

Classical and Hellenistic glass workshops from Rhodes

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Among the various crafts of Rhodes, glass making¹ undoubtedly occupied an important position during the Classical and Hellenistic periods in the thriving commercial and economic activity of the island². The arguments for a flourishing glassworking production on the island of Rhodes are mainly based on the typological and chronological study of many finds, and on workshop evidence which came to light during the fifty-four years of rescue excavations of the 22nd Ephorate of Prehistorical and Classical Antiquities, mainly at the edge of the plain, in the Πανοῖ; "Akran (Diodoros 20.83.1-4), the town of Rhodes, as well as in the excavations of the then Italian Archaeological Service³ in Ialysos and Camiros.

1. The end of the sixth century and the fifth century BC

The local glass production of Rhodes seems to have begun in the last quarter of the 6th century BC with the manufacture of opaque core-formed vessels (fig. 1), but also of opaque rod-formed head-shaped and figurine-pendants (fig. 2) and of multi-coloured beads of similar manufacture to the core-formed vessels found mainly in



Fig. 1 — Core-formed amphoriskoi. Rhodes. Late 6c. BC.

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¹ Weinberg 1992, p. 19, 23; Triantafyllidis 1997; *id.* 2000, p. 30; *id.* 2002, p. 21-22.

² Rostovtzeff (M.), *The Social and Economic History of the Hellenistic World*, II, Oxford, 1941, p. 676ff.; Berthold (R.M.), *Rhodes in the Hellenistic Age*, London, 1984, p. 19ff.; Papachristodoulou (I.), *The Ancient Rhodian Demoi, Historical Review, The Ialysia*, Athens, 1989, p. 35-37 (in Greek).

³ *La Presenza Italiana nel Dodecaneso tra il 1912 e il 1948. La Ricerca Archeologica. La Conservazione, Le Scelte Progettuali, Scuola Archeologica Italiana di Atene*, Catania, 1996, p. 40-50 (Ialysos), 60-73 (Camiros), 12-37 (city of Rhodes).

⁴ For beads and pendants, see Tatton-Brown (V.), "Rod-formed Glass Pendants and Beads of the 1st Millennium BC", in Harden 1981, p. 143; Tatton-Brown (V.), "Rod-formed Pendants", in Barag (D.), *Catalogue of Western Asiatic Glass in the British Museum I*, London, 1985, p. 57, no. 144, p. 115; Grose 1989, p. 82-83; Triantafyllidis 2002, p. 26, fig. 4; Spaer 2001, p. 156-158; Triantafyllidis forthcoming. For core-formed vessels, see Weinberg 1992, p. 80, no. 5 and Triantafyllidis (P.), *Rhodian Glassware III. The Core-formed Vessels* (forthcoming). For other core-formed vessels from Rhodes, see Arveiller, Nenna 2000, p. 34ff, nos. 5, 13, 25, 82, 85, 135. Triantafyllidis 2002, p. 22-23, fig. 1.

⁵ For beads, see *Clara Rhodos IV*, 1931, p. 270, tomb 110, fig. 297; *Clara Rhodos VI-VII*, 1932, p. 214, 270, tomb 107, no. 25, tomb 140, fig. 297; Spaer 2001, p. 101, fig. 46. For core-formed vessels, see Weinberg 1966, p. 711-712, fig. 1; Harden 1981, p. 62ff, nos. 85-86, 88, 90, 92, 94, 97-99, 101-103, 112-114, 119-120, 129-130, 133, 139, 145-146, 147-148, 152, 162-163, 167, 170, 176, 179, 180, 183-187, 191, 196, 198-199, 201, 204, 206, 216, 217, 2221-224, 230, 233-234, 236, 238, 241, 245, 250-251, 256, 257-259 and Triantafyllidis (P.), *Rhodian Glassware III. The Core-formed Vessels* (forthcoming).

⁶ For beads, see Blinkenberg (C.), *Lindos: Fouilles de l'Acropole 1902-1914, I, Les Petits Objets*, Berlin, 1931, p. 93, no. 151, p. 102, nos. 204-205. For core-formed vessels, see Harden 1981, p. 69ff., nos. 128, 142.



Fig. 2 — Rod-formed beads and figurine pendants. Rhodes. Late 6-5 c. BC.



Fig. 3 — Core-formed deformed vessels. Mediterranean group I. Rhodes. Late 6-5 c. BC.

the wider region of Ialysos⁴, Camiros⁵ and Lindos⁶.

1.1 The core-formed vessels

The core-formed vessels cover almost all the known typological groups of the Mediterranean Group 1: the pointed bottom amphoriskoi with round and widened fluted or non-fluted body, the aryballoi, the oinochoai with a trefoil-shaped mouth and an attached disc on the base of the handle, and also the alabastra with rounded base and ring-shaped handles with button shaped ends. The vessels and small objects, made in the chromatic depth of the blue, deep green and white glass, are decorated with the known designs of zig-zag and trails of yellow, white, light blue, violet and green glass. These products are part of the Rhodian glass workshop, whose installations, during the pre-settlement period, although they have not been detected during excavations, should be located on the western part of the island (Weinberg 1966, p. 712, footnote 16), possibly in the harbour area of the ancient town of Camiros, where the strong breezes and the south-westerly winds carried pure sand to the coast, a raw material possibly suitable for glassmaking. The acceptance of the above theory — the presence of a glass workshop in Camiros —, remains an attractive case, in the knowledge that recent salvage or systematic excavations in the wider region are still few.

Evidence of the Rhodian glass workshop of the 5th century BC is provided by a series of deformed core-formed vessels (fig. 3) from unsuccessful manufacture (deformed vessel walls, necks and mouths). On some vessels, there are traces of repairs on the applied decoration threads and trails during the unsuccessful manufacture of

the desired colouring, whereas others have handles of different shapes. With the help of a detailed typological study and of a comparative examination of the published groups mainly from Camiros and Ialysos, the trefoil-shaped mouth oinochoai with an attached disc on the base of the handle — a clear imitation of metallic examples — were identified by many scholars⁷ as Rhodian productions of the 5th century BC.

1.2. Colourless objects and luxury glasswares

An equally significant wide category of transparent objects and luxury glassware made with the so-called cast technique or hot-formed technique is observed in Rhodes from the late 6th century BC. A first group is constituted by the transparent colourless stands⁸ of the core-formed vessels, mainly of amphoriskoi, found in tombs in Ialysos and Camiros. The fact that these objects are of different dimensions and diameters, but similar to the diameters of the base of the core-formed vessels, suggests that they were made at the same time as the Mediterranean Group I products, possibly by the same glassworkers, who seemed to have known the hot-formed technique. Amongst the monochrome transparent products from Rhodes, there are also engraved glass seals and a large number of glass gems or stones, and beads in colourless or in light green tints found in the tombs of Ialysos⁹ and Camiros¹⁰ as well as in the depot of the Sanctuary of Filerimos dating mainly in the 7th and 6th century BC.

Colourless or green glass transparent luxury vessels were beginning to be made in Rhodes from the late 6th

⁷ Haevernick (Th.), "Beiträge zur Geschichte des antiken Glases V: Kleine Beobachtungen technischer Art", *Jahrbuch des Römisch-Germanischen Zentralmuseum Mainz* 7, 1960, p. 57-58, pl. 11.3; Weinberg 1966, p. 711; Grose 1989, p. 116ff.; Nenna 1999, p. 170-171; Triantafyllidis 1997; Triantafyllidis 2000, p. 30; Arveiller, Nenna 2000, p. 15-16, 110; Triantafyllidis 2002, p. 27-28; D. Foy, M.-D. Nenna (ed.), *Tout feu tout sable. Mille ans de verre antique dans le Midi de la France, cat. exp. Musée d'Histoire de Marseille, Aix-en-Provence*, 2001, p. 15.

⁸ Weinberg 1992, p. 92, nos. 36-38; Sternini (M.), *La Collezione di Antichità di Alessandro Palma di Cesnola, Bari*, 1998, p. 109-110, no. V111; Triantafyllidis 2000a, p. 62, footnote 185.

⁹ *Clara Rhodos* I, 1928, p. 78, fig. 59; *Clara Rhodos* III, 1929, p. 52, tomb 264, fig. 40, p. 131-132, tomb 386, fig. 123; Stampolidis (N.), Karetsov, (A.) eds, *Eastern Mediterranean: Cyprus-Dodecanese-Crete, 16th-6th c. BC. Catalogue of Exhibition*, Herakleion, 1998, p. 225, no. 266.

¹⁰ *Clara Rhodos* VI-VII, 1932, p. 69-70, tomb 23, figs. 73-74, p. 333-339, nos. 8, 16-24, 26-27, figs. 68-71 (deposit of Camiros).

¹¹ Unpublished. See also *Annuario della Scuola Archeologica Italiana di Atene VI-VII*, 1926, p. 320-324, tomb 68, no. 8 (5121). For hot-formed transparent alabastra, see also Arveiller, Nenna 2000, p. 166-167, no. 195; Triantafyllidis 2000a, p. 172, nos. 1-5.



Fig. 4 — Hot-formed transparent alabastron. Ialysos of Rhodes. Tomb 36. Late 6 c. BC.



Fig. 5 — Hot-formed transparent Rhodian, engraved phiale. Rhodes. Early 4 c. BC.

century BC. One example of these is the plain, greenish alabastron¹¹ (fig. 4) with delicate vertical ring handles with knobbed trails of tomb 68 from Ialysos. The above vessel constitutes a true copy of the opaque core-formed alabastra of the Mediterranean Group I, a shape of Hellenic origin, different from the true Achaemenid products¹² which are known from the end of the 6th century BC in the Aegean, in the wider geographical region of the Mediterranean, the Black Sea and Western Asia. Amongst the early Achaemenid vessels from Rhodes, there is a fragment of an unpublished skyphoid calyx of the late 5th century BC from Ialysos with an outward rim which bears engraved decoration of oblong rounded petals, a decorative motif, almost similar to the one of the glass calyx from Sairkhe¹³ in Georgia dated to the second half of the 5th century BC. In contrast to the Achaemenid products, the Achaemenid trend is strikingly distinguished in another group of engraved phialai discovered in Rhodes, which are attributed to Rhodian glassworkshops thanks to the typological and archaeometric study¹⁴. The greenish engraved shallow bowl (fig. 5) of the early 4th century BC from Ialysos¹⁵ belongs to this Rhodian group. It shows as main characteristics the prototype of the decoration designs, mainly of geometric-floral type, and the free, unequal sized engraving of the outlines, — possibly an

unsuccessful attempt of the glassworker to create symmetry. With the help of the archaeometric study, a higher percentage of lime was detected in the Rhodian shallow bowls, similar in percentage to some chunks of raw glass and to some colourless cullets of the 5th and 4th centuries BC found in Rhodes.

2. The fourth and third centuries

The *synoicism* of the three cities and the establishment of the city of Rhodes which is extensively mentioned by Diodoros (13.75.): οἱ δὲ τῆν Ὀροδὸν νῆσον κατοικοῦντες καὶ Ἰαλύσον καὶ Κάμειρον καὶ Λίνδον μετὰ Κίρκησαν εἰς μίαν πόλιν τῆν νῦν καλούμενην Ὀροδὸν (*Those living on the island of Rhodes residing in Ialysos, Kamiros and Lindos settled in a city, today's so-called Rhodes*) took place in 408/407 BC. Rhodes was built following the Hippodamean system on the northern edge of the island, in a key geographical position, where the sea trading routes cross each other, from the East, West, North and South. In the cosmopolitan environment of the new city during this period when, as Diodoros (20.81.2-3) mentions, every Hellenistic city had a better chance towards prosperity when fine arts and

¹² Triantafyllidis (P.), "Achaemenian Glass Production", *Annales AIHV 15 (Corning/New York 2001)*, in press.

¹³ Makharadze (G.), Saginashvili (M.), 1999, "An Achaemenian Glass Bowl from Sairkhe, Georgia", *JGS* 41, 1999, p. 11-17; Gagoshidze (J.), Saginashvili (M.), 2000, "Die Achaimenidischen Glasgefäße im Georgien", *Archäologische Mitteilungen aus Iran und Turan* 32, 2000, p. 67-73.

¹⁴ Triantafyllidis 2000a, p. 98-103, 106-117, 197-200, *id.* 2002.

¹⁵ Triantafyllidis 2000a, p. 140-141, no. 8.

¹⁶ Goodlet (V.C.), "Rhodian Sculpture Workshops", *American Journal of Archaeology* 95, 1991, p. 669-681; Machaira (V.), "Observations about the Thematical Production of the Rhodian School", in Palagia (O.), Coulson (W.) ed., *Regional Schools in Hellenistic Sculpture, Proceedings of an International Conference held at the American School of Classical Studies at Athens, March 15th-17th, 1996*, *Oxbow Monograph* 90, Oxford, 1998, p. 137-148 (in Greek); Mattuch (C.C.), "Rhodian Sculpture: A School, a Style or many Workshops?", *ibid.*, p. 149-156.

¹⁷ Kantzia (Ch.), Zimmer (G.), "Rhodische Kolosse. Eine Hellenistische Bronzegusswerkstatt", *Archäologischer Anzeiger* 1989, p. 488-523; = Kantzia (Ch.), Zimmer (G.), Bairami (K.), *Rhodian Workshops of Bronze Sculpture* (in Greek, in press).

¹⁸ Filimonos (M.), Giannikouri (A.), "Grave Offerings from Rhodes: Pottery and Jewellery", in Gabrielsen (V.), Bilde (P.), Engberg-Pedersen (T.), Hannestad (H.), Zahle (J.), *Hellenistic Rhodes: Politics, Culture and Society*, Aarhus, 1999, p. 216

¹⁹ *Archaiologikon Deltion* 43, 1988, p. 593-594; 44, 1989, p. 474; 45, 1990, p. 468; 46, 1991, p. 445-449; *Ancient Rhodes. 2400 Years. A Short Guide*, Ministry of Culture, KB⁷ Archaeological Ephorate of Prehistorical and Classical Antiquities, Athens, 1993, p. 57; Giannikouri (A.), *Hydriai Hadra from the Hellenistic Nekropolis of Rhodes. Contribution to the Study of the Rhodian Painted Pottery*, Rhodes, 1997, p. 55 (in Greek).

²⁰ *Ancient Rhodes. 2400 Years. A Short Guide*, Ministry of Culture, KB⁷ Archaeological Ephorate of Prehistorical and Classical Antiquities, Athens,

industrial production flourish, workshops of sculpture¹⁶, metallurgy (mainly copper and iron working¹⁷), goldsmiths¹⁸, pottery¹⁹ (coarse ware and luxury painted pottery), red colour²⁰ and lead production from litharge²¹ thrived in the commercial city of Rhodes. The above workshops were located near the great sanctuaries or in the area of the large port and in the south-eastern part of the town. Many of them undoubtedly occupied a special position in ancient trade due to their inventive character, which differentiated them from the similar products of the same period.

The topographical location of the glass workshop and glassmaking complex in the south-eastern section of the city of Rhodes has been established in recent years during the rescue excavations of the Archaeological Service. Dating of the Rhodian workshop, according to excavation data available, seems to point to two chronological phases in the development of the city of Rhodes. The earlier stage of the workshop corresponds to the period of the establishment and of the earlier settlement in the city, from the late 5th century until the early 3rd century BC. Polychrome and various rod-formed pendants and beads dating to this period are discovered in the wider necropolis of Rhodes as are core-formed vessels of the Mediterranean Group II (fig. 6). Some of them were found deformed and possibly were used in the Rhodian market as vessels of secondary quality and of lower value.

Glassworking activity is also associated with the wider category of the hot-formed transparent glass vessels²² found as tomb offerings in the Classical and early Hellenistic necropolis of Rhodes. Based on a typo-chronological and archaeometric study, two groups were dis-



Fig. 6 — Core-formed deformed vessels Mediterranean group II. Rhodes. 4–3 c. BC.

tinguished, as we have mentioned above, the first constituted of vessels of Rhodian type with a prototyped engraved decoration or plain; the second of vessels of Achaemenid style, belonging to the wider artistic current of the Achaemenid tradition and art, prevailing mainly in the Mediterranean and the East.

Related to the transparent luxury vessels, few remains of glassworking and glassmaking of the late Classical and early Hellenistic periods of the Rhodian workshop were found in a recent rescue excavation²³ in the eastern section of the city of Rhodes, south and outside the walls of the classical city, very near and west of the deposits of the Hellenistic workshop excavated in the middle of the 20th century by Gladys Davidson Weinberg and Olga Kakavoyianni²⁴ on the Kakoula site.

In the eastern part of the recent excavations of the Arfara site, two chronological stages of the workshop were identified. On the western part, other installations were uncovered which do not seem to be related to glassmaking and glassworking kilns, but with the preparation, processing, purification and enrichment of raw materials, such as the sand, — processes that in their majority still remain completely unknown in pre-Roman glass technology. Three underground cisterns found at different depths belong to the late Classical period of the site. They are cut into the soft rock with a system of ducts leading the water into a larger reservoir duct, and were coated with hydraulic mortar. The visible ancient ruins continue towards the East under today's buildings which have not undergone any archaeological investigation previously and in which the main workshop installations were probably located. Among the excavation finds special interest is drawn to the huge deposits of quartz sand which covered all the ruins of the site. Some of the sand deposits are burnt. Among the others, some have a high percentage of iron and a relatively low percentage of lime and are probably natural deposits, while others have a high percentage of lime and a low percentage of iron, being the initial stage of purification of the sands in the glassmaking process (Triantafyllidis 2002). The huge quantity of sand, however, is not accidental or the result of human activity, but rather a natural soil covering, since the wider region of the south-eastern part of today's city of Rhodes is known in the memorable work *Place-name of Rhodes* by the geographical place-name «Sands»²⁵. Among these deposits some chronologically closed groups of late Classical and early Hellenistic pottery were detected and belong to the archaeological stratum of the abandonment and spoilage

1993, p. 58.

²¹ Kakavoyiannis (Ev.), "Production of Lead from Litharge in Hellenistic Rhodes", *Athens Annals of Archaeology* XVII.1-2, 1984, p. 124-140 (in Greek, English summary).

²² Triantafyllidis 2000a; Arveiller, Nenna 2000, p. 17-18, 168; Grose 1989, p. 80-81, footnote 49; Nenna 1999, p. 60-61, 171-172.

²³ Triantafyllidis 2000, p. 31-32, figs. 9-10; Triantafyllidis 2002, p. 29.

²⁴ *Archaiologikon Deltion* 23, 1968, p. 441-442, pls 409-410; Perrot, Davidson-Weinberg 1968, p. 1; Weinberg 1969; *ead.* 1983; Triantafyllidis (P.), *Rhodian Glassware II. The Hellenistic Glass Workshop. The Evidence and the Historical Implications* (forthcoming).

²⁵ Papachristodoulou (Chr.), *Place-name of Rhodes*, 2nd ed., Rhodes, 1996, p. 125 (in Greek).

²⁶ Nenna 1999, p. 167; Triantafyllidis 2000, p. 32-33, figs 9-10; Triantafyllidis 2002, p. 30-32.

of the underground cisterns at the end of 4th century BC, i.e. after the siege by Demetrius. This stratum is situated beneath the Hellenistic function level of the workshop, which was placed west of the ancient street R32²⁶. In these deposits were also found many fragments of lime material, very few frit material, some cullets, chunks of raw glass, semimelted raw glass (fig. 7) with a high percentage of lime and many trapped layers of lime and silica, a result of the melting process. Glass slags were also collected, some walls from baked clay of the kilns, some of the lower parts of the kiln mixed with non-purified glass and frit, as well as glass cullets with a high percentage of lime which seem to be related to the making of raw glass but also to the working of Rhodian transparent glass vessels.

3. The late third and early second century

The more recent stage of the Rhodian workshop coincides with the extension of the town planning of the classical city after the siege of Demetrius, at the end of the 4th and early 3rd century BC. This period is characterised by the construction of the Hellenistic wall²⁷ of the city, which surrounded the town grid plan and the Hippodamean planning. A glass workshop of the 3rd and 2nd centuries BC was located in a constructible insula between the ancient roads R32b, R33, R18 and R19. Its location in the above Hellenistic insula was confirmed in the excavation which took place during the municipality's installation of a new sewage system: under the pavings of the Hellenistic roads mentioned above, were detected natural soil covering of sand. In the Arfara site excavation, however, part of the western part of the workshop was destroyed in this period by the construction of the ancient road R32b. The level of function of the workshop was then raised with the build-

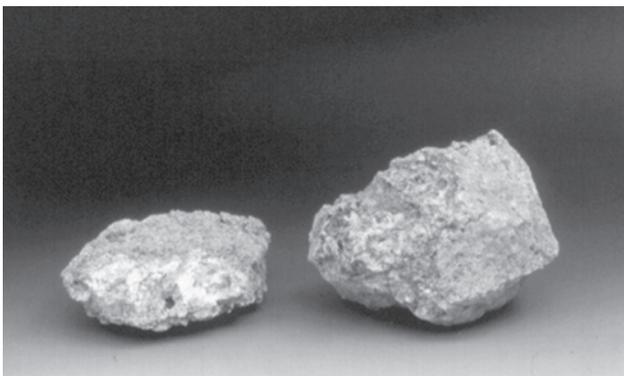


Fig. 7 — Chunks of raw glass. Rhodes. Primary glass workshop. Late 4 c. BC.

ing of over-ground waterproof cisterns, aiming to the preparation of the raw materials and the purification of sand. The waste was then channelled in the nearby wells of the ancient road R 32b.

Glassworking activity is also associated with deposits of glass debris and of the products of the late 3rd and early 2nd centuries BC as was ascertained in the rescue excavation on the Kakoula site, which is to be found in a close-by area, east of the insula where the workshop installations are located. North of the ancient road R19, remnants of a typical Rhodian house were discovered with three chronological stages: 4th century BC, late 3rd –2nd centuries BC and 1st century AD. This house was repaired twice, once in the Hellenistic period and another time in the Roman era. The waste of the glass workshop was used as landfill in the second chronological stage of the Hellenistic house after the destructive earthquake of 227/226 BC in Rhodes (Weinberg 1983), according to some closed strata which were ascertained in sections between the floors of the yard and the surrounding rooms, A, B, C, D and E. The find is of considerable importance, not only because it constitutes the earliest glass workshop in Greece, but also mainly due to the rich evidence which provides information about all the process stages of the Hellenistic glass workshop.

In the deposit of the workshop there are 10,000-11,000 beads of 40 different shapes, pendants, stirring rods, dice, gaming pieces, fragments of hot-formed transparent vessels, core-formed vessels of the Mediterranean Groups II and III, flat glass layers, fragments of luxury sandwich-gold glass vessels, some of which are deformed, millefiori vessels and gold-band vases. In the remains of the workshop there are small parts of a kiln, oblong clay cylindrical tools, possible stands of vessels and point-peaked clay stoppers used to check the ambient temperature of the kiln, some with glass traces on their lower part or with heating traces (similar to those of the late Roman kiln of the Rhodian clay amphoriskoi located in the eastern part of the ancient town and outside the walls). There were also a great many cullets and chunks, glass fragments of various colours, shapeless masses, raw glass, glass and metal slags, glass scraps for recycling (fig. 8), bunches and sections from monochrome or polychrome canes. There were also rods with thin edges from the drawing process during the manufacture of polychrome beads, (eye-shaped), and melted beads at different stages of their working — pressed, drawn, wound, folded or cut. Remarkable also is the great number of glass trails and bunches, drops of gaming pieces, some melted, made of metal, mainly iron and rarely copper, but also stone and bone tools with beads adhering, as well as rows of melted

²⁷ Filimonos (M.), *The Hellenistic Fortification of Rhodes* (Ph. D.), Ioannina, 1998 (in Greek, in press).

²⁸ Massa (M.), *La Ceramica Ellenistica con Decorazione a Rilievo della Bottega di Efestia, Monografie della Scuola Archeologica di Atene e delle*

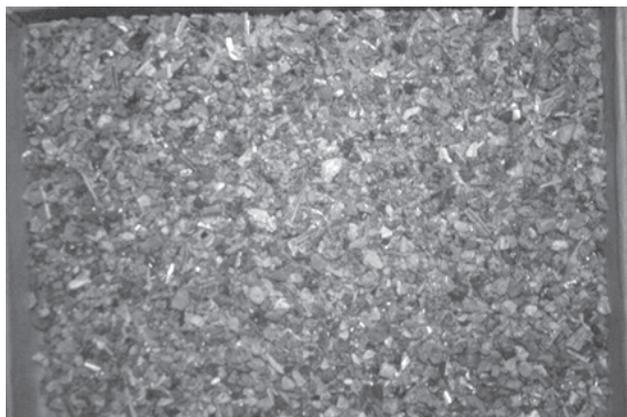


Fig. 8 — Glass scraps. Rhodes. Glass workshop. Late 3-early 2 c. BC.

or deformed beads, made on a metal rod before their cutting.

The workshop debris includes shallow pots of rectangular shape or with rounded edges, many of which are repaired with repeated glass coating; others have attached beads inside or include small pots for achieving rarer colours, such as opaque red or black. These pots were used for heating coloured or natural colourless chunks or cullet with the intention of obtaining pieces of melted and hot glass for the manufacture of beads, small objects or vessels, as well as trails for the decoration of the beads. The first preliminary study of the thousands of waste materials detected :

- deep and shallow clay vessels, shallow pots and coarse ware with traces or layers of lead oxide for colouring, many with attached supports or stands of organic material on their outside surface;
- clay basins with traces of isolated or mixed colours in their inside, such as Egyptian blue, red copper oxide and red lead oxide;
- solid pieces of colouring and organic red substances;
- lead leaves which seem to constitute remnants incurred during the process of successful colouring or decolouring of the glass chunks after their complete melting with colouring substances in the kiln.

With the successful colouring of the glass, which took place in the Rhodian glass workshop, the glass craftsman could easily proceed with the working vessels and small objects.

From recent studies and research on the rich material found in the workshop, clay lids in the pottery heaps, possibly used for the annealing or the storage of the chunks and of the cullets arranged according to colour, have been detected by expert restorers. Some lids bear traces of insulating

lime layers and remnants from glass layers in their inside.

A surprise, however, came with the finding of five fragments of clay discs of various diameters from 0,30 – 0,40 m used for making glass vessels on a wheel. One of them is almost intact with a round cavity on its lower surface for its perfect contact with the stone or wooden base of the wheel, and bears heating traces, possibly from the destruction that the glass workshop suffered in the earthquake of 227/226 BC. This unique find constitutes by today's bibliography, a true testimony of the multi-formed influences and the intimate relationships, *imitatio* or *aemulatio* of pottery with glassworking, relationships that were, as it must be pointed out, ascertained only by very few recent scholars. The function of these pottery disc-wheels, whose surprising similarity to the wheels of the pottery workshops of, for example, Myrina and Hephaestea of Lemnos²⁸, is illustrated by a representation on an Attic black-figured cylix of the 540 BC from Badisches Landesmuseum in Karlsruhe²⁹.

Among the glassworking products especially remarkable is the discovery of gold glass beads, which were salvaged either in a process stage before their cutting or ready to market, after the inlay of the gold leaf between transparent glass layers. Gladys Davidson Weinberg and Paul N. Perrot³⁰ support the idea that similar vessels were made in the Rhodian workshop. Their view is acceptable, if one considers the presence of transparent, flat glass leaves used in the sagging technique and in making skyphoi and bowls of open type, almost similar to the Rhodian ones of the beginning of the 3rd century BC.

4. The second century

The glassworking activity of the Rhodian glass workshop of the 2nd century BC, is associated with another deposit of glass waste connected with the hot-formed transparent vessels often found in layers of black soil fills in the necropolis, and also in the landfill of ancient Rhodes. In the debris there is a large number of glass cullets, coloured or decoloured, — many of which bear traces of the cutting process, which are also observed in the deposit of the Kakoula site —, overlapped walls of vessels, drops, deformed fragment of glass vessels during manufacture, core-formed vessels of the Mediterranean Group III, as well as deformed core-formed alabstra and transparent bowls (fig. 9), possibly the result of intensive heat or bad annealing. According to their colour attribution and their irregular rim and to the archaeometric analysis, these vessels are related to a large number of transparent, coloured greenish, light blue, amber or colourless

Missioni Italiane in Oriente V, Roma, 1992, p. 198-199, nos. 561-569, footnote 535, pls 83, 129; Triantafyllidis 2000a, p. 51, footnote 83.

²⁹ Lierke (R.), *Antike Glastöpferei. Ein vergessenes Kapitel der Glasgeschichte*, Mainz, 1999, p. 26, fig. 47.

³⁰ Perrot, Davidson-Weinberg 1968, p. 1; Weinberg 1991.

³¹ Triantafyllidis 1997; Nenna 1999, p. 175; Triantafyllidis 2000, p. 32, fig. 12; Triantafyllidis 2002, p. 33, fig. 8.



Fig. 9 — Core-formed deformed alabastron. Rhodes. Late 2 – early 1 c. BC.

bowls made with the sagging technique, of table use found only in Rhodes. These bowls are identified as products of the Rhodian glass workshop which offered the local market cheaper products, possibly of a secondary quality. The Rhodian bowls³¹ (fig. 10) differ in their typological characteristics from the known Syro-Palestinian samples, mainly by their fabric when compared with the engraved bowls, which however are found in a satisfactory number on Rhodes. The characteristics of the Rhodian bowls include the rough rim, the absence of polishing on the rim and on the engraved decoration, while the glass quality seems quite poor and often presents serious weathering, the result of environmental conditions and probably of the incomplete melting of the raw materials.

This synoptic presentation of the Classical and Hellenistic glass workshops of Rhodes, whose study is still developing, shows that Rhodes has a strong glassworking and probably glassmaking tradition in the Mediterranean adopting directly the new techniques and the achievements of the technology of the pre-Roman glass. From the late 6th century BC until the 1st century BC

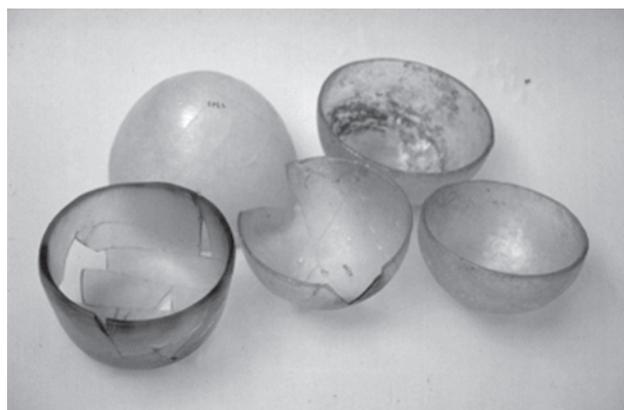


Fig. 10 — Hot-formed transparent Rhodian bowls. Late 2-1 c. BC.

rod-formed pendants and beads are made in Rhodes as well as core-formed vessels without chronological gaps between the Mediterranean Groups I, II and III as was suggested earlier by many scholars³². At the same time, hot-formed transparent vessels are made in the same workshops. Among them, two Rhodian groups are distinguished: one in the 5th and 4th centuries BC, a version of the Achaemenid glass vessels and another group in the late 2nd and 1st centuries BC, a version of their contemporary Syro-palestinian counterparts. With the creative assimilation of the new ideas which characterizes the spirit of the Rhodian traders and craftsmen, the Rhodian glass art and craft activity develop dynamically in the Mediterranean region, trying to establish its own autonomous route and identity³³.

³² Harden 1981; McClellan (M.C.), *Core-formed Glass from Dated Contexts*, Ph. D. University of Pennsylvania, Philadelphia, 1984; Grose 1989, p. 109ff.; Weinberg 1992, p. 19ff.

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