Networks of trade in raw materials and technological innovations in Prehistory and Protohistory

an archaeometry approach

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Foreword to the XVII UISPP Congress Proceedings Series Edition

Luiz OOSTERBEEK
Secretary-General

UISPP has a long history, starting with the old International Association of Anthropology and Archaeology, back in 1865, until the foundation of UISPP itself in Bern, in 1931, and its growing relevance after WWII, from the 1950's. We also became members of the International Council of Philosophy and Human Sciences, associate of UNESCO, in 1955.

In its XIVth world congress in 2001, in Liège, UISPP started a reorganization process that was deepened in the congresses of Lisbon (2006) and Florianópolis (2011), leading to its current structure, solidly anchored in more than twenty-five international scientific commissions, each coordinating a major cluster of research within six major chapters: Historiography, methods and theories; Culture, economy and environments; Archaeology of specific environments; Art and culture; Technology and economy; Archaeology and societies.

The XVIIth world congress of 2014, in Burgos, with the strong support of Fundación Atapuerca and other institutions, involved over 1700 papers from almost 60 countries of all continents. The proceedings, edited in this series but also as special issues of specialized scientific journals, will remain as the most important outcome of the congress.

Research faces growing threats all over the planet, due to lack of funding, repressive behavior and other constraints. UISPP moves ahead in this context with a strictly scientific programme, focused on the origins and evolution of humans, without conceding any room to short term agendas that are not root in the interest of knowledge.

In the long run, which is the terrain of knowledge and science, not much will remain from the contextual political constraints, as severe or dramatic as they may be, but the new advances into understanding the human past and its cultural diversity will last, this being a relevant contribution for contemporary and future societies.

This is what UISPP is for, and this is also why we are currently engaged in contributing for the relaunching of Human Sciences in their relations with social and natural sciences, namely collaborating with the International Year of Global Understanding, in 2016, and with the World Conference of the Humanities, in 2017.

The next two congresses of UISPP, in Melbourne (2017) and in Geneva (2020), will confirm this route.

Networks of trade in raw materials and technological innovations in Prehistory & Protohistory: an archaeometry approach
Introduction

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Key-words: *Archaeometry, Networks, Raw Materials, Technological Inovation, Prehistory & Protohistory*

Archaeometry is a multidisciplinary research field, where archaeologists, chemists, physicists, materials scientists and geologists cooperate for a better understanding of the past under the point of view of materials and context. It makes clear that no natural scientists can fully understand the materials evidences of the past, despite all precise measurements, without the competent and experienced support of the archaeologists in ancient human dynamics. Besides that, the skills and knowledge of the above mentioned scientists about mineralogy (e.g. ores, rocks, sediments and their characteristics), materials properties, and chemical-physical dynamics are essentials for the archaeological studies in order to put light on provenances, technology and absolute chronology of ancient materials and contexts.

Thanks to archaeometry in the last nearly four decades archeologists have had a simplified access to physical and chemical investigation methods suitable to better study the materials and their archaeological contexts, as witnessed by several authors who published manuals, such as: Renfrew and Bahn (1991 and further editions), Ellis (2000), and Brothwell and Pollard (2001). The existance of such references does not make archaeologists independent, but simply helps them to easier collaborate with chemists, physicists and geologists. What could be today questioned is the unique of the 'archeometer', since a team made of the needed specialists would be more efficient than any individual claiming to have a suitable knowledge in both arhcaeologic and scientific disciplines.

The paper collected in this book corresponds to the lectures held during session B34 of UISPP conference in Burgos (June 2014) where the presentation of multidisciplinary works were encouraged. The main goal of bringing together specialists from various disciplines (humanities and natural sciences) was to debate by different perspectives the networks in raw materials and technological innovation in Prehistory and Protohistory, involving investigation topics typical of archaeometry: archeometallurgy, petrography, and mineralogy.

C. Hawkes in 1958 coined the term 'Archaeometry', two years later, in 1960, W. F. Libby wins the Nobel prize after discovery, in 1950, the possibility to use the Carbon isotopes ratio as a dating method for organic materials. Since the number of researches involving archaeometry as an approach to the study of ancients' materials increased considerably. The technological know-how of ancient peoples and the provenance studies were carried out in two directions:

1. characterization of ancient technologies and materials, since the fundamental works by Hodges (1964 and 1971) and Forbes (1966) about technologies in ancient world; by Kempe and Harvey (1983); by Clough and Cummins (1988) about petrology and axe stone study; by Sieveking and Hart (1986), in flint and chert technology and production; by Torrrence (1986) about production and exchange of stone tools; by Shepard (1985) and by Rice (1987), about ceramic analysis and technology; by Craddock and Hughes (1985) and by Tylecote (1962, 1987) about early metallurgy in Europe followed by Pollard and Heron (1996), and by Lambert (1997) about general aims of archaeometry. The most recent works are are by Hurcombe (2007), about manufacturing methods of archaeological artefatcs; by Cuomo di

Caprio (2008) and by AlbieroSantacreu (2014) for the study of ceramic, and by Montero Ruiz (2010) for archaeometallurgy, with very comprehensive manuals. Concerning petrology, it is worth remembering Shakley (2008) for all lithic materials and Quinn (2013) for ceramic petrology.

2. provenance of materials and artifacts, carried out by, citing the most important works only, Earle and Ericson (1977) in a general view and about problems of production, circulation and provenance; by Ericson and Purdy (1984) about the production and circulation of lithic tools; by Stoss Gale (1991), Stoss Gale *et al*. (1995) (1998) and Gale (2011), about provenance of copper alloys objects in Mediterranean Bronze Age using lead isotopes; by Peacock (1969) about provenance of Neolithic pottery; by Mannoni (1968) about the contribution of mineralogy and ceramic technology to archaeology; by Wilson (1978) discussing about the meaning of chemical composition in pottery; by Glascock, Neff and Vaughn (2004) about physical methods in Nazca pottery provenance; by Tite (2008), about current state of research in ceramic production, provenance and use.

In virtue of the state of research, the limits of the classical approaches and of the new frontiers further disciplines were added to the available one as anthropology for the interpretation of ancient productions and exchanges. One aim is to sustain the discussion about trade in raw materials unveiling the few improper practices made in past researches by chemical methods (e.g. simply relying on the chemical composition of bronzes to suggest their area of origin) and introducing new approaches and methods. Another aim is to underline the importance of the technological innovations from Pre- and Proto-history in order to understand which reasons were behind the innovation.

Within these specific issues the present volume treats three main materials: metals, ceramic and stones with the following papers divided by materials kind:

1. Metals
   - 1.1. Paglietti *et al*., about a finding of an object from Monte Meana-Santadi cave representative of early bronze technology in Sardinian Bronze Age;
   - 1.2. Cristea-Stan and Constantinescu, about the continuity of gold metallurgy between Neolithic and Bronze Age in Transilvania;
   - 1.3. Constantinescu and Cristea-Stan, about researches on silver metallurgy in Bronze Age of Lower Danube;
   - 1.4. Török *et al*., about metals from a First Iron Age grave postioned at Bátmonostor-Szurdokthat reflects shared cultural traditions and commercial activities between different regions of Scythian Culture, Great Hungarian Plain and Transdanubian Hallstatt Culture
2. Ceramic
   - 2.1. Cantisani presenting a research about Bronze Age pottery from a settlement sited in Mursia (Pantelleria island) with the related issues about local production or imported goods;
   - 2.2. Gradoli refers about technological and production studies in nuragic Bronze Age ceramic;
   - 2.3. Krueger and Brandherm, write about a tecno-chronological study in Tartessian ceramic (South-West Iberia) with the aim to better define the chronology of the First Iron Age based also on the discovery of imported (Phoenician)
3. Stones
   - 3.1. Serra *et al*., presenting the provenance study of 13 menhir-stelae by the Calcolithic site of Aiodda-Nurallao

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