

A Medieval Reference to the Andromeda Nebula

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Nebulous objects among the fixed stars, in the southern as well as in the northern hemisphere, have been observed and registered since antiquity. They are mentioned in both parts of the ancient knowledge of the sky, the theoretical (that is what we nowadays would call "astronomy"), and the applied, or practical (that is what we nowadays call "astrology").

The great master of astronomy in late antiquity, Claudius Ptolemaeus of Alexandria (2nd century A. D.), whose teachings remained authoritative through the Middle Ages and down to the times of Copernicus, has registered in his star catalogue (in books vii–viii of his *Mathematiké Syntaxis*, called the *Almagest* in Europe since the Middle Ages) five stars as "nebulous" (*nepheleoidés*): the 1st star of Perseus (χ Per, M 34 = NGC 1039); the 1st star of Cancer (Praesepe, M 44 = NGC 2632, with ϵ Cnc at its centre); the 1st external star of Scorpius (most probably M 7 = NGC 6475); the 8th star of Sagittarius ($\nu^{1,2}$ Sgr, a pair of stars standing close together); and the 1st star of Orion (λ Ori, perhaps including the neighbouring

star φ^1 Ori, or the two stars $\varphi^{1,2}$ Ori). In addition, he also calls the 17th star of Cygnus ($\omega^{1,2}$ Cyg, again a pair of stars) "nebulous", but without including it in the number of the five "nebulous" stars proper. Further, under the 6th external star of Leo, he mentions the "nebulous complex" between the hind parts of Ursa Maior and Leo which refers to the region of Coma Berenices, but without entering an object from this complex into the star catalogue. These data were repeated by all the astronomers down to Copernicus' time, both in the Islamic Orient (where the *Almagest* had been translated into Arabic, and revised, several times) and in medieval Europe (where the *Almagest* was generally used in a Latin translation made from the Arabic, in Spain, in the 12th century).¹

It is remarkable that some of the most conspicuous nebulae were not registered, or called "nebulous", by Ptolemy, such as the Andromeda Nebula, or the globular cluster ω Cen (here, Ptolemy has registered the object as the 21st star of Centaurus, with magnitude 5, not mentioning its character as "nebulous").

Also in the astrological tradition a

number of nebulous objects played a role. They were named for causing diseases of the eyes, or blindness. This tradition, again, originated with Ptolemy, in his astrological handbook *Tetrabiblos*, book iii, chapter 12 (the *Tetrabiblos* was also translated into Arabic, and later, in Spain, into Latin). Here, six objects among the zodiacal constellations are listed: the Pleiades in Taurus; M 44 in Cancer; the region of Coma Berenices, near Leo; M7 in Scorpius; the arrow point of Sagittarius (perhaps $\nu^{1,2}$ Sgr, mentioned above, but here placed on the arrow while in the *Almagest* it was located on the eye of Sagittarius); and the pitcher of Aquarius (not mentioned in the *Almagest*).² Apart from successive authors of late antiquity, this tradition was also set forth in the Islamic Orient, e.g. by Abu Ma'shar in his *Introduitorium Maius*, book vi, chapter 20, and by al-Biruni in his *Kitab al-tafhim* (Elements of Astrology), § 460.³

The most famous author in the Islamic Orient on the fixed stars was Abu I-Husain al-Sufi (A.D. 903–986). He composed a *Book on the Constellations of the Fixed Stars* (ca. A. D. 964) in which



Figure 1: Drawing of the constellation of Andromeda with the big Arabic Fish over the upper part of her body; from a manuscript of al-Sufi's Book on the Constellations of the Fixed Stars. On the mouth of the big Fish, several dots mark the "nebulous spot", i.e. the Andromeda Nebula.



Figure 2: The same drawing, from a manuscript of the Sufi Latinus tradition. The dots marking the "nebulous spot" are visible to the right of the big Fish's mouth.

he described in detail the classical 48 constellations that had been established by Ptolemy in the *Almagest*.⁴ For each constellation he gave a detailed discussion of the individual stars; a list of indigenous Arabic star names of objects falling under the Greek constellation, together with a precise identification of each object with the respective Ptolemaic stars; two drawings of the constellation, one as seen in the sky, and one as seen on the celestial globe (where the left and right sides, and East-West, are always reversed); and a catalogue of the stars belonging to that constellation. Here, under the constellation of Andromeda, in the description of the indigenous Arabic names, he occasionally mentions the Andromeda Nebula. In describing the figure of a big Arabic "Fish" lying across the figure of Ptolemy's Andromeda,⁵ he says that this "Fish" is made up by two lines of stars beginning from the "nebulous spot" (*latkha sahabyiya*) which is close to the 14th star of the constellation (ν And, on the right side of the figure, being one of the three stars $\beta\mu\nu$ And on the girdle, or loin cloth, of Andromeda).⁶

This is an occasional reference, in al-Sufi's book, to the Andromeda Nebula. The author does not give more details about this object which did not form part of the material transmitted in Ptolemy's star catalogue; but it is evident that al-Sufi had observed the Nebula, and he used it, in context, as a point of reference in the description of the position of an old indigenous Arabic asterism.

The drawing of Andromeda with the big Fish, added to the description of the constellation, carefully indicates the "nebulous spot" mentioned in al-Sufi's descriptive text: it is marked by some dots on the mouth of the big Fish (see Fig. 1). In other manuscripts, in addition, the word *sahabi* ("nebulous") is written beside the dots on the Fish's mouth.

In the 13th century, there originated, perhaps in Sicily, a Western branch of the Sufi tradition, the so-called *Sufi Latinus corpus*, of which eight manuscripts have been found until now.⁴ It consisted, basically, of Ptolemy's star catalogue in the Latin version made in Spain, in the 12th century, by Gerard of Cremona (from the Arabic); but in the star coordinates the longitudes were converted to al-Sufi's value (= Ptolemy + 12°42'); further, to each constellation a drawing was added (i.e., one of the two drawings in al-Sufi's original work); and in some of the manuscripts in the title the author's name was mentioned as *Ebennesophi* (from the corrupted Arabic Ibn al-Sufi, instead of the correct form al-Sufi). Most of the eight Latin manuscripts have meticulously repeated the dots designating the "nebulous

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spot" (i.e., the Andromeda Nebula), in front of the big Fish's mouth, in the drawing of Andromeda with the big Fish (for a specimen, see Fig. 2).

It is interesting to see how carefully the Western copyists and draughtsmen have reproduced those dots beside the figure of Andromeda although they could not understand what they meant because al-Sufi's descriptive text itself had not been translated into Latin.

References

1. For the *Almagest*, see P. Kunitzsch, *Der Almagest. Die Syntaxis Mathematica des Claudius Ptolemäus in arabisch-lateinischer Überlieferung* (Wiesbaden, 1974); Claudius Ptolemäus, *Der Sternkatalog des Almagest. Die arabisch-mittelalterliche Tradition*, i: *Die arabischen Übersetzungen*, Herausgeg., ins Deutsche übertragen u. bearb. v. P. Kunitzsch (Wiesbaden, 1986). A recent

English translation (from the original Greek) is: *Ptolemy's Almagest*, Translated and Annotated by G.J. Toomer (London, 1984).

2. Ptolemy, *Tetrabiblos*, ed. and transl. F.E. Robbins (The Loeb Classical Library, repr. Cambridge, Mass./London, 1971), p. 320-321.
3. See P. Kunitzsch, *apud* W. Hübner, *Die Eigenschaften der Tierkreiszeichen in der Antike* (Sudhoffs Archiv, Beiheft 22; Wiesbaden, 1982), p. 358f.
4. P. Kunitzsch, article "al-Sufi", in: *Dictionary of Scientific Biography*, vol. xiii (New York, 1976); *idem*, "The astronomer Abu I-Husayn al-Sufi and his Book on the Constellations", *Zeitschr. f. Geschichte d. Arab.-Islam. Wissenschaften* 3 (1986), 56-81.
5. See P. Kunitzsch, *Untersuchungen zur Sternnomenklatur der Araber* (Wiesbaden, 1961), no. 126a.
6. H.C.F.C. Schjellerup, *Description des étoiles fixes... par Abd-al-Rahman al-Sûfi* (St.-Petersbourg, 1874; repr. Frankfurt/M., 1986), p. 118-119.

ALGUNOS RESUMENES

Bengt Strömgren (1908-1987)

Bengt Strömgren, ex presidente del Consejo de ESO (1975-1977) falleció el 4 de julio luego de una corta enfermedad. Su presidencia ocurrió en un momento particularmente difícil en la historia de la ESO. Gracias a su sabiduría y la manera confiada y decisiva como manejó los asuntos de ESO, se pudieron evitar muchos riesgos y se pudo establecer un alto grado de armonía entre las delegaciones de los estados miembros, que aun perdura.

Bengt Strömgren fue un destacado científico. En el año 1922, a la edad de 14, publicó sus primeros resultados sobre el cometa Baade 1922c en "Astronomische Nachrichten" (217, p. 345). Uno de sus últimos pre-

prints apareció tan solo pocos días antes de su deceso. Bengt, hijo de Elis Strömgren, Director del Observatorio de Copenhagen, obtuvo su doctorado en 1929, fue profesor de astronomía en 1938 y director en 1940. Entre los años 1951-57 fue director del Observatorio Yerkes de la Universidad de Chicago. Durante los siguientes diez años fue miembro de la Facultad del Instituto de Estudios Avanzados en Princeton. En 1967 regresó a Copenhagen para ocupar la "Casa de Honor", ser profesor de astrofísica y durante varios años director de NORDITA, el instituto de investigación común de los cinco países nórdicos. Entre los años 1970 hasta 1973 fue presidente de la Unión Astronómica Interna-