

EXPERIENCE AND EXPERIMENT IN EARLY MODERN EUROPE
An NEH Summer Institute for College Teachers
Directed by Pamela H. Smith and Pamela O. Long
25 June to 3 August 2001

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Some of the most basic assumptions about the nature of the world and our means of experiencing it changed fundamentally in the early modern period. This institute's study is shaped by the most crucial result: a transformation of natural philosophy grounded in Aristotelian common experience—or experience everyone would agree upon without need for investigation—into an experimental philosophy based on a central role for instrumentation and specialized material techniques used in the validation of knowledge claims.

But because experience remains such a touchstone of knowledge in our modern world, we readily believe that it is a stable and transhistorical—indeed a universal—phenomena: an empathetic way back into the mindsets of the past. This institute seeks first to trouble those easy assumptions about the nature of experience and then to open up a wide ranging and carefully nuanced investigation of different strands and shifting understandings of experience in the early modern period. These understandings include a new orientation towards experimentalism in the seventeenth century. The institute will gather historians of science, cultural historians, art historians, philosophers, anthropologists, sociologists, literary critics, and historians of technology for this work. It will draw upon and consolidate some of the exciting research that is currently being done in each of these disciplines (by our contributors among others). With cross-, inter-, and counter-disciplinary conversations, it will undertake a comparative investigation of key issues and texts that inform our understandings of the transformations of experience and the uses of experimentation in diverse fields. It will analyze at what points and in what ways experiment comes to function as proof in a wide variety of local circumstances. As a result, it will help reshape a common body of knowledge about the radical change in the nature of experience in the early modern period, a change that traditionally has been signaled by the term “scientific revolution.”

Directors

Professors Pamela H. Smith and Pamela O. Long will codirect “Experience and Experiment in Early Modern Europe.” Smith is an Associate Professor in the Department of History at Pomona College, Claremont and Director of European Studies at Claremont Graduate University. Her first book, *The Business of Alchemy: Science and Culture in the Holy Roman Empire* (Princeton University Press, 1994), won the History of Science Society's 1995 Pfizer Prize for the most outstanding book published that year.

Pamela O. Long is a senior research fellow at the Dibner Institute at the Massachusetts Institute of Technology. Her book, *Openness, Secrecy, Authorship: Technical Arts and the Culture of Knowledge from Antiquity to the Renaissance*, is forthcoming from The Johns Hopkins University Press. The Society for the History of Technology awarded the Abbott Payson Usher Prize to her 1991 article “The Openness of Knowledge: An Ideal and its Context in Sixteenth-Century Writings on Mining and Metallurgy.”

Proposed Schedule and Faculty

The principal focus of the institute's meetings will be on selected primary texts of the period, read in such a way as to highlight the multiple conversations and contexts into which they were written. Participants will be encouraged to raise issues of audience, transmission, translation, and the nature of evidence—the foundations of the symbolic actions texts perform in their social settings. Participants will be further encouraged to explore the collections in the mornings and to make those explorations the bases of their own presentations to the group.

The institute will meet Monday through Thursday afternoons (with the exception of the week of 4 July). The average week will feature discussion with directors, faculty, and participants taking the lead at various times. Participants will also work collaboratively to incorporate new technologies into their own teaching. On a weekly basis, they will explore a range of digital resources, discussing how to structure assignments and how to provide students with strategies to make the best use of such resources. They will compile and evaluate a cumulative list of websites that offer texts and images of primary sources. They will also collectively assemble and annotate a set of images of primary sources that they have consulted at the Folger Library. Together with the institute's syllabus and bibliographies, these will be the components of a multifaceted web posting.

Week 1 (25—29 June)

The Textures of Experience

Visiting Faculty: **John Sutton** (Lecturer of Philosophy, Macquarie University, NSW, Australia)

Week 2 (2—6 July)

Vernacular Epistemologies

Visiting Faculty: **Mary Fissell**, Associate Professor of the History of Science, Medicine, and Technology at the Johns Hopkins University, and **Gail Kern Paster**, Professor of English at George Washington University

Week 3 (9—13 July)

Mechanical Arts, Natural Philosophy, and Visual Representation

Visiting Faculty: **David Summers**, William R. Kenan, Jr. Professor of the History of Art at the University of Virginia

Week 4 (16—20 July)

Disciplining Experience

Visiting Faculty: **Chandra Mukerji** (Professor of Communications, Sociology, and Science Studies at the University of California, San Diego) and **Jim Bennett** (Keeper of the Museum of the History of Science in Oxford)

Week 5 (23—27 July)

Objects of Art/Objects of Nature

Visiting Faculty: **Paula Findlen** (Director of the Science, Technology and Society Program, and Professor of History at Stanford University)

Week 6 (30 July—3 August)

Experience and Experiment in the Scientific Revolution

Visiting Faculty: **Peter Dear** (Professor of History and of Science & Technology Studies at Cornell University) and **Adrian Johns** (Professor of Sociology at the California Institute of Technology)

Faculty and Weekly Schedule

Week 1 (25—29 June): The Textures of Experience

Visiting Faculty: **John Sutton** (Lecturer of Philosophy, Macquarie University, NSW, Australia)

In the first week, we will introduce a range of different kinds of experience and the formative impact on them of various knowledge traditions. We will ask how the conceptualization of experience is related to human perception, reason, and the acquisition of knowledge. We begin with close readings of texts that give us a basis for understanding both traditional concepts of human experience and the revisions of those concepts that the institute will investigate in ensuing weeks. With these readings, we establish a framework of select models for further development and analysis. We will read Aristotle's *De Anima (On the Soul)* in which the powers of the soul are described, including the place of the senses and of thinking, and the relationships between them. We will read several shorter works from Aristotle's *Parva Naturalis*, including his *Sense and Sensibilia* and *On Dreams*. We then move to several specific contexts of knowledge and experience in the fifteenth century, reading parts of *The Commentaries of Aeneas Sylvius Piccolomini*, della Porta's *Natural Magic*, and Ficino's *De Vita*, considering the relationship of body, soul, and experience. Such texts shed light on views of the human psyche and the ways in which nature is experienced. The secondary sources for the week will help us formulate generative questions. For instance, we will consult the influential work of Lorraine Daston and Katharine Park on attitudes of wonder toward phenomena in the world and the changes in such attitudes over time. Are things in nature perceived as marvellous or as instances of order and regularity? Finally, we will read Descartes' *Treatise on Man*. John Sutton, who will be this week's visitor, has extensively investigated the relationship of philosophy to structures of cognition, especially in Descartes. He will help the seminar link issues of the senses and the organic soul with the history of physiological psychology as he explores the ways views of the natural world are affected by such structures.

Week 2 (2—6 July): Vernacular Epistemologies

Visiting Faculty: **Mary Fissell**, Associate Professor of the History of Science, Medicine, and Technology at the Johns Hopkins University, and **Gail Kern Paster**, Professor of English at George Washington University

Here we consider the ways in which everyday experience was conceived by ordinary kinds of people, including millers, artisans, and other non-elites. We will also look at the representations of that experience in drama on the English stage. Our readings will include such texts as Ginzburg's *The Cheese and the Worms*, which concerns the heresy trial of Menocchio, a miller, together with the actual documents of his trial. We will also study the world of the artisan as described in the goldsmith Benvenuto Cellini's *Autobiography*. A medical treatise of Paracelsus's offers an opportunity to understand the ways in which this immensely interesting figure related experience and healing. We will consider Professor Smith's argument that Paracelsus articulated an "artisanal science of matter," and that by reading his texts alongside artisanal objects and treatises, we gain insight not only into this science of matter, but into what Mary Fissell calls a vernacular epistemology, in which nature and experience are primary, knowledge is active; knowing is doing, and matter is alive. With Professor Gail Kern Paster, we will turn to other views of the experience of the body, including bodies understood as operating on principles of Galenic humoralism and the resulting subjective experience of being-in-the-body. Our investigations of bodily experiences will include Francis Bacon's *Sylva Sylvarum* and at least one of plays such as *The Alchemist*, *The Family of Love*, or *The Wise-woman of Hogsdon*. Finally we will look at *Aristotle's Masterpiece*, and other popular health texts that were printed in

numerous editions and forms in the seventeenth and eighteenth centuries and which were significantly directed toward women. These diverse sources serve as a basis for a comparative consideration of the vernacular epistemologies under investigation. Participants will look particularly at the ways in which lay people experienced their own bodies and the ways in which female bodies, in particular, were constructed by women as well as men. These diverse sources allow us to move from artisanal contexts to issues of popular health and healing. With their extensive studies of primary source materials, Professors Fissell and Paster will significantly expand the scope of materials of investigation beyond the canonical texts and traditions treated in the first week.

Week 3 (9—13 July): Mechanical Arts, Natural Philosophy, and Visual Representation
Visiting Faculty: **David Summers**, William R. Kenan, Jr. Professor of the History of Art at the University of Virginia

This week we focus on one particular sensory experience, vision, to examine the complex and resonant cultural revisions of vision in the fifteenth and sixteenth centuries. We will ask about the changing status of visual representation and the mechanical arts. Recent scholarship in the histories of astronomy, art, and anatomy has produced fascinating new insights. David Summers, who has extensively investigated sixteenth-century art theory and the relationships between vision and judgement, will join the group for this week. With him, participants will compare recent research in these diverse fields. A study of optics and artists' perspective will involve us in a consideration of the fundamentally significant changes in the role of visual representation in this era. Painting was considered a "mechanical art" at the beginning of the fifteenth century while at the end of the period it had become in some quarters a higher status liberal art, partly as a result of writings such as Alberti's *On Painting*. In part by using perspective to depict machines and other apparatus, books about engineering and machines proliferated beginning with manuscript books such as Mariano Taccola's *De Machinis* and the writings of Francesco di Giorgio and Leonardo da Vinci. We will investigate aspects of Leonardo's treatise on mechanics, *Madrid Codex I*, as well as his writings on painting and anatomy. One focus will be on how the "natural" and the "mechanical" came to be interrelated and the ways in which observational experience, visual representation, and knowledge about the world were closely linked in the work of Leonardo and other sixteenth-century figures. The relationships among visual representation, the natural, and the mechanical will be explored further in the writings of Vesalius and Ambroise Paré. The theme of the transition from mechanical arts to mechanics will be introduced. At the same time, changing perceptions of visual representations and the significance of sight and its relationship to reason and to the understanding of the natural world will be explored.

Week 4 (16—20 July): Disciplining Experience
Visiting Faculty: **Chandra Mukerji** (Professor of Communications, Sociology, and Science Studies at the University of California, San Diego) and **Jim Bennett** (Keeper of the Museum of the History of Science in Oxford)

In this week we will shift perspective to look more closely at the way disciplines frame experience. We will take case studies from several specific disciplines—including alchemy, cartography, and surveying—to think about the influences that social, political, and economic forces exert in a variety of settings. We then ask again what difference this makes to the practice and definition of the discipline itself. Chandra Mukerji will guide participants in their study of the many uses of cartography. She brings the methodology of an anthropologist to her work on gardens, landscapes, cartography, and surveying—and their relationships to power—in early modern France. The extensive holdings of the Library of Congress's Geography and Mapping

Division (including an extensive web posting project) will supplement the substantial materials at the Folger. Also in this week, participants will look at the way disciplines are linked in oblique ways by their tools and instruments. With Jim Bennett, they will examine the circumstances and ways in which instrument making itself may become a site of knowledge. Bennett's work on the London workshops of instrument makers has shown, for instance, that as the learned customers visited workshops to place orders and request maintenance, the instrument makers came to assume significant roles in those knowledge communities. We may also visit the American History Museum for a close viewing of their collection of early modern instruments.

Week 5 (23—27 July): Objects of Art/Objects of Nature

Visiting Faculty: **Paula Findlen** (Director of the Science, Technology and Society Program, and Professor of History at Stanford University)

In ancient times, theoretical knowledge about the world and practical knowledge about construction were separate and usually unrelated entities. Made objects were not considered particularly useful in explicating knowledge, in part because of the separation between the artificial and the natural. This week, participants will study the ways this separation came to be undermined in the early modern period. We will look at evidence that points to an increasing closeness of objects of nature and of art around 1500. For instance, Albrecht Dürer's diary of his trip to the Netherlands reveals a collapsing of the two categories of nature and artifact in his collection. The great *Kunstammern* that developed in the seventeenth century also often mingled such objects. Paula Findlen, an expert on collecting in early modern Italy, will invite participants to consider collections as sites of knowledge and to consider, too, their epistemological significance and cultural meanings. The significance of objects can be seen in other ways, as well. In some cases, the work of fabrication came to be seen as revealing of the natural world. Francis Bacon's influential writings put forward a methodology for the investigation of the natural world which utilized the mechanical and constructive arts. Participants will read the *Novum Organum* for the way he makes this relationship explicit. They will ask what implications this proximity between art and nature holds for experience and experimental investigation.

Week 6 (30 July—3 August): Experience and Experiment in the Scientific Revolution

Visiting Faculty: **Peter Dear** (Professor of History and of Science & Technology Studies at Cornell University) and **Adrian Johns** (Professor of Sociology at Cal Tech)

The institute concludes with a study of the broad epistemological conflicts that developed in the seventeenth century over the concepts of experience and experiment. These conflicts threatened the dominant Aristotelian sense of common experience—that which was instantly recognized by all and therefore required no demonstration (e.g., if you drop a brick it will fall downwards). The new experimental philosophers argued instead that particular experiments, often using complex apparatus that could be constructed and manipulated only by experts, were required to validate claims about the natural world. Yet “experiment” meant different things to different philosophers in the seventeenth century. Participants will analyse the role of experiment in Bacon's *New Atlantis* and will compare accounts of experimentation by Blaise Pascal, Robert Boyle, and Isaac Newton. Adrian Johns will remind participants of the need to situate what we know about experimental communities in the context of print culture. Peter Dear will also emphasize the need for a cultural history of communication; he will provide, too, a reminder of other networks of communication, including extensive correspondence that exists among experimental philosophers and mathematicians. Perhaps most importantly, he will encourage participants to analyse in detail the differences in the ways experiment is utilized and conceptualized even within relatively well defined learned communities.