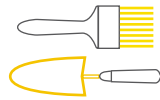


Feature

If it Glitters, It's Gold

On the trail of the secret behind the Treasure of the Avars





More than 200 years ago, farmers in the eastern Hungarian village of Nagyszentmiklós discovered a ten kilogram gold treasure. Vienna-based archaeologists have now examined the gold containers using the latest microscopic methods to learn more about how they were created.

Ganymede was simply spectacular. His long blond hair made the young man irresistible – not only for women, but also for Zeus. The father of the gods therefore appeared as an eagle and whisked the striking young man off to the top of Mount Olympus. From then on, Ganymede was to serve as a butler to the gods and pour their wine.

This scene is illustrated on one of the containers belonging to one of the most important gold treasures from the early Middle Ages in Europe. The treasure from Nagyszentmiklós, the Treasure of the Avars is a 23-part drink set presumably manufactured in the 7th or 8th century. Today, it is on display at the Art History Museum in Vienna and is only rarely removed from its bullet-proof glass display case. One such occasion was a research project of the Vienna Institute for Archaeological Science (VIAS) together with the Art History Museum. Scientists wanted to know how the valuable gold containers were made.

Non-destructively examined. Absolute care must be taken to ensure that archaeological objects are not modified or damaged. Therefore, non-destructive examination meth-

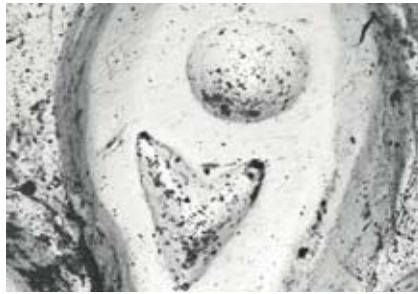
ods such as scanning electron microscopy were the only possibilities. However, the objects must fit inside the specimen chamber of a scanning electron microscope (SEM). The VIAS purchased its own *EVO 60 XVP* from Carl Zeiss with the largest standard specimen chamber available. Because several of the gold containers were too tall, the Sales and Service departments at Carl Zeiss developed a technical solution together with VIAS archaeologist Mathis Mehofer to expand the specimen chamber laterally.

Soft bedding. Gold is a very soft material. Gold containers are easily scratched. To prevent this, Mehofer also had to place them on soft bedding in the SEM. He first looked for a foam material that does not shrink or crumble in the vacuum of the specimen chamber. Using life-sized copies of the treasure, he then optimized the work routine step-by-step. Only then did the examination of the priceless original begin. Project coordinator Dr. Birgit Bühler, a spe-

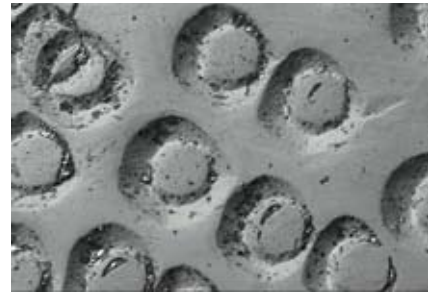




The goldsmith positioned the half-moon shaped tool several times to create an S-shaped structure.



Stylized plant subject.



Ring decoration seen on several mugs. Presumably, the same stamping tool was always used.

niques, scanned all the gold containers using a reflected light microscope and identified the most interesting surface regions which were then examined in the SEM.

The treasure comprises richly decorated jugs, cups, goblets and mugs that depict hunting and blood sport scenes. Project leader Dr. Falko Daim, General Director of the Roman-Germanic Central Museum in Mainz is amazed at the quality of the goldsmith work. "I was surprised that the customer and goldsmith had such unbelievable knowledge of the subject and the underlying myths," says Daim, who initiated the research

project. Greek, Persian, Byzantine and Christian themes are depicted on the containers.

Finely engraved. The goldsmith made the mugs from one piece and adorned the surface with various engravings. These are ornaments that are pressed into the metal using a stamping tool and which appear as a negative form of the original shape. To achieve this, he utilized different carving tools in a personal manner. Many tools were applied several times in slightly different positions and hit with a hammer to create the "signature of the goldsmith." Because the SEM delivers images with

high depth of field, it is ideal for examining and documenting 3D surfaces. Small irregularities in stamping tools that become visible in the SEM image, for example, are particularly interesting. This enables archaeologists to determine if the same stamping tool was used on different containers.

The scientists suspect that the gold containers were manufactured by a Byzantine culture in the late 7th or 8th century; however, they did not retain their original form. The canisters were originally bottles to which someone later added handles. "You can see that someone soldered over the carving pattern," says Mehofer. "The goldsmith who produced the bottle would never have done this." Using the EDX detector connected to the SEM, precise analyses of the material were made to ascertain the composition of the solder and to determine if the same solder was used on all jugs.

"The art-historical evaluation will provide information on the intellectual horizon of a 'barbaric' court. It was probably much different than what we learned in school. It must have been an unbelievably networked world."

Dr. Falko Daim, General Director of the Roman-Germanic Central Museum in Mainz about the current examinations of the Avarian gold treasure.

Hard work. Over a period of several months, more than 2000 SEM pictures were taken to document the

surface of the goldsmith's work. There were also more than 1000 single measurements for material analysis.

The job of the art historians in the project team is now to interpret the results, arrange art history comparisons with other finds and draw conclusions about the history of the more than one thousand year old gold containers. The only thing that is known about their past with certainty is that farmers in Nagyszentmiklós stumbled across the golden mugs in 1799 while they were preparing the foundation for a barn. The treasure had probably been buried there for many years. It is unknown who buried these treasures and why. Perhaps the prestigious drink set was once in the possession of the Avars, a horse-riding people that had settled in the Carpathian basin in the early Middle Ages.

Archaeologist Matthias Mehofer carefully closes the door on the specimen chamber to examine the gold jug in the scanning electron microscope.



The treasure was found in what is now Sânnicolau Mare, Romania. At the end of the 18th century, this region belonged to the Austro-Hungarian monarchy. Although the farmers initially intended to keep their discovery a secret, their treasure trove was finally reported to the Vienna Royal Chancellery (Hofkanzlei) as required by law at the time. Ownership of the Treasure of the Avars, including the Ganymede canister, was thus transferred to the double-headed eagle, the symbol of the Austro-Hungarian Empire.

According to legend, Zeus compensated Ganymede's father with a grapevine for the kidnapping of his son. For his service as a divine sommelier, Ganymede was blessed with eternal youth so that his radiant beauty would never fade.

Ingrid G. Fritz

Dr. Falko Daim, Roman-Germanic Central Museum Mainz, Dr. Birgit Bühler, VIAS, Vienna and Viktor Freiburger, Art History Museum, Vienna (from left).



The details

Avars

Horse-riding nation that originally lived as nomads in the Carpathian basin from the 6th to 8th century. The Avars had their origins in Central Asia, from where they advanced westward during the barbarian invasions and settled in parts of modern-day Hungary and Austria. The Empire of the Avars perished following its defeat at the hands of Charlemagne in 791. It is said that the majority of the royal treasure of the Avars was transported to Aachen as spoils of war and most likely melted down.

Location of the Avars.

