

Sino-Swiss Archaeological Research Project on Cultural Exchange along the Eurasian Silk Road

中瑞欧亚丝绸之路文化交流考古研究项目

University of Geneva - Renmin University of China / 日内瓦大学 - 中国人民大学

Arts and techniques / 艺术和技术

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Abstracts / 摘要

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Session 1 / 会议 1

Greek pottery in the making: shaping, decoration and firing techniques / 希腊陶器的制作：成形，装饰和烧制技术

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This paper deals with the techniques of manufacture, decoration and firing of Ancient Greek pottery, from its first production during the Initial Neolithic phase in the first half of the 7th millennium BC, down to the Hellenistic period (323-50 BC), with a focus on the Classical period (5th and 4th c. BC), when production techniques became so complex that it was not until the 20th century that they could be understood and reproduced.

During the more than 6 millennia of Ancient Greek pottery history, some basic technical features didn't change, although innovations obviously occurred: the use of depurated clay, with the addition of different kinds of temper, the use of a colloidal suspension of clay and mineral pigments for painting, the firing at high temperature, for example.

The first techniques used for building pots are coiling and battering clay, moulding it sometimes in other recipients or in holes. These techniques will never be abandoned, big jars or household small ware being hand built historical time as well.

The potter's wheel is introduced in Greece from the Near East at the end of the 3rd millennium BC, used in the beginning as a slow wheel as a mean to give more even and precise shapes to the vases. Throwing vases on the fast wheel becomes usual in the 2nd millennium BC, when the Minoan and then the Mycenaean kingdoms massively export products – such as oil, wine, perfumed oil - to the Eastern and the Western Mediterranean and need great numbers of ceramic containers for that purpose. The potter's wheel becomes then the most usual way of building pots.

A third technique appears in Hellenistic times, in the second half of the 3rd c. BC: the throwing in a mould, allowing a mass production of standardised artefacts. This technique will be adopted and refined later by the Roman potters.

As for surface treatment, they vary between painted, incised, stamped or relief decorations, combining sometimes two or more of these techniques.

Nothing is known about the kind of kiln used during the Initial and Early Neolithic phases. There is some evidence for pottery fired in a clamp or in a cross-draught kiln in the Middle Neolithic period (5800-5300). The two-chambered updraught kiln appears in the 2nd millennium BC, during the Greek Bronze Age and becomes the regular kiln for pottery production in Greece.

The peak of technical mastery in the art of pottery was certainly reached during the Archaic and Classical periods, with the production of black- and red-figures vases, involving a very complex

processing of clays, pigments, building and firing phases, resulting in the manufacturing of masterpieces.

本文论述了古希腊陶器的制造、装饰和烧制技术，从公元前 7 千年前半期新石器时代初期的生产，一直到希腊化时期（公元前 323-50 年），重点论述了古典时期（公元前 5-4 年）的生产技术，当时的生产技术变得非常复杂，直到 20 世纪才得以了解和再现。

在古希腊陶器六千多年的历史中，一些基本的技术特征并没有改变，虽然明显地出现了创新：如使用去质粘土，加入不同种类的回火，使用粘土和矿物颜料的胶体悬浮液作画，高温烧制等。

壶的建造技术最早是用泥料卷制和打浆，模制有时在其他接受者或孔中。这些技术永远不会被抛弃，大罐或家用小器被手工打造的历史时间以及。

公元前三千年末，陶轮从近东传入希腊，起初作为慢轮使用，目的是为了使花瓶的形状更加均匀和精确。公元前 2 千年时，在快轮上投掷花瓶成为惯例，当时米诺斯王国和迈锡尼王国大规模地向东地中海和西地中海出口产品--如油、酒、香油，为此需要大量的陶瓷容器。陶轮就成了最平常的造壶方式。

第三种技术出现在公元前 3 世纪后半期的希腊时代：在模具中投掷，使标准化器物的批量生产成为可能。这种技术后来被罗马陶艺家采用和改进。

至于表面处理，则有彩绘、刻划、印花或浮雕装饰，有时还结合了上述两种或两种以上的技术。

关于新石器时代初期和早期使用的窑炉种类尚不清楚。新石器时代中期（5800-5300 年）有一些证据表明，陶器是用夹窑或横窑烧制的。公元前二千年，希腊青铜时代出现了双室上升窑，成为希腊陶器生产的常规窑。

古代和古典时期无疑是陶艺技术精湛的高峰期，黑陶和红陶花瓶的制作，涉及到非常复杂的泥土、颜料、建造和烧制阶段的加工，从而制造出杰作。

唐代长沙窑瓷器釉上彩的技术来源 / Origin of the Over-glazed Painting skill on Changsha Kiln Ceramics of Tang Dynasty (mid 9th century)

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摘要：长沙窑是中国 9 世纪中期开创的一处瓷器窑场，持续一个多世纪，主要特色是成熟的瓷器彩绘技术，是中国古代瓷器彩绘技术的（如唐青花、宋金彩瓷等）的先驱。长沙窑彩绘技术以前被认为是釉下彩，是南方地区东吴青瓷点彩装饰技术的发展。但是，根据最近的科技检测，它根本不是釉下彩，而是釉上彩，因此，对长沙窑彩绘技术的来源需要重新考虑。

长沙窑瓷器彩绘技术被认定为釉上彩后，有人提出它是北方唐三彩技术的南传所致。但是长沙窑与它相比，差别是十分明显的：（1）技术流程不同；（2）装饰方法不同；（3）装饰的器物种类不同。长沙窑的釉上彩绘技术与北方的唐三彩并没有直接的继承关系。

那么，长沙窑的彩绘技术是如何产生的？

长沙窑是中国古代以外销为主的一处窑厂，1998年载印尼海域发现的“黑石号”沉船瓷器（Batu Hitam Shipwreck），以及彩绘中的大量异域主题与风格，可以作为长沙窑外销的证据。值得注意的是，长沙窑的器型、彩绘图案和装饰风格，都与西亚波斯萨珊至伊斯兰时期的陶器非常相似，尤其是彩绘植物纹和几何纹是西亚釉陶的传统，在伊朗等地发现的伊斯兰早期釉陶大多采取这种装饰方式。长沙窑兴起于9世纪前期，黑石号沉船装载的大约是9世纪20年代的长沙窑产品，工艺手法、纹饰主题和构图方式看，长沙窑的釉上彩装饰很可能受到西亚伊斯兰釉陶的影响。西亚釉陶彩绘技术影响长沙窑的另一个证据是长江中游地区的大量胡人活动，唐代已有大量波斯人通过海路到达中国沿海，并进入长江流域，9世纪中叶的安史之乱后，又有大量西亚、中亚人从中国西北南下，在长江中游地区形成了一个胡风极盛的社会环境。可能正是这种环境造成了长沙窑的外销，由于外销的需要，长沙窑生产出了迎合西亚审美的彩绘瓷器。

因此，长沙窑釉上彩绘技术是在中国本土青瓷发展的基础上，吸收西亚釉陶彩绘技术而形成的一种彩绘瓷技术，这是一个涉及古代窑业技术的产生与传播、社会变迁与人口迁徙等问题的重要个案。

The Changsha kiln was a porcelain kiln started in the mid-9th century in China that lasted for more than a century and was characterized by its specific color painting skills, which were the forerunners of ancient Chinese porcelain painting skills (e.g., Tang Blue-and-White porcelain, the Color-painting in Song and Jin porcelain, etc.). The Changsha kiln's color painting skill was formerly considered to be under-glazed, a development of the dotted decoration skill on the celadon in South China of 3rd century. However, according to recent scientific tests, it is not an under-glazed painting skill at all, but over-glazed, therefore the origin of the Changsha kiln color painting skills needs to be reconsidered.

After the Changsha kiln porcelain painting skill was recognized as an over-glazed one, it was suggested that it was the result of the Tang San Cai (Tri-color porcelain of Tang dynasty) skill's spreading southward from the Central China. But actually, the differences between the Tang San Cai and Changsha kiln porcelain are very obvious: (1) the technical process is different; (2) the decoration methods are different; and (3) the types of porcelain are different. At least, the over-glazed painting skill of Changsha kiln has no direct inheritance with the Tang San Cai skill.

Then, how did the over-glazed painting skill of Changsha kiln come into being?

The Batu Hitam Shipwreck found in Indonesian waters in 1998 and the large number of exotic motifs and styles in the painting can be taken as evidence of the export of Changsha kilns. It is noteworthy that the shape, painted motifs, and decorative style of the Changsha kiln porcelains are very similar to those of pottery from the Sassanid to Islamic periods in Persia, especially the painted botanical and

geometric motifs that are traditional in West Asian glazed pottery, and most of the early Islamic glazed pottery found in Iran and elsewhere is decorated in this manner. Changsha kilns emerged in the early 9th century, and Batu Hitam Shipwreck was loaded with Changsha kiln products from around the 2nd decade of the 9th century. The craftsmanship, motifs, and styles suggest that the over-glazed decoration of Changsha kilns was likely influenced by Persian-Islamic glazed pottery of Western Asia. Another evidence of the influence of West Asian over-glazed pottery painting skills on the Changsha kilns is the large number of records of foreigners' activities in the middle reaches of the Yangtze River. During the Tang Dynasty, a large number of Persians reached the Chinese coast by sea route and entered the Yangtze River area, and after the An-shi Rebellion in the mid-9th century, a large number of West and Central Asians came south from northwest China, creating a social environment in the middle reaches of the Yangtze River where the exotic style was extremely prevalent. It was probably this environment that caused the export of Changsha kilns, and the craftsman produced the painted porcelain that catered to the aesthetics of Western Asia in the need for export.

Thus, the Changsha kiln over-glazed painting skill is a painted skill based on the development of indigenous Chinese celadon and the absorption of West Asian glazed pottery painting techniques, which is an important case involving the creation and spread of ancient kiln skill, social change and population migration.

"Terra sigillata", the most Roman of ceramics. Function, forms, techniques, workshops, distribution, chronology / 封土瓷器之最：功能、形式、技术、作坊、分布、年表。

Marie-France **MEYLAN-KRAUSE**

Director / 馆长

Museum BIBLE+ORIENT // 博物馆圣经+古籍

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Terra sigillata is without doubt the most typical type of pottery from the Roman era. Created in the workshops of Pozzuoli and Arezzo in Italy, this red and often glossy tableware enjoyed an unprecedented popularity throughout the Roman Empire between the middle of the 1st century BC and the 7th century AD.

As the military conquests progressed, new markets opened up: Terra sigillata was very popular with soldiers and quickly found favour with the rest of the population. In order to meet the ever-increasing demand, new workshops and branches opened and flourished throughout the Roman world: in Pisa, Lyon and elsewhere in Gaul, as well as in Spain, North Africa and even up to the borders of the Empire in the Near East.

As with all pottery, Terra sigillata was highly susceptible to breaking and so its forms, as well as being strongly influenced by fashion, changed quite quickly over time. Its sherds can therefore be accurately dated by comparing the style, decoration, shapes and potters' signatures to potteries found on well dated sites, such as military camps or battlefields. Among the very many useful works on typologies of Terra sigillata, the most famous is that by the German archaeologist Hans Dragendorff.

The production of Terra sigillata was on such a large scale and it was so widely distributed that examples of it have been found as far away as India. Will Terra sigillata one day be discovered in China?

Terra sigillata 无疑是罗马时代最典型的陶器类型。这种红色的、通常具有光泽的餐具是在意大利的波佐利和阿雷佐的作坊里创造的，在公元前 1 世纪中叶到公元 7 世纪之间，这种餐具在整个罗马帝国享有空前的流行。

随着军事征服的进展，新的市场也随之打开。Terra sigillata 很受士兵们的欢迎，并很快得到了其他居民的青睐。为了满足不断增长的需求，新的作坊和分支机构在整个罗马世界蓬勃发展：在比萨、里昂和高卢的其他地方，以及在西班牙、北非，甚至是近东的帝国边境。

和所有的陶器一样，Terra sigillata 极易破碎，因此它的形式，以及受时尚的强烈影响，随着时间的推移，变化相当快。因此，通过比较陶器的风格、装饰、形状和陶工的签名，可以准确地确定陶器碎片的年代，与在年代久远的遗址（如军营或战场）上发现的陶器进行比较。在许多关于陶器类型学的有用著作中，最著名的是德国考古学家汉斯-德拉根多夫的著作。

兵马俑的生产规模之大，分布之广，远在印度就已经发现了兵马俑的例子。有朝一日，中国会不会发现瀛洲草呢？

再论丝绸之路前的彩陶之路/ A New Discussion of “The Painted Pottery Road” and Early Sino-Western Cultural Exchanges

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摘要：“彩陶之路”是史前时期以彩陶为代表的早期中国文化和早期西方文化相互交流之路，包括顺此通道中西方文化在金属器、农作物、家畜、宗教、艺术、思想等诸多方面的交流。“彩陶之路”从公元前 4 千纪一直延续至前 2 千纪，跨越铜石并用时代、青铜时代和早期铁器时代各个阶段，其中彩陶从西到东的影响至少可达中国甘青地区，从东向西的影响至少可到中亚南部和克什米尔地区。具体路线虽有许多，但大致可概括为以青藏高原为界的北道和南道。“彩陶之路”是早期中西文化交流的首要通道，是“丝绸之路”的主要前身，对早期中西方文明的形成和发展都产生过重要影响。

“The Painted Pottery Road” was the communicated passage between the early Chinese cultures and the early Western cultures represented by painted pottery, also including sino-western cultural exchanges in metals, crops, domestic animals, religions, arts and thoughts via this passage. “The Painted Pottery Road” lasted from the 4th millennium BC to the 2nd millennium BC, experienced Chalcolithic age, bronze age and early Iron Age. Furthermore, the Painted Pottery influences from the West to the East can reach Gan-Qing region of China at least, and From the East to the West at least

to southern Central Asia and Kashmir. Although there were a lot of specific routes, generally, these could be summarized into the north route and the south route. “The Painted Pottery Road” was the prime passage of early Sino-Western cultural exchanges, the precursor of “the Silk Road”, which had exerted a significant influence on the formation and development of early civilization of China and the West.

Keynote speaker / 主旨发言人

Roman glass from the 1st to the 4th century: raw materials, production techniques, use and trade / 1 至 4 世纪的罗马玻璃：原料、生产技术、使用和贸易

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Glass, which can be regarded as the first synthetic material of mankind, has been known in the form of glazes and glass pastes since the 3rd millennium BC. in the area of Mesopotamia and in Egypt.

Glass consists of three raw materials: silicon, lime, and soda or potassium. These raw materials were initially obtained in the Middle East (Egypt, Syro-Palestinian coastal areas), later also in other places of the Roman Empire and outside it and fused to raw glass in the so-called primary studios in specially developed ovens. This raw glass reached various regions through trade, where it was processed into glassware in secondary studios. At the same time, the technology of colouring or decolorizing glass with metal oxides developed.

The lecture is dedicated to the manufacturing techniques of glass vessels from the 3rd century BC to the 4th century AD in the Mediterranean region and generally in the Roman Empire.

Various manufacturing processes and a variety of shapes and decorating techniques have been developed: the pressing of glass in or over negative moulds, the blowing of glass, free or in a shape, decorations by laying on glass, by grinding in patterns or by painting. The invention of glass blowing in the late 1st century BC also allowed mass production. Glass vessels were used both as part of tableware, as waterproof packaging material for liquid products and as ash urns. Glasses are often found as grave goods. All in all, the glass productions include very simple, modest products that were probably inexpensive, as well as extremely valuable pieces that were very complicated to manufacture.

Thanks to its malleability, its density and its transparency, glass has also been processed into windowpanes of various types since the 1st century AD. As a result, the interior of buildings could be separated from the outside world for the first time climatically and without loss of light.

Despite their fragility, glasses became widely used as a commodity. They got from Egypt intact via the Mediterranean and the Alps to the north to the Scandinavian regions, but also via the Silk Road and the sea route to India, China, South Korea, and Japan.

玻璃可以说是人类最早的合成材料，早在公元前三千年，在美索不达米亚和埃及地区，玻璃就以釉料和玻璃膏的形式出现了。

玻璃由三种原料组成：硅、石灰和苏打或钾。这些原料最初在中东（埃及、叙利亚-巴勒斯坦沿海地区）获得，后来也在罗马帝国的其他地方和罗马帝国以外的地方获得，并在所谓的初级工作室中，在专门开发的炉子里熔化成玻璃原料。这些玻璃原料通过贸易到达各个地区，在那里被加工成二级工作室的玻璃制品。同时，用金属氧化物给玻璃着色或脱色的技术也得到了发展。

讲座专门介绍了公元前3世纪至公元4世纪地中海地区的玻璃器皿的制造技术，一般是罗马帝国。

各种各样的制造工艺和各种形状和装饰技术已经被开发出来：在阴模中或在阴模上压制玻璃，吹制玻璃，自由的或有形状的，通过在玻璃上铺设装饰，通过磨制图案或绘画。

公元前1世纪末，玻璃吹制技术的发明也使玻璃器皿得以大规模生产。玻璃器皿既被用作餐具的一部分，也被用作液体产品的防水包装材料和骨灰盒。玻璃器皿经常作为墓葬品被发现。总而言之，玻璃制品包括非常简单、适度、可能价格低廉的产品，也包括制造非常复杂的极其珍贵的作品。

由于玻璃的可塑性、密度和透明度，自公元1世纪起，玻璃也被加工成各种类型的窗板。因此，建筑物的内部第一次可以在气候上与外部世界隔开，而且不损失光线。

尽管眼镜很脆弱，但它还是作为一种商品被广泛使用。它们完整地经埃及经地中海和阿尔卑斯山向北到达斯堪的纳维亚地区，也经丝绸之路和海路到达印度、中国、韩国和日本。

Session 2 / 会议 2

Keynote speaker / 主旨发言人

唐朝墩古城浴场遗址与丝绸之路文化交流 / The bath remains in the Tangchaodun City Site and the cultural communication along the Silk Road

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摘要：唐朝墩古城遗址 2018~2019 年的考古发掘工作中，清理出 1 处公元 10~13 世纪的浴场遗址。该遗址由砖砌主体建筑、土坯建筑和周边灶址、水井等其他配套设施共同构成。此类浴场最早出现在地中海沿岸的古希腊，罗马时期建筑技艺逐渐发展成熟并随着罗马帝国的扩张向周边地区传播，在西亚受当地波斯建筑风格的影响出现了形制上的演变，后继续向东传播至中亚和中国新疆地区。此次发现的浴场遗址按功能可分为门厅区、洗浴区和工作区，形制结构具有浓郁的罗马风格，出土的遗物和内部装饰又具有显著的中原和本地特征，反映了丝绸之路沿线东西文化的交流与融合。

During the excavation of the Tangchaodun site from 2018 to 2019, a bath remain built about 10th to 13th century was unearthed. This site consisted of a brick main building, mud-brick buildings associated with other facilities such as stove and wells. This type of baths first appeared in the ancient Greece around the Mediterranean area, and along with the expansion of ancient Rome, it gradually developed, spread to the surrounding areas during the period of Roman Empire. In Western Asia, the bath design was changed due to the influence of local construct of Persian architecture, and such design of bath continually spread eastwards to Central Asia and further east to Xinjiang of China. The bath remain discovered this time can be identified as the hall, bathing and work areas according to the different constructions. The structure of the bath was obviously influenced by the Roman style, while the artefacts found at the bath remain and the inner decoration of the bath obviously reveal the style of Central Plain and regional characters, reflecting the ancient cultural interaction and integration between East and West along the Silk Road.

Public economy and finances, technology, and propaganda: coin production in the Greek-Roman World / 公共经济与财政、技术与宣传：希腊-罗马世界的钱币生产

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We indicate by coin an instrument specifically designed and intended to serve as:

1. goods evaluation system;
2. payment method;
3. reserve for future transactions.

This corresponds to the definition of Aristotle, revised by the moderns.

It has been observed that only two monetary systems have emerged independently of each other: the Chinese and the Greco-Anatolian. The specificity of the currency of the Greco-Anatolian type is summarized by a Latin author who wrote an encyclopedia in Latin, in Seville, Spain, around the year 600 of the Christian era: "There are three elements which constitute the coin: design, weight and fineness of the metal." That is, money cannot be confused with any other object and it contains within itself its value, the intrinsic value, as we say. It can therefore be hoarded. And this is the risk for the State. For the Greek States and Rome never succeeded in rendering currency fiduciary, that is to say of a purely conventional value, fixed by the State. This situation lasted, for a large part, until after World War I. And yet, the very name of the currency in Greek, *nomisma*, and in Latin *numus*, indicates that the currency derives from the *nomos*, the convention, the law. This is undoubtedly the substantial difference with the Chinese currency because the latter, nearly 2,600 years ahead of the Western currency, is fiduciary from the outset, or almost so.

From the technical point of view of production too, the two coinages are antithetical, one struck, the other cast. This technique, practiced in China for more than two millennia, was also used by the Italian populations in protohistoric times, but Rome quickly gave it up, preferring the mode of production used by Greek and Etruscan cities. This technique of industrial production, but at the same time dependent on the art of metal engravers, is one of the most impressive achievements of Classical Greco-Roman Antiquity. It is on the art of medallists that the use of currency for its propaganda, practiced with mastery by the sovereign, dictator, king, or emperor, was based.

我们用硬币表示一种专门设计和打算作为的工具。

1. 货物评估系统;
2. 付款方式;
3. 未来交易的储备。

这与亚里士多德的定义相对应，经过现代人的修正。

据观察，独立出现的货币体系只有两种：中国的和希腊-亚托利亚的。"有三个要素构成硬币：设计、重量和金属的精细度"也就是说，货币不能与其他任何物品混为一谈，它本身就包含着它的价值，也就是我们所说的内在价值。因此，它可以被囤积起来。而这就是国家的风险。因为希腊国家和罗马从来没有成功地使货币具有信托性，也就是说具有纯粹的常规价值，由国家确定。这种情况在很大程度上一直持续到第一次世界大战之后。然而，货币的名称在希腊语中是*nomisma*，在拉丁语中是*numus*，这表明货币来源于*nomos*，即约定俗成，法律。这无疑是与中国货币的实质性区别，因为后者比西方货币早了近2600年，从一开始就是信托的，或者说几乎是信托的。

从制作的技术角度来说也是如此，两种钱币是对立的，铸一个，铸一个。这种技术，在中国实行了两千多年，意大利民众在史前时代也曾使用过，但罗马很快就放弃了这种技术，而选择了

希腊和伊特鲁里亚城市的生产模式。这种工业生产的技术，但同时又依赖于金属雕刻师的艺术，是古典希腊罗马古代最令人印象深刻的成就之一。君主、独裁者、国王或皇帝娴熟地使用货币进行宣传，正是建立在勋章师的艺术基础上。

萨珊银器的相关概念及主要特征 / The related concepts and main features of Sasanian silver

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摘要：银器是萨珊宫廷艺术的重要体现，对于“巴克特里亚金属制品”与“后萨珊”银器而言，萨珊银器所带来的时空影响十分明显，可以理解为是在萨珊艺术冲击下的独特创新。而判断相关银器文化属性的关键，就在于能否对不同文化因素之间的交融程度有一个相对准确的认知。这就需要从造型、纹样、制作工艺这三个主要方面对萨珊银器的自身特征进行梳理探讨，以明确其源流问题。

Silver is an important reflection of Sasanian royal art. For “Bactrian metalwork” and “Post-sasanian” silver, the space-time impact of Sasanian silver is obvious, which can be interpreted as an unique creation under the influence of Sasanian art. And the key of judging the cultural attribution of related silver, which is depended on whether we could have a relatively accurate knowledge about the blending degree of different cultural elements. As a result, we need to discuss the features of Sasanian silver from three main aspects of shape, motif, and craft to make the origin clear.

Engraved Roman gems. An intimate insight into human cultural history / 镌刻的罗马宝石。深入了解人类文化历史

Lilian RASELLI

Director / 馆长

Museum of Augst / 奥格斯特博物馆

Cut stones, or gems, were used primarily as seals in antiquity. They sealed documents and goods of all kinds. From Hellenistic times onwards, however, precious stones were also used to produce valuable works of art of unprecedented size and quality. These so-called cameos were given to the political elite as a sign of love or political loyalty. Splendours of this kind were collected especially in the courtly centres of power, and at the end of the 1st century BC, after the final victory of the Romans over the Hellenistic rulers of Egypt, they were sent to Rome as booty. The splendour of the objects left a lasting impression on the Roman population. The Roman writer Pliny Secundus (23 - 79 AD) reports that the victory and the booty on display steered the fashion in Rome towards pearls and precious stones, but also towards silk fabrics. Moreover, from then on, moral rigour was defeated and luxury triumphed.

He himself, however, was so fascinated by the brilliance and colourfulness of stone objects that he dedicated an entire book to them. From then on, cut stones, the gems, were as much a part of everyday life in the Roman Empire as terra sigillata, amphorae and coins stamped with images. After the fall of the Roman Empire, the stones were preserved in church treasures and at medieval royal courts because of their material and format, but also because of their lasting value. To this day, the pictorial motifs on the gems provide a fascinating and personal insight into the beliefs, myths, hopes and fears of their ancient owners. They also show portraits of historical personalities and tell of political events.

切石，即宝石，在古代主要作为印章使用。他们封存各种文件和货物。然而，自希腊时代以来，宝石也被用来制作规模和质量空前的珍贵艺术品。这些所谓的客串，都是送给政治精英的，以示爱护或政治忠诚。这类辉煌的作品特别是在宫廷权力中心收集，在公元前1世纪末，罗马人最终战胜埃及的希腊统治者后，它们被作为战利品带到罗马。物品的华丽给罗马人留下了深刻的印象。罗马作家Pliny Secundus（公元23-79年）报告说，胜利和展示的战利品引导罗马的时尚走向珍珠和宝石，但也走向丝绸织物。而且，从那时起，道德上的紧缩被打败了，而奢侈却取得了胜利。然而，他本人却被石器的光辉和色彩所吸引，他专门用整本书来介绍石器。雕刻的石头，这些宝石，从现在起，就像罗马帝国的陶器、陶罐和铸有图像的硬币一样，成为日常生活的一部分。罗马帝国灭亡后，这些石头因其材质和格式而被保存在教堂宝藏和中世纪的王室宫廷中，但也因其价值长久。时至今日，宝石上的图形图案为人们提供了一个引人入胜的个人视角，让人们了解到宝石古代主人的信仰、神话、希望和恐惧。他们还展示历史人物的肖像，讲述政治事件。

通天河流域岩画的制作技术与年代 / The Production technology and date of rock arts in the Tongtian River Basin

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摘要：近年玉树州博物馆对辖区内通天河流域岩画进行了系统调查，新发现1230幅岩画（1700余个个体）。根据岩画的类型特征和制作技法，可把通天河流域岩画分为东西两个大区，西区是通天河上段流域，即通天河与楚玛尔河（曲麻莱河）汇合口以上地区，东区是通天河下段区域，即楚玛尔河汇合口以下至玉树的巴塘河口，东区岩画又可细分为三个小区。通天河流域的岩画，整体上以动物岩画为主，牦牛、鹿分别是东、西区的主要题材，还有符号、人物、佛塔、车辆等主题岩画，两区之间既有共同点，又各有特点。通过对岩画的打制方法、车辆岩画及鹿岩画的类型学分析可知，认为以通体凿刻为主要技法的岩画年代最早，可能早至殷商时期，线型凿刻技法的岩画年代为周初至战国，线刻法的岩画年代为战国至西汉，磨刻法的岩画年代为秦汉时期，磨划为主的岩画时代为公元7~9世纪的吐蕃时期。

In recent years, the Yushu Museum has conducted a systematic investigation on the rock art of the Tongtian River Basin in its prefecture and newly discovered 1230 panels' rock art (more than 1700 images). This paper is a statistical and comparative analysis of the newly discovered rock art. According to content and production techniques, we divided the rock art of the Tongtian River Basin into two big areas. The West Area is the upper part of the river basin, which is the area above the confluence of Tongtian River and Chumar River (Qumalai River); the East Area is the lower part of the river basin, which is from the confluence to the Batang estuary of Yushu. This area can be subdivided into three subareas.

The majority of the Tongjian River Basin's rock art is categorized as animal type. Yak and deer are respectively the main themes of the West Area and the East Area. In addition, there are other rock art types like symbol, character, pagoda, carriage and so on. The two areas have both commonalities and their own characteristics. Through the typological analysis of production techniques, in the cases of carriage rock art, and deer rock art, we think that the rock art mainly used the whole-image chiseling technique. This technique can be traced back to the Shang Dynasty; the rock art mainly chiseled linearly is dated to the early Zhou Dynasty to the Warring States Period; the rock art that was creates with the line carving technique is dated to the Warring States Period to the Western Han Dynasty; the rock art that was creates with the grind carving technique can be dated back to the Qin and Han dynasties; and the rock art mainly used scratching technique can be traced back to the Ancient Tibetan Empire Period (618-842 AD).

Roman wall-painting: an art and a craft in Pompeii, in Rome and among the Helvetians / 罗马壁画：庞贝、罗马和海尔维第人的艺术和工艺

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In use all over the Mediterranean area, as attested by archaeological evidence since the second millennium BC, mural painting was to take off particularly strongly from the 2nd century BC onwards under Roman rule. The discovery of Pompeii will give the chronological, stylistic, and technical evolution of mural painting until the fateful year of 79 AD. The changes in housing and in the architecture of public monuments such as baths were then accompanied by improvements to both the plaster that regularly covered the structures and the general decoration of the walls and ceilings. If Rome undoubtedly remained the place of the models that were to spread throughout the Empire, the provinces were not to be outdone in the adoption and reinterpretation of patterns and themes under Graeco-Roman influence. A few examples from the Swiss territory will illustrate this development until the 4th century AD.

从公元前二千年开始，壁画就在地中海地区广泛使用，从公元前二世纪开始，壁画在罗马人的统治下发展得尤为迅猛。庞贝的发现将给出壁画的年代、风格和技术的演变，直到公元 79 年这一决定性的年份。伴随着住房和公共古迹（如浴场）建筑的变化，定期覆盖在建筑上的石膏以及墙壁和天花板的一般装饰也得到了改进。如果说罗马无疑仍然是传播整个帝国的典范之地，那么各省也不甘落后，在希腊-罗马的影响下采用和重新诠释了各种模式和主题。瑞士境内的几个例子将说明这种发展直到公元 4 世纪。

Session 3 / 会议 3**Roman bronze statuettes (1st to 3rd century AD): manufacturing processes, alloys, workshops / 罗马青铜雕像(公元1至3世纪)：制造工艺、合金、作坊****Anne-Marie KAUFMANN-HEINIMANN**

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The technology of Roman bronze casting goes back to the knowledge of the Greek who had learnt from the Egyptians and ultimately from Near Eastern civilisations. The lost-wax process has been known at least since the 6th c. BC. In Greek and in Roman Imperial times the direct and the indirect processes were in use. More often the indirect method was used as it enabled the bronze-worker to make new wax-models from the original being kept in the workshop. The preferred alloy for making statuettes was copper with a medium rate of tin and a high rate of lead, which helped to lower the melting-point.

It is not easy to recognize local or regional styles of statuettes as Roman bronze workers had a marked preference for variations of the same types. These variations characterise pieces found in places far away from each other, so it is not possible to draw conclusions about their origin. So far there is evidence for one workshop only to be linked with a specific region – in this case situated in the Danube region – as the statuettes produced there featured very similar characteristics and were concentrated in a restricted area.

罗马青铜铸造技术可以追溯到希腊人的知识，他们从埃及人那里学到了知识，并最终从近东文明那里学到了知识。失蜡工艺至少在公元前6年就已为人所知。在希腊和罗马帝国时代，直接和间接的工艺都在使用。更多的是使用间接法，因为它使青铜工匠能够从保存在工场的原件中制作新的蜡模型。制作雕像的首选合金是铜与中等比例的锡和高比例的铅，这有助于降低熔点。

由于罗马青铜工人对同一类型的变体有明显的偏好，因此不容易识别当地或地区的雕像风格。这些变化的特点是在相距很远的地方发现的作品，因此不可能对它们的起源下结论。到目前为止，有证据表明，一个作坊只与一个特定的地区有关--在本案中是位于多瑙河地区--因为那里生产的雕像具有非常相似的特征，而且集中在一个有限的区域内。

佛教造像着衣的考古学研究 / Archaeological Research on the Garment of Buddhist Statuary

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摘要：在印度的佛教造像艺术中，佛与僧所着的法衣，其披覆形式一致，有通肩和袒右两种形式。根据佛经及唐宋时期的文献记载，印度的佛衣和僧衣相同，由三张大小不同的长方形织物组成，由内而外，包括安陀会、罽多罗僧伽梨三衣，分别意译为下衣、中衣和上衣。在艺术形象中，一般只能看到外层僧伽梨的两种披覆形式。

汉地佛教艺术表现的法衣披覆形式，既忠实地遵循印度法衣制度，又因不同的时代与不同的社会文化，在披覆形式、层次表现、结构和名称等方面发生局部变化。其中，佛衣和僧衣的汉化程度不同，着衣形式也有较大变化。佛衣形式汉化的过程，在云冈石窟和龙门石窟的造像中表现最为鲜明，主要有三种形式：一种介于印度通肩和袒右形式之间，另一种底端表现三衣层次，第三种在上身表现三衣层次。僧衣的本土化改革更为彻底，有领有袖裁剪的汉服逐渐取代部分三衣，最后，只有外层的僧伽梨基本保留了印度传统的形状和披覆形式。

佛教造像中的法衣，是佛教艺术中表现最为丰富的内容之一。了解印度与中国现存遗迹遗物中法衣的形式，为我们认识佛教文化传播与社会历史发展，提供了重要的参考价值。

In Buddhist images from ancient India, we know that Buddha shares the same robes with monks in two dressing styles, the Shoulder-covering Style and the Bare-shoulder style.

According to Buddhist scriptures and ancient Chinese literature, the robes of Buddha and monks in India include three pieces of oblongs cloth of different sizes, which are underclothes (antavāsaka), midriff (uttarāsanga), and assembly garments (sanghāt). The two dressing styles of the assembly garments (sanghāt) mentioned above is what we can see from Buddhist images of ancient India. When Buddhism spread to China, robes has developed new features in styles, structures, and even names while trying to follow its Indian origin. We call this the Sinicization of Buddhist garments.

During the process of Sinicization, robes for Buddha and that for monks developed their own way. As for robes for Buddha, there are three major styles. The first style stands between Shoulder-covering and the Bare-shoulder, the second one is that three layers of garments are represented in the lower part of the figure, and the last one shows that three layers of garments are represented in the upper part of the figure. Moreover, the robes for monks go even further--sleeved Chinese robes with a collar has replaced their original Indian ones. And the outer layer of the assembly garments (sanghāt) was the only element kept till today.

Robes are one of the most abundant visual materials in Buddhist art. A comprehensive perception of it both in ancient India and China is required. It offers us a concrete way to understand the history of the development of Buddhism and ancient Chinese society.

Uniqueness and diversity: introduction to the richness of the Greek terracottas / 独特性和多样性：希腊陶俑的丰富性介绍

Virginie NOBS

Swiss National Science Foundation / 瑞士国家科学基金会

Since the Greek archaic period (7th-5th century BCE), terracotta figurines have represented most of the offerings dedicated in Greek sanctuaries. Manufactured in clay, an inexpensive and readily available resource, shaped by hand and then moulded in series, the coroplastic production made it possible to answer quickly and appropriately to the demand of pilgrims. From the 4th century BCE onward, the production of Greek terracottas reached a high level of refinement, with figurines with elegant clothing or featuring small sketches of daily life. They were also found in tombs. Some regional particularities, such as types of production that can only be found in a single city or area of the Mediterranean (pinakes, i.e. plaques, from Locri or protome, i.e. heads, from Medma in Italy), show the great adaptability of this medium to regional cults.

Undoubtedly secondary production of the potter's workshops, the manufacture of terracottas with moulds did not require a great technical knowledge, which contributed to the large diffusion of popular models, thanks to overmoulding.

This talk will discuss the different types of coroplastic production from the Ancient Greek periods (7th to 1st century BCE): statuettes, moulded slabs and life-size human figures, and present both the techniques and conditions of production, and the contexts of discovery of these artefacts.

自希腊古时期（公元前 7-5 世纪）起，兵马俑就代表了希腊圣殿中的大部分祭品。用粘土制造，这是一种廉价且容易获得的资源，用手工塑造，然后用模子串联起来，可塑性生产使其能够迅速而恰当地满足朝圣者的需求。从公元前 4 世纪起，希腊陶俑的制作达到了很高的精致程度，陶俑身上有的穿着优雅的衣服，有的则是日常生活的小品。在墓葬中也有发现。一些地区性的特点，如只能在地中海的一个城市或地区发现的制作类型（Pinakes，即板，来自 Locri，或 protome，即头，来自意大利的 Medma），显示了这种媒介对地区崇拜的巨大适应性。

无疑是陶工作坊的二次生产，用模具制造陶俑不需要很高的技术知识，这就促成了流行款的大面积推广，这要归功于包浆。

本讲座将讨论古希腊时期（公元前 7 世纪至公元前 1 世纪）的不同类型的可塑制品：雕像、模制石板和真人大小的人像，并介绍制作技术和条件，以及这些文物的发现背景。

简牍文书的保密技术. / The Confidentiality Techniques of Ancient Chinese Bamboo and Wood Documents

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摘要：中国古代社会管理的一大特点是高度依赖文书的运行。军事、民事和行政管理中各类信息都需要依靠文书来传达。这些信息中，很多需要进行不同程度的保密，限制其流传的范围。在纸作为主要书写材料出现之前，中国文书的主要书写材料之一是简牍，包括竹简和木牍两类，这也是中国古代特有的书写媒介。根据考古发现，我们可以了解到中国古代简牍文书独特的保密技术。

Documents played essential roles in the social administrative system of ancient China. All kinds of information relating to military orders and civil executive management highly relied on the delivery of documents to be transmitted. Much of such information needed to be transferred in confidential and safe ways away from the public in different levels in order to keep the spreading in limited extents. Bamboo and wood are the two most important writing materials in ancient China before the popularity of papers, which are also unique materials exclusively used in China. Based on the archaeological discovery, I will demonstrate the special confidentiality technologies of ancient Chinese bamboo and wood documents.

Technological achievements in Greek and Roman Bronze Statuary / 希腊和罗马青铜雕像的技术成就

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Whereas the museums in the Western Hemisphere are nowadays filled with Greek and, mainly, Roman sculptures worked in marble, the preferred material for statuary in Antiquity has in fact been bronze. Literally thousands of bronze statues were exhibited in the sanctuaries or in the public space of the cities. As the precious metal can be easily reused for other purposes, only few of these works of art have survived to this day. They provide valuable information about the technological achievements of the Greek and Roman workshops, and about the various methods of bronze casting since its beginning.

The first part of the paper gives an overview of the most important categories of life-size and or life-sized bronze sculptures in several cases have been discovered in shipwrecks. They include representations of kings and emperors, as well as of private persons. Winners at the Olympic Games obtained the right to erect a bronze statue of themselves in the sanctuary. Also, a number of bronze

statues of gods and heroes are preserved, but in excavations, also in the Roman cities in Switzerland, we usually find only very little fragments of the sculptures that were hacked to pieces in order to reuse the material.

The second part of the paper addresses some technical achievements of the antique bronze workers. Beginning with the creation of complex wax models for the casting, we are dealing with sophisticated technologies for assembling and whelming the separately casted parts. Every bronze cost needs further on a time-consuming reworking to remove air bubbles and other errors that happened during the cast. At the same time, the use of the indirect lost wax method allowed the reuse of the same parts of the statue for different purposes, as is documented by a pair of sculptures from Pompeii.

Mary sophisticated was also the use of different alloys, metals, and glass to create a more colorful impression of the statues, e.g. with separately worked eyes and lips. Also, he clothes have sometimes been decorated with inlays and other materials, whereas all of the surface of the statue could be covered with the same golden sheets. The last part of the paper will deal with some examples of innovative solutions keeping the sculptures upright.

虽然现在西半球的博物馆里充斥着希腊和主要是罗马的大理石雕塑，但事实上，古代雕像的首选材料是青铜。从字面上看，成千上万的青铜雕像被陈列在圣殿或城市的公共空间。由于贵金属可以很容易地被重新使用，这些艺术品中只有极少数留存到今天。它们提供了有关希腊和罗马工场的技术成就以及自青铜铸造开始以来的各种方法的宝贵信息。

本文第一部分概述了最重要的几类真人大小和或真人大小的青铜雕塑，其中有几件是在沉船中发现的。它们包括国王和皇帝以及私人的代表。奥运会的获胜者获得了在圣殿中树立自己铜像的权利。此外，还有一些神和英雄的铜像也被保存下来，但在发掘中，同样是在瑞士的罗马城市，我们通常只发现了极少的雕塑碎片，为了重新利用材料，这些雕塑被砍成了碎片。

本文的第二部分论述了古代青铜工人的一些技术成就。从创建复杂的蜡模型开始，我们正在处理复杂的技术，以组装和磨合单独铸造的部分。每一件青铜器的成本都需要进一步进行耗时的返工，以去除铸造过程中发生的气泡和其他错误。同时，间接失蜡法的使用允许重复使用相同部分的雕像为不同的目的，由一对雕塑从庞贝记录。

玛丽复杂的是还使用不同的合金、金属和玻璃来创造更丰富多彩的雕像印象，例如用单独加工的眼睛和嘴唇。另外他的衣服有时也用镶嵌物和其他材料装饰，而雕像的所有表面都可以用同样的金片覆盖。本文的最后一部分将讨论一些创新解决方案的例子，使雕塑保持直立。

新疆青铜时代人群亲缘关系的生物考古学观察 /

Bioarchaeological Observation on the Origins and Distribution of Populations during the Bronze Age in Xinjiang

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摘要：欧亚草原在旧石器时代存在古北欧亚人群（Ancient North Eurasian），新石器时代欧亚草原东部则分布着古东亚人群（Ancient East Asian）。目前，新疆还没有明确的新石器时代的考古遗

存，新疆的古代人群来源可以追溯到早期青铜时代（大约 5000BP）。这一时期，在新疆发现的古代人群为古北欧亚和古东亚混合人群，这种混合人群在颜那亚文明向东扩张之前广泛存在于欧亚草原东部。新疆西北部地区新发现的三处墓地，物质文化上具有阿凡纳谢沃文化特征，这些古代个体也有明显的阿凡纳谢沃遗传成分，同时还有古北欧亚和古东亚成分；西部欧亚草原人群的成分呈现从北向南逐渐减少的趋势，暗示阿凡纳谢沃文化人群进入新疆的途径。小河、古墓沟墓地古代人群和哈萨克斯坦的波泰（Botai）古代人群拥有非常近的遗传关系，并具有人群连续性；他们的共同祖先进入新疆的时间应早于 5000 年（BP）。从小河墓地早期人群的混合模式来看，拥有东部欧亚成分的人群只有母系上的贡献，而拥有西部欧亚成分的女性和男性对其都有遗传贡献。随着时间推移，小河墓地的晚期人群向西迁徙到北方墓地，对后期塔里木盆地的古代人群产生了深远影响。

在青铜时代，新疆还有一个重要的考古学文化（安德罗诺沃文化），主要分布于准噶尔盆地周边、伊犁河谷、帕米尔高原三个区域，但三个区域考古学文化可能有各自不同的来源。在帕米尔高原发现的下坂地墓地，其人群具有典型的欧亚大陆西部人群遗传特征，与来自颜那亚文化相关人群具有非常近的亲缘关系，这一人群大概在 4500 年前后与祖先人群分离后向东向南，经帕米尔高原进入新疆。

There were ancient North Eurasian populations (ANE) in the Eurasian steppe during the Paleolithic period, and the ancient East Asian populations (AEA) were distributed throughout the eastern part of the Eurasian steppe during the Neolithic period. At present, Xinjiang has no clear archaeological remains dating to the Neolithic period. The earliest population in Xinjiang can be dated to the early Bronze Age (about 5000 BP). During this period, the ancient populations found in Xinjiang were a mixture of ANE and AEA, which existed throughout the eastern part of the Eurasian steppe before the Yamnaya culture expanded eastward. The three newly discovered cemeteries in the northwestern region of Xinjiang have the characteristics of Afanasevo material culture. These ancient individuals also have obvious Afanasevo genetic elements, as well as ANE and AEA markers. The composition of the people in the western Eurasian steppe shows a gradual decrease Afanasevo from north to south, suggesting a way for people from the Afanasevo culture to enter Xinjiang. The ancient population of Xiaohe and Gumugou cemeteries and the ancient population of Botai in Kazakhstan have very close genetic relationships and population continuity; their common ancestors should have entered Xinjiang earlier than 5000 years BP. Based on the mixed pattern of the early population at the Xiaohe Cemetery, people with Eastern Eurasian elements have only maternal contributions to the genetic pool, while both women and men with Western Eurasian elements contribute to the population. As time went by, the population from around the Xiaohe Cemetery moved west, which had a profound impact on the ancient populations in the Tarim Basin in later periods. In the Bronze Age, Xinjiang was also impacted by the Andronovo culture, which was mainly distributed in three regions around the Junggar Basin, the Ili River Valley, and the Pamir Plateau. However, the three regions may have their own archaeological cultures. The Xiabandi cemetery found in the Pamirs has typical genetic characteristics of the western Eurasian population and is closely related to the people from the Yamnaya culture. This population separated from the ancestral population about 4500BP. After going east to south, they entered Xinjiang via the Pamirs.