. Letters of Medieval Jewish Traders. Princeton, NJ:

Princeton University Press, 1973.

"Mediterranean Trade in the Eleventh Century: Some Facts and Problems." In Studies in the Economic History of the Middle East from the Rise of Islam to the Present Day, ed. M.A. Cook, 51-62. Oxford, UK: Oxford University Press, 1970.

. Studies in Islamic History and Institutions. Leiden:

E.J. Brill, 1968.

Hammam, Mohammed. "La Pêche et al., Commerce du Poisson en Méditerranée Ocidentale (Xe-début XVIe) In L'Occident Musulman et L'Occident Chrétien au Moyen Age, ed Mohammed Hammam, 151-78. Rabat, 1995.

Imamuddin, S.M. Muslim Spain 711-1492 A.D. Leiden: E.J. Brill, 1981.

Khalilieh, Hassan S. Islamic Maritime Law: An Introduction. Leiden: E.J. Brill, 1998.

Kreutz, Barbara M. Before the Normans: Southern Italy in the Ninth and Tenth Centuries. Philadelphia: University of Pennsylvania Press, 1991.

Labib, Subhi. "Egyptian Commercial Policy in the Middle Ages." In Studies in the Economic History of the Middle East from the Rise of Islam to the Present Day, ed. M.A.

Cook, 63-77. Oxford, UK: Oxford University Press, 1970. Lagardere, Vincent. "Le Commerce des Céréales Entre al-Andalus et le Maghrib aux XIe et XIIe Siécles." In L'Occident Musulman et L'Occident Chrétien au Moyen Age, ed. Mohammed Hammam, 123-50. Rabat, 1995.

Lewis, Archibald. "Mediterranean Maritime Commerce: A.D. 300-1100 Shipping and Trade." In La Navigazione Mediterranea Nell'Alto Medioevo, 481-501. Spoleto: Centro Italiano di Studi sull'alto Medioevo, 1978.

-. Naval Power and Trade in the Mediterranean A.D. 500 to 1100. Princeton, NJ: Princeton University Press, 1951.

Lombard, Maurice. Espace et Réseaux du Haut Moyen Âge.

Paris: La Haye, 1972. Lopez, Robert S. The Commercial Revolution of the Middle Ages, 950-1350. Cambridge, UK: Cambridge University

. "The Role of Trade in the Economic Readjustment of Byzantium in the Seventh Century." Dumbarton Oaks

Papers 13 (1959): 69-85.

-. "The Trade of Medieval Europe: The South." In The Cambridge Economic History of Europe, eds. M. Postan and E.E. Rich, 257-354. Cambridge, UK: Cambridge University Press, 1952.

. "Mohammed and Charlemagne: A Revision."

Speculum 18 (1943): 14-38.

Lopez, Robert, and Irving Raymonds. Medieval Trade in the Mediterranean World. New York: Columbia University Press, 1990.

Monks, George R. "The Church of Alexandria and the City's Economic Life in the Sixth Century." Speculum 28 (1953): 349-62.

Nazmi, Ahmad. Commercial Relations between Arabs and Slavs. Warszawa: Wydawnictwo Akademickie, 1998.

Pirenne, Henri. Medieval Cities: Their Origins and Revival of Trade. Princeton, NJ: Princeton University Press, 1974.

-. Mohammed and Charlemagne. New York: Meridian Books Inc., 1957.

Pleguezuelo, José Aguilera. Estudios de las Normas e Instituciones del Derecho Islámico en Al-Andalus. Seville: Guadalquivir Ediciones, 2000.

-. "El Derecho Mercantil Marítimo en Al-Andalus." Temas Arabes 1 (1986): 93-106.

Reinert, Stephen W. "The Muslim Presence in Constantinople, 9th-15th Centuries: Some Preliminary Observations." In Studies on the Internal Diaspora of the Byzantine Empire, eds. Hélène Ahrweiler and Angeliki E. Laiou, 125-50. Washington DC: Dumbarton Oaks Research Library and Collection, 1998.

Taher, Mustafa Anwar, ed. "Kitab Akriyat al-Sufun wa-al-Niza' Bayna Ahliha." Cahiers de Tunisie 31 (1983): 5-54.

Udovitch, Abraham L. "An Eleventh Century Islamic Treatise on the Law of the Sea." Annales Islamologiques 27 (1993): 37-54.

Whitehouse, David. "Abbasid Maritime Trade: The Age of Expansion." In Cultural and Economic Relations between East and West: Sea Routes, ed. Takahito Mikasa, 62-70.

Wiesbaden: Otto Harrassowitz, 1988.

Yusuf, Muhsin. "Sea Versus Land: Middle Eastern Transportation during the Muslim Era." Der Islam 73 (1996): 232-58.

TRANSLATION, ARABIC INTO HEBREW

During a period of about three hundred years, from around 1100 to 1400 CE, several dozen translators rendered more than four hundred Judeo-Arabic, Arabic, and Greco-Arabic works of grammar, law, theology, philosophy, medicine, and literature into Hebrew. The translators, who were often refugees from Islamic Spain or descendants of refugees, produced a variety of texts for patrons, students, and colleagues. Jews worked with other Jews and also collaborated with Christians, often producing Hebrew versions of the same texts that they would help render into Latin. The main centers of translation were Toledo, where Avendaut (probably Abraham Ibn Daud) worked together with the Christian Dominicus Gundissalinus; Barcelona, where Abraham Bar Hiyya collaborated with Plato of Tivoli; Southern France (Lunel, Bezier, Narbonne, Montpellier, Marseilles), where Judah Ibn Tibbon, the "father of translators," established a dynasty of translators, followed by his son Samuel, grandson Moses, and great grand-son Judah b. Makhir; and Naples, where a long line of Jewish translators found patronage, from Jacob Anatoli in the thirteenth century to Qalonymus b. Qalonymus in the early fourteenth century.

The first works translated into Hebrew were Jewish works of grammar and theology, including the writings of Isaac Israeli, Dunash b. Tamim, Sa'adyah Gaon, Judah Ibn Hayyuj, Jonah Ibn Janah, Solomon Ibn Gabirol, Bahya Ibn Paquda, Moses Ibn Ezra, Judah Halevi, and Moses Maimonides. Then the translators shifted their attention to Arabic and Greco-Arabic works of philosophy, medicine, and

literature. Among the classical authors rendered from Arabic into Hebrew were Aristotle, Alexander, Themistius, Hippocrates, Galen, Archimedes, Euclid, and Ptolemy; lesser-known authors such as Appolonius, Autolycus, Geminus, Menaleus, and Theodosius; and pseudoepigraphical works of Neoplatonic or Hermetic orientation, such as the Book of the Apple, the Book of Causes, and the Book of Istimakhus. Al-Razi, 'Ali ibn Ridhwan, al-Majusi, Ibn al-Jazzar, Ibn Zuhr, Abu 'l-Salt, Ibn al-Muthanna, Ibn al-Haytham, al-Farghani, Jabir ibn Aflah, Ibn al-Zarqalluh, Ibn al-Saffar, al-Kindi, al-Farabi, al-Ghazali, al-Batalyawsi, Ibn Bajja, Ibn Tufayl, Averroes, and al-Bitruji were translated from among the Arabs, along with popular works such as Kalila wa-Dimna, Bilawhar wa-Yudasaf, and even al-Hariri's Magamat. The most influential author translated was Averroes, many of whose writings survive only in Hebrew. Avicenna, by contrast, was made available only in his medical Canon and Canticum and in a late anthology of texts excerpted from the Najat and Shifa'.

From the very beginning of the translation movement, there were two established approaches: literary and literal. Philosophical and scientific works were generally translated word for word, producing calques and loanwords and following the original text closely even in terms of word order. Literary works. such as Kalila wa-Dimna and al-Hariri, on the other hand, were translated more loosely, often using paraphrases and replacing citations from the Qur'an and hadith (tradition) with verses from the Bible and rabbinic dicta. However, there was not always this neat division into different specialties and disciplines. Two famous controversies among the early translators helped to shape the development of the different ideologies: both Judah Ibn Tibbon and his son Samuel criticized their rival translators for subordinating meaning to language and style, failing to accurately reproduce difficult philosophical notions in their paraphrastic translations. The Hebrew terminology of the Ibn Tibbon family in particular became the standard language of philosophy and science. Their "Arabized Hebrew," as it has been called, became the accepted terminology used in original compositions as well, even by Jewish scientific authors who did not know Arabic.

The Jewish communities of Europe were changed dramatically by the translations. The traditional yeshivah student, who had previously studied only the Bible and rabbinic literature, now had access to the vast riches of the classical tradition. As a result, science and philosophy influenced every area of rabbinic Judaism. Philosophical commentaries were written about biblical texts and rabbinic legends. Legal codes and commentaries were introduced with theoretical

discussions of ethics and political philosophy. Sermons with philosophical and scientific content became a common occurrence in the synagogues. whereas liturgy was framed by philosophical poems praising wisdom and describing the soul's ascent to the supernal realm or conjunction with the active intellect. The translations also stimulated the emergence of a Hebrew scientific tradition, represented by such outstanding philosophers as Gersonides, whose original astronomical investigations were recorded primarily in Hebrew. The translations served as the basis for commentaries, supercommentaries, abridgments, encyclopedias, and original compositions. They satisfied a practical need as well, creating a medical library for aspiring physicians, who were not allowed to enter into the Christian medical schools. In fact, the extensive Hebrew medical library produced during the thirteenth century made Jewish education even superior to Christian and Jewish physicians more highly sought after.

However, not every Jew was enamored of the new sciences made available through translation. From the very beginning of the translation movement, there was opposition expressed by traditional scholars and legal authorities who recognized a danger in a "foreign wisdom" that contradicted religious doctrines and presuppositions. This opposition led to three major communal controversies, which resulted in a ban on the study of philosophy and the public burning of Maimonides' Guide to the Perplexed. The opposition to science and translation continued into the fourteenth and fifteenth centuries as well, when the Jewish study of Greco-Arabic philosophy in Hebrew translation was even blamed for the persecutions in Spain in 1391 and the expulsion of 1492. However, the reaction to Greco-Arabic science and philosophy during the fourteenth and fifteenth centuries led to a renewed interest in translation as well: works of Arabic anti-Aristotelianism such as Ghazali's Incoherence of the Philosophers were translated into Hebrew for the first time. During the fifteenth century, Jews began to turn to Latin rather than Arabic sources, not out of scientific curiosity but polemical necessity: to know how to respond to the Christians. Thus, the medieval period of scientific and philosophical renaissance among the Jews began and ended with translation.

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See also Andalus; Aristotle and Aristotelianism; Astrology; Astronomy; Botany; al-Farabi; Geometry; al-Ghazali; Grammar and Grammarians: Hebrew and Judeo-Arabic; Hunayn ibn Ishaq; Ibn Ezra; Ibn Gabirol; Ibn al-Haytham (Alhazen); Ibn Rushd (Averroes); Ibn Sina (Avicenna); Ibn Tufayl; Ibn Zuhr;

Judah al-Harizi; Judah ha-Levi; al-Kindi (Historian); Maimonides; al-Majusi; Maqama; Mathematics; Medical Literature, Arabic; Medical Literature, Hebrew; Medicine; Meteorology; Plato and (Neo)Platonism; Provence; Ptolemy; al-Razi (Rhazes); Sa'adyah Gaon; Sicily; Translation, Arabic to Persian; Translation, Pre-Islamic Learning into Arabic

Further Reading

- Berman, Lawrence. "Greek into Hebrew: Samuel b. Judah of Marseilles, Fourteenth-Century Philosopher and Translator." In *Jewish Medieval and Renaissance Studies*, ed. Alexander Altmann, 289–320. Cambridge, UK: Harvard University Press, 1967.
- Bos, Gerrit, ed. and transl. De Anima, Translated into Hebrew by Zerahyah b. Isaac b. She altiel Hen. Leiden: E.J. Brill, 1994.
- Bos, Gerrit, and Charles Burnett, eds. and transl. Scientific Weather Forecasting in the Middle Ages: The Writings of Al-Kindī. London: Kegan Paul International, 2000.
- Drossaart-Lulofs, H.J., and R.L.J. Poortman, eds. and transl. *Nicolaus Damascenus*, *De Plantis: Five Translations*. Amsterdam, 1989.
- Filius, L.S., ed. and transl. The Problemata Physica Attributed to Aristotle: The Arabic Version of Hunayn b. Ishaq and the Hebrew Version of Moses Ibn Tibbon. Leiden: E.J. Brill, 1999.
- Fontaine, Resianne. Otot ha-Shamayim: Samuel Ibn Tibbon's Hebrew Version of Aristotle's Meteorology. Leiden: E.J. Brill, 1995.
- ——. "Samuel Ibn Tibbon's Translation of the Arabic Version of Aristotle's Meteorology." In The Ancient Tradition in Christian and Islamic Hellenism, eds. Gerhard Endress and Remke Kruk, 85-100. Leiden, 1997.
- Goldstein, Bernard, ed. and transl. Ibn al-Muthanna's Commentary on the Astronomical Tables of al-Khwarizmî, Two Hebrew Versions. New Haven, Conn: Yale University Press, 1967.
- ——, ed. and transl. Al-Bitrûjî: On the Principles of Astronomy Vol. 1, Analysis and Translation; Vol. 2, The Arabic and Hebrew Versions. New Haven: Yale University Press, Yale Studies in the History of Science and Medicine 7, 1971.
- "The Survival of Arabic Astronomy in Hebrew."
 Journal for the History of Arabic Science 3 (1979): 31-9.
 "The Heritage of Arabic Science in Hebrew." In Encyclopedia of the History of Arabic Science, 3 vols., ed. Roshdi Rashed, 276-83. London: Routledge, 1996.
- Harvey, Steven. "The Hebrew Translation of Averroes' Procemium to his Long Commentary on Aristotle's Physics." Proceedings of the American Academy for Jewish Research 52 (1985): 55-84.
- Determine Which Philosophers Would be Studied by Later Jewish Thinkers?" Jewish Quarterly Review 83 (1992): 51-70.

- and Philosophy. Dordrecht: Kluwer Academic Publishers, 2000.
- Lévy, Tony. "The Establishment of the Mathematical Bookshelf of the Medieval Hebrew Scholar: Translations and Translators." Science in Context 10 (1997): 431-51.
- Lieber, Elinor. "Galen in Hebrew." In Galen: Problems and Prospects, ed. V. Nutton. London: Wellcome Institute for the History of Medicine, 1981.
- Schiffman, Yair. "The Differences between the Translations of Maimonides' *Guide of the Perplexed* by Falaquera. Ibn Tibbon, and al-Harizi and their Textual and Philosophical Implications." *Journal of Semitic Studies* 44 (1999): 47-61.
- Shatzmiller, Joseph. Jews, Medicine, and Medieval Society. Berkeley: University of California Press, 1994.
- Sirat, Colette. "Les Traducteurs Juifs a la Cour des Rois de Sicile et de Naples." In *Traduction et Traducteurs au* Moyen Âge, ed. G. Contamine, 169-91. Paris, 1989.
- Steinschneider, Moritz. Die Hebraischen Übersetzungen des Mittelalters und die Juden als Dolmetscher. Berlin, 1893; Reprinted Graz, 1956.
- Stern, Samuel Miklos. "Ibn Hasday's Neoplatonist: A Neoplatonist Treatise and Its Influence on Isaac Israeli and the Longer Version of the Theology of Aristotle." *Oriens* 13–14 (1961): 58–120.
- Twersky, Isadore. "Aspects of the Social and Cultural History of Provençal Jewry." *Journal of World History* 11 (1968): 185–207.
- Wolfson, Harry Austryn. "Plan for the Publication of a Corpus Commentariorum Averrois in Aristotelem." Speculum 36 (1961): 88-104.
- Zonta, Mauro. La "Classificazione Delle Scienze" di Al-Farabi Nella Tradizione Ebraica. Torino, 1992.
- ——. La Filosofia Antica nel Medioevo Ebraico: La Traduzioni Ebraiche Medievali dei Testi Filosofici Antichi. Brescia, 1996.

TRANSLATION, ARABIC INTO PERSIAN

From the early Islamic centuries onward, translations have played an important role in the interaction between the Arabic and Persian languages and literatures.

Translations of the Samanid Period

The first known translations of Arabic writings into (New) Persian were produced in Eastern Iran and Transoxiana under the patronage of the Samanids (AH 204–395 CE/819–1005), who promoted extensive literary activity in both languages. Among the earliest recorded examples, Abu'l-Fadl Bal'ami (d. 329/940), vizier of Nasr II b. Ahmad (r. 301–331/914–933), translated Ibn al-Muqaffa"s Arabic version of the *Kalila wa-Dimna*, a collection of animal fables, into Persian prose, and the poet Rudaki (d. 329/941–942) rendered it into Persian verse. Some two centuries earlier, Ibn