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GREECE X. GREEK MEDICINE IN PERSIA

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INTRODUCTION

The question of Greek medicine in Iran is closely bound up with the history of Greco-Arabic medicine, which developed with the impetus of the “translation movement” between the 8th and the 10th centuries when all of the Greek knowledge in medicine, science, and philosophy available in late antiquity was transmitted into Arabic.

The Greek medicine that was acquired was a comprehensive, self-contained, rational system. Based largely on the works of Galen (q.v.), it integrated philosophy (Plato, Aristotle, the Stoics) and medicine (Hippocrates/Boqrāṭ), theory and practice. The ideal physician needed to be trained in philosophy as well as the natural sciences in order to understand the human body (anatomy, humoral physiology, pathology) and the use and effect of medicaments. His critical tool was logic to evaluate clinical observations and to arrive at well-defined, valid physical diagnoses arising from natural causation. The sole responsibility was placed on the physician to the best of his “ability and judgment” (The Hippocratic Oath). Thus there was also a strong ethical component in physician-patient relations. With hindsight this is what came to

be perceived as the embodiment of the Greco-Arabic legacy, which was to dominate medicine throughout subsequent centuries.

Conquered by the Arabs (651 C.E.) and gradually incorporated into the Islamic empire, Persia was heir to this legacy and provided, under the Abbasids (750-1258 C.E.), a formidable number of major physician-philosophers from within its former imperial and cultural boundaries. The development of Greco-Arabic medicine would be inconceivable without such towering figures as ʿAli b. Rabban Ṭabari, Moḥammad b. Zakariyāʾ Rāzi (Rhazes), Abu'l-Ḥasan ʿAli Majusi (Haly Abbas), and Ebn Sinā (Avicenna). The list can easily be extended to the Saljuq-Mongol period, to include, among others, Qoṭb-al-Din Maḥmud Širāzi, or the uniquely brilliant Kamāl-al-Din Fāresi, who, although not a physician, straddles anatomy and optics in vision. They wrote largely in Arabic, which had replaced Pahlavi (Mid. Pers.) as the language of learning. From the 10th century onwards, they increasingly wrote in Persian which, enriched with Arabic vocabulary, asserted itself as the medium not only of poetry but also of scientific and medical texts.

The question needs to be addressed as to why so many major figures in the formative period came from Iranian backgrounds. Is such a phenomenon a random occurrence, a mere coincidence, or a reflection of deeper currents that require an explanation? Before answering the question it is critical to recognize that the exposure of Persia to Greek medicine preceded the legacy of the Greco-Arabic translation movement. Therefore the subject needs to be considered within the broader historical canvas of the pre-Islamic history of Iran, and its implications for the Abbasid and the subsequent "Persian" periods. The objective is twofold: (a) to place the stimulus for the development of Greek medicine in Iran within an appropriate cultural and intellectual perspective, and in the process (b) to dispel some myths that have acquired a superficial validity through repetition and oversimplify complex historical realities. In some cases they derive from the self-consciously reconstructed "histories" in Arabic sources (modeled on earlier Sasanian paradigms), that, until recently, were adopted by modern scholars.

1. PRE-ISLAMIC PERIOD

In its pre-Islamic history, Iran had been in continuous contact with the classical Greek, Hellenistic, and Byzantine worlds for well over a millennium through war and territorial expansion, diplomatic exchange and trade. From the rise of the Achaemenid Empire (550 B.C.E.) to the defeat and the eventual

collapse of the Sasanian Empire at the hands of the Arabs (651 C.E.), these contacts included not only Persian encroachment upon Greek territories but also the conquest of Persia by Alexander the Great, which made Greek the imperial language of Persia. The era between Alexander's conquest (334 B.C.E.) and the rise of the Sasanians (224-652 C.E.) marks the beginning of Hellenism, an ecumenical culture, based on the idea of *oecumena*, a "synchretic Greco-Iranian union" (Frye, pp. 123, 127, 129).

The remarkably long period of Persian-Greek interaction also coincides with that of the developments in Greek medicine from the Hippocratic writings and Hellenistic investigations of Heraphilus and Erasistratus of Ceos (fl. ca. 250 B.C.E.) in Alexandria to Galen/Jālinus (2nd cent.), and with the gradual rise and dominance of Galenism (6th cent.), promoted by the Alexandrian medical curricula and the condensed presentation of Galen's works in compendia and commentaries. It is also of relevance that Alexandria was under Sasanian rule for more than a decade (616 to 628 C.E.) when the Medical School of Alexandria was still functioning. In short, Persia co-existed in direct contact with an evolving, living tradition of Greco-Roman medicine, including such Byzantine institutions as the hospice and infirmary (*xenodocheion*), regarded as the basis of the "hospital."

The complex question of whether or not such co-existence and interaction had any impact, direct or indirect, on medicine in Persia is difficult to assess, due to the paucity of extant contemporary texts. Much has been reported as lost or destroyed by the conquests of both Alexander and the Arabs. What has survived, however, in other areas of Pre-Islamic Iranian culture (such as art, architecture, numismatics), clearly shows an extensive Greek influence (Ettinghausen, pp. 4-65; Bailey, p. 294). In spite of the problems concerning the availability of contemporary sources, one can argue that sufficient pre-conditions existed for the introduction of Greek medicine into Pre-Islamic Persia. They can be explored in the following areas: (a) medical practice and the presence of "Greek" physicians; (b) the role of Syriac/Nestorian Christians under the Sasanians, and (c) textual transmission.

Evidence from medical practice. There is evidence of the presence of Greek physicians already serving Persian rulers at the Achaemenid (6th cent. B.C.E.) and Sasanian (226-652 C.E.) courts. They are cited by name in contemporary Greek historical sources from Herodotus to Agathias, as well as in the Zoroastrian scriptures, the later *Dēnkard* (Browne, *Lit. Hist. Persia* I, pp. 103-9). For example, Democedes from Croton was personal physician to Darius I (r.

521-485 B.C.E., q.v.), Apollonides of Cos (from the island of Hippocrates) was the doctor of Artaxerxes I (r. 465-64 to 424-23 B.C.E., q.v.), and Ctesias from Cnidos (q.v.) and Polycritos of Mende were the court physicians of Artaxerxes II Mnemon (r. 405-4 to 359-58 B.C.E., q.v.; see Herodotus, 3.129-32; Elgood, 1951, pp. 22-23, 26-27).

From these meager contemporary anecdotal accounts what can also be deduced is the preference for Greek physicians, if the rich rewards they received can be taken as a measure of their success over and above alternative healing practices (such as the Egyptian or Zoroastrian; see Ullman, tr., pp. 16-17). Herodotus (3.129-32) relates that when Darius dislocated his foot while hunting wild beasts, it was Democedes, found among the slaves, and not the most illustrious Egyptian court physicians, who succeeded in healing the king. As a result he gained prestige, position, and immense wealth in Susa. In such sources the focus on court physicians does not rule out the presence of others of humbler social status, possibly among the Greeks who lived in Persia and who acquainted their countrymen with the Persian customs that are preserved in Ctesias and also related in greater detail in the later Persian epic *Šāh-nāma* (Browne, *Lit. Hist. Persia* I, p. 20).

It has been shown that in late antiquity, medical figures played a prominent (at times even notorious) role in diplomatic negotiations and missions between Byzantium and Sasanian Persia, serving as envoys or mediators (Baldwin, p. 17). This is acknowledged by Greek historians as well as in Syriac chronicles. Most likely, due to their multilingual status, some of these physicians traveled between the Greek world and the Sassanid courts, acquiring as well as disseminating information. Oribasius (325-403 C.E.), the Byzantine medical encyclopedist, who accompanied Emperor Julian (the Apostate) to Persia, may have ended there when, on the death of the emperor, he was exiled to the “court of the barbarians” (Baldwin, 17; O’Leary, 35). Sergius of Rēš ʿAynā/Raʾs al-ʿAyn (d. 536 in Constantinople), the physician who had studied at the School of Alexandria, and Syriac translator of the works of Galen, could also have been at the Sassanian court. The Byzantine historian Agathius (*History* IV, 30, apud Nutton, p. 13, esp. n. 117) mentions a certain Sergius, his friend and interpreter at the Sassanian court, who “procured for him” material from the “Persian Royal Annals.” These examples, separated in time, illustrate the mobility of physicians between the Hellenistic-Byzantine and the Syriac-Sassanian worlds. They leave no doubt of the exposure of Persia to Greek medicine even though the depth of its penetration in linguistic

or cultural terms still remains difficult to evaluate.

It is in this period, however, of the 5th and 6th centuries that a greater awareness of Greek learning emerges in Persia, due largely to two factors: (a) the increased presence of the schismatic Christians sects, in particular Syriac Nestorians, and (b) a Sasanian patronage and view of knowledge centered on Zoroastrianism.

The role of Nestorian Christians in Persia. An important factor to be considered in the pre-Islamic diffusion of Greek Medicine in Persia is the increased presence of dissident Christian schismatic sects, in particular, the Nestorians under the Sasanians. Persecuted by the Orthodox Byzantine Church in Constantinople due to theological disputes on the nature of Christ, the Nestorians had steadily been moving east. From the 4th century onwards they established theological centers at, among other places, Edessa and Nisibis, which had connections with the School of Alexandria and where some of their scholars were trained. When Nisibis fell to the Persians in 363 C.E., scholars sought refuge at Edessa and established there what came to be known as the School of the Persians, since many of its scholars and students had come from the Nisibis, just inside the Persian border. Starting in the 5th century, with the closing of the School of Edessa by Emperor Zeno in 489 C.E., followed by that of the School of Athens in 529 C.E. by Emperor Justinian, the center of Nestorian activity gradually shifted from Edessa to the Persian territories, extending from Nisibis to other cities as far apart as Jondēšāpur (q.v.), called Bēṯ Lapaṭ in Syriac (q.v.) and Marv on the fringe of Central Asia (O'Leary, pp. 47-72; esp. pp. 57-58; Mingana, 1926, pp. 436, 442). Although the refuge provided by Persia to these Christian sects was qualified with intermittent persecution and forced conversion during times of war, nonetheless they secured an ecclesiastical and administrative position with relative freedom under the Sasanians (Morony, pp. 70-83). They also appear to have exercised a certain degree of influence on the ruling class at court, at least serving as physicians (see CHRISTIANITY I).

Medical instruction. With the establishment of the Nestorians in Persia, a body of multilingual scholars emerged clustered at various monasteries and centers, who were fluent in Syriac, Pahlavi, and Greek. The study of Greek had initially been cultivated chiefly to give the Syriac-speaking scholars access to theological texts emanating from Alexandria. By the 5th century, however, there is evidence of the beginnings of Hellenistic learning and translations from Greek into Syriac, which markedly increased in the 7th century. Scholars' interest appears to have extended beyond ecclesiastical history (Eusebius) to

logic, which was needed in the service of theology. Under theinfluence of the philosophicalcurriculum of the School of Alexandria, they turned toAristotle's treatises on logic, the *Organon (*esp. the *Categories* and the *Prior Analytics*; see Brock, 1980, 22-23; idem, 1982, pp. 25-26; Fakhry, p. 13).

Among these scholars there were also Persians educated at Edessa and Nisibis, as well as Persian converts from Zoroastrianism as exemplified by Mar Aba (d. 557). There were also converts to Zoroastrianism, such as Paul the Persian (d. 571), who was active at the court of Ḵosrow I Anōširavān (r. 531-79 C.E.), and whose conversion is attributed to frustrated ecclesiastical ambitions. His "Introduction" to Aristotle's logic, originally written in Pahlavi and translated into Syriac and subsequently into Arabic, was available during the Abbasid period and influenced Meskawayh/Meskuya and Abu Naṣr Fārābi (Gutas,1983, 231-67, esp. 238-39).

In the 6th century at centers within Persia as well as in proximity to the Persian territories, Syriac scholarship shows a broadening of Hellenistic influences to encompass areas ofsecular Greek learning, which further developed in the 7th century (Brock, 1982, pp. 23-24). For example, the first translation of the works of Galen is ascribed to Sergius of Rēš ʿAynā (d. 536 C.E.), a theologian-physician who translated thirty-two of Galen's works in addition to writing medical treatises of his own (Lieber, p 174; Meyerhof, 1926, p. 703; Hugonnard-Roche, 1989, pp. 1-17; idem, 1991, 188). One can only infer that in addition to Aristotle's logic, medical texts were being read either in the original or in translation and that translations were clearly intended for those who could no longer read Greek or for the training of medical students.

Although divided by theological disputes, these scholars were not intellectually isolated from the world outside Persia. In fact they formed a fairly close-knit community that remained in touch through correspondence and travel. Sergius of Rēš ʿAynā, for example, had received his medical education at the School of Alexandria before going to Constantinople. They appear to have been aware of translations and writings whether produced at Alexandria, Nisibis, or Qennešrin (Qennasrin, Canestrine). For example, in addition to his *Discourse on Aristotle's Categories* and other philosophical writings, Sergius's translation of a text of Galen is also addressed to Theodore, Bishop of Marv, who was a protégé of Mar Aba (d. 557; Brock, 1982, p. 21), a Persian convert from Zoroastrianism. He learned Greek at Edessa and traveled to Alexandria, Corinth, Constantinople, and Antioch before returning to Nisibis to teach, and subsequently to serve as Catholicos (540 C.E.) until the school was

closed (Pigulevskaya, pp. 327-36). It has been suggested that Greek learning was introduced into East Syrian theology, not by way of the Persian School at Edessa in the 5th century, but by such influential Persians as Mar Aba and his students (Brock, 1982, p. 22).

Just as Hellenized Christian scholarship was transmitted from teacher to pupil, as in the cases of Mar Aba in the 6th and Severus of Nisibis (d. 666-67) with Jacob of Edessa (d. 708) in the 7th centuries, medical training would on the whole have also been through individual apprenticeship to other theologian-physicians. We do not have direct information on how and when Syriac physicians were first trained. Considering their contact with Alexandria and Byzantium, it would seem, however, plausible to deduce that their training was based on the late Alexandrian medical curriculum, which was centered on Galen.

A description, made more than three hundred years after Sergius of Rēš ʿAynā, by Ḥonayn b. Esḥāq (d. 873), a Nestorian and, like Sergius, physician and translator par excellence of Galenic texts, confirms the continuity of an established practice. Ḥonayn b. Esḥāq compares the late Alexandrian teaching with contemporary practices in the 9th century based on his own experience: “The members of the medical school in Alexandria would gather every day to read and study one leading text among those (books by Galen), just as our contemporary Christian colleagues gather everyday in places of teaching known as *skholé* for the study of a leading text by the ancients. As for the rest of the books, they used to read them individually, each one on his own, after having first practiced with those books which I have mentioned, just as our colleagues today read the commentaries of the books by the ancients” (Ḥonayn b. Esḥāq, tr. Bergsträsser, pp. 18-19; Meyerhof, 1926, p. 702).

Apparently Ḥonayn (Strohmaier, pp. 578-81) started reading with his teacher, Yuḥannā b. Māsawayh, Galen’s *De sectis*, which was the first book of the Alexandrian curriculum in the set books of the *Summaria Alexandrinorum* (*Jawāmeʿ al-Eskandarāniyin*, see Iskandar, 1976). The similarity in the way theological and medical texts were studied is not surprising for the training of priest-physicians. Yet the extant statutes of the School of Nisibis (590 C.E.) suggest that the two disciplines were kept separate and that medical instruction was not allowed at the school. The statutes, based on those of Edessa, were first issued in 496 C.E. They were revised only a century later and as such may represent a continuity of tradition (Vööbus, pp. 92-93, 100-101; Dols, 1987, pp. 371-75, Allan, pp. 458-61). The prohibition of teaching medicine

at theological schools is likely to be a reflection of the ambivalence of the Christian church towards secular “healing” in medicine outside the tradition of the spiritual “healing of Christ” (Nutton, pp. 5-6).

Medical institutions. The *bimārestān*. From the statues of the School of Nisibis we also learn of the establishment of an infirmary that was attached to the theological school specifically for the care of students and ecclesiastical staff. Such infirmaries attached to monasteries might even have provided some form of medical care for the community outside in keeping with the concept of Christian charity or philanthropic care of the sick and the infirm, which was institutionalized under the Church in Byzantium. In fact, a 6th-century chronicle reveals not only the existence of medical instruction outside the theological seminary, but also the fact that it was undertaken at a clearly specified institution, the *xenodocheion*. It was an Eastern Byzantine institution that had combined the Greek medical tradition with the Christian charitable activity of providing an asylum or hospice for the poor, the infirm, as well as students. The *xenodocheia/xenon* had evolved from “a place for strangers”/travelers to an institutionalized care of the sick associated with the church and regarded by historians as the origin of the hospital (Miller, pp. 54-56; Dols, 1987, pp. 372; idem, 1989, pp, 48-49; Allan, pp. 447, 453-61). Furthermore, what is significant is that the chronicle gives the Persian term *bimārestān* as an equivalent for *xenodocheion,* a Greek loanword in Syriac, which subsequently designated “hospital” in Islam. The familiarity with which the Persian term is applied to *xenodocheia* in the 7th- and 8th-century Syriac documents may be indicative of an established usage (Allan, pp. 459-61; Dols, 1987, pp. 378-80).

The building of *xenodocheions/bimārestāns,* which started in the second half of the 6th century, may have been initiated by theologian-physicians who were influential at court. The account of Zachariah of Mytilene (569 C.E.) in a later Syriac source (569 C.E.) refers to a “*bimārestān*” (553-56 C.E.), which, under Ḵosrow I Anō-širavān, was endowed by the royal treasury not only with ample provisions of one hundred mules and fifty camels, but also with twelve physicians. Although their background is not clear, the number of physicians provided to staff the institution is remarkable. The preference for the Persian word *bimārestān* in the 6th century documents indicate that it had gained greater currency that the Syro-Greek *xenodocheion* (Allan, p. 460; Dols, 1987, p. 379). The fact that such institutions were continued to be built is also attested by the letter of the Syriac scholar-patriarch Timothy (ca. 790 C.E.), who in

stating that they “have built a *xenodocheion,*” in the “royal cities” (i.e., Ctesiphon, q.v.), feels the need to explain further by adding “that is, a *bimārestān*” (see full quotation in Dols, 1987, p. 379, esp. n. 53).

When the Abbasids started building hospitals in Baghdad in the 9th century, it was the adoption of an institution that had already evolved in Persian territories over several centuries. The Persian term *bimārestān* also entered the Arabic language to designate a hospital (instead of *dār al-marżā*; Dols, 1987, p. 379) and subsequently also to denote the more specialized asylum for the insane. The essentially Christian model initiated by the Nestorians under the Sasanians, however, evolved into the complex secular “Islamic hospital,” which combined lay practice and Galenic teaching. They were endowed by rulers as exemplified by the one in Ray under the Buyids, which was headed by the celebrated physician Moḥammad b. Zakariyāʾ Rāzi (d. 925).

THE ZOROASTRIAN-SASANIAN FACTOR

Textual transmission. Although the role of the Nestorians has been greatly emphasized in textual transmission, the evidence derives from a much later period. The translations are the product of the 9th century, which places them in the period of the Abbasid translation movement. In fact, it has been shown that previously “less Greek secular literature was translated into Syriac than into Armenian” (Brock, 1980, p. 25). In some cases translations were made through the intermediary of Pahlavi (Middle Persian), not always directly from Greek (Ullmann, tr., pp. 17-19).

Although we do not have a clear picture of the extent of Greek interest or influence outside the Syriac Christian scholarship, there are definite indications of Sasanian patronage, particularly under Ḵosrow I Anōširavān (531-79 C.E.), a period that marks an increased awareness of Greek learning. The later Arabic sources also corroborate the prior existence of Pahlavi translations, where the original texts had been lost (Sezgin, *GAS* IV, pp. 172-86; Duneau, I, p. 20).

The Zoroastrian religious texts, such as the *Dēnkard* (q.v.), which is written in Pahlavi, show recognizable Greek influences mixed with theology. There are references to Aristotelian elements, Hippocratic teachings, and the humoral theory (Bailey, pp. 87, 92, 98, 102, 105). The concepts of hot and cold, dry and wet also appear elsewhere, polarized in accordance with Zoroastrian dualistic principles (Ullman, tr., pp. 18, 20 n. 2). What also emerges from such texts is a

clearly articulated rationale that would not only justify a definite Sasanian interest in the Greek sciences, but also confirm the existence of a translation activity from Greek into Pahlavi.

Zoroastrian ideology. The Sasanians saw themselves as heirs to both the Achaemenid Empire and to Zoroastrianism, their state religion, and whose scriptures, the Avesta, they believed, constituted the source of all knowl-edge. It was incumbent upon the state to ensure the continuity and preservation of that heritage. This ideology was articulated in the *Dēnkard*, the Zoroastrian book compiled to provide an account of the origin and transmission of learning in Persia from the beginning of its history. Accordingly, all the sciences originally derived from the Avesta (q.v.). Alexander, however, appropriated the Persian texts. He had them translated and then the originals destroyed. Consequently they became dispersed outside Persia.

The grounds for textual transmission from Greek into Pahlavi could thus be found in the Sasanian promotion of the origin and transmission of knowledge centered on Zoroastrianism. Since any Greek work would be regarded as part of the Zoroastrian canon, its subsequent translation and study would be recovering Persian heritage, or intellectual property. An attempt, in fact, at such textual recovery is attributed (*Dēnkar*, ed. Madan, I, pp. 412-13) to Šāpur I (241-72 C.E.), son of Ardašir, who is said to have reclaimed the texts that had been dispersed in India, China, and the Byzantine Empire, and to have had them all copied and placed in the royal treasury. In the well-known passage of the *Dēnkard* (ed. Madan, I, p. 412, ll. 17-21), it is described how Šāpur "assembled and united with the Avesta books of the Dēn on medicine, astronomy, motion, time, space, substances, creation, genesis, passing away, change and growth, and other arts and crafts, which had been scattered in India, Rome [= Byzantine Empire] and other countries" (Bailey, p. 81). On medicine the contribution was by both Greek and Indian scholars (Bailey, p. 81). It is suggested that the subjects of these texts relate to the Greek sciences studied in late antiquity and could be identified, for example, with Ptolemy's *Almagest*, or Aristotle's *De generatione et corruptione*.

Historians have pointed out problems of chronology and linguistic interpretation. The *Dēnkard*, for example, was originally compiled at the beginning of the 9th century by Ādurfarnbag ī Farroxzādān (q.v.) and was later redacted by Ādurbād Ēmēdān (fl. 3rd/10th cent.), which raises questions about its historical validity as a reflection of reality as distinct from a conscious reconstruction (Bailey, pp. 81-87, 157; Ullmann, tr., pp. 17-18). In the

absence of adequate contemporary evidence as well as the chronological and linguistic problems in the extant Zoroastrian Pahlavi sources, which largely date from the 9th century, it is not possible to establish the extent of Greek influences and learning under the Sasanians.

Textual transmission. In spite of the paucity of contemporary documents, there is sufficient evidence from extant Arabic sources to indicate that translations of medical texts (as well as in other fields) were made from Greek into Pahlavi or Middle Persian (Ullman, tr., p. 17; Sezgin, *GAS* IV, pp. 172-86). Although the texts themselves are lost, what is preserved in Arabic medical and in related texts indicates a variety of textual transmissions. These pertain to the survival in Arabic of Pahlavi words, names, or content of texts the originals of which have been lost (Ullmann, tr., pp. 17-19, gives a number of specific cases). For example, A) the author's name is of Persian origin but survives in an Arabicized form with the addition of the article "*al-*" (as with al-Qolhomān/al-Qahlamān); B) the Arabic form of the name of a Greek author indicates a Pahlavi corruption (as with the Ar. name Aṯurusfus, for the Greek name Xenocrates of Aphrodisias); C) where the content of an unknown text, which is no longer extant, is utilized and quoted from by later physicians (such as Rāzi, who simply refers to one such source as the ancient or old medicine (*al-ṭebb al-qadim*);orthe content of the extant work combines evidence of Greek and Persian sources pointing to a translation from Pahlavi into Arabic; D) the text includes plants/drugs of Indian origin, which were introduced by Persians, and would have been unknown to the Greeks, but their use/application and effectiveness is Galenic. In Arabic medical texts many of the drugs in fact bore Persian names, which may be further evidence of Sasanian transmission. One of the earliest texts written in Persian was on drugs: *Ketāb al-abnia ʿan ḥaqāʾeq al-adwia* by Abu Manṣur Mowaffaq Heravi (fl. 980-90, q.v.) under the Samanids. E) Finally, there is lexical evidence where Greek words appear in Pahlavi forms as exemplified by *sakbinaj* for *sagapenon* (*ferula persica*) or *bersām* as *sersām* (for *pleuritis* "pleurisy") and *sarsām* (possibly for *phrenitis* "frenzy"). This is an important point, as the lack of awareness of the Pahlavi presence has led to confusion and misinterpretations both in Arabic and the subsequent transmission into Latin (Ullmann, tr., pp. 27, 29). One of the earliest translators from Pahlavi into Arabic was ʿAbd-Allāh b. Moqaffaʿ (killed in 760, q.v.), a Zoroastrian convert. Of his translations only the *Kalila wa Demna* survives, which was originally translated from Sanskrit in Anōširavān's reign (Browne, *Lit. Hist. Persia* I, p. 76).

The existence of a translation activity from Greek into Pahlavi appears to be certain, culminating under Ḵosrow I Anōširavān (r. 531-79) by way of recording the national heritage of the past (Browne, p. 122). The existence of Greek works in Pahlavi translations is thus also attested in later Arabic sources (Ullmann, tr., pp. 17-18; Duneau, p. 20). The question arises, whether there was any connection between the Sasanian ideology and patronage under Anōširavān, which claimed Greek as part of ancient Persian heritage, and the increased awareness of secular Greek learning among the Nestorian scholars. It is in the 6th century that Mar Aba, a Zoroastrian convert to Christianity, plays an active role in the introduction of Greek learning to Persia, and Paul the Persian, a Christian convert to Zoroastrianism, dedicates his introduction to his study of "Aristotelian logic" to Anōšira-vān, whose interest in Greek philosophy is recorded in Greek sources (Agathias, II, pp. 28-30). It was under his patronage that the Neoplatonist philosophers visited the Persian court and Nestorians built a *xenodochieon/bimārestān.* The autobiographical account of Borzuya (q.v.), the physician at the court of Anōširavān, in his introduction to the *Kalila wa Demna*, indicates a tradition of medical practice of high ethical standards (Elgood, 1951, pp. 52-53). Similarities have been noted between the introductions of Paul the Persian and Borzuya (Brock, 1982, p. 2, n. 48). The possiblility of mutual influences between the Nestorian church and the Sasanian court in such areas of common interest is tantalizing. Future investigations of Syriac and Persian sources may reveal or even identify the extent of cross-fertilization in spite of the difference in religious affiliation. The evidence of the available sources reflects a gradual accretion of Greek influence in Persian medicine.

By the time of the rise of the Abbasids in the middle of the 8th century, a foundation of Greek medical practice had already been laid in Persia. Although the details are blurred or remain elusive in some areas, the following points can be made with certainty: By the 8th century, Persia had (1) a history of Hellenistic medical practice; (2) a tradition of multilingual scholarship and translation in both Syriac, closely allied to theology, and Pahlavi, patronized by a national ideology; (3) texts that were available in Greek as well as in Pahlavi and Syriac translations; (4) physicians, mostly Nestorian, whose training was based on Galen and the late Alexandrian curriculum; and (5) some form of hospice/hospital, referred to as *bimārestān* and modeled on the Byzantine *xenodocheion*.

The heritage of medical ideas had been kept alive at numerous Syriac

Christian centers in Persia, extending from Nisibis to Gondēšāpur, Susa, and Marv in the northeastern part of Persia. The predominant figure in this heritage was Galen, whose influence among Syriac theologian-physicians was firmly established. Their interest in Greek medicine can be accounted for, but the extent to which they adulated Galen over and above Hippocrates needs comment. One plausible possibility is that Galenic medicine was modeled on the teaching of philosophy at the School of Alexandria, where its cultural paganism had been neutralized. This made it acceptable for the medical teaching of Galen, a physician-philosopher, to be utilized and appropriated by pagan and monotheistic cultures alike. Furthermore, the easy identification of Galen's "Nature" and teleological arguments with the monotheistic "Creator" (for example, in his *De usu partium*, see tr., II, pp. 729-31) may have significantly helped promote Galenism among the Christians. It is also relevant to the subsequent admiration of Galen in Islamic civilization, where the greatest accolade was to be called "the Galen of physicians" (Temkin, pp. 202-12; Walzer, passim).

The development of the Greek medical tradition under the Abbasids in Persia attests to its continuity with this multiple heritage. It is a heritage that reflects the medical practice and instruction of late antiquity, that is, Hellenistic as well as Byzantine, which was filtered through Syriac Christian scholarship. (The sporadic translations prior to the 9th century sharply contrast with the centralized, concerted translation movement that emerged under the Abbasids.) At the same time it is accompanied by the Zoroastrian-Sasanian ideological influences which provided a rationale for the patronage and support of "Greek" learning. Under the unifying Abbasid policy of pax islamica with Arabic as the common denominator, these dominant parallel strands were woven together into the fabric of a secular coherent medical tradition that had an identity of its own.

2. ISLAMIC PERIOD: PERSIA UNDER THE ABBASIDS

The background. The Sasanian Empire (224-652 C.E.) collapsed after the slow, piecemeal conquest of Persia by the Arabs, but their traditions of government and cultural institutions survived; and particularly after the establishment of the ʿAbbasid caliphate in 132/749, these traditions played a large part in molding the now dominant Arab empire.

A number of underlying factors for the initial cultural dominance of Persia need to be mentioned, since it is usually attributed to the transfer of the

capital from Damascus to Baghdad. First of all, in the absence of any rule of succession, the first Abbasid caliphs preferred, in order to prevent any challenge to personal authority, to have at the court persons other than the family members. Secondly, the early caliphs, such as al-Manṣur (136-58/754-75) and al-Maʾmun (198-218/813-33) had significant ties with Persia. Al-Maʾmun had come under Zoroastrian and Sasanian influences in Marv, the capital of Khorasan, where he had been governor. Many (though not exclusively) Persians or client-converts (*mawāli*) of Persian origin were placed in important positions at court, such as the Barmakids (q.v.), a family of secretaries and viziers, and in medicine, the Nestorian Boḵtišuʿs (q.v.), who came from Hellenized backgrounds and also originated in Marv. Their political and medical dynasties contributed significantly to the revitalization of the Greco-Hellenistic heritage. Ḵāled b. Barmak. who served as vizier, was a Persian from Balḵ of a former Zoroastrian-Buddhist family. His descendants continued as ministers, commanders, and governors under the Abbasid caliphs from al-Manṣur (136-58/754-75) to Hārun al-Rašid (786-803), until they were purged in 187/803 (see BARMAKIDS; Sourdel, pp. 1033-36). Even the horoscope for the planning of the new capital, Baghdad, was cast by astrologers of Persian origin, namely Māšāʾ-Allāh (d. ca. 200/815), a Jew originally from Balḵ, Nawbaḵt (d. ca. 160/777), a Zoroastrian convert and Pahlavi translator, and ʿOmar b. Farroḵān Ṭabari.

Centered in Baghdad, the Abbasid caliphate united Persia with Mesopotamia in the west and Central Asia in the East, politically, administratively, and economically. It was in fact uniting peoples and areas that had gradually been exposed to Hellenization for a millennium since Alexander the Great. Against this background the fact that the transmission of Greek knowledge should take place in Baghdad, within a largely Aramaic Mesopotamian milieu in proximity to Persia, and not in the Greek-speaking Byzantine milieu of Damascus under the Omayyads (640-750 C.E), should not come as a surprise (cf. Gutas, 1998). Although the unity proved in the end to be illusory, as Persia more and more asserted within Islam its religious, cultural, and linguistic independence, the Greco- Arabic legacy survived the political dissolution of the Abbasid Caliphate and its Islamic Empire. The development of medicine in Islamic Persia needs to be viewed within this context.

FROM SASANIAN PERSIA TO ABBASID BAGHDAD LEGEND AND HISTORICAL REALITY

Before the Abbasids, the interaction between Syriac Christians and

Zoroastrian-Sasanians had remained intermittent. The accounts of their relationship pertaining to medicine have been largely anecdotal in Byzantine histories. The Nestorian sources have revealed important leads (Nisibis statutes, correspondences of the Catholicos). We know that Christian physicians (Nestorian and Monophysite) served at the Sasanian courts. They have exerted some degree of influence on individual rulers in their multiple roles as Catholicos and physician, and as such in ecclesiastical politics, religious as well as medical matters. With the Abbasids, these two seemingly disparate but closely allied strands are brought together with dramatic consequences.

Under Persian influence, the Abbasids adopted but modified the Sasanian view of history by claiming descent also from the ancient Babylonians in addition to the Prophet. Such an extension served the needs of an empire that evolved from an exclusive emphasis on Arabism, which was central to the Omayyads, to the cosmopolitan and inclusive Islamic one of the Abbasids (Ken-nedy, 1981, passim). Secondly, the Abbasids consciously emulated, for their own political and practical purposes, the specific role that the Sasanians had assumed in the recovery of ancient texts (collecting, recording, and preserving) as part of their lost heritage, but they focused entirely on Greek learning. The process of reconstruction of this perception of history is reflected in the numerous Arabic versions of Greek texts from the second half of the 8th century onwards. The Sasanian rulers were described as reclaiming what had been pillaged and destroyed by Alexander the Great. The Arabic historiographers credited the early caliphs with saving ancient Greek knowledge that had fallen into oblivion in the Greco-Roman and Byzantine lands. Thus Abbasid caliphs were not only given an ancient imperial image, but also portrayed as the true custodians of the sciences of the Greeks, which included medicine (Gutas, pp. 34-40).

In fact, physicians had provided detailed accounts of the revival of Greek medicine, based on Esḥāq b. ʿAli al-Rohāwi's (9th cent., Edessa) *Adab al-ṭabib* (Rohāwi, pp. 193-94; Sezgin, *GAS* III, pp. 263-64; Levy, 1967, p. 84). He had described the origin and the rise of medicine from Aesculapius to Hippocrates and Galen and the reasons behind the creation of the *Summaria Alexandrinorum (Jawāmeʿ al-Eskandarāniyin),*the condensed key texts of Galen and Hippocrates for medical instruction at the School of Alexandria in late antiquity. In subsequent accounts (Ebn Reżwān, d. 460/1068; Ebn Jomayʿ, d. 594/1198) the revival of the teaching of medicine and the preservation of

Hippocrates and Galen were attributed to the caliph al-Maʾmun, who is portrayed as the true savior of Greek medical knowledge in contrast to that of Byzantium (Iskandar, 1976, pp. 35-58). Persians, whether Zoroastrian or Muslims, could still identify not only with descent from the Babylonians but also with the study of the Greek sciences as part of their own heritage.

A key feature of this reconstructed history, however, was the shift from the Sasanians as the vehicle of transmission to the Abbasids and from the Zoroastrians to the Muslims. In the view that was further developed, where the emphasis was placed on the transmission of medical knowledge from Alexandria (via Antioch and Harran) to Baghdad, the significance of the role of Sasanian Persia was completely eclipsed (Gutas, 1998, pp. 35-45, 90-95). Perpetuated in Arabic historiographies (from Ebn al-Nadim to Ebn Ḵaldun), this perception gained validity and formed the basis of modern explanations, giving rise to what could best be described as the “royal intervention” theories. The widely accepted thesis of the transmission of medicine and philosophy “from Alexandria to Baghdad” by Max Meyerhof was a reformulation of the version attributed to Abu Naṣr Fārābi (Meyerhof, 1930; Rosenthal, pp. 50-55; Strohmeier, pp. 380-88; Endress, pp. 16-17).

Persian into Arabic: The Bayt al-ḥekma. Although the Caliph al-Maʾmun has been credited with founding the *Bayt al-ḥekma* as an Abbasid institution for research, teaching, and translation activities (Sourdel, p. 1141), there appears to be no historical basis to the idealized claims repeated in textbooks. The evidence points to Sasanian institution, the “imperial storehouse” or library that appears to have been taken over by the Abbasids and, according to the 10th-century author Ḥamza Eṣfa-ḥāni (p. 24), was given the Arabic term *bayt al-ḥekma* (the house of wisdom). Under the Sasanians the palacelibrary functioned as a sort of imperial archive for recording, preserving, and studying accounts written in verse of Persian history, which glorified ancient Sasanian heritage. They would have served as “storehouses of wisdom” (*ḵezānat al-ḥekma*) for the benefit of the ruler. Thus the initial significance appears to lie in the official Abbasid endorsement of an administrative office for the translation of Pahlavi works into Arabic, given the interest of the early caliphs in the Sasanian perception of history (Gutas, 1998, pp. 53-60).

The translation from Pahlavi into Arabic had already been institutionalized with the official decision under the Omayyads in 696 that records should be kept in Arabic and no longer in Greek and Pahlavi (Ebn al-Nadim, ed. Tajaddod, pp. 303 ff., tr. Dodge, pp. 583 ff.). Its impact on Persia was not felt

until Arabic, as the language of the chancellery, was extended to Khorasan and took effect in 741. With Pahlavi more and more becoming the language of the Zoroastrian priesthood, a Middle Persian koine, which had already spread under the late Sasanians, came to be used more and more as a medium of communication together with Arabic. This, in fact, became the foundation of the New Persian, which from the 10th century onwards gradually emerged as the language in which medical texts were also written using, however, the Arabic script. Thus the initial need for translation was for bureaucratic purposes, which was met by the existing class of scribes who could translate from Greek and Pahlavi into Arabic (Frye, p. 242). The Abbasid adoption of the palace "library," along with other Sasanian institutions to translate from Persian history and cultures gained support also from Arabic sources. The head of the *bayt al-ḥekma*, even during al-Maʾmun's time was Sahl b. Harun b. Rāhawayh, a Persian *šoʿubi*, a Pahlavi expert, and a poet in Arabic (Zakeri). This situation seems to have persisted throughout the vizierate of the Barmakids and Hārun al-Rašid's caliphate (r. 786-809). There appears to be, for example, no evidence in Ḥonayn b. Esḥāq's (d. 873) report on the translation movement or in Arabic historiographies to relate it to "a center for the translation of Greek works" (Meyerhof, pp. 685-724; Gutas, 1998, pp. 53-54).

The legend of Jondēšāpur. The transmission of Greek medicine is usually attributed to the connection between Baghdad and Jondēšāpur (see GONDĒŠĀPUR), a city in southwestern Persia. It is described as a major intellectual center of Greek learning with scholars from India and Persia, a major teaching hospital and a medical school (Huart and Sayili, pp. 1119-20; Elgood, 1951, 173). This view has been challenged in recent years, as no evidence has been found to support the existence of a "great medical school" of a "teaching hospital" at Jondēšāpur (Dols, 1987, pp. 367-70; Nutton, pp. 12-13). Furthermore, to consider Jondēšāpur as the most important single channel of transmission of Greek medicine to Baghdad is analogous to the thesis that for decades accounted for the emergence of the Renaissance by the influx of Byzantine scholars from Constantinople on the eve of its conquest by the Ottoman Turks. In each case the claims appear to have gained validity and remarkable longevity by sheer repetition. There is no doubt about the importance of Jondēšāpur, but it was just one of the numerous centers of Syriac scholarship, where Greek medicine was taught and practiced.

From Sasanian Persia to Baghdad. Neither of the two traditions, whether from Alexandria or from Jondēšāpur to Baghdad, which derive from Abbasid Arabic

sources, is representative of the Sasanian transmission. The historical reality is much more complex and less dramatic than the reconstructed accounts. Trained physicians were certainly available when needed by the caliphs. Prominent figures such as the members of the Boḵtišuʿ fam-ily (q.v.), who promoted Greek medicine and learning, may have been brought to Baghdad from Jondēšāpur, but they originally came from Marv in Khorasan at the farthest remove from Baghdad, where there was a long tradition of Hellenism and Nestorian heritage (O'Leary, pp. 155-56).

The arrival of Jorjis b. Jebril b. Boḵtišuʿ (d. 151/768) to treat al-Manṣur in 765 marks the beginning of a medi-cal dynasty that served, in a checkered and precarious relationship, successive Abbasid caliphs from al-Manṣur (754-75) in Baghdad to al-Motawakkel (847-61) at Sā-marrāʾ, with the last one, Jebril b. ʿObayd-Allāh b. Jeb-ril (d. 996/1006), serving the Buyid ʿAżod-al-Dawla and the Marwanid Abu Manṣur Momahhed-al-Dawla Saʿid (Sourdel, p. 1298).

As Nestorian Christians, their liturgical and scholarly language was Syriac, but their native tongue was Persian; they had now also learned Arabic. In addition to practicing medicine, these physicians also wrote medi-cal texts and, most significantly, commissioned translations. In fact, an extraordinary number of physicians commissioned translations from Greek and Syriac. Abu Zakariyāʾ Yuḥannā b. Māsawayh (d. 243/857) was personal physician to al-Maʾmun and his successors in Baghdad and Sāmarrāʾ, and chief physician at the hospital in Baghdad. He had no less than nine books of Galen, specifically on anatomy, translated for him by his then 17-year-old student Ḥonayn b. Esḥāq ʿEbādi *(*d. 873), a Nestorian Christian from Ḥira in Southern Iraqwho became the Abbasid translator *par excellence*. By the time of his death, Ḥonayn's translations of Galen's works alone included ninety-five texts into Syriac and thirty-four into Arabic (Strohmaier, p. 579).

By the end of the 9th century almost the entire Galenic corpus had become available to physicians. Although many of the commissioned texts are now lost or survive only in Latin (Meyerhof, 1926, p. 724), the titles are listed by Ḥonayn, which give an idea of what texts were available and of interest at that time. First of all, the focus of both Syriac and Byzantine scholars is entirely on the works of Galen in Syriac and Arabic versions. This derives from late antiquity and the adoption of the Alexandrian Curriculum with condensed versions of Galen's texts in the *Summaria Alexandrinorum (*Iskandar, 1976, pp. 235-58; Ullmann, 1970, pp. 65-67, 348). In fact the titles in Ḥonayn's *Resāla* are given in the order they were expected to be read according to the curriculum

at the Medical school of Alexandria (Meyerhof, 1926, p. 702, see list on pp. 713-20). Ḥonayn himself had read with his teacher Yuḥannā b. Māsawayh Galen's *De sectis*, the first book of the Alexandrian curriculum (Ebn Abi Oṣaybeʿa, I, p. 185). In fact, it is through Ḥonayn that we gain an idea of the training of these physicians. He provides a description of the continuity of the Alexandrian practice among his Nestorian colleagues, namely, reading a text with a teacher (Ḥonayn b. Esḥāq, ed. and tr. Bergsträsser, p. 18).

We also learn about the limitations as well as the uses of the earlier Syriac transmission in contrast to those of the 9th century. For example, Sergius of Rēš ʿAynā's Syriac versions formed the basis of the Arabic versions of the same texts by Ḥonayn, but they were reworked to his exacting standards. The earlier Syriac translations were, in Ḥonayn judgment, poor and inferior, because the translators did not always understand the material, nor did they always have the appropriate terminology. It is significant that no translations were attempted directly from Greek into Arabic without the mediation of Syriac, which should be borne in mind in evaluating the earlier Syriac transmission (Ḥonayn b. Esḥāq, 1925; Degen, pp. 131-66; Meyerhof, 1926, p. 711).

What the Syriac tradition provided was a precedent, a cumulative translation experience. In this capacity it served an important intermediary role for the Abbasid translators and enabled them to bridge the gap between Greek and Arabic. Although the Syriac scholarship kept the Galenic traditions alive and provided the multi-lingual skills, the few secular translations made prior to the 9th century were by individuals separated in time and place (Brock, 1980, 25-26). The complex social and intellectual climate under Abbasid patronage and policies, however, created the conditions that supported the existing translators within a community whose interest fueled the translation activity. But research which had developed through long-standing familiarity with the subject and prior translation experience were simultaneously present. In a concerted and systematic effort, in the search for new texts and further translations, Ḥonayn and his group raised the existing level of linguistic expertise, by aiming for greater textual accuracy. In the process they created the technical vocabulary that was subsequently used in Greco-Arabic medical texts. By the end of the 9th century, almost the whole of he Galenic corpus had been transmitted from Greek into Arabic via Syriac as part of a remarkable translation movement.

From Sasanid Persia to Abbasid Baghdad: The foundations. The main points can

be summarized as follows: The Zoroastrian-Sasanian ideology provided a conceptual rationale and an official justification for the interest in Greek learning as part of their ancient heritage. The accompanying institutions, which had already been established to support its realization, served as practical models (such as the "royal library" as an archival repository, exemplified initially by the Bayt al-ḥekma). There was also a multilingual scribal body from the former Sasanian bureaucracy that could translate from Pahlavi and koine Persian into Arabic, when Arabic as an official language of government chancellery was implemented. The Syriac Christians (Nestorian and to a lesser extent Monophysite) provided the literate, multilingual technical expertise (Greek, Syriac, Persian, Arabic) with scholars who were physicians trained in the Galenic medical tradition. Thus both the Zoroastrians and the Christians had a precedence of translation activity (via Pahlavi and Syriac), which preserved Greek heritage through textual transmission. Other influences, particularly from India were introduced via Pahlavi into the *materia medica* of the Galenic (-Byzantine) tradition.

These multiple strands were unified under the Abbasid centralized policies that provided a mechanism for their implementation and endorsement through extensive patronage at various levels. The result was an unprecedented translation movement that was a manifestation of intellectual curiosity to evaluate critically, verify, and expand the existing level of medical knowledge. Based on an existing foundation, this "renaissance" or revival of Greek medicine was not a consequence of the translation movement but both accompanied and stimulated the translations as well as being catalyzed by them. The social, political, economic and intellectual factors, as well as pragmatic reasons, underlying the Abbasid policies that brought these strands together are complex and outside the scope of this topic (cf. Gutas, 1998).

The Paradigm of the medical encyclopædic compendia. One way of tracing the development of medicine is to consider the evolution of the encyclopedic medical compendia in Islamic Persia, which were both contemporary with and succeeded the translation movement. A genre of an all-embracing presentation of medicine (*kon-nāš*), inherited from the Greek and Syriac traditions, it represents both a continuity and the unique features which came to be identified with Greco-Arabic medicine in Islamic civilization.

The encyclopædic compendia were not confined to medicine, but continued as a wider genre for both the sciences and cosmology, such as Zakariyāʾ Qazvini's *Ajāʾeb al-maḵluqāt*, which also contained medical information. They were

initially written in Arabic and subsequently in Persian. The development of medicine in Islamic Persia is mirrored in the transformation of the compendia from its beginnings in the 9th to its culmination in the 11th century in the hands of ʿAli b. Sahl Rabban Ṭabari (ca. 808- ca. 864), a Nestorian turned Muslim, ʿAli b. ʿAbbās Majusi (949-82), a Zoroastrian, and the two Islamic figures, Moḥammad b. Zakariyāʾ Rāzi (865-930) from Ray and Ebn Sinā/Avicenna (980-1037) from Afšana near Bokhara.

The compendia also reflect the shift or progression in the medical background of the physician from the Syriac theological tradition, as in Ṭabari, to a secular philosophical one with the full realization of the Galenic ideal of the philosopher-physician, exemplified by Rāzi, and reaching its optimal level with Ebn Sinā, who encompassed total knowledge. Furthermore, the compendia also demonstrate the emergence of Persian in the wake of Arabic as a medium of science and medicine.

MEDICAL COMPENDIA IN ARABIC

Medicine in transition. The earliest encyclopedic compendia written in Arabic by a Persian is ʿAli b. Rabban Ṭabari's *Ketāb ferdows al-ḥekma fi'l-ṭebb* (850; Sezgin, III, pp. 236-39; Browne, pp. 37-44, tr. pp. 71 ff.). Its content conveys the extent of familiarity with the Hellenistic works of late antiquity in the first half of the 9th century. ʿAli. b. Saḥl comes from a prominent scholarly Syriac family, originally from Marv in Khorasan, who settled in Ṭabarestān (Brockelmann, *GAL*, Sup. I, pp. 414-15). What he tells us in the preface to the *Ferdaws al-ḥekma* about his early training may be representative of how physicians were trained in the Syriac medical dynasties that dominated Abbasid courts. He was trained in medicine, logic, and philosophy by his father (a theologian-scholar [*rabbān*] physician) and instructed in languages (Syriac, Arabic, with some Hebrew and Greek). This accords with the dual tradition of Syriac scholarship both in philosophy, which emphasized Aristotelian logic, and the late Alexandrian curriculum in medicine, consisting largely of the synopsis of Galen's works (Lieber, pp. 167-86).

Ṭabari's career represents the advantages and difficulties faced by Syriac physicians in high office under the Abbasids. He served the Persian governor of Ṭabarestān during a turbulent period of rebellion and civil war, and then three successive caliphs in the new Abbasid capital of Sāmarrāʾ. His works are dedicated to the caliph al-Motawakkel (r. 847-67), by whose persuasion he converted to Islam and wrote an apology for it against the adherents of other

religions, namely Zoroastrians, Christians, Jews, and Hindus. His conversion can be seen as a response to the conservative Muslim backlash to the dominant non-Muslim presence at court, specifically in medical practice (Meyerhof, 1931, pp. 7-11; Dols, 1989, pp. 45-53). For example, Ṭabari's contemporary, Ebn Māsawayh (d. 243/857), also a Nestorian who may have taught Ṭabari, was personal physician to three Abbasid caliphs prior to serving al-Motawakkel, and Ḥonayn b. Esḥāq was the chief physician to the court in Baghdad.

An intimation of the antagonism directed at medicine is already given in the *Ferdaws al-ḥekma*, which contains an early attempt to defend (Greek) medicine against its religious (i.e., Muslim) critics who doubted its utility and condemned its pagan heritage and practices. Ṭabari finds it futile to answer "such misguided people" who, in their ignorance, are "like bats and owls" for whom "sunlight has no use" (*Ferdaws al-ḥekma*, part vii, tr. Meyerhof, 1931, p. 41). The need to defend medicine seems to have arisen intermittently with similar refutations by later physicians (Rosenthal, 1965, pp. 520-21).

Ṭabari is fully aware of the previous Byzantine and Syriac compilations of *Synopsis* of Oribasius (b. ca. 325), Paul of Aegina (fl. 7th cent.), Ayyub Rohāwi (Job of Edessa, d. ca. 823), as well as the *Pandects*/*Syntagma* of Ahrun (O'Leary, pp. 34-35). These were large reference works which, as exemplified early on with Oribasius, aimed to provide a synopsis and, at the same time, kept as much of the original material as possible from their selected individual sources through quotations. They had a broad knowledge of Galen and viewed Hippocrates through Galen's perception. The preference and the reasons for their admiration of him were clearly set forth: Galen was the last of the learned physicians; he linked medicine and philosophy, admired Plato, and in method he followed both Aristotle as well as the principles of Hippocrates; he offered comprehensive information on all medical subjects from anatomy to pharmacopoeia and provided a medical theory underlying medical practice, which unified all his works. In later successive compilations from the 4th to the 7th century,the cumulative knowledge from Oribasius to Paul of Aegina was expanded to include others such as Alexander Tralles and Aetius of Amida (Temkin, p. 204; Nutton, pp. 3-4).

Ferdaws al-ḥekma, an encyclopedic work on medicine and related subjects in thirty treatises and three hundred and sixty chapters, derives from this tradition. It is not, however, merely a copy. A more ambitious aim is already clear in the preface. Ṭabari claims to have attempted a more comprehensive

compendium of medicine than those of his predecessors, and accordingly utilizes not only Greek and Syriac, but also Persian and Indian works. In fact, the *Ferdaws* constitutes a significant source for the entry of Indo-Persian *materia medica* into Arabic texts, which went beyond that of Pedanius Dioscorides (Diusqoredis, 1st cent. B.C.E.).

Among the Abbasid physicians trained in Greek medicine, Ṭabari is unique in giving a detailed exposition of Indian medical theory and practice without making any judgments. His example was only taken up by Abu Ray-ḥān Biruni (d. after 442/1050, q.v.) in a remarkably unbiased and impartial study of India, in which *Ferdows al-ḥekma* is mentioned. Ṭabari's insertion of the Indian material represents a continuity of the earlier Persian interest with translations from Sanskrit, encouraged by the Barmakids (of former Buddhist and Zoroastrian origins) and ultimately rooted in Sasanian policy under Ḵosrow I Anōširavān and his physician Borzuya/Burzōē, who had brought texts from India. Ṭabari is also aware of some of the work of his contemporaries such as Ebn Māsawayh and Ḥonayn b. Esḥāq, but the extent of his familiarity with the new translations is not clear.

Although Ṭabari is greatly dependent on Galen, which is not surprising given the medical curriculum of the late Alexandrian School, consisting largely of the synopsis of Galen's works preserved in Syriac teaching (Lieber, pp. 167-86), Galen is not expressly emphasized. In spite of Galen's omnipresence in Syriac in the 9th century, however, Ṭabari's attitude, if valid, would be of interest in evaluating the extent of Ḥonayn b. Esḥāq's role in establishing Galen's predominance in Arabic through his systematized presentation of Galenic medicine.

The addition of Syriac, Sanskrit, and largely Persian terms to the Arabic technical terminology, which was in the process of development with the translators working in Baghdad, makes the *Ferdaws al-ḥekma* an important philological source as well. The inclusion of the Arabicized Persian term *ferdaws* in the title in combination with the Arabic term *ḥekma* is of interest. The translationof the title as *the Paradise of Wisdom* does not convey the etymology of the term *ḥekma*, which was used to correspond to "philosophy" in its Greek sense. By Ṭabari's time, this term had come to be inclusive of natural philosophy and physics, metaphysics, the mathematical sciences, and in some contexts alchemy and medicine. Thus *ḥekma* was taken to refer to all disciplines of acquired as distinct from revealed knowledge. A parallel application of this use prior to Ṭabari is in the early Abbasid institutions such

as the library, *ḵezānat al-ḥekma* and *bayt al-ḥekma*, taken over from the Sasanians as the repositories or store houses of knowledge (Goichon, p. 378; Sabra, p. 2). It is in this sense that the *Ferdaws al-ḥekma* is best defined, straddling the "ancient" and the "modern," the inherited Syriac-Sasanian traditions and the emerging contemporary elements with the new translations under the Abbasids. The *Ferdaw*s initiates the process of expansion of the Galenic medical legacy. By his introduction of Perso-Indian medical traditions, Ṭabari went beyond the boundaries of the late Alexandrian curriculum and previous compilations and helped define the content of medical knowledge.

Ferdawsal-ḥekma covers a wide range of subjects in addition to medicine, touching on physics, astrology, meteorological phenomena, agriculture, natural occurrences, and magical remedies. It also became responsible for the transmission of the old Iranian as well as Hellenistic magical practices into Arabic (Ullmann, tr., pp. 108, 111-12). Ṭabari's approach is gargantuan and indiscriminate, the numerous quotations and extracts from his sources are useful for the nature and content of texts which are now lost. Although initially imitated and frequently mentioned in Arabic texts, the *Ferdawsal-ḥekma* was supplanted by the medical compendia of Moḥammad b. Zakariyāʾ Rāzi, ʿAli b. ʿAbbās Majusi, and Ebn Sinā/Avicenna, whose systematic synthesis of medical knowledge mark the culmination of he genre.

Compendium as the casebook of a physician-philosopher: Rāzi. Moḥammad b. Zakariyāʾ Rāzi (865-925), a physician-philosopher from Ray, studied medicine in Baghdad (possibly under a disciple of Ḥonayn b. Esḥāq who knew Greek, Persian, and Indian medicine). He appears to have served as head of the main hospital in Baghdad, then in Ray until his death. Of his 184 works compiled and annotated by no less a scientific figure than Biruni, 56 titles are on medicine. His *Ketāb al-ḥāwi fi'l-ṭebb(*The comprehensive book on medicine) was posthumously put together and organized in twenty-five volumes from his vast private notes, under the patronage of Ebn al-ʿAmid, the vizier of the Buyid ruler Rokn-al-Dawla Ḥasan (r. 335-66/947-77). It is a unique compendium of the private journal of a practicing, immensely learned physician-philosopher. Firstly, it is a record of Rāzi's considerable clinical experience and original observations, case histories, and clinical experiments (for example, using control groups on the effect of bloodletting on *sarsām* "meningitis"). Secondly, it also contains his notes on his vast readings from Hippocrates to his own times, as a library record of medical sources for Rāzi's own works. His sources reveal an immense range of Greek, Syriac, Indian and

early Arabic texts. For this reason *al-Ḥāwi* is an important reference for texts that were available at his time but which have not survived. His theoretical understanding of medicine derives from Galen, but in practice he turned to Hippocrates and used his own observations as well. The content of *Ḥāwi* demonstrates an independence of mind which is characteristic of Rāzi. It is directly stated by Rāzi in a work where he critically reviews Galen, saying that "the art of physic is a philosophy which does not tolerate submission to any authority, nor does it accept any views or yield to any dogmas without proper investigation" (*Fi'l-šokuk ʿalā Jālinu*s "Doubts concerning Galen"; see Iskandar, 1990, p. 851-52; idem, pp. 370-77). He also states that Galen himself supported this view as none of Galen's predecessors had escaped Galen's own scathing criticisms. This is a major shift from the total adulation of Galen by the earlier Syriac physicians. Although the highest accolade of a physician was to be called "the Galen of physicians," the approach became seasoned with an awareness of Galen's shortcomings. This critical approach becomes a powerful tool of analysis in Ebn Sinā.

Rāzi's second compendium, *Ketāb al-ṭebb al-manṣuri* (comp. 903), is a shorter *konnāš*, which along with *al-Ṭebb al-ruḥāni* (Spiritual physic) is dedicated to the Samanid ruler, Abu Ṣāleḥ Manṣur b. Esḥāq. It is an annotated epitome of Greek medical theory underlying anatomy, humoral physiology, *materia medica*, and its application to surgery, poisons, and the cure of fevers. Here too, Rāzi not only criticizes the accepted Galenic views but also gives his own explanations, as with the anatomy of the eye and vision (Russell, 1995, pp. 683-84).

The general categories in *al-Ḥāwi* determined the subsequent organization of medical knowledge in terms of principles of medicine (book 1: *Fi'l-oṣul al-ṭebbiya*), materia medica (*al-adwia al-mofrada*), pharmacopoeia (*al-adwia al-morakkaba*), diseases, and treatments (*al-amrāż wa ʿelājātohā*).

The late Alexandrian Medical Curriculum updated: ʿAli b. ʿAbbās Majusi. The medical compendium the *Kāmel al-ṣenāʿa al-ṭebbiya*,also known as *Ketāb al-malaki* and as *Konnāš al-malaki*), was composed by ʿAli b. ʿAbbās Majusi (d. 384/994, q.v.) for the Buyid ʿAżod-al-Dawla (r. 338-72/949-83), under whom he served as physician (Peters, 1973, p. 390). Majusi defined the essential features of an all encompassing compendium of medicine in a series of comments on selected works of Greek and Byzantine (e.g., Oribasius, Pauld of Aegina), Syriac (Ebn Sarabiun), and later physicians, in particular his predecessor Rāzi. He found the previous compilations and *konnāšāt* "medical encyclopedias"

unsatisfactory both in content and style: They were lacking in the adequate treatment of theory and, besides, subjects such as anatomy, particularly the anatomy of parts (*aʿżāʾ*), had been omitted. Furthermore, their presentation of the material in the text suffers either from brevity (which leads to obscurity), or from prolixity (which results in vagueness and ambiguity). Majusi's criteria underlying such criticisms are consistent with the objectives of his own work to surpass them all by compensating for their shortcomings. Firstly, it is to embody both the fundamental principles of theoretical knowledge (*ʿelm*) and their practical application (*ʿamal*). These correspond to the two parts of his work. Secondly, it is to be well organized and comprehensive, yet succinct, without being too short at the expense of clarity for lack of sufficient detail, or too long, by needless repetition. (This is exemplified with reference to Rāzi. One reason for the repetitiveness of *al-Ḥāwi* was that in discussing a disease, Rāzi mentions every ancient physician who wrote on it from Hippocrates and Galen to Ḥonayn b. Esḥāq, even when they each said the same thing about the disease.) Finally, it will give due attention to areas that have previously been neglected. What emerges is that the *Kāmel al-ṣenāʿa* was clearly planned as a compendium to be consulted not so much by practicing physicians as by those who wished to become accomplished physicians. It is thus intended for their training. The originality of this compendium lies precisely in the achievement of this unique purpose (Russell, 1994, pp. 251-53).

From his objectives, we can surmise that Majusi's compendium was to be neither a collection of clinical experiences, like *al-Ḥāwi*, which was put together for the benefit of physicians, nor an encyclopedic presentation of medical science like Ebn Sinā's *Qānun*.

Kāmel al-ṣenāʿa is comprehensive in its coverage and distinguished by a rational approach "almost totally free of magical and astrological ideas" (Ullmann, tr., p. 44) and impressively systematic in its exposition. It is at the same time highly simplified, with details reduced to a bare minimum and uncertainties eliminated, leaving no margin for diversity of opinion or deliberation. It was carefully planned to serve as a compendium for the training of the student of medicine. In other words, it is designed to enable the would-be physician to achieve a mastery of his art, and is written with the condensed didactic authority of a medical textbook. Its popularity as a textbook is attested by subsequent authors like Ebn al-Qefṭi (p. 232). It may also explain its survival in Latin translations as late as the Renaissance (Russell, 1994, pp. 247-65).

Ironically Majusi's book is chosen by scholars like Manfred Ullmann (1978, pp. 55-71) as a model to outline the basic conceptions underlying the anatomy, humoral physiology, and pathology of Greco-Arabic medicine. At the same time such scholars fail to recognize that, designed as a medical textbook, there is no scope for creativity in its scheme. Majusi has been taken to represent "the schematized Galenism of Arabic medicine in its purest form" and as signaling "the end of the development of medical thought of the ancients," and the beginning of "dead book knowledge" (Ullmann, tr., pp. 44, 55). Such misguided conclusions derive from expecting deviation from the accepted body of medical knowledge that is systematized and compressed for the instruction of students. Majusi is not concerned with conveying his personal observations, as Rāzi does, or with creative synthesis, as Ebn Sinā does (Russell, 1994, pp. 249, 263-65). His *Kāmel al-ṣenāʿa* represents the continuity of the rationale of the *Summaria Alexandrinorum*, but at the same time provides an updated version for the education of the medical student. It is planned with a clear view of the limitations of the model and of the area that need improvement. It is based on a critical, comparative evaluation of the cumulative knowledge from Hippocrates and Galen to his own time. Majusi's aim is no less than a curricular reform. The originality of this compendia lies precisely in the achievement of this unique purpose. The significance of Majusi's compendium thus lies in providing a sytematized medical textbook specifically designed for students of medicine. It may be called a medieval counterpart of Osler's *Principles and Practice of Medicine*, which met a similar need for the modern era.

Compendia as total knowledge: Ebn Sinā, the ideal philosopher-physician. Coming more than a century after Ṭabari's *Ferdaws al-ḥekma*, Ebn Sinā's *Ketāb al-qānun fi'l-ṭebb* (The canon of medicine; comp. before 405/1015) represents the maturity of the development of Greek medicine in Islamic Persia. The transformation of the compendium itself, both in content and style, reflects this change. It is no longer a treasure house of knowledge of loosely allied medical and other subjects, with scattered quotations from undigested earlier works. There is no introductory history enumerating the ancients. The *Qānun* is a compendium of encyclopedic proportions, yet focused on medicine as a professional discipline, a subject clearly defined with a specific place in the classification and hierarchy of the "sciences." Ebn Sinā undertakes successfully, in five books, to synthesize all of Greco-Arabic medical knowledge into a coherent medical system. Book I introduces the theoretical principles fundamental to medicine, the general anatomy and systems of the

body (bones, muscles, arteries, veins, nerves), and what constitutes health and disease (causes, symptoms, diagnosis, treatment, and prognosis). Book II describes simple medicaments, while Books III and IV cover diseases that have specific locations in the body, ordered from "head to toe," and those which affect the body as a whole (such as fevers, considered as a class of diseases). Surgery pertains to dislocations, fractures, wounds, ulcers and tumors, skin disorders, poisons (mineral, vegetable, animal), insect bites, and stings. Book V is a pharmacopoeia on the preparation of compound medicaments.

The significance of the *Qānun* lies not only in its rational organization but also in its providing a systematic exposition of medicine that is theoretical and conceptual, as well as empirical. In Ebn Sinā's view medicine is not just an art or a technical craft. It is based on scientific principles deriving from both Aristotelian natural philosophy and Galen's humoral physiology. At the same time it draws on clinical observation in the Hippocratic tradition, relying largely on Rāzi and comparative assessment of experience (for a close comparison with Rāzi, cf. Iskandar, 1967, pp. 1-32). Iinherited legacies are evaluated and the accretion of knowledge is ordered against a systematic, logical approach that is both deductive and frequently observational and inductive.

The *Qānun* was widely disseminated as an authoritative text. By giving medicine a conceptual orientation, it ultimately shaped the nature and content of medical instruction, even superseding Majusi's text. It is understandable why it became one of the most authoritative and influential books in the history of medicine. The critical approach of Rāzi turns into a powerful analytic tool in the hands of Ebn Sinā, who is primarily a philosopher. He questions hypotheses in order to discover and articulate contradictions and inconsistencies, whether being logical or deriving from an observational experience, and always comes up with fresh insights, even when they are not resolved. This approach is more apparent in Ebn Sinā's second encyclopedic compendium, the *Ketāb al-šefā'*, which is a product of his maturity embodying a unified view of knowledge (*'elm*).

Ebn Sinā/Avicenna (980-1040) was born in Afšana near Bokhara. What we know of him derives from two unique sources: a partial autobiography and a detailed account by a lifelong Boswellian disciple, Abu ʿObayd ʿAbd-al-Wāḥed Juzjāni. Groomed for a career at court, Ebn Sinā was largely, though not entirely, self-taught. Apparently, his successful treatment of the Samanid ruler of Bokhara, Amir Nuḥ b. Manṣur (r. 365-87/976-97), was a turning point in his

education. The young physician not only entered the service of the prince, but also gained access to the remarkably rich royal library to master the extensive range of Greco-Arabic learning. His own works were produced in the face of shifting patronage by petty princes during a turbulent period of political fragmentation, while serving as counselor and physician, fleeing persecution, in prison, and during rare intervals of respite, the longest being at Isfahan as vizier. His extraordinarily prolific output survives only in part (see AVICENNA). He wrote not only in Arabic, but also in Persian. What is extant encompasses all of medicine, all of the sciences, and philosophy.

After the encyclopedic compendia of Ebn Sinā, the medical agenda is set with some exceptions. The authority of the *Qānun* and the wide range of its dissemination are exemplified by the number of commentaries written on it. Qoṭb-al-Din Maḥmud Širāzi (1236-1311 C.E.), whose influential commentary is based on a lifelong study of the *Qānun*, traveled from Shiraz to Khorasan, then to northern Mesopotamia and Byzantium in search of the commentaries written on the *Kolliyāt* (Book I). He was highly critical of what he found; the commentaries only reiterated what Ebn Sinā had written and remained "silent on what he had omitted." Not all the commentators were silent, however, as exemplified by Shirazi himself (Iskandar, 1967, pp. 43-44).

THE PERSIAN RENAISSANCE

The Persians paradoxically played both a leading role in the cosmopolitan orientation of the Abbasids and at the same time in fostering their own language and Islamic religion, which subsequently paved the way for Persian renaissance under the Buyids and the Samanids in the 10th century (Frye, p. 244; Kramer, passim; Persian self-conscious identity is manifest in the Šoʿubiya movement). They introduced Persian ideas and institutions into Abbasid/Islamic culture and Persian words into Arabic. The dichotomy that ultimately developed between the Persian and the Arabic-speaking parts of the caliphate led to the division of the Islamic world. It is so reflected in the rise of New Persian in the 10th century and the breakdown of classical Arabic as the sole means of communication or learned discourse.

During the first two centuries of the Abbasid rule in Persia, Arabic had completely displaced Pahlavi as the official language as well as for scholarly purposes. With translations from Pahlavi into Arabic, the originals of Pahlavi secular texts were discarded or lost. The rise of New Persian, however, had repercussions for medicine. Medical texts were increasingly written by

Persians, no longer only in Arabic but also in Persian. The New Persian called *Dari* (q.v.), which developed from a form generally spoken at the Sasanian court and provincial administration, was immensely enriched with Arabic vocabulary and was written in the Arabic script to become what Pahlavi had not been, that is a means of scientific discourse and learning alongside with Arabic as a language of cosmopolitan culture (Frye, p. 255).

The change is clear from Ṭabari and Majusi, who wrote in Arabic, and Biruni, who preferred Arabic, to Ebn Sinā under the Samanids, who wrote in both languages. A century later Zayn al-Din Sayyed Esmāʿil b. Ḥosayn Jor-jāni (d. Marv, ca. 531/1136) wrote an encyclopedic compendium in Persian alone and established the scientific and medical vocabulary of Persian. Jorjāni came from Jorjān Gorgān, q.v.), east of the Caspian, remote from Baghdad and may have been trained with a pupil of Ebn Sinā. His work, *Ḏaḵira-ye ḵᵛārazmšāhi*, is dedicated to Qoṭb-al-Din Moḥammad Ḵᵛāramšāh (490-521/1097-127). In this immense endeavor, considered to be comparable in scope to the *Qānun* of Ebn Sinā, Jorjāni systematized the medical and scientific vocabulary in Persian that had emerged out of the Greco-Arabic texts. The social and intellectual background to the medical practice of the period is portrayed in the fourth chapter (*maqāla*) of Neẓāmi ʿArużi's *Čahār maqāla* (comp. between 1155 and 1156), which is also written in Persian.

Conclusion. Based on the foundation of a multiple heritage — pagan, Zoroastrian, Christian, Islamic — what emerged at its best was a republic of physician-philosophers under the neutral umbrella of Galenic medicine, which survived to transcend cultures and centuries. It was the Persians who initiated it under the Abbasids.

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