CoNeXT: Ancient Ink as Technology (University of Copenhagen Programme of Excellence)

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Publication date:
2016

ANCIENT NEAR EASTERN STUDIES
DEPT. OF CROSS-CULTURAL AND REGIONAL STUDIES
FACULTY OF HUMANITIES
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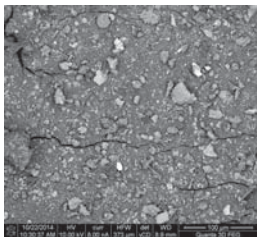
CoNeXT: Ancient Ink as Technology

University of Copenhagen Programme of Excellence

Two of the most profound technological advances in human intellectual history were the twin inventions of ink and papyrus by the Egyptians about 5,000 years ago. The advent of writing allowed information to be expanded beyond the mental capacity of any single individual and to be shared across time and space. The two inventions spread throughout the ancient Mediterranean to Greece, Rome and beyond, and they remain a central medium for communication in the modern world.

Papyrus Carlsberg 250 (detail), example of hieratic script with a heading in red ink and the main text in black, c. 1000 BC. Photo: The Papyrus Carlsberg Collection.

X-ray synchrotron sources provide exciting new perspectives of fundamental importance within the Human Sciences. The CoNeXT project *Ancient Ink as Technology* focusses on ancient manuscripts. It addresses both a decisive chapter in the history of science and also one of the central challenges facing the historian: the fact that the majority of ancient manuscripts lack a recorded archaeological context. Information about the socio-historical context is naturally crucial, whether dealing with ancient literature, diplomatic correspondences, administrative documents, or family archives. X-ray analysis delivers chemical and structural signatures, which reflect the physical properties of manuscripts. It is our expectation that these "fingerprints" will enable a mapping of characteristic traits of ink and papyrus along both a chronological and geographical axis. The focal point of the analysis is the extensive Papyrus Carlsberg Collection which includes manuscripts from a variety of geographical and social contexts spanning some four millennia. If our expectations are fulfilled and it proves possible to map various physical properties onto the archaeological maps, the same procedure can be applied to various other forms of manuscripts across different periods and cultures and the scientific impact will be far-reaching.



Left: Preparing equipment for XRF (X-ray flourescence spectroscopy) analyses at the Centre for Art Technological Studies and Conservation (CATS), National Gallery of Denmark. Photo: Poul Erik Lindelof, 2016
Right: SEM (scanning electron microscope) image revealing the distribution and size of particles in a black ink from Roman period Egypt. Photo: Kim Dalby, 2015.

The ESRF - the European Synchrotron Radiation Facility located in Grenoble - is one of the world's most intense X-ray sources and a centre of excellence for fundamental and innovation-driven research in condensed and living matter science. Photo: www.esrf.eu.

CoNeXT is a University of Copenhagen interfaculty collaborative project, supported for the period 2013-2016 by University of Copenhagen Programme of Excellence (UCPH 2016). It is initiated by the new neutron and X-ray synchrotron research infrastructures that operational or under construction in Lund, Sweden and Hamburg, Germany: ESS, MAX IV, Petra III and European XFEL. The aim of the project is to ensure that UCPH will be ready to use the full potential of the new neutron and X-ray sources and can act as a portal for Danish and North European Industries with potential for use of the unique research infrastructures. It unites scientists that are experienced users of the large facilities with other that can see the great potential in the facilities. At present CoNeXT involves 31 researchers from 5 faculties (HEALTH, HUM, LAW, SOC and SCIENCE) that all are engaged in interfaculty collaborative projects directed towards the large facilities. Web page: conext.ku.dk.

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Conducting analyses at ESRF. Photo: Poul Erik Lindelof, 2016.

CoNeXT
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ESRF
BAM Bundesanstalt für Materialforschung und -prüfung
CATS Centre for Art Technological Studies and Conservation
Papyrus Carlsberg Collection & Project