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Socio-Economic Observations on the History of Ancient Glass

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The study of the history of glass is a field which presents a synthesis of knowledge provided by material finds, i.e. archaeological discoveries, the evidence from ancient authors, art-historical studies as well as technological studies and observations from the sciences of chemistry, physics and the natural sciences. Four millennia of the history of glass-making turned it into a many-sided subject in the history of civilization. The **wealth of constantly growing information** explains the enduring attraction of this field, shared by scholars, connoisseurs of art and other members of the public.

A century ago **Kisa (1908)** completed his study on the history of glass in antiquity. Almost a century later von **Saldern (2004)** presented his up-to-date survey on the history of ancient glass. A comparison between both works demonstrates the **enormous accumulation of discoveries** of glass and the considerable strides made in its study. Between these two landmarks stand the contributions of a large number of scholars of whom one has to mention in particular Donald B. **Harden** to whom Axel von Saldern dedicated his opus magnum. Harden's studies between 1930 and 1988 constitute an important base and a leading example of glass studies in the 20th century. The foundation of the "**Journées Internationales du Verre**" and the "**Association Internationale pour l'Histoire du Verre**" by Joseph **Philippe** fifty years ago, which we are honouring in this congress, marked a further important step in the history of glass studies. The annual publication of the "**Journal of Glass Studies**" by the **Corning** Museum of Glass since **1959** offers a central tribune to students of glass history. By now the chronology and dating of ancient glass artefacts, their typology and geographical distribution rest on firm grounds and will be, undoubtedly, enhanced in the future. The present discussion aims at offering **numerous observations of socio-economic factors** related to the history of ancient glass. Constraints of space limit this survey to only a few examples in the hope of attracting attention to these interesting aspects.

The invention of **core-formed glass vessel**-making in **Mesopotamia** in the **mid-2nd millennium BC** was an epoch making invention. Glass bottles, probably the containers of costly substances, elongated beakers with Nuzi-Ware type button bases as well as cylindrical beakers were unearthed, primarily in the **Hurrian-Mittanian** areas of Mesopotamia (**Barag 1970**, 135-154; Barag 1985, 35-49, figs. 1-2, pls. 1-3, A). The glass beakers were probably used as luxury feasting vessels, and ceremonial cups and at times for libation.

The creative nature of Mesopotamian glass-makers during the 15th to 13th century BC is evident from the first introduction of mosaic glass vessels, mosaic glass wall-decorations and a wide range of small objects (von **Saldern 1970**, 206-210 and 213-217, figs. 1-12) and, last but not least, cuneiform texts related to the production of glass (**Oppenheim 1970**). The glass objects were discovered in temples, quarters of the living and graves. Mesopotamian glass objects of that period are, however, rare. The archaeological evidence demonstrates that 2nd millennium BC Mesopotamian glass served only the upper echelons of society.

New Kingdom Egypt of Dynasties 18-21 offers considerably more information on socio-economic matters related to early glass. The introduction of **core-formed glass vessel**-making into **Egypt** from **Mesopotamia**, soon after their invention in that area, prompted the formation of a **long-lasting industry** of glass in the valley of the Nile. Glass vessel-making was introduced to Egypt, from Mesopotamia early in the 15th century BC (perhaps c. 1500 BC) as is indicated by stylistic similarities between glass from the reigns of **Thutmes III** (1490-1437 BC) and **Amenhotep II** (1440-1430 BC) and the discovery of a Mesopotamian glass bottle in the tomb of Maherpra (the "**fanbearer on the king's right**"of Amenhotep II) in the Valley of the Kings. One may assume that foreign craftsmen introduced this art to Egypt, how and under which circumstances is unknown.

Birgit Schlick-Nolte (**Nolte 1968**, 154) defined the position of glass in New Kingdom Egypt in the following manner: "the location of the workshops in close proximity of the palaces and temples shows that, at least in the beginning of glass production, **glasses were made only for the king**. Possibly, especially trained specialists worked in those places under the control of priests. The earliest glass vessels from the beginning of Dyn. 18 were discovered only in royal tombs or in the tombs of high officials - probably gifts of the monarch ... Glass was never for ordinary use of broad circles of the public."

The production sites at **Malkata** and **Lisht** (**Amenhotep III** 1401-1363 BC) and el-Amarna (**Amenhotep IV - Echnaton** 1363-1346 BC) are examples of the close proximity of the royal palaces and the glass workshops. Egyptian glass vessels of the New Kingdom were containers of cosmetics, ointments and costly substances and with very rare exceptions of a few bowls there is no evidence of glass vessels which could have served for drinking. In contemporary **Mesopotamia** the evidence differs as there are beakers and goblets which probably served as drinking vessels.

Von Saldern assumes a large **export** of Dyn. 18 **glass to Syria-Palestine and Cyprus**. However finds from sites in that area are not numerous and, usually, limited to a

single or very few vessels (**Barag 1970**, 198; Barag 1993; Barag 2002; Barag 2004; Nolte 1968, 184). It seems that neither the Egyptians nor the **Mittanian kingdom** showed any interest to export glass vessels to Syria-Palestine and beyond as a commercial enterprise. Mesopotamian luxury glass vessels were exported occasionally to **Elam** (Iran) and a few were excavated at Alalakh in northern **Syria**. Egyptian glass vessels may have reached Syria-Palestine and Cyprus as royal gifts of costly vessels with highly prized contents to local rulers and dignitaries and temples of local deities. This as part of what may be described as the exchange of gifts commerce. The largest group of Egyptian glass vessels of Dyn. 19 dating were excavated in the Fosse Temple at Lachish in western **Judea**. May we assume that these were dedications of the king of Egypt to a celebrated deity of Canaan? The same may apply to an Egyptian lentoid flask from a temple at Deir Alla in the Jordan Valley.

Fragments of New Kingdom glass were discovered in the Hathor temple at the copper mines at Tirana, in the southern **Negev, Israel**, (Rothenberg 1972, 117. 132, 163 and 171-172; Lehrer-Jacobson 1988) and at the temple of Hathor at Serabit el-Khadem in **Sinai** (Cooney 1976, 54-56 and 162; Simpson 1990). These can not be explained as commercial export but rather as dedications to **pledge for the goodwill of the goddess** and her support of the **mining enterprises**. Thus glass vessels signified in Egypt of the New Kingdom and Late Bronze Age society of the East Mediterranean as well as in Mesopotamia social standing and wealth. Glass was an expensive and highly-prized material - **most ordinary mortals of those times, probably never saw a glass vessel**.

Glass inlays in gold objects, jewellery and composite statues were in use in Egyptian royal tombs (von Saldern 2004, 46-47). **Glass jewellery**, **cast in moulds** displays a particularly wide geographical distribution area in the East Mediterranean region of the 15th - 13th centuries BC. These are what may be described as **blue artificial versions of turquoise and lapis lazuli**. Cast nude female pendants, star-disc pendants and demon faces were discovered in Mesopotamia, Syria-Palestine and Cyprus. Some items reached the Hittite capital **Hatusha-Bogazköy**, the **Aegean** area and **Egypt**. In Greece locally cast jewellery expressed wealth in **Mycenaean** society of the Late Helladic period (Webb 1992, 145-147; von Saldern 2004, 24-30). The **blue glass** may have been imported to the Aegean area from Egypt and the Middle East as one may infer from the **cargo of blue glass ingots of the Uluburun shipwreck** (Tito et al. 2003). Blue glass - **ΚΥΑΝΟΣ** - was so popular, probably because of the protective qualities attributed to turquoise and lapis lazuli and their artificial substitutes.

The circumstances of the **re-emergence of glass vessel**-making in the **1st millennium BC**, after a **gap of about four centuries** in western Asia remains an **enigma**. Core-formed glass vessels were again made in **Mesopotamia** and eventually in other areas - **Elam** and the eastern Mediterranean area in the 7th century BC (Barag 1970, 154-180 and 194-197). However, a **new class of luxury glass vessels** was introduced - hemispherical drinking bowls of **clear or light greenish glass** as well as **purple** and **blue clear** glass excavated in the palaces of the kings of Assyria at **Calah-Nimrud**. These **cut and cast bowls** were at times embellished by **cut patterns**, **inlays** or **painting**. Containers made in **clear glass** were an exception, e.g., the alabastron bearing the inscription „Palace of Sargon King of Assyria“ (721-705 BC) from Nimrud. Two glass drinking bowls were unearthed in the tomb of two princesses at Nimrud, one bearing an inscription „These two princesses are the daughters of Sargon King of Assyria“ (Nashef 1990). Thus **cast and cut glass vessels** became **symbols of wealth and objects of luxury**. A phiale mesomphalos from a tumulus grave of a girl at **Phrygian Gordion**, west of Ankara, dates from the end of the 8th century BC. It is the earliest of costly clear glass phialai of a class which lasts to the end of **Achaemenid** times. Whilst clear glass drinking bowls formed the majority of finds from Nimrud, similar bowls and vessels of other shapes (a biconical jug, two-handled vase, alabastra and dinoi) are rare examples of that class found in **Crete**, central **Italy** and **Spain** (von Saldern 1970, 209-212 and 217-228, figs. 14-51; von Saldern 2004, 53-62; Barag 1985, 51-85, figs. 3-7. pls. 3-10, B-C). **Cast and cut glass inlays**, among them **mosaic-glass inlays** are associated with ivories in **Phoenician** style from the 8th - 7th centuries BC. It is likely that Phoenician artisans made a central contribution in the production of cut and cast glass in the 8th - 6th centuries BC (Barag 1985, 54). **Achaemenid** period luxury drinking glass bowls and other vessel types of **cast clear glass** present the same shapes and decorations as their contemporary metal parallels. The finds from **Persepolis** demonstrate the exquisite quality of this glass (von Saldern 2004, 106-115).

The **renaissance of cored glass vessel** making on a large scale occurred in the early-6th century BC on the island of **Rhodes**. There, workshops produced a class of four types: alabastron, amphoriskos, aryballos and small juglets in the shape of oinochoai. These containers of cosmetics of **brilliant polychrome glass** revived technically the traditions of 2nd millennium BC core-formed glass. Their distribution over the entire Mediterranean area and beyond and the large number of extant vessels heralds a major change - such vessels were now at the reach of a considerably **larger public of customers** than before and not restricted to kings, royal circles, dignitaries and temples. This is an example of a socio-economic change. However, cylindrical stands of beaten gold and cut clear glass were used for supporting such vessels in the 5th century BC demonstrating that these glass vessels were valuable luxury objects.

In the early **Hellenistic** period, during the 3rd to mid-2nd century BC, the parallel development of cast luxury drinking vessels and the production of polychrome core-formed glass cosmetic containers continued. **Luxury glass reached new peaks**, e.g., the introduction of **'sandwich' gold-glass** and **magnificent mosaic glass**.

During the first two millennia of the history of glass, from the late-3rd millennium BC to the mid-2nd century

BC **glass was an expensive material of high value**. An echo of this situation is preserved in the Book of Job 28:17 which **attributes to glass the same value as gold**. This and the complicated and often difficult and highly specialized techniques of production turned glass into a class of luxury objects. Epoch-making discoveries and inventions from the mid-2nd century BC to the first half of the 1st century AD **changed the course of the history of glass-making in a dramatic manner.**

At first **considerably simpler and cheaper methods of producing glass** were discovered, apparently in the **costal region of southern Phoenicia**. Traditions, partly of legendary nature, preserved by Pliny (**Historia Naturalis** 36: 190-191) and **Josephus** (Bellum Judaicum 2: 189-191) point to the **region south of Akko-Ptolemais**, near the estuary of the **river Belus** (Na'aman), as possibly the area of this invention. New technologies of producing glass bowls by '**sagging**' or '**slumping**' were introduced (Cummings 1980, 23-44 and 80-86). A **flourishing industry of mass-produced clear glass** hemispherical and conical drinking vessels ensued in the same region in the second half of the 2nd century BC (Jackson-Tal, 2004). In the **mid-1st century BC** a further epoch-making invention was made - **glass-blowing**. A process of about three quarters of a century led from **tube-blowing** to the invention of **mould-blowing**, the use of a **blow-pipe** and **pontil** and the development of highly-skilled manipulation techniques of **free-blown glass** (Israeli, 1990). The creative changes during that period of two centuries introduced the most important socio-economic changes in the history of glass.

The demand for luxury glass continued, however, unaffected by the unprecedented changes in the production of glass and glass-making techniques. On the contrary - the glassmakers made ample use of the new inventions and introduced **new classes of luxury glass**. Thus **ordinary glass artefacts were at the reach of very large sections of the public in the Roman Empire** and beyond and high-quality luxury glass to those who could afford it.

The **destruction of the temple in Jerusalem in AD 70** and the emergence of **Christianity** introduced the adherents of the two monotheistic faiths from the courtyards of the former temples into the House of the Lord. There was need for lighting as well as symbolic **lights in the large halls** of assembly. The glass-makers of the 4th - 6th centuries AD provided glass lamps for the metal polycandila of **synagogues** and **churches** - yet another example of socio-economic nature.

The present review tries to approach some aspects of socio-economic nature in the long history of ancient glass. The exploration of technology and establishing the chronology, typology, geographical distribution, and **trade routes of glass in antiquity** offer the opportunity to understand the socio-economic position of glass along its long history; changes were often introduced by ingenious inventions and the desire for progress.

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