Women in the History of Science

A Sourcebook

Edited by

Hannah Wills, Sadie Harrison, Erika Jones,
Farrah Lawrence-Mackey and Rebecca Martin

UCLPRESS

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For Rowan, and all the curious girls to come.

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1

Tappūtī-bēlat-ekalle (fl. 1200 BCE): A cuneiform tablet on Middle Assyrian perfumery (c.1200 BCE)

Dr Eduardo A. Escobar[3]

Introduction

Tappūtī-bēlat-ekalle has special significance within the history of science; she was an expert perfumer, an ancient Assyrian woman hailed as history's first chemist.[4] The clay tablet which bears her name was excavated from the city of Assur in what is today northern Iraq and can be dated to c. 1230 BCE, an era known as the Middle Assyrian period. Known by its publication number, KAR 220, the text preserves an extensive recipe for processing aromatic cane oil.[5] An important textual element of KAR 220 is its colophon (at the end of the source below); colophons preserved on cuneiform texts provide critical data regarding the tablet's historical context, including its date and the scribes involved in the text's production. In the case of KAR 220, the colophon ascribes all knowledge contained within the recipe to Tappūtī-bēlat-ekalle herself – or as the Assyrian scribes put it – 'according to (her) mouth'. Middle Assyrian perfume recipes such as KAR 220 below demonstrate the linguistic and chemical sophistication of ancient recipes, as well as highlighting the important role women played in this field of knowledge.

Readers should note that in this translation of KAR 220, technical terms are kept italicised in the original Akkadian and hyphenated with an approximate translation of their meaning (e.g. '*diqāru*-vat' or '*paḫutu*-particulates'). Breaks on this four-column tablet are indicated by ellipses in

the translation. Middle Assyrian volume and weight measurements have been translated to approximate modern equivalencies; these include: the talent (*biltu* ≈ 30 kg); mina (*manû* ≈500 g); seah (*sūtu* ≈10 litres); liter (*qû* ≈1 litre); and cup measurement (*kāsu* ≈1/5 litre). The translation also inserts parentheses with implicit instructions and contextual information to ease the readability of this ancient recipe. Finally, square brackets are used to indicate a break in the tablet that has been reconstructed from duplicate texts.[6] The images below demonstrate the refined nature of the clay tablet and cuneiform script preserved on this four-column text, which is housed at the Vorderasiatisches Museum in Berlin.

Source

KAR 220 (VAT 10165): A perfume recipe attributed to Tappūtī-bēlat-ekalle

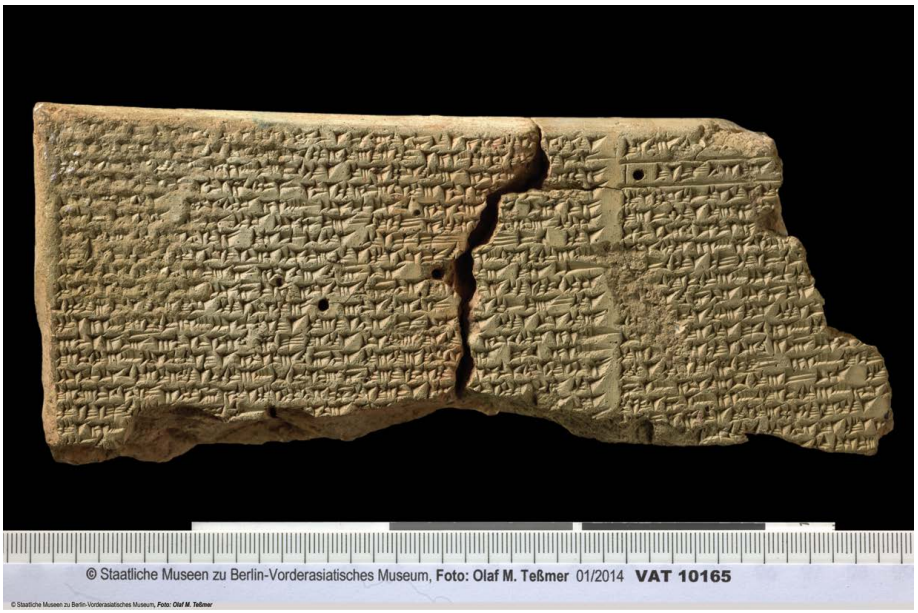

Figure 1.1a Obverse KAR 220 (VAT 10165): A perfume recipe attributed to Tappūtī-Bēlet-Ekallim (© Staatliche Museen zu Berlin – Vorderasiatiches Museum, Foto: VAT 10165).

Obverse column 1, 1–19

If you want to process aromatic cane oil: (take) ≈20 litres (2 seahs) worth of cane, along with their *tubāqu*-roots (i.e. the whole cane). Once you have washed them, you set down a … *diqāru*-vat and heat *tābilu*-aromatics

with fresh, high-quality water from a palace well of Aššur. You transfer (the mixture) into a *ḫarû*-vessel.

You (then) pour on top of this liquid mixture, within the *ḫarû*-vessel: 1 litre of *ḫāmimu*-aromatic, 1 litre of *jaruttu*-aromatic, (and) 1 litre of myrtle, good-quality (and) filtered. These are your measurements, to be apportioned according to the amount of water taken. You perform (the steps prescribed) at sunset and nightfall. (The mixture) is to steep overnight.

At dawn, when the sun rises, you filter the liquid and these aromatics through a *sūnu*-cloth into a *ḫirsu*-vessel. You clarify the mixture (by filtering it) from this *ḫirsu*-vessel to another *ḫirsu*-vessel. You remove the *minduḫru*-particulates. You wash 3 litres of crushed nut-sedge with the liquid mixture of these aromatics. You remove the *paḫutu*-particulates.

You put on top of this (filtered) liquid mixture of aromatics, within a *hirsu*-bowl: 3 litres of myrtle, 3 litres of cane, crushed and filtered. You measure out ≈40 litres (4 *sūtu*) of this liquid mixture that has (steeped) overnight with aromatics. You filter through a sieve: 1 1⁄2 litres of unfiltered mash made from almonds (together with) 2 cupsful—(using) small cups–of wood shavings from the *kanaktu*-tree. You gather up the oil (produced) in a *harû*-vessel. In the liquid mixture . . .

Obverse column 2, 1–18

You remove it from the interior of the *diqāru*-vat [which you then wash and wipe clean]. These are the ingredients [for the third stage of processing].

In your fourth pouring, you heat up *tābīlu*-aromatics [with the fresh, high-quality water from a well and you pour it into a *ḫirsu*-vessel. You place into the *ḫirsu*-vessel] 1⁄2 litre of cane, 1⁄2 litre of myrtle, crushed [and filtered onto the heated liquid mixture.] (The mixture) is to steep overnight.

At dawn, [when the sun rises, you clarify the liquid mixture] and these aromatics through a *sūnu*-cloth from this *ḫirsu*-vessel to another *ḫirsu*-vessel. You remove the unwanted *minduḫru*-particulates. You measure out 3 litres [of cane and ≈3 litres of myrrh?] which has been sifted, ≈40 litres (4 *sūtu*) litres of the liquid mixture [that has steeped overnight in aromatics]. You treat this reed and myrtle [as you did previously. You light a fire].

(When) the water is heated, [as required for mixing] you pour oil into the mixture [and you stir with a stirrer]. Once the fat oils, the water, and aromatics have penetrated each other (and) have intermingled thoroughly, [you should not disturb it]. You then gather a beneath the *diqāru*-vat [for two to three days you …]

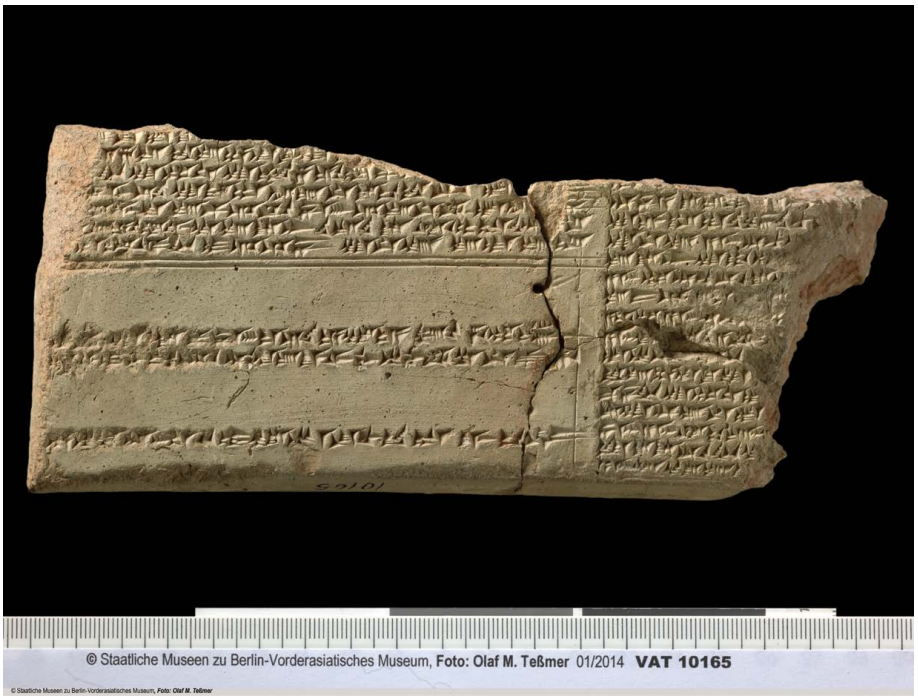

Figure 1.1b Reverse KAR 220 (VAT 10165): A perfume recipe attributed to Tappūtī-Bēlet-Ekallim (© Staatliche Museen zu Berlin – Vorderasiatiches Museum, Foto: VAT 10165).

Reverse column 1, 1′–15′

That which has steeped overnight within the liquid mixture, you scrape away [with your hand]. [You test] the *ṭinṭinu*-components and remove [the bad quality ones]. You filter and clarify this liquid mixture [through a *sūnu*-cloth transferring it into a *ḫirsu*-vessel] …

Your liquid mixture – that which you have [clarified] – you pour into a [*diqāru*-vat]. …[You place] ≈3 litres of … and ≈3 litres (3 *qû*) of "sweet myrrh" (*persaḍuḫḫu*) onto the top of this liquid mixture within a [*ḫirsu*-vessel. You ignite a fire]. Once the liquid is mixed and heated, [you pour oil into it]. You stir with a stirrer. [If the oil and aromatics] have interpenetrated one other, [you ignite] a fire. [When the oil mixture expels froth,] you cover up the top of the *diqāru*-vat. [You cool it off with water.] As soon as the sun [at the end of the morning watch has risen, you prepare a *šappatu*-jar] for the oils, waters, and aromatics. You gather a fire beneath *diqāru*-vat. [You remove] the liquid mixture and *šēlûtu*-residue. [You then wash out the *diqāru*-vat, and wipe it clean] …

Reverse column 2, 1′–10′

As soon as the sun [at the end of the morning watch has risen], if (the aromatics) have interpenetrated each other, you [ignite] a fire. You cover the top of the *diqāru*-vat, you cool it off. You prepare a *šappatu*-jar for the cane oil. You lay a *sūnu*-cloth with a *bittu*-implement across the *šappatu*-jar. Then, taking a little oil at a time, you strain it through the *sūnu*-cloth into the *šappatu* jar. You go about removing the *ṭišṭišu* and *midduḫru* particulates that have been left over in the bottom of the *diqāru*-vat.

Colophon: Perfume-making recipe for ≈20 litres (2 seahs) of processed cane oil, fit for a king, according to the mouth of Tapputi-belet-ekallim, the perfume-maker: month *Muḫur-ilāni* on the 20th day; the eponymate of *Šunu-qardu*, the chief cupbearer.

Analysis

The modern perfume industry is dominated by male 'noses'.[7] In contrast, women in Assyrian perfumery held the professional title *muraqqītu*, 'experts in aromatics'. The *muraqqītu* were respected for both their technical knowledge of processing aromatics and were charged with securing and preparing the rare and costly ingredients necessary for the production of scented oils.[8] Evidence suggests that perfume making was a collective endeavour, requiring a coordinated team of skilled perfumers. Overseeing this team was a 'head perfumer' who would lead and supervise the close measurement and processing of up to 100 litres of aromatic oil.[9] As such, this tablet provides only a glimpse of a more elaborate industry of women whose knowledge could only partially be recorded on a cuneiform tablet.

There are six known perfume recipes from Assur, and each describes a similar process of heat extraction (collecting and cooking the aromatics in large basins); maceration (allowing plant matter and aromatics to rest in water for extended periods of time); and refinement by means of filtration. Perfume makers employed a range of instruments and vessels to process aromatic oils. A large container called a *diqāru*-vessel served as the primary container for heating large quantities of aromatics. During this initial phase of heat infusion, up to 20 litres of plants and aromatics were processed before being transferred into a secondary filtering container called a *ḫarû*. Thereafter, the oil mixture was allowed to macerate overnight before a third stage of refinement took place by filtering the oil through a fine cloth called *sūnu*. Variations of these phases are repeated multiple times to

achieve a fine quality perfume. The highest quality Assyrian perfumes are named according to their level of refinement. After 20 filtrations one produces a grade of perfume suitable for trade (literally: 'for the road'); the finest quality scented oil, however, is achieved after weeks of refinement and 40 filtrations, and was described as 'fit for a king'. This is the product attributed to the expertise of Tappūtī-bēlat-ekalle more than three millennia ago.

Assyrian recipes like KAR 220 are good to think with. In no small part, this is because this tablet and texts like it are at once familiar and deeply unfamiliar. We still have perfume making recipes and instruction manuals today, and yet three millennia of cultural and linguistic distance separates us from the historical actors that first sought to codify knowledge of perfumery in ancient Assyria. While ingredient quantities, for example, could be recorded on a cuneiform tablet in great detail, much of the technical know-how at the heart of perfumery remained tacit, embodied knowledge; this included the experiential and somatic knowledge needed to manage temperature, timekeeping and quality control. In this regard, KAR 220 is not unusual as the history of science, and the history of recipe knowledge in particular, is filled with similar examples of tacit knowledge.[10]

Nevertheless, beyond the challenges of translation and procedural knowledge transmission, this tablet invites us to consider the local contexts of knowledge production. Committing perfume-making instructions to writing allowed scribes to develop a new form of technological literacy during a period of scholarly innovation and cultural expansion in the ancient Middle East. As such, these recipes, and the historical actors mentioned within them, provide invaluable evidence of early court scholarship in Assyria. While the tablet under consideration, KAR 220, belongs to a small corpus of similar technical recipes from Assur, it is also part of a much broader intellectual history of Akkadian procedural texts. Akkadian procedures – instructional texts addressed to an anonymous 'you' – became a long-standing textual format in cuneiform cultures for transmitting technical and scientific knowledge. The linguistic style of these recipes suggests both the influence of Babylonian science on Assyrian knowledge production, as well as the novel contributions of Assyrian perfumers to chemical writing and practice.[11] Middle Assyrian perfume recipes were composed in the Akkadian language using the cuneiform script and employed a linguistic style reminiscent of earlier Babylonian culinary and mathematical procedures. These recipes, however, are far from derivative of a Babylonian tradition. On the contrary, the linguistic evidence points to an innovative mixture of verb

forms unique to the Assyrian dialect of Akkadian, foreign terms for plants and ingredients attributed to northern Syria, technical terms for instrumentation and a focus on numeracy and standardised state metrology that establishes a distinctively Assyrian scientific voice.[12] Moreover, the perfume recipes would have served to define and quantify royal taste during a period in which the Assyrian state had only recently entered an international arena. Characterised as an 'international period', the late second millennium BCE in the ancient Middle East and Mediterranean world was motivated by long-distance trade of elite goods and expertise and cultural exchange between the great powers of the known world.[13]

This perfume recipe, attributed to Tappūtī-bēlat-ekalle, demonstrates the rich interface of material and textual cultures that characterise the early history of science. However, KAR 220 also shines a light on not only an individual female perfumer but on the collective and tacit knowledge production of women, as well as raising questions about what 'science' is and how it was practiced in the ancient world. When considered, as above, in its geographic and cultural setting, KAR 220 provides us with evidence of Assyrian female perfumers' significant role in scholarly innovation and codification.

Questions

1. Why do you think Assyrian scribes committed perfume-making knowledge to tablets?
2. Middle Assyrian perfume recipes were excavated from state archives in the city of Assur. What does their archaeological context tell us about their function?
3. When experiential know-how is codified as text, which elements of technical and scientific knowledge are preserved? Which elements are lost? What sorts of knowledge do recipes transmit?
4. Can we characterise the recipe of Tappūtī-bēlat-ekalle as 'chemistry'? Relatedly, what are some methodological drawbacks of identifying Tappūtī-bēlat-ekalle as 'history's first chemist'?
5. Assyrian perfume recipes record both practices of cultural exchange and the standardisation of weights and measures by the state; moreover, the scents described in these recipes provide a glimpse of elite commercial consumerism during the late second millennium BCE. What does the socio-intellectual context of KAR 220 tell us about the broader role of women within Middle Assyrian culture?

Further reading

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