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**CRYSTAL CLEAR.**  
**TWO EARLY ROMAN RIBBED BOWLS FROM TOMIS IN THE COLLECTIONS**  
**OF THE MUSEUM OF NATIONAL HISTORY AND ARCHAEOLOGY**  
**CONSTANȚA**

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**Abstract:** *The two Early Roman ribbed bowls discussed in the present paper are part of the collections of the Museum of National History and Archaeology Constanța (MINAC). Although both of them were previously published and subsequently mentioned in the archaeological literature in various occasions, the advances made in the research of this category of glass vessels since their first publication, from various perspectives, and the increasing number of finds all over the Roman world, make in our opinion quite useful a reassessment of these old finds from Tomis (present day Constanța, Constanța county, Romania).*

**Rezumat:** *Cele două boluri cu coaste discutate în acest articol fac parte din colecțiile Muzeului de Istorie Națională și Arheologie Constanța (MINAC). Deși ambele au mai fost publicate și ulterior menționate în literatura de specialitate, avansul luat în diferite direcții de cercetarea acestei categorii de vase de sticlă de la prima lor publicare, precum și numărul tot mai crescut de descoperiri din întreaga lume romană fac în opinia noastră utilă o reluare a discuției pe marginea acestor vechi descoperiri din Tomis (Constanța, jud. Constanța, România).*

**Keywords:** *ribbed bowls, Isings Form 3, Early Roman period, Tomis.*

**Cuvinte cheie:** *boluri cu coaste, Forma Isings 3, perioadă romană timpurie, Tomis.*

## **INTRODUCTION**

The two Early Roman ribbed bowls, belonging to Isings Form 3, discussed in the present paper are part of the collections of the Museum of National History and Archaeology Constanța (MINAC). Although both of them were previously published and subsequently mentioned in the archaeological literature in various occasions, the advances made in the research of this category of glass vessels since their first publication, from various perspectives, and the increasing number of finds all over the Roman world, make in our opinion quite useful a reassessment of these old finds from Tomis (present day Constanța, Constanța county, Romania).

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## DESCRIPTION

### 1. Ribbed bowl (MINAC 242)

The first **ribbed bowl** (MINAC 242) is made of transparent glass, with a bluish tinge (Figs. 1/1; 2/1). It has a maximum height of 5.9 cm, and a maximum diameter of 12.4 cm. The diameter of its mouth is 11.9 cm and the diameter of its base is 4.6 cm. The height of its rim (considered as the distance between the mouth and the top of the ribs) is 1.4 cm and the thickness of the glass at the rim is 0.4 cm. The body of the bowl is decorated with a number of 14 ribs, almost triangular in section and ending very close to the centre of the base (Fig. 3). The ribs are unevenly placed (Fig. 1/1, and for a detail Fig. 5), so that the distance between them at the top varies between 1.3 and 2.4 cm. The ribs themselves are in their turn of variable width, between 0.8 and 1.3 cm at their top. The vessel has a straight ground rim, with an almost rounded edge (Figs. 7-8), a hemispherical body and a slightly flattened base (Fig. 3). The vessel was finished through rotary-polishing on the interior (Fig. 10). The same intervention is noticed on the exterior of the vessel, but only on the rim above the ribs (Fig. 5). The vessel also presents on the interior, slightly above the bottom, an incised band, not very marked, consisting of two grooves placed at a distance of 0.1 cm from each other (Fig. 12). Uneven tooling marks can be noticed at the limit between the rim and the ribbed body (Figs. 14-16), as well as traces of rotary-polishing all over the interior (Figs. 10, 12). The glass is of good quality with very rare small spherical bubbles. The item is complete, in a good state of preservation, but presenting weathering crust and iridescence. It retains on the exterior, on the bottom, the inventory number (242), written in black ink (Fig. 3).

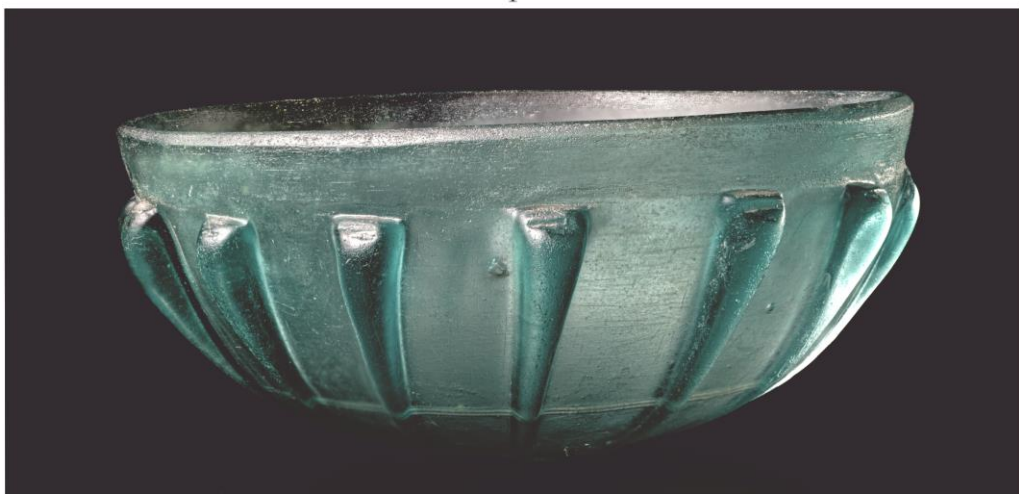
### 2. Ribbed bowl (MINAC 3927)

The second **ribbed bowl** (MINAC 3927) is made of transparent glass, also with a bluish tinge, but in a slightly different nuance (Figs. 1/2; 2/2). It is larger than the first discussed item, with a maximum height of 7.4 cm, and a maximum diameter of 16.9 cm. The diameter of its mouth is 16.3 cm. The height of its rim is 1.6 cm and the thickness of the glass at the rim is 0.4 cm. The body of the bowl is decorated with a number of 15 ribs, almost semicircular in section and ending very close to the centre of the bottom (Fig. 4). The ribs present tooling marks on their top (Figs. 17-20). They are unevenly placed, at a distance varying between 1.8 and 2.3 cm at the top (Fig. 1/2). The ribs themselves are also of variable width, between 1.3 and 1.6 cm at the top. The bowl has a straight ground rim (Fig. 6), with the edge polished only from the exterior towards the interior, so that it presents an inclination towards the interior (Fig. 9). The body is perfectly hemispherical, with no marked base (Fig. 4). The vessel was finished through rotary-polishing on the interior and only on the rim above the ribs on the

exterior (Fig. 11). On the interior, slightly above the bottom, the vessel is decorated with an incised band consisting of two grooves, very visible, placed at 1 mm from each other (Fig. 13). Uneven tooling marks can be noticed at the limit between the rim and the ribbed body, as well as traces of rotary-polishing all over the interior. The vessel is made of good quality glass with very rare small and medium-sized spherical bubbles. The item is complete and in a good state of preservation, but presenting pitting and iridescence. It retains on the exterior, on the bottom, the inventory number (3927), written in black ink (Fig. 4).



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Fig. 1. Ribbed bowls from the MINAC collections: 1. cat. no. 1; 2. cat. no. 2 (photos by Petre Nicolau).

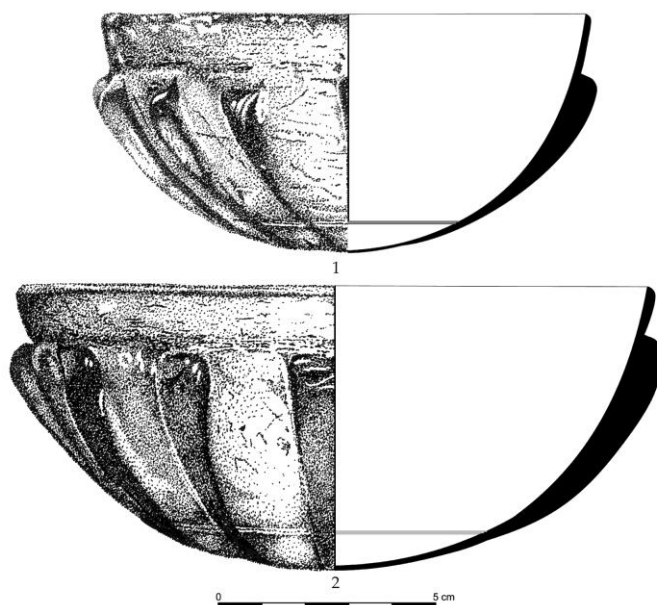


Fig. 2. Ribbed bowls from the MINAC collections: 1. cat. no. 1; 2. cat. no. 2 (drawings by Bogdan Boeru).



Fig. 3. Ribbed bowl (cat. no. 1): bottom of the hemispherical vessel with slightly flattened base.



Fig. 4. Ribbed bowl (cat. no. 2): bottom of the hemispherical vessel with no marked base.



Fig. 5. Ribbed bowl (cat. no. 1): exterior of the upper part of the vessel, with traces of rotary-polishing on the rim, tooling marks on the top of the ribs and fire-polishing on the body.

#### **FIND CONDITIONS AND FIND CONTEXT**

The information regarding the find context of the two ribbed bowls belonging to the MINAC collections is uneven, as there are more known details in the case of our second item (MINAC 3927). The vessel was first published by Mihai Bucovaľă in his

book, *Vase antice de sticlă din Tomis*<sup>1</sup>, where it was presented as representative of his *Type IX (Deep hemispherical bowls)*, belonging to the category of *Mould-cast bowls*. This type was exemplified in the book by two vessels: the ribbed bowl (MINAC 3927), at no. 28, accompanied also by two photos of the item (lateral view and bottom); and a second bowl, described but with no photo, at no. 29. As a result, it seemed somewhat implied that no. 29 was also a ribbed bowl, both vessels being presented as belonging to the same type (IX) by M. Bucovală. The fact that in the MINAC collections only two complete Early Roman ribbed bowls are known so far, both part of the permanent exhibition of the museum, in combination with Bucovală's publication, is prone to lead to a certain degree of confusion on this subject. In reality, the second vessel (Bucovală's no. 29) is described in his book as a bowl decorated only with incisions, so it does not belong to the category of ribbed bowls.

The ribbed bowl published by Bucovală (no. 28) is described by the author as having a height of 0.075 m and a diameter of 0.164 m (unclear from the text if the diameter of the mouth or the maximum diameter of the body was taken into consideration), and being preserved in a perfect condition. The bottom is convex; the rim is high, straight and rounded. As decoration, the vessel has "ribs" starting from the bottom and reaching maximum thickness at the rim's base. On the interior, close to the bottom, the vessel presents two incised circles. The glass is thick, bluish and with partial silvery iridescence. The vessel was found in a grave, excavated during 1962 in Tomis, on Traian Street, in which it was associated with a coin issued during the reign of Vespasian<sup>2</sup>. The dimensions and the characteristics of the vessel, with the additional support of the photos, together with the inventory number, offer the certainty that the item presented by Bucovală in his book at no. 28 is the one discussed in the present article as cat. no. 2.

More difficulties surround the identification of the other item considered in this paper, cat. no. 1 (MINAC 242), as it is clear that the vessel presented in Bucovală's book at no. 29, based on its description, dimensions, state of preservation (missing half its body) and inventory number (805), is entirely different. There is no mention made by M. Bucovală in his book of another similar find when MINAC 3927 (his no. 28) was described. This situation in itself offers some ground for supposing that the two vessels were not found together in the same grave, while also raising the question whether, despite the low inventory number, our cat. no. 1 is not in fact a more recent find than our cat. no. 2, one made even after 1968, when the book was published. A further confirmation of these observations might come from the fact that in his article from 1984, published in the *Journal of Glass Studies*, M. Bucovală not only that mentions two

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<sup>1</sup> Bucovală 1968.

<sup>2</sup> Bucovală 1968, 37, no. 28.

ribbed bowls from MINAC collections as being the only two complete items of this type from Romania, but selects for his catalogue a vessel with the height of 6 cm, thus matching in size our cat. no. 1 (MINAC 242).<sup>3</sup> This paper also brings an important addition of information in the case of both bowls, as the author presents them as found in cremation tombs dated to the second half of the 1<sup>st</sup> c. AD, although there is given no other information regarding the association of grave goods allegedly indicating this chronological framework, except reiterating the fact already mentioned in 1968 that one of the vessels was found together with a coin issued during the reign of Vespasian.<sup>4</sup>

A verification of the published information with the information available in the museum's register led to the following results. In the case of the first vessel (cat. no. 1), the attempt was unfortunately unsuccessful, as in the register at the respective entry (no. 242), introduced in 1964, the description of the item indicates a glass vessel with a height of 0.175 m and a diameter of 0.098 m, in a mediocre state of preservation, found in a grave excavated in 1961. An ulterior search in the museum's collections confirmed that such an item exists in the shape of a jug with ribbed body, which is registered with the same inventory number as the one presently written in black ink on the ribbed bowl. Even more unfortunately, at present it is impossible to determine when the error (the doubling of the inventory number) occurred. In normal circumstances, the presence of such a low inventory number on an item would indicate a very old find, even previous to that of the second ribbed bowl (which took place during 1962, as already mentioned above). The fact that at that position there is another item which can be described as having "ribs" enhances the probability of the scenario in which at some point (impossible to be fixed in time anymore) it was noticed that the ribbed bowl had no inventory number, the register was consulted, an item with ribs identified, and mistakenly considered as representing this bowl. As a result, an item which might be in reality a much more recent find received a much older inventory number. The fact that this ribbed bowl is not mentioned in the book but it is mentioned in the overview made by M. Bucovală for the *Journal of Glass Studies* makes it more probable that the discovery was made after 1968 and certain that it took place before 1984.

The consultation of the register with regard to the second vessel proved to be more fruitful. The entry with no. 3927 on 1965 concerns a "bowl" made of glass, described as decorated with "prominences". Its dimensions are: height 0.075 m and diameter 0.164 m (so matching perfectly the dimensions indicated by M. Bucovală in 1968). The additional information regards the state of preservation (very good), the find place and year (Constanța, Traian Street, 1962), occasion (rescue excavation made necessary by works on the extension of the sewerage system of the city), the

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<sup>3</sup> Bucovală 1984, cat. no. 2, fig. 4.

<sup>4</sup> Bucovală 1984, 60.



identification of the grave (M2) and the supplementary information that it was a cremation grave (detail published by M. Bucovală in his article from 1984, as already mentioned above). An interesting supplement of information was added by the consultation of the entries both preceding and succeeding the entry with no. 3927, as it shed some light on the association of grave goods in this particular tomb (information left aside in the publications discussing this ribbed bowl): two ceramic “*unguentaria*” and a lamp (nos. 3924-3926) and no less than 6 glass “*unguentaria*”, described as having a pear-shaped body (nos. 3927-3933), 4 glass vessels named “*ampulla*”, described as having a spherical body (nos. 3934-3937), 6 other glass “*unguentaria*” (nos. 3938-3943), 4 glass beads (no. 3944), a bronze mirror (no. 3945), bone object (no. 3946), small bone spoon (no. 3947). All these finds were registered as found in the cremation grave named M2 and dated to the 1<sup>st</sup> c. AD<sup>5</sup>.

### TPOLOGY

Based on their general appearance and characteristics, both vessels belong to **Isings Form 3**, the category of the so-called *pillar-moulded bowls*. These bowls, which can be found in shapes either deep or shallow, are characterised by the ribs decorating the body, and usually reaching to the bottom of the vessel, although there exists also a variety with ribs only on the side<sup>6</sup>. In fact, their huge success on the market, reflected in the large number of finds all over the empire, and triggering the existence of a large number of workshops in various parts of the Roman world, in combination with a series of specific traits and characteristics, both in shape and technology, make them very easily recognisable as belonging to this type. On another hand, exactly this situation led to a combination of standardisation, comprised in the main characteristics of the type, and a high degree of variation in size, proportions, number and shape of ribs, and colour.

Hence, there can be no surprise that this remarkably large amount of finds generated an equally remarkably large amount of literature, or that various opinions were expressed during time concerning certain typological, chronological or technological aspects. Thus, it should be emphasised from the beginning that the

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<sup>5</sup> The large number of grave goods indicated as belonging to the same grave is somewhat unusual and raises some questions: although the possibility that we deal with a very rich individual cremation grave cannot be ruled out, it is also possible that either there was a collective tomb, with several different cremations and their respective associations of grave goods mixed during use of the funerary structure, or the grave goods belonging to several different cremation graves were involuntarily mixed when the information was introduced in the museum's register, quite late after the moment of the archaeological excavation.

<sup>6</sup> Isings 1957, 17-18.



following discussion is not intended in any way to be a comprehensive overview of the state of the research in the field, but merely conducted in such a way as to pinpoint the place of the two items from Tomis in the larger frame of the category of ribbed bowls.

### **Shape and dimensions**

As in the case of other categories of solid bodies, the shape of this type of vessels is determined by the combination between the number and position of points of inflexion of their contour (profile) and the proportions resulted from the ratio between their height and diameter(s). A main characteristic of these vessels alluded to by their very naming in the archaeological literature as “bowls” is the fact that they represent an open form. Even more, no matter if the vessels can be included in the shallow or deep variants (Isings Form 3a or 3b)<sup>7</sup>, they do not have real points of inflexion, in other words they can be best described by the term widely used in their case in the literature, that of “hemispherical”. In other words, the diameter of their body is often enlarging continuously from the bottom towards the rim, resulting in the diameter of the mouth (diameter at the rim) as being also the maximum diameter of the vessel. Even in the case of deeper items, it seems that the tendency is to have straighter or more vertical walls in comparison to the shallower variants, but no more than that; even if the maximum diameter is already reached on the body, the vessel usually maintains up to the rim inclusively the same diameter. Of course, this observation is valid as long as only the body of the vessel per se is taken into consideration. As another main characteristic of these vessels is the fact that they are decorated with ribs, usually quite prominent ones, because of them the impression is created that the maximum diameter of the bowls is reached on the body, as a rule in the area of the top of the ribs or a little below, depending on the general degree of arching of the vessels’ walls, and then slightly decreasing. It is the case of both items from Tomis: cat. no. 1 has the diameter at the mouth of 11.9 cm and a maximum diameter on the body of 12.4 cm; cat. no. 2 has the diameter at the mouth of 16.3 cm and a maximum diameter on the body of 16.9 cm. The difference is given by the fact that the maximum diameter on the body was measured ribs included; in reality, with these left outside the equation, it can be easily noticed that the walls of both bowls are in fact enlarging continuously towards the rim.

It is quite difficult to assess in what degree the tastes and aesthetic expectations of the consumers, on one hand, and the functional issues, on another hand, influenced this particular shape. What seems to be quite clear, though, is that all the hypotheses proposed so far with regard to the technological aspects (methods of production) make this resulting shape quite inevitable, as the methods’ limitations would not have allowed the production of vessels with marked points of constriction and/or inverted

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<sup>7</sup> Isings 1957, 18-19 (Form 3a), 19-20 (Form 3b).

rim (see the discussion below). This situation raises the interesting question in what measure there was the specificity of the technology which in time “educated” the consumers’ tastes/preferences<sup>8</sup> and in what measure these tastes/preferences contributed to the prolonged survival of this specific technology.

Returning to the items representing the subject of this paper, it can be noticed that their shape, as the rest of their general aspect, is extremely typical for this form (Figs. 1/1-2, 2/1-2). Their dimensions also include them quite well in the general frame. The first ribbed bowl (cat. no. 1) finds so far more close analogies in terms of general size, although it has a tendency to be deeper than its counterparts. In other words, other vessels with similar height identified in the literature have wider diameters at the rim than our item, or the other way around, other vessels with similar diameters tend to have a more reduced height. The second ribbed bowl is placed by its dimensions, both height and diameter, somewhat on the largish side of this category, although the resulting shape brings it also quite good analogies from various parts of the Roman world. Similar vessels to these items are known, for example, from Asia Minor (present day Turkey)<sup>9</sup>, Greece<sup>10</sup>, Slovakia<sup>11</sup> or the northern part of the Black Sea (Crimea)<sup>12</sup>. Although there will be below a more detailed presentation of these analogies, it might be interesting to emphasise also at this point of the discussion the observation that, despite their difference in size, the two items from Tomis represent so far, strictly from the point of view of proportions (ratio diameter/height), the best analogy for one another.

### Decoration

As already mentioned, the ribs can be considered as some kind of “signature” for this type of vessel, which is most often to be found in the English-written archaeological literature under the name of **ribbed bowls**<sup>13</sup>. Still, although the ribs are always present – as it is impossible to have a ribbed bowl without ribs – this is about the only thing the representatives of this type tend to have in common in this particular respect. Everything else seems to vary greatly when it comes to the ribs, from item to item, including their number, their shape (section), their height, their length, their position, or their spacing. To make things worse, there seems to be no definite relation (of

<sup>8</sup> Not to mention also the accessibility to such products, both in terms of costs and presence on the market.

<sup>9</sup> Lightfoot, Arslan 1992, 33, cat. no. 2; Lightfoot 1993, 30-31, figs. 29-32.

<sup>10</sup> Tzanavari 2010, 339, cat. no. 351; Trakosopoulou, Salakidou 2010, 438, cat. no. 437.

<sup>11</sup> Kraskovská 1981, 13, fig. 3.

<sup>12</sup> Kunina 1997, 70, pl. 30.

<sup>13</sup> See, for example, Weinberg 1973, Grose 1984; Lightfoot 1993; Lightfoot 2003; Israeli 2003; Jennings 2000; Fontaine 2014.

interdependence or otherwise) either between the characteristics of the ribs or between them and the general characteristics of the vessel they decorate.

As an example, two vessels belonging to the Constable Maxwell Collection, auctioned by Sotheby's in 1979, have both the same height, 5.1 cm, while differing slightly in diameter, one of 11.7 cm and the other of 12.4 cm<sup>14</sup>; as a result, the first item has necessarily a more reduced surface than the second. Anybody expecting this difference in the surface available for decoration to be matched by a corresponding variation in the number of ribs would be sorely disappointed. A variation does exist, but not the evident one: while the vessel with the larger surface is decorated with 12 ribs, the vessel with a more reduced surface is decorated with 16 ribs.

So from this perspective, an analysis of the number and characteristics of the ribs as such is rather useless in terms of identifying good analogies for a specific item, although some trends in their treatment could be determined and proved to be quite essential especially for both determining chronological evolutions and proposing specific technological solutions which might have been employed in the fabrication of this type of vessels, aspects to be discussed briefly below.

Thus, the observations made on the characteristics of the ribs in the case of the two items from Tomis serve more for identifying similarities than perfect analogies. First of all, regarding their number of ribs, 14 (cat. no. 1) and 15 (cat. no. 2), both vessels from Tomis match quite well into the larger frame offered by their closest analogies, as these vessels are decorated with a number of ribs ranging from 11, in the case of one of the Hermitage bowls, found at Pantikapaion<sup>15</sup>, to 17, in the case of one of the bowls from Slovakia<sup>16</sup>. Other items, mentioned as analogies in this paper, similar in shape, characterised by a larger number of ribs, usually 22-23, and tending to be shallower vessels, could reflect either regional trends or, more probably, a chronological difference (see below). Other characteristics noticed in the case of the two ribbed bowls from Tomis which can be noticed also in the case of other finds are only mentioned here, as they will be more thoroughly investigated as part of the discussion on technological issues. For example, it was noticed that in the case of the bowls decorated with ribs belonging to the Roman period, the ribs are more uniform than those of the earlier types, and also in some cases they continue on the flattened undersides of the bowls, creating a kind of base<sup>17</sup>. This observation still goes unchallenged, as it can be noticed that, on one hand, the ribs are in general more equally spaced than in the case of Hellenistic bowls, and, on another hand, one of the specific traits of the later ribbed bowls is the fact that the ribs

<sup>14</sup> Sotheby Catalogue. Constable Maxwell Collection 1979, 37, cat. nos. 36-37.

<sup>15</sup> Kunina 1997, 257, cat. no. 56.

<sup>16</sup> Kraskovská 1981, 13, fig. 3.

<sup>17</sup> Israeli 2003, 76.

converge on the bottom towards the centre, in some instances the base being even made more stable by the presence of the ends of the ribs acting as support. Still, it should be emphasised that “more uniform” is far from meaning really uniform, as in general it is easily noticeable, where more details are offered in the description of ribbed bowls, or even based on available photos, that there are clear variations both in the width of the ribs themselves and in the width of the space between them. In the case of the finds from Tomis, the space between ribs at their top is between 1.3 and 2.4 cm for cat. no. 1, and between 1.8 and 2.3 cm for cat. no. 2, while the width of the ribs at the top is between 0.8 and 1.3 cm for cat. no. 1, and between 1.3 and 1.6 cm for cat. no. 2 (for the uneven spacing of the ribs and variable width, see Figs. 1/1-2 for a general image, Figs. 5-6 and 14-16 for ribs seen from the exterior, Figs. 10-13 for ribs seen from the interior). As for the other trait mentioned above, both vessels respect this norm, as their ribs reach underneath the body, ending very close to the centre of their bottom (Figs. 3-4). Another issue to be addressed briefly here is the observation that in both cases some of the ribs are slightly slanting (best noticed on the general photos, Figs. 1/1-2, and on some of the detail photos, such as Figs. 5, 10, 14), a characteristic widely spread among the representatives of the category of later ribbed bowls, and which was placed in connection with specific technological approaches. The section of the ribs is another element worth mentioning, as there is a difference between the two vessels: cat. no. 1 has ribs presenting a slightly rounded triangular section (Fig. 8, for the top of the ribs), while in the case of cat. no. 2 the ribs are more rounded and flattened, so rather semicircular in section (Fig. 6).



Fig. 6. Ribbed bowl (cat. no. 2): exterior of the upper part of the vessel, with traces of rotary-polishing on the rim and edge, tooling marks on the top of the ribs and fire-polishing on the body.

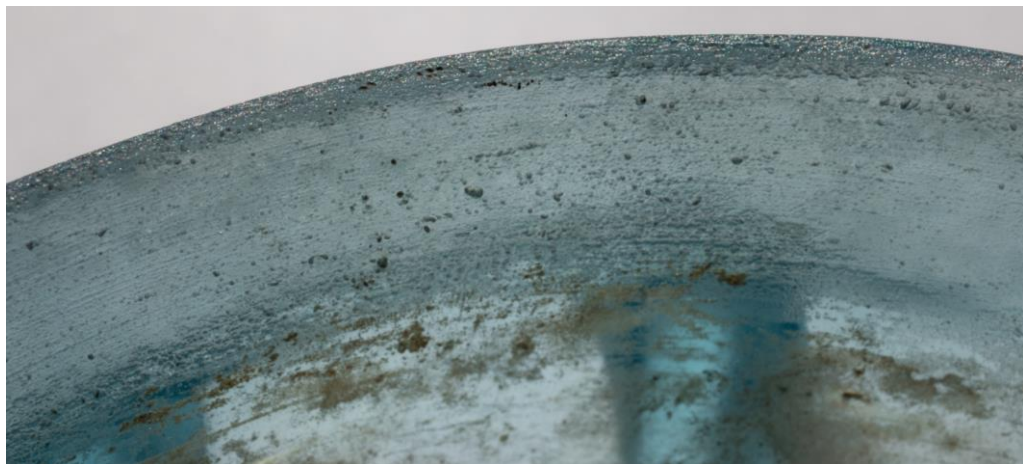


Fig. 7. Ribbed bowl (cat. no. 1): rounded ground edge of the rim viewed from the interior of the vessel.



Fig. 8. Ribbed bowl (cat. no. 1): rounded ground edge of the rim viewed from the top of the vessel, showing that the grounding was made from the very top of the edge both towards the interior and towards the exterior of the vessel.

### **Colour**

Any discussion regarding this characteristic of ancient glass tends to be open to criticism from the specialists in the field, in many cases not necessarily by any fault of the authors, but rather as a result of terminological difficulties met by researchers, as there is

no standardised vocabulary. The difficulties, noticed in general in the archaeological literature concerning this subject, not only in the English-written one, arise not so much from the existence of a multitude of colours used by ancient glassmakers as from the wide variation both in shades associated to a specific colour and the intensities ("depth") of a specific colour and corresponding shades. Here maybe it suffices to say that the two authors of this paper, looking at the same item, in the same moment, in the same light conditions, had a hard time agreeing among themselves on what they were seeing in terms of colour, or more precisely on how to best describe what they were seeing (not to mention the impossibility of expressing in words the barely noticeable, but still present, variation in shade when comparing the two ribbed bowls).



Fig. 9. Ribbed bowl (cat. no. 2): straight ground edge of the rim viewed from the top of the vessel, showing that the grounding was made from the exterior towards the interior of the vessel, resulting in an edge slightly inclined towards the interior.

On another side, this kind of situation also gives rise to difficulties when it comes to finding good analogies from this perspective for a specific item, as the name/description of a colour does not necessarily match the idea of the reader of how that colour should look like (or, it would more correct to say that the reader has no way of determining if the writer's association of a specific colour/shade with a specific term matches his/her own opinion on this matter).

The Early Roman ribbed bowls could represent a telling example of this situation. Understandably, perhaps, the consensus on colour terminology seems to be much higher in the case of mostly earlier representatives of the type, made either of

what is variously called mosaic or marbled glass (here another point of contention we are happy that we have no reason to go into), or of what is called monochrome glass, referring to glass in deep colours (glass in the case of which chromophores were clearly added in order to achieve a specific colouring). A third group of vessels, usually considered as later than their more colourful counterparts (see below the discussion on chronology), is that made of naturally coloured glass; in other words, glass in the case of which were used neither chromophores (as for example cobalt) for artificial colouring, nor decolourisers (as for example antimony) for obtaining a completely colourless result. Thus, most of the later ribbed bowls present this specificity, namely an almost colourless glass, but with bluish, greenish or anything in between (variations of greenish-bluish) tinges, visible especially when seen in natural light. The wide range of tinges that could thus result, in combination with the possible variations of their intensity or “depth”, makes very difficult any harmonisation of the terminology used in the literature.

As a result, the naturally coloured glass, used in the case of many Early Roman ribbed bowls, is described by quite a multitude of terms: for bluish tinges – light bluish colour<sup>18</sup>, light blue colour<sup>19</sup>; for greenish tinges – green colour<sup>20</sup>, greenish colour<sup>21</sup>; for bluish-greenish tinges – blue-green colour<sup>22</sup>, pale blue-green colour<sup>23</sup>, bluish-green colour<sup>24</sup>, light blue-green colour<sup>25</sup>, and even aquamarine colour<sup>26</sup>.

In the case of the present discussion, it was considered that the best solution is to describe the vessels as being transparent with a bluish tinge; in this way the fact that naturally coloured glass was used in their making was implied, while in the same time emphasising the “lightness” of the blue shade of the glass when the items are placed in natural light.

### **Finishing touches**

Alongside their shape and the presence of ribs, another typical trait easily noticed in the case of the Early Roman ribbed bowls is the fact that they were finished after casting through rotary-polishing, applied to the entire interior of the vessel and also to

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<sup>18</sup> Israeli 2003, 80, no. 69.

<sup>19</sup> Kraskovská 1981, 13, fig. 3.

<sup>20</sup> Caron, Zoitopoulou 2008, 25-27, cat. nos. 20 and 22.

<sup>21</sup> Trakosopoulou-Salakidou 2010, 438, cat. no. 437.

<sup>22</sup> Lightfoot 2007, 70, cat. no. 175.

<sup>23</sup> Lightfoot 2017, 48, cat. no. 20.

<sup>24</sup> Sotheby Catalogue. Constable Maxwell Collection 1979, 37, cat. no. 37; Grose 1984, 26; Kraskovská 1981, 13.

<sup>25</sup> Lightfoot – Arslan 1992, 33, cat. no. 2.

<sup>26</sup> Weinberg 1973; Kunina 1997, 257, cat. no. 55.



the exterior part of the rim down to the top of the ribs, while the rest of the exterior was fire-polished<sup>27</sup>. This characteristic is very clearly present also in the case of the two ribbed bowls from Tomis, which were treated in the same manner, with the entire interior presenting traces of rotary-polished, while on the exterior the body up to the top of the ribs presents a smooth, polished surface, and the rotary-polishing finishing is restricted only on the outside of the rim (Figs. 5; 10-11).



Fig. 10. Ribbed bowl (cat. no. 1): traces of rotary-polishing on the interior of the vessel.

The presence of the band consisting of two incised line on the interior, close to the bottom of vessel (the junction between the walls and the base), can also be noticed in the case of the both vessels, less visibly for cat. no. 1 (Fig. 12), and more strongly marked for cat. no. 2 (Fig. 13). This double circle, although not always present, and not always in the same position (more rarely placed below the rim also on the interior, or sometimes accompanied by a small circle at the centre of the bottom – see below) is sufficiently often noticed on items belonging to this type to make its presence rather a rule than an exception.

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<sup>27</sup> Isings 1957, 17; Lightfoot 1993, 30-31; Israeli 2003, 75-76.

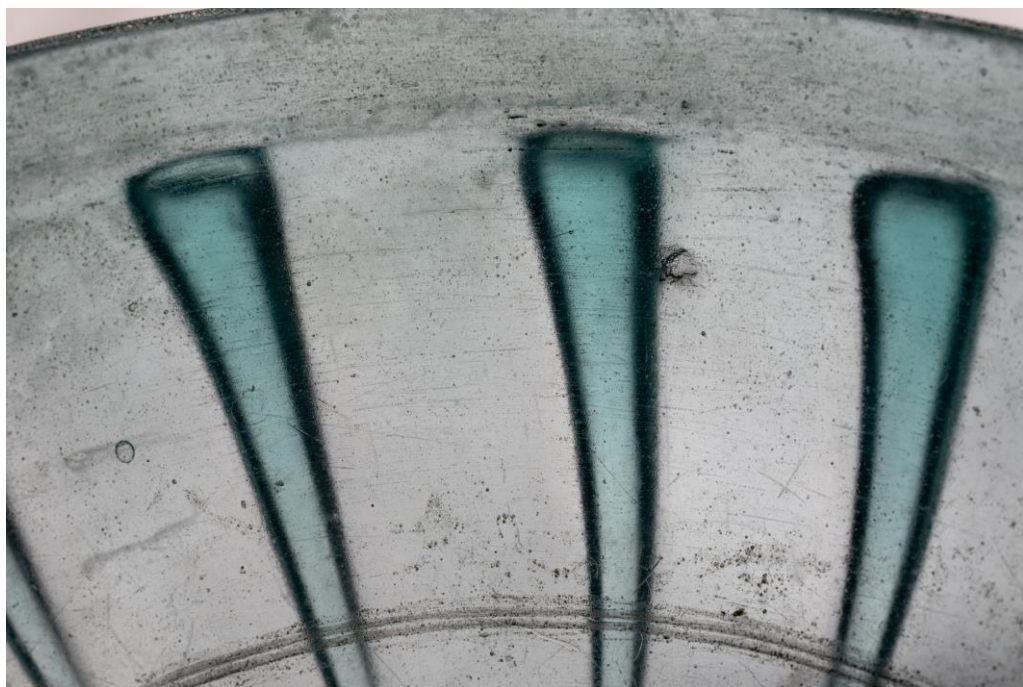


Fig. 11. Ribbed bowl (cat. no. 2): traces of rotary-polishing on the interior of the vessel.



Fig. 12. Ribbed bowl (cat. no. 1): detail with the two barely defined incised lines present on the interior of the vessel, close to the bottom.

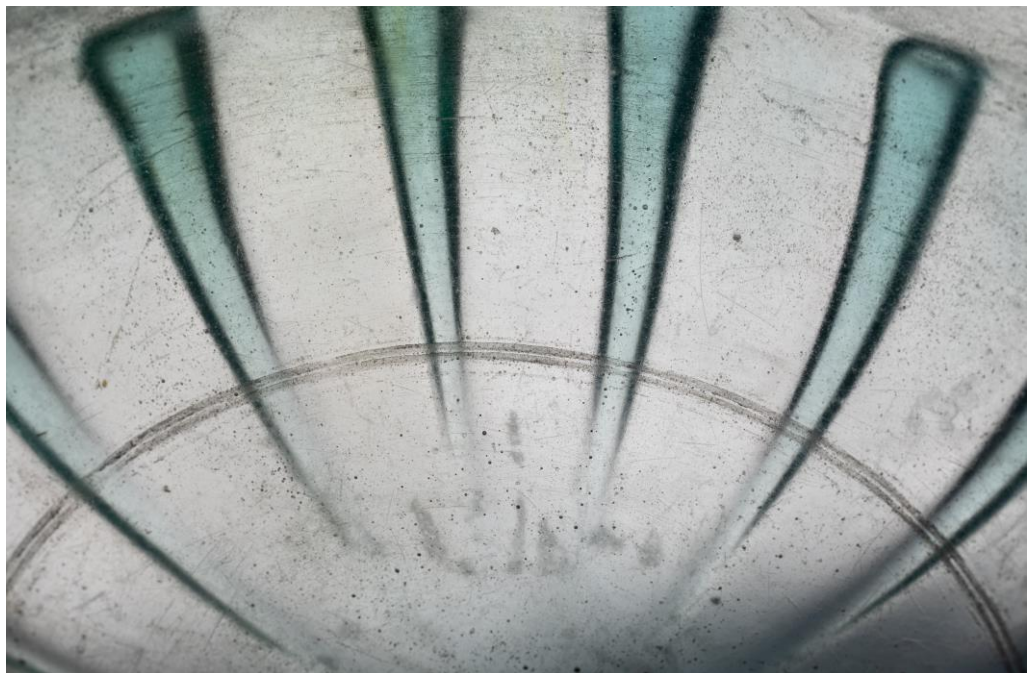


Fig. 13. Ribbed bowl (cat. no. 2): detail with the two strongly marked incised lines present on the interior of the vessel, close to the bottom.

### ANALOGIES

Several examples from the multitude of finds belonging to the category of ribbed bowls published so far were selected and are presented here as offering good analogies for the two items from Tomis, from the point of view of general appearance, shape, dimensions, colour and technological approaches.

A ribbed bowl similar in general appearance, although not necessarily in details, is known from the Eastern Mediterranean, and belongs to the collections of the Israel Museum. The vessel, mould-made and dated to the 1<sup>st</sup> century AD, is transparent, with a light bluish colour. It has a ground rim and displays traces of rotary polishing inside and outside to the tops of the ribs. There is a shallow bowl (height 3.9 cm and diameter 14.9 cm), with a concave base, and 22 ribs starting 1.5 cm below the rim<sup>28</sup>. The ribbed bowl from the Eastern Mediterranean and the two ribbed bowls from Tomis have in common the colour, the technological details and general shape. The base is treated differently, flattened or even convex in the case of the two items from Tomis, slightly concave in the case of the Eastern Mediterranean bowl. The number of ribs differs, being

<sup>28</sup> Israeli 2003, 80, no. 69.

higher in the case of the Eastern Mediterranean vessel, and thus resulting in a closer spaced distribution, as there is also a difference in the ratio between height and diameter: a diameter/height ratio of approximately 3.8 (resulting in a shallower body) in comparison to a ratio of 2/2.1 and 2.2/2.3 characterising the Tomis bowls.

Similar bowls are present also in the collections of the Montreal Museum of Fine Arts. The two ribbed bowls taken into consideration, dated to the 1<sup>st</sup> c. AD, are made of green glass, and decorated with 22 and 23 ribs, respectively. One of them displays two concentric grooves inside on the bottom, while the other has two grooves under the rim. The first item has a height of 4.3 cm and a diameter of 12.7 cm, the second has a height of 5.1 cm and a diameter of 13.5 cm<sup>29</sup>. Both vessels are also shallower than the Tomis items, with a ratio diameter/height of 2.9 and 2.65, although closer in proportions to them than the item from the Israel Museum.

Another example of a bowl similar in general appearance, but with a larger number of ribs, comes from National Museums Scotland. The item, decorated with 23 ribs, is blue-green in colour, has a flat bottom and a vertical rim with a fire-rounded edge; on interior, two concentric grooves at junction of side and bottom and a single circle at centre. It was dated to the early 1<sup>st</sup> c. AD. Its dimensions are: height 4.2 cm, diameter of mouth 13.3-13.0 cm, maximum diameter 13.65 cm, thickness of the rim 0.3 cm<sup>30</sup>. The ratio height/diameter in the case of this item is approximately 3.1/3.2, again being shallower than the bowls from Tomis.

A translucent pale blue-green bowl with 22 ribs, dated to the late 1<sup>st</sup> c. BC – mid 1<sup>st</sup> c. AD, belonging to the Cesnola Collection of Cypriot Art of the Metropolitan Museum of Art in New York<sup>31</sup>, also displays a resemblance to the items from Tomis, despite the fact that its height of 4.4 cm and diameter of 14.9 cm makes it, with a ratio of 3.4, again shallower than these.

Much closer in terms of proportions and number of ribs, although unfortunately with no details regarding their place of origin, are two ribbed bowls auctioned in 1979 by Sotheby as part of the Constable Maxwell Collection. One of them, an olive green cast glass “pillar-moulded” bowl of almost hemispherical form with flattened base, plain rim, and 16 ribs, dated to the 1<sup>st</sup> c. AD, has a height of 5.1 cm and a diameter of 11.7 cm<sup>32</sup>, thus with a ratio diameter/height of 2.3. The second one, also dated to the 1<sup>st</sup> c. AD, a bluish-green cast glass “pillar-moulded” bowl with slightly flaring sides and flattened base, plain rim, the interior with two concentric wheel-cut bands at the

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<sup>29</sup> Caron, Zoïtopoulou 2008, 25-27, cat. nos. 20 and 22.

<sup>30</sup> Lightfoot 2007, 70, cat. no. 175.

<sup>31</sup> Lightfoot 2017, 48, cat. no. 20.

<sup>32</sup> Sotheby Catalogue. Constable Maxwell Collection 1979, 37, cat. no. 36.

junction of walls and bottom, and 12 ribs, has a height of 5.1 cm and a diameter of 12.4 cm<sup>33</sup>, thus with a ratio of 2.45.

A vessel from Lete, Farmhouse A, Greece, belonging to the collections of the Archaeological Museum of Thessaloniki, dated to the 1<sup>st</sup> c. AD and presented as a ribbed phiale/bowl of probable Syro-Palestinian origin, with hemispherical body, a height of 5.9 cm and a diameter at the mouth of 13.7 cm<sup>34</sup>, is also quite similar to the bowls from Tomis, although its ratio of almost 2.7 makes it a little shallower than them. Another bowl from Greece, found in grave 4466 of the cemetery of the ancient city of Akanthos, dated to the mid-1<sup>st</sup> c. AD, presents a nearly hemispherical body, flat bottom, nearly vertical rim with slight constriction near shoulder, relatively symmetrical ribs, and is made of transparent greenish glass. Its height is 6 cm and the diameter of the mouth is 13.5 cm<sup>35</sup>, giving a ratio of 2.25, fact that makes it very similar in proportions, although on a smaller scale, to our cat. no. 2.

Two vessels also showing similarities with the finds from Tomis, in general appearance, proportions, number of ribs and colour, come from Asia Minor. One of them, dated rather early to late 1<sup>st</sup> c. BC – mid-1<sup>st</sup> c. AD, is described as light blue-green in colour, sagged, rotary-polished on the interior, the top, and the outside of the rim, fire-polished on the rest of the exterior, cut on the interior, with irregular tooling marks on and between the tops of the ribs on the exterior. It has a slightly outsplayed rim with rounded edge, convex curving side, and a slightly concave bottom. On the interior, it presents two horizontal grooves in a band at the junction of the side and bottom, and on the exterior 14 ribs of varying length, slanting downwards from right to left, ending beyond the junction of the side and bottom. The height of the vessel is 6.1 cm and the diameter at the rim 15.2 cm<sup>36</sup>, giving a ratio diameter/height of 2.5. The other one, also dated to the late 1<sup>st</sup> c. BC to mid-1<sup>st</sup> c. AD, is a hemispherical bowl, pale blue-green, sagged, rotary-polished on the interior, the top, and the outside of the rim, fire-polished on the rest of the exterior, with a slightly outsplayed rim with rounded edge, straight side, tapering obliquely downwards, and an almost flat bottom. The vessel is decorated with 11 pronounced ribs, rounded at the top and tapering sharply towards the bottom, some set vertically, others slanting obliquely, and ending beyond the junction of the side and bottom of the vessel. It has a height of 5.5 cm and a diameter at the rim of 12.4 cm<sup>37</sup>, resulting in a ratio of approximately 2.25.

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<sup>33</sup> *Sotheby Catalogue. Constable Maxwell Collection 1979*, 37, cat. no. 37.

<sup>34</sup> Tzanavari 2010, 339, cat. no. 351.

<sup>35</sup> Trakosopoulou, Salakidou 2010, 438, cat. no. 437.

<sup>36</sup> Lightfoot, Arslan 1992, 33, cat. no. 2; Lightfoot 1993, 30-31, figs. 31-32.

<sup>37</sup> Lightfoot, Arslan 1992, 35, cat. no. 4; Lightfoot 1993, 31, figs. 33-34.





Fig. 14. Ribbed bowl (cat. no. 1): detail with tooling marks on the upper part of the ribs.



Fig. 15. Ribbed bowl (cat. no. 1): detail with tooling marks on the upper part of the ribs.



Fig. 16. Ribbed bowl (cat. no. 1): detail with traces of rotary-polishing on the exterior of the rim and tooling marks on the upper part of the ribs.

Also from present day Turkey there is a ribbed bowl found in a grave at Haciveliler, in Antalya. The bowl is made of pale blue glass and decorated with 18 ribs, of slightly uneven length and thickness, set at irregular intervals, with the top cut away to form a plain band below the rim. The interior displays traces of rotary polishing, but no horizontal grooves. The vessel measures 12.8 cm in diameter and 5.2 cm in height<sup>38</sup>, meaning that the ratio between its diameter and its height is 2.46. In general appearance this bowl resembles quite a lot to cat. no. 1 from Tomis.

Other analogies can be found in Slovakia, in the necropolis from Zohor, near Bratislava. Here, in grave 3, a set of four ribbed bowls was found, consisting of two pairs: two made of opaque deep blue glass with light blue and white marbling, each decorated with 18 ribs meeting near the centre of the base; two made of light blue transparent glass, mould-pressed and ground. Only one of these two last mentioned vessels was intact, displaying a number of 17 ribs, while the other was represented only by a fragment. The intact vessel has a height of 7.2 cm and a diameter of 13.7 cm<sup>39</sup>, thus presenting a ratio diameter/height of 1.9. While in terms of proportions this ratio brings this vessel closer to our cat. no. 1 than cat. no. 2, it should be noticed that the bowl from Zohor is rather matching in height the larger item from Tomis. Two other

<sup>38</sup> Lightfoot 1993, 30, figs. 29-30.

<sup>39</sup> Kraskovská 1981, 13, fig. 3.



ribbed bowls found also in the necropolis from Zohor, one intact in grave 4, described as being made of bluish-green transparent glass, and having as counterpart a greenish fragmentary bowl, found in the vicinity of the grave, are presented as having the same shape as well as the same dimensions with the previous two<sup>40</sup>, situation which would recommend also these vessels as good analogies for the bowls from Tomis. All these vessels made of naturally coloured glass were considered as products of Italian workshops and dated to the second half of the 1<sup>st</sup> c. AD<sup>41</sup>.

Two interesting analogies can be also found in the Hermitage collection. The first ribbed bowl, considered of Eastern Mediterranean origin and dated to the 1<sup>st</sup> c. AD, has no find context. It is characterised by a hemispherical body decorated with 12 ribs and is made of clear aquamarine glass. It presents signs of working on the top of the ribs, the interior and the rim outside were rotary-polished, the exterior polished by fire, and two circular grooves can be noticed inside. The height of the vessel is 5.5 cm, the diameter at the rim is 13.8 cm, and the thickness of the glass is 0.3 cm at the rim<sup>42</sup>. The ratio between diameter and height is 2.5, thus bringing this item quite close in proportions to the bowls from Tomis, especially to cat. no. 2. The second ribbed bowl, also considered of Eastern Mediterranean manufacture, was dated to the second half of the 1<sup>st</sup> c. AD, presumably based on its find context. The item was found in 1905 in the necropolis of Pantikapaion (grave 120/12). It is described as having a hemispherical body, with smooth rim and 11 ribs converging at the bottom. It is made of light aquamarine glass, with signs of tooling on top of the ribs, traces of rotary-polishing inside, and also outside on the rim, while the rest of exterior is fire-polished. The height of the bowl is 4.5 cm, the diameter at the rim is 11.4 cm, and the thickness of walls at the rim is 0.2 cm<sup>43</sup>, making it a smaller, more delicate item. It should be interesting to notice that in the list of analogies the author also indicates Bucovaľa 1968, no. 28, so our cat. no. 2 (MINAC 3927), and in fact the ratio of 2.5 characterising the bowl from Pantikapaion brings it closer, even on a smaller scale, to the proportions of this item in comparison to those of the smaller item, cat. no. 1. As an adjacent observation, although these vessels' colour is described in similar terms, as being a clear or light aquamarine colour (a term sometimes used in the archaeological literature in order to indicate the naturally coloured bluish-greenish glass, as discussed above), the colour photo displaying both bowls side by side reveals that, as

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<sup>40</sup> Kraskovská 1981, 13.

<sup>41</sup> Kraskovská 1981, 13.

<sup>42</sup> Kunina 1997, 257, cat. no. 55.

<sup>43</sup> Kunina 1997, 257, cat. no. 56.

in the case of the vessels from Tomis, the tinge varies slightly, being more greenish in the case of the smaller item and more bluish in the case of the larger item<sup>44</sup>.

As it can be noticed from the selected examples discussed so far, it is clear that the two ribbed bowls from Tomis match quite well in the general image existing at present for this type of glass vessel all over the Roman world. In fact, the attempt to find good analogies can prove much easier when looking to distant areas than when concentrating on the area from which these two items come. This rather unexpected occurrence has a quite simple explanation: on one hand, the number of known finds belonging to this type of vessel is much reduced compared to other parts of the empire; on the other hand, all these finds are represented by fragments. The fact that the only complete items known so far from Dobruja, that is from Roman contexts, are these two vessels from Tomis, and that the local Getae milieu from the eastern part of Romania produced until now also only fragments of this type, makes the comparison between finds a lot more difficult, the chances of committing errors becoming of course greater. Below there is a short presentation of the best known of these finds, excavated either in military and civil contexts of Roman sites from Dobruja, or in Getae settlements from the eastern part of Romania.

Several sites from Dobruja offered so far finds belonging to this type of vessels, outside Tomis, such as Capidava, Carsium, Noviodunum and Ibida<sup>45</sup>. A part of these finds are briefly presented below.

The archaeological excavations conducted in 1988 in the area of the wharf of the ancient city from Capidava, Constanța county, resulted in the discovery of various categories of material datable to the Early Roman period<sup>46</sup>. In the layer of reddish sand covering the bedrock, dated to the 2<sup>nd</sup>-3<sup>rd</sup> c. AD<sup>47</sup>, amongst other finds, pottery and metal objects, there were also fragments belonging to various types of glass vessels. Of special interest from the point of view of the present discussion there are two fragments described as belonging to hemispherical ribbed bowls, one of them made of clear bluish glass and the other of greenish glass with small bubbles. The finds were dated to the 1<sup>st</sup>-beginning of the 2<sup>nd</sup> c. AD<sup>48</sup>.

Three fragments belonging to the category of hemispherical ribbed bowls were also found during excavations in the city of Carsium, Constanța county. The first one is a fragment of rim and wall with the upper part of a prominent rib still present. The glass is described as being of "natural" colour, bluish green,

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<sup>44</sup> Kunina 1997, 70, pl. 30.

<sup>45</sup> Boțan, Chiriac 2011, 155.

<sup>46</sup> Matei 1988-1989, 121.

<sup>47</sup> Matei 1988-1989, 124.

<sup>48</sup> Matei 1988-1989, 125, fig. 3/1-2.

transparent, with small bubbles and blue and silvery iridescence. On the interior there are traces of rotary polishing, as well as on the exterior, on the rim. It is considered that the vessel was obtained through the method of casting or pillar-mound casting, and the general aspect is described as negligent. The diameter of the mouth was estimated to 16-18 cm. The item was dated to the second half of the 1<sup>st</sup> – beginning of the 2<sup>nd</sup> c. AD, as its characteristics indicate its belonging to the later variants of this form<sup>49</sup>. The second fragment, also from the rim, retains the very top of a rib. The glass is bluish, transparent with violet iridescence. The fragment presents strong traces of rotary polishing. The item was obtained through the same method and was produced in the same negligent manner as the first one. The diameter of its mouth was approximated to 14 cm. It was also dated to the second half of the 1<sup>st</sup>-beginning of the 2<sup>nd</sup> c. AD, based on the traits characteristic to the later representatives of this form<sup>50</sup>. The third fragment is also from the upper part of a vessel, consisting of rim and wall with half a rib preserved, which is vertical and prominent. The rim is rather vertical and slightly rounded. The glass is greenish-bluish, translucent, with silvery iridescence and exfoliations. The traces of rotary-polishing are strong and uniform on both sides, and the vessel is considered to have been produced casting – pressing. The diameter of the mouth was approximated to 12 cm. It was dated to the same chronological framework as the other two items, based on the main characteristics<sup>51</sup>.

Another fragment, yet unpublished, should be added to these finds. It represents the rim and upper part of the wall, preserving the top of a rib, of a bowl made of transparent glass with bluish tinge, with traces of rotary-polishing on the interior and only on the rim on the exterior. The fragment was found at Histria/Istros, Constanța county, in the Crypt Basilica Sector, during the archaeological excavations from 2008, in an Early Roman layer<sup>52</sup>.

Although the fragmentary condition of these items puts certain limitations on their comparison to the ribbed bowls from Tomis, they all have in common the fact that they are made of naturally coloured glass, transparent with bluish, greenish or bluish-greenish tinges, with details indicating that they are later representatives of the form. In addition, the estimated diameter of the finds from Carsium makes them comparable in size to those from Tomis, first of them to cat. no. 2, so quite a large vessel, the third one being closer to cat. no. 1, and the second falling somewhere in between.

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<sup>49</sup> Chiriac 1999, 75, no. 1, pl. III/1.

<sup>50</sup> Chiriac 1999, 76, no. 2, pl. III/2.

<sup>51</sup> Chiriac 1999, 76, no. 3, pl. III/3.

<sup>52</sup> The authors would like to express their thanks to Dr. Irina Achim (Institute of Archaeology “Vasile Pârvan” Bucharest) for this kind information.

Alongside earlier, polychrome and monochrome in deep colours, ribbed bowls, vessels of this type, made of good quality naturally coloured bluish-greenish glass, were also found in the settlements of the local Getae communities, in the eastern part of Romania, at Poiana, Răcățau, Brad and Bărboși<sup>53</sup>. An interesting feature to be mentioned is that this variety is not the only one represented in these sites; fragments of ribbed bowls made of opaque white glass or marbled glass were also found, for example at Poiana<sup>54</sup>, a situation which is not mirrored by the finds from Dobruja, where such variants were not found so far.

Such an example is a fragment of a ribbed bowl, preserving part of rim and wall, with the upper part of a rib, found in the Getic settlement from Bărboși – Tirighina, Galați county, and included in Isings Form 3a, which shows many similarities with the ribbed bowls from Tomis. It is described as made of translucent aquamarine glass, with no bubbles, with silvery iridescence. The rim is straight, thinned and rounded at the edge. The estimated diameter of the mouth is 10.5 cm and the estimated height is around 5 cm, based on the fact that the rib seems preserved in proportion of approximately 80% on a length of 3 cm. The original number of ribs was also estimated as being 14<sup>55</sup>. The estimated dimensions and number of ribs, as well as the resulting proportions of the vessel (ratio diameter/height of 2.1), would make this item very similar especially to the smaller ribbed bowl from Tomis (cat. no. 1).

### CHRONOLOGY

The vast majority of ribbed bowls included in Isings Form 3 were found in archaeological sites dated to the 1<sup>st</sup> century AD, and in consequence they were considered as typical for finds of that period<sup>56</sup>. Although their period of flourishing is the 1<sup>st</sup> century AD, their existence begins earlier, when, following the Roman conquest of the Eastern Mediterranean and Egypt in the 1<sup>st</sup> century AD, the new techniques of glass production already in use in those areas, spread to Italy. It was considered that the artisans who immigrated to Rome produced numerous mosaic glass vessels and distributed them throughout the empire, with ribbed bowls beginning to be produced in Italy by the late 1<sup>st</sup> century AD. An interesting aspect which was emphasised, as it tends to make more difficult the chronological attribution to more specific time spans, is that while the western production reveals a decided preference for colourfulness, in the Eastern Mediterranean the ribbed

<sup>53</sup> Boțan, Chiriac 2011, 155, fig. 1/3-4, fig. 2, fig. 3, fig. 10/3-4, 9-10, fig. 12/5, fig. 14/2; Boțan 2014, 252, pl. III/10-12, 14-16, pl. V/9-11, pl. VI/1-7.

<sup>54</sup> Boțan, Chiriac 2011, 155.

<sup>55</sup> Liușnea 2019, 374, fig. 5/1.

<sup>56</sup> Isings 1957, 17.

bowls from the Roman period are mainly in the natural greenish-bluish hues of glass<sup>57</sup>. By the middle of the 1<sup>st</sup> century AD this preference spreads throughout the Roman world and the so-called later ribbed bowls tend to be produced mainly from naturally coloured glass.

It was in fact noticed that the cast vessels, ribbed bowls among them, already in competition with blown vessels, share with the last mentioned ones this predominance of naturally coloured glass. This is considered a characteristic of the Flavian period: for example, the research conducted in the port of Arles showed the predominance (80%) of blown vessels in “natural” coloured glass (bluish green, light blue, pale green, yellowish green) that were not deliberately coloured or decoloured, and in the same layer the ribbed bowls were also mostly cast from similar naturally coloured glass<sup>58</sup>. Their success also led to both blown and mould-blown imitations of the form during this period<sup>59</sup>. Finds from other parts of the Roman world sustain this chronological framework; for example, finds from Beirut, forming the so-called Cistern Group, dated to 60-70 AD, were generally made of natural bright blue-green glass<sup>60</sup>.

As there were also finds with an earlier dating made of naturally coloured glass, despite the clear predominance of the polychrome and monochrome vessels in strong colours<sup>61</sup>, the colour in itself is not a strong enough indicator of a later chronological framework. Thus, the main characteristics to be investigated are the shape of the vessel and the treatment of the ribs, as there is an evolution noticed in their appearance during time. In fact, they seem to follow closely the evolution of the profiles of their plain, un-ribbed counterparts<sup>62</sup>, so that the later variants become shallower. With regard to the ribs, the earliest form of these bowls has short, fat, widely spaced ribs<sup>63</sup>, situation changing during time towards vessels with ribs reaching down and curving so as to end closer to the centre of the bottom<sup>64</sup>.

Taking into consideration these criteria, their colour, shape and characteristics of the ribs, already discussed in some detail above, the two vessels from Tomis can be assigned to the later group of ribbed bowls, produced and used during the second half of the 1<sup>st</sup> century AD. In the case of one of the vessels (cat. no. 2), this dating is further sustained by the fact the ribbed bowl was found in a cremation grave together

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<sup>57</sup> Israeli 2003, 76.

<sup>58</sup> Fontaine 2014, 359-360.

<sup>59</sup> Lightfoot 1993, 27.

<sup>60</sup> Jennings 2000, 49, fig. 4/10-11.

<sup>61</sup> Isings 1957, 17-19.

<sup>62</sup> Jennings 2000, 47.

<sup>63</sup> Jennings 2000, 47-49.

<sup>64</sup> Israeli 2003, 76.

with a coin issued during the reign of Vespasian (69-79)<sup>65</sup>. Thus, the chronological position of this item in the second half of the 1<sup>st</sup> century AD is firmly secured; this meaning in fact that at least it was still in use in the second half of the century, no matter the moment of its production. Based on the strong similarities between the two vessels from Tomis, it seems highly probable that the other ribbed bowl (cat. no. 1) was in use during the same interval.

### TECHNOLOGY

The technique in which these bowls were made raised some question marks to the specialists in this field. The traditional view is that vessels of this type were first mould-pressed<sup>66</sup> (hence the name offered to this category of bowls as early as the 19<sup>th</sup> century – “pillar-moulded”) and afterwards fire-polished externally; the finishing consisted of their being rotary-polished internally, as proved by the wheel incisions left on their interior, as well as on the upper part of the outside walls, usually to the upper ends of the ribs<sup>67</sup>.

Still, several alternatives for the ancient techniques used to produce ribbed bowls were advanced during time in the literature concerning this subject, some of them becoming largely influential and being considered as better explaining the peculiarities of this type of bowls.

Starting from the description of such a specific process by K. Cummings<sup>68</sup>, D. Grose discusses an alternative solution (without considering it the only possible one), which took place in two stages and could have been used for various types of bowls, not only the ribbed ones, but also linear-cut bowls. First, a circular blank of glass in the desired size was created, and once cooled it was sagged one or more times under its own weight over, in or through a “former” mould until reaching the proper shape. Following annealing, only the interior and the top or the entire interior and only the rim on the exterior required rotary-polishing because the exterior was already fire-polished simply by being exposed to the heat in the kiln<sup>69</sup>. The additional step needed by the ribbed bowls was made necessary by their specific decoration. The method considered by D. Grose would have required a special tool with regularly spaced gaps

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<sup>65</sup> Bucovală 1968, cat. no. 28.

<sup>66</sup> The method also mentioned in the archaeological literature in the variant “press-moulded” (see, for example, Caron – Zoitopoulou 2008, 25).

<sup>67</sup> Isings 1957, 18; Israeli 2003, 75-76.

<sup>68</sup> Cummings 1980, 23-36.

<sup>69</sup> Grose 1984, 28.

pressed on the circular blank of glass while still hot<sup>70</sup>. This method of “sagging” was seen by the author as helping explain two of the characteristics of this types of vessels: the simplicity of the shape, on one side (aspect also briefly discussed above), and the absence of parts such as handles or base rings, on another side<sup>71</sup>.

The method of production was put into discussion and amended some years later by R. Lierke, who also approached the manufacturing of the ribbed bowls. The author considered that there can be identified three steps in the production of a ribbed bowl: the sagging of a hot thick glass cake over a reusable core mould on a turning wheel; the pressing of the rim with the help of a metal tool with a simple form during the first turn of the wheel (by this action it also chilled and stiffened); the ribs were created with a similar tool by indenting the interstices in the exterior of the glass cake during the second turn of the wheel, this way the bowl being also widened. The tool could have had different profiles. The observation was also made that this method could have caused curved ribs by the turning of the wheel.<sup>72</sup> In fact, the irregularity shown by most of the ribs, with some vertical and some slightly slanting on the same vessel, is considered by the author as one of the features confirming the proposed method: the first ribs would have been straight as the wheel was not turning yet, while the next would have become slanting and slightly sickle-shaped because of the turning of the wheel<sup>73</sup>. The author noticed also that what was previously considered as the proof of rotary-polishing on the interior is in fact the result of the contact between the interior part of the glass blank and the former, the so-called hot scratches; in her opinion, only the edge and the outer part of the rim were ground, and this intervention succeeded the pressing flat of the rim on the turning wheel<sup>74</sup>.

An experiment in reproducing Roman and Hellenistic glass was conducted by M. Taylor and D. Hill, who consider that the early glassmakers would have applied to the quickest and simplest methods available, and that the production of ribbed bowls was respecting this rule. The researchers identified two stages in the production process: the hot-forming stage and the cold-working stage. The hot-forming stage consists of forming each rib individually on a hot, flat glass disc, using a pair of adapted pincers. The time necessary for pinching all the ribs leads to the necessity of reheating the disc; as a result, the earlier pinched ribs could undergo

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<sup>70</sup> Grose 1984, 28, figs. 4, 9, who also sends in footnote 10 to Weinberg 1973, 36-39, for examples of ribbed bowls with tooled ribs.

<sup>71</sup> Grose 1984, 29.

<sup>72</sup> Lierke 1993, fig. 28; Lierke 2009, 54.

<sup>73</sup> Lierke 2009, 55.

<sup>74</sup> Lierke 2009, 56.



a certain amount of remelting, an effect sometimes noticed in the case of original vessels. Also, during rib-pinching, it was found that the disc became prone to distortion, requiring readjusting with the pincers.<sup>75</sup> The heated disc was placed on the former and arranged in such a way as to create an even rim by meeting the glass disc with the horizontal surface of the kiln batt; the areas which do not meet the batt could be helped with the blade of the pincers, resulting in nearly horizontal linear toolmarks in the form of slight indentations, also noticed on some of the ancient vessels<sup>76</sup>. The exterior upper part of the vessel was tooled after the slumping, in order to form the characteristic wider flattened ends of the ribs and to ensure that all the ribs begin at the same distance below the rim – an operation done by reheating the bowl and applying two narrow rods at either side of the rim, turning the vessel as it was pressed by them. The slight slanting of some ribs was noticed as a result of this method<sup>77</sup>. The cold-working stage consists of grinding the rim of the bowl, grinding and polishing of the area above the ribs, grinding and polishing the inside of the vessel and cutting the decoration<sup>78</sup>.



Fig. 17. Ribbed bowl (cat. no. 2): detail with barely visible tooling marks on the upper part of a rib.

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<sup>75</sup> Taylor – Hill 2003, 1-2.

<sup>76</sup> Taylor – Hill 2003, 3.

<sup>77</sup> Taylor – Hill 2003, 3.

<sup>78</sup> Taylor – Hills 2003, 4.



Fig. 18. Ribbed bowl (cat. no. 2): detail with pronounced tooling marks on the upper part of a rib.



Fig. 19. Ribbed bowl (cat. no. 2): detail with tooling marks on the upper part of the rib and on the top of the rib.



Fig. 20. Ribbed bowl (cat. no. 2): mosaic of detail photos showing in comparison the tooling marks present on the upper part of all the 15 ribs of the vessel.

All these methods have at their core the fact that the characteristics of glass allow the working of a hot glass disc on a former, by sagging or slumping, instead of casting in a mould. The adoption of the sagging technique by the Roman glassmakers was seen as facilitating and speeding the fabrication of vessels, both because it reduced by half the amount of requisite polishing (as the exterior would have been fire-polished) and it enabled them to work the glass at lower temperatures<sup>79</sup>. The estimated time needed for producing a ribbed bowl using variants of the sagging method varies, but the accent is placed by all these authors on the remarkable speeding of the process, in comparison to the methods traditionally accepted in the literature as being employed in the production of the cast vessels, including the category of the ribbed bowls<sup>80</sup>.

<sup>79</sup> Grose 1984, 29.

<sup>80</sup> Lierke (2009, 54) estimates 2 minutes maximum for working the glass cake on the former, to which 5-10 minutes should be added by the grinding of the rim (although there is unclear what time was needed for heating the glass and separating the necessary quantity in order to create the glass cake); Taylor and Hill (2003, 1) determined that in order to form and slump a monochrome ribbed bowl using their method would take approximately 15 to 20 minutes (twice this time for a mosaic or polychrome vessel).

Trying to analyse the two ribbed bowl from Tomis from this perspective, of the technological approaches which could be implied by some of the noticeable details in their appearance, we arrived to some tentative conclusions, although we are fully aware that more could be done. Taking into consideration the three variants of the sagging method briefly presented above, we arrived at the conclusion that, strictly in the case of the two items from Tomis, the method proposed by D. Grose is the less probable. The reason is that the second stage of the technique involves in this case a special tool with regularly spaced gaps. Thus, in theory at least, there would be the best chances of all the three variants that the resulted ribs were indeed placed at equal distance and the ribs themselves equal in width, a situation not encountered for the two ribbed bowls in discussion. Not only that the distance between ribs varies, but also the width of the ribs is variable (Figs. 5-6, 10-16), so there are much better chances that one of the two other methods was used, either implicating a metal bar<sup>81</sup> or metal pincers<sup>82</sup>. It is more difficult though to decide which of these two remaining approaches would have been effectively used, as the aspect of the ribs seems to match both sets of results. The slight slanting of some of the ribs, present in the case of both items, is a frequent result of both methods, as well as the tooling marks noticed on the top of the ribs, especially visible for cat. no. 2. A detail which could perhaps incline the balance in the favour of the method proposed by Taylor and Hill can be noticed in some of the interstices at the top of the ribs, a sort of lateral “smearing” of the top of some of the ribs in the interstitial space, again visible especially in the case of vessel cat. no. 2 (Fig. 17-20). Such a “leftover” trail seems to match better the steps taken in the last presented method, with the rim being flattened after the ribs were created – the action of the metal bars while the wheel was turning could have trained some of the still soft glass of the ribs’ tops with them; if the order of the interventions was inverse, so the rim created first and then the ribs tooled with the metal bar, it seems less probable that such traces could have been created. It is even more difficult to express an opinion regarding the existence or not of finishing touches on the interior of the vessel. R. Lierke is very emphatic when attributing the traces on the interior of the ribbed bowls to natural causes (hot scratches), not to ulterior interventions through rotary-polishing<sup>83</sup>. In the same time, Taylor and Hill, describing their experiments, include the phase in which the interior polishing of the resulted glass vessel is necessary in order to remove any fused lumps and the remains of the former which could get attached to the interior of the vessel<sup>84</sup>. Especially in the absence of

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<sup>81</sup> Lierke 2009, 54.

<sup>82</sup> Taylor, Hill 2003, 1.

<sup>83</sup> Lierke 2009, 56.

<sup>84</sup> Taylor, Hill 2003, 4.

photos taken with the help of a microscope, unfortunately this aspect should be left for now without a clear answer with regard to the two discussed items.

### FINAL REMARKS

The two ribbed bowls from Tomis can be considered as typical representatives of the later variety of this type of vessels, dated to the second half of the 1<sup>st</sup> century AD, together with similar finds, although in a much more fragmented condition, excavated from other sites in Dobruja. Their small number in comparison with what can be found in other parts of the Roman world, where this category of bowls tends to be very well represented, raised some questions in the archaeological literature concerning the degree of access of the local communities to such a commodity and the possible reasons for this scarcity, be it apparent or real<sup>85</sup>. Still, they offer an interesting glimpse on the presence and use of the Early Roman glassware in this part of the empire. Even more, it is only to be expected that future archaeological research in combination with the valorification of the glass material from previous archaeological excavations, so far completely or partially unpublished, will help to shed more light on this category of finds and their place in the larger frame of the Roman material culture in this province.

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<sup>85</sup> Boțan 2014, 253.

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