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the bone of contention being whether there are pure atoms that lack attributes entirely. The same author reports that some of his predecessors held atoms to be indivisible bodies, whereas others claimed that only composite substances, or conjunctions of atoms, are spatially extended and therefore legitimately called bodies. Divergence also prevailed about the minimal number of atoms required to constitute a composite substance.

**Other Concepts of Substance.** Let us conclude with two examples of yet further alternative concepts of substance. In the alchemical corpus of Jābir ibn Ḥayyān, the concept of substance is identical to that of the ultimate substrate or subject of everything. Consequently, there is only one substance, which Jābir then identifies with prime matter. Jābirian materialism aside, Ibn al-‘Arabī (d. 1240) seems to be guided by the same intuition when he says that “the Breath of the Merciful” (*nafas al-Rahmān*) is the underlying basis of the existence of all created things and should therefore be called the ultimate substance of all there is. By the same token, all concrete things are accidents whose existence relies on this substantial basis.

As these two examples corroborate, al-Ghazālī was right in his observation that philosophers, Ṣūfīs, and *mutakallimūn* all mean different things when they speak of substance and accident. But despite these genuine differences as to what is the basis and primary sense of existence, the concept of substance figures in one and the same function in all its applications.

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JARI KAUKUA

**ṢŪFĪ, ‘ABD AL-RAḤMĀN, AL-** (903–986). Persian astronomer and mathematician. Al-Ṣūfī wrote on alchemy, astrology, and mathematics but he is best known for his astronomical works.

His most important work is the *Kitāb Ṣuwar al-kawākib al-thābitah* (Book on the Constellations of the Fixed Stars), completed in Shīrāz around 964. The work was dedicated to the Būyid ruler Abū Shujā’ Fannā Khusraw, entitled ‘Aḍūd al-Dawlah (936–983), a friend and a pupil of al-Ṣūfī whose court was seated at Shīrāz (until 977/978) and Baghdad. Originally written in Arabic, it was later translated into Persian and also into Latin



and Castilian. Al-Şūfī also compiled a comprehensive work in 1,760 chapters on the astrolabe and its use, of which only a shorter version in 170 chapters is known.

His star atlas presented an expanded and illustrated Arabic edition of the famous star catalog of the Hellenistic astronomer Claudius Ptolemy (second century CE), listing 1,025 individual stars organized in 48 constellations. Al-Şūfī's work closely follows Ptolemy's descriptions of the constellations for which he largely depended on Işhāq ibn Ḥunayn's translation (c. 890) of the *Almagest*. The stellar coordinates, as given in the *Almagest* (Books 7 and 8) for the epoch 885 Nabonassar [= 20 July 137], were corrected for the effect of precession to the epoch 1276 Alexander [= 1 October 964] by adding  $12^{\circ} 42'$  to the ecliptic longitudes. Although Ptolemy's stellar positions were otherwise left unchanged, al-Şūfī systematically reobserved the brightness (magnitude) of each star and changed the reported value when he found it to be different. In total al-Şūfī listed 1,017 stars, omitting 8 stars (the 14th star of Auriga, the 11th star of Lupus, and the 6 "unformed" stars of *Piscis Austrinus*) from Ptolemy's catalog, which he could no longer find at their stated positions.

A novel feature of al-Şūfī's edition was the addition of carefully drawn images of the constellation figures, each depicted in two ways: as seen by a terrestrial observer and as seen on a celestial globe. In essence, al-Şūfī's work can be viewed as the first true star atlas. The constellation illustrations are of great importance to art historians for studying the portrayal of human figures and animals in various Islamic periods.

Furthermore, al-Şūfī also added notes on how the Ptolemaic (i.e., Greek) constellations were described in early Islamic sources, which were often based on completely different celestial figures. Drawing from sources that often no longer exist, al-Şūfī's work is thus also an important source for pre- and early Islamic star lore.

Notably, al-Şūfī occasionally records several stellar objects that are not found in the Ptolemaic star catalog, such as a nebulous star above the 14th star of Andromeda (the Great Spiral Nebula in Andromeda [= M 31]), a small luminous cloud in Aquila (Collinder 399 [also known as Brocchi's Cluster or "The Coat Hanger"] in Vulpecula), a nebulous star above the 37th star of Argo Navis (the Omicron Velorum Cluster [= IC 2391]) and possibly also the Large Magellanic Cloud, below the "feet" of Suhayl (Canopus).

Al-Şūfī's star atlas enjoyed great popularity among Muslim readers and more than eighty manuscript copies, dating from the early eleventh century (Bodleian Library, Oxford, ms. Marsh 144) to the nineteenth century, can still be found in libraries and private collections scattered across the globe.

His work was the basis of the star catalog (epoch 1437) in the *Zīj-i jadīd-i Sulṭānī* of the Timurid ruler Uluğ Bey (1393/94–1449), who used the Persian translation made around 1250 in Marāgheh by Naşīr al-Dīn al-Ṭūsī (1201–1273), court astronomer of Hülegü Khan (c. 1217–1265).

His star atlas was also known to medieval European astronomers who copied many of his Arabic star names in their publications and star lists. First translated into Latin in the thirteenth century, probably in Sicily, copies of this work (commonly referred to as "Şūfī Latinus") only contain the star catalog (in some later copies with longitudes updated to the epoch 1428) and pictures of the constellations but omitting his commentary. A Castilian version was incorporated in the *Libros del saber de astrología* of Alfonso X of Castile (r. 1252–1284).

Material from al-Şūfī's atlas, apparently from an original Arabic version, was used by Petrus Apianus (1501–1552) in his star charts. His stellar nomenclature was also adopted on the 13.5-inch (34-cm) celestial globe published after the mid-1640s in



Amsterdam by Jacob Aertsz Colom (1599–1673), in collaboration with the Leiden oriental scholar and astronomer Jacob Golius (1596–1667). The lunar crater Azophi and the minor planet 12621 Alsufi are named in his honor.

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R. H. VAN GENT

**SUFISM, DOCTRINAL AND PHILOSOPHICAL (‘IRFĀN)** The word ‘*irfān* refers to knowledge based on a direct awareness and intuition of the Truth and acquired through a process of inspiration and illumination. This process validates the use of ordinary means of knowledge, including sense perception, reason, and logical comprehension, but questions the authority and sufficiency of such means in the metaphysical realm, especially with regard to the knowledge of God.

‘*Irfān* is a noun derived from the verb ‘*arafa* (to know). Both ‘*irfān* and *ma‘rifah*, its counterpart noun from the same root, mean knowledge. There is, however, another word for knowledge

in Arabic, namely ‘*ilm*. When one translates *ma‘rifah/‘irfān* or ‘*ilm* into English, one faces certain difficulties. Unlike French, German, Turkish, or Arabic, English does not distinguish between *connaître-savoir*, *kennen-wissen*, *tanımak-bilmek*, or ‘*arafa-‘alima*. *Ma‘rifah/‘irfān* have traditionally been associated with specific spiritual knowledge, whereas ‘*ilm* has been connected to more general religious knowledge as well as the philosophical tradition. These two separate concepts, with their divergent affiliations and connotations, are both reduced to “knowledge” in English. For such terminological issues, throughout this article, I use the word “gnosis” for *ma‘rifah/‘irfān*—but not in the sense that the term is used in Christian and more general gnosticism—and “knowledge” for ‘*ilm*.

**The Lexicography of “Knowledge.”** According to al-Rāghib al-Işfahānī (d. 1108 CE), the verb ‘*arafa* in Qur’ānic usage means perceiving (*idrāk*) a thing through reflection (*tafakkur*) and consideration (*tadabbur*) of its effect. *Ma‘rifah* and ‘*irfān* have a more special meaning than ‘*ilm*. The verbs ‘*arafa* and ‘*alima* (to know) have different implications in Arabic, depending upon whether they are used for man or God. Thus Arabs say, “*fulānun ya‘rifu Allāha wa-rasūlahu*” (so-and-so knows God and His Messenger), but not “*ya‘lamu Allāha*” (he knows God). In the latter case, the verb *ya‘lam* would have a single objective complement. What al-Işfahānī seems to mean by this is that, in this context, the former example implies an indirect relationship and the latter implies something more direct. He argues that the use of ‘*arafa* is more appropriate, because man’s knowledge (*ma‘rifah*) of God is arrived at indirectly, through the consideration of His effects (*āthār*), rather than directly, through the perception of His essence (*dhāt*). As far as God is concerned, on the other hand, Arabs say, “*Allāha ya‘lamu kadhā*” (God knows such and such) but not “*ya‘rifu kadhā*,” because *ma‘rifah* is used in