Summaries

Glassmaking in Denmark until the end of the 17*th* century and the future study of the topic in Scandinavian context

By Jan Kock

For the upper part of the Danish society the period from the end of the 15th century until the beginning of the second part of the 17th century was a time with a booming economy which even allowed few noblemen and the king to erect expensive glass houses, where table ware and panes for windows were produced. The needed technology as well as the glassmakers have to be imported, because the skill to do glass was unknown in the country. This exclusive production stopped again because of a decline in the financial situation of the country.

In Jutland four to five complex of glass houses are known, a couple from Zealand and then a few from Scania, see fig. 1. Most of these glass houses only existed for a short time. The knowledge about them comes from archaeological investigations and more limited also from written sources. The used technology in the known furnaces is a bit different, but clearly give an indication that the know how is taken from Central Europe.

The investigations are often rather old and not reliable to the standard of today. The investigations were published in 1970. Since that time lot of new knowledge about the glass production have come up in Europe, which gives a better background to understand and to evaluate the here used technology.

In the last decade there have been new interests on different places in Scandinavia to study renaissance glass houses as well as the production itself. To unite these efforts and to get a better and broader platform to work with this topic in the future a scientific conference was arranged in Malmö January 2010. The result of this meeting is presented in this volume and it is the intention, that it will be the starting of broader cooperation in form of a networking to understand the production and use of table ware as well as window panes.

Glarborg – a Renaissance glassworks from the forest of Gribskov, Northern Zealand

By Liv Appel and Arne Jouttijärvi

Archaeo-metrical analysis of finds originating from archaeological investigations carried out by Gillelejе Museum at Glarborg in the Gribskov forest from 2003-2006 show, that both slags, parts of ovens, glass pots and shards of glass all stem from a Renaissance glassworks. The precise position of the glasseworks itself has not yet been established, however as cultiva-

tion in the forest area had ceassed already by the end of the 18th century, the glassworks site could well be preserved undisturbed and thus be a viable object for further research investigations.

The first part of the placename Glarborg stems from the Old Danish word *glar*, meaning glass, whilst the last part *borg* refers to an older fortified site nearby. When the name Glarborg first crops up in the written sources in 1555, the site was most probably younger than the other settlement sites in the forest founded in the 11th-12th century.

The Danish King Christian III (1534-1559) undoubtedly required a supply of glass for his royal castles in Elsinore and Cophenhagen and the citing of a glassworks in the Gribskov forest would have been an obvious choice, as it had been a crown posscession from the beginning of the medieval period. By all accounts it seems, that the glassworks was located in a natural forest clearing created by a storm, with ample supplies of wood for firing charcoal to heat the glass-ovens. Archaeo-metrical analysis shows, that the glass-maker and his workers had been brought in from Hessen. The glassmaker possibly received the tenancy of the farm, that was created by forest clearence before 1555 and which took the name of the glassworks.

Both the archaeological and the written sources indicate, that there was an unusal level of affluence at Glarborg right up until the end of the 17th century. It's possible, that the tenant farmer managed to earn enough money and was shown soo much good will by both the kings officers and the King himself – in the short time that glass was produced at Glarborg – that he sucessfully built up the farms animal flocks, which consequently ensured the farms affluence right through the 17th century.

Waste from a glasswork at Glargaarde in northern Jutland

By Arne Jouttijärvi

Waste found during archaeological investigation of a Renaissance glasswork by Glargaard in northern Jutland have been analyzed. Among the parts from the furnace clay plates that had been used for closing openings in the furnace was found (Fig. 1). Some of these were made from ordinary clay, while fireclay was used for another group. This probably reflects the use in different parts of the furnace or different furnaces.

The crucibles for melting of the glass were also made from fireclay. As raw clay and unburned crucibles were found, it could be seen, that the crucibles were made at Glargårde from a mixture of fresh clay and grog made from old crucibles.

Frit, the intermediate product of the glassmaking process, was identified as greyish half molten lumps (Fig. 3), having a composition close to that of the finished glass.

Window glass was apparently the main product of the glasswork, and tree types of glass were identified (Fig. 7). The light olive-green glass normally associated with »forest glass« did constitute a large part of the glass fragments found, but the glassmaker at Glargårde had also been able to produce nearly colourless glass by decoloration with manganese oxide. A third type of glass was coloured bright green using copper oxide. This type was the only one used for the production of painted window panels.

The paintings were primarily made in a brown color, using iron oxide as a pigment, mixed with lead containing glass. The lead-oxide probably made the

fusing of the paint easier. A gray color on some glass fragments was identified as a copper oxide.

On similar painted window fragments from Ribe to shades of brown was used, produces by the addition of different amounts of iron oxide to a pulverized lead glass.

Trestenshult and the early glassworks in Småland

By Martin Hansson

This article discusses and presents the glasswork of Trestenshult in southern Småland. The site was excavated in 1932 and in 1974, but the material have never been properly analysed. The glasswork existed a couple of years around 1630 and was founded by Karl Karlsson Gyllenhielm, bastard son to duke Karl, the later king Karl IX of Sweden. As many other glassworks of this period, Trestenshult was connected to the higher aristocracy and the royal family. The production of Trestenshult was varied, and medical glasses, bowls, drinking glasses as well as window glass were produced. The production was partly intended for Gyllenhielms own needs, partly for sale. The glasswork is fairly well preserved and situated in a forest close to a minor stream. Remains of the glass work with the oven, a dam and mill can be found on the site. The article summarizes the results of the previous excavations at Trestenshult, which is seen as a suitable place for further research, especially regarding spatial analysises of how a late Renaissance glass work was constructed. Some outlines for future research is given.

The archaeological excavation of Sundby glasworks outside Örebro

By Leif Karlenby

The glass production in Sweden developed into an industry during the late 16th and early 17th centuries. One of the first glassworks to be established was founded in 1592 in Sundby by Karl IX of Sweden. This was superseded by another one at the nearby Glashytteudden. This was established by a merchant, Påvel Jung, who had recently arrived from Nyköping, with the sole purpose of starting a glass works. His son, Melchior Jung, later became the founder of the first glassworks in Stockholm. In this way it is possible to establish an unbroken tradition from the royal glassworks at Nyköping and Sundby to the mercantile pre-industrial glassworks of the Jung's to the beginning of glass industry in Sweden.

During two weeks in the summer 2006 excavations were performed in Sundby. It had been started by Duke Karl, soon to be king Karl IX to produce window- and drinking glasses for the Örebro castle.

The kiln was preserved in parts of up to a meter in height. We excavated the northern part where the remains of the cooling kiln were found. It had been torn down when it no longer worked properly and below it the fundaments of several more kilns were found.

The production consisted of both window glass and drinking vessels, that showed a great variation in style. They were similar to glasses produced in all of northern Europe, and maybe that is not so strange since the glassblowers came from Germany and Holland. A large part of the find material was shards

from pharmacy equipment and a lot of shards came from broken bottles, with dark green or brown and thick walls.

»...since 1742« – a glassarchaeological investigation in Kosta

By Johan Åstrand

The Kosta glassfactory in Småland was founded in 1742 and is today Swedens oldest glass-industry still producing hand-blown glass. In 2006 a trial excavation was carried out on the place where the factory was located from the start until 1838. Even if the excavation was limited it is one of the few archaeological projects on 1800-century glassfactories in Scandinavia. The remains of the old factory were in large parts wellpreserved. Floorlevels from the old factory were preserved and contained waste from the glassblowing. A dump was situated outside the old factory where broken moulds and parts of furnaces had been thrown. Glassherds from various types of vessels were found and two glass-seals of a formerly unknown type with the factory's signature K-S were found. One of the glass-furnaces that was unearthed was constructed in a different way than what is known about other furnaces in Kosta and Småland. It shows close similarity to a furnace that has been excavated in Åvik, Finland. The glass-factory in Åvik was founded in 1748 and the production was started by two wellkown glassblowers Fromm and Waltzer who had both been employed at Kosta. From 1750 we know that another type of furnace was introduced in Kosta. Maybe the uncovered »oldfashioned« furnace had been constructed by the two masters. The trial excavation in Kosta shows that even if there are rich historical sources, the accounts of the Kosta factory are preserved from 1742 until today, very little is known about how the 1800-century glassproduction was carried out. The archaeological knowledge about glassproduction is important for the interpretation of glass in a social context. It also gives opportunities to understand how the specialised knowledge of artisans was passed on in an early-industrial era.

The glasblowers at Melchior Jungs glassware in Stockholm

By Annica Ramström

In year of 1641 Melchior Jung founded a glasswork in Stockholm. His idea was to make the same kind of luxurious glasses that were made in Italy. The glass made in Sweden was a kind of glass called waldglas, green- or brown colored glass. The glassblowers in Sweden were not able to produce this kind of clear glass so Melchior Jung travelled to Paris to hire more skilled craftsmen. He found some Italian glassworkers that were interested in the idea. But when they arrived to Sweden they disappeared in just a few months. He hired some new Italian glassblowers in Paris but the same thing happened again, they disappeared.

To try and understand what made the Italians run away, Homi K Bahbah's theories about cultural distress have been used. Especially the terms *unhomely* and *third space* is used in this article. The cultural differences between the Italians and the Swedes were hard to over-bridge. It was not only the material world that was different, there were also different norms and values to comprehend. If the Italians and

the Swedes had been able to create what Bahbah calls the third space the outcome might have been different and the Italians would have stayed. Third space is a space were new rules and norms are negotiated forth. It is not a blending of two original elements that form a third, but a space where completely new positions are developed.

»3 hat bulbs full with soda«

From the notebook by Gustaf Johan Jung in Uppsala university libraries – a brief overview

By Lars G. Henricson

A very important document, written by Gustaf Johan Jung, concerning the study of Swedish but also other European glass industries, during the second part of the 1700th century, is kept in Uppsala university library.

Gustaf Johan Jung was the son of Melchior Jung, a significant entrepreneur in the glass industry during the Swedish great power era.

Gustaf Jung's notebook contains notes, different observations and drawings from total 27 years' experiences (1666-1693) of the glass handicrafts and industry, and from at least 6 years' study travels to different European countries, England, France and perhaps also Germany, Holland, Italy and Denmark.

Jung's original manuscripts, to the overwhelming part written in Swedish, but even in English and French, has now been interpreted and translated to understandable Swedish text.

His work will contribute with important supplementary completions to a broader European research.

In this short essay, some notes and illustrations from Gustaf Jung´s notebook will be discussed.

The Glas-Art of Peder Månsson

Introduction by Martin Hansson

Peder Månsson (ca 1465-1534) was a member of the Order of S:t Bridget in Vadstena. He was sent to Rome as an envoy for his monastery. In Rome he stayed for sixteen years. During this time studied almost every topic ha came about. As a result of his studies, he wrote several books on various subjects. His topics varied from how to raise children, farming, war, but also the art of making glass. Many of his many books are compilations of earlier authors, some of antique origin. His Glas-Art is unfortunately incomplete but seems to have been based on Italian writers. In contrast to many of the topics on which he wrote, the art of making glass was a craft of which could have had personal experience, since it seems that glassmaking of some sort was taking place at the monastery in Vadstena. In his Glas-Art Peder Månsson describes the making of glass in the sixteenth century, which makes it an invaluable source for the glass industry of its time. Peder Månsson's Glass-Art is preserved in the Royal Library in Stockholm, in the library at Uppsala University, and at the library in Linköping.

Georgius Agricola: De Re Metallica Libri XII 1556

Introduction by Jan Kock

The German doctor and mineralogist, Georg Bauer (Georgius Agricola) worked until his death in 1555 on the extensive publication: De Re Metallica Libri XII. The contents focus on mining and metallurgy in all its diversities, as well as glass production. He lived for years at Joakimsthal/Jáchymov on the south

side of the North Bohemian Mountains, where at the time were many glass works. Within the field of glass production he informed that he had studied the subject during a stay at the »glass island« Murano near Venice. Important in this book are the 289 woodcuts showing the different production processes, such as the four concerning glass shown here. The description of the glass production is the last part of his book. The work of Agricola stayed as a reference book until the end of the 17th century. This English translation was completed in 1912 by Herbert Clark Hoover and Lou Henry Hoover and is taken from a 1950 edition, reprinted in 1986.

Table manners and the trade of glass in the Northern Europe during the Renaissance

By Georg Haggrén

During the Renaissance, the use of glass increased quickly everywhere in western, central and northern Europe. In the Middle Ages glass vessels were exclusive items used by nobles and the most prosperous merchants. In the early modern era glass vessels came into the hands of not only the poorer townspeople but also some of the peasants too. At the same time table manners improved and people increasingly started to use different vessels for different drinks.

The *Passgläser* were usually octagonal green beakers which were made in northern Germany, the Netherlands, and even in southern Scandinavia. Early modern glass of the *Berkemeyer* and *Römer* variety were produced especially in the Rhineland and the Netherlands. From 16th and 17th century paintings we can see that *Berkemeyer* and *Römer* glasses were meant for white wine and *Passgläser* especially for beer.

In the second half of the 16th century Venetian glass started to gain ground in the markets of western and central Europe. Soon many Italian glass blowers left their homes and started to make glass in western and central Europe. The »*cristallo*« or the *façon de Venice* -glasses made by these Italian masters soon became popular in all of the western and northern Europe.

During the Renaissance, material culture became uniform with regard to both ceramics and glass vessels in all of the northern Europe. Similar *Passgläser*, *Römerglas* and *façon de Venice* winged goblets were used in Denmark, Norway, Sweden and Finland alike.

Glasses from Vallensgaard

By Torben Sode

In 1937 the wings of Bornholms largest farmhouse, Vallensgaard, burned down and in connection with the subsequent rebuilding of the farm the foundations of two older buildings were investigated.

This work revealed that the foundations were the remains of the houses built just before 1560 by the former district bailiff Schweder Ketting, a rich merchant and brewer from the Hanseatic town of Lübeck.

At the bottom of the foundation of the tower built onto the western wall of the southern building nearly 150 fragments of glass were found. They included 30 window glasses, some still with marks from the lead framing, together with more than 70 shards from at least four pear-shaped bottles, and more than 30

shards of so-called »waldglas«, mostly from vessels known as passglas.

The most remarkable findings among the glass from Vallensgaard were the fragments of two filigree glasses in Venetian style. One, a trumpet-shaped foot with the rim folded under, was made of 52 twisted filigree canes made of white and clear glass. The second was a fragmented bowl from a filigree goblet. The bowl was decorated on the lower part with seven white threads alternating with seven twisted filigree canes vertically applied. Over these were two rows of a white filigree cane between two white canes applied horizontally.

The two glasses in Venetian style were most probably made in glass workshops in Antwerp or London around 1550 and are in this way examples of very early glass produced *à la façon de Venise*.

Mirrors in medieval and renaissance Europe

Production, symbolism and archaeological remains

By Vibe Esdahl-Schou

Until only a few decades ago medieval glass mirrors were an almost unexplored subject in archaeology mostly because of a lack in finds. Lately a lot of attention has been drawn to the subject and the quantity of finds is growing rapidly.

Through the Middle Ages convex glass mirrors fitted in a simple wooden frame were fairly common and can be seen in many paintings from the 15th and 16th century. Only a handful of wooden frames and cases are known from Denmark.

Around 1500 A.D. the Venetian manufacture of plate glass mirrors was perfected and Venetian mirrors became extremely valuable luxury items reserved for princes or kings. The convex glass mirror was still preferred by the common people and remained popular until the 1800s when Industrialisation made it possible to produce plate glass en masse at a reasonable price.

Window panes at a forest farm

By Josefina Andersson and Stig Welinder

Grannäs is a Forest Finn farm from the 17th century in the province of Hälsingland in Midsweden. It can be considered peripheral both in a local context, being in marginal woodlands, and in a broad North European perspective. The Forest Finns migrated from Finland to the Scandinavian Peninsula in the beginning of the 17th century.

There are abundant pieces of broken window panes in and around the farm house with a traditional Finnish smoke oven. There was a window with several panes and leaden window bars in the southern timber wall of the house. The panes were smashed several times during the century of use of the house. Some of the pieces of glass have melted, as has some lead from the bars, when the house burned, which happened at least twice.

The small pieces of glass were still situated by the window at the time of the archaeological excavation. Big pieces had been thrown behind the house or between the smoke oven and the timber wall of the house. The pieces that had been scattered in the farm yard had been crushed into small shards by feet, hooves and wheels. Among the pieces, at least half a score of different panes can be recognized from the thickness and colour of the glass. Broken window panes were replaced several times.

The forest farm Grannäs, despite its peripheral location, had obviously been part of a market economy in which glass window panes were produced, distributed and used. In 17th century excavations all over Scandinavia pieces of glass panes are extremely common. The exceptions are a few country-side farms like the Forest Finn farm Gammelvallen in the province of Värmland and the tenancy farm Vall in the province of Gästrikland.

Meals and memories

The consumption strategies of German glassmaker Liborius Trebing in the Danish glass workshop Stenhule around 1600

By Jette Linaa

Extensive research has been carried out into Renaissance glass production and glass workshops, but the consumption patterns of the glass craftsmen are less well known. Even so, these patterns shed light upon an important aspect of the subject: the lifestyle, social status, identity and integration of the foreign glassmakers in their new surroundings. The glass workshop of Stenhule, near Silkeborg in Jutland, was founded by the German master glassmaker Liborius Trebing in 1604; production ceased in about 1610. Trebing came from Hessen In Germany He was employed by the King Frederik II in 1585 and he established several glass workshops in the area. The Stenhule workshop was excavated in 1964 and the many finds included a large amount of pottery. The latter is clearly very diverse and comprises vast amounts of decorated ceramics for representative purposes. The type-variation is extensive, encompassing Werra plates, highly decorated tankards and jugs from Raeren and Siegburg, Dutch red ware pots and Weser pots and plates. The local red ware cooking pots occur in a large variety of sizes, indicating that Trebing preferred the diverse and refined gastronomy of the Renaissance. The analysis of the pottery demonstrates that Liborius Trebing's consumption had great similarities with that of Jutland's nobility and bourgeoisie, as known from many high-status sites, and less in common with the patterns seen on local farms and in villages. Through a comparison with pottery from other early industrial sites inhabited by Germans in Sweden, the imported pottery, and especially the highly decorated stoneware tankards and jugs from Siegburg and Raeren, are linked to social strategies adopted among the craftsmen. This paper suggests that the use of representative vessels in Trebing's glass workshop functioned both internally as a living, active medium, a marker of his memories and his identity in his new country, and externally, as a marker of Trebing's elevated social position in his native Hessen, where he was regarded as a skilled and innovative craftsman. This strategy was probably directed towards both the Danish king and the king's vassal at the castle in Silkeborg, who was Trebing's superintendent. This article proposes that similar consumption strategies may be found relating to many foreign craftsmen who settled in Scandinavia during the 16th and 17th centuries.