BRILL

NUNCIUS (2022) 1–18

NUNCIUS
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Alchemical Waters Run Deep

The Four Waters and Their Use in The Treasure of Alexander

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Abstract

In the course of the 9th and 10th centuries, the Arabo-Islamic world acquired a massive amount of knowledge from the antique and late antique traditions. In order to reconstruct the historical circumstances in which this transfer of knowledge took place, we are often forced to rely on the narratives that frequently accompany technical texts. The frame tale attached to *The Treasure of Alexander* (*Ḏaḫīrat al-Iskandar*) is a complex narrative that glues together an anthology of technical texts in ten chapters. Its alchemical section contains, among other things, instructions for preparing four different 'sharp waters', characterized by an increasing degree of intensity. Such 'waters'—possibly acid and corrosive substances—were supposed to be used in the treatment and dyeing of different minerals and metals. This paper offers a critical edition and English translation of the passages dealing with the four 'waters' and their role in different alchemical procedures in *The Treasure of Alexander*. Special attention is paid to those textual clues that may link the contents of *The Treasure* to the Graeco-Egyptian alchemical tradition of 'divine water'.

Keywords

Arabic alchemy – divine water – Graeco-Arabic translations

1 *The Treasure of Alexander* and the Four 'Waters'

The intriguing title of *The Treasure of Alexander* (*Ḏaḫīrat al-Iskandar*) introduces us to a collection of ten chapters on rather heterogenous subjects, all dealing with knowledge of nature. Alchemical procedures, talismans, poisons

and antidotes, wondrous plants, and properties of animal parts are presented as the components of the Hermetic antediluvian knowledge that was passed down to Alexander the Great.[1] According to the tradition, in his last hour, Alexander felt that his contemporaries were not worthy of these great secrets, so he decided to conceal the golden book that contained them in a hidden shrine in ʿAmūriyya, the ancient city of Amorion in Asia Minor. There, it was rediscovered, one millennium later, by the Abbasid Caliph al-Muʿtaṣim (r. 833–842) during his siege of the town. He was assisted in this enterprise by his smartest courtesans, who actually found and translated the book and the notes left in it by Aristotle and Alexander. Paradoxically, it is the overabundance of historical elements and material details that ultimately make the story implausible, a fictional tale with a strong historical flavour to it.[2] In the Islamic tradition, Alexander the Great is also a prophetic figure and his alleged authorship of this text places it in a prestigious line of transmission of knowledge with ancestral roots, conferring it with coherence and prestige.

The second chapter of *The Treasure of Alexander* is devoted to 'the Art' *par excellence*, that is alchemy. The chapter opens with instructions for the preparation of the four 'waters' to be used in the treatment of metals.[3] Together, these

1 For the critical edition, the English translation of the frame tale of *The Treasure of Alexander*, and a more inclusive bibliography on the subject, see Lucia Raggetti, "*The Treasure of Alexander*. Stories of Discoveries and Authorship," in *Education Materialized: Reconstructing Teaching and Learning Contexts through Manuscripts*, ed. Stefanie Brinkmann, Giovanni Ciotti, Stefano Valente and Eva Maria Wilden (Berlin: De Gruyter, 2021), 279–314. Julius Ruska was the first to bring this text to the scholarly attention, at the beginning of the twentieth century. He partially edited the text and translated it on the basis of the manuscript kept in Berlin, see Julius Ruska, *Tabula Smaragdina: Ein Beitrag zur Geschichte der Hermetischen Literatur* (Heidelberg: Akademie Verlag, 1926), 68–107. Later, a Portuguese translation appeared, based on the Escorial manuscript, and an English one was self-published in a series of esoteric texts, see Ana Maria Alfonso-Goldfarb, *Livro do Tesouro de Alexandre: um estudo de hermética árabe de hist*ò*ria de ciência. Tradução do original árabe*, trans. Safa Abou Chahla Jubran (Petròpolis: Editora Vozes, 1999); and *Book of the Treasure of Alexander: Ancient Hermetic Alchemy & Astrology*, ed. Christopher Warnock, trans. Nicholaj de Mattos Frisvold (Lexington: Renaissance Astrology, 2010). For a synthetic overview of the contents, see also Manfred Ullmann, *Die Natur- und Geheimwissenschaten im Islam* (Leiden: Brill, 1972), 376–377.

2 A telling example of such exaggerated details is the description of the golden book in which the texts was written: a rough calculation shows that such a book would be impossible to produce, both in terms of its dimensions and due to the incredible amount of gold that it would require. See Ruska, "Tabula Smaragdina," 76; and Raggetti, *Treasure of Alexander*. Surprisingly, bibliographical sources do not mention the Caliph al-Muʿtaṣim as patron of any translation except for the alleged one recorded in *The Treasure of Alexander*, see Dimitri Gutas, *Greek Thought and Arabic Culture* (London: Routledge, 1998), 123.

3 For other occurrences of the alchemical 'waters' in the Arabic tradition, see Ullmann, *Natur- und Geheimwissenschaften*, 174–175; and Ruska, "Tabula Smaragdina," 81–104.

four 'waters' form a coherent textual unit and, except for the first, the preparation of each 'water' prescribes the use of the previous one as the key ingredient for the new concoction. All of them are labelled with evidently non-Arabic names, though no translation or paraphrase is provided.[4] The progression from one 'water' to the other is marked by an increasing degree of intensity. The procedure itself is complex, articulated, and rather time-consuming as the number of days indicated for the maceration increases by seven each time. The list of ingredients necessary for the preparation of these 'waters' suggests that they were powerful acid substances, actually capable of affecting the appearance of metals.[5]

The edition of the texts presented here is based on five available manuscript witnesses of the Arabic tradition: MS British Library India Office 673 (henceforth I); MS Escorial 947 (henceforth E); and MS Berlin We II 1209 (henceforth B); MS New York Columbia University, Rare Book and Manuscript Library Or 276 (henceforth N);[6] MS Teheran Mağlis 2783 (henceforth T).[7] The versions of the text transmitted in the different manuscripts are quite closely related, and there is no element that allows us to establish a stemmatic relation between them.[8] The variants (*lectiones adiaphorae*) therefore have to be evaluated case by case.[9] If, in general, the process of copying implies a trivialization of the

4 In the sections devoted to poisons and talismans, an explanation of the meaning is provided for many of such non-Arabic names. The frame tale of the *Treasure* provides, also in this specific case, an explanation and a context for the presence of these obscure names. Moreover, an allegedly foreign name may be particularly effective as 'label' for an alchemical product.

5 For the experimental replication of the divine water, see Lawrence W. Principe, *The Secrets of Alchemy* (Chicago, IL/London: The University of Chicago Press, 2013), 17; for the fresh perspectives opened by the interdisciplinary research which involves historians and chemists, see also Marianna Marchini, Massimo Gandolfi, Lucia Maini and Matteo Martelli, "Exploring the ancient chemistry of mercury: new insights into old recipes", *Proceedings of the National Academy of Sciences* 119, no. 24 (2022), https://www.pnas.org/doi/10.1073/pnas.2123171119#sec-3 (accessed July 6, 2022).

6 For a more detailed description and the digital reproduction of this manuscript, see https://openn.library.upenn.edu/Data/0032/html/ms_or_276.html (accessed May 26, 2022).

7 For the digital reproduction of this manuscript, see https://www.vhmml.org/readingRoom (accessed May 26, 2022).

8 These are the five witnesses of which it was possible to obtain a digital reproduction. For the complete list of manuscripts of *The Treasure of Alexander*, see Ullmann, *Natur- und Geheimwissenschaften*, 376; and Fuat Sezgin, *Geschichte des arabischen Schrifttums*, vol. 4 (Leiden: Brill, 1971), 103–104.

9 In the case of the waters' names, for instance, there would be no ground at all to prefer a variant over another, particularly in the case of the third water. As for the edition of the Arabic texts, I have opted for making it available to a broader scholarly audience, largely by adapting the orthography to modern conventions (i.e. orthography of the hamza, *yā'*/*alif maqṣūra*,

forms, it is impossible to prove that the more complex forms here represent an older layer of the textual tradition. That said, the more inclusive forms have been chosen for the edited text.[10]

Section on the extraction of the 'sharp water', called *Ṣābiyūs*.[11]

فصل في استخراج الماء الحادّ المسمى بصابيوس

The shells of the shellfish [called] river frogs must be taken, a great quantity of them must be burnt, mixed with the same quantity of the lime that has not been quenched, and alkali in the same quantity of the whole mixture, after that these three [components of the mixture] are ground until they become like a powder.

يؤخذ صدف الضفادع النهرية فيحرق منه جملة كثيرة ويضاف اليه مثله من النورة التي لم تطف ومثل الجميع من القلي بعد ان يستحق كل واحد من هذه الثلاثة حتى يصير كالذرور

Then this must be put into a large basin, covered with water, a large quantity of the chaff obtained from wheat must be added, then left for seven days, covering it with the branches of a tree.

ثم يجعل في حوض كبير ويغمر بالماء ويجعل فيه من التبن المتخذ من الحنطة مقدارا كثيرا ويترك سبعة ايام فيغطى باغصان الشجر

dots on the *tā' marbūṭa*). The texts presented here frequently mention units of measure. The standard reference for this aspect is Walther Hinz, *Islamische Maße und Gewichte, umgerechnet ins metrische System, Handbuch der Orientalistik* (Leiden: Brill, 1970). One should always consider a possible equivalence *cum grano salis*: such units of measure have been in use over a century-long period and in a very vast area. Considering the fundamentally conjectural nature of such equivalence, when possible, interdisciplinary research tends to focus on the proportion between the amounts of the different ingredients, which remains constant, regardless for value associated to the unit of measure.

10 As additional feature of the tradition, (E) bears witness to the use of a secret alphabet to encode crucial technical information in the chapter on alchemy. The secret alphabet is employed when mention is made of distinctive ingredients, their dosage, and even the words of caution about the deadly effects of some fumes. On the outer margin of fol. 13v, corresponding with the section on the 'third water', we can see a *legenda* for decoding the secret alphabet. From that point on, for a few folia, the isolated Arabic letters corresponding to each sign of the secret alphabet are written in the interlinear space. The interlinear hand might be the same one that copied the main text (which would imply that the same person produced and used the book) but it is not possible to make a positive identification.

11 (B), fols 9r–11v; (E), fols 12v–14r; (I), fols 13r–14v; (N), fols 14r–15v; (T), 162–165. The manuscript tradition is in agreement on the expression *al-mā' al-ḥādd* (sharp water) in the section header, with (I), (N), and (T) opting for the feminine form.

ثم يفتح مزال الحوض ليجري فيه الماء الى حوض اخر قد جعل برسمه

Then, one side of the basin must be opened so that the water can flow into another basin that has already been prepared for this.

فهذا هو الماء الاول المسمى بصابيوس

And this is the first water called *Ṣābiyūs*.

| T يطف [تطف | *om.* E [صدف | *inter l.* صابيوس N T, صابيوس [بصابيوس | B الحالة; I N T الحادة [الحاد المسمى | B I N T الحوض الاخر [حوض اخر | B يفتح يترك نزال [يفتح مزال | E N التين [التبن | B يضاد [يصير T بصابيوص [بصابيوس | *om.* E;

استخراج الماء الثاني المسمى قوريال

Extraction of the second water, called *Qūriyāl*.

خذ من الصدف المحرق جزأ ومن النورة جزأ ومن النوشادر جزأ ومن البورق سدس جزء ومن الزاج سدس جزء

Take one part of burnt seashells, one part of lime, one part of ammonium salt, one sixth of a part of natron (*bawraq*), and one sixth of vitriol.

ويجمع ذلك كله مسحوقا ويلقي عليه من التبن المدقوق المتخذ من الارز مقدارا كثيرا ويصب عليه من الصابيوس ما يزيد على غمرة بنحو سبعة امثال ما غمره ويغطى باغصان الشجر ويترك اربعة عشر يوما

Everything must be mixed together once ground, and a great quantity of the ground chaff obtained from rice must be thrown onto it; some *Ṣābiyūs* [water] must be poured onto it—more than is needed to cover it, approximately seven times the quantity needed to cover it—it must be covered with the branches of a tree, and left for fourteen days.

ثم ينزل الحوض ويخرج منه الماء وينقله الى حوض اخر

Then, the basin must be taken down, and the water allowed to flow out of it into another basin.

فهذا هو الماء الثاني المضاعف القوة التي تسميه قوريال

And this is the second water—twice as powerful—that is called *Qūriyāl*.

[التبن | N ويلقي [وينقهى | *inter l.* قوريال T قوريان [قوريال | *inter l.* فصل واما استخراج [استخراج | *add.* T الحوض الاخر [حوض اخر | B يترك الحوض يخرج [ينزل الحوض ويخرج | N ويصيب [ويصبّ | I N التين [الصابيوس | *om.* E; الصابيوص T *inter l.* | التي تسميه قوريال] *om.* E; تسميته N

Extraction of the third water, called *Zaʿrāsiyūs*.

Twenty dirhams of salt and one *raṭl* of ammonium salt must be taken, cooked with one hundred and twenty *raṭl* of water, until only forty *raṭl* are left.

Then, eighty *raṭl* of water must be poured over it, and cooked until only forty *raṭl* are left; the pouring of either eighty or one hundred and twenty *raṭl* of water should be alternated with the cooking, and must not cease before, seven times over, only forty *raṭl* are left.

When forty *raṭl* are left during the seventh cooking, remove it from the fire.

Then, some ground burnt seashells must be poured over it so that [the mixture] becomes thick like a paste as a result of this.

Then, the same weight of lime, one sixth of its weight of ammonium salt, and one sixth of yellow arsenic, one third of sulphur, and one third of alkali must be taken.

Once it has been ground, throw some of the second water into it—seven times the quantity needed to cover it—it must be covered and left for twenty-one days.

And this is the third water, called *Raʿrāsiyūs*.

استخراج الماء الثالث المسمى زعراسيوس

يؤخذ من الملح عشرون درهما ومن النوشادر رطل واحد ويطبخ بمائة وعشرين رطلا من الماء حتى يبقي اربعون رطلا

ثم يصب عليه من الماء ثمانون رطلا ويطبخ حتى يبقي اربعون رطلا ولا يزال يصبه عليه ثمانون ويطبخ المائة وعشرون حتى يبقي اربعون سبع مرات

فاذا بقى منه في الطبخة السابعة اربعون رطلا فانزله عن النار

ثم يصب عليه من الصدف المحرق المدقوق ما يصير معه ثخينا كالعجين

فيؤخذ مثل وزنه نورة ومثل سدس وزنه نوشادر ومثل سدسه ايضا زرنيخ اصفر ومثل ثلثه كبريت ومثل ثلثه ايضا قلي

ويلقي على هذه بعد سحقها من الماء الثاني سبعة امثال غمرها ويغطي ويترك احد وعشرون يوما

فهذا هو الماء الثالث المسمى رعراسيوس

زعراسرمس ;N غراسيوس I B E; رعراسيوس [زعراسيوس | *add.* T *inter l.* فصل واما استخراج [استخراج | *om.* E [رطلا | *om.* B E N [يبقي | T [رطلا | N T اربعين [اربعون | عشرين [عشرون | *inter. l.* T زعراسيوس | *om.* E I والعشرون [وعشرون | T ويطبخ المائة وعشرون [ويطبخ | *om.* N| اربعين [اربعون | N T المدقوق [المحروق | *add.* E ويؤخذ [فيؤخذ | B ثخينا كام العجين [ثخينا كالعجين | N يثير [يصير | E [ايضا زرنيخ اصفر ومثل ثلثه | *om.* N T زعراسيوس ;N بغراسيوس; *om.* E [المسمى رعراسيوس | N T وعشرين [وعشرون | *add.* B اصفر [كبريت

Extraction of the fourth water, called *Ṭarīrās*, which is the apogee of the utmost degree [of intensity].

Equal parts of copper filings and black lead filings must be taken and ground on a cutting board with sublimated wine vinegar.

One sixth of a part of ammonium salt and one sixth vitriol must be added to it, until it has reached the highest degree of smoothness.

It must be dried in the sun, diluted with the same quantity of ammonium salt and one sixth of its weight of red arsenic, one third of yellow sulphur, six times its weight of lime, the same quantity of burnt seashells, and mixed well.

Then, seven times the *Raʿrāsiyūs* [water] is needed to cover it must be poured into it; then, dry 'milky plants'—roughly three times the mixture, and these are *lāʿiyya* [i.e. a plant with yellow flowers] and euphorbia—must be thrown into it.

Then, it must be left for twenty-eight days, and this is the fourth water, called *Ṭarīrās*: it is fatally harmful to all living beings that touch it, and its smell produces great damage to the brain.

استخراج الماء الرابع المسمى طريراس وهو الغاية القصوى

يؤخذ من برادة النحاس وبرادة الرصاص الاسود اجزاء متساوية ويسحق على صلاية بخل خمر مصاعدٍ

فيدخل فيه سدس جزء نوشادر وسدس جزء زاج حتى يصير في غاية النعومة

ثم يجفف في الشمس ويضاف اليه مثله نوشادر وسدس وزنه زرنيخ احمر وثلثه كبريت اصفر وستة امثاله نورة ومثله من الصدف المحرق ويخلط ذلك ناعما

ثم يصب عليه من رعراسيوس سبعة امثال غمره ثم يلقي فيه من الحشائش اليتوعية المجففة ثلاثة امثال الاخلاط بالتقاريب والحشائش اليتوعية هي اللاعية والشبرم

ثم يترك ثمان وعشرون يوما فهذا هو الماء الرابع الذي يسمى الطريراس وهو قتال مهلك لكل حيوان يلمسه ورائحته عظيمة الضرر بالدماغ

وهو الغاية القصوى [المسمى طريراس وهو الغاية القصوى | *add.* T *inter l.* فصل واما استخراج [استخراج *add.* T | برادة النحاس وبرادة الحديد N; برادة الحديد وبرادة النحاس [برادة النحاس | E المسمى طريراس بالتقريب [امثاله | N غراسيوس [رعراسيوس | E امثاله [امثال | I كمثله [مثله | E جاز [زاج | *om.* I [فيه من الحشائش اليتوعية المجففة ثلاثة امثال الاخلاط | *om.* E [والحشائش اليتوعية هي اللاغية والشبرم | B T الذي | E ثمانية [ثمان | N T وعشرين [وعشرون | B E اللاغية [اللاعية | N اليتوعية [بثوعية | *om.* N [بالتقاريب | *om.* E [يسمي الطريراس

For this reason, Hermes prescribed that the one who handles it should place two cotton pads imbued with rose water and camphor in his nostrils, so that this cannot harm his brain, and this is of greatest usefulness.

فلذلك امر هرمس ان يجعل الذي يباشره في منخريه قطنتين مغموستين في ماء الورد والكافور لئلا يضر بدماغه وكان ذلك اعظم نفعا

واذا جعل في منخريه [في منخريه | T *add.* يجعل فيه قطن يلطخ بالقطران [يباشره | B *om.* [لئلا يضر بدماغه | N T في الماء ورد [في ماء الورد | T *add.* [لئلا يضر بدماغه | N *om.*

Mention of the peculiar properties of this water, called *Ṭarīrās*.

ذكر خواص هذا الماء المسمى طريراس

Among these [properties] is that, if some of it is put inside a vessel and any part of a living being is placed in it—its heart, for instance, or its liver, or its bladder—and it remains in the water for one hour, while the vessel is covered with something that protects it from the air, then this part or flesh will melt, until only a fluid liquid remains, mixing with the 'water'.

منها انه ان جعل منه في اناء ووضع فيه اي عضو كان من اعضاء الحيوان مثل قلبه او كبده او طحاله او لحمه فانه اذا بقي فيه مقدار ساعة واحدة وغطى الاناء بشيء يستره عن الهواء فان ذلك العضو او اللحم يذوب حتى يبقي ماء جاريا ويختلط بالماء

Any living being that is immersed into this water for half an hour, then its parts will dissolve, and it will soon die.

واي حيوان غُمس في هذا الماء مدة نصف ساعة فان اعضائه يتهرى ولا يلبث ان يموت

If a small part of it is put in the eye of someone who is sleeping, his eyes will be gouged out on the spot, so that he will not be able to see the one who does it for the swiftness of the water's effect.

واليسير منه ان وضع في عين النائم سالت عيناه على المكان بحيث لا يرى من فعل به لسرعة فعله فيه

If it is allowed to fall in drops inside the nose or the ear of someone who is sleeping, convulsions will affect his brain, and he will die in one or two days.

وان قطرت منه قطرات في انف النائم او في اذنه اصابه تشنج في دماغه وهلك بعد يوما و يومين

Any vessel made of copper or iron that is immersed in it for one night will entirely burn, and it will remain as if its inside and outside have been burnt by fire, as if someone had been grinding it into a fine powder, thanks to [the water's] power over it.

واي اناء من الاواني النحاس او الحديد غمس فيه ليلة فانه يحترق باسره ويبقي كانه احرق بالنار باطنه وظاهره بحيث لو دام احدٌ ان يطحنه كالذرور لقدر على ذلك

And I will mention its great advantage in its place, God willing. وفائدته الكبرى سياتي ذكرها في موضعها ان شاء الله

ويختلطه الماء [ويختلط بالماء | N الحمه [لحمه | N ووضع عليه [ووضع فيه | *om.* N [المسمى | *add.*T واما ذكر [ذكر T | اذا [ان | E B N T [لا | *om.* E به لك سرعة [به لسرعة N; به ذلك لسرعة | add. T يحرق [يحترق | N لزم [دام | ذكره في موضعها [ذكرها في موضعها | *om.* N [الكبرى | N اورام B;

These texts contain some hints to a transmission of this piece of technical knowledge in a longue durée perspective. The narrative of the frame story in *The Treasure of Alexander* places the contents in the line of knowledge transmission originating in antediluvian times. Hermes, the first link in the chain of transmission, passed it on along an anachronistic—though most evocative—line: Apollonius of Tyana retrieved it from the abysses of the sea in which Hermes had decided to bury it; then it passed from Aristotle to Alexander, and, eventually, to the Abbasid Caliphate in Baghdad. The frame tale also presents *The Treasure of Alexander* as a summa of the different branches of technical knowledge that the Arabo-Islamic world inherited by translation from the Graeco-Hellenistic times. Assuming that this is the case and that there is a kernel of historical reality behind the narrative, it is worth scrutinizing the Greek sources in search of clues that may help us draw a possible line of transmission.

In fact, Graeco-Egyptian alchemical literature also refers to substances labelled as 'water' prepared with vegetal and mineral components.[12] The most celebrated of them is probably so-called 'divine water', which is said to have the power to turn base metals into gold, that is to say to dye them. The expression 'divine water', however, is potentially ambiguous and can also be interpreted as 'sulphur water' (Θεῖον ὕδωρ or Θείου ὕδωρ).[13]

12 Synesius, commenting on the Pseudo-Democritus, states that 'waters' can be extracted by any solid substance; the 'waters' meant for the making of gold were dealt with separately from the common ones: "By speaking about flowers he showed us that the waters are obtained from solid substances. And in order to persuade us that this is the way things are, after mentioning 'pure urine' he said: 'and quicklime water, and water of cabbage ashes, and waters of lees, and alum water,' and at the end he said 'dog's milk'. It is clear for us that it [i.e. this milk] is what [i.e. the vapour that] rises up from what is common [i.e. from the substances of everyday use]. Before [the dog's milk] he introduced the substances that can dissolve bodies, i.e. "soda water and water of lees." And look at how he spoke: 'These are the substances for the making of gold; these are the substances that change the matter, that make it possible to mine [metallic bodies] and make them fire-resisting'." Matteo Martelli, *The Four Books of the Pseudo-Democritus* (Leeds, UK: Maney Publishing, 2013), 129.

13 See Matteo Martelli, "*"Divine Water"* in the Alchemical Writings of Pseudo-Democritus,"

The evident difference between the concise Greek tradition and the much more abundant Arabic one suggests that there is no direct relation of translation between the two. What these different waters have in common is the effect, that is to be substances with a highly corrosive power, possibly some kind of acid. The first 'water' is, in fact, labelled as 'sharp water' (*al-mā' al-ḥadd*) and represents the starting point of the aforementioned progression of intensity detectable in the series of four concoctions.[14]

A possible relation, however, can also be established on the basis of very peculiar elements whose parallel attestation can hardly be considered mere chance due to polygenesis. These elements can be described as 'clues of transmission' to the Graeco-Hellenistic tradition that survived through time, different cultures, and various languages.[15] The technical nature of the contents opens the possibility of changes and innovations in the procedures that might have resulted from an actual empirical dimension, in constant dialogue with the textual tradition.

The first 'water', for instance, counts a peculiar substance among its ingredients, the shells of a mollusc called a 'river frog'. This is reminiscent of one of the substances for the making of gold listed by the Pseudo-Democritus, possibly a code name for chrysocolla, a copper phyllosilicate mineral with a distinctive green hue.[16]

> [Ps. Democritus] Substances for the making of gold: Mercury that comes from cinnabar, *magnēsia*'s body, malachite, that is 'ranunculus' [lit. 'little frog', χρυσόκολλα, ὅ ἐστι βατράχιον]—it is found among the green stones

Synesius' commentary adds some details about the procedure and the use of this 'water'.

Ambix 56, no. 1 (2009): 5–22. The replication performed to match the philological study has confirmed the effect described in the sources. At the beginning of this article, Matteo Martelli gives a detailed list of the attestations of the 'divine water' in Graeco-Egyptian alchemy, see 5, note 2.

14 This contribution focuses on the possible 'clues of transmission' that may witness to the reception of a Graeco-Egyptian 'erratic block'—to say it with Manfred Ullmann—into the early tradition of Arabic alchemy. The use of 'sharp waters' to treat metals is largely attested in al-Rāzī. See Julius Ruska, *Al-Razi's Buch Geheimnis der Geheimnisse* (Berlin: Verlag von Julius Springer, 1937); and Gail Taylor, "The *Kitab al-Asrar*: An Alchemy Manual in Thenth-Century Persia," *Arab Studies Quarterly* 32, no. 1 (2010), 6–27.

15 See Carlo Ginzburg and Anna Davin, "Morelli, Freud and Sherlock Holmes: Clues and Scientific Method," *History Workshop* 9 (1980): 5–36.

16 See Martelli, *Four Books*, 117, 127, and 129–131.

> [Synesius] The solution concerns solid bodies, in order to dissolve them and make them liquid [lit. waters]: in this way they flow and are made dark and thin. This is called divine water and mercury and malachite and unburnt sulphur and all the other names that are suitable.
>
> [Synesius] Mix the bodies with mercury, file them finely and add any other mercury: for mercury attracts everything to itself. Let it macerate for three or four days and put it in a vessel [placed] not on hot ashes with a high flame, but in ashes at a milder temperature [this is the *kērotakis*]. During this application of heat, a glass instrument that has a breast-shaped protuberance is fitted onto the vessel. Put it on the top of the vessel and turn it upside down; collect the water going up through the breast and keep it for the fermentation. This water is called divine water, and this is how to turn [the bodies] inside out. Through this method you lead the hidden interior nature outside; this is called the melting of bodies. This water after being macerated is called vinegar and Aminaios wine and similar names.

The 'river frogs' mentioned in *The Treasure of Alexander* may be the relic of a literal interpretation of a *Deckname* for the green copper mineral. The shells might have been added in the course of transmission in order to make better sense of a possibly obscure passage. Burnt shells, in fact, were commonly used to produce lime, and this too may have driven the analogy.[17]

The extractions of the first and the second 'waters' make explicit reference to the use of two different—though not better specified—receptacles, with the water flowing from one into the other. In the Greek tradition too, two different receptacles constantly appear in connection with 'divine water', the *tribikos* and the alembic.[18]

The general warning to avoid inhaling this preparation's fumes is definitely expanded in the Arabic tradition.[19] Here, it is said that the vapours of the fourth water are fatally harmful to any living being, and specifically that their smell damages the brain. In order to protect the brain, the text mentions Hermes' advice to insert cotton pads imbued with perfumed substances into the

17 For the use of eggs and their shells in the preparation of 'divine water', see Zosime de Panopolis, *Mémoires authentiques*, trans. Michèle Mertens (Paris: Les Belles Lettres, 1995), 30.

18 See Zosime, *Mémoires authentiques*, 30–33.

19 See Zosime, *Mémoires authentiques*, 31.

nostrils. The section devoted to the properties of the 'fourth water' resumes the discussion on its harmful effects. In this instance, however, the warning seems to turn into a set of instructions to use this substance as a poison.

If, on the one hand, there are macroscopic differences between the two texts and the procedures they describe, on the other they share significant structural elements of the procedure, such as alternating between a dry and a moist phase in the processing of the ingredients, along with attention to the duration of the procedure. The number of days probably has also a symbolic dimension; if the process transmitted in Greek needed one hundred and ten days, the one transmitted in Arabic required seventy days, a number that seems to complete the numerical progression of seven by seven.

2 The Use of the Four 'Waters'

The second chapter of *The Treasure of Alexander* also contains a number of recipes for processing minerals and metals (e.g. the purification of red arsenic, or the whitening of copper) in which the four 'waters' are actually put to use as ingredients in alchemical procedures. Two of these procedures are presented here in order to provide some context for the use for the 'waters'.

The first example describes a process to 'whiten' copper in order to make it look like silver.[20] This procedure is explicitly ascribed to Hermes and Apollonius of Tyana. Here, the fourth water is used to moisten the dry ingredients while grinding them. The ingredients are allowed to dry in a sealed vase three times and, in the course of the process, the mixture changes its colour from red to white, reaching by the end the consistency of a powder (a dry elixir) that has the power to change into silver ten times its weight in copper.

20 After the attribution of the procedure to Hermes—another clue of the possible relation with the Graeco-Egyptian tradition—there is a description of a first recipe to whiten copper. This first procedure is simpler and more concise than the one edited and translated in this chapter: copper leaves must be cooked in a mixture of pure water and leek juice, with the addition of some other metallic ingredients. After that, the copper leaves have to be wiped with a woollen cloth, then immersed, first, in pure water, and then in leek water, and finally in olive oil.

Chapter on the whitening of copper and making it like silver.[21]

This is one of the best of what Hermes gave us, and also Apollonius [of Tyana] praised it.

باب بياض النحاس وتشبيهه بالفضة

وهو من افضل ما افادناه هرمس وكان بليناس ايضا يثني عليه

[...]

[*first procedure to whiten copper*]

Another manner: half a *raṭl* of quicksilver must be taken, placed on a cutting board, one sixth of its weight of ammonium salt and one quarter of its weight of ceruse of lead must be poured onto it, well ground on the cutting board, moistened with some of the water named *Ṭarīrās*, in the necessary quantity.

نوع اخر يؤخذ نصف رطل من الزيبق ويجعل في صلاية ويصب عليه من النوشادر مثل سدس وزنه ومن اسفيداج الرصاص مثل ربع وزنه ويسحق على الصلاية سحقا شديدا ويسقي من الماء الملقب بالطريراس مقدار الحاجة

Then, it must be ground for one day and one night; after this, one quarter of the whole weight of ground yellow arsenic (orpiment) must be thrown into it.

ثم يسحق ذلك يوما وليلة وبعد ذلك يطرح عليه من سحق الزرنيخ الاصفر ربع وزن الجميع

Then, it must be ground for one day and one night; during this interval [of time], some *Ṭarīrās* water must be added to it, in the quantity that makes its consistency suitable for grinding and mixing.

ثم يسحق يوما وليلة وفي خلال ذلك يسقي من الطريراس قدر ما يصلح قوامه للسحق والاختلاط

Then, it must be put into a terracotta vase suitable for the operation, sealed with philosophical clay (*lutum sapientiae*), and allowed to dry.

ثم يودع ذلك كوزا من الفخار محكم الصنعة ويطين بطين الحكمة ويجفف

Then, it must be sealed for a second time with philosophical clay, then sealed for a third time, and allowed to dry in the shade.

ثم يطين ثانيا بطين الحكمة ويجفف ويطين ثالثا ويجفف في الظل

Then, it must be placed on an intense fire for seven hours; then, break out the vessel, and you will find that what is inside it has taken on a stone-like and dry consistency—like cinnabar, except for the fact that its colour is not of the same red as cinnabar—and then grind it with egg white for a whole day.

ثم يودع نارا قوية مدة سبع ساعات ثم تكسر الاناء عنه فانك تجد ما فيه مستحجرا يابسا كالزنجفر الا ان لونه ليس على حمرة الزنجفر فاسحقه ببياض البيض يوما كاملا

21 (B), fols 13r–4v; (E), fols 17r–18r; (I), fols 17r–18r; (N), fols 18r–19r; (T), 172–175.

ثم جففه في الظل واسقه خلا حاذقا ثم اسحقه بالخل يوما اخر ثم اغسله بالخل سبع مرات ثم بالماء العذب سبع مرات ثم جففه واضق اليه مثل وزنه من الزيبق واخلطهما بالسحق

Then, dry it in the shade, and moisten it with sour vinegar, then moistened with [regular] vinegar for another day; then washed with vinegar seven times, then seven times with fresh water; then let it dry, and its same weight of quicksilver must be added to it, and the two substances mixed by grinding.

ثم صعدهما في الاثال يصعد حجرا على لون النقرة الا انه اقل بياضا من النقرة

Then, the two must be sublimated in the aludel (*al-uṯāl*) in the form of a stone of the colour of the white elixir (*nuqra*, i.e. silver) will rise and evaporate, with the difference that it is less white than the white elixir.

فالق منه درهما واحدا على عشرة من النحاس المطهّر يصير فضة بيضاء لا يشك فيها احد

Then, throw one single dirham of it on ten dirhams of purified copper, and it will become white silver, of the kind that nobody will have doubts about.

| E I N سحيق [سحق | *om.* N [ومن اسفيداج الرصاص مثل ربع وزنه | E وزن الزيبق [وزنه | T طريق [نوع الماء [الاناء | N قارا [نارا | *add.* E ثانيا [ويجفف | T تودع [يودع | B والاخلاط [والاختلاط | N قادر [قدر | E بيض الدجاج [البيض | *om.* E [فاسحقه | N الماء [الاناء | *om.* B [ويطين ثالثا ويجفف | T وسقه [واسقه | N ثم مرات جففه [سبع مرات ثم جففه | B N وسقه [واسقه

The second procedure chosen as an example prescribes the use of two different waters in order to confer the required degree of purity to one of the basic ingredients necessary for the purification of tutty (*tūtiyā'*).[22] *The Treasure of*

22 It is not easy to identify this mineral substance. In his *Lexicon*, Lane wrote: "an arabicized word, Tutia or tutty; an impure protoxide of zinc; a certain stone or mineral, well known, employed as a collyrium. It is also applied in the present day to several kinds of vitriol; the sulphates of zinc and of copper and of iron. De Sacy says, on the authority of Ibn Beyṭár, that there are two species thereof; one which is found in mines; the other, in the furnaces in which copper is melted, like cadmia; and this latter species is what the Greeks called pompholyx: of the fossil tutia there are three varieties; one is white; another, greenish, the third, yellow, with a strong tinge of red: the white is the finest variety; the green, the coarsest", see Edward W. Lane, *Arabic-English Lexicon*, vol. 1 (Edinburgh: Williams and Norgate, 1863), 321c; Alfred Siggel, *Arabisch-Deutsches Wörterbuch der Stoffe* (Berlin: Akademie Verlag, 1959), 78; see also Fabian Käs, *Die Mineralien in der arabischen Pharmakognosie: Eine Konkordanz zur mineralischen Materia Medica der klassischen arabischen Heilmittelkunde nebst überlieferungsgeschichtlichen Studien*, vol. 1 (Wiesbaden: Harrassowitz, 2010), 361–372.

Alexander says that natural metals are not necessarily preferable to artificial ones;[23] what really counts is that they are prepared by means of a thorough purification. The purification of tutty sees the use of an additional 'water' called *Kaylayānas* that is endowed with a softening faculty.[24]

This operation is supposed to be carried out under a particular astrological configuration—a signature for Hermetic materials in Arabic technical literature—that is, while Venus, the Moon, and Saturn are in a favourable position. The numerous ingredients, progressively added during the operation, are alternately soaked in the 'waters' and cooked on the fire. The last part of the text explains the virtues of purified tutty, presented as a powerful elixir that can turn silver into a very plausible imitation of gold.

Purification of tutty and its procedure.[25]
You should know that, between the metals that come from the mines and the artificial things that resemble metals, there is no need to prefer what has been generated by the burning and the excessive cooking derived from the sulphurous, salty and ashy faculty of bad quality.

In fact, in most operations, these spoil and alter the right condition, and provoke a despicable corruption.

For this reason, then, it is necessary to pursue the purification of these metallic bodies from these filthy and dirty [components] which are among the most important things we need to keep in mind.

صفة تطهير التوتياء وتدبيره
اعلم ان المعدنيات الخارجة من المعدن والاشياء
المصنوعة المشبهة المعدنيات غير مستغنية عن ان
يفضل بينهما ما قد ولده فيها الاحراق والطباخ
المفرط من قوة كبريتية وملحية ورمادية ردية
الكيفية
فانها في اكثر الاعمال تدفع صلاحا وتختلف
وتؤثر فسادا مكروها
فلذلك العناية بتطهير اجسام المعدنيات من هذه
الادران والاوساخ من اهمّ ما ينبغي لنا ان
نقصد له

23 Among the different theories on the formation of minerals and metals, *The Treasure of Alexander* mentions three different faculties, attributed respectively to sulphur, salt, and ash. For the reception of the Aristotelian theory on the formation of metals and its elaboration in the Arabo-Islamic context, see Paul Lettinck, *Aristotle's Meteorology and its Reception in the Arab World, with an Edition and Translation of Ibn Suwār's* Treatise on Meteorological Phenomena *and Ibn Bājja's* Commentary on the Meteorology (Leiden: Brill, 1999).

24 The mention of this extra water strongly suggests that the four 'waters' mentioned by *The Treasure of Alexander* represent an anthological choice in a much larger pool of materials.

25 (B), fols 15r–15v; (E), fols 20r–21r; (I), fols 20r–21r; (N), fols 21r–22r; (T), 179–181.

When you want to purify tutty, then Venus must be in her house, with the Moon in a favourable conjunction with her, while Saturn has to be in his house or in its exaltation.

فاذا اردتم تطهير التوتياء فلتكن الزهرة في بيتها والقمر متصل بها اتصالا مقبولا وليكن زحل في بيته او شرفه

Then, take three *raṭl* of tutty and grind it finely.

ثم خذوا من التوتياء ثلاثة ارطال واسحقوه ناعما

Then, cover it with the third water called *Ra'rāsiyūs*, and leave it in this for one night.

ثم يغمر بالماء الثالث المسمى برعراسيوس ويترك فيه ليلة

Then, take it out, wash it with sublimated vinegar, and then with fresh water.

ثم يصب عنه ثم يغسل بالخل المصاعد ثم بالماء العذب

Then, it must be ground with half of its quantity of quicksilver, one third of its weight of cinnabar, and half of its tenth of ammonium salt; moistened with egg yolk, and roasted on a moderate fire for seven hours.

ثم يسحق مع مثل نصفه زيبق وثلث وزنه زنجفر ومثل نصف عشره نوشادر ويسقي دهن البيض ويشوي في نار معتدلة القوة سبع ساعات

Then, one tenth of its quantity of litharge is added to it, one tenth of quicksilver, half tenth of copper filings, ground well on a cutting board with the second water called *Qūriyāl* for one hour; and the quantity [of the second water] needs also to cover it must be poured over it, and left like this for one night.

ثم يضاف اليه مثل عشره مرداسنج ومثل عشره زيبق ومثل نصف عشره روسختج ويسحق ناعما على صلاية بالماء الثاني المسمى قوريال ساعة ويصب عليه منه ايضا ما يغمره ويترك فيه ليلة

Then, [the water] must be poured out from it and this [mixture] must be washed with sublimated vinegar; then with water and salt; then with fresh water; then allowed to dry and mixed with one sixth of its weight of quicksilver and one third [of its weight] of cinnabar.

ثم يصب عنه ويغسل بالخل المصاعد ثم بالماء والملح ثم بالماء العذب ثم يجفف ويضاف اليه وزن سدسه زيبق ووزن ثلثه زنجفر

Then, everything must be ground and moistened with the softening 'water' called *Kaylayānas*; then, it must be roasted on a moderate fire for one day and one night; then ground finely, and washed with the first water called *Ṣābiyūs*; then with vinegar, then with water, and carefully stored away, because it is purified tutty.

ثم يسحق الجميع ويسقي الماء الملين المسمى كايليانس
ثم يشوي في نار معتدلة القوة يوما وليلة
ثم يسحق ناعما ويغسل بالماء الاول المسمى صابيوس ثم بالخل ثم بالماء ويحتفظ به فهو التوتياء المطهّر

Section فصل

Know that purified tutty is a mighty elixir that turns the aspect of copper into that of gold, as far as colour, lustre, faculty, and softness are concerned.

اعلم ان التوتياء المطهر هو اكيسر عظيم يقلّب هيئة النحاس الى هيئة الذهب لونا ورونقا وقوة ولينا

And this is that, if five dirhams of it are poured onto twenty dirham [of copper], this will become pure gold, and no one who looks at it will ever have any doubt about that.

وذلك انه اذا القى منه وزن خمسة دراهم على عشرين درهما نحاس صار ذلك ذهبا ابريزا لا يشك فيه من يراه

So, treasure this chapter and as instruction, since it is among the most precious sciences and the most noble chapters.

فاحفظ هذا الباب وصنةً فانه من انفس العلوم واشرف الابواب

الخارجة من المعدن والاشياء المصنوعة | T المصبوغة ;B المصوغة [المصنوعة | N om. [اعلم | E N om. [وتدبيره وتختلف | B ولد [ولده | E منها [بينهما | N om. [عن ان | N مستعينة ;B معينة [مستغنية | E om. [المشبهة المعدنيات N متصلة ;B I متصلة [متصل | N يقصد [نقصد | B يتطهر [بتطهير | B E om. [فلذلك | E ويختلف ويؤثر [وتؤثر | N om. [ثم يصب عنه | T زعراسيوس ;N بغراسيوس ;I رعراسيوس [برعراسيوس | N واسحقوا [واسحقوه | T [ثم بالماء العذب | I روسنحتج ;B روستحج [روسختج | I عنها [عنه | N ومن [دهن | N بالعذب [بالماء العذب مشار [هيئة | N om. [هو | I T add. لهذا [المطهّر | N يشفي [يشوي | T كايلنايس ;N كالماس [كايليانس | N om. وصيه بوصية [وصية | N طار [صار | I om. [النحاس | T وزنا ;E I ورنقا [ورونقا | N

3 Concluding Remarks

The 'sharp waters', whose preparation and use is described in great detail in *The Treasure of Alexander*, indeed appear to run deep. Some textual clues suggest that the Arabic text of the 'waters' may belong to a stream of tradition that goes back to Graeco-Egyptian alchemy. If there is a connection between the Greek and the Arabic waters, however, it is far from a direct link. The frame story woven around *The Treasure of Alexander* underlines this connection and bears witness to the cultural need to re-contextualize and imbue the acquired knowledge with prestige in the context of reception. The acquisition of materials did not exclude the possibility of elaboration, also thanks to the empirical aspects of alchemical knowledge, which was in constant dialogue with its textual tradition. From a methodological point of view, a multilingual and multidisciplinary perspective, along with a complete *recensio* of primary sources, and special attention for the clues of transmission are the keys to unlocking and interpreting this and other technical texts.

Acknowledgments

This article is being published within the framework of the *AlchemEast* project, which has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (G.A. 724914).