapourisation of the humours; psychic pneuma, generated from a further refinement of the vital pneuma in the retiform web through the carotid arteries, reaching the ventricles of the brain;<sup>45</sup> and natural pneuma, generated in the liver and distributed through the veins.<sup>46</sup> In addition to pneuma, Galen's physiological system, explained in his *De usu partium*, is based on the idea that each division of the soul has a special power or faculty. He assigned the psychic faculty to the brain, the vital faculty to the heart, and the natural faculty to the liver. Additionally, most of the other body parts had their faculties, such as the attractive faculty to attract nutriment, the retentive faculty to hold the nutriment, and the expulsive faculty to get rid of surplus material. Galen assigned these faculties to various parts of the body, such as the uterus, the arteries, the muscles, and the veins, while being aware that assigning these faculties did not actually explain much, but rather served as a label until the true essence of the cause behind actions could be understood.<sup>47</sup> The faculties of attraction, assimilation, excretion, and growth, found in every living organism, allowed each part of the body to absorb what it needed to function properly. Ultimately, Galen viewed the body as a self-regulating microcosm that responds to changes and actively seeks what it requires to function and survive.<sup>48</sup>

In summary, health was viewed as a vulnerable state, influenced by numerous factors including air, lifestyle, diet, sleep, and exercise. Moreover, it was in a constant state of flux due to climate, seasonal shifts, and ageing. This perspective emphasised individual constitution, each person having their own ideal balance, perpetually at risk of disruption from external changes. However, many of these changes were predictable and thus preventable. For instance, knowing that fevers could result from excess bile, which was prevalent in summer and autumn, one could take dietary precautions to limit bile production. Sim-

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44 Nutton, *Ancient Medicine*, pp. 242–243.

45 Galen, *PHP* VII 3, pp. 444–445. For an explanation how this works, see Galen, *PHP* VII 3–4, pp. 442–453.

46 Galen, *UP*, p. 48.

47 Galen, *UP*, pp. 49–50.

48 Nutton, *Ancient Medicine*, p. 233.

ilarly, understanding that blood increased in spring and early summer allowed for preventative measures to protect the body from potential harm. To prevent an imbalance and restore the body to a natural state, one had to account for a range of elements, such as age, constitution, season, and the appropriate treatment. Though intricate, this was achievable and desirable, as health was valued as ‘the most precious of goods.’<sup>49</sup>

## 1 Graeco-Arabic Medicine

Building upon the foundations of Greek medical heritage, scientific medicine began to flourish centuries later under Islamic civilisation, marking one of the most dynamic phases in the historical development of medicine.<sup>50</sup> The reception and translation of Greek literary and scholarly traditions within the regions that became the Islamic world was crucial for the later integration of Greek arts and sciences into Islamic thought<sup>51</sup> and for the formation of Graeco-Arabic medicine.<sup>52</sup>

During the Umayyad period (661–750 A.D.<sup>53</sup>), translation efforts were largely pragmatic, driven more by administrative and social needs than by scholarly ambition. Following the Arab conquest of Syria, Palestine, and Egypt, the continued use of Greek in government and daily life made translation from Greek into Arabic essential—especially in administrative contexts, as evidenced by bilingual documents and papyri from the seventh and eighth centuries.<sup>54</sup> The lack of scientific, and especially medical, knowledge became evident, and teachings from Greek sources had to be accessed indirectly, first through Syr-

49 Nutton, *Ancient Medicine*, pp. 82–83.

50 Isaacs, *Arabic Medical Literature*, p. 342.

51 Goodman, *The Greek Impact on Arabic Literature*, p. 472.

52 While some scholars use the term ‘Islamic medicine’ to describe the medical tradition that emerged in the Islamic Empire, this term may have limitations and could be perceived as implying an exclusive association with Islam. However, as Pormann & Savage-Smith (p. 2) point out, the term is not limited to practitioners of Islam and does not exclude practitioners of other religions or cultures. I have chosen to use the term ‘Graeco-Arabic medicine’ instead, which emphasises the continuity of the Graeco-Roman medical tradition in this development. However, I acknowledge that any term could be misunderstood or have limitations. While there currently is no term that explicitly recognises the multiple sources of this tradition, it is important to clarify that the term ‘Graeco-Arabic medicine’ is not meant to imply that only Greek and Arabic traditions were involved, but rather to highlight the prominent role of these two in the development of the medical tradition.

53 Gutas, *Greek Thought, Arabic Culture*, p. 17.

54 Gutas, *Greek Thought, Arabic Culture*, pp. 23–24.

iac translations and later through Arabic ones.<sup>55</sup> Although some translations took place under the Umayyads—often by Syriac-speaking Christians—they remained limited in scope and lacked the organisation and scale that would come to define the Abbasid period.<sup>56</sup>

Despite the practical approach to translations, there was some interest in Greek learning: for instance, ‘Umar b. ‘Abd al-‘Azīz, who reigned between 99–102/717–720, is credited with ordering the Arabic translation of a Greek medical work.<sup>57</sup> Some political and advisory texts were rendered into Arabic, and the administrative apparatus was gradually arabicised. However, the translations of scientific texts remained rare, with few confirmed instances.<sup>58</sup> Furthermore, early intellectual activity also encompassed topics like grammar, administration, law, and Islamic thought.<sup>59</sup>

While the Umayyad period laid important groundwork, it was under the Abbasids that the translation of scientific and medical texts truly flourished. The transmission of Greek medical heritage gained significant momentum with the rise of the Abbasid dynasty around 750 A.D. and the subsequent foundation of Baghdad in 762 A.D., which led to an immense translation movement<sup>60</sup>—a deliberate and large-scale scholarly project with far-reaching historical, social, and cultural consequences.<sup>61</sup> In its first century, the translation movement introduced foundational Greek concepts such as the four elements, four humours, and four temperaments into Arabic discourse.<sup>62</sup> Over a period of two centuries, nearly the entire corpus of Greek scientific texts was translated into Arabic.<sup>63</sup> Beyond its own merits, this translation movement was essential because it ensured the survival of numerous Greek works, the original versions of which have since perished.<sup>64</sup>

A central force in this intellectual activity was the work of Syriac-speaking Christians, who served as trilingual intermediaries, often translating from Greek into Syriac and then into Arabic.<sup>65</sup> Among them, Ḥunayn ibn Ishāq

55 Isaacs, *Arabic Medical Literature*, pp. 342–343.

56 Gutas, *Greek Thought, Arabic Culture*, pp. 20–22.

57 Goodman, *The Greek Impact on Arabic Literature*, p. 473.

58 Gutas, *Greek Thought, Arabic Culture*, pp. 23–24.

59 Goodman, *The Greek Impact on Arabic Literature*, p. 473 ff.

60 Gutas, *Greek Thought, Arabic Culture*, p. xiii.

61 Gutas, *Greek Thought, Arabic Culture*, p. 24.

62 Isaacs, *Arabic Medical Literature*, p. 343.

63 Gutas, *Greek Thought, Arabic Culture*, p. 1.

64 Gutas, *Greek Thought, Arabic Culture*, p. 1.

65 Hoyland, *Seeing Islam as Others Saw It*, pp. 195–196.

(192/808–260/873<sup>66</sup>), a Nestorian Christian active in the 9th-century Baghdad, played a central role. He not only translated much of the *Hippocratic Corpus* and the commentaries of Galen,<sup>67</sup> but also led a circle of disciples, including his family members, who translated numerous other medical works.<sup>68</sup> His method emphasised clarity, precision, and fidelity to the original meaning, prioritising technical accuracy over stylistic ornamentation.<sup>69</sup> The intellectual activity of centres like Alexandria, which had already engaged with Greek medical thought, further facilitated the reception of Hippocratic texts in Baghdad.<sup>70</sup> Prior to Ḥunayn ibn Isḥāq, Arabic lacked a suitable technical vocabulary. His pioneering efforts in translation and terminology became the model for future translators, and profoundly shaped Arabic medical literature.<sup>71</sup>

While deeply rooted in Hellenistic medicine, Graeco-Arabic medicine evolved to incorporate elements from across the vast Islamic Empire, which during the medieval period stretched from Spain and North Africa to India and Central Asia, fostering a society in which different cultures and languages co-existed and collaborated. Thus, Graeco-Arabic medicine was cultivated by scholars from diverse backgrounds, overlooking origin, language, religion, and culture. They would all write in Arabic, a language that connected both medical practitioners and patients.<sup>72</sup> In urban centres like Baghdad, an elite medical culture developed, while rural areas maintained more traditional, pre-Islamic medical practices.<sup>73</sup> The necessity of precise medical communication functioned as an incentive for establishing a comprehensive Arabic technical terminology, ultimately transforming Arabic into the scientific *lingua franca* of the Empire.<sup>74</sup>

In parallel with the translation of medical works, a sophisticated culinary tradition also emerged. Significantly, this Arabic-Islamic culinary culture was built upon the foundations of Greek humoral theory and the existing culinary practices of the ancient Near East. The connection between diet and medicine, rooted in humoral principles, is illustrated for instance in Ibn Sayyār al-Warrāq's culinary manual, *Kitāb al-Ṭabīḥ*, and in the works of the early Abbasid

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66 Isaacs, *Arabic Medical Literature*, p. 344.

67 Pormann, *The Cambridge Companion to Hippocrates*, p. 19.

68 Waines, *Dietetics in Medieval Islamic Culture*, p. 101.

69 Isaacs, *Arabic Medical Literature*, p. 344.

70 Pormann, *The Cambridge Companion to Hippocrates*, pp. 19–20.

71 Isaacs, *Arabic Medical Literature*, p. 344.

72 Pormann & Savage-Smith, *Medieval Islamic Medicine*, p. 2.

73 Pormann & Savage-Smith, *Medieval Islamic Medicine*, p. 6.

74 Pormann & Savage-Smith, *Medieval Islamic Medicine*, pp. 31, 33–35.

court physician, Abū Zakariyyā' Yuḥannā b. Māsawayh (d. 857), to whom a culinary manual, alongside medical manuals, is attributed.<sup>75</sup> This reflects the broader integration of medical principles into daily life, which is also reflected in the current work.

Following the translation period, Arab physicians entered a phase of original learning and teaching. Greek methods dominated medical education, which was often rhetorical and debate-oriented. Medical training varied, combining theoretical knowledge with practical skills in diverse ways. The physicians' engagement with the translated texts sharpened their critical skills and powers of observation. Most physicians were usually generalists rather than specialists, and often authored encyclopaedic works, revering ancient Greek authorities and aiming to systematise medical knowledge.<sup>76</sup> A notable example is 'Alī ibn Rabbān al-Ṭabarī's (3rd/9th century) *Firdaws al-Ḥikma*, a comprehensive manual covering medicine, philosophy, zoology, meteorology, psychology, and astrology. The author explicitly stated that mastering its contents would provide students with the essentials of medical science.<sup>77</sup>

The scholarly character of this period, often referred to as the 'translation movement,' has been the subject of academic debate. For instance, Gutas (1998) uses this term to highlight several key factors that contributed to its success: its sustained nature over two centuries, the broad support it received from all levels of the Abbasid society, the substantial public and private funding it received, and the rigorous scholarly methodology employed by the translators.<sup>78</sup> In contrast, Pormann (2022) argues against a singular movement, pointing out that the role of earlier Syriac translations as intermediaries is often overlooked, and that attributing Arabic versions solely to specific schools or workshops simplifies the reality that scholars built upon prior work. According to him, the diverse styles, motivations, and contexts of translation over time suggest the lack of a unified purpose implied by the term 'movement.'<sup>79</sup>

Regardless of terminology, the intellectual exchange and transmission of Greek medical knowledge into the Arabic-speaking world during the Abbasid era occurred. It undeniably shaped the course of medicine both within the Islamic Empire and later in Europe, where Graeco-Arabic medical texts were introduced in the late medieval period, forming the core of Western medi-

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75 Waines, *Dietetics in Medieval Islamic Culture*, pp. 102–103.

76 Isaacs, *Arabic Medical Literature*, p. 345.

77 Isaacs, *Arabic Medical Literature*, pp. 345–346.

78 Gutas, *Greek Thought, Arabic Culture*, p. 2.

79 Pormann, *Translations of Medical and Occult Texts into Arabic and Syriac and Their Contexts After 80/700*, pp. 57–58.

cine.<sup>80</sup> Furthermore, the transmission of medical knowledge continued in medieval Europe through other linguistic channels, for instance among Jewish communities, who faced exclusion from Christian universities, and thus lacked access to Latin medical education and texts. This led to an effort to translate Latin medical works into Hebrew for Jewish physicians. These Hebrew translations, along with translations into various vernacular languages written in Hebrew characters for regional use, not only preserved valuable medical knowledge but also highlight the multifaceted nature of cross-cultural scientific exchange in medieval Europe.<sup>81</sup>

## 2 Al-Rāzī

Abū Bakr Muḥammad ibn Zakariyyā' al-Rāzī (251/865–313/925<sup>82</sup> or 323/935<sup>83</sup>) was born on the first day of Ša'bān in Rayy,<sup>84</sup> near present-day Tehran.<sup>85</sup> He studied music, alchemy, and other natural sciences,<sup>86</sup> and played the oud.<sup>87</sup> According to al-Bīrūnī (d. ca. 442/1050<sup>88</sup>), al-Rāzī's interest in medicine was sparked by seeking treatment for eye damage from alchemical experiments involving fire and harmful vapours, a condition possibly worsened by his habit of studying by lamplight and his fondness for beans, which may have contributed to the cataracts he later developed in both eyes.<sup>89</sup> Around the age of thirty, al-Rāzī travelled to Baghdad to study medicine.<sup>90</sup> Although we do not know his medical teacher for certain,<sup>91</sup> Ibn Abī Uṣaybi'a claims that al-Rāzī studied under 'Alī ibn Rabbān al-Ṭabarī, which, however, poses a chronological problem.<sup>92</sup> Al-Rāzī was both a prolific author of numerous medical works and a ded-

80 Pormann & Savage-Smith, *Medieval Islamic Medicine*, pp. 3–4.

81 Bos, G., and Fischer, K., *A Glimpse into Medical Practice Among Jews Around 1500*, pp. 1–2.

82 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63.

83 Stroumsa, *Freethinkers of Medieval Islam*, p. 90. The exact dates of birth and death are not certain.

84 Bīrūnī, *Risāla*, p. 4.

85 Martin, *Encyclopedia of Islam and the Muslim World*, p. 446.

86 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 274.

87 Ibn Ğulġul, *Ṭabaqāt*, p. 77.

88 Stroumsa, *Freethinkers of Medieval Islam*, p. 88.

89 Bīrūnī, *Risāla*, pp. 4–5.

90 Ibn Abī Uṣaybi'a, *Ṭabaqāt*, p. 760.

91 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 275.

92 Ibn Abī Uṣaybi'a, *Ṭabaqāt*, p. 760. Al-Ṭabarī died when al-Rāzī was just five years old. Perhaps al-Rāzī 'studying under' al-Ṭabarī should be understood as him being trained according to al-Ṭabarī's knowledge, as a disciple.

icated clinical practitioner.<sup>93</sup> Excelling in the study and practice of medicine,<sup>94</sup> he was entrusted with the management of the hospital of Rayy before being selected to direct a hospital in Baghdad.<sup>95</sup> He continued practising medicine in Baghdad before returning to Rayy, and it was also there that he died.<sup>96</sup> His accomplishments in medicine were acknowledged in both Arabic and Latin medical literature, earning him the Latin name Rhazes.<sup>97</sup>

Al-Rāzī was a prolific author who constantly wrote new works.<sup>98</sup> Sezgin attributes 76 works to him,<sup>99</sup> and several other titles in Latin and Hebrew translations are possibly linked to his authorship, though further examination is required to confirm their origin. Additionally, Ibn al-Nadīm, al-Bīrūnī, and Ibn Abī Uṣaybi'a list more works attributed to al-Rāzī, for which no manuscripts are currently known.<sup>100</sup> According to Ibn al-Nadīm, al-Rāzī was unparalleled during his time, collected information on ancient sciences, and visited various countries.<sup>101</sup> According to Ibn Abī Uṣaybi'a, al-Rāzī served as a physician to numerous prominent Persian rulers and spent most of his time there, composing several of his books on medicine and other topics,<sup>102</sup> such as *al-Kitāb al-Manṣūrī*<sup>103</sup> composed for al-Manṣūr ibn Iṣḥāq ibn Aḥmad, the governor of Kirmān and Khorasan, and *al-Ṭibb al-Mulūkī*<sup>104</sup> for 'Alī ibn Wahzūzān, the son

93 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63.

94 Ibn Ġulġul, *Ṭabaqāt*, p. 77.

95 Ibn Abī Uṣaybi'a, *Ṭabaqāt*, p. 762. According to Ibn Abī Uṣaybi'a, al-Rāzī served as the director of the al-ʿAḡudī hospital, attributed to the king ʿAḡud al-Dawla, and played a crucial role in choosing its location by hanging meat around Baghdad and by observing where it did not putrefy quickly (Ibn Abī Uṣaybi'a, *Ṭabaqāt*, p. 761). However, the story of him working under the king ʿAḡud al-Dawla (936–983) may not be accurate as the king was born after al-Rāzī's death. Most likely, the story refers to a hospital named after the Abbasid caliph al-Mu'taḡid (d. 902) (*Encyclopaedia of Islam* 111, "ʿAḡud al-Dawla"; Iskandar, p. 155).

96 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 275.

97 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63.

98 Goodman, *Encyclopaedia of Islam*. Consulted online on November 11, 2022.

99 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 274 ff.

100 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 292. For titles attributed to al-Rāzī in early historical sources, see 144 titles in Ibn al-Nadīm, *Fihrist*, p. 701 ff.; 225 titles in Ibn Abī Uṣaybi'a, *A Literary History of Medicine*, Volume 3–2 [11.5.25] p. 845 ff., and 184 titles in Bīrūnī, *Risāla*, p. 6 ff.

101 Ibn al-Nadīm, *Fihrist*, p. 701.

102 Ibn Abī Uṣaybi'a, *A Literary History of Medicine*, Volume 3–2 [11.5.14] p. 850.

103 A book on anatomy, physiology, pathology, *materia medica*, general maintenance of health, diet, cosmetics, surgery, toxicology, etc. (Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 281).

104 "... on illnesses and the treatment of all diseases through nutrition and the addition of medicine to food where necessary and where the patient is amenable to it" (Ibn Abī

of the governor of Ṭabaristān.<sup>105</sup> Among his other notable works is *al-Kitāb al-Ḥāwī*, a comprehensive medical encyclopaedia that includes quotations from Greek, Syriac, Indian, and Arabic sources.<sup>106</sup> Ibn al-Nadīm notes that al-Rāzī was also known for his compassion towards the ill and poor, offering them financial aid and nursing care, and was generally considered “generous, distinguished, and upright with the people.”<sup>107</sup> Al-Rāzī even wrote a book, *Kitāb ilā man lā yaḥḍuruḥu ṭabīb*, also known as *Kitāb ṭibb al-fuqarāʾ*, to guide people in treating illnesses when a physician was not available.<sup>108</sup>

Al-Rāzī, being a native speaker of Persian and well-versed in Arabic, certainly had access to texts in various languages and to libraries containing translations of Sanskrit, Pahlavi, and Syriac works. According to Kahl (2015), it is possible that al-Rāzī was even familiar with Syriac and Greek,<sup>109</sup> and he may have been familiar with the Devanāgarī alphabet, if not the Sanskrit language itself, as well as the Chinese writing system.<sup>110</sup> He was unequivocally influenced by Galenic medicine; however, rather than merely implementing the teachings of Galen, he gathered his own observations based on his patients and their response to treatment.<sup>111</sup> He was also committed to scientific progress, conducting his research carefully, identifying areas for further investigation, and expressing his hope that other scholars would collaborate to advance scientific knowledge.<sup>112</sup> Drawing inspiration from Hippocrates’ *Epidemics*, al-Rāzī started documenting his own patient histories, including personal details such as names and professions. Notably, his writings reveal an early approach to medical evalu-

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Uṣaybiʿa, *A Literary History of Medicine*, Volume 3–2, [11.5.25] p. 859). Listed in Sezgin, p. 286, no. 16.

105 The editors of *A Literary History of Medicine* point out that he was rather the governor of Rayy than of Ṭabaristān (Ibn Abī Uṣaybiʿa, *A Literary History of Medicine*, Volume 3–2 [11.5.14] p. 850).

106 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 278.

107 Ibn al-Nadīm, *Fihrist*, p. 702.

108 Ibn Abī Uṣaybiʿa, *Ṭabaqāt*, p. 778. The title is listed in Sezgin as *K. Man lā yaḥḍuruḥu ṭ-ṭabīb*, (Sezgin, p. 287, no. 21).

109 However, given that the Syriac and Greek texts had already been translated into Arabic, this is not certain.

110 Kahl, *Rhazes*, p. 6. His book *al-Kitāb al-Ḥāwī* includes a great number of Sanskrit, Syriac, and Persian sources. For more, see Kahl, *The Sanskrit, Syriac and Persian Sources in the Comprehensive Book of Rhazes*.

111 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63. For more on this topic, see “Thirty-Three Clinical Observations by Rhazes (circa 900 A.D.)” by M. Meyerhof in *Isis*, Vol. 23, No. 2 (Sept. 1935), pp. 321–372. According to Ibn Abī Uṣaybiʿa, al-Rāzī had a noble friend with whom he used to spend nights reading the works of Hippocrates and Galen (Ibn Abī Uṣaybiʿa, *Ṭabaqāt*, p. 764).

112 Iskandar, *Ar-Rāzī, the Clinical Physician*, p. 215.

ation: in what seems to be an early clinical trial, al-Rāzī applied phlebotomy to one group of meningitis patients and withheld this treatment from a control group to objectively determine its therapeutic value.<sup>113</sup> Other observations of his own, accompanied by the Arabic translations of works of Galen, Hippocrates, and other authors, are gathered in one of his primary contributions to medicine, the aforementioned *al-Kitāb al-Ḥāwī*, ‘The Comprehensive Book.’<sup>114</sup> Al-Rāzī acknowledged the views of Galen and other physicians, but only when confirmed by his own practical experience. His writings are filled with evidence of his strong opinions and his reliance on empirical knowledge, showing that he did not blindly follow established authorities.<sup>115</sup> Al-Rāzī’s writings demonstrate a critical mindset,<sup>116</sup> as shown for instance in his treatise *Kitāb al-šukūk wa-l-munāqaḍāt allatī fī kutub Ḡālīnūs*, ‘Doubts about Galen.’<sup>117</sup> In addition to writing medical handbooks and commentaries, al-Rāzī also composed medical texts on specific topics, such as *Kitāb al-Ġudarī wa-l-Ḥašba*, ‘On Smallpox and Measles,’<sup>118</sup> *Kitāb fī l-Qawlanġ*, ‘On Colic,’<sup>119</sup> and *Kitāb al-Taqsīm wa-l-Tašġūr*<sup>120</sup> on differential diagnosis.

Al-Rāzī recognised the challenges in accurately diagnosing diseases with similar symptoms. In his work ‘On how to recognise the Best Physician,’ he stressed the crucial need to test a physician’s ability to differentiate between conditions such as kidney and colon pains, pleurisy and pneumonia, and various presentations of blood or pus in bodily fluids.<sup>121</sup> Moreover, according to Iskandar, al-Rāzī was not afraid to acknowledge his own mistakes. If persuaded by a different viewpoint, he adopted it. This intellectual honesty clearly reflects his scientific spirit and his ability to overcome pride.<sup>122</sup>

113 Young, Latham & Serjeant, *Religion, Learning and Science in the ‘Abbasid Period*, p. 377.

114 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63. See also Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 278.

115 Iskandar, *Ar-Rāzī, the Clinical Physician*, p. 221.

116 Iskandar, *Ar-Rāzī, the Clinical Physician*, p. 216.

117 Ibn Abī Ušaybi’a, *Ṭabaqāt*, p. 776. In Sezgin listed as *aš-šukūk ‘alā Ḡālīnūs* (p. 292, no. 70). For a recent edition and translation into French, see Pauline Koetschet, *Abū Bakr al-Rāzī, «Doutes sur Galien»*. *Introduction, édition et traduction* (coll. Scientia Graeco-Arabica), Berlin, de Gruyter, 2019. Al-Rāzī justified criticising Galen by stating that “It is more in the spirit of Galen to follow his exhortation to search for truth than to swear by his opinions.” (Temkin, p. 118).

118 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 283, no. 3.

119 Ibn Abī Ušaybi’a, *Ṭabaqāt*, p. 787; Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 286, no. 14. Edited and translated into French by Ḥammāmī, 1983.

120 Ibn Abī Ušaybi’a, *Ṭabaqāt*, p. 778; Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 284, no. 5.

121 Iskandar, *Ar-Rāzī, the Clinical Physician*, p. 230.

122 Iskandar, *Ar-Rāzī, the Clinical Physician*, p. 222.

While primarily celebrated for his medical authority, al-Rāzī also engaged deeply with philosophy, reportedly studying under al-Balḥī.<sup>123</sup> His largest surviving philosophical work is *al-Ṭibb al-Rūḥānī*, ‘The Spiritual Medicine,’<sup>124</sup> written for Maṣṣūr ibn Ishāq.<sup>125</sup> Notably, al-Rāzī developed the controversial theory of the ‘five eternal’—God, soul, matter, time, and place—suggesting that cosmos derived from these co-eternal principles. This idea, which seemed to place soul, matter, time, and place on a similar eternal footing with God, was widely opposed and ridiculed by other scholars.<sup>126</sup> Unlike his well-preserved medical legacy, most of al-Rāzī’s philosophical writings, including the ones explaining the five eternal, are lost, and survive only as fragments in writings by other authors who mostly mention al-Rāzī and his theory with the aim of refuting him:<sup>127</sup> al-Qāḍī Ṣā’id claimed that al-Rāzī did not understand theology, and thus possessed foolish, malicious beliefs and criticised people he did not understand,<sup>128</sup> and Abū Ḥātim al-Rāzī, a Persian philosopher, also from the city of Rayy, considered him a heretic for his critical views on prophecy.<sup>129</sup>

Despite his potentially unorthodox theological views, the intellectual climate of the time allowed for such radical ideas.<sup>130</sup> Al-Rāzī’s philosophical approach was inspired by his scientific interest and background in the natural sciences,<sup>131</sup> drawing influence from Persian, Indian, and Greek thought, though he considered himself an independent philosopher, distinct from established schools of thought.<sup>132</sup> His critical stance on prophecy set him apart and even influenced his scientific work in alchemy: by rejecting the divine qualities often attributed to alchemical substances, al-Rāzī’s approach to alchemy leaned towards a more practical investigation of substances, transforming alchemy into chemistry.<sup>133</sup>

Despite producing many works that demonstrate his profound knowledge and exceptional expertise in philosophy,<sup>134</sup> no continuing school of thought

123 Ibn Abī Uṣaybi’a, *Ṭabaqāt*, p. 763. According to Sezgin, the person in question most likely is Abū Zayd al-Balḥī (236/850–322/934) (Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, pp. 274–275).

124 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 64.

125 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 275.

126 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63.

127 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63.

128 Ibn Abī Uṣaybi’a, *Ṭabaqāt*, p. 763.

129 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63.

130 Stroumsa, *Freethinkers of Medieval Islam*, p. 90.

131 Stroumsa, *Freethinkers of Medieval Islam*, p. 93.

132 Nasr, *Islamic Philosophy from Its Origin to the Present*, p. 144.

133 Nasr, *Islamic Philosophy from Its Origin to the Present*, p. 145.

134 Ibn Abī Uṣaybi’a, *A Literary History of Medicine*, Volume 3–2 [11.5.14], pp. 849–850.

preserving his philosophical views was established. In contrast, his contributions as a physician and scientist have left their permanent mark in our history.<sup>135</sup> Al-Rāzī was renowned for his knowledge of medicine, alchemy, and philosophy, as well as his studies in physics, mathematics, zoology, and botany. He was a well-respected scholar in the Islamic world, with his reputation resting mainly on his medical achievements.<sup>136</sup> Indeed, he was both a prolific writer of medical works and a dedicated practitioner of clinical medicine.<sup>137</sup> The Latin translations of his *al-Kitāb al-Ḥāwī* and *al-Kitāb al-Manṣūrī* gained wide readership even in Europe where they were used as part of the medical education for centuries,<sup>138</sup> and he was considered the second Galen among his contemporaries and held undisputed authority in Western medicine until the 17th century.<sup>139</sup>

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135 Nasr, *Islamic Philosophy from Its Origin to the Present*, p. 145.

136 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 275.

137 El-Rouayheb & Schmidtke, *The Oxford Handbook of Islamic Philosophy*, p. 63.

138 Young, Latham & Serjeant, *Religion, Learning and Science in the 'Abbasid Period*, p. 377.

139 Sezgin, *Geschichte des arabischen Schrifttums*, Bd. 3, p. 275.