



Greek and Roman Textiles and Dress

An interdisciplinary anthology

edited by

Mary Harlow & Marie-Louise Nosch

ANCIENT TEXTILES SERIES VOL. 19

GREEK AND ROMAN TEXTILES AND DRESS

an Interdisciplinary Anthology

edited by

Mary Harlow and Marie-Louise Nosch



Oxbow Books
Oxford & Philadelphia

Published in the United Kingdom in 2014 by
OXBOW BOOKS
10 Hythe Bridge Street, Oxford OX1 2EW

and in the United States by
OXBOW BOOKS
908 Darby Road, Havertown, PA 19083

© Oxbow Books and the individual contributors 2014

Paperback Edition: ISBN 978-1-78297-715-5
Digital Edition: ISBN 978-1-78297-716-2
Mobi: ISBN 978-1-78297-717-9; PDF: ISBN 978-1-78297-718-6

A CIP record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data

Greek and Roman textiles and dress : an interdisciplinary anthology / edited by Mary Harlow and Marie-Louise Nosch.

1 online resource. -- (Ancient textiles series ; VOL. 19)

This anthology is the second volume of two which group interdisciplinary contributions to the field of textile research. The first volume is Mary Harlow, Cécile Michel & Marie-Louise Nosch (eds), Prehistoric, Ancient Near Eastern and Aegean Textiles and Dress: an interdisciplinary anthology.

Includes bibliographical references and index.

Description based on print version record and CIP data provided by publisher; resource not viewed. ISBN 978-1-78297-716-2 (epub) -- ISBN 978-1-78297-717-9 (mobi (kindle)) -- ISBN 978-1-78297-718-6 (pdf) -- ISBN 978-1-78297-715-5 (alk. paper) 1. Textile fabrics, Ancient--Greece. 2. Textile fabrics, Roman. 3. Clothing and dress--Greece--History--To 500. 4. Clothing and dress--Rome. I. Harlow, Mary, 1956- editor. II. Nosch, Marie-Louise, editor.

NK8907.3

746.0938--dc23

2014040016

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopying, recording or by any information storage and retrieval system, without permission from the publisher in writing.

Printed in Malta by Gutenberg Press

For a complete list of Oxbow titles, please contact:

UNITED KINGDOM
Oxbow Books
Telephone (01865) 241249, Fax (01865) 794449
Email: oxbow@oxbowbooks.com
www.oxbowbooks.com

UNITED STATES OF AMERICA
Oxbow Books
Telephone (800) 791-9354, Fax (610) 853-9146
Email: queries@casemateacademic.com
www.casemateacademic.com/oxbow

Oxbow Books is part of the Casemate Group

Front cover: The Parthenon east pediment. © Trustees of the British Museum.

Contents

Acknowledgements	v
Contributors	vi
1 Weaving the Threads: methodologies in textile and dress research for the Greek and Roman world – the state of the art and the case for cross-disciplinarity <i>by Mary Harlow and Marie-Louise Nosch</i>	1
2 Embellishment Techniques of Classical Greek Textiles <i>by Stella Spantidaki</i>	34
3 The Importance of Beginnings: gender and reproduction in mathematics and weaving <i>by Ellen Harlizius-Klück</i>	46
4 Representation and Realities: fibulas and pins in Greek and Near Eastern iconography <i>by Cecilie Brøns</i>	60
5 Dressing the Citharode: a chapter in Greek musical and cultic imagery <i>by Marco Ercoles</i>	95
6 Alchemical Textiles: colourful garments, recipes and dyeing techniques in Graeco-Roman Egypt <i>by Matteo Martelli</i>	111
7 The Conservation of a 5th-Century BC Excavated Textile Find from the Kerameikos Cemetery at Athens <i>by Christina Margariti and Maria Kinti</i>	130
8 Transport Amphoras and Loomweights: integrating elements of ancient Greek economies? <i>by Mark L. Lawall</i>	150
9 The Wool Basket: function, depiction and meaning of the <i>kalathos</i> <i>by Elisabeth Trinkl</i>	190

10	Unravelling the Tangled Threads of Ancient Embroidery: a compilation of written sources and archaeologically preserved textiles <i>by Kerstin Droß-Krüpe and Annette Paetz gen. Schieck</i>	207
11	New Archaeological Data for the Understanding of Weaving in Herakleia, Southern Basilicata, Italy <i>by Francesco Meo</i>	236
12	Roman Art: what can it tell us about dress and textiles? A discussion on the use of visual evidence as sources for textile research <i>by Lena Larsson Lovén</i>	260
13	Where Marble Meets Colour: surface texturing of hair, skin and dress on Roman marble portraits as support for painted polychromy <i>by Amalie Skovmøller</i>	279
14	Dressing the Adulteress <i>by Jessica Dixon</i>	298
15	Looking Between Loom and Laundry: vision and communication in Ostian fulling workshops <i>by Elizabeth Bevis</i>	306
16	Roman Textiles and Barbarians: some observations on textile exchange between the Roman Empire and <i>Barbaricum</i> <i>by Zofia Kaczmarek</i>	323
17	The Multiple Functions and Lives of a Textile: the reuse of a garment <i>by Ines Bogensperger</i>	335
18	Discovering Late Antique Textiles in the Public Collections in Spain: an interdisciplinary research project <i>by Laura Rodríguez Peinado, Ana Cabrera Lafuente, Enrique Parra Crego and Luis Turell Coll</i>	345
19	A New Approach to the Understanding of Historic Textiles <i>by Pilar Borrego and Carmen Vega</i>	374
20	Burial Threads: a late antique textile and the iconography of the Virgin Annunciate spinning <i>by Catherine C. Taylor</i>	399

Acknowledgements

Our sincere gratitude to the Danish National Research Foundation for its continued support.

We thank our colleagues at the Centre for Textile Research for their valuable help and advice, especially Dr Giovanni Fanfani. Mary Harlow was granted research leave from the University of Leicester, School of Archaeology & Ancient History, in order to finalise this anthology and we are grateful for their support. The Danish Institute at Athens generously provided us with one month's stay in order to edit the texts. We thank Clare Litt, editor in chief at Oxbow Books, for the always smooth collaboration and professional help. Finally, we thank the authors for their excellent contributions, trust and patience.

This anthology, Mary Harlow & Marie-Louise Nosch (eds), *Greek and Roman Textiles and Dress: an interdisciplinary anthology*, Ancient Textiles Series 19, Oxbow Books, Oxford (2014), is the second volume of two which group interdisciplinary contributions to the field of textile research. The first volume is Mary Harlow, Cécile Michel and Marie-Louise Nosch (eds), *Prehistoric, Ancient Near Eastern and Aegean Textiles and Dress: an interdisciplinary anthology*. Ancient Textiles Series 18. Oxbow Books, Oxford (2014).

Copenhagen, September 2013

The editors

Mary Harlow and Marie-Louise Nosch

Contributors

ELIZABETH BEVIS is a PhD candidate in the Department of History of Art at Johns Hopkins University. She received an MA in Classical Archaeology from the University of Missouri in 2010. Her research interests include Roman dress and textiles, late Roman art and archaeology, and combining methods from art history, anthropology and literary studies to better understand the material remains of the Roman world.

INES BOGENSPERGER studied Classical Archaeology at the University of Vienna. During her study she focused on Greek papyrology in addition. With the research programme *forMuse* she has investigated and catalogued the collections of late antique textiles of the Department of Papyri of the Austrian National Library in Vienna. Conducting her research in one of the largest collections of papyri she was confronted with the papyrological records of textiles and textile production. In her research she combines these two fields, the textual and the material evidence of Late Antiquity in Egypt.

PILAR BORREGO is a chemist, with a master's in Cultural Heritage, and textile conservator at the Cultural Heritage Institute of Spain since 1986. She has participated in conservation work, execution and management of restoration projects, training of restoration technicians and dissemination (publication, conferences) of completed projects. Since 2010 she works as a technical specialist in textiles in the Area of Research of El Instituto del Patrimonio Cultural de España (IPCE).

CECILIE BRØNS is a PhD fellow in classical archaeology at the National Museum of Denmark and the Danish National Research Foundation's Centre for Textile Research (CTR). Her dissertation '*Gods and Garments. Textiles in Greek Sanctuaries in the 1st Millennium BC*' investigates three aspects of the cultic use of textiles: the use of textiles as votive offerings, the dressing of cult statues, and sacred dress-codes in Greek sanctuaries. The study is based on a range of sources: Iconography, epigraphy, literary sources and archaeological material such as the fibulas and dress pins.

ANA CABRERA LAFUENTE is a museum curator at the Museo Nacional de Artes Decorativas in Madrid and is in charge of the textile collection. She holds an MA in Art from the Universidad Complutense of Madrid and a BA in Philosophy and Humanities, majoring in Prehistory and Archaeology from Universidad Autónoma of Madrid. Her research is focused on the study of archaeological textiles. She has published several articles and conference papers on textiles from Late Antiquity to the Early Middle Age focused on questions related to raw materials, textile production and trade. These are part of her contributions to various Spanish research projects related to Late Antiquity and Middle Age textiles in the Mediterranean Basin. She was awarded a Dumbarton Oaks Foundation Summer Fellowship in Byzantine Studies in 2010.

JESSICA DIXON completed her Undergraduate and Master's Degrees at the University of Liverpool and finished her doctoral research at the University of Manchester in 2013. Her PhD was in Ancient History and looked at the relationship between morality and law through Augustus' legislation on adultery. She is now teaching Classics at Merchant Taylors' Boys Senior School in Crosby.

KERSTIN DROSS-KRÜPE studied Classical Archaeology, Ancient History and Business Administration and holds a PhD in Ancient History from Philipps-University, Marburg in Germany. Her PhD-thesis dealt with textile production in Roman Egypt focusing on papyrological sources. It was published as a monograph in 2011 (*Wolle – Weber – Wirtschaft*). In 2012 she was postdoc at the Danish National Research Foundation's Centre for Textile Research (CTR) at the University of Copenhagen. In 2013 she organized the International Conference *Textile Trade and Distribution in Antiquity*, and in 2014, the international conference *Ancient Economies and Cultural Identities*. She is conducting research on the ancient economy and New Institutional Economics at Kassel University, where she is also working on a new research focus on the reception of antiquity.

MARCO ERCOLES is a philologist and is currently junior researcher at the University of Bologna. His interests include Greek melic poetry, particularly Alcman, Stesichorus, Bacchylides, Timotheus and Ps.-Arion, and ancient Greek metrics and music. His approach to these fields is mainly philological and literary, but involves methodologies derived from history, archaeology, archeoastronomy and iconography. This multi-disciplinary approach seems increasingly necessary for a deeper comprehension of ancient Greek song culture. Besides several articles, his main publication is the edition with commentary of Stesichorus' *testimonia: Stesicoro: testimonianze. Edizione critica, traduzione e commento* (2013).

ELLEN HARLIZIUS-KLÜCK is Marie Curie-Research Fellow of the Gerda-Henkel Foundation in the Danish National Research Foundation's Centre for Textile Research. In 2002–2006 she was guest professor in Textile Studies at the University of Osnabrück and Scholar in Residence at the Deutsches Museum in Munich. In her PhD thesis, she combined mathematics, philosophy and textile studies. Since then she focuses on the question if and in which way ancient textile technology has contributed to the advent of mathematics and sciences in ancient Greece. Together with colleagues from Art History she is preparing an international conference on *Framings* and editing the conference proceedings.

MARY HARLOW is an ancient historian, senior lecturer at the School of Archaeology and Ancient History, University of Leicester. In 2011–2013 she was guest professor at the Danish National Research Foundation's Centre for Textile Research (CTR) at the University of Copenhagen. She works on Roman dress and the Roman life course. Her research combines literary studies, iconography and archaeology and methodologies derived from history, anthropology and sociology. She is publishing the Cambridge Key Themes volume on Roman dress.

ZOFIA KACZMAREK is an archaeologist, has a PhD in Ancient History, and is working as an independent researcher in Poznan, Poland. She works on textiles in cultural relations between the Roman Empire and *Barbaricum*, but also on the question of how the ancient tradition is reflected

in the modern European culture. In her research she combines literary sources with archaeological evidence and iconography and methodologies derived from ancient history and archaeology.

MARIA KINTI is a textile conservator working for the Hellenic Ministry of Culture. She graduated from the School of Conservation at the Technological Educational Institution of Athens in 2012. Her dissertation focused on the identification and treatment of biodegradation on excavated textiles. She is currently undertaking an MPhil in the Textile Conservation course (2013/14) at the Textile Conservation Centre/University of Glasgow.

LENA LARSSON LOVÉN is a Senior Lecturer in Classical Archaeology & Ancient History at the Department of Historical Studies, the University of Gothenburg. Her research interests cover textile history, iconology, and Roman social history, especially gender and life course studies. She is currently working on a project on Dress codes in Ancient Rome and a forthcoming volume is *The Imagery of Textile Making*.

MARK L. LAWALL is an archaeologist and associate professor in the Department of Classics at the University of Manitoba. Much of his research, since earning his PhD from the University of Michigan in 1995, has focused on the study of transport amphorae as evidence for the histories of ancient economies. As a graduate student in 1991–92, he catalogued the American School of Classical Studies' collection of loomweights and spindle whorls, which includes examples from sites across Greece. Using comparative research in economic anthropology and sociology he has emphasized the goal of using the archaeological record to study regional diversity and chronological changes in economic complexity.

CHRISTINA MARGARITI is a textile conservator working for the Hellenic Ministry of Culture. She has taught textile conservation at the Technological Educational Institution of Athens and the University College London Qatar. She was trained (MA in Textile Conservation 2002) and awarded her PhD (2009) on the conservation of excavated textiles at the Textile Conservation Centre/University of Southampton. Her research focuses on the analysis and conservation of excavated textiles.

MATTEO MARTELLI is currently research associate at the Humboldt Universität zu Berlin in the programme “Medicine of the Mind, Philosophy of the Body” (von Humboldt Foundation) and within the SFB 980 “Episteme in Bewegung”. His investigation mainly focuses on ancient alchemical tradition, Galen's pharmacology, Oriental translations of Greek scientific treatises, and Byzantine medicine.

FRANCESCO MEO is an archaeologist, PhD in Ancient History at the University of Salento (Lecce, Italy). His research aims at the reconstruction of breeding and textile activities along the Ionic Arc through archaeological data and historical and epigraphic sources until the Romans arrived. After several years on Egyptian and Italian archaeological sites, he now works on Greek towns of the Magna Graecia and Messapian indigenous settlements, trying to define daily life and productive activities. He is the curator of two exhibitions of archaeological material from the Messapian site of Muro Leccese, co-editor of their catalogues, and co-organizer of the International Workshop

Treasures from the Sea. Sea-silk and Shell purple dye in antiquity (Lecce – Italy, May 26–28, 2013). MARIE-LOUISE NOSCH is a historian and director of the Danish National Research Foundation's Centre for Textile Research (CTR) at the University of Copenhagen and the National Museum of Denmark. She is a professor in ancient history. She was awarded her PhD by the University of Salzburg in 2000 with a thesis on Mycenaean textile administration in Linear B but has subsequently merged Linear B studies with experimental archaeology and textile tool studies; as director of the CTR, she has launched research programmes combining history, archaeology and the natural sciences.

ANNETTE PAETZ GEN. SCHIECK is a classical archaeologist and director of the Deutsches Textilmuseum Krefeld, Germany. Her research focuses on Roman textiles and her approach always starts from the object, combining archaeological and scientific analyses, relating the information with contemporary pictorial and written sources. She was awarded her PhD by the University of Cologne in 2002 with a thesis on late Roman textiles from Egypt.

ENRIQUE PARRA CREGO is a chemist and conservation scientist at the Instituto del Patrimonio Cultural de España. He holds a PhD in chemistry from the Autónoma University of Madrid with a thesis in organic chemistry. He was a professor at Autónoma University and Alfonso X el Sabio University of Madrid. His research is focused on the study of materials, pigments, analytical techniques, microscopic techniques and cleaning methods. He has participated in various Spanish research projects related to the study of art materials and he has published several articles on these issues.

LAURA RODRÍGUEZ PEINADO is a medieval art historian, PhD in Medieval Art at the Complutense University of Madrid, with a thesis on Coptic textiles in 1993. She is a professor in the Department of Medieval Art History at the Complutense University of Madrid. Much of her research is focused on the study of textile iconography and textile production from Late Antiquity and the Middle Ages. Over the last decade she is principal investigator in three Spanish projects with an interdisciplinary character related to Late Antiquity and the Middle Age textiles in the Mediterranean Basin.

AMALIE SKOV MØLLER received her Master's degree in Classical Archaeology from the University of Copenhagen. She is a PhD fellow at the Ny Carlsberg Glyptotek and the University of Copenhagen, working on rediscovering the original painted polychromy of selected Roman marble portraits from the collections of the Ny Carlsberg Glyptotek. Her research interests include the original use and manipulation of materials for three-dimensional Roman sculptures and portraits and their original polychrome look, research history and modern collecting and conservation of marble sculptures and the methodology of Roman portraiture.

STELLA SPANTIDAKI is an archaeologist and researcher in the field of Greek archaeological textiles. She was awarded her PhD by the Universities of the Sorbonne and Heidelberg in 2013 with a thesis on Textile Production in classical Attica. She is currently Honorary Research Associate at UCL, Institute of Archaeology. Since 2002, she has been involved in the Centre for Research and Conservation of Archaeological Textiles (ARTEXT), specialized in the study and scientific analysis of extant Greek textiles. Her research combines different fields such as archaeology, classics, biology and experimental archaeology.

CATHERINE C. TAYLOR is an art historian and adjunct faculty in the Department of Ancient Scripture at Brigham Young University. She was recently awarded her PhD from the University of Manchester in 2012 with a thesis on late antique images of the Virgin Annunciate spinning. Her research interests include late antique Christian iconography as well as Roman precedents in material culture and artistic representation from the 2nd to the 6th century. Additionally, she investigates the intersection of patristic texts and Christian images.

ELISABETH TRINKL is an archaeologist and associate professor at the Institute of Archaeology in the University of Graz, Austria. Since earning her PhD from the University of Vienna in 1998, she has worked for the Austrian Archaeological Institute, Vienna, and the Austrian Academy of Sciences (Institut für Kulturgeschichte der Antike). She dedicates her research especially to studies of pottery and textiles. Both fields give an insight into ancient daily life. The research on ancient daily life is best done by combining sources and approaches of ancient history, iconography, and practical archaeology. A further domain of hers is the use of new technologies for the documentation of ancient pottery (e.g. 3D-scanning).

LUIS G. TURELL COLL is an archaeologist. He holds an MA in Archaeology and History from the University of Barcelona. He has been curator at the Montserrat Museum in Barcelona, and is now advisor at the same Museum. His research is focused on Coptic textiles, clothing, Late Antiquity, collecting, Archaeology and written sources. He has participated in different archaeological campaigns in Spain and Italy and in Spanish research projects related to Archaeology and textile production, and he has published several articles on textile collections and textile production in Late Antiquity.

CARMEN VEGA holds a PhD in Biology from the University of Navarra. She performed her PhD work in biophysics at the European Molecular Biology Laboratory in Hamburg. She has a degree in “Arts of the Photographic Image” and she is supervisor of radioactive facilities. Since 2001 she collaborates with the Area of Research of El Instituto del Patrimonio Cultural de España in Physical Studies of cultural beings. Currently she is a researcher at the Polytechnic University of Madrid.

1. Weaving the Threads: methodologies in textile and dress research for the Greek and Roman world – the state of the art and the case for cross-disciplinarity

Mary Harlow and Marie-Louise Nosch

In the recent past the study of textiles and dress has become almost a discipline in its own right.¹ The universal character of textiles and clothing invites us to cross traditional disciplinary boundaries, for example, the semi-artificial divisions between prehistoric and classical archaeology, design and textile engineering, or Indo-European and Semitic language studies. Researching dress and textile history in antiquity presents particular methodological challenges. To be really effective and innovative it needs to combine the approaches of academic disciplines often kept separate in university departments. The standard methodologies of the various disciplines that intertwine to explore and create dress and textile history in antiquity (ancient history, art history, archaeology, classical philology, etc.) are well known and we shall not reiterate them here but rather describe the cross- and inter-disciplinary innovations that arise from this new field, and the necessary ventures it requires into more disparate but cognitively linked academic disciplines (e.g. anthropology, ethnography, sociology, cultural studies).² In consequence, we see dress and textile research as fertile ground for using interpretive frameworks from newer areas of scholarship: e.g. fashion studies, New Institutional Economics, trend theory, literary theory and similar approaches more widely used in the field of cultural studies.³ Another significant institutional characteristic of the field is that textile research is often embedded in museums, departments of conservation, dye analysis laboratories as well as university departments; these represent excellent opportunities to disseminate research and share knowledge not only with other scholars but also to the wider audience of museum visitors.

The scattered and often isolated location of textile researchers in Europe has been partly remedied by two international networks: *North European Symposium of Archaeological Textiles (NESAT)* which gathers archaeologists and textile craftspeople from Central and Northern Europe; and *Centre international d'études de textiles anciens (CIETA)* with a focus on historical textiles and scholars

¹ Taylor 2002, 90–114; 2004. For an excellent survey of late 20th-century developments in the study of archaeological textiles, see Good 2001.

² See the seminal work by Weiner and Schneider (eds) 1989.

³ See the emergence of trend theories, early modern dress and consumption history in Toft and MacKinney-Valentin 2014. Literary theory and dress, see Taylor 2002, 90–114; Hughes 2005. New Institutional Economics is applied to textiles in papyrological material from Roman Egypt in Droß-Krüpe 2011; Temin 2012.

from museums and art history. However, the Greek and Roman world is not entirely embraced by either of these although it has an interest in both.

Textile research and dress history are evolving fast. Across Europe a series of research centres frame this progress⁴ and a multitude of PhD and postdoctoral projects deal with textiles and clothing as a new means of understanding society, culture, identity, ethnicity, economy, and politics. In 2013 two large international European funded projects came to an end: *Fashioning the Early Modern* and *Dress ID. Clothing and Identity in Roman Times*.⁵ These projects brought together scholars from a range of disciplines to share knowledge, create networks and at the same time develop methodologies for this emerging new way of studying the past. Both projects resulted in publications and museum exhibitions. Historians and archaeologists, it seems, are now exploiting the methods that have traditionally been used by anthropologists working with living cultures and, combined with the knowledge they have of their own period of interest, creating new insights and new research questions. In 2012–2013 alone conference themes on textile and clothing in antiquity ranged from the study of the silk trade in antiquity (Harvard, April 2012), textile as metaphor and narrative device (Copenhagen June 2012, 2013, Basel August 2012, Cambridge September 2012), dress and age and gender (Berlin, September 2012), the Bronze Age wool economies in the ancient Near East (Paris, November 2012), to textile trade and distribution (Marburg April 2013), wool on the Silk Road (Hangzhou, China, April 2013), purple dye, sea silk (Lecce, May 2013) and textiles in cult and sanctuaries (November 2013) to name but some in a plethora of relevant gatherings.⁶ The matter of textiles and dress is now becoming embedded in approaches to antiquity, rather than remaining peripheral. The strength and acceptance in academia of this emerging field is confirmed by a rapid recent accumulation of prestigious European grants from the 7th Framework Programme, on the topic of textile research: the status in 2014 is a series of Marie Curie mobility grants,⁷ as

⁴ For example, The Danish National Research Foundation's Centre for Textile Research (CTR) in Copenhagen since 2005; The Textile Research Centre (TRC) in Leiden founded and run by Gillian Vogelsang Eastwood; The Research Network for Textile Conservation, Dress and Textile History and Technical Art History at the University of Glasgow (with funding from the Getty Foundation, 2010). The research group The Textile Revolution headed by Wolfram Schier in the German Excellence cluster TOPOI, since 2012.

⁵ www.fashioningtheearlymodern.ac.uk and www.DressID.eu. Collaborative publications deriving from these projects are, among others; Welch (ed.) forthcoming; Engelhardt Mathiassen *et al.* (eds) 2014; Tellenbach *et al.* (eds) 2013; Nosch (ed.) 2012; Gleba and Pásztoókai-Szeőke (eds) 2013; Grömer 2014.

⁶ Most of these conferences are currently being published: Michel and Breniquet (eds) 2014; Harich-Schwarzbauer (ed.) forthcoming; Droß-Krüpe (ed.) 2014; Landenius Enegren and Meo (eds) forthcoming; Brøns and Nosch (eds) forthcoming; Fanfani, Harlow, Nosch (eds) forthcoming; Hildebrandt (ed.) forthcoming.

⁷ M. Gleba, *Textile Fibre in Italy before the Roman Empire* (2009–2011); H. Landenius Enegren, *West and East: Textile technologies and identities in the 1st millennium BC South Italy and Cyprus*; E. Harlizius-Klück, *Periphron Penelopeia: Textile Technology and the Tacit Dimension of Thought in Ancient Greece* (2012–14); B. Hildebrandt, *The Emperor's New Clothes. Power Dressing in the Roman Empire from Augustus to Honorius*; S. Gaspa, *A Study on the Terminology and the Material Culture of the Textiles in the Neo-Assyrian Empire*; M. Vigo, *Textile Terminology of Hittite Anatolia*; M.-Á. Andrés-Toledo, *Zoroastrian Text(ile)s. Regulations, Symbolism, Identity*; M. Siennicka, *Greek Textile Tools. Continuity and changes in textile production in Early Bronze Age Greece*; J. Cutler, *Weaving the Fabric of Society: Bronze Age Aegean Economies of Cloth* (2013–2015). C. Sauvage, *Identities and Transformation in the Eastern Mediterranean: the Late Bronze Age and Early Iron Age 13th–10th century BCE*; F. Carraro, *Textile Studies: questions and issues between knowledge and knowhow. A case study from archaeological textiles*; R. Laurito, *Textiles and textile technology in central Tyrrhenian Italy from prehistory to the Roman period*; G. Fanfani, *Performing the Fabric of Song. Textile Technology and Imagery in Ancient Greek Poetry and Poetics. A Study in Metaphors and Terminology* (2014–2016). In addition, the Leverhulme Trust funded postdoc. A. Quercia, *Weaving Relationships: loom-weights and cross-cultural networks in the Ancient Mediterranean* (2010–2013).

well as two ERC starting grants⁸ and one ERC advanced grant.⁹ In the Humanities section of the European Research Area (HERA) of the European Science Foundation, of the 19 projects funded under the first HERA joint research programme in 2010–2013, two concerned textiles and dress.¹⁰

This academic movement is not limited to any single discipline or to a single time frame. Scholars across the world interested in periods as diverse as the early Bronze Age in the Aegean through to classical antiquity and the medieval period to the early modern have all been profoundly impacted upon by recent textile research. It is as if historians had continually and consistently failed to notice how people dressed and used the flexible complex material of clothing and the textiles they are made from, to create individual and group identities, to make statements about status, rank, gender, political and religious affiliation etc.; nor did they take account of the raw materials, labour, time and skill involved in the cultivation and production of textiles and clothing; nor did studies of innovation, technology history, science and engineering etc. explain the role of textiles in technologies, cross-craft movements, or innovations. Such matters were simply not considered of importance alongside the ‘big themes’ of classical history such as political narratives or warfare and even when the focus was on large scale issues such as the environment, landscape, climate or nutrition, little attention was given to the role of textile production. This should surprise us, given that in terms of technological developments societies were producing textiles long before they were producing pottery or metalwork.

What is special about textiles, why do they merit a place among the ‘big themes’?

Outside tropical climate zones the production and use of textiles is absolutely essential for survival for most societies. Even in tropical areas, body adornments of some kind often serve similar purposes to the decorative effects of dress (e.g. feathers, beads, tattooing, etc.). In other climates and cultures, such as peoples living inside the Arctic Circle, the protective nature of clothing is often fulfilled by the use of skins rather than woven textiles. This double function of clothing – physical protection as well as media of communication – is present in all cultures.

Unlike the subjects of other big themes, textiles are the nearest we can come to the human body and therefore have a strong affinity with both group and individual identity and with notions of intimacy and hygiene. ‘You are what you wear’ and the study of clothing is to a large degree the study of the moving body in space. It concerns the relationship of garment to body and of individual body to the social body; this close connection with the person and individual is perhaps one of the reasons it has been omitted from large scale surveys of other aspects of the past. This may be due to an erroneously perceived gender divide in the method of production. Textiles are traditionally assigned to the realm of women, who are also linked more closely to ideas of the body and bodily adornment, and were mostly not deemed worthy of study by 20th-century urban male scholars, who considered the very idea of dress and ornament subjects that academic minds should not waste time on. It was social anthropologists who noted the importance of adornment in creating identity. It has required a cross-disciplinary nudge to make historians of early periods sit up and take notice.

⁸ ERC Starting Grants: T. Weddingen, ‘Textile. An Iconology of Textile in Art and Architecture’ (2009–2013); M. Gleba, ‘Textile Economy and Urbanisation in Mediterranean Europe 1000–500 BCE’ (2013–2018).

⁹ ERC Advanced Grant: J. Styles, ‘Spinning in the Era of the Spinning Wheel, 1440–1800’ (2010–2015).

¹⁰ www.fashioningtheearlymodern.ac.uk and <http://cinba.net/> Creativity and Craft Production in Middle and Late Bronze Age Europe (CinBA).

Despite its marginality in the ‘big themes’, textile production, from raw material to finished item, has had a significant impact on society from its earliest history. The production of textiles of quite complex weaves preceded the production of pottery and metals. Thus people spun and wove for many thousands of years before they started to develop and use other technologies, and we must assume that textile technology strongly influenced the emergence of many other later innovations.¹¹ The continuing centrality of textiles to daily life is an essential characteristic of the claim to establish their study as one of the ‘big themes.’ For over 10,000 years textiles have been known to cover the human body and remain relevant to everyone, everyday.¹² However, particularly for textiles it is significant that in the last three or four generations the majority of people have become alienated from the craft elements of production. Few Europeans now know how to weave or even understand the principles of weaving, and even fewer of those who do are academic scholars. In the last hundred years in the West, textile crafts have moved from being a fundamental industry to being perceived as a female handicraft and leisure activity: a part of the cultural economy but not highly valued in the wider monetary economy. This attitude probably also partly explains why the field is neglected in academia. In other parts of the world the reverse is happening: textile production in both its traditional and industrialised forms is being seen and exploited as a means of creating an economic base for communities, and sustainable production and corporate social responsibility are becoming themes which shape the new textile consumer literacy.¹³ In Europe, however, there is a divorce between textile production and textile consumption in the minds of consumers. In this sense, textile production has followed notions of food production and consumption: while cooking may still be a daily activity in the household, many western children do not understand the origin of food beyond the supermarket shelf.¹⁴ Likewise for textiles: never have we owned and consumed as much fabric as today, yet we rarely know or question where it comes from, how it is made, and by whom.

One of the key aspects for textile and dress history then, is to (re-)establish the recognition of textiles as essential and present everywhere – in the past and the present. Surprisingly, many publications neglect textiles both as raw materials and as consumables of the past. Studies on ancient trade focus on trade in grain, oil, wine, pottery and metals, and rarely mention textiles.¹⁵ Works about agriculture outline in detail crops from antiquity which are still grown today but mention only edible plants, neglecting dye plants, flax and hemp (except when it is for consumption either as food or narcotic).¹⁶ Detailed studies of the logistics of military missions discuss weapons, transportation,

¹¹ Barber 1991, 4. McEwen 1993 relates the emergence of Greek classical architecture (in particular the peripteral temple reflecting the structure of a warp-weighted loom) as influenced by textile technology. Nosch (forthcoming a) highlights the textual and technological relationship between sewing in textile and leather in the Aegean Bronze Age. Harlizius-Klück (2004; 2014) demonstrates the connections between weaving and mathematics, and the textile expressions used in modern science (Harlizius-Klück 2009). Bertolin 2008 and Nosch (forthcoming b) discuss the terminological, iconographical and technological links between the loom and the ship, between weaving and sailing.

¹² See Gleba and Mannering 2012 for a survey of the earliest textiles in Europe.

¹³ UNESCO’s Intangible Cultural Heritage initiative: cf. <http://www.unesco.org/culture/ich/doc/src/20435-EN.pdf> (accessed 5.7.2013). See Tyabji and Das 2008 for some projects in India.

¹⁴ <http://www.nutrition.org.uk/nutritioninthenews/pressreleases/healthyeatingweek> (accessed 5.7.2013) a British Nutrition Foundation survey ‘found that nearly a third (29%) of primary school children [in Britain] think that cheese comes from plants, one in ten secondary school children [i.e. 11–18 year olds] believe that tomatoes grow under the ground.’

¹⁵ Garnsey and Whittaker 1983; Garnsey, Hopkins and Whittaker 1983; Parkins 1998; Osborne 1996; Prag, Snodgrass and Tsetskhladze 2000; Whitby 1998; Andreau, Briant and Descat 1994. Morley 2007. Bresson 2008, 150–160 is one of the few authors who explicitly inserts textiles in the trade networks of classical Greece. See also Nosch 2014b.

¹⁶ Most scholarly works on ancient agriculture focus entirely on the cultivation and procurement of edible crops: Finley (ed.) 1975; Amouretti 1986; 1994; Wells (ed.) 1992; Isager and Skydsgaard 1995.

food and strategy but omit to dress the soldiers.¹⁷ Prolific studies of the ancient economy, if they refer to textiles and dress at all, place it in a domestic context, preferably in the chapter about women.¹⁸

To expand the point with just one example: agriculture in all its forms has transformed the physical and cultural landscape of Europe since the first planting of crops and domestication of animals, yet the entire sector of textile production as a determinant factor for shaping the European landscape has been neglected. Some pioneering works, such as Elizabeth Barber's *Prehistoric Textiles* (1991) and *Women's Work – the First 20,000 Years* (1994) recognised the concept of the fibre revolution¹⁹ and considered how the very early production of fibres into spun thread influenced gender roles, the division of space in villages and the emergence of craft and task specialisations.²⁰ Generally, the role of textiles is more acknowledged in studies of prehistory than in classical studies. We now need to recognise how this revolution was amplified throughout history as increasingly complex societies required more and more textiles. In the Greek world sanctuaries, for instance, became huge producers and consumers of textiles;²¹ the levy of a fleet demanded long term planning in terms of the production of sailcloth, and the Roman army was a mass consumer of textiles by the end of the Republic.²² Textiles and clothing did not merely come out of the hands of busy textile workers. They were grown in fields and retted in ponds that fast became poisonous, or produced from the fleeces of hundreds of thousands of sheep grazing off land and pasture. These resources competed with edible crops, fundamentally depleting the soil and modifying the landscape. If the land had not been put to pasture, grazing and transhumance, the ancient landscape would have looked very different; and if textiles had not developed as a major productive element in ancient societies, the cultural landscape would also have looked different. The fibre revolution created growth in the production of raw materials, particularly in the area of the Mediterranean triad (grapes, olives and wheat), as flax and sheep can flourish on land that cannot support other crops.

The question then is how do we access this type of information? In Greece ethnographic studies of the 19th and early 20th century villages and agricultural practices are often drawn on in order to elucidate early, 'primitive', subsistence or simple economies. Such research has the potential to provide clues for how ancient communities dealt with the procurement of necessary goods.²³ However, villagers in even remote areas in the 20th century might, to a large extent, have been self-sufficient when it came to food, energy, combustibles, alcohol, construction materials and transportation; but in terms of textiles, most purchased their clothing commercially, rather than making it at home or with local resources, while some even produced cotton for the global market. Thus, ethnographic sources are rarely reliable evidence for textile crops as part of mixed domestic

¹⁷ See contributions by Raaflaub, Hamilton, Rosenstein and Campbell in Raaflaub and Rosenstein (eds) 1999; Rich and Shipley 1993; 1995; Chaniotis 2005; Gabrielsen 1994. Instead, the textile requirements of the ancient armies are treated in specialised volumes: James 1999; 2004; Sumner 2009; Nosch (ed.) 2012.

¹⁸ This is not the place for a historiographical survey so only a few works serve here as examples for the ancient economy: Finley 1973 and 1977 hardly include textiles, nor women for that matter. In Gehrke 1986 focus is on the rural economy but without including textile production apart from a brief mention of Elis. Leveau (ed.) 1985 gathers contributions but none about textiles as a source of wealth, with the exception of one chapter on the papyri.

¹⁹ McCorriston 1997.

²⁰ Good 2001.

²¹ On textiles and Greek and Roman sanctuaries see Linders 1972; Cleland 2005a and 2005b; Neils 2009; Brøns forthcoming; Brøns and Nosch (eds) forthcoming.

²² On Roman military demand for textiles cf. Livy 29.36; 44.16; Droß-Krüpe 2012; Liu 2009 and 2012; Nosch (ed.) 2012.

²³ Ernestine Friedl's book from 1962 on the late 1950s Boeotian village *Vasilika* is one example among many. See also Welters 1999.

subsistence farming. Since the 19th century, or even earlier, textile crops were integrated into a global industrial cycle of production and distribution of, for example, Indian or Egyptian cotton, Russian flax and British wool. It is hard to find ethnographic comparative evidence for textile fibre crops as part of the domestic agrarian produce or to find households where sheep were kept for their wool and where this wool was also spun and woven in the same household. Self-sufficiency in textiles ended long before the self-sufficiency in food for the peasant population; this is a worldwide phenomenon.²⁴ Thus, to investigate textile crops and dye plants as part of ancient agriculture, fieldwork, ancient travellers' reports, ethnographic parallels or comparisons with contemporary yields all risk being misleading methods with the potential to produce misleading results which minimise the role and position of textiles in the ancient landscape, agriculture and economy. This position needs to be rectified in order to bring textile production in antiquity into the spotlight. A source critical approach is vital, informed by intimate knowledge of the craft and its historical developments. Early modern wool output from merino sheep, or flax fibre yields from new species cannot be compared directly to ancient breeds and yields; even less can modern textile fibre crops based on genetically manipulated species and chemical fertilizer. On the other hand, information on sheep rearing – disease, fertility, the annual cycle of the shepherd's work and his skills – can often be gained from modern studies of the time when Europe still produced such fibre for export and larger markets. An example is the French veterinary Louis-Jean-Georges Daubenton and his valuable observations and recommendations for best sheep rearing practice in late 18th-century France, *Extrait de l'instruction pour les bergers et les propriétaires de troupeaux*. Such works demonstrate the importance of textile production, sheep rearing and fibre crops in early modern societies, a fact which we tend to forget. The effects of the fibre revolution are yet to be clearly acknowledged as one of the 'big themes' of ancient history.

It is evident from classical literature that an understanding of textile production, particularly of spinning and weaving was very much part of the common body of knowledge of the general population of antiquity, who were either actively engaged in or close observers of these activities. This close association between methods of production and finished article is something modern society has lost sight of when it comes to clothing and textiles. Despite this, the nature of weaving: the organisation of warp and weft; the need to count in a binary system of odd and even to create the most basic simple weave (a tabby); the innate knowledge of the technical and numerical relationship between yarn tension, weight of loom-weight and its effect on the finished textile etc., spoke to ancient philosophers who adopted many textile terms and used weaving as a paradigm for order and classification in close connection to arithmetic as well as the order of the ideal city state.²⁵ The association between textiles and technology has been translated into modern science where the use of textile terminology and textile metaphors to describe complex concepts continues today (e.g. DNA string, nodes and histology for the biological tissue, string theory in physics, fabric of the universe in astrophysics).²⁶ There are numerous examples of modern science's deep interest in textiles and dyes and the potential thereby to create innovations in new areas.²⁷

²⁴ Richter 1968.

²⁵ See Scheid and Svenbro 1996; Harlizius-Klück 2014 and references.

²⁶ Harlizius-Klück 2009 and 2014.

²⁷ Damhus *et al.* (eds) 2011.

Evidence of textiles and dress

At the outset of this chapter we stated that researching dress and textile history in antiquity presents particular methodological challenges. This is not due to a lack of evidence but rather to the fact that there is evidence everywhere, but it is not the same type of evidence. Take textiles themselves as artefacts: in northern Europe, due to the climate and soil conditions, archaeological textiles are preserved to an astonishing degree from the Bronze Age, Iron Age and the Medieval period (Greenland). In southern Europe, scraps and threads must be highlighted to tell the same story. A significant exception is Egypt where burial practices combined with the dry environment allowed the preservation of textiles from the Pharaonic period right up to Ottoman times.²⁸ The peculiar situation of archaeological preservation biases the investigation of textiles and clothing considerably. For example, it is the remains of clothing found as torn up rags, reused and abandoned in dumps at Roman sites in Egypt that provide us with much of what we know about the Roman soldier's wardrobe. Nowhere else in the world than in the rubbish of these garrison sites and quarries are we given as much concrete archaeological detail about Roman military clothing, despite a clear programme of iconographic depictions in reliefs, statues and wall paintings, and documents which control soldier's a consumption, or historical narratives of his exploits.²⁹ In the dry conditions of other parts of the Near and Middle East more textiles and garments survive but it is rare to find such material in the rest of Europe in the classical period.³⁰ Here, textiles are more often found as mineralised deposits associated with metal. These usually small, mineralised scraps can, however, provide a wealth of information when appropriate methods and experience are engaged.³¹ Even tiny fragments of a textile can be analysed to establish the type of raw material it was made from, spin direction, type of weave, nature of any dye present, primary or subsequent use etc. All of these elements can help to establish issues, such as provenance, the possibility of trade, use and function. Spin direction, for instance, tends to be culturally determined with Z spun being more common in Northern Europe and the Mediterranean, and S spun found in Egypt, the Levant and the Near East. However, spin direction is also botanically determined since bast fibres grow with a slight S twist, and as more and more textiles are analysed, the picture of spin-direction becomes increasingly blurred.³² The raw material is also of interest, especially if out of the ordinary for the context of the find. Most clothing and household textiles in the classical period were made from wool or linen, so a find of silk or cotton raises interesting questions of trade and travel.³³ The use of rare or expensive dyes, such as murex purple, can also suggest something about the origin and function of an item. More recently, the development of techniques such as strontium isotope and DNA analysis,

²⁸ De Moor (ed.) 1993; De Moor *et al.* 2008.

²⁹ On Mons Claudianus see Bender Jørgensen 2000; Mannering 2000; 2006; on Didymoi see Cardon, Granger-Taylor and Nowik 2011. For Roman army clothing more generally see papers in Nosch (ed.) 2012; Sumner 2009; James 1999; 2004.

³⁰ There are some notable exceptions for the classical period, e.g. Les Martres le Veyre: van Driel Murray 1999. For a comprehensive 'atlas' of archaeological textile finds in Europe, see Gleba and Mannering 2012.

³¹ See for example the surprisingly vast field of information yielded by mineralised textile finds from north European weapon deposits of the Iron Age illustration warrior clothing and ritual practice in Möller-Wiering 2011.

³² Forbes 1964, 152–153 emphasises the S spinning of Egypt; Barber 1991, 65–68 discusses spin-directions and also emphasises the S-spin tradition of linen thread in Egypt and the Z-spinning elsewhere, but also attributes this pattern to the fact that elsewhere it is primarily wool textiles which are preserved, and wool does not naturally twist in one direction. Wild 1970, 38 mentions that linen fabrics can be Z spun in northern Europe, and Alfaro Giner 1984, 82 mentions linen textiles from Spain which are Z spun.

³³ Margariti, Protopapas and Orphanou 2011.

have allowed textile researchers to consider the origin of the raw materials for clothing and their genetic biography.³⁴

The survival of ancient textiles is a great advantage to the study of dress in antiquity, even if the finds tend to be geographically rather specific. The disadvantage is that surviving textiles have sometimes already been taken apart and only the most decorative elements are preserved, separated from the garment they originally came from, as is most often the case for Coptic textiles. The predilections of early museum curators and collectors have left us with a very exotic and somewhat eclectic spread of examples, and it is sometimes hard for curators to identify the status of a wearer, or even the function of a fragment (was it clothing at all?) from the nature of surviving pieces.³⁵ Archaeological textiles, despite some large collections and recent discoveries, remain the exception and most textile researchers must rely on other sources and other types of evidence to complete the picture.³⁶

Visual evidence from antiquity comes from free standing monuments still *in situ* or preserved with other types of art in museum collections. Museum collections are handed down to us by a long process of acquisition, selection and display. The context for iconographic depictions is a central element in understanding the images they may portray of the dressed body. Both the modern and the ancient contexts for visual material present some problems for the viewer. However, it is precisely the vast array of dressed figures that are available to us in a range of media – from Attic vase paintings, funerary reliefs, statues of important individuals, of gods and goddesses to images on silver plate and frescoes – that allow us to visualise the clothed body in antiquity so vividly. The reading, however, is not so simple; clothing in images does not translate easily into clothing as worn in real life. The context and genre of any piece of visual culture creates a particular visual message, and clothing is often used as a signifier: the modest wife, the semi-clad courtesan, the god or goddess with special attributes, the soldier, the old man, the togate Roman.³⁷ The iconographic wardrobe forms part of the identifying features of the individual depicted, it may be exaggerated in the presentation of certain aspects – did male and female Roman citizens really wear all that drapery? Which categories of Greek women were conventionally veiled, if any? As much as they speak to our imaginations, visual images also constrain our interpretation of both the clothing worn and the body beneath it. Some images are portraits, it is true, but even here the clothed body is often divorced from the head, in the sense that carefully carved head likenesses are set on stock workshop bodies.³⁸ Yet, visual imagery is seductive, it is hard to resist reading depicted scenes as reflections of ‘real textile life’ even though they may rather testify to ‘ideal textile life’. There are ways to mitigate the temptations, one is to look closely at scenes and establish their often mythological content or inferences, another is to compare archaeological textile remains and think about how a textile may have draped on the body in reality. Classical images, however, do provide information on areas where both literary and archaeological evidence has gaps. Only from images for instance, might we work out how different clothing ensembles might have been put

³⁴ Frei *et al.* 2009; Ørsted Brandt *et al.* 2011; Friis Bengtsson *et al.* 2011.

³⁵ See Borego and Vega 2014; Peinado *et al.* 2014; Margariti and Kinti 2014; Bogensperger 2014.

³⁶ See for example, Cardon, Granger-Taylor and Nowick 2011, 273–362 on textile finds from Didymoi. They make great use of Roman-Egyptian mummy portraits to get a sense of how some of the fragments found might have worked as garments.

³⁷ See for example Harlow 2004a on female dress.

³⁸ Koortbojian 2008.

together: did Romans commonly wear more than one tunic for instance? Recent research on the polychromy of marble statues has begun to demonstrate the colourful world of ancient sculpture, and presumably of ancient clothing.³⁹ Again, however, we must ask how far these colours reflect a real or ideal costume tradition, and the question of stylised fashions versus realities.

The wide ranging written sources of antiquity work in tandem with visual images to allow us to fill the ancient landscapes with clothed people. Literary sources are constrained by genre in much the same way as visual media. Each type of literature will privilege particular and often contradictory images of the clothed body and the use of textiles. Additionally the authors of most ancient written material – from poetry to law codes – were upper class men, writing primarily for an audience of their peers and their interest in dress and textiles went far beyond simple descriptions – in fact, it is arguable that simple description for its own sake was the least of their interests.⁴⁰ Describing the clothed body served many other functions in ancient literature: the clothing of an individual could be used as a short hand for their character or their gender or their ethnicity.⁴¹ Cross dressing in Aristophanic comedy, for instance, works as a joke because the audience expects certain gendered norms which the drama subverts to comedic effect; or authors who wish to present moral *exempla* to their listeners/readers ensure that good rulers wear correct clothing and deviations from this suggests an inability to rule and a tendency to moral weakness expressed in dress;⁴² and good, chaste wives and mothers do not wear see-through garments or go about with their heads uncovered.⁴³ Other genres require an equally critical reading although they may at first glance appear more ‘factual’. Roman law codes, for instance, suggest that certain garments are only suitable for certain types of people. Dress codes were certainly part of the verbal (and non-verbal) communicative world of Roman society, but how far any individual knew the law, might suffer penalties for wearing the ‘wrong’ clothing is questionable. However, the law was used to maintain a sense of decorum and identity – in the late 4th century AD the wearing of trousers was banned in the city of Rome, punishable by banishment. This seems a little extreme and fighting a rear guard action in terms of current male fashions but draws attention to attempts to use dress as a means of social control, an aspect only found in the written evidence.⁴⁴ Documentary papyri and letters from Roman Egypt provide a rich source of information on textile and clothing production and arguably, taste and fashion. Among these are accounts for estates, for weaving workshops, for dye recipes, for dowry and marriage contracts all of which can be trawled for detailed information on quantities and qualities of wool, particular garments, desirability of certain colours and dyes, apprenticeships of young boys to master weavers and complaints from weavers about the amount of clothing they are expected to produce. Together they provide a very vivid account of often non-elite voices in the textile

³⁹ Østergaard 2010a; 2011; See Larsson Lovén 2014 for more on visual evidence; Brøns 2014 on fibulae and Skovmøller 2014 on polychromy.

⁴⁰ With the possible exception of archaic Greek choral lyric poetry describing actual cultic and religious ceremonies: on the dress of the young girls performing the chorus of Alcman’s and Pindar’s *parthenoi* see Coward forthcoming.

⁴¹ For the exploitation of textiles as a mark of gender in Greek tragedy see Jenkins 1985; for Greek literary sources dealing with the social habit of exchanging textiles see Lyons 2003.

⁴² On dress in Aristophanes see Robson 2005; Swalec forthcoming; on Roman emperors see Harlow 2004b, 2005; Hildebrandt 2009; 2012.

⁴³ Harlow 2004b; 2012; Hildebrandt 2009; 2012.

⁴⁴ Harlow 2004b on trousers in Rome (*Theodosian Code* 14.10.2. AD 399); on adultery and dress codes see Dixon 2014 and her references.

business, in both the domestic and the workshop environment. They are specific to Egypt, it is true, and this is a factor that needs taking into account as it is questionable how far such information may be extrapolated to the wider Mediterranean, but still they provide an invaluable insight.⁴⁵ The terminology of ancient dress and textiles is provided by the written sources, but even here the situation is not unproblematic. Inscriptions from both Greece and Rome mention garments or textile related terms that we cannot identify in the material or iconographic record⁴⁶ – it is often not clear to the modern reader (especially in translation) just exactly what type of garment is being described or how one rectangular garment, essentially the same shape and function as another should have a series of different names (*khlamýs*, *khlaina*, *himátion*, *tribōn*, *ampékthonon*, *khlánis*) – do these refer to the way it was worn, the material it was made out of, the gender of the wearer or any combination of reasons? How far this literary view of clothing reflects lived social reality is one of the fundamental questions of ancient dress history. It seems that in order to solve the problem of the many dress and textile terms, it is not sufficient for the philologists to trawl through ancient texts, they must also turn to archaeology and to reconstructions (see below) to provide a sense of the experiential nature of ancient clothing.

One of the drawbacks of the loss of craft knowledge is that as modern authors we lack technical knowledge and often miss an essential part of the information. The inter-textual and metaphorical use of the techniques and terms of textile production, as mentioned above for ancient mathematics and philosophy, but also evident in drama, poetry and other forms of literature suggests that the production of textiles in antiquity was fundamental and transcended all areas of life, from the practical to the symbolic: the Fates spin the thread of life, Helen, Andromache and Penelope act as meta-literary weavers in the Homeric poems,⁴⁷ the cosmos is thought of as a woven fabric, plots and songs are woven: textile terminology is endemic once one starts to recognise it.⁴⁸

All these examples demonstrate that textile craft was not invisible in the past, but has slowly become so over time. This is partly due to industrialisation which removed textile work from the craftsperson to the factory, removing the element of individual skill. The training to work the early mechanised weaving and lace-making machines required skill but was associated with engineering rather than the craft of textile production. The design and creative element of the process slowly became owned by hand weavers, fashion and interior designers. However, this invisibility has arguably more to do with the perception of textile craft as a gendered entity, belonging to the realm of women. In antiquity the term *lanam fecit* (she worked wool) was used of women to associate them with the virtues of a good wife and mother; modern scholarship, following from a Victorian tradition, has bought into this ideal which has a very old pedigree in Homer's Penelope, weaving and un-weaving while she waits for her husband, Odysseus, to return from the Trojan War. This view of antiquity is a misconception however; in both the Greek and Roman worlds, while spinning remained primarily the work of women and children, weaving became the preserve of men once it stepped outside the confines of the home. Weavers who worked in a workshop situation and for profit were more often than not male workers rather than female.⁴⁹

⁴⁵ On papyri see Droß-Krüpe 2011; Martelli 2014; Droß-Krüpe and Wagner 2014.

⁴⁶ Cf. Cleland 2005a, 2005b.

⁴⁷ Clader 1976; Clayton 2004.

⁴⁸ Scheid and Svenbro 1996; Harlizius-Klück 2004, 2005; Andrés-Toledo 2010; Nosch 2014a; Harlow, Nosch and Fanfani (eds) forthcoming. Rudy and Baert 2007.

⁴⁹ Larsson Lovén 1998a, 1998b, 2002; see also Sigismund Nielsen 2011 on the idea that modern scholarship has overplayed

Aligning textile production with domesticity and female virtue conceals both the necessity of domestic production in some circumstances and situates textile production in a seemingly unimportant socio-economic category which makes economists refrain from considering its role and value in the ancient economy. This, however, is paradoxically a vision invented in the late 20th century by a professional academic community, who were distant from the experience of practical life and knowledge of the modes and methods of textile production. Indeed in works from the early 20th century and before, scholarly studies of ancient clothing and costume were recognised as integral to the study of antiquity.⁵⁰ Research on the ancient economy undertaken in that period also contains detailed discussion of clothing, textiles, fibres, and labour in textile industry.⁵¹ As Beate Wagner-Hasel has demonstrated, late 20th-century studies of ancient technology history neglect textiles as a field of ancient technology.⁵² Indeed a series of scholarly works of the late 19th and early 20th century explore textile technology and its role in ancient technology, its origins and developments,⁵³ followed by comparative studies of textile technologies.⁵⁴ For instance, the construction of ancient looms and their technologies involved historians and archaeologists alike and was a topic of lively debate.

Gender studies have regrettably not done much to improve this situation – we might think that studies of women would highlight and emphasise domestic production and the contributions by women and children to the economy; but gender historians have wished to stress women as authors, women in politics, equality etc. (all of which are valid issues), and in inheriting the 20th-century notion that textile production is a humble domestic production they play down or neglect the domestic sphere and thus the production of textiles. Ironically then, it is still today women scholars who dominate the field of textile research in antiquity in almost all areas: archaeology, iconography and literary studies. A salient example here is the Brauron catalogues. While Greek and Roman epigraphy is traditionally a discipline with many male scholars, this major 4th-century Greek inscriptional corpus concerning dedicated textiles and garments, the Brauron catalogues and their Athenian copies,⁵⁵ proves an exception. The garment contents have been investigated primarily by female epigraphers: Tullia Linders, Dina Peppas-Delmousou, and Lisa Cleland.⁵⁶ The Brauron Artemis cult is investigated, among others, by Lilian Kahil, Joan Breton Connelly, and Cecilie Brøns.⁵⁷ The gendered perception of textile craft as female work is rather compounded by the fact that most academics working in the field of textile and dress research in antiquity are women.⁵⁸ The present volume is further evidence of that: in the group of twenty-six authors and co-authors, twenty are women.

the *lanam fecit* motif (paper presented at the Dress ID workshop on age, gender and dress, Sheffield, November 2011). Already in Mycenaean Greece, men figure among weavers and boys take part in textile production, see Nosch 2014c.

⁵⁰ Bieber 1928; 1934; Mongez 1818; Heuzey 1922; Wilson 1924; 1938; Repond 1931.

⁵¹ Textiles are discussed quite extensively in e.g. Francotte 1900–1901 and Glotz 1920; Weigert 1865/66; Heer 1872; von Cohausen 1879; Schröder 1884; Grothe 1885; Buschan 1889; Riegl 1893; Coyon 1903; von Stokar 1934; 1938.

⁵² Wagner-Hasel 2000, 306–307 and note 8. She mentions, for example, Landels 1978; Burford 1972; Roebuck 1969; Hopper 1979.

⁵³ Weigert 1865/66; Grothe 1883; Schröder 1884; Buschan 1889; Riegl 1893; Blümner 1912; Johl 1917; von Stokar 1934; 1938; Forbes 1964. La Baume 1995.

⁵⁴ Hald 1946; Ling Roth 1951; Haffmann 1964; Picard-Schmitter 1965.

⁵⁵ *JG II*² 1514–1516, 1517B, 1518B, 1521B, 1522–1523, 1524B, 1525, 1528–1530. We thank C. Brøns for this information.

⁵⁶ Linders 1972; Peppas-Delmousou 1988; Cleland 2005a and 2005b.

⁵⁷ Kahil 1963; 1965; 1977; 1981; 1988; 1990. Connelly 2007; Brøns forthcoming.

⁵⁸ Bender Jørgensen 2010, xx. To highlight this gender situation, we have chosen to include the first names of the authors in the bibliography below.

Asking modern questions of ancient clothing: the case for interdisciplinarity

We could address a list of all the sources and types of evidence and coin them interdisciplinarily by their merger, not that this in itself is methodologically sound. Simply layering different types of evidence alongside each other does not create instant interdisciplinarity, nor does it deal effectively with context or genre. Instead, here we will operationalize interdisciplinarity by compiling a list of the relevant questions to ask of a wardrobe or clothing today and in antiquity, and discuss what sources are necessary and useful to answer these questions. The questions are:

- How was clothing worn and used?
- Who wears it?
- When is it worn and why?
- What terms are used for textiles and clothing?
- Where do the textiles come from?
- How is it made?
- Do I look good in this?

The answers are broad and general but they make the point that collaborative research and the willingness to engage with disciplines outside and beyond our own expertise can exponentially improve our understanding of ancient textiles and dress. It also highlights how a narrow focus on only one type of source will necessarily limit the scholar to certain questions.

How was clothing worn and used?

Wardrobe studies are used extensively in museums today to examine the clothing collections of individuals from the early modern period onwards and are created based on actual clothing collections, texts, particularly inventories, interviews where possible, and iconography. Visual evidence aids understanding and interpretation of how clothing was worn on the body and in combination with what accessories. In periods where there are surviving items these can also be very informative, and in living history the owner's opinions on their clothing is enlightening and reminds us that personal taste is a constant in clothing choice.⁵⁹ For antiquity we have a far more limited range of available material but for many items we can make assumptions about how they were worn, what clothing ensemble they were part of and how they were used. For the most part our source material comes from iconography and written sources, although archaeological textiles can reveal much about patterns of use and re-use. One example is vase painting with detailed representations of Greek clothing illustrating how fabrics might have been draped and fastened around the body. Another is the fact that without surviving sculpture and iconography, the iconic Roman toga would be very hard to imagine since it is only superficially discussed in ancient literary sources and completely absent in sources such as Diocletian's Edict of Maximum Prices and the archaeological record.⁶⁰

In the archaeological record of burials, more often than not we have no textiles preserved but the exact placement of dress fasteners, fibulae and jewellery on the human remains can help reconstruct how ancient costumes were fixed on the body of the deceased.⁶¹ This reconstructed costume may, however, reflect the dressing of the dead and thus a burial costume rather than the real contemporary costume tradition.

⁵⁹ Klepp and Bjerck 2012; see Hayward 2009 on the Tudor period.

⁶⁰ On the toga see Wilson 1924; Goette 1989; Davies 2005, 2010 and Harlow forthcoming.

⁶¹ Grömer, Rösel-Mautendorfer and Bender Jørgensen 2013.

In museums, experiential and experimental archaeology and participant involvement now provide the audience with a tactile experience of how ancient dress was worn and used; scholars follow this path with interest and increasingly sophisticated criteria for reconstructing different levels of ancient clothing.⁶² Other scholars have drawn on ethnographic parallels for how to wear clothing in antiquity, or included experience of female clothing from today's Islamic costume traditions as the use of draped clothing in modern societies, particularly those which impose certain dress codes for women, play to the ancient historian's imagination.⁶³

Who wears it?

This question addresses how clothing expresses aspects of the wearer's individual and social identity: their gender, age, profession, rank, ethnicity, religious affiliation etc. Texts and visual evidence can show how an author or artist chose to represent and stress particular characteristics; it is the relationship between representation and social reality that requires nuancing here. As noted above, dress could be manipulated by ancient authors to create a particular image of the person or group described, and it is sometimes impossible to ascertain how much of this rhetoric was simply literary fiction used for effect. Cicero was particularly good at this in his forensic speeches, while satirists exploited it to the full.⁶⁴ Public art also offers a relatively limited repertoire of dressed individuals, implying that a limited range of wardrobe choices was available for the individual when out and about in the community. This limited wardrobe does not match the huge range of items found mentioned in literary sources and epigraphy, nor the range of different textiles found in the archaeological record, suggesting the likelihood of both a public and private wardrobe: clothing that was considered suitable for wearing in private at home, and another outfit that was suitable for official business, for a religious event and the presentation of the public persona. At all times, this may only have been an option for the wealthy and upper social classes – the group that is over represented in the sources. Trying to access the everyday clothing of other social groups is often difficult. Only rarely, and usually to make a specific point, do we see people in rags, in ordinary dress, worn out shoes, or non-matching ensembles. Ordinary, everyday clothing is, in most periods, difficult to grasp and must represent a specific focus for the dress historian.⁶⁵ Some groups do appear in art but often in genre pieces: the elderly or poor or labourers are often shown in short tunics worn only over one shoulder for instance, while children are shown in loose tunics. Clothing regulations sometimes suggest that some types of clothing are only suitable for certain groups, and occasionally, there were attempts to control the expression of wealth through ornament in various sumptuary laws.⁶⁶

⁶² Demant 2009 on different criteria for different levels of reconstruction: C standard = factory woven fabric, in quality as close as possible to the original, machine sewn, except where the stitching is visible and used for school children and adults who want to experience the feeling of natural fibres; B standard = garments made from hand-woven fabric from machine spun yarn, in quality as close as possible to the original. All material plant dyed. Suitable for museum displays and living history environments; A standard = hand spun fibre from as close to the original as possible, woven on correct contemporary loom, hand sewn, plant dyed. Suitable for research reconstructions; on *Dama de Baza* see Demant 2011; Grömer 2009 on reconstructions of pre-Roman dress in Austria. Much of this work was undertaken as part of the European Dress ID project (2007–2013) (<http://www.dressid.eu>). On the theory and use of reconstructions see papers in Staubermann (ed.) 2011.

⁶³ Barber 1991; Harlow 2012; 2015.

⁶⁴ For Cicero see Hesel 1994 and Dyck 2001; on satire see Salles 2003; for the *Historia Augusta* see Molinier-Arbo 2003 and Harlow 2005.

⁶⁵ See for example, Diocletian's Price Edict 26.69, 75 on linen listing certain types of coarse linen, suitable for farm workers and slaves (*rusticorum vel familiarum*). In Greece, the typical clothing for the male slave is the *exōrmis*, a woolen garment especially made in Megara.

⁶⁶ Cf. Livy 34.1–8 on the *Lex Oppia*, Digest 34.2.23; 47; Theodosian Code 10.21.3 (AD 424) on the wearing of silk and

Funerary evidence if found *in situ* can reveal how an individual was dressed on the special occasion of their burial, but again the value of this answer depends on the social context of the burial (are clothing and grave goods for the deceased or for the viewers of the burial to demonstrate the status of the living relatives?) and on the nature, recording and conservation of the archaeological material.⁶⁷ Some of the closest evidence we have for ‘who wears it?’ comes from finds from sites such as the Roman garrison at Didymoi and Mons Claudianus, a Roman quarry site, both in Egypt, and from Vindolanda on Hadrian’s Wall. We know a little of the population content of these sites, and the clothing items found, including shoes, hats, bags, etc., enhance our understanding of social identities, social relationships and wider elements such as trade.⁶⁸

When is it worn and why?

Most cultures have ceremonial or ritual costumes for particular people on special occasions. These wardrobes tend to be over-represented in the visual and iconographic material, particularly in vase paintings and sculpture. Written texts sometimes explain the prohibition or proscription of particular clothing for occasions such as at religious rituals or by particular priesthoods or at semi-public events such as weddings. From epigraphic material one could mention Greek clothing regulations in sanctuaries stipulating white as an appropriate colour, and often including local traditions such as being bare-footed, not wearing pig-skins or, alternatively, dressing in purple to honour the gods.⁶⁹

And, as already mentioned, burials privilege what a community thought of value when dressing the dead, but archaeological textiles *per se* cannot answer this question without reference to other types of evidence. One instance where the study of archaeology and the visual material have come together to change traditional opinions about dress is in the matter of *clavi*, the stripes that run vertically from shoulder to the hem of tunics throughout the Roman period. Historians who primarily use texts often cite the example from Suetonius that Augustus insisted on the status marking *latus* and *angustus clavi* for those of senatorial and equestrian rank. Archaeological textiles, Roman-Egyptian mummy portraits, wall paintings and mosaics, however, demonstrate that *clavi* were worn on almost all tunics, by all classes and by both men and women. The notion of status marking must have been evidenced in other more subtle ways by Romans of the ruling classes.⁷⁰

What terms are used for textiles and clothing?

Textile terms in antiquity appear in all types (inscriptions on stone, papyri, literature) and genres of written sources (poetry, prose, economic and legal documents, etc.) producing an extensive glossary of clothing and textile terms. Two of the major corpora of textile terms are from the extremities of the chronological span: Linear B tablets of the Bronze Age (c. 1300 BC) and Diocletian’s Edict of Maximum Prices (AD 301). During this 1600 year period, the basic textile technology does not

purple; for sumptuary legislation in ancient Greece: Blok 2012; Frisone 2011.

⁶⁷ See, for example, papers in Carroll and Wild (eds) 2012. For an excellent case study see Van Raemdonck *et al.* 2011 and Van Strydonck *et al.* 2011 on Euphemia, the ‘embroideress’.

⁶⁸ See note 29 for Didymoi and Mons Claudianus; for Vindolanda see for example Wild 1979 and Wild *et al.* 1998.

⁶⁹ See for example: Connelly 2007, 85–116 on dress of Greek priestesses; Brøns forthcoming on Greek sanctuary evidence; Aulus Gellius 10.15 and Festus 92 on the costume of the *Flamen* and *Flamenica Dialis* at Rome; Livy 10.7.9, 30.15.11; Pliny *NH* 8.74.195; *SHA* Sev. Alex. 40.8; Gord. 4.4. on the triumphal dress of Roman emperors; for Roman bridal wear see La Follette 1994; Hersch 2010.

⁷⁰ Bender Jørgensen 2011.

change, while the textile terminology does. There are few or no overlaps between the two corpora (*pa-wo* and *phāros*; *ki-to* and *khitōn*). Mycenaean Greek textile terminology is clearly rooted in a Bronze Age tradition influenced by the Minoan language,⁷¹ while the bilingual Greek and Latin of Diocletian's Edict testifies to the multicultural world of late antiquity. Diocletian's Edict of Maximum Prices mentions over 150 textile and garment types and their prices seem to suggest that this is a highly regulated market for textile circulation.⁷² As Valentina Gasbarra has demonstrated for the 3rd and 2nd millennia, there are textile terminology loans between Semitic languages and Mycenaean Greek, but these are a special class of loanwords, so-called *Wanderwörter*, and they occur only for traded goods such as spices, textiles and precious metals.⁷³ Textile terminology is clearly a very dynamic and productive field in terms of loans, adaptations of foreign terms, invention and integration of new ones. Frustratingly, for textile terms, we are mostly unable to identify the semantic shifts which might appear with technological changes.⁷⁴

It is often challenging for researchers in the present to identify a garment from its ancient name. Many textile and clothing names are not securely identifiable in the current visual and archaeological record; others carry an ambiguity in the modern mind that presumably was not present in ancient times. Some garments are termed according to their most prominent feature, particularly the coloured decorative elements. The placement of this decorative element then generated highly visual garment names: *platyalourgēs* 'with a wide red band', *peripórphyros* 'with a red border', *mesóleukos* 'with a white element in the centre', or *periēgētós* 'with a coloured border'.⁷⁵ On the other hand, generic terms for wrapped clothing or cloaks may also have carried specific meanings in antiquity that are now lost to us. In both Greek and Latin there is a series of clothing items to cover shoulders and upper body and often attached with a metal device (pin, fibula), and they are called *khlamýs*, *khláina*, *himátion*, *sagum*, *amictus/amiculum*, *pallium* (to name but a few). We see them everywhere in the iconography but their different and subtle meanings seem to constantly shift and change. One example is Alexander the Great's *khlamýs* (cloak), said to be of Macedonian type which meant with rounded edges to facilitate riding, as opposed to the Thessalian *khlamýs* with squared edges. Scholars have searched for iconographic evidence for both and found it.⁷⁶ However, functionally seen, the difference between the two is insignificant and it is probably rather in the political and social dimension of clothing that the different clothing terminologies for male cloaks should be placed. Alexander's strategic use of ethnically mixed dress code of Macedonian and non-Macedonian, e.g. Persian/foreign, clothing was instrumental in fulfilling his political ambitions.⁷⁷

A second challenge is that ancient populations recognised fabrics as a matter of course and did not need to specify different types in detail. However, throughout antiquity, as today, a 'made-in' label for clothing is found in the use of toponyms and their derived forms to indicate the place where clothes were made, traded, or, once the toponym is an accepted part of local terminology, simply to suggest a specific quality. This phenomenon is already well attested in the 3rd and

⁷¹ Del Freo, Nosch, Rougemont 2010.

⁷² Barańscy and Janiszewski 2007, 17.

⁷³ Gasbarra 2014.

⁷⁴ Wild 2000, 209; Cleland, Davies, Llewellyn-Jones 2007; Schrader 1886.

⁷⁵ See Spantidaki 2014 for the references.

⁷⁶ Neuffer 1929; Fredricksmeyer 1997; Saatsoglou-Paliadeli 1993; Kingsley 1984.

⁷⁷ Papadopoulou forthcoming.

2nd millennia BC where it is used for textile and garment designations.⁷⁸ However, by the 1st millennium toponymic designations also become a wide-spread linguistic and economic tool to designate ranking and qualities of, for example wine and oil.⁷⁹ Qualities, types, traditions and places are connected, and places are a useful denominator for remembering and ranking quality and type, and this is especially evident in the Edict of Maximum Prices. Thus a garment might be called *amórgina* and *tarantína*, but it would be futile to search for special techniques, tools or textiles in the Cyclades or in Salento. This does not mirror a politically fragmented classical landscape, but rather reflects a sense of regionalism, *terroir* and locality. Other renowned examples are Coan silk, or, for instance, Pannonian and other locally named cloaks in Diocletian's Edict, and Pliny's list of the best local Italic wool types. This topological generation of textile terms mirrors both places of production, of origin, and sale places, but over time comes to refer to qualities and types as well.

Byssus is another challenging term for clothing worth mentioning in this context. Originally a Semitic term employed to designate fine cloth of silk, cotton, or linen. In modern translations, especially in the Italian translation of the Bible of the early modern period, as demonstrated by Felicitas Maeder, via a misunderstanding and confusion of *byssus* and Italian *bisso* as 'depths of the sea', it was perceived as the technical term for 'sea silk' made of filaments of the *pinna nobilis* mussel. While we have some fragments of a hat made from *pinna nobilis* dating from the 4th century AD, we are unsure what name the ancients gave to such marine textile fibre.⁸⁰

Finally, it is important to consider how far textile terms are to be considered metaphorical images or references to real techniques. Literary texts also provide extensive vocabularies of clothing and textile terms.⁸¹ However, as discussed above, in these genres, clothing terms are often a tool to describe a character, not to describe technicalities of manufacture or quality. Conversely, as Ellen Harlizius-Klück has observed, modern scholars often tend to understand textile terms only metaphorically, and not as real technical concepts used by ancient Greeks and Romans. For modern scholars, the ancient use of textile terms have often been seen as metaphors for mathematics and astronomy, Harlizius-Klück on the other hand, attributes a more concrete meaning to these textile paradigms and demonstrates that the ancient Greeks quite technically and literally compared and exemplified cosmic phenomena to textile technology. The division of odd and even numbers stems from practical actions and theoretical models aimed at solving quite concrete challenges in textile patterns.⁸²

Where do the textiles come from?

The new methodology of isotopic tracing of strontium in textiles provides the possibility to trace the locality of textiles and thereby demonstrate their local or non-local origin.⁸³ This technique gives new impetus to examining the origins of textiles, which were previously established by identifying the fibre and/or stylistic analyses of textile patterns and techniques.⁸⁴

⁷⁸ Michel and Nosch 2010.

⁷⁹ Lawall 2011. Greek divinities are also differentiated by their affiliation to different places.

⁸⁰ Maeder, Hänggi and Wunderlin (eds) 2004; Maeder 2008; Landenius Enegren and Meo forthcoming.

⁸¹ See, for example, Gallet 1990 on Pindar, and Wagner-Hasel 2000 on Homer.

⁸² Harlizius-Klück 2004; 2014.

⁸³ Frei *et al.* 2009.

⁸⁴ See, for example, the Viring textile discussion, Kaczmarek 2014.

Another significant marker of non-local textiles and their mobility are fibres foreign to the place of discovery. In the Mediterranean, finds of cotton or silk stand out as non-local and imported.⁸⁵ Silk textiles found in Palmyra with in-woven Chinese signs raise questions about origin and mobility of both materials and craftspeople.⁸⁶ Finds of wool textiles in Egypt can be considered a sign of their Roman origin and wool as a Roman cultural marker, against the more common linen of local preference. The remains of cotton fabrics in Egypt indicate trade with India and are interpreted as old Indian cotton sails reused as isolation in buildings, suggesting contact over a longer period of time.⁸⁷ Also from Egypt, Dominique Cardon has demonstrated how the composition of dye components of red dye can lead to the exact identification of the mollusc species, in this case the banded dye-murex, *Hexaplex trunculus* which then pinpoints the dye to the Mediterranean, its exclusive biotope.⁸⁸ One of the highlights of textile finds testifying to the mobility of styles and patterns comes from the Tarim Basin in China. Here a late 4th or early 5th-century burial costume tailored into a kimono styled garment was discovered to have been woven on a Chinese loom; made of red woollen yarn, decorated with images of Hellenistic-Roman iconographic themes.⁸⁹ Another example is the remains of silks and knotted pile rugs found in burials in Pielgrzymów and Zakrzów in Poland which are considered to be of Roman origin; similar contemporaneous items have also come to light in Palmyra.⁹⁰

As mentioned above, spin-direction has often also been used as a tracer of origin or at least as a sign of locality since there are some overall cultural traditions of directional tendency. As much as the overall picture is important, spin-direction cannot alone trace origin, since exceptions and personal styles appear. However, it is evident that researchers have a number of tools with which to track the mobility of textiles and textile techniques.

Recent research has provided new insights into the modalities of long distance textile trade since it becomes increasingly evident that not only textiles and garments, but also fibres, yarn, dyes and even unfinished materials are all traded. For classical antiquity it is particularly the discussion of the extent, distance, and volume of textile trade between the Roman Empire and the world beyond its borders which has highlighted the issue.⁹¹ Textile analyses from the northern regions beyond the limits of the empire have demonstrated that the quality of fabrics increased in the Roman period and decreased again in the later medieval period.⁹² However, this does not necessarily imply that high quality was due to the importation of Roman textiles: it is possible that the Romans traded fine-fleeced sheep into areas along the northern borders where they were crossbred with local species; or perhaps wool or spun yarn was imported.

The mobility of the Roman army, and its presence along the *limes* meant an increased demand for clothing and other textile necessities; these were purchased individually by soldiers or collectively as a part of the army logistics.⁹³ Distribution patterns and mechanisms varied over time and in different provinces or conflict situations but the possibility of exchange of materials, techniques, and styles was present at all times.

⁸⁵ Hildebrandt (ed.) forthcoming.

⁸⁶ Stauffer 1996.

⁸⁷ Wild *et al.* 2008.

⁸⁸ Cardon 2010.

⁸⁹ Jones 2009.

⁹⁰ Maik 1994, 12–13.

⁹¹ Bender Jørgensen and Wild 1988, 65–98; Kaczmarek 2014.

⁹² Maik 2001; 2007, 97–105.

⁹³ Nosch (ed.) 2012; Kaczmarek 2014; Jones 1960–61.

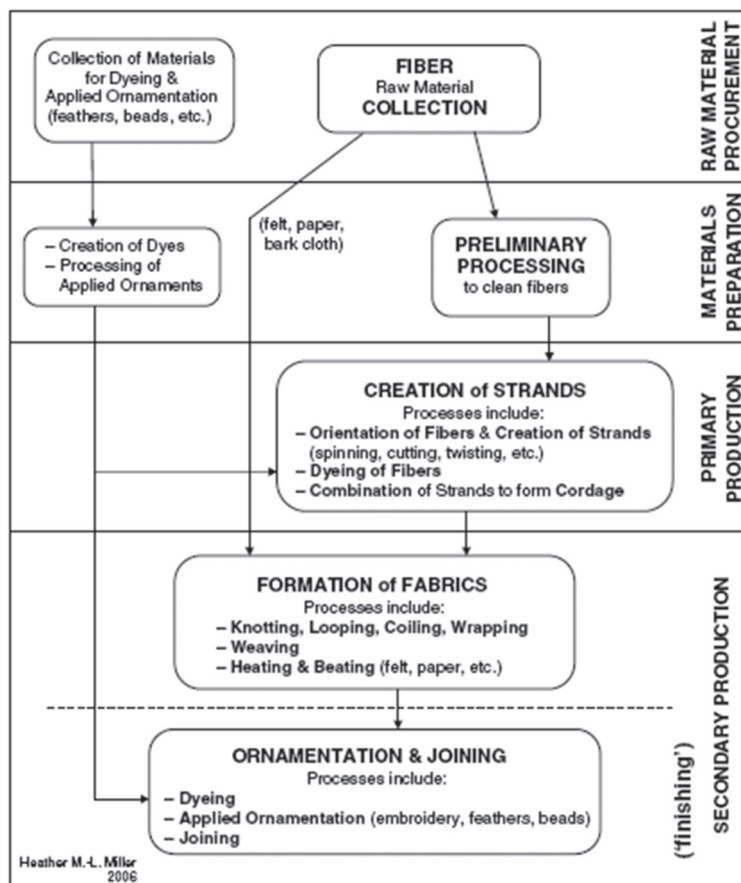


Figure 1.1 Chart of the chaîne opératoire in Miller 2007.

The question of the trade and mobility of textiles can only partially be answered through iconography. In both Greek and Roman cultures artists used dress as a visual marker for ‘the other’, and in local communities along the Roman borders for instance, individuals used dress as a clear marker of local/Roman allegiance (or their rejection of it).⁹⁴ Margaret C. Miller has highlighted Persian clothing in Greek vase painting because it is colourful and highly patterned, and therefore a visual marker of non-Greek origin.⁹⁵ How far this translates into any real Persian wardrobe is unknown, but it certainly outlines them as foreign and non-Greek to Greek viewers. In written Greek sources, Aristophanes in particular, who must have used the everyday clothing terms for his audience to visualise his characters, a thick coat – without any suggestive patterning it seems – is called a *persis*;⁹⁶ rugs from Miletus, *strómata milésia*,⁹⁷ and wool from Miletus *eria*

⁹⁴ See, for example, Wild 1968; Rothe 2009; Hendzsel *et al.* 2008; Grömer 2014.

⁹⁵ Miller 1997.

⁹⁶ *Vespae* 1131ff, where the comic point is brought by terminology and an explicit Greek/Persian dichotomy.

⁹⁷ *Ran.* 542.

milésia ‘Milesian wool’.⁹⁸ Aristophanes lists traded items such as ‘Laconian shoes’, which may have come from Laconia, but the fact that Laconian shoes are so often mentioned, rather suggests that the term simply conveyed a certain type or fashion of shoes.⁹⁹

In Greek sources, female clothing is ethnically coined in the shape of the *Ionian chiton* and the *Doric peplos* (and the dichotomies are highlighted by the fibres: the *Ionian chiton* being of linen and the *peplos* of wool). The dichotomy between Ionian and Doric clothing is emphasised by the use of pins and fibulae in the Doric clothing. After a conflict with Aegina, Herodotus uses this dress element in his narrative to explain the change of female dress: the *peplos*-dressed Athenian women killed the sole surviving soldier with their dress pins and as punishment had to change to the Ionian style without pins.¹⁰⁰ This is again another case of the use of ethnonyms to describe styles.

Lists of wonderful exotic traded goods are preserved in Hermippos’ trade list and lists from comic fragments (Antiphanes and Eubulos) from the Hellenistic period.¹⁰¹ Hermippos’ trade list is a catalogue of delicacies and their place of origin or trade in Greece. Most of the products are edible and of rather exclusive nature: species of fish from the Hellespont, pork and cheese from Sicily, raisins and figs from Rhodes, apples and pears from Euboa, acorns and almonds from Paphlagonia, dates and fine wheat flour from Phoenicia. High-end textiles and textile products, are among these traded goods: couches and pillows from Sicily;¹⁰² carpets (*strómata*) and pillows from Corinth.¹⁰³ Clearly, textiles and clothing seem to integrate well into the trade networks and logistics of long-distance trade.¹⁰⁴

How is it made?

This question can be answered by standardised textile analysis, verification of weave type, seams, dyes, spin direction and tension, and yarn qualities. The results can be compared to local textile tools and their physical properties to assess whether the fabrics were made with these tools.¹⁰⁵ It is now possible to hypothesise on the range of possible textiles from the tools alone.¹⁰⁶ In this area work on archaeological textiles is essential. The seminal work on weaving-to-shape by Hero Granger-Taylor was possible due to her extensive knowledge of archaeological textiles and her ability to read the signs on the bronze (i.e. moulded) statue of the Arringatore.¹⁰⁷ Granger-Taylor demonstrated that garments in antiquity were made on the loom, requiring only minimal or no tailoring to make them suitable for wear. Since the early 1980s then, scholars have understood the techniques of ancient clothing manufacture in very different ways, and combined knowledge of surviving textiles with contemporary iconography in more meaningful analysis.

⁹⁸ *Lys.* 729, and see *Av.* 493.

⁹⁹ Aristophanes, *Vesp.* 1158, *Thesm.* 142, *Eccl.* 74, 269, 345, 508, 542, *Thesm.* 421. It is perhaps worth noting that in the French language today women’s leather sandals with crossed straps, no matter where they are made or purchased, are termed *spartiates*, ‘Spartan’ sandals.

¹⁰⁰ Herodotus 5.87.1–3. On pins and fibulae, see Brøns 2014.

¹⁰¹ Hermippos: fr. 63 (Koch I, 243); Aristophanes: fr. 193 and fr. 236 (Koch II, 92, 115); Eubulos: fr. 19 (Koch II, 171); Knorrige 1926, 74–76, 134–136.

¹⁰² Eubulos Fr. 121 (Koch II, 208).

¹⁰³ Antiphanes Fr. 236 (Koch II, 115).

¹⁰⁴ Seland 2014.

¹⁰⁵ Gleba 2008; Andersson Strand and Nosch (eds) forthcoming.

¹⁰⁶ Andersson Strand *et al.* 2009.

¹⁰⁷ Granger-Taylor 1982.

The discipline of experimental archaeology has made an equally significant contribution to research in this area. It is now possible through many tests and experience to gain deeper understanding of how textiles were made and to answer such questions as: how long might it take to make a garment; what level of skill was required; what quality of raw material used; and what resources and techniques were required. Furthermore, archaeologists working together with experienced craftspeople have produced reproductions which have given new insights into how textiles were made and how they might have been used. This allows us to ask how long a garment could last, how often it needed mending and where the wear is first visible.¹⁰⁸ Such experiments and close observation of surviving textiles have also helped in the avoidance of embarrassing anachronisms and mistranslations in philological studies. For instance the modern common misuse of the term embroidery to designate decorated textiles;¹⁰⁹ or the misuse of the term carding for the 3rd and 2nd millennia BC textiles when fibres were actually cleaned and processed by combing instead.

It is far harder to answer this type of question with literary material as ancient male authors tend to assume an understanding of textile techniques omitting any clear explanations, or using wrong or confusing terms. Pliny for instance, expends a great deal of effort on the description of murex-dyeing techniques which seem to reveal that he had good informants but did not know the whole secret of colourfast quality dyes.¹¹⁰ On the other hand dye recipe books on papyri tantalise in their detail and suggest a good knowledge of the chemistry behind dyeing – even if we cannot identify all the ingredients.¹¹¹

Understanding how a garment is made, and from what type of material, is key to understanding the manner in which it might be worn and how it might be experienced on the body. The properties of any given textile will influence what can be made from it, and how it might be made. Wool can be heavily felted for waterproofing, or it can be light and loosely woven in many colours – as a textile it is extremely versatile. Silk might be valued for its sheen, its colour and in antiquity for its rarity and exoticism. Linen for its fineness, or for its extreme tensile strength. Ancient clothing is often talked about in terms of ‘drapery’ and it is the relationship of the type of textile and its properties combined with the techniques of its construction that create drape.¹¹²

Fundamental to all this is the perception of the *chaîne opératoire* or the logic of production. This approach – examining the processes, resources, skills required to move from raw material to finished garment – has been much studied by prehistorians but for the classical period again tends to find itself lost in disparate academic disciplines. For instance, landscape archaeologists tend to stress the effects of sheep rearing and transhumance; other archaeologists might examine the production and placement of dye-works while textile archaeologists examine the finished articles; ancient historians look at the occupations of those involved in textile production. Figure 1.1 is Miller’s generic chart outlining the chain of production. Figure 1.2 is rather more complex and based on the various methods examined in the papers in this volume. It highlights the variety of processes that might have come into play at different stages of production. While there is an underlying basic flow (gather material, process for spinning, weaving, finishing) there are a multiplicity of ways

¹⁰⁸ Kelly McLauchlin 1981; Demant 2009; Andersson *et al.* 2008; Andersson Strand and Nosch (eds) forthcoming.

¹⁰⁹ Droß-Krüpe and Paetz gen. Schieck 2014.

¹¹⁰ McGovern and Rudolph 1987; 1990.

¹¹¹ Pliny *NH* 9.124 (60)–141 (66); Martelli 2014.

¹¹² Losfeld 1999.

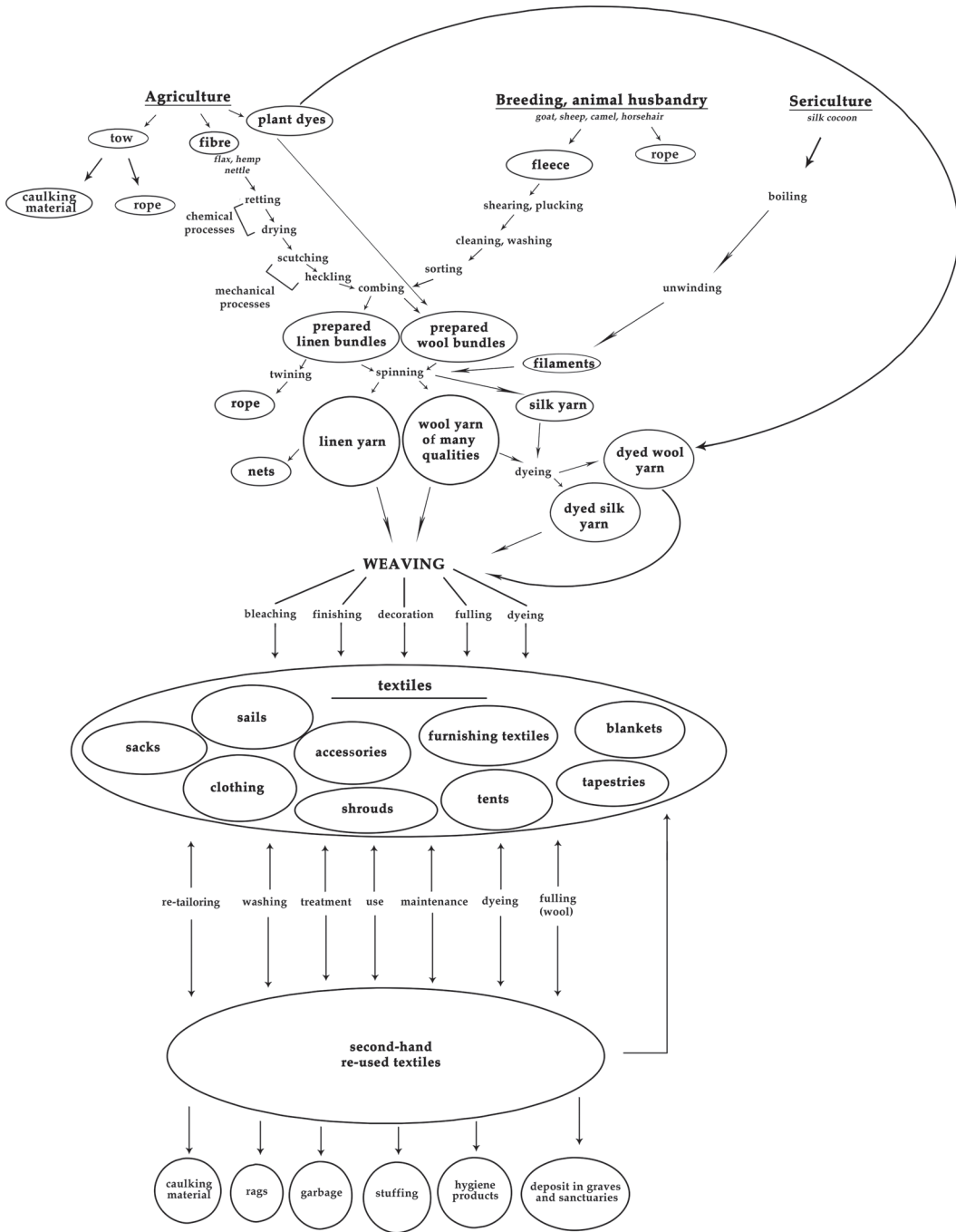


Figure 1.2 Figure of the chaîne opératoire according to the papers in this volume. Encircled words indicate textile commodities.

in which the process was nuanced by cultural preference, by pragmatic practicality, by the craft-person's ingenuity, by the desire for a particular finish etc. Textile archaeologists might identify these subtleties but it is important that all those who work on dress are aware of them and their variations in order to fully comprehend what we are looking at.

In recent years with the recognition of the need for more interaction between the sciences and the humanities coupled with the increasing acceptance of the methods of experimental archaeology, more joined-up thinking is becoming apparent in published work. This is a mode of academic study in which the arts and humanities are learning from the sciences.¹¹³

Do I look good in this?

This is a question most often asked of modern clothing where a 'look', be it uniform, corporate or highly individualistic, has become very much part of the notion of identity. It is far harder to ask this of antiquity and some may argue that it is not a relevant question for the period. However, even in antiquity, individuals desired a 'look' even if one controlled simply by conceptions of gender, and everyone had an intimate relationship with clothes and an experiential relationship with clothing: was it comfortable to wear, smooth or scratchy on the skin, how did it smell etc.?

In antiquity, the shape of textile clothing remains fairly static over hundreds of years and mostly consists of draping and wrapping rather than the modern cutting and sewing and moulding to body shape. However, archaeological finds from northern Europe suggest that skin and leather clothing, shoes, cloaks and hats were instead stitched and fitted to shape. Thus, we have a quite static clothing habit covering a body which over the years changes in size and morphology. How did clothing respond to obesity, pregnancy, breastfeeding, emaciation, physical disability? It seems that clothing must have been adjusted by belts, pins, fibulae and the layering of different garments. In Roman sources at least, it is never said, and never really shown, but iconography reveals layers of folds and the impression of belted garments. The same phenomenon in the Greek world is evident for fibulae. They are rarely shown in iconography where figures wander relaxed about in loose dresses without constraints, but the substantial number of fibulae in archaeological contexts and burials demonstrate that they must have been functional, necessary devices to keep clothing in place.¹¹⁴ Overall our sources present us with highly normative dressed bodies, and the relationship of the changing body and dress in antiquity is an area that requires more research.¹¹⁵ Another side to this question is how does this make me beautiful? Ancient literature, particularly the works of Ovid and the debate in antiquity over the dangers of female (and male) adornment alert us to the fact that beautification was part of normal social behaviour. The notion of beauty is highly culturally determined but both the Greeks and the Romans had clear, if not consistent, ideas of beauty and how individuals should look. The basic shaping of garments suggests that women, and men, might

¹¹³ On the *chaîne opératoire* see Wild 1970; Andersson Strand, 2010; 2012; on various processes of the production chain see, for example: Frayn 1984 (on sheep rearing and wool trade in Rome); Flohr 2013 (on fulleries and fullers); Larsson Lovén 2000; 2002 (on imagery of textile workers); Liu 2009 (on *centonarii*); Hopkins 2011; 2013; Boesken Kanold and Haubrichs 2008 (on uses of experimental archaeology). The *Dress ID* project and the *Purpurae Vestes* conferences organised by Carmen Alfaro in Valencia have been instrumental in bringing many disciplines and scholars together and encouraged the type of collaborative work that is essential in textile and dress research (see, for example papers in Tellenbach *et al.* 2013; Grömer 2013; Alfaro, Costa and Wild (eds) 2004; Alfaro and Karali (eds) 2008; Alfaro *et al.* 2011; Carroll and Wild 2012).

¹¹⁴ Brøns 2014.

¹¹⁵ See papers in Fluck and Larsson Lovén forthcoming.

have draped and wrapped their clothing to suit their figures, to highlight their perceived good points or used any combination of colour, fine quality textiles, jewellery and cosmetics to create their desired image.¹¹⁶ For the modern reader these subtleties are hard to identify, let alone interpret. As with all the other questions asked here, we need to have a wide range of understanding to interpret the evidence and to put it into context.

Talking about fashion also produces mixed reactions among academics studying the ancient world, many (including ourselves) take it for granted that ideas of fashion existed but others are more sceptical arguing that the concept can only be applied from the early modern era and period of industrial revolution which revolutionized cloth and clothing production and set the cyclic production and consumption schedule which today frames the constant changes in fashion. However, even in antiquity when the basic shapes of clothing did not change much over time, there are changes of style, ways of draping and alterations of dress and in choices of material and colours. Much of the information about such nuances comes from literary material and particularly from moralizing treatises in which descriptions of dress express far more than simply descriptions. Individuals who chose to dress differently (or, we might say, ‘fashionably’ in modern terms) are often defamed or vilified for choosing to look outrageous in the author’s eyes – but if we look behind the literary gloss we might argue that here are the introductions of new trends and choices. Archaeological finds can also show the development of these trends – purple was always a popular colour in antiquity and different -shades of it more fashionable at some times than others. The introduction of lighter weight and sheerer materials, particularly for female clothing is also commented on by moralizing and satirical authors but sculptures from the 2nd century BC seem to delight in showing layers of lighter weight materials, and where colour has been detected on such sculptures this seems to go hand in hand with more pastel shades.¹¹⁷ The sculptures may show off the artistic ability, of both the sculptors and the painters but they may equally represent dress as worn, or at least aspired to. Experimental research on dyes shows that shades are not difficult to attain and were not necessarily expensive and that many alternatives to the expensive murex purple were available.

Winding up

All of these questions are linked to each other and are best answered by open ended and multi-layered interpretations. To create a history of textiles and dress that engages with the cross-disciplinary dynamic it is essential to take an interdisciplinary approach. Collaborative working has produced some of the most interesting and provocative research on dress in antiquity, and even in single authored works the influence of diverse approaches is clear. To understand iconography one needs to identify garments, in so doing we can ask questions about production, origin and material – and then ask how a certain textile might drape or gather, how much it might weigh, or cost, or how it might enable or restrict movement. Reading about textile production and clothing in poetry or in papyri is greatly enhanced if we really understand the processes the authors are describing – we might better understand the nuances of the poetic uses of say, colour, the use of wool/silk, descriptions of spinning, Penelope at her loom and the like if we have a fuller understanding of the processes of production.

¹¹⁶ Cf. Ovid *Ars Amatoria*, 3. 263–74 and Harlow 2012.

¹¹⁷ Dillon 2010; Østergaard 2010b.

To really advance textile and dress studies in the classical period we need to focus on potential future perspectives as well as to engage fully with interdisciplinary approaches. We need to integrate textile research into other histories: of agriculture, of gender, of politics, of economy and consumption, of technology and mentalities. To highlight the tactile and sensory aspects of textiles and dress and be able to ask: how did it feel to wear a new garment, how did the sound of garments put across the idea of quality, how did clothing operate as it got worn, and eventually worn out. How did new wool smell, how did freshly washed or dyed clothes smell, and what was the scent of true purple or woad? All these questions require interdisciplinary approaches. The evidence dictates the questions as much as the questions guide what sources to use. Some sources are more relevant than others to answer certain questions; some sources are simply not able to answer some questions but may offer enhanced information or may address other tangential issues.

In many respects the novelist Iris Murdoch could have been thinking of textiles with the following statement:

“There are certain areas of scholarship, early Greek history is one and Roman law is another, where the scantiness of evidence sets a special challenge to the disciplined mind. It is a game with very few pieces, where the skill of the player lies in complicating the rules. The isolated and uneloquent fact must be exhibited within a tissue of hypothesis subtle enough to make it speak.”¹¹⁸

Acknowledgements

We thank our colleagues Ellen Harlizius-Klück, Peder Flemestad, Miguel-Angel Andrés-Toledo, Berit Hildebrandt, Cherine Munkholt and Giovanni Fanfani for their valuable comments and assistance.

¹¹⁸ Murdoch 1968, 165.

Bibliography

- Alfaro Giner, Carmen 1984 *Tejido y cestería en la Península Ibérica: historia de su técnica e industria desde la Prehistoria hasta la romanización*. Consejo Superior de Investigaciones Científicas, Instituto Español de Prehistoria.
- Alfaro Giner, Carmen, Wild, John Peter and Costa, Benjamí (eds) 2004 *Purpurae Vestes I: Textiles y Tintes del Mediterráneo en época romana*.
- Alfaro Giner, Carmen, Karali, Lilian (eds) 2008 *Purpurae Vestes II: Vestidos, Textiles y Tintes: Estudios sobre la producción de bienes de consumo en la Antigüedad*.
- Alfaro Giner, Carmen, Brun, Jean-Pierre, Borgard, Philippe and Pierobon Benoit, Rafaella 2011 *Purpurae Vestes I: Textiles y Tintes en la Ciudad Antigua*.
- Amouretti, Marie-Claire 1986 *Le Pain et l'huile dans la Grèce antique. De l'aire au moulin*.
- Amouretti, Marie-Claire 1994 L'agriculture de la Grèce antique. Bilan des recherches de la dernière décennie, *Topoi. Orient-Occident* 4, 69–94.
- Andersson Strand, Eva 2010 The basics of textile tools and textile technology: from fibre to fabric. In Cécile Michel and Marie-Louise Nosch, (eds), *Textile Terminologies in the Near East and Mediterranean from the Third to the First Millennia BC*, Ancient Textiles Series 8, 10–22.
- Andersson Strand, Eva 2012 The textile chaîne opératoire : using a multidisciplinary approach to textile archaeology with a focus on the Ancient Near East. *Paléorient* 38, 21–40.
- Andersson Strand, Eva, Margarita Frei, Karin, Gleba, Margarita, Mannering Ulla, Nosch, Marie-Louise and Skals, Irene 2009 Old textiles – new approaches, *European Journal of Archaeology* 13:2, 149–173.
- Andersson Strand, Eva, Mårtensson, Linda, Nosch, Marie-Louise, Rahmstorf, Lorenz 2008 New Research on Bronze Age Textile Production. *Bulletin of the Institute of Classical Studies* 51, 171–174.
- Andersson Strand, Eva and Nosch, Marie-Louise (eds) forthcoming *Tools, Textiles and Contexts*. Ancient Textiles Series.
- Andreau, Jean, Briant, Pierre and Descat, Raymond (eds) 1994 *Les échanges dans l'Antiquité: le rôle de l'Etat*. Entretiens d'archéologie et d'histoire 1.
- Andrés-Toledo, Miguel Ángel 2010 *El hilo de la vida y el lazo de la muerte en la tradición indoiraniana*.
- Barańscy, Agnieszka and Piotr and Janiszewski, Paweł 2007 Historia odkrywania i wprowadzenie do studiów nad edyktem (The History of Discovery and the Introduction to the Studies on the Edict). In *Edictum Diocletiani de pretiis rerum venalium*, 7–19.
- Barber, Elizabeth J. W. 1991 *Prehistoric Textiles: The development of Cloth in the Neolithic and Bronze Ages*.
- Barber, Elizabeth J. W. 1994 *Women's Work – the First 20,000 Years*.
- Bender Jørgensen, Lise 2000 The Mons Claudianus Textile Project. In Dominique Cardon and Michel Feugère (eds), *Archéologie des textiles des origines au V^e siècle: Actes du colloque de Lattes, Octobre 1999*, 253–263.
- Bender Jørgensen, Lise 2010 A brief history of the Northern European Symposium for Archaeological Textiles (NESAT). In Eva Andersson Strand, Margarita Gleba, Ulla Mannering, Cherine Munkholt and Maj Ringgaard (eds), *North European Symposium for Archaeological Textiles X*, xvii–xxii.
- Bender Jørgensen, Lise 2011 Clavi and non clavi: definitions of various textile bands in Roman textiles. In Carmen Alfaro, Jean-Pierre Brun, Philippe Borgard and Rafaella Pierobon Benoit (eds), *Purpurae Vestes III. Textiles y tintes en la ciudad Antigua*, 75–81.
- Bender Jørgensen, Lise and Wild, John Peter 1988 Clothes from the Roman Empire. Barbarians and Romans. In Lise Bender Jørgensen, Bente Magnus and Elisabeth Munksgaard (eds), *Archaeological Textiles. Report from the 2nd NESAT Symposium 1–4.V.1984*, 65–98.
- Bertolin, Reyes 2008 The mast and the loom: signifiers of separation and authority. *Phoenix* 62: 92–108.
- Bieber, Margarete 1928 *Griechische Kleidung*.
- Bieber, Margarete 1934 *Entwicklungsgeschichte der griechischen Tracht von der vorgriechischen Zeit bis zur römischen Kaiserzeit*.
- Blok, Josine H. 2012 Sumptuary legislation, Greece. *The Encyclopedia of Ancient History*.
- Blümner, Hugo 1912 Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern.
- Boesken Kanold, Inge and Haubrichs, Rolf 2008. Tyrian purple dyeing: an experimental approach with fresh Murex trunculus. In Carmen Alfaro and Lilian Karali, (eds) *Purpurae Vestes II*. 253–255 and DVD.

- Bogensperger, Ines 2014 The Multiple Functions and Lives of a Textile – the Reuse of a Garment. In Mary Harlow and Marie-Louise Nosch (eds) 2014.
- Borrego, Pilar and Vega, Carmen 2014 A new approach to the understanding of historic textiles. In Mary Harlow and Marie-Louise Nosch (eds) 2014.
- Bresson, Alain 2008 *L'économie de la Grèce des cités*, vol. II. Les espaces de l'échange.
- Brøns, Cecilie 2014 Representation and realities: Fibulas and pins in Greek and Near Eastern iconography. In Mary Harlow and Marie-Louise Nosch (eds) 2014.
- Brøns, Cecilie forthcoming *Gods and Garments: Textiles in Greek sanctuaries in the 1st Millennium BC*. Ancient Textiles Series.
- Brøns, Cecilie and Nosch, Marie-Louise (eds) forthcoming *Textiles and Cult in the Mediterranean Area in the First Millennium BCE*, Ancient Textiles Series.
- Burford, Alison 1972 *Craftsmen in Greek and Roman society*.
- Buschan, Georg 1889 Die Anfänge und Entwicklung der Weberei in der Vorzeit, *Verh. d. Berl. Gesellsch. f. Anthropol.*, 227–244.
- Cardon, Dominique 2010 Natural Dyes, Our Global Heritage of Colors. *Textile Society of America Symposium Proceedings*. Paper 12.
- Cardon, Dominique, Granger-Taylor, Hero and Nowik, Witold 2011 What did they look like? Fragments of clothing found at Didymoi: case studies. In Héléne Cuvigny (ed.), *Didymoi. Une garnison romaine dans le désert Oriental d'Égypte. 1. Les fouilles et le matériel*, 273–362.
- Carroll, Maureen and Wild, John Peter (eds) 2012 *Dressing the Dead in Classical Antiquity*.
- Chaniotis, Angelos 2005 *War in the Hellenistic World: A Social and Cultural History*.
- Clader, Linda Lee 1976 *Helen: the Evolution from Divine to Heroic in Greek Epic Tradition*.
- Clayton, Barbara 2004 *A Penelopean Poetics. Reweaving the Feminine in Homer's Odyssey*.
- Cleland, Liza 2005a The semiotics of description: some reflections on fabric and colour in the Brauron inventories. In Liza Cleland, Mary Harlow and Lloyd Llewellyn-Jones (eds), *The Clothed Body in Ancient World*, 87–95.
- Cleland, Liza 2005b *Clothing in the Brauron Inventories: Text, Analysis and Translation*.
- Cleland, Lisa, Davies, Glenys and Llewellyn-Jones, Lloyd 2007 *Greek and Roman Dress from A to Z*.
- Connelly, Joan B. 2007 *Portrait of a Priestess: Women and Ritual in Ancient Greece*.
- Coyon, Charles 1903 *Notes sur le filage et le tissage dans l'antiquité, d'après les découvertes faites à Reims et dans les environs*.
- Coward, Thomas forthcoming The robes of Alcman's and Pindar's parthenoi. In Giovanni Fanfani, Mary Harlow and Marie-Louise Nosch (eds).
- Damhus, Ture, Nielsen, Anita K. and Knudsen, Christian B. (eds) 2011 *Kemi & Klæ'r. Tekstilkemi i historisk perspektiv*, Dansk Selskab for Historisk Kemi.
- Daubenton, Louis-Jean-Georges 1795 *Extrait de l'instruction pour les bergers et les propriétaires de troupeaux*.
- Davies, Glenys 2005 What made the Roman toga virilis? In Liza Cleland, Mary Harlow and Lloyd Llewellyn-Jones (eds), *The Clothed Body in Ancient World*, 121–130.
- Davies, Glenys 2010 Togate Statues and Petrified Authors. In Dominic Berry and Andrew Erskine (eds), *Form and Function in Roman Oratory*, 51–72.
- Del Freo, Maurizio, Nosch, Marie-Louise and Rougemont, Françoise 2010 The Terminology of Textiles in the Linear B Tablets, including Some Considerations on Linear A Logograms and Abbreviations. In Cécile Michel and Marie-Louise Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, Ancient Textiles Series 8, 338–387.
- Demant, Ida 2009 Principles for reconstruction of costumes and archaeological textiles. In Carmen Alfaro, Michael Tellenbach and Rafael Ferrero (eds), *Textiles y Museología*, 143–153.
- Demant, Ida 2011 From stone to textile: constructing the costume of the Dama de Baza. *ATN* 52, 37–40.
- De Moor, Antoine 1993 *Coptic Textiles from Flemish Private Collections*.
- De Moor, Antoine, Verhecken-Lammen, Chris and Verhecken, André 2008 *3500 Years of Textile Art*.
- Dillon, Sheila 2010 *The Female Portrait Statue in the Greek World*.
- Dixon, Jessica 2014 Dressing the Adulteress. In Mary Harlow and Marie-Louise Nosch (eds), 2014.

- Droß-Krüpe, Kerstin 2011 *Wolle – Weber – Wirtschaft. Die Textilproduktion der römischen Kaiserzeit im Spiegel der papyrologischen Überlieferung*. Philippika 46.
- Droß-Krüpe, Kerstin 2012 Purchase orders of military garments from papyri of Roman Egypt. In Marie-Louise Nosch (ed.), *Wearing the Cloak: Dressing the Soldier in Roman Times*, Ancient Textiles Series 10, 13–18.
- Droß-Krüpe, Kerstin (ed.) 2014 *Textile Trade and Textile Distribution in antiquity. International conference at Marburg Universität, April 2013*. Philippika 73.
- Droß-Krüpe, Kerstin and Wagner, Yvonne 2014 Kleidung als Mitgift im kaiserzeitlichen Ägypten. Eine Bestandaufnahme. *Marburger Beiträge zur Antiken Handels-, Wirtschafts- und Sozialgeschichte* 31, 153–173.
- Droß-Krüpe, Kerstin and Paetz gen. Schieck, Annette 2014 Unravelling the tangled threads of ancient embroidery – a compilation of written sources and archaeologically preserved textiles. In Mary Harlow and Marie-Louise Nosch (eds).
- Dyck, Andrew R. 2001 Dressing to kill: attire as proof and means of characterization in Cicero's speeches. *Arethusa* 34.1, 119–130.
- Engelhardt Mathiassen, Tove, Nosch, Marie-Louise, Ringgaard, Maj, Toftegaard, Kirsten and Venborg Pedersen, Mikkel (eds) 2014 *Fashionable Encounters: Perspectives and Trends in Textile and Dress in the Early Modern*. Ancient Textiles Series 14.
- Fanfani, Giovanni, Harlow, Mary and Nosch, Marie-Louise (eds) forthcoming *Spinning Fates and the Song of the Loom: the use of textiles, clothing and cloth production as metaphor, symbol and narrative device in Greek and Latin literature*. Ancient Textiles Series.
- Finley, Moses 1973 *The Ancient Economy*.
- Finley, Moses (ed.) 1975 *Le Problème de la terre en Grèce ancienne*.
- Finley, Moses 1977 *The World of Odysseus*.
- Flohr, Miko 2013 *The World of the Fullo: Work, Economy and Society in Roman Italy*.
- Fluck, Cäcilia and Larsson Lovén, Lena (eds) forthcoming *Age and Gender in Roman Dress*.
- Forbes, Robert J. 1964 *Studies in Ancient Technology* vol. IV.
- Francotte, Henri 1900–1901 *L'industrie dans la Grèce ancienne*.
- Frayn, Joan 1984 *Sheep Rearing and the Wool Trade*.
- Fredricksmeyer, Ernst A. 1997 The Origin of Alexander's Royal Insignia. *Transactions of the American Philological Association* 127, 97–109.
- Frei, Karin Margarita, Frei, Robert, Mannering, Ulla, Gleba, Margarita, Nosch, Marie-Louise and Lyngstrøm, Henriette 2009 Provenance of ancient textiles – a pilot study evaluating the Sr isotope system in wool. *Archaeometry* 51.2, 252–276.
- Friedl, Ernestine 1962 *Vasilika: A village in modern Greece*.
- Friis Bengtsson, Camilla, Olsen, Maia E., Ørsted Brandt, Luise, Bertelsen, Mads F., Willerslev, Eske, Tobin, Desmond J., Wilson, Andrew S. and Gilbert, M. Thomas 2011 DNA from keratinous tissue. Part I: Hair and Nail. *Ann Anat.* Apr. 5, 17–25.
- Frisone, Flavia 2011 Construction of Consensus. Norms and Change in Greek Funerary Rituals. In Chaniotis, Angelos (ed.), *Ritual Dynamics in the Ancient Mediterranean: Agency, Emotion, Gender, Reception*, 179–201.
- Gabrielsen, Vincent 1994 *Financing the Athenian Fleet. Public Taxation and Social Relations*.
- Gallet, Bernard 1990 *Recherches sur κάρπος et l'ambiguïté dans la poésie de Pindare*.
- Garnsey, Peter and Whittaker, Charles R. 1983 *Trade and famine in classical antiquity*.
- Garnsey, Peter, Hopkins, Keith and Whittaker, Charles R. 1983 *Trade in the ancient economy*.
- Gasbarra, Valentina 2014 Textile Semitic Loanwords in Mycenaean as *Wanderwörter*. In Mary Harlow, Cécile Michel, and Marie-Louise Nosch (eds).
- Gehrke, Hans-Joachim 1986 *Jenseits von Athen und Sparta. Das Dritte Griechenland und seine Staatenwelt*.
- Gleba, Margarita 2008 *Textile Production in Pre-Roman Italy*. Ancient Textiles Series 4.
- Gleba, Margarita and Mannering, Ulla (eds) 2012 *Textiles and Textile Production in Europe from Prehistory to AD 400*. Ancient Textiles Series 11.
- Gleba, Margarita and Pászttókai-Szeöke, Judit (eds) 2013 *Making Textiles in Pre-Roman and Roman Times: People, Places, Identities*. Ancient Textiles Series 13.

- Glötz, Gustave 1920 *Le travail dans la Grèce ancienne*.
- Goette, Hans Rupprecht 1989 *Studien zu römischen Togadarstellungen*.
- Good, Irene 2001 Archaeological textiles: a review of current research. *Annual Review of Anthropology* 30, 209–226.
- Granger Taylor, Hero 1982 Weaving Clothes to Shape in the Ancient World: the Tunic and the Toga of the Arringatore. *Textile History* 13, 3–25.
- Grömer, Karina 2009 Reconstruction of pre-Roman dress in Austria: a basis for identity in the Roman province of Noricum. In Carmen Alfaro, Michael Tellenbach and Rafael Ferrero (eds), *Textiles y Museología*, 155–165.
- Grömer, Karina, Rösel-Mautendorfer, Helga and Bender Jørgensen, Lise 2013 Visions of Dress: Recreating Bronze Age Clothing from the Danubian Region. *Textile. The Journal of Cloth and Culture* 11, 218–241.
- Grömer, Karina 2014 *Römische Textilien in Noricum und Westpannonien im Kontext der archäologischen Gewebefunde 2000 v. Chr. – 500 n. Chr. in Österreich*. With contributions by Annette Paetz gen. Schieck, Eva Steigberger and Kordula Gostenčnik. *Austria Antiqua* 4.
- Grothe, Hermann 1883 *Die Construction der Webstühle, die Fachbildung und die Eintraggeräte beim Weben im Altertum*, Verhandlungen des Vereins zur Beförderung des Gewerbefleißes.
- Grothe, Hermann 1885 Die Geschichte der Wolle und Wollenmanufaktur im Altertum. *Deutschen Vierteljahrsschrift* IV, 259–304.
- Hald, Margrete 1946 *Ancient textile techniques in Egypt and Scandinavia: a Comparative Study*.
- Harich-Schwarzbauer, Henriette (ed.) forthcoming *Weben und Gewebe in der Antike. Materialität – Repräsentation – Episteme – Metapoetik*. Ancient Textiles Series.
- Harlizius-Klück, Ellen 2004 *Weberei als episteme und die Genese der deduktiven Mathematik: in vier Umschweiften entwickelt aus Platons Dialog*.
- Harlizius-Klück, Ellen 2005 *Saum and Zeit: ein Wörter-und-Sachen-Buch in 496 lexikalischen Abschnitten angezettelt von Ellen Harlizius-Klück*.
- Harlizius-Klück, Ellen 2009 Verbinden, Verknüpfen, Verstricken. Textile Metaphern in den Wissenschaften. In Christina von Braun, Dorothea Dornhof and Eva Johach (eds), *Das Unbewusste. Krisis und Kapital der Wissenschaften. Studien zum Verhältnis von Wissen und Geschlecht*, 196–209.
- Harlizius-Klück, Ellen 2014 The importance of beginnings: Gender and Reproduction in Mathematics and Weaving. In Mary Harlow and Marie-Louise Nosch (eds).
- Harlow, Mary 2004a Female Dress 3rd–6th Century: the Message in the Media. *Antiquité Tardive* 12, 203–216.
- Harlow, Mary 2004b Clothes maketh man: power dressing and the elite male in the later Roman world. In Leslie Brubaker and Julia Smith (eds), *Gender in the Early Medieval World*, 44–69.
- Harlow, Mary 2005 Dress in historical narrative: the case of the *Historia Augusta*. In Liza Cleland, Mary Harlow and Lloyd Llewellyn-Jones (eds), *The Clothed Body in Ancient World*, 143–153.
- Harlow, Mary 2012 Dressing to Please Themselves: Clothing Choices for Roman Women. In Mary Harlow (ed.), *Dress and Identity*, 37–46.
- Harlow, Mary 2015 Palla, Pallu, Chador: Draped clothing in ancient and modern cultures. In Marie-Louise Nosch, Zhao Feng and Lotika Varadarajan (eds), *Global Textile Encounters*. Ancient Textiles Series 20.
- Harlow, Mary forthcoming *Key Themes in Roman Dress*.
- Harlow, Mary and Nosch, Marie-Louise (eds) 2014 *Greek and Roman Textiles and Dress: An Interdisciplinary Anthology*. Ancient Textiles Series 19.
- Harlow, Mary, Michel, Cécile and Nosch, Marie-Louise (eds) 2014 *Prehistoric, Ancient Near Eastern and Aegean Textiles and Dress: An Interdisciplinary Anthology*. Ancient Textiles Series 18.
- Hayward, Maria 2009 *Rich Apparel: Clothing and the Law in Henry VIII's England*.
- Heer, Oswald 1872 Über den Flachs und die Flachskultur im Altertum. Eine kulturhistorische Skizze, *Neujahrsblatt der naturforschenden Gesellschaft Zürich* 74, 1–26.
- Hendzsel, Ilona, Istvánovits, Eszter, Kulcsár, Valéria, Ligeti, Dorottya, Óvari, Andrea and Pásztókai-Szeőke, Judit 2008 On the Borders of East and West: A Reconstruction of Roman Provincial and Barbarian Dress in the Hungarian National Museum. In Margarita Gleba, Cherine Munkholt and Marie-Louise Nosch (eds), *Dressing the Past*. Ancient Textiles Series 3, 29–42.
- Hersch, Karen 2010 *The Roman Wedding: Ritual and Meaning in Antiquity*.

- Heskel, Julia 1994 Cicero as evidence for attitudes to dress in the late Republic. In Judith Sebesta and Larissa Bonfante (eds), *The World of Roman Costume*, 133–145.
- Heuzey, Léon 1922 *Histoire du costume dans l'antiquité classique d'après des études sur le modèle vivant*.
- Hildebrandt, Berit 2009 Seide als Prestigeobjekt in der Antike. In Berit Hildebrandt and Caroline Veit (eds), *Der Wert der Dinge. Güter im Prestigediskurs*, Münchner Studien zur Alten Welt 6, 175–231.
- Hildebrandt, Berit 2012 Der Römer neue Kleider. Zur Einführung von Seide im kaiserzeitlichen Rom. In Gustav Adolf Lehmann, Dorit Engster and Alexander Nuss (eds), *Von der bronzezeitlichen Geschichte zur modernen Antikenrezeption. Vorträge aus dem Sommersemester 2008 und Wintersemester 2008/09*. Syngamma. Vorträge aus dem Althistorischen Seminar Bd. 1, 11–53.
- Hildebrandt, Berit (ed.) forthcoming *Exchange along the Silk Roads between Rome and China in Antiquity: The Silk Trade. Proceedings of a Volkswagen Fellows Symposium, Mahindra Humanities Center Harvard, 20.04.–21.04.2012*, Ancient Textile Series.
- Hoffmann, Marta 1964 *The Warp-Weighted Loom: Studies in the History and Technology of an Ancient Implement*.
- Hopkins, Heather, 2011 Using experimental archaeology to answer the 'unanswerable'. A case study using Roman dyeing. In Klaus Stauber (ed.), *Reconstructions: Recreating Science and Technology of the Past*, 21–49.
- Hopkins, Heather (ed.) 2013 *Ancient Textiles Modern Science*.
- Hopper, Robert J. 1979 *Trade and Industry in Classical Greece*.
- Hughes, Clair 2005 *Dressed in Fiction*.
- Isager, Signe and Skydsgaard, Jens Erik 1995 *Ancient Greek Agriculture: An Introduction*.
- James, Simon 1999 The community of soldiers: a major identity and centre of power in the Roman empire. In Patricia Baker, Colin Forcey, Sophia Jundi and Robert Witcher (eds), *TRAC 98. Proceedings of the eighth Annual Theoretical Archaeology Conference, Leicester, 1998*, 14–25.
- James, Simon 2004. *Excavations at Dura-Europos 1928–1937, Final Report VII: The Arms and Armour and other Military Equipment*.
- Jenkins, Ian D. 1985 The Ambiguity of Greek Textiles, *Arethusa* 18, 109–132.
- Johl, Carl Hermann 1917 *Die Webestühle der Griechen und Römer: technologisch-terminologische Studie*.
- Jones, Arnold Hugh Martin 1960–61 The Cloth Industry under the Roman Empire, *Economic History Review* XIII, 183–192.
- Jones, Robert 2009 Centaurs on the Silk Road: Recent Discoveries of Hellenistic Textiles in Western China. *The Silk Road*, 6.2, 23–32.
- Kahil, Lilian 1963 Quelques vases du sanctuaire d'Artémis à Brauron. *Neue Ausgrabungen in Griechenland* (AK suppl. 1), 5–29.
- Kahil, Lilian 1965 Autour de l'Artémis attique. *AK* 8, 20–33.
- Kahil, Lilian 1977 L'Artémis de Brauron: Rites et mystère. *AK* 20, 86–98.
- Kahil, Lilian 1981 Le 'cratéristique' d'Artémis et le Brauronion de l'Acropole. *Hesperia* 50, 253–263.
- Kahil, Lilian 1988 Le sanctuaire de Brauron et la religion grecque. *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres*, 132e année, N. 4, 799–813.
- Kahil, Lilian 1990 Le relief des dieux du sanctuaire d'Artémis à Brauron. Essai d'interprétation. In Jean-Paul Descœudres (ed.), *Eumousia: Ceramic and Iconographic Studies in Honour of Alexander Cambitoglou*, Sydney, Mediterranean Archaeology, suppl. 1, 113–117.
- Kaczmarek, Zofia 2014 Roman Textiles and Barbarians – Some Observations on Textile Exchange between the Roman Empire and *Barbaricum*. In Mary Harlow and Marie-Louise Nosch (eds).
- Kelley McLauchlin, Barbara 1981 New Evidence of the Mechanics of Loom Weights. *AJA* 85, 79–81.
- Kingsley, Bonnie M. 1984 The Kausia Diadematophoros. *AJA* 88:1, 66–68.
- Klepp, Ingun G. and Bjerck, Mari 2012 A methodological approach to the materiality of clothing: wardrobe studies. *International Journal of Social Research Methodology*, <http://dx.doi.org/10.1080/13645579.2012.737148> (accessed July 2013).
- Knorringa, Heiman 1926 *EMPOROS. Data on trade and trader in Greek literature from Homer to Aristotle*.
- Koch, Theodor (ed.) 1880–1888 *Comitorum Atticorum Fragmenta*. Vol. I–III.
- Koortbojian, Michael 2008 The double identity of Roman portrait sculptures: costumes and their symbolism at Rome. In Jonathan Edmonds and Alison Keith (eds), *Roman Dress and the Fabrics of Roman Culture*, 71–93.

- La Baume, Wolfgang 1955 *Die Entwicklung des Textilhandwerks in Alteuropa*.
- La Follette, Laetitia 1994 The costume of the Roman bride. *The World of Roman Costume*, 54–64.
- Landens, John Gray 1978 *Engineering in the Ancient World*.
- Landenius Enegren, Hedvig and Meo, Francesco (eds) forthcoming *Treasures from the Sea. Sea-silk and Shell purple dye in antiquity. International Workshop in Lecce, Italy, May 2013*. Ancient Textiles Series.
- Larsson Lovén, Lena 1998a Male and female professions in the textile production of Roman Italy. *NESAT VI*, 73–78.
- Larsson Lovén, Lena 1998b *LANAM FECIT* – woolworking and female virtue. In Lena Larsson Lovén and Agneta Strömberg (eds), *Aspects of Women in Antiquity. Proceedings of the First Nordic Symposium on Women's Lives in Antiquity*, 85–95.
- Larsson Lovén, Lena 2000 Representations of textile production in Gallo-Roman funerary art. In Dominique Cardon and Michel Feugère (eds), *Archéologie des textiles des origines au V^e siècle: Actes du colloque de Lattes, Octobre 1999*, 235–240.
- Larsson Lovén, Lena 2002 *The Imagery of Textile Making. Gender and Status in the Funerary Iconography of Textile Manufacture in Roman Italy and Gaul*.
- Larsson Lovén, Lena 2014 Roman art – what can it tell us about dress and textiles? A discussion on the use of visual evidence as sources for textile research. In Mary Harlow and Marie-Louise Nosch (eds).
- Lawall, Mark L. 2011 Transport amphoras and regional styles in the Classical Aegean. In Mark Lawall and Peter van Alfen (eds), *Caveat Emptor: A Collection of Papers on Imitations in Ancient Greco-Roman Commerce. Marburger Beiträge zur Antiken Handels-, Wirtschafts- und Sozialgeschichte* 28, 45–88.
- Leveau, Philippe (ed.) 1985 *L'origine des richesses dépensées dans la ville antique. Actes du colloque organisé à Aix-en-Provence par l'UER d'histoire, les 11 et 12 Mai 1984*.
- Linders, Tullia 1972 *Studies in the Treasure records of Artemis Brauronia found in Athens*. Acta Instituti Atheniensis Regni Sueciae, 4, xix.
- Ling Roth, Henry 1951 *Ancient Egyptian and Greek Looms*.
- Liu, Jinyu 2009 *Collegia centonariorum: The Guilds of textile dealers in the Roman West*.
- Liu, Jinyu 2012 Clothing supply for the military. A look at inscriptional evidence. In Marie-Louise Nosch (ed.), 19–28.
- Losfeld, Georges 1999, *L'art grec et la draperie pure*.
- Lyons, Deborah 2003 Dangerous Gifts: Ideologies of Marriage and Exchange in Ancient Greece, *Classical Antiquity* 22, 93–134.
- Maeder, Felicitas 2008 Sea-silk in Aquinum: first production proof in antiquity. In Carmen Alfaro and Lilian Karali (eds) *Vestidos, Textiles y Tintes. Purpurae Vestes II*, 109–118.
- Maeder, Felicitas, Hänggi, Ambros and Wunderlin, Dominik (eds) 2004. *Bisso marino: Fili d'oro dal fondo del mare – Muschelseide: Goldene Fäden vom Meeresgrund*. Naturhistorisches Museum and Museum der Kulturen, Basel, Switzerland.
- Maik, Jerzy 1994 The New Textile Finds from Palmyra. *Archaeological Textiles Newsletter* 18–19, 11–13.
- Maik, Jerzy 2001 Recent Textile Finds of the Roman Period in Poland. In Penelope Walton Rogers, Lise Bender Jørgensen and Antoinette Rast-Eicher (eds), *The Roman Textile Industry and Its Influence. A Birthday Tribute to John Peter Wild*, 105–112.
- Maik, Jerzy 2007 Tkaniny z pomorskich cmentarzysk kultury wielbarskiej w świetle najnowszych badań (Textiles from Cemeteries of Wielbark Culture in Pomerania in the light of the newest research). In Mirosław Fudziński and Henryk Paner (eds), *Nowe materiały i interpretacje. Stan dyskusji na temat kultury wielbarskiej*, 97–108.
- Mannering, Ulla 2000 Roman garments from Mons Claudianus. In Dominique Cardon and Michel Feugère (eds), *Archéologie des textiles des origines au V^e siècle: Actes du colloque de Lattes, Octobre 1999*, 283–290.
- Mannering, Ulla 2006 Questions and answers on textiles and their find spots: the Mons Claudianus textile project. In Sabine Schrenk (ed.), *Textiles in Situ. Their Find Spots in Egypt and Neighbouring Countries in the First Millennium CE*. Riggisberger Berichte 13, 149–160.
- Margariti, Christina, Protopapas, Stavros and Orphanou, Vassiliki 2011 Recent analyses of the excavated textile find from Grave 35 HTR73, Kerameikos cemetery, Athens, Greece. *Journal of Archaeological Science* 38: 3, 522–527.
- Margariti, Christina and Kinti, Maria 2014 The conservation of a 5th century excavated textile find from the Kerameikos Cemetery in Athens. In Mary Harlow and Marie-Louise Nosch (eds).

- Martelli, Matteo 2014 Colourful Garments, Recipes and Dyeing Techniques in Graeco-Roman Egypt. In Mary Harlow and Marie-Louise Nosch (eds).
- McCorriston, Joy 1997 The Fiber Revolution. *Current Anthropology* 38:4, 517–549.
- McEwen, Indra K. 1993 *Socrates' Ancestor. An Essay on Architectural beginnings*.
- McGovern, Patrick and Michel, Rudolph H. 1987 The Chemical Processing of Royal Purple Dye: Ancient Descriptions as Elucidated by Modern Science. *Archeomaterials* 1, 135–143.
- McGovern, Patrick and Michel, Rudolph H. 1990 The Chemical Processing of Royal Purple Dye: Ancient Descriptions as Elucidated by Modern Science. *Archeomaterials* 4, 97–104.
- Michel, Cécile and Nosch, Marie-Louise 2010 Textile Terminologies. In Cécile Michel and Marie-Louise Nosch (eds), *Textile Terminologies in the Ancient Near East and Mediterranean from the Third to the First Millennia BC*, Ancient Textiles Series 8, ix–xix.
- Michel, Cécile and Breniquet, Catherine (eds) 2014 *Wool Economy in the Ancient Near East and the Aegean: From the Beginnings of Sheep Husbandry to Institutional Textile Industry*. Ancient Textiles Series 17.
- Miller, Margaret C. 1997 *Athens and Persia in the Fifth Century BC: A Study in Cultural Receptivity*.
- Miller, Heather Margaret-Louise 2007 *Archaeological Approaches to Technology*.
- Molinier-Arbo, Agnès 2003 'Imperium in virtute esse non in decore': le discours sur la costume dans l'*Histoire Auguste*. In François Chausson and Hervé Inglebert (eds), *Costume et société dans l'Antiquité et le haut Moyen Age*, 67–84.
- Möller-Wiering, Susan 2011 *War and Worship: Textiles from 3rd to 4th-century AD Weapon Deposits in Denmark and Northern Germany*, Ancient Textiles Series 9.
- Mongez, Antoine 1818 *Recherches sur les habillements des anciens*. Mém. de l'Inst. royal de France. Classe d'hist. Tome IV.
- Morley, Neville 2007 *Trade in Classical Antiquity*.
- Murdoch, Iris 1968 *The Nice and the Good*.
- Neils, Jennifer 2009 Textile Dedications to female deities: the case of the peplos. *Kernos Suppl.* 23, 135–148.
- Neuffer, Eduard 1929 *Das Kostüm Alexanders des Grossen*.
- Nosch, Marie-Louise (ed.) 2012 *Wearing the Cloak: Dressing the Soldier in Roman Times*. Ancient Textiles Series 10.
- Nosch, Marie-Louise 2014a Voicing the Loom: Women, Weaving, and Plotting. In Dimitri Nakassis, Joan Gulizio and Sarah A James (eds), *KE-RA-ME-JA: Studies presented to Cynthia Shelmerdine*, 91–101.
- Nosch, Marie Louise 2014b Linen Textiles and Flax in Classical Greece: provenance and trade. In Kerstin Droß-Krüpe (ed.), 17–42.
- Nosch, Marie Louise 2014c The Wool Economy in Greece in the end of the II Millennium BCE. In Cécile Michel and Catherine Breniquet (eds), *Wool Economy in the Ancient Near East and the Aegean: From the Beginnings of Sheep Husbandry to Institutional Textile Industry*. Ancient Textiles Series 17, 366–395.
- Nosch, Marie Louise forthcoming a: The Wool Age: Textile Traditions and Textile innovations. In Florian Ruppenstein and Jörg Weilhartner (eds), *Tradition and Innovation in the Mycenaean Palatial Politics*. Veröffentlichungen der Abteilung für Ägäische und Mykenische Forschungen, Österreichische Akademie der Wissenschaften, Philosophisch-historische Klasse, Denkschriften, Academy of Sciences, Wien.
- Nosch, Marie Louise forthcoming b: The Loom and the Ship in ancient Greece. Shared knowledge, shared terminology, cross-crafts, or cognitive maritime-textile archaeology? In Henriette Harich-Schwarzbauer (ed.).
- Ørsted Brandt, Luise, Tranekjer, Lena Diana, Mannering, Ulla, Ringgaard, Maj, Frei, Karin Margarita, Willerslev, Eske, Gleba, Margarita and Gilbert, M. Thomas P. 2011 Characterising the potential of sheep wool for ancient DNA analyses. *Archaeological and Anthropological Sciences* 3, 209–221.
- Osborne, Robin 1996 Pots, trade and the archaic Greek economy, *Antiquity* 70, 31–44.
- Østergaard, Jan Stubbe (ed.) 2010a *Tracking Colour: The Polychromy of Greek and Roman Sculpture in the Ny Carlsberg Glyptotek. Preliminary Report 2*. http://www.glyptoteket.dk/sites/default/files/tracking-colour_report02_2010.pdf.
- Østergaard, Jan Stubbe 2010b The Polychromy of Antique Sculpture: A Challenge to Western Ideals. In Vinzenz Brinkmann, Oliver Primavesi and Max Hollein (eds), *Circumlitio. The Polychromy of Antique and Mediaeval Sculpture*, 78–107.
- Østergaard, Jan Stubbe 2011 The Copenhagen Polychromy Network: aims, organization and activities. *Medelhavsmuseet. Focus on the Mediterranean* 6, 23–30.

- Papadopoulou, Maria forthcoming Designing a *chlamys* or how to make the plans for a city: the foundation myth of Alexandria in Egypt. In Giovanni Fanfani, Mary Harlow, Marie-Louise Nosch (eds).
- Parkins, Helen 1998 Time for a Change? Shaping the future of the ancient economy. In Helen Parkins and Christopher Smith (eds) *Trade, Traders and the Ancient City*, 1–15.
- Peinado Laura Rodríguez, Cabrera Lafuente, Ana, Parra Crego, Enrique and Turell Coll, Luis 2014 Discovering Late Antique Textiles in the Public Collection in Spain: An Interdisciplinary Research Project. In Mary Harlow and Marie-Louise Nosch (eds).
- Peppas-Delmousou, Dina 1988 Autour des inventaires de Brauron. In Denis Knoepfler and Nicole Quellet (eds), *Comptes et inventaires dans la cité grecque: Actes du colloque international d'épigraphie en l'honneur de J. Tréheux*, 329–346.
- Picard-Schmitter, Marie-Thérèse 1965 Recherches sur les métiers à tisser antiques: à propos de la frise du Forum de Nerva, à Rome. *Latomus* 24, 296–321.
- Prag, John N. W., Snodgrass, Anthony M. and Tsetschkladze, Gocha R. (eds) 2000 *PERIPLOUS. Papers on Classical Art and Archaeology presented to Sir John Boardman*.
- Raaflaub, Kurt A. and Rosenstein, Nathan (eds) 1999 *War and Society in the Ancient and Medieval Worlds. Asia, the Mediterranean, Europe, and Mesoamerica*.
- Repond, Jules 1931 *Les secrets de la draperie antique. De l'himation grec au pallium romain*. Rome, Pontificio Istituto di archeologia cristiana.
- Rich, John and Shipley, Graham 1993 *War and Society in the Greek World*.
- Rich, John and Shipley, Graham 1995 *War and Society in the Roman World*.
- Richter, Will 1968 *Die Landwirtschaft im homerischen Zeitalter*. *Archaeologia Homerica* II, H. Göttingen.
- Riegl, Alois 1893 Der antike Webstuhl, *Mitteilungen des K. K. österr. Museums f. Kunst und Industrie* VIII, 290–303.
- Robson, James 2005 New clothes, a new you: clothing and character in Aristophanes. In Liza Cleland, Mary Harlow and Lloyd Llewellyn-Jones (eds), *The Clothed Body in Ancient World*, 65–74.
- Roebuk, Carl 1969 *The Muses at Work*.
- Rothe, Ursula. 2009 *Dress and Cultural Identity in the Rhine-Moselle Region of the Roman Empire*.
- Rudy, Kathryn M. and Baert, Barbara (eds) 2007 *Weaving, Veiling, and Dressing. Textiles and their Metaphors in the Late Middle Ages*.
- Saatsoglou-Paliadeli, Chryssoula 1993 Aspects of Ancient Macedonian Costume. *Journal of Hellenic Studies* 113, 122–147.
- Salles, Catherine 2003 Le costume satirique dans la poésie satirique latine. In François Chausson and Hervé Inglebert (eds), *Costume et Société dans L'Antiquité et le haut Moyen Age*, 57–66.
- Scheid, John and Svenbro, Jesper 1996 *The Craft of Zeus. Myths of Weaving and Fabric*.
- Schrader, Otto 1886 Zur Terminologie des Spinnens und Webens in den indogermanischen Sprachen, *Linguist.-histor. Forschungen zur Handelsgesch. und Warenkunde*.
- Schröder, Otto 1884 Zu den Webstühlen der Alten, *Arch. Zeitung* 42, 169–180.
- Seland, Eivind 2014 Caravans, smugglers and trading fairs: organizing textile trade on the Syrian border. In Kerstin Droß-Krüpe (ed.), 83–90.
- Sigismund-Nielsen, Hanne 2011 (unpublished) Roman Wool Work.
- Skovmøller, Amalie 2014 Where marble meets colour. Surface texturing of hair, skin and dress on Roman marble portraits as support for painted polychromy. In Mary Harlow and Marie-Louise Nosch (eds).
- Spantidaki, Stella 2014 Embellishment Techniques of the Classical Greek Textiles. In Mary Harlow and Marie-Louise Nosch (eds).
- Staubermann, Klaus 2011 *Reconstructions. Recreating Science and Technology of the Past*.
- Stauffer, Annemarie 1996 Textiles from Palmyra: local production and the import and imitation of Chinese silk weavings. In *Palmyra and the Silk Road: Special Issue Documenting the Activities of the International Colloquium (Damascus, 1996)*. *Les Annales archéologiques Arabes Syriennes: Revue d'Archéologie et d'Histoire* 42, 425–430.
- Sumner, Graham 2009 *Roman Military Dress*.
- Swalec, Jennifer forthcoming Weaving for the people not a *peplos*, but a *chlaina*: woolworking, peace, and nuptial sex in Aristophanes' *Lysistrata*. In Giovanni Fanfani, Mary Harlow and Marie-Louise Nosch (eds).