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18 Arabic into Latin: the reception of Arabic philosophy into Western Europe

In the history of Western philosophy the role played by texts written in Arabic is crucial. This can be seen from the sheer volume of works that were translated (see the table that follows this chapter). We have hints of Arabic-speaking teachers of philosophy. Adelard of Bath (fl. 1116–50) speaks of his *studia Arabica/Arabum studia* (in reference to natural philosophy) and *magistri*,[1] which he probably encountered in southern Italy and Sicily. Stephen of Pisa (fl. 1127), who wrote on cosmology in Antioch, expresses his debt to "a certain Arab."[2] Kamāl al-Dīn ibn Yūnus of Mosul (d. 1242), the greatest Muslim teacher of his time, in turn, boasted of Christians among his pupils; one of Ibn Yūnus' pupils, Sirāj al-Dīn Urmawī, became a member of Frederick II Hohenstaufen's household and wrote a book on logic for him.[3] Andrea Alpago (d. before 1546) acquired knowledge of Avicenna's psychology from the Shī'ite scholar Muḥammad ibn Makkī Shams al-Dīn al-Dimashqī (d. 1531) in Damascus.[4] But it is through the surviving Arabic texts and their translations that we can best gauge the extent of the impact of Arabic philosophy. The works translated reflect the various genres current in Arabic.

(1) Arabic translations of Greek philosophical works, of which the great majority are those of Aristotle or commentaries on them. The *Republic* of Plato, though translated into Arabic, was not subsequently translated into Latin. Certain opinions of philosophers other than Aristotle survive in doxographies: see (5) below.
(2) The summary or *questio*: e.g., among al-Kindī's *rasā'il* ("letters" or "treatises"), *On Sleep* deals with questions arising from Aristotle's *De Somno et Vigiliis*; his *On the Five*

Essences, those from the *Physics*; and his *On Moistures and Rain* (part of the Latin *De Mutatione Temporum*), those from the *Meteora*. Al-Kindī's model was the *questiones* of Alexander of Aphrodisias (2nd cent. C.E.), three of which were also translated from Arabic into Latin. Also to be mentioned in this context is the Pseudo-Avicennian *Book on the Heavens and the World* which brings together sixteen questions arising from Aristotle's *De Caelo*.[5]

(3) The systematic treatise on *falsafa* (Peripatetic philosophy). The most important text of this kind is Avicenna's *al-Shifā'* (*The Healing*, namely from ignorance). The title was wrongly (but aptly) translated into Latin as *Sufficientia*, as if Avicenna's single comprehensive work was a sufficient replacement for the several books of Aristotle.[6] Al-Ghazālī's *Aims of the Philosophers* provided a compendious and easily digestible summary of Avicenna's philosophy.

(4) The commentary. The Arabic tradition of commentaries on Aristotle, deriving from that of the Greek, develops from al-Fārābī, through Ibn Bājja (Avempace) to Averroes. Ibn Bājja was known in the medieval West only through the works of Averroes.

(5) The doxography. The Greek model for the arrangement of opinions of diverse philosophers under topics was a text by Aëtios of Rhodes, translated by Qusṭā ibn Lūqā in the ninth century. This was followed by a number of Arabic works, among which Ḥunayn ibn Isḥāq, *Ādāb al-falāsifa* (*Witty Sayings of the Philosophers*) was translated into Castilian. A faint echo of a Greek doxography survives in the alchemical *Turba Philosophorum* (whose Arabic text is lost), which preserves some opinions of Presocratic philosophers among a welter of spurious attributions.

These Arabic works became known in the West from the late eleventh century onward. The beginnings can be discerned amongst the interest in medicine and natural philosophy among scholars in southern Italy, where a medical school in Salerno had long been established, and where Alfanus, archbishop of Salerno (d. 1085), translated from Greek Nemesius' *On the Nature of Man*, under the title *The Trunk of Physics* (*Premnon Physicon*). It was at Salerno that

Constantine the African arrived from Tunisia with a collection of books in Arabic whose contents he went on to translate in the ideal academic environment of the abbey of Montecassino, the mother house of the Benedictine Order. The Arabic texts were products of the thriving school of medicine in Qayrawān, represented especially by the work of Isaac Israeli and his pupil Ibn al-Jazzār. Constantine or his colleagues also translated texts belonging to the realm of physics: Isaac Israeli's text *On the Elements*, the chapter on the elements from the Arabic version of Nemesius' *On the Nature of Man*, a short text on mineralogy, and Qusṭā ibn Lūqā's *On Physical Ligatures*.[7] Moreover, the medical translations, especially that of the *Royal Book* of 'Alī ibn al-'Abbās al-Majūsī (a work known in Latin as the *Pantegni*), were used by scholars of the first half of the twelfth century, such as William of Conches and Bernardus Silvestris, as sources for their own philosophy of nature.[8] It was perhaps in this environment that Adelard of Bath picked up the Arabic learning that he purports to provide in his *Questions on Natural Science*, though specific Arabic texts from which he could have drawn this learning have not been identified.

ARABIC *FALSAFA* AS THE CONDUIT OF ARISTOTELIAN PHILOSOPHY

The burgeoning interest in natural philosophy in the early twelfth century presages the establishment of a completely new field of learning in the Latin Middle Ages, which was to supplement the traditional education in the seven liberal arts, divided into the arts of speaking (grammar, logic, and rhetoric) and the mathematical arts (arithmetic, geometry, music, and astronomy). It led to the recovery of Aristotle's works on natural philosophy (*libri naturales*), from both Greek and Arabic sources. Most of the Greek texts evidently came from Constantinople, where the principal translators, James of Venice and Burgundio of Pisa (d. 1193) could be found together in 1136 involved in the negotiations between the Eastern and Western Churches, though *Magna Graecia* (southern Italy and Sicily) and Antioch were also places where Greek manuscripts and scholars could be found. The majority of the *libri naturales* were translated from Greek in the twelfth century, but the presence of two translations of the same work, and the omissions of parts of the corpus,

suggest that the process was rather haphazard.[9] In the case of translations from Arabic, on the other hand, a more systematic program can be discerned, and this was centered in Toledo.

There are several reasons for the preeminence of Toledo as the main place for translation from Arabic into Latin from the mid-twelfth century onward. As the metropolitan city of the Iberian peninsula it was the cultural capital, and the home of well-educated Latin clergy from outside the peninsula. The predominant language of the inhabitants, however, was Arabic, and libraries of Arabic manuscripts could be found in the city. Moreover, Toledo was the closest place of refuge for Jewish scholars escaping from the intolerant regime of the Almohads who had taken over Islamic Spain in 1147. Also, perhaps not without significance is that the last of the line of the kings of Saragossa, Ja'far Aḥmad III Sayf al-Dawla, was given a residence in Toledo in 1140 and was treated as an honorable resident of the city. His library had been accessible to Michael, bishop of Tarazona, the patron of the translator Hugo of Santalla, before Ja'far moved to Toledo. We know only of texts on mathematics, the science of the stars, and divination that are likely to have come from his library, but it is worth noting that Ibn Gabirol (or Avicebron, d. 1058 or 1070) and Ibn Bājja (d. 1139) had resided in the kingdom of Saragossa, and their books may have enriched the royal library.

The translation of Arabic philosophical works in Toledo follows a double trajectory, which can be associated respectively with the near contemporary scholars, Gerard of Cremona (1114–87), a canon of the cathedral, and Dominicus Gundisalvi (fl. 1162–90), an archdeacon of Segovia resident at the cathedral. The path followed by Gundisalvi is the subject of the next section of this chapter. A list of the translations made by Gerard was drawn up by his pupils (*socii*) after his death.[10] It is arranged according to subject matter, starting with his contribution to the traditional seven liberal arts (logic, geometry, and astronomy are represented); then turning to the new arts of *philosophia* and medicine. Whereas in earlier Latin works, *philosophia* was the subject of the seven liberal arts, here it is equivalent to Arabic *falsafa* and is applied to natural philosophy, and metaphysics.

Gerard would have known the program of *falsafa* from al-Fārābī's *On the Classification of the Sciences*, which he translated. For here,

each of the main divisions of learning are described, from grammar and logic, through mathematics, natural philosophy, and metaphysics, to politics, jurisprudence, and theology. Moreover, the relevant books by Aristotle are mentioned. Evidently as a preparation for the study of natural philosophy, Gerard translated the *Posterior Analytics* under the title *The Book of Demonstration* (the work's descriptive title, commonly used in the Arabic tradition); for in it is explained how a philosophical argument should be conducted. Judging from the order of the works in the list of the *socii*, metaphysics – the investigation of the ultimate causes of things – was regarded as preceding physics.[11] Gerard chose to translate not the *Metaphysics* of Aristotle (mentioned by al-Fārābī), but rather an Arabic text based on the *Elements of Theology* of Proclus, whose title is literally translated as "the exposition of pure goodness," but which became known in the West more commonly simply as *On Causes* (*De Causis*).[12]

In natural philosophy itself Gerard appears to have followed al-Fārābī's template faithfully. For al-Fārābī divides the faculty into eight parts or "inquiries" (*fuḥūṣ*), and translations of the texts relevant to the first three of these are listed in the same order by the *socii*: the *Physics*, the *De Caelo*, and the *De Generatione et Corruptione*. There then follows *On the Causes of the Properties of the Four Elements*, a Pseudo-Aristotelian work on the different parts of the earth and their elemental constituents, that naturally falls between the *De Generatione et Corruptione*, and the text mentioned in the fourth "inquiry" of al-Fārābī: the first three books of the *Meteora*. These three books were translated by Gerard, and this, apparently, is as far as he got. But his enterprise was continued by his successors. For Alfred of Shareshill, deliberately evoking the authority of al-Fārābī, added the fourth book of the *Meteora* (the subject of al-Fārābī's fifth inquiry), in the Greek–Latin translation of Henricus Aristippus, and translated two chapters of Avicenna's *Shifā'* to supply the topic of al-Fārābī's sixth inquiry: namely, minerals.[13] Alfred went on to translate Nicholas of Damascus' *De Plantis*, which was attributed to Aristotle and corresponded to al-Fārābī's seventh inquiry, and, finally, Michael Scot completed (before 1220) the series in natural philosophy by translating the Arabic collection of Aristotle's nineteen books on animals (al-Fārābī's eighth inquiry).[14]

The main advantage of the Arabic Aristotle over the Greek was that it was part of a lively tradition of commentary and teaching up

to the time of the translators themselves. Hence Gerard was able to translate along with Aristotle's texts those of his commentators, both the Greeks, Alexander of Aphrodisias and Themistius, and their Arabic successors, al-Kindī and al-Fārābī. It is likely that the seeds of writing Latin commentaries were also sown in Toledo (the evidence of glossed translations of works on medicine and the science of the stars from the city suggests this), but the first extant examples are the glosses of Alfred of Shareshill to the *Meteora, On Stones and Minerals* and *On Plants*.[15] These were soon supplemented by translations of the commentaries of Averroes (who had been writing in Córdoba at the same time as Gerard was active in Toledo), in which the lead seems to have been taken by Michael Scot in the early thirteenth century. The Long Commentaries of Averroes included the entire commented text as *lemmata*. Thus the *lemmata* provided new translations of Aristotle's *Physics*, *De Caelo*, *De Anima*, and *Metaphysics* in the early thirteenth century, and scholastic philosophers could compare alternative interpretations to the Greek–Latin translations of the same works.[16] Finally, now that the translation of the works of physics and metaphysics had been completed, attention was turned to other areas of the Aristotelian corpus: the *Rhetoric*, the *Poetics*, and the *Ethics*. To this task Hermann the German, working in Toledo, applied himself between 1240 and 1256, translating a summary of the *Nicomachean Ethics* (the *Summa Alexandrinorum*), the *Rhetoric* (together with excerpts from Arabic commentators), and Averroes' Middle Commentary on the *Poetics*, which substituted for Aristotle's own work on the subject.

Arabic texts, therefore, contributed massively to the building up of a coherent curriculum of Aristotelian philosophy, represented by the numerous manuscripts of the *Corpus Vetustius* and *Corpus Recentius*, which was to remain at the center of university training for many centuries to come. The fact that they were *Arabic*, and issued from Muslim lands, did not cause a problem. They were simply the best texts available, and Averroes provided the most dependable and comprehensive commentaries on Aristotle's works. If there were errors, they were errors of philosophers in general, and not of Arabic philosophers in distinction to Latin philosophers. For scholastic philosophers Latin was the sole medium of their scholarship, and different translations of the same text were welcomed as providing different ways of getting to the "truth" of Aristotle.[17] The translators,

from Gerard of Cremona, through Alfred of Shareshill, to Michael Scot and Hermann the German, had filled in the gaps in knowledge among the Latins and, through their translation and interpretation, had recovered the ancient and perennial wisdom.

But from our perspective we can see that the Arabic origins of this restitution of Aristotle had a decisive effect on the *nature* of the medieval curriculum in philosophy. Greek manuscripts provided the raw texts of Aristotle's works. But the Arabic tradition supplied not the "pure" Aristotle of the fourth century B.C.E., but rather, as Cristina D'Ancona has shown in this volume, the late Neoplatonic curriculum, in which Aristotle's metaphysics was crowned with a rational theology issuing from the Platonic tradition. Hence the *De Causis* could naturally be incorporated into a corpus of Aristotle's works. These Neoplatonic elements can be seen even more clearly in other texts of Arabic philosophy which were never integrated into the Aristotelian corpus.

ARABIC TRADITIONS INDEPENDENT OF THE ARISTOTELIAN CORPUS

The second trajectory stemming from Toledo follows a parallel course to the first. Its beginnings might be seen in the translation of a short treatise "on the difference between the spirit and the soul" by Qusṭā ibn Lūqā, made by John of Seville for Raymond, archbishop of Toledo (1125–52). Here a medical account of the corporeal spirit is juxtaposed with a commentary on the definitions of the soul by Plato and Aristotle respectively. Noteworthy is the fact that Aristotle is not privileged, but given as an authority in the company of Plato (whose *Phaedo* and *Timaeus* are mentioned), Theophrastus, Empedocles, and Galen. The choice of text may have been made because of the relevance of psychology to theology, in which the nature of the individual human soul was much discussed. But Qusṭā's work was not only picked up immediately in the work of scholars operating in Spain, from Petrus Alfonsi, through Hermann of Carinthia, to Gundisalvi; it also set in motion the translation of a whole series of texts on the soul and the human intellect. First, Avicenna's *On the Soul*, and texts on the intellect by Alexander of Aphrodisias, al-Kindī, and al-Fārābī, all apparently translated in the circle of Gundisalvi; then two texts on the conjunction of the intellect within man with

the active intellect by Averroes and one by his son, Abū Muḥammad 'Abdallāh, translated in the early thirteenth century; and finally the Long Commentary on Aristotle's *De Anima* by Averroes. The intellect was a subject which Aristotle was thought to have failed to discuss,[18] and the controversy aroused in the West by Averroes' supposed opinion that the potential and the active intellect are both single entities outside man is well known.[19]

Avicenna's *On the Soul* is part of his *Kitāb al-shifā'*, which provided an up-to-date and easily accessible account of logic, mathematics, physics, and metaphysics. It took into account the opinions of the doctors of medicine (Avicenna, after all, had also written the medical encyclopedia, the *Canon of Medicine*). As well as describing the function of each of the five "outer senses" of sight, hearing, smell, taste, and touch, Avicenna also set up a system of five "inner senses," common sense, imagination, the cogitative faculty, estimation, and memory; these held different positions within the brain. This orderly arrangement of faculties, in which physiology and psychology were brought together, had no equivalent in Aristotle, but owed more to Galen, and was to have a great appeal among Western scholars.[20]

Another item that achieved prominence was metaphysics, or the concern with the first causes of things. The direct knowledge of Aristotle's *Metaphysics* in the Latin scholarship in the twelfth century is meager. The first translation was probably made in the middle of the twelfth century by James of Venice, possibly in Constantinople. But only the first four books of James of Venice's translation survive (in two twelfth-century manuscripts and some later ones).[21] Only in the thirteenth century is there evidence of a proliferation of versions and copies of the *Metaphysics*, with the appearance of the lemmatized text translated with Averroes' Long Commentary, the *Translatio Composita* (or *Metaphysica Vetus*), and finally the version of William of Moerbeke.

Latin scholars had always known of the existence of Aristotle's work. This was largely through Boethius, who, at various points in his two commentaries on Aristotle's *De Interpretatione* and his commentary on the *Categories*, refers to "further discussion" in *libri quos* [*Aristoteles*] *meta ta phisica inscripsit*. Already in manuscripts of Boethius' works the three Greek words *meta ta physica* were combined into one *metaphisica*, and twelfth-century scholars, such

as Abelard and the author of the *Liber Sex Principiorum*, quoting Boethius, refer simply to the *Metaphysica*.[22] But Latin philosophers of the twelfth century drew their metaphysics from other sources.

It has already been mentioned that, for this subject, Gerard of Cremona translated an Arabic text based on the *Elements of Theology* of Proclus, namely, the *De Causis*. This work was copied and diffused more quickly than any other translation by Gerard,[23] and survives in numerous manuscripts (ca. 250). The popularity of the *De Causis* represents a general interest in metaphysics which dates at least from the early years of the twelfth century, when Adelard of Bath promises to discuss "*nous* [intellect], *hule* [matter], the simple forms and pure elements" and "the beginning or beginnings (of things)."[24] In the last phrase Adelard is probably deliberately recalling the words of Plato's *Timaeus*, the principal text on natural philosophy before the rediscovery of Aristotle's *Libri Naturales*, in which the fictional "Timaeus" refuses to talk "de universitatis vel initio vel initiis" (Plato, *Timaeus*, 48C). But, whether or not Adelard fulfilled his promise (we have no evidence that he did), other scholars did rise to the challenge.

Honorius Augustodunensis (first half of the twelfth century) revived the ninth-century Neoplatonic metaphysics of Scotus Eriugena by paraphrasing his *Periphyseon*. But Hermann of Carinthia turned to Arabic sources. In 1143 he wrote a cosmology which he called the *De Essentiis* (*On the Essences*).[25] The whole of the first section of this work is devoted to exploring the nature of the First Cause. It is a concise essay on metaphysics. Hermann starts by defining what things "are"; these "essences" are comprised under five genera: cause, movement, place, time, and *habitudo*. There are three principles: the efficient cause, that "from which" (the formal cause), and that "in which" (the material cause). The efficient cause in turn is divided into a "first or primordial cause" and a "secondary cause." The primordial cause is the same as Aristotle's Prime Mover, the Demiurge of Plato's *Timaeus*, and the Christian God. There follow the proofs of his existence: by revelation, and by deduction from composite and moving things. The essay ends with a definition of the two movements of the primordial cause: creation, which is of *principles*, created from nothing and occurring at the beginning of time, and generation, which is of *things*, generated from the principles, and being continuous up to the present day. In generation

God uses an instrument, which is the "secondary cause," and which turns out to be the created universe itself. Hermann derives much of his terminology and some of his arguments from the first chapter of Boethius' *Arithmetic* (the definition of "essences"), and the *Vetus Logica*. His argument that the primordial cause must be the *causa et ratio* for everything else, on the other hand, recalls a well-known phrase in Plato's *Timaeus*, the dialogue on which the *On the Essences* is modeled.[26] But what is most striking is how he uses Arabic sources for developing his argument. The very idea of five essences recalls similar lists of five basic principles in al-Rāzī, Pseudo-Apollonius, and al-Kindī.[27] But other sources are explicitly named. The most significant of these is the *Great Introduction to Astrology* of Abū Ma'shar (787–886), which Hermann had translated in 1140, three years before writing the *On the Essences*. Abū Ma'shar's use of Aristotelian philosophy was recognized and described in detail by Richard Lemay.[28] The Arabic astrologer does not mention any work of Aristotle by name, and none of his several citations of the "Philosopher" follows a text in Aristotle verbatim. Nevertheless, most of the first part of his eight-part book, on the validity of astrology, on the way the stars act on this world, and on forms, elements, composition, and the results of composition, is imbued with Aristotelian philosophy. In his discussion of the First Cause, Hermann quotes Abū Ma'shar's words that "the generating cause is prior to everything that is generated."[29] Another phrase in the same discussion quotes one of Abū Ma'shar's authorities: "For this, according to Hermes the Persian, form is the adornment of matter, but matter is the necessity of form."[30]

The section on metaphysics in the *On the Essences* was, in turn, a major source for Dominicus Gundisalvi's *On the Procession of the World*.[31] This work is concerned with how one can come to an understanding of God's existence, and the different ways in which things are caused by God and his creatures. While in Hermann we have seen how Arabic sources are brought in to corroborate and supplement Latin ones, in the *On the Procession of the World* we see a continuation of this process: Gundisalvi exploits translations made on his own initiative, and those of his fellow Toledans, of works by al-Fārābī, Avicenna, al-Ghazālī, and Ibn Gabirol. In addition, his arguments appear to be influenced by another work of which a Latin translation was not made: namely, *Kitāb al-'aqīda al-rafī'a* (*Book of the Exalted Faith*) of Abraham ibn Da'ud.[32]

Abraham ibn Da'ud was a Jewish scholar who fled from Córdoba to Toledo because of the persecution of the Almohads shortly before 1160, and there wrote several texts on philosophy, astronomy, and history, in Arabic and Hebrew. It is very likely that he is the "Avendeuch Israhelita" who wrote a letter, addressed to a prospective (but unnamed) patron, advertising the fact that he intended to translate Avicenna's *al-Shifā'*, and including translations of two sample passages. It seems as if he was successful in securing the patronage of the archbishop of Toledo, for we next encounter him as collaborating with archdeacon Gundisalvi on the translation of Avicenna's *On the Soul*. The other texts that Gundisalvi translated may also reflect the scholarship of Jewish philosophers in Spain. The substantial work *Fons Vitae* was written by the Jewish mystic and poet, Solomon ibn Gabirol, while Avicenna and al-Ghazālī were the main philosophical authorities of Ibn Da'ud.[33]

Thus, in Toledo, we can see, running parallel, first, a program of translating Aristotle with his Arabic commentators, inaugurated by Gerard of Cremona. This program reflects the interest of Muslim philosophers in al-Andalus, among which al-Fārābī's literal interpretation and commentary on Aristotle was possibly already introduced in the late ninth century, and followed by Ibn Bājja in eleventh-century Saragossa and Averroes in late twelfth-century Córdoba.[34] Second, there is a program of translating works of the Avicennian tradition, favored by Jewish scholars in Islamic Spain, directed by Dominicus Gundisalvi.[35] There was some overlap between these two programs, since Gundisalvi and Gerard sometimes translated the same works, such as al-Fārābī's *On the Classification of the Sciences*, Isaac Israeli's *On Definitions*, and al-Kindī's *On the Intellect*. Moreover, both were inspired by al-Fārābī's *Classification*: Gerard to translate the Aristotelian texts listed by al-Fārābī, Gundisalvi to write his *On the Division of Philosophy*, of which al-Fārābī's text is the main source.[36] But the very fact that there are two separate translations of some texts indicates that the two programs were separate. Michael Scot brought together the two traditions by translating both Aristotle's *On Animals* from Arabic, and by translating the equivalent section on zoology in the *Shifā'*. Hermann the German used both the Arabic commentators, al-Fārābī and Averroes, and the *Shifā'* to complement his translation of Aristotle's *Rhetoric*, and this combination of the results of the two Toledan traditions

is characteristic of scholastic philosophers of the thirteenth century and afterward.

THE THIRTEENTH CENTURY

In the thirteenth century in general the barrier between Arabic and Latin scholarship was more porous than it had ever been. We see not so much tributaries from the Tigris and Euphrates, but rivers running directly into Latin channels, and spreading out into an alluvial plain. There were several reasons for this. First, in Spain Arabic had become the language of the intellectual classes of Toledo and of the nobility, thanks to the ascendancy of the Mozarabic community and their influence over the settlers from northern Spain and further afield. Second, in Sicily and southern Italy, Arabic-speaking scholars were encouraged to collaborate with Jews and Christians, thanks to the support of Frederick II and the intellectual vibrancy of his court. Third, the popes for the first time showed an active interest in promoting scholarship of the highest kind, whether in Rome or in Viterbo. Finally, throughout the Mediterranean as a whole there was a greater exchange of ideas than there had ever been before.

Some results of this situation were that, instead of simply making a literal translation of a single text from Arabic, Latin scholars used a whole range of Arabic texts (which they read in Arabic) to compose their Latin works. We have already seen how Hermann supplemented his version of Aristotle's *Rhetoric* with Arabic commentaries of which there are no independent Latin translations. At the same time Pedro Gallego, bishop of Cartagena (1250–67), compiled a text on zoology, in which, aside from using Aristotle's and Avicenna's *On Animals*, he gives passages from the Middle Commentary of Averroes and a lost work on the *On Animals* by Abū al-Faraj ibn al-Ṭayyib (d. 1043). Gonzalo Pérez "Gudiel" (d. 1299), of Mozarabic stock and an Arabic speaker, in his positions as bishop of Burgos, archbishop of Toledo, and cardinal at Rome, and finally as the founder of the university of Alcalá de Henares (1294), not only commissioned translations of parts of the *Shifā'*, but also collected Arabic manuscripts and Latin and vernacular translations of Arabic texts. He was accompanied by Alvaro of Toledo, who translated an Arabic astrological text, and wrote commentaries and glosses on other Latin translations of Arabic cosmological

and astrological texts which show that he was reading Arabic texts directly (including, probably, al-Ghazālī's *Tahāfut al-falāsifa*). Meanwhile, in Barcelona, Ramón Martí (ca. 1220–ca. 1285) was drawing on a wide range of Arabic philosophical texts: in his *Pugio Fidei* he cites (aside from those works already well known in the Latin) al-Fārābī's commentary on the *Physics*, Avicenna's *Kitāb al-ishārāt wa al-tanbīhāt* and *Kitāb al-najāt*, al-Rāzī's *Shukūk 'alā Jālīnūs* (*Doubts about Galen*), al-Ghazālī's *Tahāfut*, *al-Munqidh min al-ḍalāl*, *Mīzān al-'amal*, *al-Mishkāt al-anwār*, *Iḥya' 'ulūm al-dīn*, *Kitāb al-tawba* and *al-maqṣad al-asnā fī asmā' Allāh al-ḥusnā*, as well as Averroes' *Tahāfut al-tahāfut* and *al-damīma*.[37] His pupil, Arnald of Villanova, could also read Arabic, and as well as translating Avicenna's *On Medicines for the Heart* and Galen's *On Palpitation* (*De Crepitatione*), appears to have used Arabic texts directly in his original writings.[38] The supreme example of this process occurs in the case of Alfonso X (*el Sabio* "the Wise") who, even before he became king of León and Castile in 1252, was sponsoring translations of texts from Arabic, and compilations on individual subjects based on a wide range of Arabic texts. His principal interests, however, were in astronomy, astrology, magic, and Islamic law codes, and the resultant texts, in Castilian, have only incidental relevance to philosophy, such as the statement at the beginning of a text on the properties of stones and gems attributed to Aristotle, "who was the most perfect of all the philosophers." The *Secret of Secrets*, purportedly Aristotle's advice on political philosophy to his pupil Alexander the Great, was also translated into Castilian before the end of the thirteenth century. Many of the Arabic texts used by Alfonso X may have come into his possession after the fall of Córdoba (1236) and Seville (1248); in the latter city he attempted to set up a school of "Arabic and Latin."

The translations of the commentaries of Averroes show a particularly clear example of "internationalism." The works of Averroes arose within the context of Andalusian Aristotelianism, which we have already sketched in respect to the translation program of Gerard of Cremona; from the same context comes al-Biṭrūjī's rejection of Ptolemaic astronomy in favor of an explanation of the movements of the heavenly bodies which is compatible with Aristotle's physics. Within a surprisingly short period after Averroes' death his works were being translated by both Christian and Jewish scholars, sponsored especially by Frederick II. Michael Scot, who is said to

have known Hebrew as well as Arabic, translated, as a sequence of texts on cosmology, al-Biṭrūjī's work and Averroes' Long Commentary on Aristotle's *De Caelo*.

The writings of Albertus Magnus in particular show a knowledge of several Arabic philosophical texts of which we do not have evidence of full translations into Latin, such as al-Fārābī's commentaries on Aristotle's logic and physics, which may have reached him through this process of seepage through a porous wall, and a similar situation can be observed in the case of his fellow Dominican, Arnold of Saxony.[39]

The spread of Arabic philosophical works in the thirteenth century, as evidenced by their existence in libraries, has been comprehensively documented by Harald Kischlat.[40] The preeminence of Arabic sources for Western philosophy can be seen in the fact that, when Giles of Rome criticizes the errors of the philosophers,[41] all the philosophers named are Arabic or wrote their philosophy in Arabic (Maimonides), with the exception of Aristotle himself. Even in the case of Aristotle, Giles uses the Arabic–Latin translations of the *Physics*, *Metaphysics*, and the *De Anima*, since he takes them from the lemmatized texts in the Long Commentaries of Averroes (the Greek–Latin *Physics* is also used). He also uses Alfred of Shareshill's translation of the Pseudo-Aristotelian *De Plantis*.

PARA-PHILOSOPHICAL WORKS

One might be surprised to find, as one of the books from which Giles of Rome takes philosophers' errors, a work with the title *On the Theory of the Magic Arts* (*De Theorica Artium Magicarum*). What has magic to do with philosophy? The work was, in fact, attributed to the well-known "philosopher of the Arabs" al-Kindī, although neither was al-Kindī known as the "philosopher of the Arabs" to Latin scholars, nor has *On the Theory of the Magic Arts* been found in Arabic. The presence of its doctrines[42] among the "errors of the philosophers," however, does alert us to strands of philosophical thought which were conveyed neither through the main-line Peripatetic tradition, nor through Avicenna.

We must be aware that our own conception of philosophy is different from *philosophia* in the Middle Ages, which in turn is not a stable term. It migrates, for example, from being applied by Latin scholars

to the seven liberal arts, to being split into the "three philosophies" (moral, natural, and "first" philosophy or metaphysics) of the scholastic period. Gundisalvi in two works (including the translation *On the Rise of the Sciences*) describes the "particular divisions of natural philosophy" as "astrological judgements, medicine, natural necromancy, talismans, agriculture, navigation, alchemy, and perspective," most of which we would hardly consider philosophical. Nevertheless, we have to bear in mind that Arabic philosophical ideas were transmitted via texts on these subjects as well, even though they were not incorporated in the teaching curriculum of *philosophia* at the universities. The indebtedness of Abū Ma'shar's *Great Introduction to Astrology* not only to Aristotle's works on natural philosophy, but also to his logical works, has become increasingly obvious to scholars, and the first seven chapters also of Māshā'allāh's *On the Elements and Orbs* are an exposition of celestial physics. Medicine, notoriously described by Isidore as a "second philosophy," was also a conveyor of philosophical ideas, especially in regard to the elements of bodies and to ethics. "Natural necromancy," by which Gundisalvi would have meant the art of harnessing the occult forces in nature, especially through the use of talismans (which is his next division), appealed to the authority of Aristotle and Plato, and adapted Aristotle's words on the relation of soul to body to that of the spiritual force within the talisman.[43] In agriculture and navigation the impact of Arabic learning did not occur until a later period. But alchemy provides a rich and largely unexploited hunting ground for Arabic philosophical ideas. This includes the *On the Soul* of Pseudo-Avicenna and the underpinning Hermetic philosophy of bonds between all parts of the universe, and, in general, of a "biological" view of generation, involving at every level the mixture between male and female principles, which can be found in Hugo of Santalla's translation of Pseudo-Apollonius' *On the Secrets of Creation*. Finally, the science of perspective, or "how one sees things," described for the first time in the West in the Latin versions of al-Fārābī's *On the Classification of the Sciences*, combined mathematics with physics and medicine, and, through the anonymous translation of Ibn al-Haytham's magisterial *Optics*, engendered a tradition of writing on perspective that engaged some of the West's greatest scholars, Witelo, John Peckham, and Roger Bacon.

LATE MEDIEVAL AND RENAISSANCE TRANSLATIONS OF ARABIC PHILOSOPHICAL WORKS

Direct Latin translations from Arabic texts continued to be made in the fourteenth century. Among these are those of Ibn al-Haytham's *On the Configuration of the World*, surviving in a single Toledan manuscript (Madrid, Biblioteca nacional, MS. 10059), and Averroes' *Incoherence of the Incoherence*, translated by a scholar variously called "Calo the Jew" and "Calonymos ha-Nasi" for Robert of Anjou, king of Naples, in 1328. At the same time, however, that Calo the Jew was translating an Arabic text into Latin, Calonymos ben Calonymos (who may or may not be the same scholar) was translating a large number of scientific and philosophical texts from Arabic into Hebrew, and after this time there was a shift from translating directly from Arabic into translating the Hebrew versions of Arabic texts.

From the earliest period Jewish scholars had always played an important role in introducing and interpreting Arabic texts for Christian scholars writing in Latin. We have already seen the significance of Avendauth and the Andalusian Jewish philosophical tradition for Gundisalvi. Alfred of Shareshill expressed his debt to the Jew Solomon, and Michael Scot was criticized by Roger Bacon for not knowing his source language sufficiently but relying on a converted Jew called "Andrew" (we know that he used the services of a Jew called "Abuteus" in translating al-Biṭrūjī).

As part of the humanist movement in Italy from the late fifteenth century onwards, scholars returned to Greek and Arabic sources, both to discover texts that had never been translated into Latin before, and to improve the quality of extant medieval Latin translations (which they regarded as being written in barbarous Latin). Thus, at the turn of the sixteenth century, Andrea Alpago revised Gerard of Cremona's translation of Avicenna's *Canon of Medicine* by consulting manuscripts in Damascus, and, at the same time, translated some short philosophical texts by Avicenna which had never been translated before. Particular interest was shown in the works of Averroes, but in this case scholars turned to Hebrew versions. At least thirty-eight of Averroes' commentaries were translated into Hebrew from the early thirteenth century onwards, and Jewish scholars such as Levi ben Gerson (Gersonides) wrote "super"-commentaries on some of these commentaries. The reasons for translating Hebrew versions

included the facts that first, Christian scholars of the Renaissance were more likely to know Hebrew than Arabic because of their interest in both Biblical studies and the mystical Kabbalah; second, that Jewish scholars were available to help them, especially after the expulsion of the Jews from Spain in 1492; and third, that Hebrew was regarded as being so close to Arabic that it did not really matter whether an Arabic work was translated from Hebrew rather than directly from Arabic.[44]

Most of the translations from Hebrew into Latin were made by Jewish scholars, the most prolific of whom was Jacob Mantino (d. 1549). The ambitious editors of the complete works of Aristotle with all the commentaries of Averroes, published in eleven volumes from 1550 to 1552 by the Giunta brothers in Venice, commissioned Mantino to revise earlier translations of Averroes and provide new translations. The Giuntine edition added further philosophical works by Arabic authors, including some short letters on logic which have not yet been identified. But it was published just at the time when two interrelated developments in European intellectual culture were getting under way. The first of these was the study and publication of texts in their original languages, which led, in 1584, to the setting up of an Arabic press in Rome by Giovan Battista Raimondi. The second was the separation of the study of Arabic texts from the mainstream of European academic education. From the mid-thirteenth to the mid-sixteenth century at least, students of philosophy in Western Europe, following the Peripatetic tradition, used the works of Avicenna, al-Ghazālī, and Averroes as an integral part of their syllabus. In the course of the sixteenth century chairs in Arabic began to be set up in European universities, and the foundations for the modern discipline of Oriental Studies were laid. But this professionalism in the study of Arabic marked the end of the period in which Arabic philosophy was part of the fabric of the European intellectual tradition.

NOTES

1 Adelard of Bath, *Questions on Natural Science*, in Adelard of Bath, *Conversations with his Nephew*, ed. and trans. C. Burnett (Cambridge: 1998), 82–3 and 90–1 for references to Arabic studies. An "old man" (*senex*) in Tarsus gave a practical demonstration to Adelard that the human body is made of a web of nerves and blood vessels (ibid., 122–3).

2 Preface to the fourth book of the *Liber Mamonis*, ed. in C. Burnett, "Antioch as a Link between Arabic and Latin Culture in the Twelfth and Thirteenth Centuries," in A. Tihon, I. Draelants, and B. van den Abeele (eds.), *Occident et Proche-Orient: contacts scientifiques au temps des croisades* (Louvain-la-Neuve: 2000), 1–78 (see 56).
3 H. Suter, *Beiträge zur Geschichte der Mathematik bei den Griechen und Arabern* (Erlangen: 1922), 7–8. Frederick's personal contact with Arabic teachers is discussed in C. Burnett, "The 'Sons of Averroes with the Emperor Frederick' and the Transmission of the Philosophical Works by Ibn Rushd," in Aertsen and Endress [134], 259–99.
4 M.-T. d'Alverny, "Avicenne et les médecins de Venise," *Medioevo e Rinascimento: studi in onore di Bruno Nardi* (Florence, 1955), 177–98 (see 185).
5 See O. Gutman, "On the Fringes of the *Corpus Aristotelicum*: The Pseudo-Avicenna *Liber Celi et Mundi*," *Early Science and Medicine* 2 (1997), 109–28.
6 Scholars of Western philosophy often mistakenly call Avicenna's *Shifā'* a "commentary" on Aristotle. This is not so, and Avicenna never implies this, but rather refers to his work as "a comprehensive work arranged in the order which will occur to me." The relation of the work to that of Aristotle is mentioned only in the introduction to the Latin translation of the section on the soul: "the author . . . has collected together what Aristotle said in his books *On the Soul, On Sense and What is Sensed*, and *On Intellect and What is Intellected*." See Hasse [251], 1 and 6.
7 See C. Burnett, "Physics before the *Physics*: Early Translations from Arabic of Texts Concerning Nature in MSS British Library, Additional 22719 and Cotton Galba E IV," *Medioevo* 27 (2002), 53–109. The last work examines the nature of the supposedly occult effects of talismans.
8 See D. Elford, "William of Conches," in *A History of Twelfth-Century Western Philosophy*, ed. P. Dronke (Cambridge: 1988), 308–27. The discussion of the elements at the beginning of the *Pantegni* was especially important in this respect.
9 The richest discussions of this process remain those in the articles of Lorenzo Minio Paluello, collected in his *Opuscula: The Latin Aristotle* (Amsterdam: 1972).
10 The list is edited and discussed in detail in Burnett [245].
11 In the following paragraph the order of texts is that given by the *socii*, and is not necessarily the chronological order followed by Gerard himself, none of whose translations is dated.
12 For a recent conjecture concerning the origin of the *De Causis*, see M. Zonta, "L'autore del *De Causis* pseudo-aristotelico: una nuova ipotesi," in R. B. Finazzi and A. Valvo (eds.), *La diffusione dell'eredità classica*

nell'età tardoantica e medievale: il "Romanzo di Alessandro" e altri scritti (Alessandria: 1998), 323–30.

13 The four books of the *Meteora* were combined with these two (in Latin, three) chapters, and the whole was supplied with a commentary by Alfred: this implies that Alfred was responsible for the combination.

14 The Arabic collection included the *Generation of Animals*, the *Parts of Animals*, and the *History of Animals*, but not the two short works that completed the Greek corpus.

15 For these glosses see J. K. Otte, *Alfred of Sareshel: Commentary on the Metheora of Aristotle* (Leiden: 1988); G. Freibergs (ed.), *Aspectus et Effectus: Festschrift for Richard Dales* (New York: 1993), 105–11; and R. French, "Teaching Meteorology in Thirteenth-Century Oxford: The Arabic Paraphrase," *Physis* 36 (1999), 99–129.

16 Quite frequently these Arabic–Latin versions appear in the margins of the Greek–Latin translations of Aristotle's *Libri Naturales*.

17 It is noticeable that a scholar such as Albert the Great would refer to a *vetus translatio* and a *nova translatio*, but not to *Graeca interpretatio* and a *Saracenica interpretatio*.

18 Cf. Abū Muḥammad 'Abdallāh ibn Rushd (the son of Averroes), *On the Conjunction*, (2): "This is that question which the Philosopher promised to explain in his *De Anima* [i.e., *De Anima*, III.7, 431b17–19], but that explanation has not come down to us": C. Burnett, "The 'Sons of Averroes,'" 287. See also chapter 9 above.

19 See Davidson [208].

20 Hasse [251], 127–53.

21 At about the same time, another translator made an independent translation from Greek, known as the *Translatio Anonyma* or *Metaphysica Media*, which I have suggested elsewhere may have been made in the context of a group of translators associated with Antioch, whose work had little impact: see C. Burnett, "A Note on the Origins of the *Physica Vaticana* and the *Metaphysica Media*," in R. Beyers et al. (eds.), *Tradition et traduction: les textes philosophiques et scientifiques grecs au moyen âge latin. Hommage à Fernand Bossier* (Leuven: 1999), 59–69.

22 G. Vuillemin-Diem, *Metaphysica lib. I–XIV, Recensio et Translatio Guillelmi de Moerbeka*, 2 vols. (Leiden: 1995).

23 It was copied into an English manuscript before 1200 (MS. Oxford, Selden supra 24) and known to Alexander Nequam at about the same date.

24 Adelard, *Questiones Naturales*, 226: *de NOY, de hyle, de simplicibus formis, de puris elementis . . . de initio vel initiis*.

25 Hermann sets forth the principles of his metaphysics in *De Essentiis*, 58vB–60rE (ed. C. Burnett [Leiden: 1982], 76–88), but develops specific themes throughout the work.

26 *Omne autem quod gignitur ex causa aliqua necessario gignitur; nihil enim fit cuius ortum non legitima causa et ratio praecedat* (Plato, *Timaeus*, 28A).

27 Al-Kindī's text *De Quinque Essentiis* was translated by Gerard of Cremona, but substitutes "matter" for *habitudo*.

28 R. Lemay, *Abu Ma'shar and Latin Aristotelianism in the Twelfth Century* (Beirut: 1962). For a recent analysis of Abū Ma'shar's philosophical position see P. Adamson, "Abū Ma'shar, al-Kindī and the Philosophical Defense of Astrology," *Recherches de philosophie et théologie médiévales* 69 (2002), 245–70.

29 *Omni quoque genito causa genitrix antiquior* (Hermann of Carinthia, *De Essentiis*, 80). This phrase is attributed to "the Philosopher" in bk. 1, ch. 4 of Abū Ma'shar's *Great Introduction*, ed. R. Lemay, 9 vols. (Naples: 1995–6), vol. II, 39 (Arabic) and vol. VIII, 12 (Hermann's translation).

30 *Sic enim apud Hermetem Persam: forma quidem ornatus est materie; materia vero forme necessitas*: cf. bk. V, ch. 4 of Abū Ma'shar, *Great Introduction*, vol. I, 313, and vol. VIII, 76.

31 Dominicus Gundissalinus, *The Procession of the World (De Processione Mundi)*, trans. J. A. Laumakis (Milwaukee: 2002).

32 M. Alonso, "Las fuentes literarias de Domingo Gundisalvo," *Al-Andalus* 11 (1946), 159–73; Laumakis (see previous note), 14–15.

33 The *Liber de Causis* was also attributed to "Avendauth" in its earliest manuscript (Oxford, Selden supra 24), and, in its Arabic form, is cited mainly by Jewish philosophers in Spain (including Ibn Gabirol): see R. Taylor, "The *Kalām fī Maḥḍ al-Khair* (*Liber de Causis*) in the Islamic Philosophical Milieu," in Kraye, Ryan, and Schmitt [60], 37–52, at 41.

34 See D. Gutas, "Aspects of Literary Form in Arabic Logical Works," in Burnett [50], 54–5.

35 M. Zonta, "Avicenna in Medieval Jewish Philosophy," in Janssens and de Smet [97], 267–79, at 267–9, points out the dependence of Andalusian Jewish scholars, from the first half of the twelfth century onward, on works by Avicenna and al-Ghazālī (Judah Halevi, Joseph ibn Saddiq, and above all, Abraham ibn Da'ud).

36 Gundisalvi was also probably responsible for translating al-Fārābī's *Directing Attention to the Way to Happiness*, which is an exhortation to the study of philosophy, whose message is repeated at the beginning of his *On the Division of Philosophy*: "to wisdom pertain all those [sciences] which either illuminate the soul of man for the recognition of truth, or which ignite it toward the love of goodness, and all these

are the sciences of philosophy" (ed. L. Baur, *Beiträge zur Geschichte der Philosophie des Mittelalters*, vol. IV, parts 2–3 [Münster: 1903], 5). For Gundisalvi's significance in general see A. Fidora, *Die Wissenschaftstheorie des Dominicus Gundissalinus* (Berlin: 2003).

37 A. Cortabarria, "La connaissance de textes arabes chez Raymond Martin O.P. et sa position en face de l'Islam," *Cahiers de Fanjeaux* 18 (1983), 279–300.

38 J. Paniagua, *Studia Arnaldiana* (Barcelona: 1994), 319–34.

39 I. Draelents, "Arnold de Saxe," *Bulletin de philosophie médiévale* 34 (1992), 164–80, and 35 (1993), 130–49.

40 Kischlat [252].

41 Giles of Rome, *Errores Philosophorum: Critical Text with Notes and Introduction*, ed. J. Koch, trans. J. O. Riedl (Milwaukee: 1944); written ca. 1270, according to Koch.

42 These include: "the future depends simply and without qualification upon the state of the supercelestial bodies"; "all things happen of necessity"; "heavenly harmony alone brings all things to pass"; "the form imaged in the mind exercises causality over things outside the mind"; "prayers addressed to God and to spiritual creatures have a natural efficacy for conserving what is good and excluding what is evil."

43 See *Picatrix*, ed. D. Pingree (London: 1986), I.v.36.

44 These points are illustrated in C. Burnett, "The Second Revelation of Arabic Philosophy and Science: 1492–1562," in C. Burnett and A. Contadini (eds.), *Islam and the Italian Renaissance* (London: 1999), 185–98.

Arabic philosophical works translated into Latin before ca. 1600

In the following table, the translations are arranged according to the chronological order of the author in the Arabic original. In the second column the Latin translator is named, and a date and place for the translation is given when it is known. Works that have not survived in Arabic, or in the Latin translation, or which have not been identified, are marked with an asterisk. Translations made via the intermediary of a Hebrew text are marked with an obelisk.[1] The order of works in the list of translations drawn up by Gerard of Cremona's students after his death (1187) is given in bold.[2] The most recent editions of the Latin texts have been given; AL = Aristoteles Latinus; ASL = Aristoteles Semitico-Latinus; AvL = Avicenna Latinus. For Averroes/Ibn Rushd's works, the serial number in Gerhard Endress, "Averrois Opera," in Aertsen and Endress [134], 339–81, is given in bold. For Renaissance editions, the dates of first publication are given. Certain works which primarily belong to other genres, such as mathematics and medicine, have been added because they include substantial discussions of topics germane to falsafa: e.g., Ptolemy's *Almagest*, whose first book deals with questions also present in *De Caelo*, Abū Ma'shar's *Great Introduction to Astrology*, which deals with several issues of physics and logic, and Pseudo-Apollonius' *On the Secrets of Nature*, which treats of the animal, vegetable, and mineral kingdoms.

Text	Translator
Aristotle, *Posterior Analytics*	Gerard of Cremona (1; AL IV, 3)
Aristotle, *Rhetoric*	Hermann the German (Toledo, between 1240 and 1250)
Aristotle, *Physics*	Gerard of Cremona (**34**; AL VII, 1.2)
Aristotle, *De Caelo*	Gerard of Cremona (**35**)
Aristotle, *De Generatione et Corruptione*	Gerard of Cremona (**37**)[3]
Aristotle, *Meteora*, bks. I–III (paraphrase of Yaḥyā ibn al-Biṭrīq)	Gerard of Cremona (**38**; ASL 12)
Aristotle, *Metaphysics*, a fragment of the beginning of Alpha Meizôn	Perhaps the same translator as that of al-Kindī's *De Radiis*.[4]
Aristotle, *On Animals* (19 bk. version)	Michael Scot (before 1220; ASL 5)

(*cont.*)

(*cont.*)

Text	Translator
Summa Alexandrinorum (a compendium from the *Nicomachean Ethics*)	Hermann the German (Toledo [?], 1243–4)
Pseudo-Aristotle, *On the Pure Good* = Proclus, *Elements of Theology*	Gerard of Cremona (**33**; *De Causis*)[5]
*Pseudo-Aristotle, *On the Causes of the Properties of the Four Elements*	Gerard of Cremona (**36**; bk.1 only)[6]
Pseudo-Aristotle (Nicholas of Damascus), *On Plants*	Alfred of Shareshill (ca. 1200; ASL 4)
Pseudo-Aristotle, *Theologia* = Plotinus, *Enneads* (selection)	Moses Arovas and Pier Nicolas Castellani (1519)
Pseudo-Aristotle, *Secret of Secrets*	(a) John of Seville (ca. 1120; partial)[7] (b) Philip of Tripoli (ca. 1220; complete)[8]
On the Apple (*The Death of Aristotle*)	†Manfred (ca. 1260; *De Pomo*)[9]
Ptolemy, *Almagest*	(a) Abdelmessie Wittoniensis (ca. 1130)[10] (b) Gerard of Cremona (**22**)
Alexander of Aphrodisias, *On the Intellect*	Gundisalvi (?)[11]
Alexander of Aphrodisias, *On Time*, *On the Senses*, and *That Augment and Increase Occur in Form, not in Matter*	Gerard of Cremona (**39**)[12]
*Themistius, Commentary on *Posterior Analytics*	Gerard of Cremona (**2**)[13]
*Themistius, Paraphrase of *De Caelo*	†Mosè Alatino (1574)[14]
Nemesius, *On the Elements* (= *On the Nature of Man*, ch. 6)	Anonymous (Constantine the African?)[15]
Pseudo-Apollonius (Bālīnūs), *On the Secrets of Nature*	Hugo of Santalla (ca. 1150)[16]
Kalīla wa Dimna, translated from Middle Persian by Ibn al-Muqaffa'	(a) †John of Capua, *Directorium Humanae Vitae* (1263–78) (b) Raymond of Béziers (1315)

(*cont.*)

Text	Translator
*Māshā'allāh (Messehalla, d. ca. 815), *On the Elements and Orbs* (*On the Knowledge of the Movement of the Orb*)	Gerard of Cremona (**25**)[17]
Ḥunayn ibn Isḥāq (d. ca. 873), *Witty Sayings of the Philosophers*	*Libro de los buenos proverbios* (no Latin translation known)
**Turba Philosophorum*	Anonymous[18]
Qusṭā ibn Lūqā (fl. 9th c., Costaben Luce), *On the Difference between the Spirit and the Soul*	John of Seville (between 1125 and 1152)[19]
Qusṭā ibn Lūqā, *On Physical Ligatures*	Constantine the African (before 1198)[20]
Abū Ma'shar (d. 886, Albumasar), *Great Introduction to Astrology*	(a) John of Seville and Limia (1133) (b) Hermann of Carinthia (1140)[21]
*al-Kindī (d. after 870, Alkindi), *On the Five Essences*	Gerard of Cremona (**41**)[22]
al-Kindī, *On Sleep and Vision*	Gerard of Cremona (**43**)
al-Kindī, *On the Intellect*	(a) Gundisalvi (?) (*De intellectu*) (b) Gerard of Cremona (*De ratione*)
*al-Kindī, *Two Letters on Weather Forecasting*	Anonymous (*De mutatione temporum*)[23]
*al-Kindī, *On Rays* (*The Theory of the Magic Arts*)	Anonymous (perhaps the same translator as that of fragment of Aristotle, *Metaph*. Alpha Meizôn)[24]
al-Kindī, Commentary on *Almagest*, bk. 1	*Hugo of Santalla
al-Fārābī (d. ca. 950, Alfarabi), *On the Classification of the Sciences*	(a) Gundisalvi (b) Gerard of Cremona (**42**)[25]
al-Fārābī, *On the Intellect*	(a) Gundisalvi (?)[26] (b) †Abraham de Balmes (Vat. lat. 12055)
al-Fārābī, *Directing Attention to the Way to Happiness* (*K. al-tanbīh 'alā sabīl al-sa'āda*)	Gundisalvi (?), *Liber exercitationis ad viam felicitatis*[27]
al-Fārābī, *The Sources of the Questions* (*'Uyūn al-masā'il*)[28]	Anonymous fragmentary translation (*Fontes questionum/ Flos Alpharabii secundum sententiam Aristotelis*)[29]

(*cont.*)

(*cont.*)

Text	Translator
al-Fārābī, *On* "*De Interpretatione*"	Abbreviated excerpts[30]
*al-Fārābī, *On the Syllogism*	*Gerard of Cremona (**3**), unidentified in Latin
al-Fārābī, *On* "*Posterior Analytics*"	Cited by Albert the Great
*al-Fārābī, *Introduction to the Book of Rhetoric* (*Ṣadr kitāb al-Khiṭāba*)	Hermann the German (*Didascalia in Rhetoricam Aristotelis ex Glosa Alpharabii*)[31]
*al-Fārābī, *On* "*Physics*"	*Gerard of Cremona (*Distinctio super Librum Aristotilis de Naturali Auditu*; **40**)[32]
al-Fārābī, *Explanation of the Problems in the Postulates of the Fifth Book of Euclid*	Gundisalvi (?)[33]
al-Fārābī, *On the Perfect State* (beginning only)	†Afonso Dinis of Lisbon and magister Alfonsus conversus (Abner of Burgos)?: *De Perfectione Naturali Intellectus*, chs. 5–6[34]
*Pseudo-Fārābī, *On the Rise of the Sciences*	Unknown 12th-century translator (Gundisalvi?)
Ikhwān al-Ṣafā', *Letter on Proof*	Anonymous[35]
Ikhwān al-Ṣafā', *Letter on Geography*	Anonymous (*Epistola Fratrum Sincerorum in Cosmographia*)[36]
Ikhwān al-Ṣafā' *Final Letter*	*Liber de Quattuor Confectionibus*[37]
*Isaac Israeli (ca. 855–907), *On the Elements*	Gerard of Cremona (**54**)[38]
*Isaac Israeli, *On the Description and Definition of Things*	(a) Dominicus Gundisalvi (?) (b) Gerard of Cremona (**55**)[39]
Avicenna (d. 1037, Ibn Sīnā), *The Healing* (*al-Shifā'*), prologue of Juzjānī	Avendauth (with the aid of an unknown Latinist)[40]
j1 (Logic), f1 (*Isagoge*), bk. 1, chs. 1 and 12	Avendauth (with the aid of an unknown Latinist)
j1, f1, bk. 1, chs. 2–11, 13–14, bk. 2, chs. 1–4	Unknown 12th-century Toledan (?) translator(s) (not Gundisalvi)
j1, f5 (*Posterior Analytics*), bk. 2, ch. 7	Gundisalvi (*De Convenientia et Differentia Scientiarum*, within his *De Divisione Philosophiae*)[41]

(*cont.*)

Text	Translator
j1, f8 (*Rhetoric*) (excerpts)	Within Hermann the German's translation of Aristotle's *Rhetoric*
j2 (Natural Science), f1 (*Physics*), bks. 1–3 (beginning only)	Unknown 12th-century Toledan (?) translator(s) (AvL)
j2, f1, bks. 3–4 (continuation of previous translation)[42]	Juan Gonzalves de Burgos and Salomon (Burgos, 1275–80; AvL)
j2, f2 (*On the Heavens*)	Juan Gonzalves de Burgos and Salomon (AvL)[43]
j2, f3 (*On Generation and Corruption*)	Juan Gonzalves de Burgos and Salomon (AvL)
j2, f4 (*On Actions and Passions*)	Juan Gonzalves de Burgos and Salomon (AvL)
j2, f5, bk. 1, chs. 1 and 5 (*On Stones and Minerals*)	Alfred of Shareshill (ca. 1200; *De Congelatione et Conglutinatione Lapidum*)[44]
j2, f5, bk. 2, 1–6 (*Meteora*)	Juan Gonzalves de Burgos and Salomon (Burgos, 1275–80)
j2, f5, bk. 2, 6 (*On Floods*)	Alfred of Shareshill (?) (ca. 1200)
j2, f6 (*On the Soul*)	Avendauth and Gundisalvi (AvL)
j2, f7 (*On Plants*)	**Liber eiusdem (Avicenne) de Vegetabilibus*[45]
j2, f8 (*On Animals*)	Michael Scot
j4 (*Metaphysics*)	Gundisalvi and an unknown collaborator (AvL)
Ibn Sīnā, *Letter on Medicines for the Heart*	(a) chs. 2–7 by Avendauth and Gundisalvi, inserted into Avicenna's *De Anima*[46] (b) Arnold of Villanova (ca. 1300) (c) Andrea Alpago (1527; a revision of a)
Ibn Sīnā, *Compendium on the Soul (Maqala fī al-nafs)*	Andrea Alpago (1546; *Compendium de Anima*)[47]
Ibn Sīnā, *Treatise on the Destination (of the Soul)* (*Risāla aḍḥawīya fī al-ma'ād*)	Andrea Alpago (1546; *Liber Mahad*)
Ibn Sīnā, Extracts from *The Marginal Notes (on the Soul)* (*Ta'liqāt*)	Andrea Alpago (1546; *Aphorismi de Anima*)

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Text	Translator
Ibn Sīnā, *Letter on Definitions* (*Risāla fī al-ḥudūd*)	Andrea Alpago (1546; *De Diffinitionibus et Quaesitis*)
Ibn Sīnā, *Divisions of the Intellectual Sciences* (*Aqsām al-ḥikma*)	Andrea Alpago (1546; *De Divisione Scientiarum*)
*Pseudo-Ibn Sīnā, *Book on the Heavens and the World*	Gundisalvi (*Liber Caeli et Mundi*; ASL 14)
Abū Wafā' al-Mubashshir ibn Fātik, *Choicest Maxims and Best Sayings* (1048–9)	(a) Gerard of Cremona (the sayings of Ptolemy, in the preface to the *Almagest*) (b) John of Procida (?) (*Liber Philosophorum Moralium Antiquorum*)[48]
Al-Ghazālī (d. 1111, Algazel), *Prologue to the Aims and the Destruction of the Philosophers*	Anonymous[49]
Al-Ghazālī, *The Aims of the Philosophers*	Magister Johannes and Gundisalvi (*Summa Theorice Philosophie*)[50]
Al-Ghazālī, *The Destruction of the Philosophers*	Included within Ibn Rushd, *The Destruction of the Destruction* q.v.
*Ramon Llull's Arabic logical compendium, dependent on the logic of *The Aims*	Ramon Llull (*Compendium Logicae Algazelis*; Montpellier, 1275–6 or 1288)[51]
Ibn al-Haytham (965–ca. 1040, Alhazen) *On the Configuration of the World*	(a) *Liber Mamonis* (Stephen the Philosopher, mid-12th c.; adds commentary) (b) In Oxford, Canon. misc. 45 (late 13th c.)[52] (c) In Madrid, BN, 10059 (before early 14th c.)[53] (d) †Abraham de Balmes (MS Vat. lat. 4566)
Ibn al-Haytham, *Optics*	Two unknown translators before the late 13th century[54]
*Ibn Gabirol (1021–58 or 1070, Avicebron), *Fount of Life*	Johannes Hispanus and Gundisalvi (*Fons Vitae*)

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Text	Translator
Ibn Bājja (d. 1139, Avempace), *Letter of Farewell (Risālat al-wadā')*	†Abraham de Balmes (*Epistola Expeditionis*; MS Vat. 3897)
Ibn Ṭufayl (ca. 1100–85), *Ḥayy ibn Yaqẓān*	†Unknown translator (before 1493; MS Genoa, Bibl. Univ. A.IX.29)
Ibn Rushd (1126–98, Averroes), *Epitomes on Logic* (1–9)	(a) †Abraham de Balmes (1523) (b) †Giovanni Francesco Burana (1524; *Prior Analytics* only)
Ibn Rushd, Middle Commentary on **Isagoge* (10)	(a) William of Luna (b) †Jacob Mantino (1550/2)
Ibn Rushd, Middle Commentary on *Categories* (11)	(a) William of Luna (b) †Jacob Mantino (1550/2)
Ibn Rushd, Middle Commentary on *De Interpretatione* (12)	(a) William of Luna (?)[55] (b) †Jacob Mantino (1550/2)
Ibn Rushd, Middle Commentary on *Prior Analytics* (13)	(a) William of Luna (?) (b) †Giovanni Francesco Burana (1524)
Ibn Rushd, Middle Commentary on *Posterior Analytics* (14)	(a) William of Luna (?) (b) †Giovanni Francesco Burana (1550/2)
Ibn Rushd, Long Commentary on *Posterior Analytics* (19)	(a) †Abraham de Balmes (1523) (b) †Giovanni Francesco Burana (1550/2) (c) †Jacob Mantino (1562; fragment)
Ibn Rushd, Middle Commentary on *Topics* (15)	(a) †Abraham de Balmes (1523) (b) †Jacob Mantino (1550/2; bks. 1–4)
Ibn Rushd, Middle Commentary on *Sophistici Elenchi* (16)	†Abraham de Balmes (1523)
Ibn Rushd, Middle Commentary on *Rhetoric* (17)	(a) Excerpt in Hermann the German's translation of Aristotle's *Rhetoric* (b) †Abraham de Balmes (1523)
Ibn Rushd, Middle Commentary on *Poetics* (18)	(a) Hermann the German (Toledo, 1256, AL 33) (b) †Abraham de Balmes (1523) (c) †Jacob Mantino (1550/2)

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Text	Translator
Ibn Rushd, Middle Commentary on *Physics* (21)	(a) †Abraham de Balmes (MS Vat. lat. 4548) (b) †Jacob Mantino (1550/2), bks. 1–3
*Ibn Rushd, Long Commentary on *Physics* (22)	(a) Michael Scot (?) (1501)[56] (b) Hermann the German (?) bk. 7 and bk. 8, comm. 80–6 only[57] (c) Theodore of Antioch (1501; Proemium) (d) †Jacob Mantino (1550/2; Proemium)
Ibn Rushd, Middle Commentary on *De Caelo* (24)	†Paolo Ricci (1511)
Ibn Rushd, Long Commentary on *De Caelo* (25)	Michael Scot (?) (1501)[58]
Ibn Rushd, Epitome of *De Generatione et Corruptione* (26)	(a) †Vitale Nisso (1550/2) (b) †Abraham de Balmes (1552)
Ibn Rushd, Middle Commentary on *De Generatione et Corruptione* (27)	Michael Scot (?) (1501)
Ibn Rushd, Epitome of *Meteora* (28)	†Elias del Medigo (1488)
Ibn Rushd, Middle Commentary on *Meteora* (29)	(a) Michael Scot (?) (1501; bk. 4 only) (b) †Elias del Medigo (1488; fragment)
*Ibn Rushd, Middle Commentary on nine books of *De Animalibus* (30)	(a) Michael Scot (?) (b) †Elias del Mendigo (MS Vat. lat. 4549; bks. 12-beginning of 14) (c) †Jacob Mantino (1521)
Ibn Rushd, Epitome of *De Anima* (31)	(a) †Elias del Medigo (MS Vat. lat. 4549; part of bk. 3) (b) †Abraham de Balmes (1552)
*Ibn Rushd, Long Commentary on *De Anima* (33)	(a) Michael Scot (?)[59] (b) †Jacob Mantino (1550/2; bk.3, chs.5 and 36)
Ibn Rushd, Epitomes of *Parva Naturalia* (34)	(a) Michael Scot (?)[60] (b) †Abraham de Balmes (1552)

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Text	Translator
Ibn Rushd, Epitome of *Metaphysics* (35)	†Jacob Mantino (1523)
*Ibn Rushd, Middle Commentary on *Metaphysics*, I–VII (36)	†Elias del Medigo (1560)
Ibn Rushd, Long Commentary on *Metaphysics* (37)	(a) Michael Scot (?) (1472)[61] (b) †Elias del Medigo (1488; preface to bk. Lambda) (c) †Paolo Ricci (1511; preface to bk. Lambda) (d) †Jacob Mantino (1550/2; preface to bk. Lambda)
*Ibn Rushd, Middle Commentary on *Nicomachean Ethics* (38)	Hermann the German (Toledo, 1240; 1501)
*Ibn Rushd, Epitome of Plato's *Republic* (39)	(a) †Elias del Medigo[62] (b) †Jacob Mantino (1550/2)
Ibn Rushd, Questions on Logic (40)	(a) †Elias del Medigo (1497) (b) †Abraham de Balmes (1523)
Ibn Rushd, Questions on Natural Science (41)	†Abraham de Balmes (MS Vat. Ottob. 2060)
Ibn Rushd, *Letter on the Primacy of Predicates in Demonstrations*	†Abraham de Balmes (*Epistola de Primitate Praedicatorum in Demonstrationibus*; 1550/2)
Ibn Rushd, *On the Substance of the Orb* (42)	(a) Michael Scot (?) (b) †Abraham de Balmes (chs.6–7; 1550/2)
*Ibn Rushd, *On the Separation of the First Principle* (41)	†Afonso Dinis of Lisbon and magister Alfonsus conversus (Abner of Burgos), Valladolid, mid-14th c.[63]
Ibn Rushd, *On the Possibility of Conjunction with the Active Intellect*, treatises 1 and 2 (43)	(a) †Afonso Dinis of Lisbon and magister Alfonsus conversus (Abner of Burgos)?: *De Perfectione Naturali Intellectus*, chs. 2–4 = tr. 1 and 2 (b) †Calo Calonymos ben David (1550/2; tr. 1)

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Text	Translator
Abū Muḥammad ʿAbdallāh Ibn Rushd (the son of Ibn Rushd), *On the Possibility of Conjunction*	Anonymous (*De intellectu*; early 13th c.)[64]
Ibn Rushd, *al-Damīma* (55)	Ramón Martí (*Epistola ad amicum*)[65]
Ibn Rushd, *The Incoherence of the Incoherence (Tahāfut al-Tahāfut)*	(a) Calo Calonymos (1328) (b) Calonymos ben David (1527)[66]
*al-Bitruji (d. 1204, Alpetragius) *On the Movements of the Heavens*	(a) Michael Scot and Abuteus Levita (Toledo, 1217) (b) †Calo Calonymos ben David (1531)
Maimonides (1135 or 1138–1204), *Guide to the Perplexed*[67]	(a) †John of Palermo (*Dux Neutrorum*) (b) †J. Buxtorf (*Dux Perplexorum*, 1629)
Maimonides, *Liber de uno Deo Benedicto* (= *Guide*, bk. 2, chs.1–2)	Anonymous (13th c.)
Maimonides, *Liber de Parabola* (= *Guide*, bk. 3, chs. 29–30 and 32–49)	Anonymous (early 13th c.)
*Ibn Ṭumlūs, *Question*	†Abraham de Balmes (1523)
*Abū al-Qāsim ibn Idrīs, *Questions concerning the Knowledge of Genus and Species*	†Abraham de Balmes (1523; *Quaesita de Notificatione Generis et Speciei*)
*Abū al-Qāsim Muḥammad/Maḥmūd ibn Qasim, *Question*	†Abraham de Balmes (1523)
*Abū ʿAbd al-Raḥmān (?) ibn Jawhar (Abuhabad Ahadrahman ben Iohar), *Letters*[68]	†Abraham de Balmes (1523)

Notes

[1]Details are given in G. Tamani, "Traduzioni ebraico-latine di opere filosofiche et scientifiche," *L'Hébreu au temps de la renaissance*, ed. I. Zinguer (Leiden: 1992), 105–14. I am very grateful to Dag Nikolaus Hasse for providing further information from a chapter of his *Habilitationsschrift*: "Arabic Sciences and Philosophy in the Renaissance."

[2] See Burnett [245], 276–81.

[3] Parallel texts are included in G. Serra, "La traduzione araba del *De generatione et corruptione* di Aristotele citata nel *Kitāb al-Taṣrīf* attribuito a Jābir," *Medioevo* 23 (1997), 191–288.

[4] In MS. Vat. Ott. Lat. 2048, see C. Martini, "The Arabic Version of the Book *Alpha Meizon* of Aristotle's *Metaphysics* and the Testimony of the MS. Bibl. Apostolica Vaticana, Ott. Lat. 2048," in J. Hamesse (ed.), *Les traducteurs au travail: leurs manuscrits et leurs méthodes* (Turnhout: 2001), 173–206.

[5] Ed. A. Pattin, in *Tijdschrift voor filosofie* 18 (1966), 90–203. New edition in preparation by Richard Taylor; cf. R. C. Taylor, "Remarks on the Latin Text and the Translator of the *Kalām fī maḥḍ al-khair/Liber de Causis*," *Bulletin de philosophie médiévale* 31 (1989), 75–102. For Pseudo-Aristotelian works in Arabic and Latin, see Kraye, Ryan, and Schmitt [60].

[6] Ed. S. L. Vodraska, Ph.D. diss., London University, 1969.

[7] H. Suchier, *Denkmäler Provenzalischer Literatur und Sprache* (Halle: 1883), 473–80.

[8] Ed. with Roger Bacon's commentary by R. Steele, *Rogeri Baconi Opera Hactenus Inedita*, vol. V (Oxford: 1920), 2–172.

[9] Ed. M. Plezia (Warsaw: 1960).

[10] C. Burnett, "'Abd al-Masīḥ of Winchester," in L. Nauta and A. Vanderjagt (eds.), *Between Demonstration and Imagination: Essays on the History of Science and Philosophy Presented to John D. North* (Leiden: 1999), 159–69.

[11] Ed. G. Théry, "Autour du décret de 1210: II. Alexandre d'Aphrodise," *Bibliothèque thomiste* 7 (Kain: 1926), 74–82; see also C. Burnett, "Sons of Averroes," 282. The translations of Gundisalvi (Dominicus Gundissalinus) fall between ca. 1160 and ca. 1190.

[12] Ed. Théry, "Autour du décret," 92–7, 86–91, and 99–100.

[13] Ed. J. R. O'Donnell, *Medieval Studies* 20 (1958), 239–315.

[14] Ed. S. Landauer (Berlin: 1902).

[15] Ed. C. Burnett in "Physics before the *Physics*," *Medioevo* 27 (2002), 53–109 (86–105).

[16] Ed. F. Hudry in *Chrysopoeia* 6 (1997–9), 1–154.

[17] Ed. J. Heller (Nuremberg: 1549).

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Notes (*cont.*)

[18] Ed. J. Ruska, *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* 1 (Berlin: 1931).

[19] Ed. J. Wilcox, "The Transmission and Influence of Qusṭā ibn Lūqā's *On the Difference between Spirit and the Soul*," Ph.D. diss., City University of New York, 1985.

[20] Ed. in J. Wilcox and J. M. Riddle, "Qusṭā ibn Lūqā's *Physical Ligatures* and the Recognition of the Placebo Effect," *Medieval Encounters* 1 (1995), 1–50.

[21] Both translations ed. in R. Lemay, Abū Ma'shar al-Balkhī, *Liber Introductorii Maioris ad Scientiam Judiciorum Astrorum*, 9 vols. (Naples, 1995–6; see vols. V and VIII).

[22] This and the following two items are ed. in A. Nagy, *Beiträge zur Geschichte der Philosophie des Mittelalters*, vol. II, pt. 5 (Münster: 1897).

[23] Ed. C. Burnett in G. Bos and C. Burnett, *Scientific Weather Forecasting in the Middle Ages: The Writings of al-Kindi* (London: 2000), 263–310.

[24] Ed. M.-T. d'Alverny and F. Hudry, *Archives d'histoire doctrinale et littéraire du moyen âge* 41 (1974), 139–259.

[25] Ed. González Palencia, 2nd edn. (Madrid: 1953) (new edn. in preparation by H. Hugonnard-Roche).

[26] Ed. E. Gilson, "Les sources gréco-arabes de l'augustinisme avicennisant," *Archives d'histoire doctrinale et littéraire du moyen âge* 4 (1929), 4–149 (115–26).

[27] Ed. D. Salman, *Recherches de théologie ancienne et médievale* 12 (1940), 33–48.

[28] This is a collection of comments on Aristotle's logic. Al-Fārābī's summaries of at least the *Categories* and the *De Interpretatione*, as well as his commentaries on the *Prior* and *Posterior Analytics*, were known to Albertus Magnus: see M. Grignaschi, "Les traductions latines des ouvrages de la logique arabe et l'abrégé d'Alfarabi," *Archives d'histoire doctrinale et littéraire du moyen âge* 39 (1972), 41–107.

[29] See I. Bignami-Odier, "Le manuscrit Vatican latin 2186," *Archives d'histoire doctrinale et littéraire du moyen âge* 11 (1938), 133–66, at 137, 154–5.

[30] Ed. M. Grignaschi, "Les traductions latines."

[31] Ed. M. Grignaschi and J. Langhade, *Deux ouvrages inédits sur la réthorique* [sic] (Beirut: 1971).

[32] Cf. a text ascribed to al-Fārābī in L. Thorndike and P. Kibre, *A Catalogue of Incipits of Mediaeval Scientific Writings in Latin* (London: 1963), col. 1253: "Liber de natura loci ex latitudine et longitudine: Quod naturam loci scire oportet in scientia naturali . . ."

[33] Incorporated into a Latin commentary on Euclid's *Elements* in Vatican, Reg. Lat. 1268, fols. 72r–73r, ed. C. Burnett, "Euclid and al-Fārābī in MS

Vatican, Reg. Lat. 1268" in *Festschrift Gerhard Endress* (Leuven: 2004), 411–36.

[34] The *De Perfectione* was rewritten with reference to the Hebrew by Alessandro Achillini (1501); both texts are edited in M. Geoffroy and C. Steel, *Averroès, La béatitude de l'âme* (Paris: 2001).

[35] The text is ascribed to "Mahometh discipulus Alquindi" (Muḥammad, a disciple of al-Kindī), and entitled *Liber Introductorius in Artem Logicae Demonstrationis*. Ed. Nagy, *Beiträge*, vol. II, pt. 5, 51–64. See further C. Baffioni, "Il *Liber Introductorius in artem logicae demonstrationis*: problemi storici e filologici," *Studi filosofici* 17 (1994), 69–90.

[36] Ed. P. Gauthier-Dalché, *Revue d'histoire des textes* 18 (1988), 137–67.

[37] Ed. A. Sannino, "Ermete mago e alchimista nelle biblioteche di Guglielmo d'Alvernia e Ruggero Bacone," *Studi Medievali* 41 (2000), 151–89; see C. Baffioni, "Un esemplare arabo del Liber de quattuor confectionibus," in P. Lucentini et al. (ed.), *Hermetism from Late Antiquity to Humanism* (Turnhout: 2003), 295–313.

[38] Printed in *Opera Omnia Isaac* (Lyons: 1515).

[39] Both versions ed. J. T. Muckle, *Archives d'histoire doctrinale et littéraire du moyen âge* 11 (1938), 300–40.

[40] Ed. A. Birkenmajer, "Avicennas Vorrede zum 'Liber Sufficientiae' und Roger Bacon," in A. Birkenmajer, *Etudes d'histoire des sciences et de la philosophie du moyen âge* (Wroclaw: 1970), 89–101. The information on *The Cure* comes from M.-T. d'Alverny, "Notes sur les traductions médiévales d'Avicenne," article IV in d'Alverny [248]. The *Shifā'* is divided into *jumul* (sing. *jumla*), which are progressively subdivided into *funūn* (sing. *fann*), *maqālāt* or "books," and *fuṣūl* (sing. *faṣl*) or "chapters." The first two chapters of the logic (j1, f1, bk. 1, chs. 1 and 2) are respectively entitled *Capitulum Primum et Prohemiale ad Ostendendum quid Contineat Liber Asschyphe* and *Capitulum de Excitando ad Scientias*.

[41] Ed. L. Baur, *Beiträge zur Geschichte der Philosophie des Mittelalters*, vol. IV, pts. 2–3 (Münster: 1903), 124–33 (see also 304–8).

[42] Corresponding to bk. 3, chs. 1–10 in the Arabic. Arabic bk. 3, chs. 11–15 and bk. 4 do not appear to have been translated into Latin.

[43] Ed. M. Renaud, *Bulletin de philosophie médiévale* 15 (1973), 92–130.

[44] Ed. E. J. Holmyard and D. C. Mandeville (Paris: 1927).

[45] Only as an item in the 1338 catalogue of the library of the Sorbonne.

[46] Ed. Van Riet, *De Anima*, vol. II, AvL, 187–210.

[47] This and the following translations by Alpago were made in Damascus in ca. 1500; see M.-T. d'Alverny, "Andrea Alpago, interprète et commentateur d'Avicenne," article XIV in d'Alverny [248].

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Notes (*cont.*)

[48] Ed. E. Franceschini in *Atti del Reale istituto veneto di scienze, lettere ed arti* 91 (1931–2), 393–597 (the Latin is translated from the Spanish *Bocados de oro*). For this sort of wisdom literature in Arabic see Gutas [22].

[49] D. Salman, "Algazel et les latins," *Archives d'histoire doctrinale et littéraire du moyen âge* 10 (1936), 103–27 (125–7).

[50] Part on logic ed. C. Lohr, *Traditio* 21 (1965), 223–90 (239–88); metaphysics and physics ed. J. T. Muckle (Toronto: 1933).

[51] Ed. C. Lohr, Diss. Freiburg/Br., 1967, 94–123 (this compendium was also put into Catalan verse by Llull).

[52] A Latin translation of a lost Castilian version made by "Abraham Hebreus" for Alfonso X of Castile; ed. J. L. Mancha in M. Comes et al. (eds.), *"Ochava espera" y "Astrofísica"* (Barcelona: 1990), 133–207 (141–97).

[53] Ed. J. M. Millás Vallicrosa, *Las traducciones orientales en los manuscritos de la Biblioteca catedral de Toledo* (Madrid: 1942), 285–312.

[54] Ed. M. Smith, *Transactions of the American Philosophical Society* 91.45 (2001).

[55] Ed. R. Hissette (Leuven: 1996).

[56] An *editio minor* is being prepared by G. Guldentops.

[57] See H. Schmieja, "Secundum aliam Translationem: Ein Beitrag zur arabisch-lateinischen Übersetzung des grossen Physikkommentars von Ibn Rushd," in Aertsen and Endress [134], 316–36.

[58] Ed. F. J. Carmody and R. Arnzen (Leuven: 2003).

[59] Ed. F. S. Crawford (Cambridge, MA: 1953).

[60] Ed. E. L. Shields (Cambridge, MA: 1949).

[61] An *editio minor* is being prepared by D. N. Hasse.

[62] Ed. A. Coviello and P. E. Fornaciari (Florence: 1992).

[63] Ed. in C. Steel and G. Guldentops, "An Unknown Treatise of Averroes," *Recherches de théologie et philosophie médiévales* 64 (1997), 86–135 (94–135).

[64] Arabic, Hebrew and Latin versions ed. C. Burnett and M. Zonta, *Archives d'histoire doctrinale et littéraire du moyen âge* 67 (2000), 295–335.

[65] Ed. M. Alonso, *Teología de Averroes: estudios documentos* (Madrid: 1947), 357–65.

[66] Ed. B. H. Zedler (Milwaukee, WI: 1961).

[67] For the medieval Latin translations of Maimonides, see W. Kluxen, "Literargeschichtliches zum lateinischen Moses Maimonides," *Recherches de théologie ancienne et médiévale* 21 (1954), 23–50.

[68] The last four items are included in *Epistolae seu Quesita Logica Diversorum Doctorum Arabum precipue Averroys*. The original Arabic texts are not known, and the last three authors have not been identified.