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The Importance of Aquatic Fauna on Ancient Mesopotamian Healing Practices—An Environmental Humanities Approach to Human Dependency of Non-Human World

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Abstract: Diachronically, Mesopotamian data pertaining to the religious spheres point to a transversal notion that deities were considered responsible for every cause–effect event observed/experienced by humans in their natural/cosmic surroundings. Such notion is especially visible on texts pertaining to the restoration of human health, where such an aspect was ultimately considered as a divine prerogative. Yet, these textual data also show how natural elements were basilar to the success of healing practices when thoroughly manipulated by specialists. Their examination through a perspective that intertwines the apparatus of History of Religions and Environmental History thus reveals great potential for contributing to the topic of human/nonhuman entanglements in the *longue durée*. With this paper, we propose to revisit the uses of aquatic fauna as displayed in Babylonian and Assyrian healing texts dated to the second half of the 2nd millennium and the first half of the 1st millennium BC. Although at a preliminary stage, our research has been guided by the combined theoretical-methodological perspective above-mentioned, aiming at highlighting the great importance conferred to these animals. Ultimately, we aim at stressing the importance of addressing the dependence of Mesopotamian specialists and patients on such elements of Nature to better understand this ancient context.



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1. Introduction

Human societies have always been concerned with issues related to health/illness, as they constitute a basic aspect of everyday life and, more importantly, they are of utter importance for their survival as a species. As such, when integrated into a specific natural environment, in the past, as today, human groups sought resources that met their basic needs, including elements suitable to maintain and/or restore health. By doing so, humans constructed knowledge about the natural world, built relationships with animals and other biological entities, and gave meaning to the products they provide or/and became. The Environmental Humanities, including the paradigms from ecocriticism or studies of literary productions addressing more-than-human relationships, allows us to question classical academic approaches on this wide subject matter. In fact, the “traditional” postulates from History and Cultural Studies to human societies' developments and adaptations can undoubtedly gain another dimension if considering their integration and close entanglements with the natural realm. Among other aspects, the environmental humanities “ask how our humanity is enabled by the nonhuman world and what our humanity (in its various, often dissonant forms) can and should contribute to that world through symbolic and material practices” (Castree 2021, p. 436).

Consequently, the study of healing traditions of different human communities, throughout time, constitutes a fertile ground to contribute to the ongoing discussion on the human/non-human interrelationships and their interdependence with the surrounding environment and biomes. This includes the study of ancient periods of human history as they are starting to take the so-called “environmental turn” (Holm et al. 2015; Holm and Brennan 2018; Holm and Travis 2017; McNeill 2017) as we see, for example, in the forthcoming 12th Oxford Post-Graduate Conference in Assyriology “From Heaven to Earth—Divinity, Humanity, and Nature in the Ancient Near East” (OPCA 2024). Understanding past practices upon natural resources and the mythical worldviews of ancient societies thus offers an interesting perspective of human reliance on Nature, of learning, adaptation, and resilience. Ancient Mesopotamia, a largely urban civilization that flourished between the mid-4th and the 1st millennia BC in the territory encompassed by present-day Iraq and Syria, can offer multiple case-studies for this wide topic.

In fact, the abundance of Mesopotamian data that displays information on the recurrent practice of zootherapy by specialized healers clearly shows that these experts and their procedures were, in general, structured around a profound theocentric framework that guided every step of the way, as we will detail in the following section. As such, though the Mesopotamian healing *corpora* cannot be labelled as strictly mythical, it was created by agents and its therapeutics were applied to individuals whose thinking operated mainly through mythological filters (Bottéro 1998, p. 55). Hence, by focusing on the textual data of these healing traditions, we aim at addressing this special issue’s challenge on the world mythology and its connection to Nature, bringing to attention a rather interesting case-study on aquatic fauna from this ancient context.

We will follow an approach that intertwines History of Religions and Environmental History, namely Latour’s (1991) seminal thesis that humans’ relation with Nature should be analyzed as an integrated system of several actants and the idea that “anthromes” or nature–humane landscapes, should be considered in the analysis and interpretation of historical multispecific entanglements (Fuentes and Baynes-Rock 2017). Having in mind the work and discussions we have been developing together and with other colleagues within a research line that aims at evaluating the relationship between humans and aquatic environments/elements at a global level, in the *longue durée*, the focus of this paper will be on the use of aquatic animals as *materia medica* and *materia magica*. We will revisit the examples we have already identified in our ongoing systematic survey of Babylonian and Assyrian textual *corpora*, by turning the traditional academic focus on this subject-matter and data (mainly concerned with the human specialists/patient’s relationship) to the relation developed between the human and the animal agents. By trying to discern links between their biological components and the symbolic/apotropaic value attributed to them, we hope to contribute to the wide topic of the relation between human and non-human worlds, emphasizing its importance and pertinence for the reconstruction of a given historical and ecological context.

2. Ancient Mesopotamian Healing Tradition—The Divine Power and the Mythical Framework

When analysed from a *longue durée* perspective, the Mesopotamian religious framework was characterized by its profound theocentric nature, which was constantly confirmed by a centrifugal tendency focused on deities (Bottéro 1998, p. 88). In other words, the material, iconographic, and textual data pertaining to divine entities diachronically manifested these beings as possessing supreme and creative power, which made them simultaneously the cosmic substances and those responsible for managing the entire functioning of the Cosmos, which naturally included all spheres of human existence. The anxieties felt before this extraordinary control were soothed by the development of mythical–ritual discourses that aimed at accommodating the human experiences within a reality controlled by powerful numinous entities.

Accordingly, several aetiological myths tried to reason about the relationship between humans and divine figures. The anthropogenic narratives that stand out as the several Sumerian–Akkadian written versions that survived until present day, like *Enki and Ninmah* (ETCSL 2003–2006, 1.1.2; Klein 1997) or *Atrahasis* (Lambert and Millard 1969; Dalley 2000, pp. 1–38), share the same common thread: humanity was created by the divine figures to substitute a group of deities into the work of the earthly domain. As such, this mythical explanation for their origin framed and guided every human single action. These meant that in their daily labor and behaviors, humans had to comply with the norms and ethics sanctioned by divine authority (Bottéro 1995, pp. 226–28). Naturally, this service also included the regular practice of certain cultic acts, such as reciting prayers, worshipping divine statues, and participating in private, familiar, or communal ceremonies, among other actions (Linszen 2004, p. 12). In return, Mesopotamian *homo religiosus* expected to receive divine blessings and the guarantee of a healthy, lasting, and prosperous existence, both individually and collectively.

Yet, the balance of power was not equivalent. The divine figures, with their superior and immortal nature, were much more powerful than humans, characterized by the fleetingness of their life and their limited ability to perceive divine designs (Oshima 2017, pp. 386–430). Nevertheless, the human reverence for the divine beings was, at least theoretically, deeply imbued with notions of reciprocal care and affection between the “creators” and their “creatures”, a decisive notion which would aid to maintain the contentment of deities, and, of course, was crucial for the survival and well-being of humans (Pryke 2016, pp. 4–5). The disruption of the terms of this agreement could thus be understood as resulting from human misconduct (whether conscious or not) and could provoke nefarious and wrathful reactions from deities. As such, when enduring problems occurred in their daily existence, Mesopotamian *homo religiosus* could explain these problems as being due to the lack of divine protection and/or a harmful divine response.

It was thus within this framework that maladies were frequently understood as divine punishment unleashed upon a flawed individual or group. Iconographic and textual records also show an interrelated action between deities and divine hybrid creatures (*daimōnes*) or even an independent action of the latter, who in both cases could “seize” or “strike” their human victims provoking health issues, and even death (Heeßel 2004, p. 99; Wiggermann 2011, pp. 77, 302–19; Konstantopoulos 2015, pp. 13–31). Additionally, the spectral component of the deceased (Akkadian: *etemmu*) could likewise torment the health of their living descendants, especially if the latter had neglected the mandatory funerary customs and rituals (Scurlock 2006; Bottéro 1995, pp. 281–85; Heeßel 2018, p. 133).

As a way of responding to the harmful actions and pathologies caused by these entities, a highly complex healing system was developed over millennia, resulting in a body of knowledge accumulated by successive generations of specialists. By meticulously observing the patient’s symptoms and establishing links with similar cases previously reported/referenced, these experts were able to diagnose the illness as well as to identify the divine agent(s) responsible for it. They were then capable of indicating the appropriate healing prescription which, diachronically, consisted of a combination of two different methods: the use of natural remedies and the performance of religious rituals. Though for a long time, western modern academia insisted on addressing these dimensions through an antagonistic approach (firmly separating the two), in recent years, the perspective has changed (vide, for instance, Scurlock and Andersen 2005; Schwemer 2015; and Satiro and Gomes de Almeida 2022).

In fact, ancient Mesopotamian data pertaining to its healing system clearly show how *materia medica* (from the eponymous *opus* by Dioscorides, in the 1st century BC), that is, the remedies prepared through the mixing of natural compounds, was greatly dependent on the complementary action of ritualistic actions. These conveyed symbolic gestures as well as the recitation of incantations, and the use of objects (like figurines or amulets) that were made from special materials, such as precious metals and stones, understood as having apotropaic properties. This *materia magica* can thus be seen as a psychological component

of the healing processes, able to appease the individual's anxieties regarding the treatment and even provide some physical relief, in the manner of today's "placebo effect" (Sousa 2003, pp. 64–67).

Hence, the *materia medica* and *materia magica* listed in the therapeutic compendia consisted of everything Mesopotamians could gather from their environments: from untamed and domesticated flora and fauna, to metals, minerals, and stones, and even some substances from the human body, like blood or saliva. Concerning fauna, it is quite significant how circa 80 different animals have been listed by Chalendar (2016, p. 101) in the therapeutic texts she has been focusing on, in each case detailing the specific range of substances extracted from each specimen, as well as their use as ingredients for the treatment of precise pathologies. Moreover, within these lists it is possible to identify a broad selection of species, from insects to mammals, as well as fishes, amphibians, chelonians, and crustaceans. Yet, and before revisiting their use on the texts we surveyed, it is important to properly frame the Mesopotamian healing data.

3. Ancient Mesopotamian Healing Corpora—Main Characteristics and Challenges

Although abundant, the surviving textual, material, and iconographic sources regarding the Mesopotamian healing traditions are often extremely fragmentary. Moreover, one can find abundantly preserved corpora from a specific time–space milieu; for other(s), the survival material can be rather scarce, thus preventing a continuous analysis of the ancient Mesopotamian multiple millennium-long contexts. To add to these challenges, the specialization that the healing knowledge comprehended seems to have led to a high degree of secrecy amongst their specialists (Lenzi 2008, pp. 747–50; Stevens 2013, pp. 211–16). In fact, a closer look at the data clearly shows that many details and processes were not recorded (either materially, iconographically, or textually), but were most likely transmitted orally between peers and amongst these and their apprentices (Lenzi 2013, pp. 13–42). Lastly, it must be kept in mind that most of the data that has survived until present day was produced by human agents who were part of the elite intellectual circles of urban institutions. In fact, it is important to stress that, despite the scientific advances in prioritizing the retrieval and careful analysis of the historical–archaeological footprint of non-elite and/or non-urban individuals/groups/communities¹, most of the available textual sources related to and/or embedded in the religious and mythical–ritual domains stem from institutional spheres and agents—who naturally neglected other experiences and considerations, for one or another reason, as Oppenheim (1977, pp. 174–77) has long alerted. There are still, therefore, many questions about the healing specialists, the procedures, and even the patients who did not integrate the circles of the Mesopotamian intellectual elites.

From what can be recovered and especially regarding fauna, however, it is safe to state that, in general, the ancient Mesopotamian healing specialists had a comprehensive understanding of the anatomy of the animals used in healing procedures, as they were also exploited in parallel processes related to other divinatory and ritual practices. In this regard, the divinatory technique known as extispicy particularly stood out, given that the numinous messages were thought to be within the internal organs of a sacrificial animal. As such, a thorough inspection of the entrails was needed, which added knowledge to animal anatomy and physiology (Scurlock 2002, pp. 397–99; Koch 2011, pp. 447–69; Martins and Martins 2013, pp. 322–23). The detailed observation as well as multiple experiences on the manipulation of animals (as a whole or of its parts), combined with the accumulation of knowledge that derived from long-lasting processes of attempts/errors/corrections/successes, resulted, therefore, in a long thread of knowledge that enabled the establishment of a referential framework as to the correct use of fauna for therapeutic benefits.

The above-mentioned complexity of the data available led us to select information displayed in therapeutic *compendia* and in ritual texts dated to the second half of the 2nd millennium and the first half of the 1st millennium BC, which survived quite complete and in abundance, when compared to sources dated to other epochs². For the former, we paid

special attention to the descriptions that, though focused on the symptomatology of the patient, provided detailed instructions about the preparation of remedies, and as such, the animal-derived ingredients needed. As for the latter, our focus was on the ritual references on an animal becoming a suitable receptacle of the disease that affected the human patient. Our survey thus allowed us to identify the common use of fishes (Ebeling 1971a, pp. 66–67), frogs (Ebeling 1971b, p. 118), turtles (Weszeli 2011, p. 179), and crabs (Heimpel 1983, p. 223) in these practices, which draw attention to the importance of the aquatic fauna within this healing system. Simultaneously, these preliminary results stress the need to encompass the multiple aquatic environments and ecosystems, beyond the riverine ones, as the richness of the marshy and maritime biomes, namely in southern Mesopotamia, was (and still is) crucial (Silva 2020, p. 30).

As already mentioned, the examination of the selected was guided by the goal of trying to discern the possible links between the animal biological components and the symbolical/apotropaic value conferred to them. As such, we had in mind current identified biochemical properties, as well as treatments for maladies postulated by modern medicine. Yet, we also have considered the dangers of retrospective diagnosis, as Leven (2004) has emphasized, as well as the multiple changes on pathologies due to multifactorial causes that affect their characteristics and progression.

4. Ancient Mesopotamian Healing Tradition—Aquatic Animals as *Materia Magica*

As Scurlock (2002, p. 371) has noted, one of the most common uses of animals in ancient societies, in addition to sacrificial practices, was as vessels that absorbed and deflected elements considered to be harmful. In fact, in both ancient and modern contexts, ritualistic substitution is a widely spread practice and is considered one of the basic mechanisms of cultural construction of a given context. In general, it involves the notion that, in certain circumstances, a surrogate figure could assume the identity of a being or object. In this sense, the substitute's body serves as a reservoir for a wide variety of ailments, from physical and psychological illnesses to ominous messages, and even some of the individual's transgressions (Bottéro 1995, pp. 142–43). Overall, to accomplish these processes, two fundamental steps should be completed: the first involves verbal and/or physical identification between the patient and the surrogate, to form a bond between the two, which ensures that the transmission of the ailment is successful; while the second involves disposing of the surrogate—whether objects, animals, or even humans—given that it has been contaminated or “polluted” during the ritual. Hence, when these substitutes were disposed of, whether by incineration, burial, or transport to a remote location, they could not return to negatively influence the individual's health and life (Wright 1987, pp. 32, 37, 43).

For several ancient western Asian contexts, we have evidence of the use of various substitution practices that followed this overall structure but varied according to the needs and socioeconomic status of the individuals. As such, it is possible to identify simple rituals involving materials more accessible to the general population, as well as utter complex ones that could only be affordable to members of elite groups, and naturally the ruler and his family. Regarding this aspect, it is interesting to note that while in the ancient Hittite world, there seems to have been possible to use animal clay replicas, particularly by the less wealthy (Bryce 2004, p. 204). In ancient Mesopotamia, the use of several live animals was preferred to these types of rituals. Following the above-mentioned structure, the animals were caught, and placed (physically or symbolically) in contact with the patient, to successfully receive the disease. Afterward, the animal was released into a fluvial course or cast away to the steppe, carrying the illness away, which guaranteed the impossibility of its relapse (Chalendar 2016, p. 98).

One of the most extensive and elaborate rituals in this regard is known as *Namburbi*, that aimed at avoiding and/or cancelling out ominous messages, before they could take tangible form in the individual/community's life (Caplice 1974, pp. 7–14), as stated in the following passage:

“[Namburb]i incantation that the evil frog [...] [may] no[t approach t]o the man and his house [Its ritual:] you [...] in the bank of the river, [you set up] the ritual arrangement in front of [Shamas and Assalluhi. . .] you make an offering, [bring near] shoulder flesh, fatty tissue [...] [you scatter] dates (and) *sasqû* flour [...] *mersu* cake [...] you set out a censer (burning) *burāšu* juniper [...]”. (LKA 118, obv. 1–13; [Bácskay 2018a](#), p. 2)

Interestingly, in this excerpt, the frog was portrayed as menacing, and as such, it should be driven away from human abodes. Although fragmentary, it is noticeable that a ritual was conducted around the same frog on the bank of the river, where offerings, libations, and fumigation had to be made to annul the adverse omen that the amphibian symbolized.

Another example of this situation is found in one prescription that reports how the patient could be relieved from an illness referred to as “*li’bu* of the mountain”—one of the variants of the *li’bu* pathology, described as a type of fever ([Bácskay 2018b](#), pp. 3–8)—by performing a ritual that consisted of capturing and massaging a green frog (Akkadian: *muša’irānu*). Then, the patient should spit in the animal’s mouth, as their saliva would act as a conduit to transfer the disease. Finally, the frog was carried away to the steppe, where trapped, it was left to die:

“If from his feet to his shoulders it throbs, the *li’bu* of the mountain afflicts <(that person)>. Its ritual: he catches a green frog in the water. On the day that it afflicts him, in the morning before he puts his foot on the ground, you massage [him] from head <(to)> foot, (saying): “O frog, the affliction that seized me you know (but) [I do not know]; (. . .) You have [him] say this three times [and] three times he spits his spittle into its mouth. You take it to the steppe and you tie its foot with a band of red-dyed (and) white wool [so that] you fasten (it) to a *baltu*-thorn [or to an *āšagu*-thorn]. He should recover”. (AMT 53/7+ K 6732, l. 1–9, [Scurlock 2014](#), p. 678)

It must be noted that the term *muša’irānu* is one of the most widely used to designate frogs in the cuneiform tradition, which may be similar to present day use in several languages of the broad designation of “frog” and/or “toad” to the more than 7600 species of these amphibians scientifically identified ([AmphibiaWeb 2024](#)). [Dittrich and Götting-Martin \(2021, pp. 106–8\)](#) nevertheless argued that the *muša’irānu* corresponds to the marsh frog (*Pelophylax ridibundus*) which belongs to the family of true frogs (*Ranidae*), whose specimens are relatively highly abundant in present-day Iraqi natural environments. According to the above-mentioned authors, the ancient Mesopotamian descriptions of the *muša’irānu* coincide with some of its features, particularly in what concerns its greenish/brownish body color and its pattern of green blotches and dorsal stripes, as well as its loud vocalizations. Moreover, the marsh frog is semi-aquatic and inhabits a wide range of flowing and stagnant waters, which draws a link between the animal and the environments where some fevers were typically developed ([Scurlock 2014](#), p. 675).

On using other aquatic animals in substitution rituals, we found a prescription related to problems in the urinary tract, in which the use of a living *giritu*-fish, a still unidentified species, was paramount:

“Prescription No. 3: Seize a live *giritu*-fish, (the patient) will urinate onto its head, you will release it into the canal and he will get better”. (BAM IV 396, iv. 22–23, [Geller 2005](#), p. 41)

We find an analogous procedure regarding the disposal of another unspecified type of fish, which in this case became a vessel to soothe the divine anger a human felt:

“[Yo]u catch [a fish] (and) keep hold (of it); then you put your spittle in the mouth of the fish, [Fish], undo my [c]urse, fish, carry off my sin, take it down [to the sub]terranean ocean!”. (BAM 318, l. 19, [Schwemer 2013](#), pp. 181–200)

It is worth noticing that in this case, the animal should be disposed in the subterranean ocean, commonly referred in Akkadian as *apsû* (or **abzu**, in Sumerian), which was also the

cosmic domain of god Enki/Ea, one of the most important deities in the Sumero-Akkadian pantheon throughout time. This connection with the cosmic domain of the fresh and “pure” waters might explain his association with aquatic animals, like the goat-fish or the turtle (abundantly depicted in visual arts as his animal symbol), as well as his fertile sexual actions, as described in several textual mythical narratives³. Additionally, multiple references point to his tutelage of knowledge, of the arts and crafts, of magical practices and, as such, of the healing sphere (Foster 2005, pp. 151–52; Galter 2015, pp. 66–76; Zare et al. 2022, pp. 19–37). Stadhouders (2018, p. 163) suggests that the disposing of the surrogate frog in the *abzu/apsû* might be due to the understanding that it was the place where the illness originated from. Yet, and having in mind the above-referenced purification ritual of the surrogate frog nearby a river and the disposal of the surrogate fish on a canal, it might as well imply that the cosmic domain of Enki/Ea, with its “pure” and fresh waters, was considered a fit location to dispose of whatever was considered “impure”/“polluted”.

These examples of using living frogs and fishes as substitution animals might point to some specific qualities and/or symbolic values conferred to them as suitable for this type of rituals. Concerning the frog, it is important to stress that their abundance in Mesopotamian aquatic environments made these animals quite familiar to humans, who were thus able to closely observe their amphibious nature, their metamorphosis, and the seasonal shedding of their skin. These features might have concurred for them to be considered chthonic/liminal, as well as symbols of fertility, rebirth, transformation, and immortality (Dittrich and Götting-Martin 2021, pp. 99–100). Having in mind that frog-shaped pendants and/or amulets are also well attested since early times, all these qualities/properties could have added to their special place within the ritualistic sphere, whereas their aquatic nature might have contributed to an association with cleansing and purification. As for the fishes, their deep connection with Enki/Ea and consequently this god’s own characteristics, cosmic domains, and functions, could help to shed some light on their role as suitable surrogates. Yet, it must be stressed that their abundance in the riverine, marshy, and maritime environments, which made them vital in the ancient Mesopotamian diet, could also concur to their importance as *materia magica* and also *materia medica*, as we will further detail.

5. Ancient Mesopotamian Healing Tradition: Aquatic Animals as *Materia Medica*

5.1. Fishes

Though abundantly used in prescriptions, the documents we have surveyed so far do not allow us to identify specific species of fish. The only possible reference concerns the so-called *kuppû*, which has been identified in some studies as the Mesopotamian spiny eel (*Mastacembelus mastacembelus*), whose bile and gallbladder were especially used as balms or oils, mixed with other ingredients, in the treatment of ophthalmological diseases (Arbøll 2021, pp. 179–93). Interestingly, fish bile (particularly of common carp, grass carp, and/or black carp) has been used in several other Asian healing traditions, such as the ones from the Chinese, Indian, and Japanese contexts, to not only treat eye conditions, but also throat pain, hypertension, asthma, and skin pruritus (Yan et al. 2020, p. 419). Over the last few decades, modern sciences have identified specific properties on the bile acids, which aid a better functioning of the gastrointestinal tract and liver. According to Wang and Carey (2014, p. 9970), animal bile acids, including those of fish, are paramount to diminish the impact of several health problems, which might help explain their prolific use in so many healing traditions, throughout time and space.

For ancient Mesopotamia, one of the most common mentions is the use of fish oil, which appears to have been used to treat a diverse range of maladies. For instance, it appears prescribed to treat a dermatological condition, the *saharšubbû*, a highly infectious skin disease that appears in numerous texts of varying genres (lists of workers, incantations, curses, rituals, etc.) dating back to the early 2nd millennium BC. The Akkadian term refers to a condition that covered the patient’s body, similar to what is known today as leprosy, which caused the patient to be stigmatized and even exiled from their community

(Feder 2016, pp. 107–8). Yet, different types of *saḥaršubbû* were distinguished, and specific instructions were provided for each one, based on the different discolorations the patient's skin displayed. As stated in the following excerpt, one of the possible treatments concerned an ointment, with fish oil and other ingredients, that should be applied to the patient's body, along with a bandage:

“Before approaching (someone with) *saḥaršubbû* you should recite the recitation **ME.ÅÈ BA.DA.RI** (a recitation for numbness) three times over him (. . .) Ditto (If there is) red and black (*saḥaršubbû*) on his body, for seven days you repeatedly bind on snake oil, fish oil, hot “human (fat)” from a grave (and) fat of a large snake (hunting) gecko”. (Tsukimoto 1999, pp. 199–200, l. 41–42; 56–57)

On the same dermatological domain, the *muruş kabbari*, which corresponds to a fungal infection of the foot, possibly what is known today as mycetoma or *Madura foot* (Scurlock and Andersen 2005, pp. 78–80), was also treated with this element:

“[If] a person is sick with *muruş kabbari* so that the appearance of his flesh is white dotted with black, that illness has penetrated (. . .) Alternatively, you grind *nurmû*-pomegranate leaves (variant: peel). You gently rub (him) with fish oil (and) daub (him with it)”. (BAM 124 I, ls. 1–50, Scurlock 2014, p. 452)

Likewise, the fish oil was mixed with other ingredients to treat infections on the ear or even a fever of some kind:

“[If] pus drips [from a person's] ears, you drip *nurmû*-pomegranate [juice] into his ears (. . .) you mix together *zibû*, myrrh, fish oil, (and) *nînu*-mint and put (variant: drip) (it) into his ears”. (BAM 503 cols. Iii, ls. 12–21, Scurlock 2014, p. 383)

“If a person's] crown of the head is continually hot, you mix [together] *gaşşu*-gypsum, *indar*-type(?) *uḥḥûlu qarnân*, *kibrîtu*-sulphur, bone, *uḥḥûlu qarnânu*, rancid oil and fish oil. You fumigate his head (with it) over *aşāgu*-thorn coals”. (BAM 480, cols. Ii, ls. 10–11, Scurlock 2014, p. 322)

Moreover, when mixed with water, fish oil produced a vomit-inducing beverage to treat gastrointestinal problems:

“If a person's insides are continually bloated and “wind” rumbles in his stomach, his stomach continually afflicts him, (and) he keeps bringing his hand up to his abdomen, that person is sick with *urbātu*-worms (. . .) You pour fish [oil] and water(?) into it [and have him drink it] for three days. If you have him vomit, [he should groan] (and) ditto (produce the worm)”. (BAM 159 cols. Ii, ls. 20–24, 28–31, Scurlock 2014, p. 497)

In this last case, it is possible that the *urbātu*-worm corresponds to roundworms (Scurlock and Andersen 2005, pp. 82–83), which, as it is well known, can lodge in the intestine of humans, provoking several other health issues.

Lastly, fish oil was also commonly used as an ingredient in the treatment of specter-induced diseases:

“[If d]itto (“hand” of ghost afflicts a person so that his ears roar), you mix *şumuttu* with fish oil. You fumigate his ears (with it)”. (RSO 32.109ff, rev. 17, Scurlock 2006, p. 401)

Another way to use this animal was in brine. For example, in a prescription for mouth paralysis, the *kadibbidû*, the practitioner was instructed on the preparation of a remedy that consisted of:

“(. . .) water, fish brine and vinegar ‘spoon’ into it with a potsherd, and leave overnight under the stars. In the morning he (the patient) shall dip his (unaffected?) *thu[mb]* into (the mixture) and rub his mouth constantly (therewith before eating)”. (K 2418+ rev. iii, ls. 41–42, Finkel and Geller 2007, pp. 75–76)

The overnight marinade could evoke divine protection or even divine intervention while the ingredients rested, since these entities were also envisioned as capable of manifesting themselves in astral forms (Rocheberg 2009).

There are also references to a fermented fish sauce (Akkadian: *šiqqum*) which appeared to be very popular, since it is well attested in the textual evidence dated between late 3rd millennium BC and the 1st millennium (Potts 2012, p. 232). This sauce was used to treat urinary tract disorders, as follows:

“If a man has difficulty with urine . . . he suffers from stricture of the bladder (. . .) Crush *kasû*-juice, date-tree juice, pressed oil, fish sauce, river locust and ‘white’ plant, and he drinks it in milk. (. . .) He drinks fish-sauce in water on an empty stomach”. (AMT 31,1 + 59,1 + 61,1, ls. 21, 26, Geller 2005, p. 45)

The whole animal could also be prescribed in certain situations. For example, a fish could be used for the treatment of **DÚR.GIG**, a chronic disease of the digestive system that appeared to block or retard the passage of urine or stool (which might correspond to ulcerative colitis) (Scurlock and Andersen 2005, pp. 150–53). In this case, a patient was prescribed a special diet, consisting of several items, including fish:

“If a person has bloody stools and pours out bloody excrement or pus or the pent-up (wind) of **DÚR.GIG**, to cure him (. . .) [Alternatively], he should repeatedly eat [. . .] sweet milk, sheep’s milk, ghee (and) pressed-out oil for one day each. Alternatively, he should repeatedly eat rolled pickled beef (and) rolled pickled fish for one day each”. (BAM 159 cols. iii, ls. 1–6, Scurlock 2014, p. 503)

In a general sense, modern sciences have recognized fish as a beneficial part of the human diet, given the high protein level and other essential elements that it contains, like vitamins, iron, amino acids, or calcium. It has also been hypothesized that the understanding of fish as a healing symbol or even purified food has emerged due to the psychotropic properties of its omega-3 fatty acids, which seem to help decrease the risk of mental illnesses, such as depression or violent behaviors (Reis and Hibbeln 2006). Naturally, and focusing on the Mesopotamian case, the dietary importance was transposed to a symbolic and ritualistic level, which was profusely displayed in textual, material, and iconographic records, making it possible to draw a close relationship between these species and notions of abundance linked to the aquatic environment (Potts 2012, pp. 221–35). As for the benefits in mental conditions, at the moment, we can only speculate if there was any association between the fish’s properties and their relief for these ancient human groups.

5.2. Amphibians

As *materia magica*, the above-mentioned characteristics of frogs could have also been evoked through *sympatheia*, as their whole body or just parts of it were commonly used in Mesopotamian pharmacology.

We found two cases of diseases caused by entities, where the whole frog was used. In what concerns the first case, an *eṭemmu* was pictured as physically taking hold of an individual. The only way to remove this was to:

“(. . .) mix (together) a bone from mankind, a *muša’irānu* (. . .) fumigate him over coals, (put it) in a leather bag”. (BAM 469, r. 32–34, Bácskay 2018a, p. 8)

In the second case, a *dalīlu*-frog was dried, alongside the chameleon’s fat, which, combined with other ingredients, resulted in an ointment that would treat a condition linked with god Enki/Ea (“hand of the stiff deity”), whose symptoms include high fevers, sweating, and stiff joints:

“(. . .) In order to release him from the Hand of the stiff deity, you dry a chameleon’s fat and a *dalīlu*-frog that lives amidst the pebbles. You put (them along with) tamarisk, asphalt, black sulphur, yellow sulphur, and *emēsallu*-salt around his neck (. . .)”. (CTN 7, 72, cols. iii, ls. 14–20, Bácskay 2018a, p. 6)

The *dalīlu*-frog, which could correspond to the green toad (*Bufo* *sitibundus*) or the spadefoot toad (*Pelobates syriacus*) (Dittrich and Götting-Martin 2021, pp. 108–9), was also used for treating respiratory problems, namely the *suālu* disease, which had a cough as a main symptom:

“If a man has been seized *suālu* disease, you dry *dalīlu* frog which (lives) amidst the pebbles (of the river), pulverize (it) in filtered oil, he drink (it) and he will live”. (AMT 80, 1 col. I, ls. 17–17, BAM 548, col. i, ls. 17–18, Bácskay 2018a, p. 6)

A pulverized *dalīlu*-frog was also used, amongst other ingredients, for relief of an ophthalmologist illness:

“If ditto, you sieve charcoal of *urbatu*-plant, knead (it) in *kasū* juice. . . you pulverize the *dalīlu* frog which (lives) amidst the pebbles (of the river) in oil (his) eyes”. (BAM 12 rev. 30–31, Bácskay 2018a, p. 6)

Within the group of therapeutics that recurred to a frog’s body parts, bile and fat were, respectively, used in the treatment of eye diseases and in preventing hair loss:

“You cut open a green frog, mix his bile in ghee (and) anoint his eyes”. (BAM 510, col. I, l. 23, BAM 513 col. I, l. 14, Bácskay 2018a, p. 9)

“[. . .] anoint his head repeatedly after it has been cooked; mix dried *kulīltu* insect [. . .] frog fat in ghee, anoint repeatedly and (his) hair will grow”. (BAM 494, col. ii, ls. 65–66, Bácskay 2018a, p. 11)

The frog’s *takaltu*, which has been interpreted as its stomach or liver (Bácskay 2018a, p. 9), appears connected to the treatment of cavities:

“Incantation against the (tooth) worm. You catch a frog, open (its) inner parts, take out, its *takaltu* and its fatty tissue, cook (them) on fire, place (them) on an empty stomach onto his sick teeth and put (this medicine) repeatedly (on his teeth) and he lives”. (YOS 11 No. 4, obv. 1–10, Bácskay 2018a, p. 9)

Though more fragmentary, we have also noticed some mentioning of prescriptions where the frog blood was used, namely in a cataplasm against a skin condition, the *epqēnu*; and even a possible use of the frog’s lungs for the treatment of an unidentified illness (Bácskay 2018a, p. 12).

Lastly, it is possible to identify another group of remedies that made use of tadpoles (Akkadian: *atmu ša muša irānu*). Curiously, most of these prescriptions are aimed at treating sexual-related conditions, such as erectile dysfunction:

“If ditto, *atāišu*-plant, tadpole of green frog, *hašhūru*-apple tree, reed (mixed) in cedar oil. You run him repeatedly (and) this man will have potency as long as he lives”. (BAM 205, obv. 14–16, BAM 320, rev. 23–24, Bácskay 2018a, p. 7)

According to Bácskay (2018a, pp. 7–8), the reference to the tadpoles may have been used as an analogical association to the frog’s sexual potency based on its specific characteristics, such as the long-lasting copula. Yet, it should also be considered that the hundreds and even thousands of eggs a female frog can lay, when connected with the eggs from other females, can produce a visible layer of frog spawn in ponds and still waters, protected by a gelatinous substance (AmphibiaWeb 2024). Either way, it seems that a strong link between this amphibian and sexual activity was established, given that in the so-called ŠĀ.ZI.GA rituals, one of the major Mesopotamian therapeutic ritual series, whose main objective was to restore human sexual vigor, there are also some prescriptions in which the frog is used, like the following example:

“Its ritual: you dry and crush a green frog, in powder of [. . .] you mix together in *pūru*-oil. After the water . . . [. . . with] oil you rub him, [sprinkle]? tamarisk juice seven times in front of him (and) seven times behind him], his potency will be remedied”. (K 2499, obv. 6–9, Bácskay 2018a, p. 8)

All these examples display a great apotropaic/symbolic value conferred to this animal, as well as a strong identification of it as having important healing properties. Interestingly, several modern studies in the fields of Biology, Medicine, and Herpetology have pointed out the antibiotic, antiviral, wound healing, antidiabetic, anticarcinogenic, among other properties of the skin, substance produced by these amphibians, when frightened (Gowender et al. 2012, pp. 1–6; Xu and Lai 2015). Though it is not clear in the textual references if this substance was identified/used by Mesopotamian specialists, one can speculate that some of its above-mentioned properties were responsible for producing positive effects in the care of several conditions, which impelled the profuse use of frogs in the pharmacology of this ancient context.

5.3. Reptiles

Despite there being some evidence on the gathering of turtles and terrapins in southern Mesopotamia (Owen 1981, pp. 40–42), chelonians appear to have played an insignificant role in the subsistence and economic strategies, possibly given their small size and their low protein value. The number of turtle's remains in the archaeological record is also particularly low, with many arguing that they were caught in the fishing nets by accident (Owen 1981, pp. 41–42; Berthon et al. 2016, p. 199). Thus, it seems that the use of turtles was primarily motivated by the symbolic value attributed to them. In fact, it is worth noticing that in various ancient and modern cultures, chelonians are depicted as an emblem of longevity, eternity, endurance, strength, and intelligence. This might explain why in Mesopotamian data, they are most often mentioned either in funerary contexts and in apotropaic rituals, through offerings, or as healing materials, as we will detail below.

According to Berthon et al. (2016, pp. 112–13), most of the references to this animal displayed in the Mesopotamian therapeutic texts might correspond to the Euphrates soft-shell turtles (*Rafetus euphraticus*). On his turn, Perterson (2007, pp. 199–202) advanced with the hypothesis of the Caspian turtle (*Mauromys caspica*) or the Greek turtle (*Testudo graeca iberica*), through the identification of a hard-shelled animal on literary compositions, such as *Heron and the Turtle* or *Ninurta and the Turtle* (ETCSL 2003–2006, 5.9.2; Gragg 1997, and ETCSL 2003–2006, 1.6.3; Bottéro and Kramer 1989, pp. 418–23, respectively). Interestingly, all these three species are freshwater turtles, which led Silva (2020, p. 72) to conjecture that although sea turtles could be observed and even captured, river turtles were possibly more common and consequently better known by Mesopotamian human communities.

In the therapeutic *corpus*, we find several mentions of this animal, known in Akkadian as *raqqu* or *šeleppû*. The use of its shell is especially significant as a healing material for some unidentified conditions, as it is displayed in the following excerpts:

“Sift and mix the shell of a turtle, horned alkali, salt, and mustard. Wash with high quality beer and hot water. Rub with the whole mixture and sprinkle (?), smear with oil, crush pine (needles?), introduce (into the mixture?)”. (CBS 14221, ls. 18–27, Perterson 2007, p. 498)

“Boil and crush a turtle shell, smear the mouth with plant extract, rub the (mouth) of the man (...) (Treatment) pertaining to the ridding of the afflicted mouth of a human”. (HS 1359, ls. 8–12, Perterson 2007, p. 499)

As for their meat, interestingly, we found a literary text of a sapiential nature that restricts its consumption, as it seems it could trigger or worsen an unidentified condition:

“He shall not eat *raqqu* turtle or *šeleppû* turtle, the illness ... (Akk. “... shall not be eaten, it contains illness”. (H77 (OB) ls. 11–12, Ermidoro 2014, p. 86)

In another two excerpts, and on the contrary, the consumption is prescribed, in the first case to ease childbirth, and in the second, to prevent white hair:

“She will eat turtle meat, the same. She will eat white pork meat, the same. She will eat vixen meat, the same”. (BAM 248 col. iv, l. 25–27, Couto-Ferreira 2014, p. 314)

“(..) If he eats the head of a turtle, he will have no gray hair”. (BAM 318, col. iii, ls. 19–29, [Ermidoro 2014](#), p. 84)

Erica [Couto-Ferreira \(2014, pp. 303–4\)](#) points out that turtle meat was considered a valuable food in Mesopotamia, throughout time. Given these two excerpts, we add that its high value might have been related to the above-mentioned symbolic significance of longevity that this animal encompassed.

5.4. Crustaceans

Like turtles, the small size of crabs seems to have contributed to their little dietary use, despite their abundance in ancient Mesopotamian aquatic environments ([Naser 2009](#), pp. 1599–602). Though well attested in iconographic records, in textual documentation, these animals mainly appear in necromancy and other rituals against malignant entities, as follows:

“An incantation to enable a man to see a ghost (...) You dry, crush and sieve snake-tallow, lion-tallow, crab-tallow, white honey, a frog (?) (that lives) among the pebbles, hair of a dog, hair of a cat, hair of a fox, bristle of a chameleon (and) bristle of a (red) lizard, «claw» of a frog, end-of-intestines of a frog (...) You recite the incantation three times and you anoint your eyes (with it) and you will see the ghost: he will speak with you. You can look at the ghost: he will talk with you”. (K 2779, ls. 1–9, [Finkel 1983](#), p. 10)

Although not strictly medical, as this prescription was used to enable contact with an *etemmu*, it is rather interesting as it shows how *materia medica* and *materia magica* were closely intertwined in several ritualistic dimensions. As stated, for this necromantic action, the individual should anoint their eyes with a remedy made on the mixture of several animals, including the crab’s tallow and the above-mentioned *dalīlu*-frog, while reciting a prayer. It is probably no coincidence that the two aquatic animals used in this mixture had an obvious chthonic nature and, as such, a symbolic liminal value, especially useful for contacting the dead.

Lastly, we also found some mentions of shrimps, namely dated to the beginning of the 2nd millennium BC revealing long-distance transportation and consumption. This might have added to their high value, both as a delicatessen and as a therapeutic ingredient. According to some 1st millennium BC references, shrimps were used in dermatological remedies to prevent human’s nails from falling out (AMT 100 3, [Lion et al. 2000](#), p. 60); and in bandages for the treatment of *sikkatu*, a skin disease, in this case, in the form of flour or powder (AMT 93 2, [Lion et al. 2000](#), p. 60). The insufficient data prevent further analyses on these crustaceans’ use in ancient Mesopotamia. It is nevertheless interesting to note that shrimps’ high concentration of minerals, vitamins, and antioxidants have been presently linked to several health benefits, including skin repair and regeneration ([Lall and Kaushik 2021](#)).

6. Conclusions

The relationship between humans and the aquatic fauna with whom they shared their natural environment, especially regarding ancient contexts, is not always easy to grasp given the lack of bioarchaeological data, material culture, and iconographic and textual evidence. Yet, the analysis conducted in the previous sections allowed us to highlight these fruitful *corpora* which encompasses multiple references to the topic. The examples presented above thus display the complex Mesopotamian repertoire of *materia medica* and *materia magica*, which derives from a long thread of firsthand observations, manipulation, and experimentation of/with several natural elements. Furthermore, as both typologies were used together, enhancing each other, it becomes clear that the ancient Mesopotamian healing system was guided by not only a tangible understanding but also by a mythical-symbolic conception of Nature.

Concerning aquatic fauna, it is interesting to stress how these animals were not only used as ingredients for the preparations of remedies, but were also assigned with strong symbolic and apotropaic significances that allowed them to become worthy substitutes for the human patients, succeeding in receiving (and thus annulling) their illness. At the same time, their biological behaviors and specific features seem to have been paramount to connect them to some of the diseases and/or to their respective remedies. This seems quite obvious with the use of scaly fish and amphibians for skin diseases, or with the use of turtles' shells for age-related conditions; or even with the use of the fertile frogs to improve sexual performances. Here, animals were resources, but mostly, they were performative matter for the balance of the body and the cosmos. As such, Mesopotamians were especially dependent on these animals for restoring their wellbeing. Simultaneously, and though there is still a long road ahead, in what concerns present day understanding of these prescriptions, it is safe to assume that some of the biological properties of these aquatic animals were known by ancient Mesopotamian healers and concurred for their importance within the healing universe.

It is thus our understanding that further exploring ancient Mesopotamia healing practices through a multidisciplinary approach will bring new and stimulating knowledge on the human/non-human relationships. By convoking History of Religions and Environmental History/Humanities alongside the Natural Sciences, it will be possible to shed some light on the fundamental impact that Nature had on the elaboration and development of mythical-ritual discourses.

Historicizing water bodies, aquatic animals, and interspecific relationships of this period of human history and of the history of the planet, while considering the multiple agencies involved diachronically, helps to conceptualize narratives of change, of loss, and of regeneration. As [Oppermann \(2023, p. 53\)](#) has put it in his recent book on Blue Humanities, we are as well hoping to “highlight both the existential issues related to the physical realities and the symbolic configurations of water [and of aquatic fauna]” by giving the historical view of mutual influence and shaping of life that results from multi-species dependences. The fluidity of the element itself, of the aquatic environments and animals, as much as of the relationships established between water and land, and between humans and non-human animals, offer room enough to explore new avenues of research and thinking.

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Notes

- ¹ On the renewed analyses that attempt to go beyond the institutional spheres, agents, and data, particularly in what concerns the Mesopotamian religious experiences and mythical-ritual framework, vide the different contributions in ([Goodison and Morris 1998](#); [Porter 2009](#); [Raja and Rüpke 2015](#); as well as the studies of [Westenholz 1997](#); [Nejat-Nemet 2007](#); [Rüpke 2011](#); [Rowan 2012](#)), among others.
- ² In what concerns the therapeutic texts surveyed, to which we will mention throughout this article, they are compiled in the following works: [Tsukimoto \(1999\)](#), [Geller \(2005\)](#), [Scurlock \(2006, 2014\)](#), [Finkel and Geller \(2007\)](#), [Perterson \(2007\)](#), [Schwemer \(2013\)](#), [Couto-Ferreira \(2014\)](#), [Ermidoro \(2014\)](#) and [Bácskay \(2018a, 2018b\)](#). As for the ritualistic texts, we are referring in particular to the *ŠĀ.ZI.GA* and the *Namburbi* series ([Bácskay 2018a](#)).

³ Throughout time, Enki/Ea was associated with the city of Eridu (modern Tell Abu Shahrain, Iraq) as its patron god. When in his anthropomorphic form he was frequently depicted with flowing streams sprouting from his shoulders, having fish swimming on it (vide, for instance, the depiction on an Akkadian cylinder seal, known as ‘Adda Seal’ (nr. 89115)) at [The British Museum Online Site 2024](https://www.britishmuseum.org/collection/object/W_1891-0509-2553), https://www.britishmuseum.org/collection/object/W_1891-0509-2553 (accessed on 15 January 2024). In mythical literature, this god was portrayed as inhabiting and controlling the **abzu/apsû** on the already-mentioned narrative known as *Enki and Ninmah* (ETCSL 2003–2006, 1.1.2; Klein 1997); as fertilizing the Tigris and Euphrates through his ejaculation on *Enki and the world order* (ETCSL 2003–2006, 1.2.3; Kramer and Maier 1989, pp. 38–56); and as getting several goddesses pregnant in *Enki and Ninhursag* (ETCSL 2003–2006, 1.1.1; Bottéro and Kramer 1989, pp. 151–64). He was also deeply connected with the creation of humankind. Enki/Ea’s multilayered nature, character, and functions, as well as his association with a creative intelligence (Kramer and Maier 1989; Gomes de Almeida 2019) might explain his transversal importance as attested in his profuse presence in religious data.

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