

THE BEGINNINGS OF THE ILLUSTRATED ARABIC BOOK: AN INTERSECTION BETWEEN ART AND SCHOLARSHIP

In the well-known introduction to the moralistic animal fable, *Kalīla wa Dimna*, the author Ibn al-Muqaffa' (d. 759) explains the role of illustration:

Firstly, it was put into the mouths of dumb animals so that lighthearted youths might flock to read it and that their hearts be captivated by the rare ruses of the animals. Secondly, it was intended to show images (*khayālāt*) of the animals in varieties of paints and colours (*asbāgh alwān*) so as to delight the hearts of princes, increase their pleasure, and also the degree of care which they would bestow on the work. Thirdly, it was intended that the book be such that both kings and common folk should not cease to acquire it; that it might be repeatedly copied and re-created in the course of time thus giving work to the painter (*muṣawwir*) and copyist (*nāsikh*). The fourth purpose of the work concerns the philosophers in particular (i.e., the apologues put into the mouths of animals).¹

In an equally celebrated account, the historian al-Mas'udi recounts that in 915 in Istakhr, he saw a chronicle of the Sasanian dynasty which was compiled in 731 from documents found in the Persian royal treasury and translated from Persian into Arabic for the Umayyad Caliph Hisham ibn 'Abd al-Malik. The work contained portraits of twenty-five kings and two queens, each depicting a likeness of the ruler at death, a custom of the Sasanian dynasty. Mas'udi describes two of the portraits as follows:

The first king that is seen of this dynasty was Ardashir. The distinctive color in his portrait was a brilliant red. He wore trousers of sky blue and a miter of green on gold. He carried a lance in his hand, and was standing. The last [king] was Yazdegird, son of Kavād (Shiruya), son of Khosrau Parviz. The distinctive color was green of different shades. He wore trousers of several tones of sky blue and a miter of ruby red. He carried in one hand a lance and leaned with the other on his saber. This painting was made with Persian colors which cannot be found today, of ground gold, silver and copper.

The leaf was colored purple with a wonderful tone. I did not know if it was paper or parchment, so beautifully was it prepared.²

Despite the fact that these accounts, as well as records of thousands and hundreds of thousands of manuscripts in the libraries of Cordoba, Cairo, and Baghdad, point to an early production date, the beginnings of the Arabic illustrated book are marked by uncertainty and cannot be easily identified. Many have been lost: not a single dated illustrated Arabic book survives from before the year 1000 and the earliest surviving visual evidence consists of isolated leaves among the large but motley body of undated fragmentary works on paper discovered at Fustat.³ The scarcity of early surviving works and the discrepancy between documentary and material evidence have led scholars to question the reliability of the documentary evidence and even to cast doubt on whether there was any significant production of illustrated manuscripts before the eleventh century.

It would be wrong, however, to dismiss the evidence of the early fragments or minimize accounts of early manuscript production. While claims of thousands upon thousands of volumes in the libraries in Cordoba, Cairo, and Baghdad may indeed have been exaggerated, these fantastic numbers, uniformly reported for all of these libraries, may signify the sheer enormity of their holdings.⁴ Numbers held meaning not just in the literal sense but as a strategy to express abstract notions of grandness and status, found similarly in textual descriptions and inventories of royal treasures.⁵

The discrepancy between the accounts of significant library holdings and the paltry surviving material evidence may simply speak to the enormity of the decimation that befell the holdings of all of these libraries. Of all the arts, the arts of the book and works on paper were clearly the most vulnerable because they were the most fragile; many were lost from the looting as well as the relocation and purging that com-

monly accompanied political change. The looting and destruction of books that occurred during the reign of al-Mustansir in the year 1056 when the Fatimid treasury was dispersed is well known. The aftershocks and reverberations of these events are even more chilling. Al-Maqrizi reports that the twenty-five camel loads of books taken by the vizier Abu'l-Faraj Muhammad b. Ja'far b. al-Mu'izz al-Maghribi in lieu of his salary were, in turn, looted from his house and carried off to Alexandria. Those books that survived the journey were then taken to the Maghrib where they were discarded or burned after being stripped of any valuable or utilitarian binding materials.⁶

While certainly not all the Fustat fragments are manuscript illustrations, it has been suggested, and I will confirm here, that a number of these leaves belonged to books and thus represent the earliest surviving examples of book illustration. The question is not whether early illustrated manuscripts existed among these early remains, but rather how to reclaim these illustrated manuscript pages from obscurity and isolation and reconcile them with the later twelfth- and thirteenth-century development, the period from which a sizable number of fully preserved illustrated Arabic manuscripts in a range of literary, scientific, and encyclopedic texts survives.

This reconciliation is complicated by the uncertainties surrounding the origins and classification of these impressive later works. For the most part, they have been explored in terms of contemporary trends in the portable arts during the late twelfth and thirteenth centuries, when an "explosion of visual imagery" tied to middle-class patronage has been identified.⁷ With a focus on stylistic classification, the identification of and distinction between a Western "classical" component and an Eastern "Oriental" component has produced a familiar paradigm of the convergence of Eastern and Western sources to form the Islamic "melting pot."⁸ Only rarely have scholars linked these later works to the early fragments. Even when Western classical sources have been noted, the early fragments have been bypassed in favor of the suggestion of Byzantine intermediary models.⁹

A framework for the exploration and definition of the beginnings of early Arabic illustrated manuscripts will be proposed here that will enable us to sketch a coherent development and transmission of Islamic illustrated manuscripts beginning at least in the tenth and possibly as early as the mid-eighth century and

continuing through the thirteenth. While contact and exchange with Byzantine works is not precluded, the impulse for the development of illustrated manuscripts came from within the Islamic sphere and was motivated intrinsically. Beyond stylistic analysis and visual source hunting, this study will ask how these works were used and how they were connected to other activities and expressions within the wider cultural realm in which they were created.¹⁰ In particular, I will argue that illustrated manuscripts developed as culturally contingent formations tied to the Islamic intellectual and cultural arena in which the production of scientific and learned works played a major role and where illustrations were intrinsic to and inseparable from that production.¹¹

Regardless of their diverse visual sources and styles, a unifying thread for early illustrated Arabic manuscripts is their affiliation with a body of scientific and learned works rooted in the classical manuscript tradition. This group of works extended well beyond the exact sciences to include an encyclopedic collection of learning and knowledge systematized into a range of empirical, philosophical, and intellectual disciplines. Thus, while the group obviously includes illustrated copies of the celebrated astronomical catalogue of the stars and their constellations, *The Book of the Fixed Stars* (*Kitāb ṣuwar al-kawākib al-thābita*) by 'Abd al-Rahman b. 'Umar al-Sufi,¹² and the diagrams of the anatomy of the human eye in the treatise on optics, *Kitāb al-ʿaṣḥar maqālāt fī l-ʿayn*, by Hunayn ibn Ishaq,¹³ it also includes the Arabic translation of the Greek herbal with descriptions of plants and their medicinal uses, *De Materia Medica* by Dioscorides,¹⁴ and the *Kitāb fī maʿrifat al-ḥiyāl al-handasiyya* (Book of the Knowledge of Mechanical Devices) by al-Jazari,¹⁵ based on Greek compendia of classical sources on mechanics and mathematics by such writers as Heron of Alexandria and Philon of Byzantium. Within this category were also encyclopedic works, such as the *Rasāʾil Ikhwān al-Ṣafāʾ*¹⁶ (Epistles of the Sincere Brethren), a tenth-century work based on classical thought and philosophy while at the same time expounding a new Muslim religious truth, and the popular thirteenth-century cosmology, *ʿAjāʾib al-makhlūqat wa-gharāʾib al-mawjūdāt* (The Wonders of Creation and Their Singularities) by Qazvini,¹⁷ an integration of assorted scientific and non-scientific subjects. This broader definition of the term "scientific" opens the inquiry up to the consideration of certain historical and literary works as well.

The animal fable, *Kalīla wa Dimna*, for example, would qualify in the didactic and philosophical sense as specified by the author, and its illustrations could have come from models in ancient zoological works.¹⁸ Similarly, the illustrated history with portraits described by al-Mas'udi falls into the realm of the learned discipline of biography.¹⁹

FUSTAT FRAGMENTS

It is possible to link a number of the Fustat fragments to this body of scientific and learned works. Indeed, a number of early fragments found in Egypt have been identified as sketches or illustrations for a variety of scientific and pseudo-scientific subjects from astronomy and astrology to magical apotropaic images.²⁰ It is no coincidence, furthermore, that among those identified as leaves from early illustrated manuscripts and ascribed on paleographic and stylistic grounds to the Fatimid period (969–1171), scholars have also suggested the preeminence of Hellenistic sources in

both form and subject, rooted in the classical manuscript tradition.²¹ Two striking examples deserve mention here.

One leaf probably comes from the *Speech of Wild Animals* by the early author, Ka'b al-Ahbar.²² On one side of the page is a representation in color of a lion with verses of text from this work, and on the other side a hare with the title of the work repeated along with later glosses (fig. 1 a-b; New York, Metropolitan Museum of Art, 54.108.3). This leaf may have been part of a text rooted in the tradition of the classical zoological handbook which contained similar animal illustrations and was widely adopted in later Islamic manuscript illustration.

The second example is a leaf covered entirely with a richly painted rooster (New York, Metropolitan Museum of Art, 54.108.1); it may similarly have served as an illustration for a zoological text or possibly as a scientific or nature drawing.²³ Such sketches were made during botanical expeditions. The full and free brush, suggesting depth and texture, has been associated with the tradition of classical painting which



Fig.1 a-b. Lion and hare on both sides of a paper fragment. New York, Metropolitan Museum of Art, 54.108.3.

survived in Egypt well after late antiquity. Other illustrations may suggest evidence for the existence of hippological works or other scientific handbooks following the classical handbook tradition.²⁴

Admittedly, other fragments are more puzzling and not all of them can be integrated into this framework. The scholarship on the Cairo Geniza, however, presents a model for the tremendous value of the painstaking study of a large body of work, one fragment at a time, in the recovery of social and cultural experience and interaction.²⁵ This enormous potential may be demonstrated by one of the most enigmatic of these Fustat fragments.

THE FATIMID NUDE

The fragment is a leaf with a representation of a full-length nude figure of uncertain gender which covers nearly the entire paper surface measuring 25.5 cm × 18 cm (fig. 2; Jerusalem, Israel Museum of Art).²⁶ The nude carries a lute in its left hand and holds up a cup in its right. The robust form is framed by and silhouetted against long black curls. Accessories of jewelry, ornaments on the hands and feet, and a fluttering head band further accentuate the nudity. The black outlines of the drawing follow a preliminary red underdrawing. Certain areas, such as the curve of the face and lower abdominal folds, lack the black outline, while the raised right hand, which is outlined in black, does not follow the red underdrawing.

In view of the figural type, accessories and details—including the ornament of the hands and feet, jewels, stemmed cup with liquid, bottle, ewer, tray and vase—the nude has been convincingly identified as Fatimid, dating between the mid-tenth and twelfth centuries. In particular, the nude can be related to a number of Fatimid figures painted on lusterware (fig. 3) and carved in ivory (fig. 4).²⁷ The figure can also be related to late-antique figural forms employed for a range of mythological subjects as, for example, the ivory Bacchus panels from Egypt, now inserted into the pulpit of the Cathedral at Aachen (fig. 5) and the personification of autumn on a season sarcophagus (fig. 6).²⁸

The connection of the nude to the late-antique visual sphere can be located within a more widespread adaptation of late-antique forms and vocabulary in Fatimid art, and can be found, in particular, in other



Fig. 2. Nude. Paper fragment. Jerusalem, The Israel Museum.

Fatimid works related to the nude.²⁹ The pose, figural types, and drapery of the Fatimid ivory panels in the Bargello Museum, Florence (fig. 4), for example, similarly find their late-antique formal counterparts in the Aachen ivories (fig. 7) and other late-antique ivories.³⁰

A possible model for the nude that lies at the heart of fourth-century imperial late-antique manuscript production is the *Calendar of 354*, an illustrated secular chronograph of Roman origin that survives today only through reliable copies (figs. 8–10).³¹ The illustrations of the *Calendar of 354* comprise a variety of subjects including consul portraits, planets, and allegories of the months. The most compelling comparisons to the nude, in terms of both theme and style, can be found in the autumn months of September, October, and November.³² The composition of the Fatimid drawing,



Fig. 3. Lutist. Luster bowl. Athens, Benaki Museum. (Photo: Philon, *Early Islamic Ceramics*, pl. XXIIA)

depicting a central single standing nude figure with background accessories of a tray supporting bottles and a vase, closely follows the compositional organization of the September page (fig. 8). The rigid projectiles protruding from the vase in the September calendar page, originally representing lotus leaves, are the counterparts of the flowers in the drawing of the nude. There is also a parallel coordination of decorative detail on the tray and vase—crosshatching in the September calendar page and a meander pattern in the drawing of the nude. These compositional devices of tray and vase similarly appear in the October calendar page (fig. 9). In the Fatimid drawing, the red liquid which fills the cup and containers may refer to and translate the vinous aspects of the September page, while the nude's lute may translate the sistrum in the November page (fig. 10).³³ Once these connections are made, the nude's relation to the late-antique calendar and season iconography found on a host of late-antique works becomes clear.³⁴ The drawing may itself be a calendar page representing autumn or it may be a page of a work from the broader cal-

endar genre. Calendars existed in Islamic times too.³⁵ From antiquity on, the seasons and months were included alongside the planets and zodiac in illustrated scientific treatises of a semi-mythological, semi-scientific nature.³⁶

The representation of the nude figure here, unusual in Islamic art, finds justification in its scientific context and meaning.³⁷ Aside from the portrayal of biblical or pre-Islamic personages, as in the celebrated *Manāfi' al-hayawān* in the Morgan Library in New York, nudity was generally reserved for astronomical and scientific representations and for related imagery of imaginary beings that ultimately derived from the scientific and mythological personifications of late antiquity.³⁸ In the early surviving illustrated copies of the astronomical treatise, the *Book of the Fixed Stars* by 'Abd al-Rahman b. 'Umar al-Sufi, the Gemini twins are represented nude (figs. 11–12).³⁹ Nudes of a similar type are also used to represent the queen of the island of Waqwaq flanked by attendants (fol. 60v) in the earliest surviving illustrated copy of Qazvini's *'Ajā'ib al-makhlūqāt wa-gharā'ib al-mawjūdāt* (*The Wonders of*



Fig. 4. Dancer. Ivory panel. Florence, Bargello Museum.

Creation and Their Singularities), dated 678 (1280), now in the Staatsbibliothek, Munich, ms. Arab 464.⁴⁰ While not a purely scientific work, Qazvini's work is a treatise on cosmography, combining scientific and legendary material, employing visual vocabulary from the established scientific repertory. Nude figures are also found in the context of magical illustrations and objects, which have been compared to the Fatimid nude especially in the context of similar body ornamentation identified as tattoos.⁴¹ The ornament on the Fatimid nude deserves closer examination, however, before such an identification can be made here.

The basic unit of ornament is, in fact, an abstracted palmette, used ubiquitously in Fatimid art. It may be found quite precisely on a painted luster ceramic inscribed with the name of al-Hakim (996–1021) and on the carved stonework of the mosque of al-Hakim, dated to the beginning of the eleventh century.⁴² It is worth noting that, as on the Fatimid nude, the use of the palmette as a restricted ornament appears on other Fatimid figurative representations where it does



Fig. 5. Bacchus. Ivory panel. Aachen, ambo of cathedral.

not necessarily signify tattoos—as on the haunches of animals in portable arts and in the patterns on garments on the related Bargello ivory figure (fig. 4).⁴³ As on these works, the ornament on the nude may call attention to certain parts of the body and mark the work as distinctly Fatimid. In the case of the Fatimid nude, it may signal a transformation from the late-



Fig. 6. Autumn. Detail of Season sarcophogus. Vatican, Lateran, 191. (Photo: Nordenfalk, "Kalendar von Jahre 354," fig. 11)



Fig. 7. Maenad. Detail of ivory panel with Isis. Aachen, ambo of cathedral.



Fig. 8. September. *Calendar of 354*. Peiresc copy, Vatican Library, Barb. Lat. 2154 (Photo: Stern, *Calendrier*, pl. X)



Fig. 9. October. *Calendar of 354*. Peiresc copy, Vatican Library, Barb. Lat. 2154. (Photo: Stern, *Calendrier*, pl XI)



Fig. 10. November. *Calendar of 354*. Peiresc copy, Vatican Library, Barb. Lat. 2154. (Photo: Stern, *Calendrier*, pl XII)

antique figural identification into a distinctly Fatimid one.⁴⁴

The most convincing Islamic comparative material from the scientific sphere comes from early illustrated copies of one of the most notable astronomical works, the *Kitāb ṣuwar al-hawākib al-thābita* (or the *Book of the Fixed Stars*), a catalogue of the stars and their constellations written and originally illustrated by ‘Abd al-Rahman b. ‘Umar al-Sufi (903–86) for his patron the Buyid prince ‘Adud al-Dawla (936–83) (figs. 11–13).⁴⁵ Notwithstanding variations in style and date, the series of illustrated works, especially those produced from the eleventh through the thirteenth centuries, retain a certain homogeneity and fundamental adherence to scientific accuracy and the classical figural types.⁴⁶ A particularly striking visual comparison can be drawn between the Fatimid nude and the representation of the nude Gemini twins from a copy of al-Sufi’s work at the British Library in London, ms. Or. 5323, probably dating to the thirteenth century (fig. 11).⁴⁷ While several centuries separate these im-

ages, reliable evidence points to the availability of al-Sufi’s *Book of the Fixed Stars* in Egypt.⁴⁸

Further comparisons have been drawn between the Fatimid nude and the earliest surviving copy of al-Sufi’s work at the Bodleian Library in Oxford, ms. Marsh 144, dated 1009–10 (figs. 12–13)—a work closer in date to the Fatimid nude.⁴⁹ According to its colophon, this manuscript was copied and illustrated directly from the original version by al-Husayn b. ‘Abd al-Rahman b. ‘Umar b. Muhammad, presumably the son of al-Sufi, only one generation after al-Sufi composed the work. In terms of form, similarities in pose and proportions and in details in the delineation of the face, hair, hands, feet and fingernails have been noted between the Fatimid nude and the representation of the personification of the constellation of Virgo.⁵⁰ The leaf of the Fatimid nude and those of the Bodleian al-Sufi share comparable page dimensions (28.5 × 18 cm for the nude and 26.3 × 18.2 average cm for the al-Sufi illustrations) and similar compositional formats where a single figure occupies the entire page.⁵¹ While I am not claiming any direct “borrowing” between these objects, these characteristics suggest a similarity in kind, supporting the suggested function of the Fatimid nude as a leaf from a manuscript. Along with the other early and rare identified manuscript illustrations among the Fatimid leaves, the Fatimid nude serves as an anchor for the practice of illustration from at least the tenth century and as a bridge between the classical manuscript tradition and later scientific and learned works from the twelfth and thirteenth centuries.

TRANSLATION AND SCHOLARSHIP

The appearance of early illustrated works did not develop as an isolated phenomenon but rather within what has been described as one of the major intellectual movements in human history: the translation into Arabic of a full range of Greek scientific and learned works and the pursuit of related original scholarship in Arabic in such fields as science, medicine, and philosophy.⁵² This movement began under the Islamic Abbasid dynasty in Baghdad as early as the mid-eighth century and, as Dimitri Gutas has shown, it was not restricted to isolated intellectuals but was fully integrated into the social and political fabric of Abbasid life.⁵³ Sponsored as a strategy of furthering

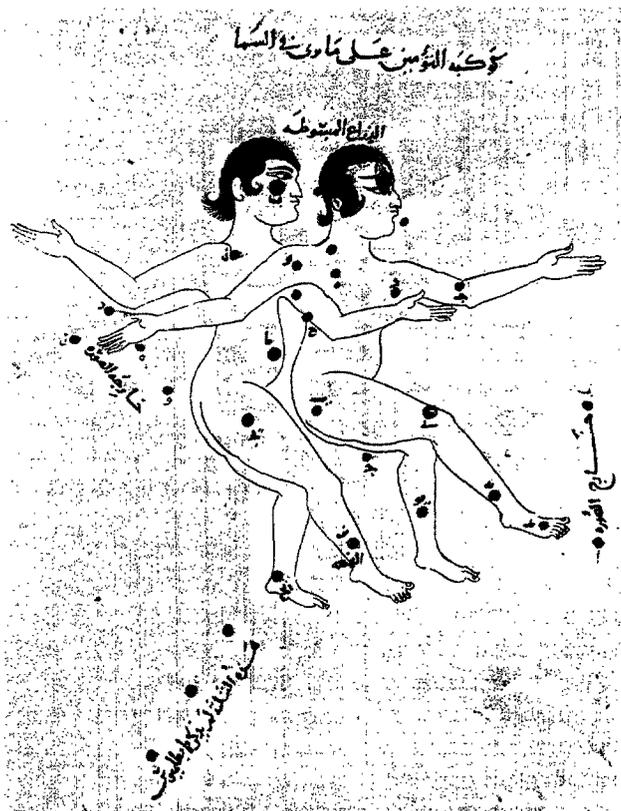


Fig. 11. Gemini Twins. al-Sufi, *Book of the Fixed Stars*. Oxford, Bodleian Library, ms. Marsh 144, p. 210.

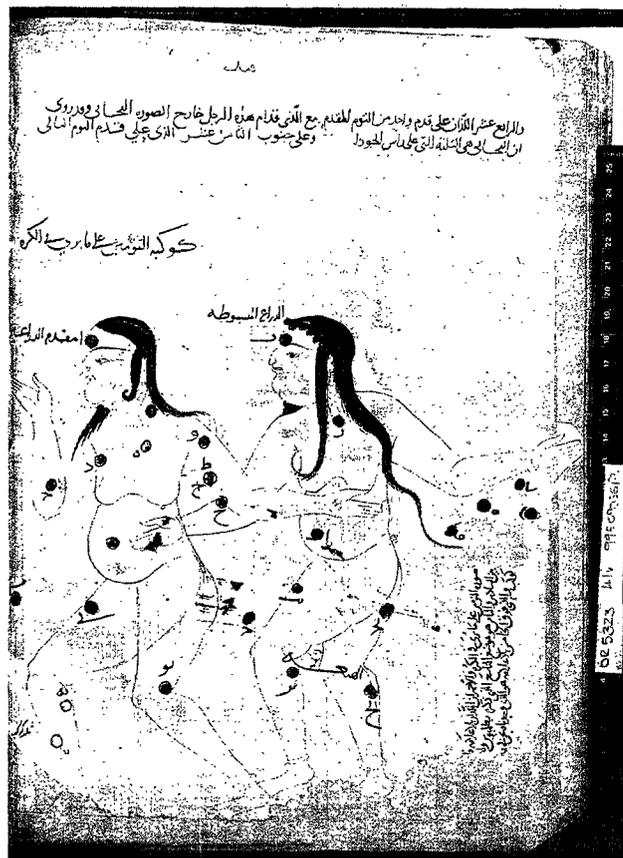


Fig. 12. Gemini Twins. al-Sufi, *Book of the Fixed Stars*. London, British Library, ms. Or. 5323. (Photo: reproduced by permission of the British Library, London)

Abbasid imperial policy, the translations of Greek works and scholarship were also inspired by an intense scientific curiosity and a thirst for knowledge in Islamic culture at that time. It was between the ninth and eleventh centuries that the basic works in Islamic science, medicine, and philosophy were written, integrating learning and knowledge from pre-Islamic traditions, including classical Greek scholarship.⁵⁴ The scholars active during this period read like a *Who's Who* of Islamic science and thought. Among them were the physician al-Razi (865–925), whose *Kitāb al-hāwī* (Comprehensive Book) synthesized the Greek, Syriac, and Arabic medical knowledge of his day; Ibn Sina (980–1037), whose *Qānūn fi'l tibb* (Canon of Medicine) marked the culmination of Arabic classification of knowledge; the geographer, al-Mas'udi (912–57), whose *Murūj al-dhahab wa ma'ādin al-jawāhir* (Meadows of Gold and Mines of Jewels), written in 947, is a

historical-geographical work full of scientific curiosities; al-Tabari (d. 923), the author of the first Arabic universal history of the world; al-Biruni (973–1048), the historian, natural scientist, and mathematician, and author of the *Chronology of Nations*, an astronomical encyclopedia and various summaries of mathematics and astronomical and astrological works; and al-Farabi (d. 950), the philosopher who assimilated Greek philosophy and adapted it to Islamic doctrine.⁵⁵

Certain practical and social mechanisms facilitated and supported this extraordinary scholarship and its dissemination. First was the availability of paper, whose value cannot be overstated. While certainly more widely distributed in the twelfth and thirteenth centuries, already in the tenth and eleventh centuries paper played a major role in disseminating books and in revolutionizing the book-making enterprise throughout the major centers of Islam in Iraq, the



Fig. 13. Virgo. al-Sufi, *Book of the Fixed Stars*. Oxford, Bodleian Library, ms. Marsh 144, p. 223.

Levant, Egypt, Yemen, the Maghrib and Spain.⁵⁶ To be sure, the price of books made with paper was high. In the eleventh century, a copy of al-Tabari's history cost 100 dinars and Ibn Durayd's dictionary cost 60.⁵⁷ By this time in Baghdad, there were nevertheless over one hundred bookshops, and in Cairo booksellers and paper makers occupied a section of the bazaar.

The role of libraries in supporting all these scholarly activities must also be acknowledged. In addition to the celebrated royal libraries in Cairo, Baghdad, and Cordoba, scores of private libraries flourished between the tenth and eleventh centuries staffed with copyists and librarians who were often scholars in their own right, and fully equipped with writing materials, and catalogues.⁵⁸ Among the wide range of holdings,

science and philosophy figured prominently and included both ancient Greek texts from late antiquity and original Islamic works. Libraries set the stage or, more literally, provided the theater for manuscript production.

While no autograph ninth- and tenth-century Islamic manuscripts in science, medicine, or philosophy survive, these works were copied time and again. The culture's high regard for tradition and the rigorous system of transmission ensured not only the continuous copying of these works but also the preservation of accuracy in later copies. This is exemplified, first and foremost, by the Koran, and by the necessity of authenticating the sayings of the Prophet and their transmission through properly authorized channels.⁵⁹ In a similar way, knowledge and the transmission of scholarship were closely scrutinized with respect to the originality of the sources, the merit and integrity of the transmitters and contributing scholars, and the unadulterated *isnād*, the chain of transmission. The revered classical tradition lent authority and authenticity to the scholarly enterprise of the ninth through twelfth centuries which integrated classical Greek learning into Islamic thought, advanced its own teaching, and would, in turn, be approved for inclusion into and transmission of the authorized body of knowledge.

The perception of these translation and intellectual activities as a cumulative enterprise is conveyed succinctly in the ninth-century translation of Dioscorides' *De Materia Medica* by Stephanos, son of Basilios. Later accounts report that in his translation, Stephanos stated that he retained some of the original Greek nomenclature in "the hope that God should later send someone who would know them and be able to translate."⁶⁰

There is no reason to doubt that illustrated works were included in this continuous tradition of scholarship and book-making activity. The inclusion of illustrations from the start follows the precedence of the classical tradition and is further supported by the fact that images were not simply embellishments to the text but developed side by side with the text, serving an abiding practical function of clarifying the subject. As in the case of the unillustrated works, no autograph illustrated manuscripts from the ninth and tenth centuries survive; surviving illustrated manuscripts—from the earliest eleventh-century works to the later celebrated illustrated manuscripts of the

thirteenth century—were either copies of earlier Arabic translations of Greek scientific and learned works or copies of early original Arabic works rooted in the classical manuscript tradition.

For a number of these later thirteenth-century illustrated works, it is possible to establish visual links to the classical tradition;⁶¹ in some cases, the connection is obvious. For example, an author portrait in a thirteenth-century copy of Dioscorides' *De Materia Medica* (ms. A. III, 2127, fols. 1v-2r, Topkapi Palace Library) bears a remarkable similarity to the author portrait in the late-antique sixth-century Dioscorides copy made for the Princess Juliana Anicia (Cod. Med. Graec. I, Nationalbibliothek, Vienna). Furthermore, the botanical representation of the grapevine (fol. 252) in the thirteenth-century Topkapi Dioscorides manuscript possesses a remarkable naturalism, including the roots, vines, and leaves, in every detail of form and gradation in color.⁶² Regarding this representation, Richard Ettinghausen observed, "It is a faithful copy of a classical type of illustration, so faithful indeed that if it were not painted on paper one would be inclined to regard it as a Greek 'original' inserted into the Arabic volume."⁶³ Arabic glosses found in the sixth-century Juliana Anicia codex confirm direct access to this late-antique manuscript by Islamic scholars, though when the glosses were added is not known.⁶⁴ The delineation of the grapevine in the Topkapi Dioscorides is a testament not only to classical models but also to the explanatory scientific role it played; hence, the incorporation of illustrations, not simply as embellishments to the text but for their abiding practical function of clarifying the subject.

Just as for the unillustrated manuscripts, an internal Islamic continuum can be shown for the illustrated scientific works from the tenth through the thirteenth century. Franz Rosenthal demonstrated, for example, that the eleventh-century work, *Mukhtār al-hikam wa mahāsīn al-kalam*, by al-Mubashshir was originally designed with illustrations. Preserving all original aspects of the work, later thirteenth-century copies included illustrations. Even in those unillustrated copies, however, the blank spaces for illustrations were preserved.⁶⁵

The most convincing evidence for the continuous tradition and for the integral function of illustration in these works comes from the two earliest surviving illustrated manuscripts which date from the eleventh century, al-Sufi's *Book of the Fixed Stars* (figs. 12-13) dated 400 (1009-10) (Oxford, Bodleian Library, ms.

Marsh 144)⁶⁶ and Dioscorides' *De Materia Medica* dated 1083 (Leiden, University Library, cod. Or. 289 Warn.).⁶⁷ Both manuscripts contain inscriptions that specify they were copied from earlier tenth-century manuscripts: the Bodleian al-Sufi was copied from the autograph manuscript designed with accompanying illustrations by the author in the tenth century and the Leiden Dioscorides was copied from an earlier illustrated manuscript made by al-Natili in 990. However far apart these works may be visually, they exemplify and share many of the hallmarks of this body of scientific and learned illustrated manuscripts. Each is a seminal work in the repertory of illustrated scientific and learned works, probably illustrated from the start and followed by a long succession of illustrated copies; each emphasizes the overriding explanatory function of the illustrations with an interrelationship between image and text; and each preserves a close affinity to the classical tradition. Al-Sufi's work, an original scholarly endeavor, represented a synthesis of the body of known classical scholarship, as well as contemporary Arabic treatises. It was designed with illustrations in the mid-tenth century by its author who states in his introduction that both image and text were subordinate to the scientific accuracy of the work. The representation of the constellations—one image as it would appear in the sky and one as transposed on a globe—clarifies the subject with precision in a way that only a visual description can. *De Materia Medica*, first translated from Greek to Arabic in the ninth century, formed the basis of all Islamic pharmacology. Illustrations in this work were vital to its comprehension. The earliest illustrated copies coincided with further refinements in the translation and a major Arabic commentary and were produced for a number of different translated versions.⁶⁸

INTERSECTION BETWEEN ART AND SCHOLARSHIP

Viewed within a continuum of scholarship, linking the revered traditions of the past to the Islamic present, image and text were adapted as an ensemble and continued to play complementary roles in the formulation of Islamic visual and scholarly schemes that would ultimately define a new Islamic identity. Al-Sufi's *Book of the Fixed Stars*, for example, was based primarily on parts 7.5 and 8.1 of Ptolemy's *Mathematikē Synaxis*, known as the *Almagest*, which was translated from

Greek into Arabic as part of the translation movement in the ninth century. The *Book of the Fixed Stars* represented a synthesis of the body of known classical astronomical scholarship, contemporary Arabic treatises based on classical works and the bedouin constellation system of the *Anwā'*.⁶⁹ In his introduction, al-Sufi says that he has evaluated all the material anew and has included his own observations.⁷⁰

Similarly, the illustrations were not simply copies of late-antique scientific themes, but rather, they were thoughtful adaptations into the new Islamic sphere, both in terms of scientific accuracy and visual concerns. In the Bodleian al-Sufi, the astronomical personifications are transformed from the late-antique Greek mythological beings into Islamic royal figures, some of whom are crowned and enthroned, dressed in courtly garb and accompanied by their coterie of attendants and entertainers. As a whole, they comprise what has often been referred to as the "princely cycle."⁷¹ Confirming the transformation and new Islamic identity is the textual labeling that went along with the visual transformations. The constellation traditionally named after the Greek hero-deity Herakles, for example, is renamed "the dancer," an identity that accurately describes the configuration of the constellation and, at the same time, is consistent with the entertainer member of the princely cycle.⁷² Similarly, the Fatimid nude, with its dance-like pose and lute, once an astral calendar image, originating in the Greco-Roman mythological vocabulary of late antiquity, is transformed into a musician in the Islamic princely cycle. Later, motifs from the princely cycle will become part of the iconography for the representation of astrological imagery, appearing ubiquitously on the portable arts during the twelfth and thirteenth centuries. Much the same transformation is chosen by the philosopher and historian Miskawayh (d. 1030), a contemporary of al-Sufi, who enjoyed the patronage of the same Buyid prince, 'Adud al-Dawla. Although like al-Sufi, passages from his ethical treatise were based on classical sources, *Tahdhīb al-akhlāq* (The Refinement of Character), Miskawayh substituted Koranic verses exalting Muslim heroes for the original Homeric verses describing Greek heroes.⁷³ Similarly, the eleventh-century Fatimid prince al-Mubashshir, in his *Mukhtār al-hikam*, imparted a Muslim identity to the Greek philosopher Socrates, going so far as to include Arabic epithets in the description.⁷⁴

The impetus for illustrated Arabic manuscripts ema-

nated from the scholarly sphere and the main role of the illustrations, like the text, was primarily to clarify and accurately convey the scientific content of the work. Once these illustrated manuscripts were disseminated, however, they provided expanded possibilities for interchange. Through these works, the preserved vocabulary of the classical tradition, now naturalized in the Islamic milieu, circulated within the broader Islamic visual vocabulary and was adapted for illustrations in manuscripts from other genres as well. Conversely, contact with the broader Islamic visual vocabulary introduced a variety of sources and styles into the realm of scientific manuscripts. Poised at the intersection of art and scholarship, these early illustrated Arabic manuscripts had thus expanded the modes of representation in both the visual and intellectual spheres.

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NOTES

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1. As translated by D. S. Rice from *Kalīla wa Dimna*, ed. S. de Sacy (Paris, 1816), p. 58, in "The Oldest Illustrated Arabic Manuscript," *Bulletin of the School of Oriental and African Studies* 22 (1959): 208-9. On *Kalīla wa Dimna* and bibliography, see Esin Atıl, *Kalīla wa Dimna: Fables from a Fourteenth-Century Arabic Manuscript* (Washington, D.C., 1981).
2. Mas'ūdī, *Kitāb al-tanbīh wa'l-ishrāf* (Cairo, 1938), p. 106, as translated by Rice. Also mentioned by Rice, "Oldest Arabic Manuscript," p. 208. On this work, see T. Khalidi, *Islamic Historiography: The Histories of Mas'ūdī* (Albany, N.Y., 1975), esp. pp. 90-92.
3. Ernst J. Grube, "A Drawing of Wrestlers in the Cairo Museum of Art," *Quaderni di Studi Arabi* 3 (1985): 89-106, with an appendix listing recorded Fustat fragments; also idem, "Fostat Fragments," *Islamic Painting and the Arts of the Book in the Keir Collection*, ed. Basil W. Robinson (London, 1976), pp. 23-66; see, most recently, *Trésors fatimides du Caire*, exhibition catalogue, Institut du Monde Arabe (Paris, 1998), pp. 99-103; also, *L'Islam dans les collections nationales, Grand Palais, 2 mai-22 août 1977* (Paris, 1977) cat. nos. 57-61; T. W. Arnold and A. Grohmann, *The Islamic Book: A Contribution to Its Art and History from the VII-XVIII Century* (Leipzig, 1929).
4. On this problem, see, for example, Etan Kohlberg, *A Medieval Scholar at Work: Ibn Tawus and His Library* (Leiden, 1992), pp. 71f.; also Lawrence I. Conrad, "Abraha and Muhammad: Some Observations Apropos of Chronology and Literary Topoi in the Early Arabic Historical Tradition," *Bulletin of the School of Oriental and African Studies* 50 (1987): 225-40. I thank David Roxburgh for this reference.

5. Ghada Qaddumi, ed. and trans., *Book of Gifts and Rarities (Kitāb al-Hadāyā wa al-Tuḥaf)* (Cambridge, Mass., 1996), para. 372, and paras. 383, and 413 for books. The use of a royal library to further "cultural politics" is discussed in Daniel Wasserstein, "Library of al-Hakam II al-Mustansir and the Culture of Islamic Spain," *Manuscripts of the Middle East* 5 (1990-91): 99-105; see Paul E. Walker, "Fatimid Institutions of Learning," *Journal of the American Research Center in Egypt* 34 (1997): 200, for conclusions regarding the Fatimid royal library complex as a "treasury for items of rare value."
6. Al-Maqrīzī, *Kitāb al-mawā'iz wa'l-i'tibār fī dhikr al-khīṭāt wa'l-āthār*, 3 vols. (Bulaq, 1853), 1:408; idem, *Itti'āz al-ḥunafā' bi-akhhbār al-a'imma al-Fatimiyyīn al-khulafā'*, 3 vols. (Cairo, 1967-73), 2:295, summarized in Walker, "Fatimid Institutions," pp. 195-96. For the purging of al-Hakam's library, see Wasserstein, "Library of al-Hakam," p. 103.
7. See, for example, Oleg Grabar, "The Visual Arts 1050-1350," *Cambridge History of Iran* 5 (Cambridge, 1968), pp. 626-58.
8. For this paradigm, see Richard Ettinghausen, *Arab Painting* (Geneva, 1962). Scholars have pointed to Manichaean miniatures from Turfan and to Sogdian monumental painting from Transoxiana for examples of Eastern sources; and to the Greco-Roman tradition from the Mediterranean lands for the Western sources. For the "Eastern" influence, see, for example, G. Azarpay, *Sogdian Painting: The Pictorial Epic in Oriental Art* (Berkeley, 1981); for the "Western" influence, see Ernst Grube, "Materialien zum Dioskurides Arabicus," *Aus der Welt der islamischen Kunst: Festschrift für Ernst Kühnel*, ed. Richard Ettinghausen (Berlin, 1959).
9. Kurt Weitzmann, "Greek Sources of Islamic Scientific Illustration," *Archaeologica Orientalia in Memoriam Ernst Herzfeld*, ed. George Miles (Locust Valley, N.Y., 1952), pp. 244-66.
10. Clifford Geertz, "Art as a Cultural System," *Local Knowledge* (New York, 1983), p. 96.
11. As first proposed in Eva R. Hoffman, "The Emergence of Illustration in Arabic Manuscripts: Classical Legacy and Islamic Transformation," Ph.D. diss., Harvard University, 1982.
12. Fascimile of ms. Marsh 144, Bodleian Library, Oxford: Abd al-Rahmān al-Sūfī (Abu 'l-Husayn 'Abd al-Rahmān ibn 'Umar ibn Muhammad), *Kitāb Suwar al-kawakib* (The Book of Constellations), ed. Fuat Sezgin (Frankfurt am Main, 1986); French translation of St. Petersburg ms., see *Description des étoiles fixes composée au milieu du dixième de notre ère par l'astronome persan Abd al-Rahman al-Sūfī. Traduction littérale de deux manuscrits arabes de la Bibliothèque royale de Copenhague et de la Bibliothèque impériale de St. Petersbourg. Avec des notes par H. C. F. C. Schjellerup* (St. Petersburg, 1874) ed. and reprinted by Fuat Sezgin (Frankfurt am Main, 1986). Literature on the illustrated works: Emmy Wellesz, "An Early al-Sufi Manuscript in the Bodleian Library in Oxford: A Study in Islamic Constellation Images," *Ars Orientalis* 3 (1959): 1-22; and idem, "Islamic Astronomical Imagery, Classical and Bedouin Tradition," *Oriental Art* 10 (1964): 85-91; Barbara Brend, "A Reconsideration of the Book of Constellations of 400/1009-10 in the Bodleian Library," and Julian Raby, "Saljuq-Style Painting and a Fragmentary Copy of al-Sūfī's 'Fixed Stars'," in *The Art of the Saljuqs in Iran and Anatolia: Proceedings of a Symposium Held in Edinburgh in 1982*, ed. Robert Hillenbrand (Costa Mesa, Calif., 1994), pp. 89-93 and 106-13.
13. Dietrich Brandenburg, *Islamic Miniature Painting in Medical Manuscripts* (Basel, 1982), pp. 44-45.
14. Grube, "Materialien zum Dioskurides," pp. 163-94; Alain Touwaide, ed., *Farmacopea araba medievale: Codice Ayasofia 3703*, 4 vols. (Milan, 1992-93); and Marie Geneviève Balty-Guesdon, "Le livre médical et son illustration," *La médecine au temps des califes à l'ombre d'Avicenne*, exhibition catalogue, Institut du Monde Arabe (Paris, 1996) pp. 230-37.
15. Donald R. Hill, *Book of the Knowledge of Ingenious Mechanical Devices* (Dordrecht, 1974); Ettinghausen, *Arab Painting*, pp. 93-95.
16. Ettinghausen, *Arab Painting*, pp. 98f.
17. Ibid., pp. 138-40. See also these studies of the later copies of this work: Stefano Carboni, "The Wonders of Creation and the Singularities of Ilkhanid Painting: A Study of the London Qazwini, British Library Ms. Or. 14140," Ph.D. diss., University of London, School of Oriental and African Studies, 1992; Julie A. O. Badiie, "An Islamic Cosmography: The Illustrations of the Sarre Qazwini," Ph.D. diss., University of Michigan, 1978. Even in this later copy, Badiie had noted the presence of the classical tradition, pp. 2-14 and 343.
18. See above, n. 1; also, Zoltán Kádár, *Survivals of Greek Zoological Illuminations in Byzantine Manuscripts* (Budapest, 1978); Weitzmann, "Greek Sources," pp. 250-66; and Anna Contadini, "The *Kitāb manāfi' al-hayawān* in the Escorial Library," *Islamic Art* 3 (1988-89): 33-52; idem, "Kitāb na't al-hayawān (Book on the Characteristics of Animals, BL Or. 2784) and the 'Ibn Bakhtishu' Illustrated Bestiaries," Ph.D. diss., University of London, 1992.
19. Eva R. Hoffman, "The Author Portrait in Thirteenth-Century Manuscripts: A New Islamic Context for a Late-Antique Tradition," *Muqarnas* 10 (1993): 16.
20. Hoffman, "Painted Illustration: Scientific and Technical," in *Dictionary of Art*, 16: 297-300.
21. See, in particular, Grube, "Fostat Fragments," pp. 27-28; idem, "Studies in the Survival and Continuity of Pre-Muslim Traditions in Egyptian Islamic Art," *Journal of the American Research Center in Egypt* 1 (1962): 75-102; Dalu Jones, "Notes on a Tattooed Musician: A Drawing of the Fatimid Period," *Art and Archaeology Research Papers* 7 (1975): 1-14.
22. Stefano Carboni, in *Trésors fatimides*, p. 99, no. 15, with related bibliography. I wish to express my gratitude to Dr. Carboni for providing me with photographs of this page and for discussions of this work, which he believes was probably a page from a bound manuscript. The repetition of the title on the verso and addition of a gloss may perhaps be explained in the context of frequent additions to texts and the reuse of paper. We might further speculate that the title above the hare on the verso was added after the book had been dismantled in order to display that side of the page.
23. Grube, "Survival and Continuity," pp. 89-90; note the related fragment of a rooster in *Trésors fatimides*, p. 100, no. 16.
24. Arnold and Grohmann, *The Islamic Book*, pp. 6-8 and fig. 4a., for a drawing of a mounted horseman (Vienna, Nationalbibliothek, Rainer Collection, 954), which was dated on paleographic grounds to the tenth century and may have been part of a hippological handbook or a handbook on military science, following a tradition of such works known from antiquity and preserved in the Greek *Hippiatrika* in

- Byzantine times. An inscription on the recto below the representation reads, *al-faras bi-'l-sādim* ("the horse, vigorous in onslaught"). Also Richard Ettinghausen, "Painting in the Fatimid Period: A Reconstruction," *Ars Orientalis* 9 (1942): 122, fig. 31; for the *Hippiatrika*, see Ernst Grube, "The Hippiatrika Arabica Illustrata, Three Thirteenth-Century Manuscripts and Related Material," *Survey of Persian Art* (2) 14 (1967), pp. 3138 f.
25. S. D. Goitein, *A Mediterranean Society: The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza*, 6 vols. (Berkeley, 1967–93).
 26. Rachel Milstein, *Islamic Painting in the Israel Museum*, with contributions by Na'ama Brosh (Jerusalem, 1984), p. 23 with bibliography. Also Hoffman, "Emergence of Illustration," pp. 32–63; Jones, "Notes on a Tattooed Musician," pp. 1–14; D. S. Rice, "A Drawing of the Fatimid Period," *Bulletin of the School of Oriental and African Studies* 21 (1958): 31–39.
 27. For the seated lute player on a luster bowl in the Benaki Museum, Athens, see Helen Philon, *Early Islamic Ceramics* (London, 1980), pl. XXII A; the full-bodied dancer on a luster dish at the Islamic Museum, Cairo, in G. M. Mehrez, "Fatimid Lustre Ceramics in the Dr. Aly Pasha Ibrahim Collection," *Majallat Kulliyat al-Adab* (Cairo) 7 (1944): 143–67, pl. 4 (in Arabic); and the reclining figure, as first noted by Rice in "Drawing of the Fatimid Period." For the ivory panel, see Ernst Kühnel, *Die islamischen Elfenbeinskulpturen* (Berlin, 1971), pl. 90F.
 28. Henri Stern, "The Ivories of the Ambo of the Cathedral of Aix-la-Chapelle," *Connoisseur*, July 1963, pp. 166–72; For other examples, see Kendrick, *Catalogue of Textiles from the Burying Grounds of Egypt* (London, 1924), pl. X, no. 26 and D; Deborah Thompson, *Coptic Textiles in the Brooklyn Museum* (New York, 1971), pl. 2, no. 3. Other examples are discussed in Hoffman, "Emergence of Illustration," pp. 36f. Richard Ettinghausen traced the spread of these motifs and forms as far as the Sasanian Empire, where, for example, he identified the representation of female figures on a celebrated series of Sasanian vessels as adaptations of contemporary late-antique maenads rooted in the Greco-Roman world. Ettinghausen compared these figures to those on a fifth-century Egyptian ivory. See Richard Ettinghausen, *From Byzantium to Sassanian Iran and the Islamic World* (Leiden, 1972), pp. 3–10.
 29. This wider Fatimid adaptation is discussed in Eva Hoffman, "A Fatimid Book Cover: Framing and Re-framing Cultural Identity in the Medieval Mediterranean World," in *L'Egypte fatimide: son art et son histoire*, ed. Marianne Barrucand (Paris, 1999), pp. 403–19.
 30. Such as the late-antique panels with representations of Muses and Thiasos in Kurt Weitzmann, ed., *Age of Spirituality: Late Antique and Early Christian Art, Third to Seventh Century*, exhibition catalogue, (New York, 1979), p. 260, no. 243.
 31. Michele R. Salzman, *On Roman Time: The Codex-Calendar of 354 and the Rhythms of Urban Life in Late Antiquity* (Berkeley, 1990); Henri Stern, *Le calendrier de 354: études sur son texte et ses illustrations* (Paris, 1953).
 32. Hoffman, "Emergence of Illustration," p. 82, n. 78, for other examples.
 33. *Ibid.*
 34. For late-antique calendar/season imagery, see Hoffman, "Emergence of Illustration," pp. 44–46; G. M. A. Hanfmann, *The Season Sarcophagus in Dumbarton Oaks* (Cambridge, Mass., 1951).
 35. For Islamic calendars, see L. Pellat, "Le 'Calendrier agricole' de Qalqashandi," *Annales islamologiques* 15 (1979): 165–85, with further references. For the suggestion of calendar imagery in Fatimid ivories, see Richard Ettinghausen, "Early Realism in Islamic Art," *Studi orientalistici in onore di Giorgio Levi della Vida*, 2 vols. (Rome, 1956), 1:258–59, nn. 1–2, and fig. 5. No early illustrated Arabic calendars have survived. It is possible that there existed illustrated versions of a work such as *Taqwim al-sihhah* by Ibn Butlan which included information on the calendar and seasons. The fourteenth-century Latin adaptations of this work (*Tacuinum Sanitatis*), however, were illustrated and D. S. Rice compared their illustrations to those in a contemporary fourteenth-century Arabic work. See D. S. Rice, "The Seasons and Labors of the Months in Islamic Art," *Ars Orientalis* 1 (1954): 1–39.
 36. For the integration of the seasons and months into broader scientific investigations, see, for example, Hanfmann, *Season Sarcophagus*, pp. 3, 91–93, 169, 360, and *passim*.
 37. Full discussion in Hoffman, "Emergence of Illustration," pp. 46f. For a discussion of the representation of nudity in Islamic art, see Grace Guest and Richard Ettinghausen, "The Iconography of a Kashan Luster Plate," *Ars Orientalis* 4 (1961): 43f.
 38. The appearance of nudes in the celebrated monumental paintings of the Umayyad desert palaces are adaptations of the pre-Islamic indigenous Greco-Roman visual vocabulary of mythological personifications and most likely served private functions. These Umayyad themes and their relationship to late antiquity were fully discussed in a forthcoming paper by Barbara Finster, "Probleme der Antikenrezeption in der umayyadischen Kunst," *Die Gegenwart des Altertums*, 18–20 November 1999, Universität Würzburg (summary in conference abstracts, pp. 115–18). For Khirbat al-Maffjar, see R. W. Hamilton, *Khirbat al-Maffjar, An Arabian Mansion in the Jordan Valley* (Oxford: Clarendon Press, 1959), pp. 233–36, 237; for Qasr al-Hayr Gharbi, see Ettinghausen, *Arab Painting*, p. 35; and for Qusayr Amra, see J. Almagro, L. Caballero, J. Zozoya, and A. Almagro, *Qusayr Amra: residencia y baños omeyas en la desierto de Jordania* (Madrid, 1975).
 39. Wellesz, "An Early al-Šūfi Manuscript"; and *idem*, "Islamic Astronomical Imagery."
 40. Guest and Ettinghausen, "Kashan Lustre Plate," fig. 45.
 41. Rice, "Drawing of the Fatimid Period," pp. 34 and 38; Jones, "Notes on a Tattooed Musician," pp. 6–7.
 42. For ceramics, see Marilyn Jenkins, "The Palmette Tree: A Study of the Iconography of Egyptian Lustre Painted Pottery," *Journal of the American Research Center in Egypt* 7 (1968) pl. 1, fig. 1.; for stonework, see Jones, "Notes on a Tattooed Musician," p. 7, n. 15.
 43. For paintings on ceramics, see Jenkins, "Palmette Tree," pp. 119–26; for representations in ivory and woodcarving, see, for example, Kühnel, *Elfenbeinskulpturen*, nos. 88 c-d. Richard Ettinghausen noted the integration of this palmette motif in other perfectly realistic schemes in "Early Realism," p. 259 and figs. 5–6. Also note the use of necklaces and head-dresses on certain fantastic animals such as harpies.
 44. There are comparable late-antique figures that are nude ex-

- cept for jewelry, boots, and a casual piece of drapery flung over an arm, shoulder or leg. See, for example, *Age of Spirituality*, p. 141, no. 119; pp. 154–55, no. 132. Also, André Grabar, *The Golden Age of Justinian: From the Death of Theodosius to the Rise of Islam*, trans. S. Gilbert and J. Emmons (New York, 1967), p. 298, illus. p. 301.
45. See n. 12 above.
 46. Wellesz, "Early al-Sūfi Manuscript," pp. 20–26; and idem, "Islamic Astronomical Imagery," pp. 87f., for a discussion of the main groups of copies of al-Sufi's work.
 47. *Ibid.*, p. 23. While Wellesz associates this work with a group of manuscripts with illustrations executed by different hands, she has observed that most of its illustrations are related to a group that follows the classical iconography.
 48. Wellesz, "Early al-Sūfi Manuscript," p. 405; idem, "Astronomical Imagery," n. 6.
 49. See facsimile of ms. Marsh 144, al-Sūfi, *Kitāb ṣuwar al-kawākib* (The Book of Constellations), ed. Fuat Sezgin; and study of illustrations in Wellesz, "Early al-Sūfi Manuscript."
 50. *Ibid.*
 51. Pointed out in Jones, "Tattooed Musician," pp. 10–14.
 52. For the most recent evaluation of the translation movement with an excellent up-to-date bibliography, including references to the important older scholarship, see Dimitri Gutas, *Greek Thought, Arabic Culture* (London, 1998). On p. 53, Gutas suggested that these translations were part of the Abbasid appropriation of Sasanian imperial ideology and that the earliest translations were made via Pahlavi intermediaries. For transmission through Syriac, see the forthcoming paper by Hans Daiber, "Die Aristotelesrezeption in der syrischen Literatur," *Die Gegenwart des Altertums, 18–20 November, 1999* (to appear). Other recent contributions include I. A. Sabra, "Situating Arabic Science: Locality versus Essence," *Isis* 87 (1996): 654–70; Gerhard Endress and Remke Kruk, eds., *The Ancient Tradition in Christian and Islamic Hellenism*, Studies on the Transmission of Greek Philosophy and Sciences dedicated to H. J. Drossaart Lulofs on his Ninetieth Birthday (Leiden, 1997); C. G. Thomas, ed., *The Paths from Ancient Greece* (Leiden, 1988).
 53. Gutas, *Greek Thought*, esp. pp. 28–107.
 54. See Franz Rosenthal, *The Classical Heritage in Islam*, trans. Emile and Jenny Marmorstein (London and Berkeley, 1975); Gerhard Endress, "Die wissenschaftliche Literatur," in *Grundriss der arabischen Philologie*, 3 vols. (Wiesbaden, 1987 and 1992), 2:400, 506, and 3:3–152. A sampling of subjects: A. I. Sabra, "The Scientific Enterprise," in *The World of Islam*, ed. Bernard Lewis (London, 1976), pp. 181–200; Seyyed Hossein Nasr, *Islamic Science: An Illustrated Study* (London, 1976); J. Vernet, "Mathematics, Astronomy, Optics," in *The Legacy of Islam*, ed. J. Schacht and C. E. Bosworth (Oxford, 1974), pp. 461–89; for medicine: Manfred Ullmann, *Islamic Medicine*, trans. Jean Watt (Edinburgh, 1978); *À l'ombre d'Avicenne. La médecine au temps des califes*, exhibition catalogue, Institut du Monde Arabe (Paris, 1996).
 55. References to these and other works in Hoffman, "Emergence of Illustration," pp. 101–2.
 56. As previously discussed in Hoffman, "Emergence of Illustration," pp. 102f.; Gutas, *Greek Thought*, p. 13.
 57. Al-Maqrizi, *Khīṭat* 1:408; Ibn Khallikan, 1:479. Also see Ibn al-Nadīm, *Kitāb al-Fihrist*, ed. G. Flügel (Leipzig, 1871), 1: 24 with examples.
 58. For libraries, see Walker, "Fatimid Institutions," and Wasserstein, "Library of al-Hakam." Also Hoffman, "Emergence of Illustrated Arabic Manuscripts," pp. 103–11, especially for private libraries and scholars who frequented and were associated with them.
 59. For a full discussion of the authorization of a work and the system of transmission, see Johannes Pedersen, *The Arabic Book*, trans. G. French and ed. Robert Hillenbrand (Princeton, 1984), pp. 20f.
 60. Ibn Abi Uṣaybi'a, *Uyūn al-anbā' fī ṭabaqāt al-aṭibbā'*, ed. August Müller, 2 vols. (Cairo and Königsberg [1884], 1882), 2:48, related in M. Sadek, *The Arabic Materia Medica of Dioscorides* (St. Jean Chrysostome, Quebec, 1983), p. 8.
 61. Explored in Hoffman, "Author Portrait" and "A Fatimid Book Cover."
 62. Ettinghausen, *Arab Painting*, pp. 67–70 and illustrations on pp. 68, 69, and 72.
 63. *Ibid.*, p. 70.
 64. For facsimiles, see H. Gerstinger, *Dioscorides, Codex Vindobonensis, Med. gr. 1* (Graz, 1970); P. Buberl, *Die Byzantinischen Handschriften*, vol. 1 (Beschreibendes Verzeichnis der illuminierten Handschriften in Österreich, vol. 8, pt. 4) (Leipzig, 1937); A. V. Premerstein, K. Wessely and J. Mantuani, *Dioscorides, Codex Aniciae Julianae Picturis Illustratus, nunc Vindob. Med. gr. 1* (Leiden, 1906). For a discussion of this work, see Sadek, *The Arabic Materia Medica*, p. 63; P. Buberl, "Die antiken Grundlagen der Miniatur des Wiener Dioskurides Kodex," *Jahrbuch des Deutschen Archäologischen Instituts* 51 (1936): 115–36; William T. Stearn, "The Earliest Illustrated Herbal, Codex Aniciae Juliannae," *Graphis* 54 (1954): 322–29; E. Diez, "Die Miniatur des Wiener Dioskurides," *Byzantinische Denkmäler* 3 (Vienna, 1903).
 65. "Al-Mubashshir ibn Fatik: Prolegomena to an Abortive Edition," *Oriens* 13–14 (1961): 132–58; Rosenthal, "From Arabic Books and Manuscripts, XIII–XIV: Ms. Chester Beatty, 3207 of al-Mubashshir," *Journal of the American Oriental Society* 95 (1975): 211–13.
 66. See the facsimile of ms. Marsh 144: al-Sufi, *Kitāb ṣuwar al-kawākib*, ed. Fuat Sezgin; also, Wellesz, "An Early al-Sufi Manuscript."
 67. Sadik, *The Arabic Materia Medica*, pp. 51f. with illustrations.
 68. See *ibid.*, pp. 7–19.
 69. Wellesz, "An Early al-Sūfi Manuscript," with bibliography.
 70. *Description des étoiles fixes*, ed. H. C. F. C. Schjellerup, p. 39.
 71. Ettinghausen, *Arab Painting*, pp. 52–53. For the abandonment of the Greek mythological identities in pursuit of scientific exactitude in Islamic imagery, see Erwin Panofsky and Fritz Saxl, "Classical Mythology in Medieval Art," *Metropolitan Museum Studies* 4 (1933): 228–80; Ralph Pinder-Wilson, "The Malcolm Celestial Globe," *The Classical Tradition*, The British Museum Yearbook 1 (London, 1976), p. 84. For the retention of the Islamic transformations in certain Western adaptations, see the al-Sufi ms. written in Sicily, now in the Bibliothèque de l'Arsenal, 1036 in Wellesz, "An Early al-Sūfi Manuscript," p. 22, figs. 57–58; also, ms. Bodl. 614, Bodleian Library, Oxford, in Fritz Saxl and H. Meier, *Handschriften in englischen Bibliotheken*, pt. 3 of Fritz Saxl, *Verzeichnis*

- astrologischer und mythologischer illustrierter Handschriften des lateinischen Mittelalters* (Nendeln/ Liechtenstein: Kraus Reprint, 1953-78), 1:313f. and 2: pl. 74.
72. In other copies the "kneeling man," a translation of the original Greek name (Engonasin) is used. See Wellesz, "An Early al-Sufi Manuscript," p. 8; Pinder-Wilson, "Malcolm Globe," p. 89, points out that only three constellations, *qifā'us* (Cepheus), *al-qitas* (Cetus) and *qanṭūris* (Centaur), retain the Greek nomenclature.
73. Ahmad ibn Muḥammad Miskawayh, *Tahdhīb al-Akhlāq* (Cairo, 1323 A.H.); trans. as *The Refinement of Character*, by C. K. Zurayk (Beirut, 1968), pp. 58-59, and 64, mentioned by Richard Walzer, "Some Aspects of Miskawaih's *Tahdhīb al-Akhlāq*," *Greek into Arabic: Essays on Islamic Philosophy* (Cambridge, Mass., 1962), p. 235.
74. Franz Rosenthal, "On the Knowledge of Plato's Philosophy in the Islamic World," *Islamic Culture* 14 (1940): 389.