AN EARLY AL-ŠŪFI MANUSCRIPT IN THE BODLEIAN LIBRARY IN OXFORD

A STUDY IN ISLAMIC CONSTELLATION IMAGES*

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THE MANUSCRIPT

The Bodleian Library in Oxford contains a manuscript (Marsh 144) of "The Book of the Fixed Stars" (Šuwar al-Kawākib al-Thābitah), by the famous Arab astronomer 'Abd al-Rahmān b. 'Umar al-Šūfi.1 It has 419 pages; pages 252–269 have been misplaced and should be inserted between pages 211 and 212. From page 405 onward the manuscript shows more or less drastic repairs: the original upper parts of the last pages are altogether missing and have been rewritten and replaced at a later date. The binding, in red morocco with a flyleaf, was done at a late date and rather carelessly, so that the inner margins of the pages are wider at the bottom than at the top. The edges have been cut to such an extent that quite a number of drawings are slightly mutilated. A few pages are wider than the others and have had to be folded back to match the average size of 26.3 cm.: 18.2 cm. The figures are drawn in black ink throughout, except for the first three, in which the inside drawing is done with a brownish wash. Most figures show signs of tracing; sometimes, however, the actual contours are at variance with the traced lines. The stars, on the other hand, conform exactly with the more or less punched marks which indicate their position. Those stars that form the constellations are red, their numbers are inscribed in black, and the most important ones have their names added. The stars outside the constellations are black, most of them with red numbers.

The last page includes a fragment of what seems to be the original colophon, with the usual words of praise to God and His Prophet and the statement that the book was written and illustrated by al-Ḥusayn b. 'Abd al-Rahmān b. 'Umar b. Muḥammad in the year 400 A.H./A.D. 1009–102 (fig. 35). In the margin and at the bottom we find a Latin inscription written in Constantinople in 1644 by Christianus Ravius,2 saying that he supplied

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1 I should like to express my sincerest thanks to the Warburg Institute which allowed me to use their vast photographic material and generously supplied me with most of the photographs published for the first time in the present article; to Dr. D. S. Rice, London University, who furnished much information and who also kindly provided me with photographs as yet unpublished; to the Dumbarton Oaks Research Library, Washington, D. C.; to the Bodleian Library and to the History of Science Museum, Oxford; also to Professor A. F. L. Beeston and Dr. Otto Paecht, Oxford University; to Professor Richard Ettinghausen, Freer Gallery of Art, Washington, D. C.; to Professor Oleg Grabar, University of Michigan; to Mr. R. H. Pinder-Wilson, British Museum; and to Mr. Marcel Destombes, Paris, all of whom helped me in many ways.

2 An Urjūzah on the fixed stars was attributed to a son of al-Šūfi bearing that name. A different view is taken by C. Brockelmann, Ges. d. Arab. Lit., Supplementsb. 1, p. 863.

3 The Keeper of Oriental Manuscripts in the Bodleian Library, Mr. Sainsbury, kindly drew my attention to the fact that Ravius (Christianus) is mentioned in the Catalogue of Arabic books in the British Museum, vol. 2, p. 507 (696.g.38).
the missing parts of the text after having compared it with a more recent copy of the same work. 4

If the dating on the colophon proves correct, as most scholars agree, the Bodleian manuscript is not only the earliest known copy of al-Ṣūfī’s work, but with very few exceptions the earliest example of Islamic book illustration. The existence of the manuscript is widely known and its text, together with that of other manuscripts, has recently been used for an edition of al-Ṣūfī’s work; 5 yet none of the drawings have been published. This is the more remarkable since, apart from their historical relevance, they are of considerable artistic merit.

AL-ṢŪFĪ AND THE TRADITION OF CONSTELLATION IMAGES

Al-Ṣūfī was born in Rayy in A.D. 903 and died in 986. He was one of the greatest Muslim astronomers, the friend and teacher of the Buyid sultan ‘Aḍud al-Dawlah to whom “The Book of the Fixed Stars,” his most important work, was dedicated. 6 As he says, it was actually the desire of this prince to know the fixed stars, their position within the figures and in relation to the Zodiac, which compelled him to write this book. He had convinced himself that many who pretended to be authorities on the subject could not be trusted, since their knowledge was not founded on personal observation and they blindly accepted the errors of their forerunners, relying on spheres which were worked by artists who were not astronomers and who followed books and tables which were not themselves entirely reliable. 7 The works of the astronomers which al-Ṣūfī criticizes were, like his own, based on Ptolemy’s classical work, the Mathematike Syntaxis, commonly called the Almagest, which had been translated into Arabic as early as in the beginning of the ninth century. 8

It was, as is well known, a natural process with primitive man to name certain outstanding groups of stars after familiar forms of human beings, animals, or inanimate objects. A further step consisted in identifying these

4 "Haec sunt rudera veteris scripturae quae supra complevimus. Christianus Ravius, Constantinopolis, 8. Januar, 1644. Contuli cum aliquo Examplari M.S. 100 annorum, id quod singulas figuras saltem semel habuit et minus elegantae. Semperque hoc melius deprehendi recentiore illudque ad diem saltem habere potui die ut supra." I am grateful to Dr. Hunt, Keeper of Western Manuscripts in the Bodleian Library for having helped me in deciphering the handwriting.

5 Al-Ḳitāb ʿSuwār al-Kavākib, ed. Dr. M. Nizam-u’d-Din, with a contribution by Professor H. J. J. Winter, Hyderabad, Deccan, 1953.


8 The earliest translator was the Jew Sahl al-Ṭabarî. Another translation was made a little later (in 829), on the basis of a Syriac version, by al-Hajjâj ibn Yûsuf. Cf. G. Sarton, Introduction to the history of science, vol. 1, Baltimore, 1927, p. 545.
celestial configurations with mythological personages, even in linking them together into heavenly projections of mythological events. Astronomy as a science had begun with the Ionian philosophers. The first to compile a scholarly catalogue of the fixed stars was Hipparchos (active 161–126 B.C.). He also constructed the first celestial globe on record, though it is believed that other globes had existed before. His work was continued and brought into a definite form by Ptolemy about A.D. 138, and his catalogue of the fixed stars forms part VII, 5, and VIII, 1, of the Syntaxis.

It may be useful to give the names of the constellations in their original Greek as well as in the current latinized form, adding an English translation.

THE CONSTELLATIONS OF THE NORTHERN HEMISPHERE

Arktos mikra, Ursa minor, the lesser Bear.
Arktos megale, Ursa maior, the greater Bear.
Drakon, Draco, the Dragon.
Kepheus, Cepheus.
Bootes, Bootes, the Herdsman.
Stephanos boreios, Corona borealis, the Northern Crown.
Engonasin, Hercules.

Lyra, Lyra, the Lyre.
Ornis, Cygnus, the Swan.
Kassiopeia, Cassiopea.
Perseus.
Heniochos, Auriga, the Charioteer.
Ophiuchos, Ophiuchus, Serpentarius, the Bearer of the Serpent, with Ophis, Serpens, the Serpent.
Oistos, Sagitta, the Arrow.
Aetos, Aquila, the Eagle.
Delphos, Delphinus, the Dolphin.
Hippou protome, Equus minor, the lesser Horse.
Hippos, Pegasus.
Andromeda.
Trigonon, Triangulum, the Triangle.

THE CONSTELLATIONS OF THE ZODIAC

Krios, Aries, the Ram.
Tauroi, Taurus, the Bull.
Didymoi, Gemini, the Twins.
Karkinos, Cancer.
Leon, Leo, the Lion.
Parthenos, Virgo, the Virgin.
Xelai or Zyon.
Libra, the Balance.
Skorpios, Scorpius, the Scorpion.
Toxotes, Sagittarius, the Archer.
Aigokeros, Capricornus, the Kid.
Hydrochoos, Aquarius, the Water Pourer.
Ichthyes, Pisces, the Fishes.

THE CONSTELLATIONS OF THE SOUTHERN HEMISPHERE

Ketros, Cetus, the Whale.
Orion, Orion.
Potamos, Eridanus, the River.
Lagoos, Lepus, the Hare.
Kyon, Canis maior, the greater Dog.
Prokyon, Canis minor, the lesser Dog.
Argo, Argo navis, the Ship.
Hydros, Hydra.
Krater, Crater, the Cup.
Korax, Corvus, the Raven.
Kentauros, Centaurus, the Centaur, with Therion, Lupus, the Beast.
Thymiater, Ara, the Censer.
Stephanos notios, Corona Australis, the Southern Crown.
Ichthyos notios, Piscis Australius, the Southern Fish.

In his catalogue, Ptolemy indicates the position of each single star of a constellation
according to its longitude and latitude and in its relation to the human figure, the animal or the inanimate object which is regarded as the image of the constellation. Ptolemy's attitude toward these figures becomes obvious from his directions concerning the construction of a celestial globe.\textsuperscript{12} He says that its color should be likened to the darkness of the night, that the contours of the constellation pictures should not be too conspicuous, but that the stars should stand out in their own shining hue, in order to make it obvious to the eye that the figures are merely imaginary formations to act as an aide-mémoire to what exists in the heavens.

In connection with the catalogue he explains that he sometimes disagrees with his predecessors—as his predecessors disagreed with those who came before them—in indicating how the stars should be placed in the image, if by this he can make the contours more characteristic and more pleasing. This passage shows that a certain flexibility existed in regard to the iconography of the constellation images. It is believed that globes of the kind indicated by Ptolemy were in common use in his day, and that his own work was based on their figures. The globes also served to illustrate the Phainomena in which Aratos of Soli (c. 300 B.C.) had described the starry sky in poetic language and which remained of paramount influence throughout antiquity.\textsuperscript{13}

As mentioned before, it is obvious from al-Ṣūfī's text that such ancient pictures of constellations, in books as well as on globes, must have been well known in the Arabic world and have been used by Arabs before al-Ṣūfī's time.

In his criticism of former scholars\textsuperscript{14} he makes special mention of a book by ‘Utarid, written in the latter's hand and containing the 48 constellation pictures. He also finds fault with a big sphere made by ‘Alī ibn Ṭsa-Ḥarrānī, since its images reflected certain errors committed by the scribe of a particular manuscript of al-Ḥajjāj's translation of the Almagest which he himself had consulted.

‘Utarid is probably identical with the arithmetician and astronomer ‘Utarid ibn Muhammed al-Hasib who flourished in the ninth century;\textsuperscript{15} al-Ḥarrānī obviously was the famous maker of astronomical instruments who is known to have worked in Baghdad and Damascus at about A.D. 830.\textsuperscript{16} Al-Ṣūfī also speaks about several globes made by the Harranians, on which the names of the stars were inscribed according to Arab fashion.\textsuperscript{17}

In fact, in a Latin translation of an Arabic original, a celestial globe, made of silver, was attributed to al-Ṣūfī himself, “ad usum Regis Adadhaldaulat.” It was on show about A.D. 1043 in the Public Library in Cairo, together with another globe, made of brass, which was attributed to Ptolemy, a fact which, as A. Hauber points out, clearly indicates the inti-

\textsuperscript{12} Book 8, chap. 3.


\textsuperscript{14} Schjellerup, p. 31. He includes al-Baṭṭānī whom he accuses of having suppressed any mention of stars on which the various copies of the Almagest were not in agreement.


\textsuperscript{16} Cf. Sarton, vol. 1, p. 566.

\textsuperscript{17} Schjellerup, p. 121. The Harranians were famous makers of instruments. On the importance of the Harranian Sabians as the transmitters of the Babylonian type of the planets to the Eastern and Western world, cf. F. Saxl, Beiträge zu einer Gesch. d. Planetendarstellung in Orient u. Occident, Der Islam, vol. 3 (1912), pp. 151–177.

Concerning the illustrations to his own text, al-Ṣūfī says: “We shall draw the figures which gave their names to the constellations on account of the likeness which was found between both, and we shall assign to the stars their right place within these figures, in order to represent what is seen in the sky.” Each figure appears twice, in symmetrically opposed drawings. For on globes, as al-Ṣūfī explains later on, they appear as seen from above, so that what should be their left side becomes their right side, and vice versa. “But in the sky,” he goes on, “we see the stars in their true position, because we look upwards from the centre of the globe . . . and it is for this reason that we have included both positions; for otherwise the beholder might be confused if he saw the figure on the globe differing from what he sees in the sky. If we want to see the constellations in their true state we must raise the page over our head and look at the second figure from underneath. We shall then see it conforming to what is found in the sky.”\footnote{Schjellerup, pp. 45–46.}

In the main part of his book al-Ṣūfī treats each single constellation separately, giving a full description in which he adds his own very important observations to what he had learned from Ptolemy, and from the Anwā’, the system which had already been used by the Bedouin Arabs. He quotes and comments upon the Arabs’ stellar nomenclature which was infinitely richer than that of the Greeks;\footnote{Cf. \textit{The Encyclopedia of Islam}, new ed. (1957), article \textit{Anwā} by Ch. Pellat.}

for long before acquiring any knowledge of scientific astronomy the Arabs had become acute observers of the stars which were their only guides when during the hot season they had to travel by night. The description of each constellation is followed by a catalogue of its stars according to Ptolemy; but al-Ṣūfī changes the longitudes by 12° 42', according to his estimation of the precession at the rate of one degree in the course of 66 solar years, and he gives his own estimate of the sizes of the stars, which is often at variance with that given by Ptolemy.\footnote{Cf. M. Destombes, \textit{L'Orient et les catalogues d'étoiles au moyen âge}, Arch. Internat. d’Hist. des Science, No. 37 (Oct., Dec. 1956), p. 342. Ibn al-A'lam, al-Ṣūfī’s contemporary and fellow scientist at the court of ‘Aḍūd al-Dawlah, had discovered the more precise rate of 70 degrees.}

Little remains of those ancient constellation pictures which were the ultimate models of al-Ṣūfī’s figures. The most important constellation pictures surviving from antiquity are those on the famous “Atlas Farnese” in the Museum in Naples (\textit{fig. 1}), a huge celestial globe supported by the kneeling figure of the Giant. The globe is believed to be a Roman copy dating from the Hadrianic Age of a Greek original.\footnote{According to Thiele (pp. 27–45, fig. 5, pls. 2–6) it ultimately was derived from a globe made by Hipparchos, a view accepted by other scholars only in the wider sense that all later work was influenced by Hipparchos. Cf. F. Boll, \textit{Beiträge zur Gesch. d. griechischen Astrologie u. Astronomie}, Sitzungsber. d. Bayr. Akad. d. Wiss., philol. u. hist. Kl., 1899, vol. 1, p. 120.} Though the Farnese globe undoubtedly has its scientific aspect, it is not designed primarily for scholarly purposes, as the one described by Ptolemy, but must primarily be regarded as a work of art. The figures stand out in relief, their positions approximately indicated by lines of latitude and longitude; there are no stars, but they may have been applied in paint and become invisible. Generally the figures are seen from the back,
as indeed they should be, since they are visualized by the astronomer as being suspended in the air, facing the earth. Nevertheless, the artist aims at showing their faces, so that some of them appear in rather twisted positions.\footnote{23}

Another class of classical constellation pictures was found in manuscripts. They ultimately rest on the Phainomena by Aratos of Soli which were mentioned before, and survive in many medieval copies, containing commentaries and translations by Latin writers. The earliest date only from the ninth century A.D., but some of them are closely connected with their classical or postclassical prototypes. The Codex Vossianus in Leiden, a manuscript illustrated by framed paintings of the constellation figures, which have been fully reproduced by Thiele, seems to be a fairly accurate copy of a fourth-century original.\footnote{24} Another manuscript showing very marked classical features is the fragmentary Aratos translation by Cicero in the British Museum (Harley 647).\footnote{25}


Both these manuscripts, as well as others of the same kind, do not aim at scientific correctness alone; the interest is focused on the aesthetic and mythological aspect of the figures, more than on their relation to the starry sky. Yet our knowledge of the classical tradition of astronomical imagery owes much to those comparatively late and debased constellation pictures.

Two Byzantine manuscripts in the Vatican Library, however, survive, which are of special interest for our subject. The one (Cod. Vat. gr. 1291) is a Ptolemy manuscript dating from the ninth century but obviously derived from a late classical prototype.\footnote{26} The other (Cod. Vat. gr. 1087) dates from the fifteenth century, but is believed to be copied from a manuscript whose illustrations were closely related to those of the more defective Ptolemy copy. It contains—as do some of the previously mentioned Latin manuscripts—the drawing of a celestial sphere; it "shows the whole globe flattened out, so to speak, into one Panorama, consisting of five concentric circles. The inner circle represents the northern arctic circle, then follows the northern tropic, then the equator, then the southern tropic and the southern arctic, the constellations of which appear, of course, in grotesque distortion."\footnote{27}

According to Saxl, who refers to a number of astrotheric errors they have in common, the

647 is discussed in: III, 1, p. XIII ff.) Cf. also K. Weitzmann, Illustrations in roll and codex, Princeton, 1947, pp. 72, 84, 85 (with notes), 105, 112.

26 A full description of this important manuscript is given by Boll, op. cit., who dates it 813/20. Cf. also K. Weitzmann, op. cit., p. 158, with references.

pictorial tradition of these manuscripts is related to that of the earliest Islamic constellation images that have come down to us, those in the hemispherical dome in the palace of Qusayr ‘Amrah built by an Arabian prince at the beginning of the eighth century. Much has been written about the outstanding importance of the frescoes in Qusayr ‘Amrah as demonstrating the close connection between late classical and early Islamic art. This is particularly true of the way in which both elements meet in the paintings of the dome, which therefore provide a fascinating subject for comparative studies (fig. 2).

As a representation of the “Dome of Heaven” the cupola of Qusayr ‘Amrah can by no means be regarded as an isolated phenomenon in the classical and postclassical world. It is, however, unique in being utterly devoid of any visionary and symbolical features; though the frescoes cannot be called scientifically correct, they attest a thoroughly scientific approach.

As on a celestial globe, the constellation figures appear within a system of coordinates. The analogy goes even further and leads to illogical consequences: as Saxl points out, the figures do not appear as they are seen in heaven, as one would expect when looking up toward a domed ceiling, but they are transposed from left to right, as on the outer surface of a globe. Another illogical feature derives from the fact that the celestial equator is placed considerably above the base of the cupola, that, in other words, not only the northern but parts of the southern celestial hemisphere are encompassed in the single hemisphere of the globe. The painter takes the constellations down to —40 degrees; had he rendered realistically the heavens as he saw them at Qusayr ‘Amrah he would have had to include the southern heavens down to almost 60 degrees. As it is, the discrepancy in size and shape between the figures in the upper and the lower part of the ceiling is a considerable one; the distortion would have been even more accentuated had the painter been bound by the heavens as they really were, and this may well account for his self-imposed restriction. Some of these peculiarities can be explained if we imagine, with Saxl, that the painter proceeded by transferring a plane drawing to the inner surface of a dome—a plane drawing of the kind which was described in these pages as belonging to the fifteenth-century Byzantine manuscript in the Vatican Library. The use of this method and the astronomical errors they have in common seem to demonstrate that both the Islamic paintings and the Greek manuscripts were ultimately derived from the same or from a similar prototype.

The iconography of the figures, however, is not always in accordance with that of the illustrations of the Vatican manuscripts. Some are closer to the Atlas Farnese types, others to those of the Latin Aratea illustrations. A few foreshadow later Islamic constellation pictures. The questions involved will, however, be discussed in the next section. Most important from our point of view is the fact that the paintings in the cupola of Qusayr ‘Amrah combine scientific with aesthetic aspi-


30 Saxl-Creswell, p. 290.

31 E.g., both in Qusayr ‘Amrah and in Cod. Vat. graec. 1087 Heracles is not placed between, but after, Bootes and Serpentarius. For other examples see Saxl-Creswell, pp. 291–292.
rations in a way unknown to the Western world during the early Middle Ages.

AL-ŞŪFĪ'S ICONOGRAPHY

"The ninth and the tenth centuries"—to quote Sarton's *Introduction to the history of science*—"were essentially Muslim centuries," and their activities were superior to the West in almost every respect. Not only were the Arabic-speaking peoples the chief recipients of Greek knowledge, but they developed a great intellectual activity of their own, particularly in the scientific field; and astronomy was among their main achievements.

It is not surprising, therefore, that when al-Şūfī wrote his major opus some of the constellations had assumed a new nomenclature and, in a few instances, even a changed iconography. It seems a natural process that the Arabs, working from classical representations of the constellation figures, should have altered some names deriving from a mythology which had no meaning for them, either owing to a misunderstanding or else in an attempt to find names which could be more easily grasped and remembered. Usually al-Şūfī gives the Arabic transcription, sometimes the translation, of the Greek names, then the names which had been assigned to them by the Arabs.

*Cepheus* (fig. 3), the fourth among the constellations, and the first human figure, has been given the name of "the flamboyant." This name may be derived from the pointed Phrygian cap which in classical representations is characteristic of barbaric kings and which, painted in red, *Cepheus* wears, e.g., in the Cod. Vossianus. Also the possibility has been pointed out that his Arabic name may be due to the fact that his head lies within the radiance of the milky way. In our manuscript his headdress is a mitre, in accordance with Ptolemy's text. Contrary to classical representations, where he is seen standing with outstretched arms, he is here represented with one knee bent and uplifted arms, a position which he had already acquired at Qusayr 'Amrah.

*Boötes* (fig. 4), the second human figure, is rightly translated the "Herdsman," but is also called the great "Howler," or "Shouter," probably from an older translation which misread Boötes for Boetes, or Boötes.

*Heracles* (fig. 5) is called "the kneeling man," or "the dancer," the former being the correct translation of Engonasin, the original name given to this constellation figure in antiquity. As a "kneeling man" without any attribute which would characterize him as a mythological figure, he appears on the Atlas Farnese. It is a later stage which shows him standing, with a lion's skin and a shepherd's crook. This crook must have been misunderstood by the illustrator of our manuscript or by one of his Arab predecessors, since in the Şūfī manuscript he is holding a scimitar, an Oriental weapon. Here, as in several other instances, we are aware of a fusion of various earlier traditions.

*Cassiopea* (fig. 6) has become "the woman with a seat" (dhāt al-kursī), the seat being described as "having legs like a throne, and a cushion." The legs, ending in lion's paws, may occur wherever classical tradition is kept alive; the palmette-shaped knobs in which the back posts end, on the other hand, are charac-

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34 Thiele, *op. cit.*, fig. 19; Saxl-Creswell, fig. 348.
36 Saxl-Creswell, fig. 348.
38 E.g., Thiele, fig. 19 (Cod. Vossianus); Panofsky-Saxl, fig. 12 (Vat. Reg. Lat. 309).
teristic of Islamic work. On the Farnese Globe the chair stands in profile and the lady turns away from the beholder; on the analogous picture of the Cod. Vossianus both chair and lady are seen almost en face.\textsuperscript{39} Our manuscript combines both aspects, the chair being shown as on the Globe, the lady as in the Codex.

Perseus (fig. 7) is called the “Bearer of the Demon’s Head,” \textit{al-Ghūl}, which in European usage has become “Algol” and now designates the most important star of that particular constellation, the one in Perseus’ hand. Contrary to classical tradition, the Islamic figure no longer carries Medusa’s head, but that of a male demon, the streams of blood flowing from the Gorgon’s neck having perhaps been misinterpreted as a beard.\textsuperscript{40}

Auriga (fig. 8), the Charioteer, also “he who holds the reins” (\textit{mumsik al-a’innah}), or “the goats,” stands with bent knees and a whip in his hand, and follows classical lines on the whole. “The goats”—here not represented—and “the kids” are the ancient names of groups of stars of which the first are usually at his elbow, the second on his wrist, and with which he is actually seen in the Cod. Vossianus.\textsuperscript{41}

Serpentarius, or the Psylle (fig. 9), the “Serpent-bearer” and the “Serpent,” have not acquired any new iconographic distinction. It might even be said that our illustrator stays closer to the early origin of the figure than some of his classical and postclassical fore-runners, for in his drawing the serpent turns its head away from the man, as demanded by Hipparchos and by Aratos and as demonstrated on the Farnese Globe, while in the Vossianus, in other manuscripts, and also in Quṣayr ‘Amrah, its head is turned toward the man.\textsuperscript{42}

Andromeda (fig. 10) is called “the Woman in Chains” (\textit{al-masalsilah}), also “the Woman who never had a Husband.” She raises both arms, according to classical tradition; but contrary to it there is no indication of chains. Strangely enough, al-Ṣūfī gives the following comment: “This woman is called ‘the en-chained’ because she stretches out both hands.”\textsuperscript{43} In al-Ṣūfī’s description as well as in the illustrations of our manuscript she appears in two other variations (figs. 11, 12): in the one, two fishes of different sizes, one drawn inside the other, are laid across her body; in the second, a large fish covers her feet. Here we meet with an entirely new iconography, unknown to the West, which is partly due to the observations and the nomenclature of the Bedouin Arabs.

Al-Ṣūfī says that Gemini, the Twins (fig. 22a), appear as if they were embracing each other, since the stars of the one merge into those of the other. From Ptolemy’s catalogue we actually learn that the one is \textit{following} the other. On the Farnese Globe, in Quṣayr ‘Amrah, and in the Vatican Ptolemy, where they are seen from the back, they have their arms on each other’s shoulder, but are not as closely, and unnaturally, interlaced as they are here.\textsuperscript{44}

Virgo (fig. 13), the Virgin is also called “the Spike.” The second name as well as the first was derived from classical sources; it arose because the fourteenth star, which is situated in the left hand of the figure, was named “Spica” and the Virgin was often represented as holding one or several ears, e.g.,

\textsuperscript{39} Thiele, fig. 30, pls. 3, 4.
\textsuperscript{40} Cf. Panofsky-Saxl, pp. 240–241.
\textsuperscript{41} Thiele, fig. 27.
\textsuperscript{42} Saxl-Creswell, fig. 344; Thiele, fig. 21.
\textsuperscript{43} Schjellerup, p. 119. For the figures with fishes cf. Ideler, pp. 124–126; Benhamouda, \textit{op. cit.}, pp. 95–96.
\textsuperscript{44} Saxl-Creswell, fig. 341.
on the Farnese Globe. These are, however, missing in our manuscript and so are the wings which usually characterize the Virgin.\textsuperscript{45} There is a curious diatonomy in al-Ṣūfi’s paragraph on this constellation: in the catalogue he follows Ptolemy, who locates a number of stars in the wings; but in the description which precedes the figure he assigns the fifth star to the left shoulder, adding that it is “the one which Ptolemy locates at the tip of the wing.” And about the sixth star he says: “It is found in the left side, it is the one which Ptolemy says is in the left wing.” Since the wings were omitted, the left shoulder had to be raised very high in order to comply with al-Ṣūfi’s indication that “the fifth star should form a roughly straight line with the stars which are in the face.”\textsuperscript{46} It seems impossible to decide whether this new iconography of the Virgin which, as far as my knowledge goes, finds no parallel in antiquity, was worked out by al-Ṣūfi himself or by one of his Arab predecessors, and on what grounds. Could it be that mostly back views of the figure, as it would appear on globes, were known in the Arab world, and that the Arab designer for reasons of his own would have found it preferable to omit the wings in a figure seen frontally? One thing is certain: the solution is a very successful one, the Virgo drawing being one of the finest of the entire manuscript. The survival of both traditions in later al-Ṣūfi manuscripts is interesting and will have to be discussed later.

\textit{Sagittarius (fig. 14)}, the “Archer,” also called the “Bow.” There are two classical prototypes for this figure, both of which lived on during the middle ages: the one is a faun who bends his bow in a standing position (e.g., Farnese Globe); the other a centaur, also about to shoot his arrow.\textsuperscript{47} Both Ptolemy’s and al-Ṣūfi’s remarks are based on figures of the second type, but whereas al-Ṣūfi, in his description and in the catalogue, speaks of certain stars as being located in the “fluttering ribbons of the headband,” Ptolemy places them in the “mantle.” In fact, classical representations of “Sagittarius,” e.g., in Cod. Vossianus, show him with a garment fluttering from his back, and so does the Quṣayr ‘Amrah fresco. There, however, he is shooting backward, the “mantle” being blown forward, i.e., in the direction into which he is moving. Saxl, in pointing out the illogicality of these proceedings, believes that the painter of the cupola may have mixed up two different prototypes.\textsuperscript{48} Al-Ṣūfi resolves this incongruity, but it seems from his text that this peculiar way of representing Sagittarius was in the Islamic world not restricted to Qusayr ‘Amrah, for his criticism of ‘Uṭārid includes the following: “He states that the Archer has his face turned towards the East, and this is the way in which he designs him in his book”; and al-Ṣūfi goes on to explain that this was evidently wrong, since the stars (as the figure rises from the east) followed each other in the opposite order, the point of the arrow rising before the notch, the notch before the hair, the head before the tail of the animal—“so how could the face be turned towards the East?”\textsuperscript{49} The “Sasanian” origin of the figure in general and of the headdress in particular will be discussed later.

\textit{Aquarius (fig. 15)}, “the Water Pourer,” also called “the Bucket,” is represented as a young man holding some curious receptacle from which he pours out a schematically drawn flow of water—indeed, it looks as if he

\textsuperscript{45} E.g., Thiele, fig. 23, pls. 5, 6; Panofsky-Saxl, fig. 8.

\textsuperscript{46} Schjellerup, p. 159, and also p. 31.

\textsuperscript{47} E.g., Saxl-Creswell, fig. 350; Saxl, vol. 3, 1, fig. 3 (Harley 2506).

\textsuperscript{48} Saxl-Creswell, p. 294.

\textsuperscript{49} Schjellerup, pp. 30–31.
FIG. 1—GLOBUS FARNESIE.
(From an eighteenth-century drawing.)

FIG. 2—THE DOME OF QUŞAYR 'AMRAH.
(Reconstruction of the figures of the stellar constellations.)
FIG. 3—CEPHEUS.

FIG. 4—BOOTES.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 5—Heracles.

Fig. 6—Cassiopea.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 7—Perseus.

Fig. 8—Auriga.

Oxford, Bodleian Library, Ms. Marsh 144.
**Fig. 9—Serpentarius with Serpens.**

Oxford, Bodleian Library, Ms. Marsh 144.

**Fig. 10—Andromeda.**
Fig. 11—Andromeda B.

Fig. 12—Andromeda C.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 13—Virgo.

Fig. 14—Sagittarius.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 15—Aquarius.

Fig. 16—Orion.

Fig. 17—Centaurus.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 18—Arctus minor.

Fig. 19—Arctus major.

Fig. 20—Draco.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 21—Navis.

Oxford, Bodleian Library, Ms. Marsh 144.

Fig. 22a—Gemini.
FIG. 22b—LYRA.

FIG. 23—CYGNUS.

FIG. 24—AQUILA.

FIG. 25—CORVUS.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 26—Canis minor.

Fig. 27—Canis major.

Fig. 28—Lepus.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 29—Equus.

Fig. 30—Equus major.
Oxford, Bodleian Library, Ms. Marsh 144.

Fig. 31—Capricornus.
Fig. 33—Leo.

Fig. 34—Cetus.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 32—Taurus.

Fig. 35—Last Page.

Oxford, Bodleian Library, Ms. Marsh 144.
Fig. 36—Details from Silver Bowl.
Freer Gallery of Art (cf. note 70).

Fig. 37—Silver Bottle.
Hermitage Museum, Leningrad (cf. note 72).

Fig. 38—Silver Plate.
Walters Art Gallery, Baltimore (cf. note 73).

Fig. 39—Samarra Painting.
Herzfeld, plate 2 (cf. note 75).
were squeezing it out of a bag. In Quṣayr ‘Amrah and even in the Vatican manuscript Aquarius holds the urn upside down in an awkward way, in contrast to the Farnese Globe, where he holds it by the brim, as one naturally would.50 Our manuscript shows a further schematization, or even a misunderstanding, of the Quṣayr ‘Amrah type.

About Orion (fig. 16), “The Giant” (al-jabbār) (also called “the Spouse,” which name seems to be due to a complicated philosophical error),51 it is said in the description that “he resembles very much a human figure . . . he holds a stick in his hand and is girded by a sword.” Again there are inconsistencies between the description of the constellation figure with which the illustration conforms, and the catalogue, in which al-Ṣūfī follows Ptolemy. According to the latter, the stars 17–25 are on the skin which covers the left arm—and this is the way in which they appear in classical representations, including Quṣayr ‘Amrah. But in the description al-Ṣūfī states that these same stars are on “the sleeve of the figure,” and in the illustration they are actually placed on a sleeve which is lengthened far beyond the Giant’s hand.52 Also, the lagobolon or the shepherd’s crook, mentioned by Ptolemy and characteristic of this figure in antiquity, has become a club according to al-Ṣūfī. (The literal translation of the Greek is “staff for flinging at hares,” since Orion is supposed to hunt the Hare, the adjoining constellation.)

It is surprising (particularly when compared with Sagittarius) how closely the figure of Centaurus (fig. 17) with Lupus, the wild beast, follows its classical forerunners in its proportions and in the easy, cantering movement of the heavily built horse. And if in the Centaur’s hand the thyrsos has become a bunch of leaves, these are obviously meant to be the vine leaves in which the thyrsos is often wreathed. That this conception of the thyrsos must have been suggested by a classical model is made obvious by the representation of a Maenad in the Pseudo-Oppian of the Bibl. Marciana in Venice (Cod. Gr. 479), who is holding a very similar branch, this time of ivy, “the branch being a deformed thyrsos.” Since the Pseudo-Oppian is believed to be based ultimately on classical formulae, it may well be that both the vine in Centaurus’ hand and the ivy in the Maenad’s should go back, not to the same, but to a parallel prototype.53 The way, however, in which Centaurus holds the thyrsos in one hand and the beast’s hind legs in the other has no analogy in ancient art. His gestures are exactly those of Sagittarius spanning his bow, gestures familiar to us from so many works of Sasanian origin.

It is, of course, mainly the human figures which were renamed by the Arabic astronomers, since their classical names were more closely bound up with classical mythology than those of the constellation figures belonging to the two other groups, to the animals and the inanimate objects.

The latter are often reduced to their simplest form in the drawings of our manuscript; a number of them are mere diagrams and no attempt is made to give any perspective or embellishment. The Corona borealis, for example, appears on the Farnese globe and in

50 Saxl-Creswell, fig. 347.
51 Schjellerup, p. 214, n. 1.
52 Exaggeratedly lengthened sleeves are often used in Islamic art to accentuate the movement of a figure, e.g., a lustre bowl in the Freer Gallery of Art, Washington; cf. R. Ettinghausen, Early Realism in Islamic Art, Studi Orientalistici in Onore di Giorgio Levi Della Vida, vol. 1, fig. 5; or the Eumorfopoulos bowl, cf. A Survey of Persian Art, ed. by A. Upham Pope and Ph. Ackerman, vol. 5, London and New York, 1938–39, p. 603. This feature may be due to Chinese influence.
53 K. Weitzmann, Greek mythology in Byzantine art, Studies in Manuscript Illumination, No. 4, Princeton, 1951, pl. 43, fig. 157, p. 130.
the Cod. Vossianus as a highly ornamental wreath;\(^{54}\) in the al-Ṣūfī manuscript it is a simple circle. The one object which has been drawn lovingly and with great care is Navis, the “Ship” (fig. 21), both drawings of which are the only ones that extend over two pages of the book. One fact, however, is worth mentioning: Lyra is called by al-Ṣūfī “Persian Harp” and “Cymbal” (fig. 22b), and also “Goose” and “Tortoise.” In our manuscript the drawing may be interpreted as a schematized, not even fully adequate, representation of a “Persian Harp”; but on Islamic celestial globes and in later manuscripts the constellation image has often become a Tortoise, because the body of Lyra was, in classical representations, often made of tortoise shell.\(^{55}\)

The animal figures also retain, on the whole, the names given to them in classical times, sometimes with other names added to the old ones. Aquila (fig. 24) is also called “flying Vulture”; here a part stands for the whole, for “flying Vulture” is the name given by the Arabs to the first three stars and, in particular, to the third and main star of the constellation,\(^{56}\) a star of such importance that it is indicated by a bird on astrolabes. Cygnus (fig. 23) is called al-Dajajah, which may mean a bird of any description, or else the “Hen.” In classical antiquity this constellation is usually represented as a swan,\(^{57}\) and as such it also appears in Quşayr ‘Amrah. The bird of our manuscript, however, does not recall any of those prototypes. Hydra, Crater, and Corvus are each represented by a single drawing and are not united into consistent compositions as, on globes and in books, they used to be in antiquity.

One animal figure, which does not appear in Ptolemy’s catalogue and therefore is not numbered, is, as al-Ṣūfī says, the figure of “another horse, which resembles a horse more closely than does the “Greater Horse” (Pegasus).\(^{58}\) It is formed by a series of stars which partly belong to the constellation Peg- asus. Like the drawings of Andromeda with the fishes, which also are unnumbered, the “Horse” appears only in a single drawing, not in the double aspect of the other figures (fig. 29).

**THE TYPES OF THE DRAWINGS AND THEIR STYLE**

Let us remember that the Marsh manuscript is supposed to have been copied from al-Ṣūfī’s original by his son, only a few years after the author’s death. In such an authoritative manuscript the drawings were bound to be of first-class draughtsmanship. Yet the main interest was focused on the scientific contents of the book, of which the illustrations were merely to form the visual counterpart. The artist was therefore limited in his freedom, and the figures had to remain true in their general outline to their classical prototypes. We saw, however, that their iconography underwent some alterations when they were transferred into the Islamic sphere, and even more were the details of their appearance and style affected by a natural process of Islamization.

In a study of the human figures, it immediately becomes apparent that their proportions differ from what they had been in antiquity: here they have comparatively large heads,

\(^{54}\) Thiele, *op. cit.*, pl. 6, fig. 20.

\(^{55}\) Ibid., pl. 6, fig. 38.

\(^{56}\) Note Schjellerup, p. 105. For comparison: Late Sasanian silver plate, coll. Stoclet, in Pope, *Survey*, vol. 4, pl. 225,B, and seals of the period. Orbeli (Pope, *Survey*, vol. 1, p. 741) believes in a possible connection with the constellation figure.

\(^{57}\) According to Ideler, *op. cit.*, p. 76, n. 2, this name was first used by Eratosthenes. Cf. also Thiele, *op. cit.*, fig. 29; Saxl-Creswell, fig. 346; Panofsky-Saxl, fig. 8.

\(^{58}\) Cf. Schjellerup, p. 122.
short bodies, and well-developed hands and feet. Their posture, too, is characteristic; whether their faces are seen in three-quarter view or in profile as in Perseus, Sagittarius, Gemini, and Centaurus, the bodies are presented in full frontal view, which often is accentuated by outstretched arms, while the legs are again set either completely or partially in profile.

With the single exception of Cepheus, who according to classical tradition is always represented as a bearded man, suggesting a barbarian king, the male figures are youthful and beardless. Their facial type is hardly distinguishable from that of the women. They all have broad foreheads, full cheeks and rather pointed chins, long drawn eyes with the upper lid visible, and slightly crooked noses. The distance between nose and mouth is unnaturally short, and the line which marks the chin is set immediately under it.

The drawing of hands and feet is careful and sensitive, though, like that of the faces, it follows a standard convention. This is particularly evident from the semicircular line that runs from the thumb down to the wrist when the palms of the hands are visible.

All the youths have their hair falling down to and in front of their ears, sometimes curling over their cheeks (Perseus, Heracles, the Twins). The women have long hair streaming down their backs and the same “temple locks” as some of the men. Sometimes the rendering of the hair stands out against the other parts of the drawings owing to a profuse appliance of black ink, a realistic feature, since it was the fashion to dye one's hair.

The style that has produced the type to which our figures belong has been called “Post-Sasanian,” or “Perso-Iranian”; or, from its most famous representative, the “Samarra style.” As Dr. Ettinghausen puts it, it is “a manifestation of East Hellenic art, strongly reflecting Sasanian ideas,” and it was widespread in the Islamic world. Before appearing fully developed in the 'Abbāsid residence town of Samarra, built in 836 and abandoned 50 years afterward, it was overshadowed in the fresco representing a musician in the Umayyad palace of Qasr al-Ḥayr al-Gharbi. It can be seen in Fāṭimid wall paintings, on pottery and on the fragment of a painted column in the Ghaznevid palace of Lashkari Bazar in southern Afghanistan, attributed to the tenth or eleventh century. It survives in a modified form in the paintings of the Cappella Palatina in Palermo executed for king Roger II. Very similar types drawn according to the same stylistic convention exist in Manichaean manuscripts in Chotcho, attributed to the ninth or tenth century A.D.

All women, with the sole exception of Virgo (and also Heracles), wear diadems of various shapes, with different kinds of rosettes, large plain earrings, necklaces, and bracelets. The same kind of jewelry was en vogue in Sasanian Persia and can be paralleled in Sasanian art: the Niké of Tāq-i Bustān, for example, wears a diadem with a rosette; the moon

61 Herzfeld, op. cit., particularly figs. 19, 22, 23.
63 Cf. the reproductions and references given by R. Ettinghausen, op. cit., particularly figs. 19, 22, 23.
crescent of Andromeda's diadem occurs frequently on the headgear of Sasanian kings and is included in the exuberant jewelry reproduced in the mosaics of the Dome of the Rock.\textsuperscript{66} Very similar jewelry is also worn by the Manichaean ladies of Chotcho \textsuperscript{67} and it survives in later Islamic works.\textsuperscript{68}

Essentially, all the figures wear the same costume: it is a kind of girded, sleeved chiton, crossed right over left, down to the waist, with flaps hanging down at both sides. There is a possibility that the round line at the base of the neck may be meant to indicate that a close fitting garment is worn underneath.\textsuperscript{69} There are differences in this basic shape: sometimes the men's gowns open down from the waist, so that short trousers become visible. Perseus wears long trousers; the women, too, have long trousers which sometimes become wide and baggy. Only Cassiopea's are invisible under her long dress, while Andromeda has a second, frilled skirt underneath her first.

The way in which folds and draperies are treated is throughout extremely interesting and original. On the whole the folds follow a fairly regular pattern. They are, of course, at their richest in the skirts, which are gathered together at the waist at regular intervals and form looped draperies. The ends of these are turned up as if windblown, falling back in a swirl, and ending in a scroll pattern at the bottom. This main theme is treated by the artist in many variations: it is most elaborate in the cascades of Andromeda's skirt, has greater lightness in that of Virgo, and is fuller in Cassiopea's. In other parts of the garments, sleeves, lapels, etc., the scrolls are simpler, yet they are derived from the same motif. The unity, and at the same time the variety, in the energetic handling of folds is altogether admirable and matches the quality of the sensitive and unfafttering outlines of the drawings.

To some extent the folds comply with the conventions of classical drapery; and it is apparent that in the last instance they derive from the excitedly fluttering garments of late so-called "baroque" antiquity. Their specific stylization, however, was devised in the semi-classical sphere of eastern Hellenism.

In discussing a group of silver vessels (fig. 36) which he attributes to the Bactrian melting pot of styles, Professor Weitzmann\textsuperscript{70} mentions as an outstanding feature the falling of the women's garments over their feet, and their spreading in waves over the ground, where they form scrolls; and he traces the origin of this mannerism back to the coins of the Saka and Kushan kings of northwestern India. There is a close connection between this particular mannerism and that of the "windblown" folds of fluttering scarves and garments which, mainly since Shapur I, appear on the rock sculptures of the Sasanian kings, and which Herzfeld was the first to describe.\textsuperscript{71} Similar folds are displayed in great richness and variety on Sasanian and post-Sasanian silver. Looking at the well-known silver bottles in the Hermitage in Leningrad (fig. 37), we shall certainly find that the ends of the dancers' garments, swinging with the rhythm of

\textsuperscript{66} Creswell, \textit{op. cit.}, pls. 2, 16, 17, etc.
\textsuperscript{68} E.g., A lustre-painted bowl from Rayy. Pope, \textit{Survey}, vol. 5, pl. 646.
\textsuperscript{69} The young workmen in the frescoes of Qusayr 'Amrah wear similar chitons. Cf. \textit{Kuşeir 'Amra}, pls. 18, 20. The painted copies, however, may be misleading.
\textsuperscript{71} Herzfeld, \textit{op. cit.}, p. 64; also \textit{Iran and the ancient East}, 1941, p. 314.
their movement, form cascading swirls very similar to those which we see in the al-Şūfī illustrations. Another example is given by the much-discussed silver plate in the Walters Gallery in Baltimore (fig. 38), where the queen’s double skirt is reminiscent of Andromeda’s.

As far as my knowledge goes, the al-Şūfī illustrations are the only surviving works of Islamic pictorial art in which this particular type of fold and drapery has not only been retained, but has been used in a most competent and original way. Nothing similar appears on the few extant examples of Umayyad painting; certainly not in the frescoes of Qusayr ‘Amrah in spite of the fact that the chiton worn by a number of figures is not unlike the garments of our figures. Even the flying ribbons of the otherwise decidedly “Sasanian” rider of Qaṣr al-Ḥayr al-Gharbi are drawn in a more illusionistic fashion, which is nearer to a classical conception. In Samarra, on the other hand, folds and draperies are more conventionally drawn than in the al-Şūfī manuscript. The cascading scroll motif is used only occasionally, mainly in the garments of the dancing girls, whose descent from the Sasanian type in the Hermitage silver bottles is obvious (fig. 39). It is outside the Islamic sphere that a fairly close parallel can be found: we have already turned once to the Manichaean manuscripts of Chotcho to find analogies with our drawings, and this time we find an object of comparison in the garments of a High Priest and in the draperies which cover the desks of writing clerics.

The treatment of folds and draperies, whose forms, in spite of being rooted in classical convention are defined by linear rather than by plastic means, may be taken as an indication of the artist’s truly oriental attitude regarding the introduction of depth. In the representation of human figures the third dimension, generally speaking, is admitted to the picture plane only as far as it is suggested by their iconographical type, and is indispensable for their plausibility. Foreshortening and overlapping of limbs occurs, but to a fairly limited extent.

Most figures are shown as if they were on the point of moving, or actually in the process of walking, in a horizontal direction within the limitation of the picture plane; their feet, however, are not on the same level, and one at least is seen in full expansion. There is a curious lack of poise in their appearance, as if they were treading on air.

Cassiopea (fig. 6), the one seated figure, seen mainly en face, with the chair drawn in profile, is precariously perched on the side of the seat, pressed flat against the surface of the page. On the first image, her feet have been left out altogether; on its symmetrically opposed replica, which is artistically less satisfactory, part of the chair is missing. These facts, taken together with al-Şūfī’s remark that she is sitting “with her feet outstretched,” show how unfamiliar this attitude must have been to the Muslim draughtsman.

The kneeling figures, especially Hercules and Orion (figs. 5, 16), convey a certain feel-
ing for depth in the position of their legs, but this is again counterbalanced by the action of their outstretched arms. Cepheus' arms and legs (fig. 3), on the other hand, move essentially in parallel planes. It is not made altogether clear whether he is actually kneeling or whether he is performing some extravagant step. The drawing of the Twins (fig. 22a) is the only one in which the artist shows himself unable to transpose what was to him an utterly foreign artistic medium into his own form of expression: no attempt is made to define the natural shapes of the body; and the decorative unity is missing, which would have safeguarded the artistic quality of the drawing. Perseus' (fig. 7) vigorous action, however, is beautifully convincing, yet it is closely linked with the picture page and, in spite of his vigor and energy, he is standing as if in suspense, like a dancer.

As mentioned above, Sagittarius (fig. 14) recalls Sasanian prototypes. The fluttering bands of his turban, the way he bends his bow with his head turned in profile and his body fully expanded, the “double” or “Asiatic” bow itself, are well-known characteristics of what may be called the most common subject of Iranian art. The figure seems somewhat incongruous, the problem of wielding together horse and rider proving too difficult since the artist had renounced classical guidance (so much more apparent in Centaurus). The incongruity is made even more obvious by the fact that, owing to astrotheric reasons, the horse's foreleg is unnaturally raised, while the hindlegs seem to belong to a prancing horse. Yet even this odd feature can be somewhat paralleled in a Sasanian hunting plate where the hunter, according to Erdmann, was fused from two models, one a galloping, the other a bucking horse.77

The figures in their poses and movements as much as in their proportions, are far removed from the poise, the plastic modeling of forms, and the symmetrical structure which surely must have characterized their Mediterranean prototypes. In many ways their artistic conception goes back to Sasanian art, where we find the same reluctance to use the third dimension, intense vigor, and sometimes a certain fluidity of movement.78 It is especially this latter feature which underwent a peculiar development in Islamic art, and very close analogies can be found between the movements of our figures and those which appear in Fatimid works.79

Oddly enough, it is in the representation of some of the animals that the style is closer to the classical fashion. This, however, seems due to mere chance. The first drawings in the series (figs. 18, 19), the “Bears,” are carried out in a technique which, for reasons unknown to us, was discarded in the bulk of the manuscript. They are modeled in the round by thin brownish wash, a treatment conveying an impression of corporality which distinguishes them from the other figures. Yet, even these first drawings show a certain tendency (which becomes more obvious in the other animal representations) to “dissect” the bodies by curved lines separating their various parts.80 In comparing the “lesser” and the “greater Bear” we find that this principle has been applied more forcefully in the second drawing; a curve running from the eye to the ear encircles the cheek, another divides the neck, etc. Draco (fig. 20) is the last drawing to which color is applied, but here its function is no longer to


78 Cf., e.g., the “huntress,” Herzfeld, op. cit., pl. 6, with Perseus.


80 Cf. Herzfeld, op. cit., p. 57 ff.
accentuate modeling, but merely to form a decorative surface pattern all over the body of the reptile.

The other animals are, like the human figures, defined exclusively by strokes of the pen. Some of them are extraordinarily life-like. This is certainly true of the various birds, in spite of the schematic rendering of feathers in their wings and tails which are drawn after a standard pattern, and of the calligraphical design of their feet (figs. 23, 24, 25). However, the most impressive of them, Cygnus, with its breast in full view and its claws out-stretched in an almost symmetrical design, brings to mind those heraldic birds of ancient Oriental lineage which appear so frequently on objects of Islamic art.

The “Smaller Dog” (fig. 26) is partially a new invention, for in this picture the hound of classical origin has been replaced by a Saluki, a typically Eastern dog. The “Bigger Dog” is less convincing with its long hind legs, one of them raised in a curious fashion. The drawing of the “Hare” is much more satisfactory in its vivid characterization. It is surprising to what extent the spiral line of the muzzle is apt to suggest its mobility. As in the bird drawings, a kind of modeling is achieved by linear means: tufts of hair here, of feathers there, are drawn in thin parallel lines and located in the most telling parts of the body.81

The “smaller Horse,” “The Horse” and “Pegasus” have identical heads, with long drawn eyes (figs. 29, 30), calligraphically circumscribed cheeks (clearly noticeable already in the “greater Bear”), and nostrils indicated by a bean-shaped mark, idiosyncrasies which also occur in the representation of most of the other animals. With slight variations the characteristic circular line drawn from the eye to the ear appears frequently on Sasanian silver vessels (figs. 40, 42). The persistence of this peculiarity is shown in miniatures of a later date, e.g., the animal drawings in the Manafi’ al-Ḥayawan in the Pierpont Morgan Library.82

The Horse is conspicuous by a schematized emphasis on knees and ankles, again by circular lines. This peculiar indication of the joints by circles again goes back to Sasanian and post-Sasanian silverwork (fig. 41). It is also very noticeable in the drawing of a rider in the Vienna Papyrus collection, one of the few Islamic drawings which may be attributed to the ninth-tenth centuries A.D.83

Pegasus, if compared with the same image on the Farnese Globe and in Western manuscripts, has gained by the fact that his wings are no longer those of a bird but of some fabulous, nonexistent creature, a Senmurv, the typically Sasanian dragon found in the stone reliefs of the Ṭaq-i Bustān, on textiles, silver (fig. 40), and pottery, where it survives into Islamic times.84

Among the imaginary beasts, Aries and Capricornus are faithful translations of the classical prototypes into a different language. Others, Draco (fig. 20) and Cetus (fig. 34), have acquired a new, more fantastic and more sinister appearance. The latter, with upright ears, the beard of a musk deer, and the snout of a snarling dog, brings to mind the heads of

82 Ibid., vol. 4, pls. 219 ff. and vol. 5, pl. 819.
83 On many Sasanian and post-Sasanian hunting plates, e.g., ibid., vol. 4, pp. 211, 213, 229, B; cf. also Th. Arnold, A. Grohmann, Islamische Buchkunst, 1929, fig. 4, a pen drawing, ninth-tenth centuries.
some of the “Senmurvs.” Taurus (fig. 32) is no longer the realistic charging bull whose hindpart happens to be missing; it has been given a new, imaginative shape which in an uncanny way contains all the characteristics of a bull and, at the same time, is of a convincing decorative nature. The “Dolphin,” represented even in Qusayr ‘Amrah as true to nature as it had been in antiquity, has now assumed a purely fantastic appearance. The Fishes, whenever they appear, are seen almost completely from above, their faces determined by a series of symmetrical, calligraphical lines which, beside forming ornaments of an almost geometrical character, contribute to the individuality of the creatures (figs. 11, 12). Curiously enough, these lines are partly identical with those that define the Lion’s head. The Lion (fig. 33) is the only beast that is not seen in profile. Parallels can again be found in Sasanian and post-Sasanian silver, where lions are frequently represented almost en face, with similar spiral-shaped nostrils (fig. 42).

Any further comment on the other animal figures of the Marsh manuscript would merely confirm what we know already: there is great competence in the artist’s way of handling them, whether he keeps fairly close to classical or oriental models or whether he follows more imaginative trends. His mastery shows itself in the skillfully drawn, sensitive contours and in the manner in which lines and shapes of an essentially ornamental kind are made subservient to his intention to depict the individual appearance of his objects and to imbue them with a life of their own.

THE “ORIENTALIZATION” OF THE IMAGES

Summing up what has been gathered from this short investigation into the type and the style of the al-Ṣūfī drawings, it can be concluded that they have been thoroughly orientalized. They definitely belong to the class of objects called “post-Sasanian.” This term is sometimes used in a wider sense but it particularly applies to objects that were made in Persia during the first centuries of Islam whose derivation from Sasanian art is obvious. Our knowledge of the art of that period is, indeed, so fragmentary, and so little of what survives is securely dated, that this rather vague term was chosen for works in which the Sasanian tradition survives, the age and provenance of which cannot be defined, however, except within a rather wide margin.

No such uncertainty exists where our drawings are concerned. It can safely be assumed that they are of the same date as the manuscript, which assigns them to the year A.D. 1009/10. We are, however, faced with the question as to what extent they were original conceptions of an individual artist, and how far this artist was following existing Islamic prototypes or, in other words, at what time the “orientalization” of the classical constellation pictures took place.

If we believe the colophon, the Bodleian manuscript was copied from al-Ṣūfī’s original; this suggests A.D. 960 as the date of the initial type of the figures. But most likely it will be necessary to go still further back in time, for it can hardly be doubted that some of the books and globes by earlier Islamic astronomers mentioned by al-Ṣūfī were already illustrated in an orientalized fashion.

In this connection it seems interesting to quote from the fi ṭaṣīḥ al-ṣuwar wa ṭaḥṭīḥ al kuwar (“about the projections of constellations and of countries”) written by the great scientist al-Birūnī (973–1048). He states

85 E.g., fig. 40.
86 E.g., ibid., vol. 4, pl. 220, Hermitage; according to Dimand, op. cit., it is post-Sasanian.
that, owing to the great number of manuscripts and to the frequency of their copying, the original correctness of the illustrations of books by such authors as 'Uṯarid b. Muḥammad (9 c.), 'Umar b. Farruchen al-Ṭabari (d. 803), or of Abū al-Ḥusayn al-Ṣūfī, from whom his own knowledge was mainly derived, had greatly suffered. And he goes on to say that in books even the best illustrations have the drawback of being separated from each other, so that they do not offer a simultaneous picture (of the sky). Such a simultaneous picture can only be presented on globes, "not on small ones, but on big ones. But these are rare and costly, and too big to be carried and transported and they are difficult to use."

In a later passage, al-Birūnī mentions having heard from his friend, the geometer Abū Saʿid Aḥmad b. ʿAbd al-Jalīl (al-Sīżji) (c. 951–c. 1024), that al-Ṣūfī traced the single stars as well as the constellations from a globe by applying very thin paper to its surface. Al-Birūnī speaks rather critically of these proceedings before turning to his own, scientific, method of converting a spherical into a planimetrical design.87a

We have, of course, no evidence at all for the validity of al-Birūnī's anecdote. Yet, his remarks are of great importance for our subject. In the first place, they confirm the impression we got from al-Ṣūfī's introduction, namely, that of a wide circulation in the Islamic world of illustrated works by earlier astronomers. Secondly, we learn that big globes, obviously much bigger than any which have come down to us, existed among the Arabs as they had existed in antiquity, and that, as in antiquity, they were objects to be admired rather than used, in contrast to the smaller globes which were designed for scholarly work and for teaching purposes. The big globes were probably made for princely patrons only; it seems that the heavy silver globe in the Cairo Library which belonged to the Buyid sultan ʿAbd al-Dawlah and which was attributed to al-Ṣūfī, was such a major objet d'art. (See note 18 above.)

Thirdly, it seems unlikely that al-Sīżji, a younger contemporary of al-Ṣūfī, or even al-Birūnī himself, who must have known manuscripts of al-Ṣūfī’s work which were very close to the original, if they did not include the original itself, could have reported a story indicative of the most intimate connection between the illustrations of such manuscripts and the constellation images on globes, unless such a connection had existed and been obvious to the eye. This would mean the existence of big globes, obviously made of silver—since al-Birūnī mentions their preciousness—containing constellation images in a style akin to that of the earliest Ṣūfī illustrations, but, in all probability, going back to an earlier period. The frequent analogies between the drawings of Marsh 144 and Sasanian and post-Sasanian silver, particularly that they have in common the fold convention which is so characteristic of our manuscript, would then find a most plausible explanation: the engravings on metalwork, including the "costly globes," and the illustrations of the earliest Islamic manuscripts followed an artistic tradition identical in style.

From all this it seems reasonable to believe that an oriental type of constellation picture on globes as well as in books, came to life when the East was made familiar with Greek astronomy, a time remarkable not only for its scientific studies but also for its artistic activities.

This does not mean that al-Ṣūfī slavishly copied what he found in the works of his predecessors. This would be impossible in a man who, as modern astronomers agree, competently criticized not only the works of his

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87a Ibid., p. 86.
Oriental forerunners, but even asserted his own observations of the stars against Ptolemy's. It is, indeed, much more probable that some divergencies between the iconography of classical images and those found in many copies of his work were his own doing.

It cannot be doubted that this iconography was scrupulously followed by al-Ṣūfī's son, when he drew these pictures we know; yet he presumably included a few "modern" trends into his presentation of the figures. But he must have felt, as we do, that the treatment of folds and draperies constituted such an integral part of their aesthetic aspect that in carrying out this particular part of his work, he followed closely in the wake of his predecessors. We shall presently see that many of his own successors took a similar attitude.

In the drawings of other items, however, he showed greater independence. Leaving aside Cepheus' "mitre" which from antiquity onward had a tradition of its own, all male figures wear large turbans which, though showing slight variations in size as well as in manner, are essentially similar to each other. Headgears not unlike in fashion can be traced in Rayy pottery and in Fatimid art, where close, if not identical, parallels occur in wall paintings, on pottery, and also on the fragment of a drawing published by Wiet and dated in the eleventh century. The artist of the Marsh manuscript "modernized" the turbans of the figures, changing the headdresses of their prototypes into those which were fashionable in his own day.

TRENDS IN LATER AL-ṢŪFĪ MANUSCRIPTS

A comprehensive survey of the many al-

Ṣūfī manuscripts still existing in Eastern and Western libraries and of the survival of their iconography in the infinitely more numerous copies of Qāzwini's 'Ajā'ib would present a most welcome attempt to supplement Professor Saxl's pioneer work on Western astrological and astronomical manuscripts, and on their relations with the East. It is hoped that such a work might be undertaken in the not too distant future. At present only a sketchy picture of the proceedings of later al-Ṣūfī illustrators can be attempted by comparing a few drawings of some outstanding manuscripts with their predecessors in the Marsh manuscript in the Bodleian. What emerges most strikingly from this comparison is the faithfulness with which throughout the centuries a number of illustrators clung to an established pictorial tradition.

The likeness between the Virgo of our manuscript and that of the al-Ṣūfī in the Top Kapi Seray Library in Istanbul (Ahmet III, No. 3493) (fig. 43) dated A.D. 1130/31 goes far beyond what might be due to astrotheric requirements. The iconographical type is identical, since the absence of wings is made up for by the raising of the right shoulder. Also the similarity in the treatment of the folds is astonishing indeed; it is true that some of the inside folds show a schematization unknown to the older draughtsman, but those at the bottom of the skirt are copied with great accuracy. And if the Istanbul Virgo wears no trousers, this applies to a number of figures in the Oxford manuscript as well. The main difference is in the change of proportion. The dress of the younger figure is "modernized" by the insertion of bands with Kūfic inscrip-

tions which adorn the sleeves and the ends of
the sash.

Not all the figures of Ahmet III 3493 re-
main as true to type as Virgo (fig. 43). The
“modernization” has gone a little further in
Orion (fig. 45). Some figures have obviously
been tampered with at some later period.
Others seem to have been drawn by a different
hand. But in the case of a number of illustra-
tions the connection between the older and the
younger manuscript must be regarded as a
very close one indeed.

Another important Istanbul manuscript
(Aya Sofya 2595) is the autograph of Naṣir
ad-din al-Ṭūsī’s90 translation into Persian,
which was owned subsequently by the Jalā’īrid
Aḥmad ibn Unways and by Ulugh Beg, and
which dates from A.D. 1249/50. Here, too,
a number of figures are intimately related
to the corresponding ones in the Bodleian
manuscript: Heracles (fig. 46), for example,
whose attitude and garment conform exactly
with the early model, although he now wears
a large, extremely ornate turban; Cassiopea
(fig. 47) whose diadem has been converted
into a crown; the Charioteer (fig. 48) has
bands with Kūfī inscriptions on his sleeves and
on his turban, while the cascading folds have
been transferred from the bottom of the tunic
to his trousers. The same is true of Androm-
eda (fig. 49) who, like Cassiopea, wears a
crown.91

The representation of Pegasus (fig. 50)
shows that the animals as well as the human
figures conform to the Bodleian manuscript,
though it is more ornate than its model, just
as some of the accessories of the figures are
richer than in the older manuscript. Also the
folds of the garments, in spite of being de-
signed according to the former tradition, have
become more schematized. This is perhaps
most apparent in the other Cassiopea figure
(fig. 51), where the artist seems to have al-
lowed free play to his imagination and has
invented new variations on the old scheme,
with the result that wherever the folds are
gathered together they form a regular design
which is spread all over the robe like a surface
pattern.

But some of the illustrations were obvi-
sously added by a later hand, and will be dis-
cussed in another context.

A Paris manuscript in the Bibliothèque
Nationale (Arabe 2489) is undated but is also
assigned to the thirteenth century A.D., and
its drawings definitely belong to the same
group. The similarity of a number of figures
to the corresponding ones in the Aya Sofya
al-Ṣūfī in particular is quite extraordinary—
we only have to compare the two renderings of
Heracles (figs. 46, 52). There is, however, an
increased predilection on the part of the illus-
trator for profusely ornamented crowns and
rich jewelry; Virgo (fig. 53) may exemplify
this point. Again, it is the wide trousers of
some of the figures which form the typical
cascades of folds (Charioteer, fig. 54), though
others have retained their wide tunics (And-
romeda, fig. 55).

In their proportions the drawings of the
Paris manuscript conform more closely to
those in the Bodleian manuscript than to those
of later manuscripts, and some of the former's
idiosyncrasies are faithfully repeated, even in
the facial types, though a Turkish element is
obvious (fig. 56). Also, the overall pattern
of folds, which we found in some of the Aya
Sofya drawings, never occurs in the Paris
manuscript, where it is replaced by a looser
arrangement of an essentially decorative char-

90 Al-Ṭūsī, astrologer to the Ismaili governor
Naṣir al-Din, later adviser to Hūlagū, on whose
orders he founded the Observatory of Marāgha
(1261). Cf. Encyclopedia of Islam, p. 980 (Stroth-
mann).

91 Analogies in contemporary and later manu-
scripts, e.g., Vienna Galen and the Demotte Shāh
nāmeh.
acter, less logical than that in our original manuscript.

The tradition to which these manuscripts belong is by no means confined to an early period. It is widespread in time as well as in place. The manuscript of the Metropolitan Museum in New York (Acc. No. 13.160, 10) is believed to have been written in the late fourteenth century, probably in Samarkand. Though very much debased, the old theme of folds is still recognizable, and there are close analogies in the general conception of the figures (Cepheus). A much later copy, which was used by Schjellerup for his translation of al-Ṣūfī’s work is in the Public Library in Leningrad (Arab 191, New Series). It was written in Nayin, in central Persia, on October 15, 1606 A.D. Its ultimate derivation from the Oxford manuscript is obvious, though, again, it underwent a certain process of modernization. The figures have slender proportions. They wear the turbans that were fashionable during the reign of Shāh ‘Abbās. The folds are true to type, but they are relegated to wide trousers made of thin material, and have acquired a new, more naturalistic aspect.

Another outstanding manuscript which follows the same tradition is in the Bibliothèque de l’Arsenal in Paris (Cod. 1036). It is a Latin translation of al-Ṣūfī’s work, written in Sicily in the thirteenth century. Years ago Professor Saxl drew attention to this remarkable manuscript, and to its dependence on Islamic models. His remarks can now be complemented by our knowledge of the particular type of manuscript from which the Romanesque artist took his inspiration. For the likeness of the Arsenal Şūfi to that of the Bodleian is striking indeed.

It is true that, apart from the usual change in headdress, the Western manuscript shows considerable differences in technique and in idiom: the figures are painted in different colors, in a fashion that increases their compactness and plasticity, and the faces have more expression (figs. 57, 58). The animals, in particular, achieve a monumentality which is beyond the scope of the illustrator of Marsh 144 (figs. 59, 60). But the Western manuscript reproduces with remarkable exactitude not only the outlines, but also many details of its drawings; the garments are identical in kind, and the treatment of folds shows obvious relationship.

A manuscript, which is now in the Top Kapi Seray Library (Fatih, No. 3422), was written in Mārdin and is dated A.D. 1134–35, approximately at the same time as the Ahmet III one. Yet, it is of a completely different type. The drawings are less elaborate than any so far described in these pages; they are mostly reduced to mere contours, the garments being indicated by a few simple lines. All that remains of the exuberance of folds are a few meaningless arabesques. Not only its style but also its iconography is at variance with that of the other copies: Andromeda wears chains (fig. 61); the cushion is missing from Cassiopea’s seat (fig. 62), her hand reaches backward in order to clutch its pole; and Virgo (fig. 63) has wings as she had in antiquity.

The fact that the Aya Sofya manuscript had a number of illustrations added by a different hand has been mentioned above. One of those illustrations is the image of Virgo (fig. 64); and we notice at once that this figure deviates from the tradition of our Bod-
leian manuscript, which, for the sake of convenience, we shall call that of "Group A," and that it must have derived from the same prototype as the Virgo image of Fatih 3422. Apart from having the wings in common, both have the same oddly-shaped skirts with parallel divisions from which all folds have disappeared. The Centaurus (figs. 65 and 66) images of both manuscripts confirm our view that the second part of the Aya Sofya manuscript and Fatih 3422 are closely related. Both follow a tradition which we shall call that of "Group B," as opposed to the "Group A" tradition.

We do not know whether Fatih 3422 is the first of its kind. One thing, however, is certain: in its iconography it follows classical usage more closely than the manuscripts belonging to the "A Group," and it is intimately connected with the iconography of the celestial globes.

Like Fatih 3422, a number of the B Group manuscripts are fairly simple in design, for example the Paris manuscript of the Bibliothèque Nationale, Arabe 2488, which, like Ar. 2489, is believed to date from the thirteenth century. A confrontation of the Cassiopea drawings (figs. 62, 67) of both manuscripts may serve to demonstrate this point, and to show that in both classes of al-Šūfī illustrations the once-established types may survive for centuries.

Yet it would be quite wrong to believe that all Group B manuscripts are of the simple kind. One of them, in fact, is the best known and the most elegant of all al-Šūfī copies. It is Ar. 5036 in the Bibliothèque Nationale in Paris, which was Ulugh Beg’s personal copy, believed to have been written in Samarkand before A.D. 1437, when this prince had the astrological tables newly revised in his own observatory. The figures are most delicately painted, they are realistic according to contemporary conceptions, and their costumes comply with the fashion of the day. Here, too, we find a winged Virgo (fig. 69) and Andromeda (fig. 70) with chains. Cassiopea (fig. 68), on her more elaborate, but cushionless seat, has the posture we know from other B manuscripts and—another feature of most manuscripts of this group—Hydra, Crater, and Corvus appear on a single page (fig. 71).

Two illustrations from another Istanbul manuscript, Pertev Paşa 375 (figs. 72, 74), may exemplify the survival of the B tradition into the sixteenth century. In fact, most, though not all, later manuscripts belong to the B group, e.g., the second manuscript used by Schjellerup, which was written in Median in 1601 and which is now in the Royal Library in Copenhagen (No. 83).

There are some manuscripts which do not fall entirely into either group. It is impossible to say whether they represent divergent groups, or whether they have to be regarded as isolated specimens. One of those manuscripts is the British Museum Şūfī Arab. 5323. Again, different hands have participated in the drawings. It is undated, but the greater, and at the same time the better, part of the illustrations have much in common with Aya Sofya 2595, and can be assigned to the thirteenth century (fig. 75). Some figural types are almost identical, and so are the costumes, and the fold convention, though some Chinese influence may have already come in. There are, however, some remarkable divergences: a number of the youthful male figures have partly by E. Blochet, Musulman painting, pls. 88–93, and in Les peintures des manuscrits orientaux de la Bibl. Nat., vol. 2, Paris, 1914–20, pls. 25–33.

been transformed into bearded men, others into women. Both aspects of most of the human constellation images appear on one and the same page worked into a consistent composition. Nothing decisive can be said about the iconography of the manuscript; the image of *Cassiopeia* is a poor drawing which does not belong to the main set; and a few constellation images are missing, among them *Virgo*. Yet, the connection with Group A seems obvious.

Another interesting manuscript which fits even less into the general scheme is Cod. Rossi 1033, now in the Vatican Library, which was written in Ceuta in Morocco in A.D. 1229. Here both aspects of almost all constellation images confront each other symmetrically on one page, and quite a few of the animals and of the inanimate objects are reminiscent of the Group A manuscripts. Most of the human figures, however, differ so widely from any others we know that sometimes their identity may be doubted. The *Charioteer* (fig. 73) has become a bearded man, and so has *Heracles*, who has lost his scimitar. *Orion* is without his sword, his elongated sleeve has become meaningless, and he is standing instead of kneeling. *Virgo* (fig. 76) is the one who most complies with the A Group prototype.

The style of this manuscript, so different from that of any other al-Šūfi copies, was obviously influenced by its milieu which was unlike that of the Middle East. We should remember that Ceuta had for a long time belonged to Islamic Spain and that, in Spain, interrelations between Eastern and Western art were not uncommon. Such interrelations may account for some of the unusual features displayed in Cod. Rossi 1033. However, this, like the British Museum manuscript, does not display an iconography of its own; both must be regarded as interesting variations of those manuscripts which follow the A Group tradition. 98

We are now faced with the problem of explaining the existence of two different iconographies in al-Šūfi drawings. The iconographic disparity also has stylistic implications, since the A Group is characterized by that particular mannerism of folds which can be traced back to Marsh 144 but which, according to the hypothesis put forward in these pages, goes back to an older tradition of artistic conventions.

It may be useful, at this point, to recall al-Birūnī's mention of small globes as opposed to the "big and costly globes" whose style we believe to have survived in Marsh 144 as well as in other manuscripts of the same class.

It is not impossible that some of the count- less globes made of cheap material which circulated in the Hellenistic world 99 had come down to Islamic times, and we may certainly assume that the intensive study of the Almagest promoted the construction of wooden globes on which, according to Ptolemy's instructions, greater stress was put on the stars themselves than on the constellation images, on the real thing instead of the fictitious. 100 Such globes were undoubtedly made by the astronomers themselves, while the finer specimens were presumably constructed in collaboration with professional craftsmen. 101 The

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98 Another extremely interesting variation is represented by the Bodleian Manuscript Hunt 212, a few illustrations of which contain certain items derived from the nomenclature of the Arabs.


100 In fact, a wooden globe, but gilt, was constructed by Qaysar, the same one who constructed the globe in Naples, Museo Nationale (1225). Cf. L. A. Mayer, *Islamic astrolabists and their works*, Geneva, 1956.

101 According to Mayer, the astrolabists, some of whom also made globes, were astronomers of some
figures, then, would be drawn on simple lines, rather like diagrams meant to illustrate a scientific text. They would hardly be affected by any implications of style or by artistic imagination, and would, therefore, show only such alterations in iconography as were imposed by the Arabic translations. In fact, the earliest globes which have come down to us, though made of bronze, have a simple, rather crude design. The figures are engraved in outline only, without any indication of clothing, though their attributes, which are essential to their character, are easily recognizable. Their iconography is, as stated before, that found in the B Group of Şūfi manuscripts. Some of the later globes are more sophisticated: it is not impossible that by then the big globes had altogether gone out of fashion and were replaced by those of smaller dimensions.

On the Dresden globe, made at Hulāgu Khan’s court at Marāghah, the figures show considerable realism and their headdresses and garments are clearly defined. But they reflect the fashion of their own day, and are in no way reminiscent of the idealized garments which appear in the A Group of manuscripts. The iconography is that of the B Group manuscripts. As far as I know, the globe in the British Museum, made in Mosul in 1275, is the only one which deviates from this iconography insofar as Virgo has no wings. However, she seems to hold a spike in her hand. Actually, the engraving is somewhat rubbed off at that particular place. Others of the same and of a later period again comply with the B Group manuscripts.

How can we account for the fact that the iconography of the small globes was taken over by some copyists of al-Şūfi’s work while others faithfully followed the tradition which we believe to have been developed by al-Şūfi himself and which, if we follow al-Birūnī, was connected with the tradition of the big globes? Unfortunately, there is no clue which would suggest an authoritative answer. The following possibility may perhaps be suggested: that some early copyist of al-Şūfi’s book, finding the illustrations too elaborate to be followed even by tracing, took refuge in the simpler drawings of some globe which he had in hand. The Istanbul manuscript Fatih 3422 could easily be the outcome of such proceedings.

When once established, this second tradition may have been followed and improved upon by other copyists. It is understandable that a patron like Ulugh Beg might have pre-

103 Made by Mohammed ben Movajid Alardhi; published by A. Drechsler, Der Arabische Himmelsglobus im mathematisch-physikalischen Salon in Dresden, 1873.

104 Dept. of Oriental Antiquities No. 71. 3.1.1. (formerly in the Royal Asiatic Society) made in Mosul by Muhammad b. Hilāl in 1257. Cf. B. Dorn, Mem. Royal Asiatic Society, vol. 21, No. 2 (1829). This is the largest of all surviving globes, with a diameter of 240 mm.

ferred a prototype which would leave complete freedom to the artist in choosing the garb and attire of his figures to another which would impose its own, more rigid, conventions. Also he might have been partial, and others with him, to an iconography which was closer to that of the classical originals than the one which was followed by al-Ṣūfi himself.

Another possibility ought to be considered: it could well be that some astronomers other than al-Ṣūfi had, in their books, followed an iconography differing from his and analogous to that of the small globes; this might, for the reasons mentioned above, have slipped into a copy of his own work.

If we compare the constellation images of the various al-Ṣūfi manuscripts with other miniatures we shall find that only the later manuscripts of the B Group seem to fit entirely into the general framework of contemporary book illustrations.

Taken as an entity, the images, particularly those of the A Group, represent a tradition which is unique in Islamic miniature painting. They are, of course, subject to the same evolutionary process as other works. To quote one example only, there is a marked difference between the drawings in Marsh 144 on the one hand, and those of Arabe 2489 in the Bibliothèque Nationale on the other. Also, certain parallels can be found between the drawings of al-Ṣūfi manuscripts and other miniatures of the same period. More extensive studies might work such developments and analogies into a more coherent pattern.

Yet, within the limitations mentioned above, the constellation pictures will always hold a place of their own. This is not due altogether to their derivation from classical prototypes. Other miniatures were closely connected with Greek book illustrations, as we know. The most interesting feature of the al-Ṣūfi drawings lies not in their resemblance to, but rather in the degree of their independence of, these prototypes. For, surely, their style is far remote from anything which existed either in the Western or in the Byzantine world. Unlike the paintings of Quşayr ‘Amrah, which represent the very first stage of this evolution, they have been completely orientalized.

It is hard to imagine that this process could have taken place as an isolated phenomenon. We are only able to visualize it against an artistic background where other similar achievements were accomplished. If seen in this light, the drawings attain an importance far beyond their artistic and scientific merit; for they help to throw some light on the beginnings of Islamic book illustration, which up to now have been almost completely obscure.


FIG. 40—Silver Vessel.
Hermitage Museum, Leningrad; Pope, Survey, plate 219 (cf. note 82).

FIG. 42—Silver Plate.
Hermitage Museum, Leningrad; Pope, Survey, plate 220 (cf. note 86).

FIG. 41—Hunting Plate.
Metropolitan Museum, New York; Pope, Survey, plate 213 (cf. note 83).
Fig. 43—Virgo.
Istanbul, Ahmet III Libr., Ms. 3493 (24.5 : 15.8 cm.).

Fig. 45—Orion.

Fig. 44—Cassiopea.
Istanbul, Ahmet III Libr., Ms. 3493 (24.5 : 15.8 cm.).

Fig. 46—Heracles.
Istanbul, Haya Sofya Libr., Ms. 2595 (31 : 20 cm.).
Fig. 47—CASSIOPEA A.

Fig. 48—AURIGA.

Istanbul, Haya Sofya Libr., Ms. 2595 (31 : 20 cm.).
**Fig. 49—Andromeda.**

**Fig. 50—Pegasus.**

**Fig. 51—Cassiopea B.**

Istanbul, Haya Sofya Libr., Ms. 2595 (31 : 20 cm.).
FIG. 52—HERACLES.

FIG. 53—VIRGO.

FIG. 54—AURIGA.

Fig. 55—Andromeda.

Fig. 56—Centaurus.
Fig. 57—Serpentarius.

Fig. 58—Virgo.

Fig. 59—Cygnus.

Fig. 60—Pegasus.

Paris, Bibl. de l'Arsenal, Ms. 1036.
FIG. 61—ANDROMEDA.

FIG. 62—CASSIOPEA.

Istanbul, Top Kapi Seray Libr., Ms. Fatih 3422 (29.7 : 20.6 cm.).

FIG. 63—VIRGO.

FIG. 64—VIRGO.

Istanbul, Top Kapi Seray Libr., Ms. Fatih 3422 (29.7 : 20.6 cm.).

Istanbul, Hayy Sofya Libr., Ms. 2595.
Fig. 65—Centaurus.
Istanbul, Haya Sofya Libr., Ms. 2595.

Fig. 66—Centaurus.
Istanbul, Top Kapi Seray Libr., Ms. Fatih 3422.

Fig. 67—Cassiopea.

Fig. 68—Cassiopea.
Fig. 69—Virgo.

Fig. 70—Andromeda.

Fig. 71—Hydra with Corvus and Crater.
FIG. 72—CASSIOPEA.
Istanbul, Pertev Paça Libr. 375.

FIG. 73—AURIGA.
Rome, Vatican Libr., Rossi 1033 (22.5 : 18.5 cm.).

FIG. 74—VIRGO.
Istanbul, Pertev Paça Libr. 375.

FIG. 75—ANDROMEDA.
London, British Museum, Ar. 5323 (27.5 : 15.4 cm.).

FIG. 76—VIRGO.
Rome, Vatican Libr., Rossi 1033 (22.5 : 18.5 cm.).