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Bezoar Stones: the Antidote to All Poisons

Bezoars, which have played an important role in medicine since their discovery until the development of modern treatments, have been the subject of many questions and mysteries. According to some reports, bezoars were thought to be found in the head, stomach, or even the liver of some animals, as well as in their faeces. Other sources claimed that bezoars originated from deer eyes. Regardless of their origin, it is undeniable that for centuries, medicine has relied on these animal stones to treat poisoning symptoms and cure rabies. In my paper, I will lay out the origin and history of these mysterious materials with poison-absorbing properties. I will present the terms used to refer to items later known as bezoars in Sextus Placitus's work De medicamentis ex animalibus libri. In addition, I will describe some intriguing characteristics of the many types of bezoars.

Keywords: Placitus, Pliny, medicine, bezoar, gastrolith, historical overview

1. Introduction

My PhD research centres on *De medicamentis ex animalibus libri,* the only surviving work by Sextus Placitus Papyriensis, an ancient Roman physician who lived and worked in the 4th century AD. The main objective of the text, which was primarily influenced by *Naturalis Historia*, written by Gaius Plinius Secundus, is the description of the remedies derived from various living organisms. While Plinius, commonly known as Pliny the Elder, focuses on medicines made from plants, devoting only four books of his monumental work to medicines from animals

and humans, Placitus discusses solely the latter. In terms of length, *De medicamentis ex animalibus libri* is considerably shorter than *Naturalis Historia*, making it much easier to navigate and comprehend. This could explain why the work has survived, despite the fact that its authorship is frequently disputed. Although we know almost nothing about the author of the work, based on the content and accuracy with respect to contemporary circumstances, it appears that Sextus Placitus was either a physician himself or someone who was familiar with and understood the medical literature of his time.

Placitus takes *Naturalis Historia* as a basis for his book's structure and organisation, grouping the descriptions of the remedies according to their origin. This arrangement closely follows Pliny's division, namely the books VIII–XI on zoology and the books XXVIII–XXXII on remedies derived from animals. An interesting distinction is that Placitus only discusses medicines derived from terrestrial animals and birds, paying no attention to those derived from aquatic or amphibious animals, as is the case with the medicinal sections of *Naturalis Historia*.

Placitus writes about a total of thirty animal species, some of which he examines separately by the male and the female variants, such as the rooster and the hen, which are discussed as *De gallo* and *De gallina*, respectively. However, in most cases, the male and the female forms of an animal are treated as one, such as the bear (*De urso et ursa*) or the donkey (*De asino et asina*). The goat is also unique in terms of classification, since it is divided into two types: wild goat (*De capra sylvatica*) and domestic goat (*De capro*). In contrast to Pliny, who was the period's leading author, Placitus enumerates the remedies rather than placing them in a literary narrative. In the absence of a narrative, it is difficult to determine the author's point of view, as he merely employs repetitive particles to demonstrate the efficacy of the medicines and provides no personal opinion.

The description of the remedies is typically brief, ranging from half a sentence to two or three sentences. The author only describes information he considers essential, usually in half sentences, making the meaning of text somewhat difficult to decipher. However, this is also a feature of the book that foreshadows the style of subsequent recipe books. The fact that in some cases the lists of ingredients for the preparation of medicines are provided in precise units of measurement lends credibility to the assumption that the descriptions for the preparation of medicines in the book were actually employed in practice.

Reading the text from a modern perspective reveals several astonishing remedies that, in the light of today's medical advances, appear worthless. In addition to prescriptions for medicines, Sextus Placitus' *De medicamentis ex animalibus libri* records the names of the special objects used to prepare, administer, and presumably store these medicines, without providing further information about them.

The main object of my PhD research, rather than determining the efficacy of these specific remedies or uncovering the history of their survival, is the linguistic analysis of the text. My research also aims to identify the various substances used to prepare them, which may be unfamiliar to today's readers. This latter may aid in gaining a better understanding of the daily lives of people in the 4th century AD Roman Empire.

In the present paper I would like to discuss a theme that I came across while analysing the various passages of the above-mentioned work of Sextus Placitus. In between accounts of remedies derived from deer, rabbits, and eagles, the author mentions a few stones that possess unusual qualities from a modern scientific standpoint. While identifying these stones, I came across the so-called bezoars, which bear a striking resemblance to the stones featured in Placitus' treatments and had been known for centuries for their healing and detoxifying properties. Given that this research will be a part of my future PhD thesis, where

I intend to delve much deeper into every aspect of this subject matter, my goal here is to provide a brief summary of the main questions, challenges, and potential answers regarding the stones referenced by Sextus Placitus as well as the topic of bezoars.

Bezoars, which have played an important role in the history of medicine, have been surrounded by many questions and mysteries since their emergence until the advent of modern medicine. In this paper, I will present a concise history of this mysterious animal-derived stone that has the power to treat poisoning, as well as some of the unique characteristics of some of its varieties. Furthermore, in the last section of my paper, I will explain why I believe the stones referenced by Placitus could be categorised as early bezoars. To substantiate this assertion, we must first define the concept of bezoar, which requires the examination of the gastroliths that serve as their foundation.

2. From gastroliths to bezoars

Gastroliths are smaller or larger stones or compacts of organic matter resembling stones found in the digestive system of mammals.[1] In ruminants, a buildup of hard mass resembling a gastrolith is most commonly created from small undigested organic debris, and rarely from actual stones caught in the digestive system. In humans, hair knots are the most common source of gastroliths, although bone fragments can also create them. In modern medicine, however, gastroliths refer exclusively to dinosaur stomach stones and human hair knot based accumulations.[2] Since it is very difficult to determine if the stones discovered amid dinosaur remains are actual gastroliths or simply stones mixed in with the bones, it can take years before such a stone is classified as a stomach stone.

[1] Wings (2004).
[2] Balogh (1919).

Bezoars are a special type of gastrolith that had never been precisely defined by scientific research until they disappeared from medical practice. According to some of the historical sources, bezoars are to be found in a specific animal's head (as in the case of snakes and toads), stomach, or liver, or even in their droppings (as in the case of deer and goats or mountain goats), while others claim that bezoars are derived from deer eyes.[3]

However, for a stone to be called a bezoar, particularly in the Middle Ages, it had to fit specific criteria, such as being derived from an animal and having a detoxifying property. The stone gained its detoxifying property if the animal from which it originated ate a venomous snake, whose venom was absorbed by the stone, allowing it to neutralise other poisons.[4] According to this, neither dinosaur stomach stones nor human gastroliths can be classified as bezoars.

3. The rise and fall of bezoars

The bezoar, also known in Hebrew as *Bel Zaard*, or 'The Master', was well-known in ancient Arabic regions, and it is possible that Westerners were aware of these healing stones prior to the spread of Islam, albeit there is no particular mention of them.[5] Even if they were aware of the existence of bezoars, they did not refer to them by this name. However, because there are a few sources that reference stones with similar characteristics to bezoars, and there was no precise definition of bezoars in antiquity, we cannot draw a firm conclusion in this regard.

Yuhannā Māsawayh, an Arabic author who lived in the eighth century AD, provided the first precise description of bezoars and was the

[3] Barrosso (2013); Lecouteux (2012).
[4] Barroso (2014: 79–80).
[5] Elgood (1935: 73–74).

first to connect them to the ability to remove poison.[6] Considering that nearly all Arabic doctors have written about bezoars,[7] it is not surprising that it was first referenced in European scientific literature by another Arabic physician named Aevenzoar around 1140.[8] The most notable treatise on these stones, however, was produced by Abu Rejhan Muhammad ibn Ahmad al-Biruni around the millennium.[9] His work stands out for being the first to compile all available Greek, Roman, Syriac, Indian, and Islamic literature on bezoars. He was also the first to describe how to discern genuine bezoars from imitations and forgeries. He also provided a detailed physical description of what he called 'animal bezoars'.[10] At the time, bezoars were typically administered as a tincture: a little piece of the stone was cut off and given to the patient dissolved in a liquid, generally water or wine, a method that quickly depleted the stone.[11] On the other hand, documents dating back to the thirteenth century claim that bezoars possessed the same healing powers when applied directly to wounds, a method that allowed them to be used repeatedly.[12]

Bezoars spread during the Age of Discovery, courtesy to Portuguese sailors, and were traded for gold due to their scarcity and therapeutic properties. The fact that bezoars from India were thought to provide long, healthy lives and good luck in love illustrates that the definition of the term bezoar was interpreted more broadly at the time. Because bezoars were in high demand among the European elite, many fakes appeared, yet demand for them did not decline. Furthermore, their possession became a status symbol. When they arrived in Europe, these

[6] Barroso (2014: 78).
[7] Barroso (2014: 79).
[8] Elgood (1935: 74).
[9] Barroso (2014: 79).
[10] Barroso (2014: 79–80).
[11] DiMarco (2014: 73–75).
[12] DiMarco (2014: 73–75).

unique stones were typically inlayed in jewellery, but there were also examples of them being inlayed in cutlery and decorative holders. This trend resulted in the embedding of bezoars in objects becoming nearly an art form, as evidenced by the Holy Roman Emperor Rudolf II's extensive collection of bezoars.[13]

As far as we know, Caspar Bauhin was the first to dispute the medical efficacy of bezoars. He wrote a treatise based on his observations, in which he states that, while most doctors are aware that bezoars are not a cure-all, they are compelled to prescribe them since their clients, the nobility, believe in their effectiveness. The idea that bezoars were a cure for all maladies was so ingrained in people's minds that they were actively used until the nineteenth century, when medicine itself entered a new era. After that, except for a few tribal applications, bezoars have almost completely fallen out of favour.[14]

However, scientific research has not fully abandoned this extremely complex subject, even if it can sometimes offer dubious results regarding the effectiveness of the bezoars. There is ongoing research into the chemistry of gastroliths and bezoars, as well their role in early medicine and literature. Medically, it is still debated whether they contain poison-removal properties or if their success is due to a trick of the human mind. In the context of literary research, it is critical to distinguish between the three most well-known types of bezoars, as these stones of miraculous power are referred to by different names in the relevant sources.

A person with only a basic understanding of the subject will most likely associate bezoars with the so-called goatstones. These stones from the Arabic regions are the most prevalent type of bezoar. Goatstones, or bezoars in the classical sense, derive from the stomachs of mountain goats native to the Arabic regions, though the way in which these

[13] Barroso (2013: 12–13).
[14] Barroso (2013: 13–15).

stones gained their poison-absorbing properties is still up for debate. As previously mentioned, most of our sources claim that bezoars can only originate from a mountain goat that ate a venomous snake, absorbing its venom and therefore forming the healing stone.[15] Another popular sort of bezoar is the so-called snakestone, which is referenced in sources all throughout the world, with the best variant said to originate from India. The third most prevalent type of bezoar is the so-called madstone, which is found in the United States of America, or deerstone, as one of its local variety is known.[16]

4. Snakestone for snakebites[17]

The so-called snakestone holds a unique place among bezoars because we have information about it dating back to antiquity, specifically from Pliny. The *Naturalis Historia* merely states the existence of such stones, claiming they are in fact bones, and that they are found in snake heads, without any mention regarding their healing properties. Due to the widespread distribution and popularity of *Naturalis Historia*, later generations relied on Pliny's work to identify these stones, and only healing stones that matched his specific description were referred to as snakestones.[18]

Snakestones have gained popularity primarily because they were considered to have the most potent poison-absorbing properties of any bezoars; so much so that even the *Encyclopedia Americana* referred to

[15] Barosso (2013: 8).
[16] DiMarco (2014: 55–89).
[17] DiMarco (2014: 55–89). The following section will contain merely a summary of the research and findings on snakestones. For further reading, see DiMarco's book chapter titled 'Mysteries of the Madstone', as it goes into much greater detail about both snakestones and toadstones. It also delves further into the history and literature of madstones in America.
[18] DiMarco (2014: 61–62).

them as such in the early 1990s.[19] In terms of its use, we know that the snakestone had to be placed directly on the snakebite and left on the wound. If the poison was absorbed by the stone, it would naturally fall off. If the stone could not absorb any more poison, it was soaked in water or milk, depending on the source, causing the fluid to become greenish in hue and removing the poison from the snakestone. After the first application, the stone was placed back on the snakebite; if the stone remained on the wound, it indicated that there was still poison there, and it was left on the wound until it fell off again. This procedure had to be repeated until the stone, when placed on the wound, instantly fell off. If this occurred, it was assumed that the poison had been completely emptied from the wound and the patient had been cured.[20] Pliny also mentions the so-called toadstone, whose history is even more unclear than that of most bezoars. In *Naturalis Historia*, the author discusses not only the procurement of this stone, but also its medicinal properties.

The snakestone, which appears in early European literature alongside the toadstone, is also known as blackstone due to its colour.[21] We have a source from Peru in the early 2000s that uses the name Piedra Negra[22] to refer to a stone that, similarly to other snakestones, is considered to be an antidote for snakebites. The account from Peru shows that, while in modern scientific and medical terms, a snakestone is merely a piece of burnt bone with no healing properties, in areas of the world where modern antidotes to poisons and antibiotics are scarce and ancient religion is still part of people's daily lives, the very belief in the stone's ability to heal has the potential of healing.

In North America, snakestones are also sometimes referred to as madstones. We know this because the most well-known madstones,

[19] Encyclopedia Americana XXV. (1920: 178).
[20] DiMarco (2014: 65; 76).
[21] DiMarco (2014: 72).
[22] Size (2001: 7–8).

which appear in the *Encyclopedia Americana*,[23] were later determined to be merely snakestones imported from Europe or the Middle East. The name 'madstone' refers to the fact that in America these stones were used to treat rabies caused by so-called mad dog bites rather than snake bites, but in scientific literature written in Latin, they were explicitly referred to as snakestones.[24] The two madstones mentioned in the *Encyclopedia Americana* can still be found today, one in Arizona[25] and the other in Missouri.[26]

The majority of the madstones were given to the American settlers by local indigenous people in exchange for their good deeds. In addition to gifts from natives, some madstones have been discovered on beaches and even in shipwrecks, implying that they were sourced from Europe or India.[27] Another theory suggests that these madstones originated in the East and derived from deer eyes[28] or perhaps were found in deer droppings, and were effective not only against snakebites but also against other poisons.[29] In America, a local variant of the madstone is known as the deerstone. Because madstone, which we previously identified is essentially a snakestone, was thought to have originated from a deer, the terms madstone and deerstone are often used interchangeably.

5. The bezoars of Placitus?

As my final unit of study, I would like to focus on deerstones while returning to 4th century AD Rome. Unlike Pliny, who does not mention any stones derived from deer in his *Naturalis Historia*, Sextus Placitus

[23] Encyclopedia Americana XVIII. (1918: 109–110).
[24] DiMarco (2014: 76).
[25] Hanchette (2002: 384).
[26] Randolf (1933: 1–12).
[27] DiMarco (2014: 79–81).
[28] Lecouteux (2012: 76–77).
[29] Barroso (2013: 8).

cites a specific stone in his *De Medicamentis ex animalibus libri*, in the section on medicines derived from deer.

> 16. Ut mulier cito concipiat. Lapis qui vulva, aut in ventriculo cerviculae invenitur, philacterium est. Praegnanti vero efficit, ut partum liberaliter proferat, quod ratio collegit velocissimum esse illud animal, nec tamen aborsum facere: simul ratio esse potest, si ossicula, quae in vulva, aut in corde eius reperiuntur, secum habuerit, nam eundem effectum praestant.[30]

> To make it easier for women to conceive. *The stone found in the vagina or stomach of a doe has magical powers.* It helps the pregnant woman to easily carry the foetus to term because, as we all know, this animal is very fast and yet does not abort: it is also well known that if a woman carries a bone found in the vagina or stomach of a doe, the same effect occurs.[31]

Despite the fact that the author does not give the stone a specific name and its location does not correspond exactly to that of the bezoars—because it can be found both in the animal's stomach and vagina—and that its use has nothing to do with poisons, what we have here is a stone found in a mammal, which suggests that this might be a reference to an early European bezoar or medicinal stone. The term *ventriculo*, as it appears in the Latin text, refers to the abdominal cavity. This could indicate that the magical stone mentioned, which was used to help pregnant women, is not a bezoar. At the same time, in medical writings, *ventriculo* was also used to refer to the stomach itself, in which case the stone could be a bezoar.

Even if this stone is not a bezoar, it is definitely a gastrolith, since it is a stone found in the digestive system. In terms of application, this

[30] Placitus (1538: 5).
[31] Citations from Placitus throughout the study are in my own translation (K.B.).

stone, similarly to the other healing stones of Placitus, is unique in that bezoars were typically used to treat poisoning or snakebite, but in this case, it is believed that the stone aids pregnancy. Further research is needed to determine whether such healing stones used during pregnancy appear in other authors' works. We cannot tell from this segment alone how the stone was intended to be utilised, but based on the second half of the recipe, it was most likely carried in a pouch or worn as a bracelet. The latter possibility would imply that the stone needed to come into contact with the body to be effective, just as later snakestones needed to be placed on wounds to heal them.

In another segment of *De Medicamentis ex animalibus libri*, Placitus mentions another stone similar to a bezoar. Specifically, on the list of remedies that can be prepared from rabbits, he describes the following treatment for kidney stones:

> 11. Aliter ad calculos pellendos. Leporis sanguinem, et pellem totam in latere crudo comburis, ut in cinerem convertatur, et in aqua calida potui dabis cochlearium unum ieiuno, mox lapidem defrangit et eiicit. Experimentum huius perfectius habere si volueris, mittis in aquam cochlearium pulveris, et lapidem qualem volveris, et lapis liquescit, ut mireris virtutem.[32]

> 11. Another recipe, for passing kidney stones. Burn the rabbit's blood and skin all over its body while it is still fresh, then grind it to ashes, add a spoonful to a cup of warm water [and drink it] on an empty stomach, this will break down the kidney stones and help them pass. If you want to achieve an even more perfect effect, *put a spoonful of powder and a stone of your choice in the water; when the stone dissolves, it will have a marvellous effect.*

[32] Placitus (1538: 6–7).

The author does not clarify the type of stone he is referring to, but it is undeniable that it is a water-soluble stone with medical properties. As previously stated in this study, bezoars were exclusively utilised as tinctures until the thirteenth century. However, it should be emphasised that typically only a portion of the stone was needed, whereas Placitus recommends using the entire stone, which would result in a particularly potent treatment. It is also worth noting that, unlike early bezoars, this stone is employed in combination with a liquid-based medicine rather than as a tincture in and of itself. Water solubility is a rare and unique quality of a stone, and because Placitus does not define the type of stone he is referring to, there is a possibility that this stone is an animal-based gastrolith. In light of this, it is conceivable that what Placitus is referring to in this section of his book is one of the early bezoars, similar to the stone previously mentioned in the section regarding the remedies derived from deer.

Later in the text, there is a mention of a stone similar to a bezoar in the section on medicines derived from eagles:

> 3. Mulier quae concepit ut pariat. Lapis qui in ventre, aut in nido eius invenitur, quem aetos vocant, (cuius vim et nomen etiam aetites habet) prodesse praegnantibus, ut facile pariant ferunt.[33]
>
> 3. For a pregnant woman to have an easy birth. *The stone found in the stomach or nest [of an eagle]*, known as aetos (and aetites, which has the same name and effect) is said to be beneficial to pregnant women: it makes childbirth easier.

As we can see, Placitus recommends using a stone from an eagle's stomach or nest to aid in childbirth. Placitus does not indicate how the stone is used in this recipe, making it impossible to determine if it was utilised

[33] Placitus (1538: 25).

the same way that a traditional bezoar would have been. It could have been utilised as the stone mentioned in the segment regarding the remedies derived from deer, as both cases relate to facilitating childbirth. It is also conceivable that it was employed as a tincture, perhaps as a primitive painkiller. However, given the length of this recipe and the fact that it is the only mention of this treatment, we are unable to determine what exactly it was referring to.

Of all the stones that Placitus mentions, this is the only one that he identifies and names. He refers to it as aetos (ἀετός) or aetites (ἀετίτης). Both words are of Greek origin, yet their meanings are difficult to decipher, the only certainty being that they are somehow related to eagles. It is noteworthy that this so-called aetos (ἀετός) or aetites (ἀετίτης) is the only example of a stone with healing properties coming from a bird, with later referenced medical stones originating from either a mammal (typically goat or deer) or a reptile (usually snake or toad). Although Placitus never mentions a stone by this name again in subsequent works, Pliny describes a healing stone called aetites when discussing the eagle. It is crucial to note that, while the term used for the stone is the same, Pliny only uses it for the stone found in the eagle's nest and does not specify its origin.[34]

It should be observed that, although regularly discussing snakebite remedies in his work, Placitus never mentions the existence of a stone derived from any animal that might be used to neutralise snake poison. All of this raises the question of whether he is actually talking about bezoars, considering our knowledge regarding the later use of bezoar stones. Another interesting point is that both Pliny and Placitus write about goats, the animal from which the most common variety of bezoar originates and from which the first stones known in literature as bezoars derive. Regardless, neither of them mention stones in relation to these animals.

[34] Pliny *Nat. Hist.* 10, 3, 4; 30, 130.

So, the logical question is whether the Roman authors were aware of bezoars derived from goats. We are unable to provide a definite answer to this question due to the lack of sources. It is equally possible that they were aware of it but did not believe it was effective, or that they were unaware of its existence. What is known, however, is that Pliny was aware of snakestones and toadstones, and Placitus mentions deerstones, as well as stones that seem to resemble bezoars of some kind, though their origin is unknown. Although this would show that they were aware of medicinal stones, but it is then unclear why they did not write about specific types. Perhaps they were not considered effective, or they were too difficult to obtain. Perhaps they were so commonplace that they were overlooked because everyone knew how to utilise them. Unfortunately, to the best of our knowledge, we are unable to answer these questions.

In the light of what has been addressed in this paper, we are able to conclude that Placitus' healing stones do not have a poison-removing function, as subsequent bezoars apparently do. Bezoars were not necessarily considered poison-removing stones at the time of the writing of *De medicamentis ex animalibus libri*, around the 4th century AD, because there was no precise definition of bezoars at the time; the first text referring to a bezoar as a poison-removing stone dates back about 400 years later than the afore-mentioned text. However, Placitus' stones bear significant resemblance to bezoars in terms of origin and use, therefore, similarly to other stones used for a variety of maladies until the nineteenth century, they may be classified as bezoars.

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