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BOOK REVIEW

Gabriele Ferrario, *The Book on Alums and Salts of Pseudo-Rāzī: The Arabic and Hebrew Traditions*

New York: Routledge, 2024. Pp. 220. ISBN 978-1-032-86940-7. £32.00 (paperback).

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Gabriele Ferrario's edition and translation of the Arabic and Hebrew versions of the chemical treatise *On Alums and Salts* is a praiseworthy contribution to history of medieval and early modern science. Composed in Arabic in eleventh-century Iberia, according to Julius Ruska (p. 9), the treatise was attributed to the famous Arabophone medical and chemical author Abū Bakr Muḥammad ibn Zakariyyāʾ al-Rāzī (d. 925 or 935), apparently by its twelfth-century Latin translator Gerard of Cremona (p. 6). The treatise's recipes and characterizations of chemical materials and operations circulated widely in Western Europe in Latin and Hebrew. Ferrario presents the *editio princeps* of the unique Hebrew manuscript, alongside a re-edition of the unique Arabic manuscript, previously edited by Ruska, with accompanying English translations. The book will be indispensable for future research on this text.

An introduction addresses the text's significance, past scholarship, attribution to al-Rāzī, Arabic and Latin textual traditions, and chemistry (concerned with much more than making gold), plus the Arabic manuscript and, finally, the Hebrew manuscript (tentatively dated to 'the first half of the seventeenth century' – pp. 42–5), text and paratexts. Within this last and most significant section, Ferrario offers a fascinating account of the Hebrew translator's many Italian words and phrases, along with Arabic and Latin terms. The meticulous editions and translations themselves follow, with a series of helpful tables and indexes, and an appendix on the Latin manuscripts. Overall, this is an outstanding piece of work.

The Arabic edition/translation is generally good (though it could be more literal at times, e.g. §48, p. 93, *wa-ghsilhā* 'and dip them' > 'and *wash* them'), with a helpful apparatus. On a first reading, typos are few (e.g. §48, p. 92, line 12, *frqqhʾ* > *frqhʾ* = *farriqhā*), though the transliteration of technical terms could occasionally be improved (p. 67, n. 198 *et passim*, *rāsẖat* > *rāsuẖt*?), and at least one emendation suggests itself (e.g. p. 60, line 4, *al-thālithah* > *al-thābitah*?). But Ferrario's re-edition represents a great advance.

The Hebrew *editio princeps* allows non-specialists to encounter this text for the first time. Ferrario is perhaps too quick to presume that transliterated terms in the Hebrew derive from Arabic. This proves crucial for Ferrario's proposed reconstruction of the text's multilingual history. In particular, he tentatively accepts Patai's view (against Steinschneider's) that the Hebrew text derives not from the Latin translation but from Arabic (in a different version from the extant Arabic text) based on 'the very strong presence of Arabic words in Hebrew transliteration' in his new edition of the Hebrew (p. 42). But the evidence is less decisive. For example, where the Hebrew reads *ʾunqy*, Ferrario's translation consistently

reads *uqqiyyah*, explained as a transliteration from Arabic. But the Hebrew looks much more like a transliteration of the Latin (*unciam*) – or indeed the Greek (οὐγκίαν).

Yes, the Greek. Although it receives no mention in the book, a Greek translation of *On Alums and Salts* exists. This translation is transmitted as one of the major sources for the Greek treatise known as *Zuretti's Anonymous*, composed in southern Italy around 1300 and critically edited and translated by Andrée Colinet (*L'Anonyme de Zuretti*, Les alchimistes grecs 10 (2000), pp. xxii, lxxxiv–lxxxvi; οὐγκίαν at §26, p. 43, line 3). Colinet's discussion of the Greek, Latin and Arabic versions and their interrelation was mentioned in a recent article urging specialists in the history of Western European alchemy not to ignore Byzantium (Alexandre M. Roberts, *Isis* (2022) 113, p. 576 n. 119). In doing just that, Ferrario reveals a lingering blind spot that the field of medieval history of science has yet to overcome.

Though editing a Greek text, Colinet worked extensively on the Latin versions too. Both aspects of her edition help solve textual puzzles in Ferrario's Hebrew edition. For example, Ferrario renders the name 'of an iron vessel' with an unvocalized transliteration of the Hebrew: *qqul*ʾ (§56, p. 153 and n. 459). A glance at Colinet's edition (§26, p. 42) shows that this must be a scribal error for *qʾzl*ʾ or *qzl*ʾ (*z* and *w*/*u* look similar in the Hebrew script, and 'q' and aleph are not entirely dissimilar; see the samples of handwriting in Ferrario, Figures 1–4), which is to say, a transliteration of the word *cazola*, which is present ('*cazolam*') at this point in the version of the Latin text Steele edited, but not in his edition of it (where one reads *capola*), only in a different manuscript whose variant readings Colinet reports. In the same recipe, the Hebrew mentions porphyry where the Arabic does not (p. 152–3; cf. pp. 78–9). The Latin versions edited by Ruska and by Steele have no mention of porphyry here, but the Greek does have it (a line earlier than in the Hebrew), as does the third Latin version (not mentioned by Ferrario) preserved in the *Liber claritatis* of Geber (Colinet, p. 42 apparatus, p. 43, line 1). Could the Hebrew derive from a Latin version rather than the Arabic?

As a final example, consider the beginning of the Hebrew text (§1, p. 100, line 3; not extant in Arabic), where a series of terms for vitriols appears. Ferrario leaves them undeciphered, describing them as transliterations from the Arabic that are hard to identify (n. 301). Again, Colinet's edition of the Greek has the answers (§71.1, p. 124): where Ferrario renders the Hebrew as 'the *qolqodor*, the *sorin*, the *qalqadim*, and the *qalqant*' (p. 101), the Greek lists these (originally Greek) terms as 'χάλκανθος [whence Arabic *qalqand*], χαλκίτις [whence Arabic *qalqadīs*], σώρυ [whence Arabic *sūrī*/*ṣūrī* and Hebrew *śwryn*] καὶ ἕτερα', and Colinet's apparatus gives the Latin in several versions, of which the version edited by Steele (Colinet, pp. xliii–xliv) seems closest to the source of the Hebrew: 'alcolcotar et alsurin et calcadis et calcantum'. These terms often appear transliterated in Arabic as well, but there is no reason to assume that the Hebrew derives directly from an Arabic version here (indeed Hebrew *qlqnt* is closer to Latin *calcantum* than to Arabic *qalqand*), or to suggest that these are unusual or unknown terms (see Colinet, p. 77, n. 360; 124, n. 514; and Fabian Käs, *Die Mineralien in der arabischen Pharmakognosie*, 2 vols (2010), 601–29, Hebrew *śwryn* at p. 623).

In short, Ferrario's work, read alongside Colinet's, opens up new avenues for research on the multilingual transmission and development of medieval and early modern chemistry – a story that very much includes Byzantium.