



Edited by **Pamela H. Smith**

Entangled Itineraries

Materials, Practices, and Knowledges across Eurasia

Entangled Itineraries

Entangled Itineraries

Materials, Practices, and Knowledges across Eurasia

Edited by Pamela H. Smith

University of Pittsburgh Press

Published by the University of Pittsburgh Press, Pittsburgh, Pa., 15260

Copyright © 2019, University of Pittsburgh Press

All rights reserved

Manufactured in the United States of America

Printed on acid-free paper

10 9 8 7 6 5 4 3 2 1

Cataloging-in-Publication data is available from the Library of Congress

ISBN 15: 978-0-8229-6577-0

ISBN 10: 0-8229-6577-1

Cover art: Rectangular world map from Fatimid treatise,
Book of Curiosities of the Sciences and Marvels for the Eyes.

Cover design: Melissa Dias-Mandoly

In memory of Ronald E. Smith (1931–2018),
whose love still journeys with me

Contents

Acknowledgments xi

Part 1. Overview

Chapter 1. Nodes of Convergence, Material Complexes, and
Entangled Itineraries 5

Pamela H. Smith

Chapter 2. Trans-Eurasian Routes of Exchange: A Brief
Historical Overview 25

Tansen Sen and Pamela H. Smith

Part 2. Entangled Itineraries: Modes of Approach

Chapter 3. The Silk Roads as a Model for Exploring Eurasian
Transmissions of Medical Knowledge: Views from the
Tibetan Medical Manuscripts of Dunhuang 47

Ronit Yoeli-Tlalim

Chapter 4. Things (*Wu*) and Their Transformations (*Zaowu*) in
the Late Ming Dynasty: Song Yingxing's and Huang Cheng's
Approaches to Mobilizing Craft Knowledge 63

Dagmar Schäfer

Chapter 5. Curative Commodities between Europe and
Southeast Asia, 1500–1700 79

Tara Alberts

Chapter 6. Translating the Art of Tea: Naturalizing Chinese
Savoir Faire in British Assam 99

Francesca Bray

Part 3. Material Complexes in Motion

Chapter 7. The Itinerary of Hing/*Awei*/Asafetida across Eurasia,
400–1800 141

Angela Ki Che Leung and Ming Chen

Chapter 8. Smoke and Silkworms: Itineraries of Material
Complexes across Eurasia 165

**Pamela H. Smith, Joslyn DeVinney, Sasha Graft,
and Xiaomeng Liu**

Chapter 9. Itineraries of Images: Agents of Integration in the
Buddhist Cosmopolis 182

Tansen Sen

Chapter 10. Itineraries of Inkstones in Early Modern
China 202

Dorothy Ko

Part 4. Convergences and the Emergence of New Objects of Knowledge

Chapter 11. Convergences in and around Bursa: Sufism,
Alchemy, Iatrochemistry in Turkey, 1500–1750 227

Feza Günergün

Chapter 12. A Wooden Skeleton Emerges in the Knowledge Hub
of Edo Japan 258

Chang Che-chia

Notes 283

Bibliography 327

Contributors 379

Index 383

Acknowledgments

This volume traveled a long and looping itinerary, wending its way from the Max Planck Institute for the History of Science in Berlin (MPIWG) around the globe, and back and forth between multiple scholarly hubs and New York City in a constant whirring (pinging?) of electronic files and emails, sometimes stalled, sometimes frenetic. First and foremost—and on behalf of all the participants and contributors to this volume—I offer wholehearted thanks to MPIWG, the origin point of that itinerary, and especially to Prof. Dr. Lorraine Daston who invited me to organize the working group on “Itineraries of Materials, Recipes, Techniques, and Knowledge in the Early Modern World.” The initiative ran from 2013 to 2015, with two large workshops in March and July 2014 and a two-week writing session with most of the final contributors in July 2015.

At the MPIWG, Raine Daston created a node of intense activity in the history of science, which shaped all who came within its force field. Her meticulous attention to detail—human, material, and logistical—has been felt in her brilliant scholarship as well as in her ability to foster an extraordinary space of knowledge exchange and creation in Berlin. Thank you, Raine, for all your very hard work, expansive generosity, genuine wisdom, and depth of insight.

My deep gratitude also goes to Josephine Fenger, a remarkable hub of activity in her own right. Josephine took charge of organizing all the workshops and at the last minute obtained all images, rights, and permissions—an extremely complicated feat. Daria Coscodan, Regina Held, Nina Ludwig, Tanja Neuendorf, and Cathleen Paethe also assisted in myriad ways. The MPIWG is an astonishing place; long may it endure! At Columbia University, Shabnam Aslam and Rae Binstock helped with editing and formatting. Many more wonderful presentations were given and papers written than could appear in this volume, and I thank all the participants, including Sonja Brentjes, Harold Cook, Sven Dupré, Johan Elverskog, Asaf Goldschmidt, Harun Küçük, Shigehisa Kuriyama, Elaine Leong, Maria Mavroudi, Luca Mola, Carla Nappi, Hyunhee Park, Dhruv Raina, Claire Sable, Angela Schottenhammer, Tim Stanley, Mary Terrall, Francesca Trivellato, and Yulian Wu.

I have very much appreciated working with editor Abby Collier at the University of Pittsburgh Press, and I am especially grateful for her care in finding two anonymous readers who provided remarkably timely, generous, and knowledgeable readings and sage advice for every chapter. We are all very much in their debt, as well as to the excellent copyeditor, Pippa Letsky, for preventing many gaps and gaffes in this volume. Of course, we take responsibility for the remaining ones. We hope they provide not irritation but, rather, a spur to further scholarship on the itineraries of materials, objects, practices, people, and knowledge. Finally, I am enormously grateful to the contributors to this volume from whom I learned so much. Our intensive two weeks together in Berlin, discussing, eating, arguing, writing, and above all, educating each other, was an experience of deep and sustained colloquy that I hope every scholar, young and old, has the good fortune to enjoy at some point in life.

Entangled Itineraries

Part 1

Overview

Chapter 1

Nodes of Convergence, Material Complexes, and Entangled Itineraries

Pamela H. Smith

The artifact, in short, is the crystallization of activity within a relational field.

Tim Ingold

Science is not just knowledge about matter; it is also knowledge that comes through matter.

Francesca Bray

Some time ago global historians of science moved away from a model of knowledge-making in which a discretely bounded fixed corpus of knowledge from one part of the globe diffuses outward—transmitted from point to point, arriving whole or in parts, and replacing local knowledge systems. Instead, knowledge is now understood to be constituted in part by movement. In other words, the routes that materials, practices, and knowledge take can be more important than their roots or originary forms. This perspective informs the present volume, in which contributors follow the routes of materials, people, techniques, and practices (both esoteric and exoteric), ways of knowing, and codified knowledge systems across Eurasia, tracing their itineraries as they weave in and out of “nodes of convergence” or “relational fields.” Through such movement, these materials and practices—and the knowledge systems that both give them meaning and in turn are formed by them—are transformed and constituted anew.

Nodes of Convergence

Tim Ingold’s suggestive description (quoted above) of artefacts as the crystallization of activity within a relational field makes the same point: materials and objects are constructed by the material, social, economic, intellectual,

and emotional contexts in which they find themselves—the “relational field.” As these artifacts move, they do not remain stable, although perceived properties or characteristics might sometimes continue to be noted (such as the putrid smell of *asafetida* as detailed in Leung and Chen’s chapter). Materials are not stable across distance and time—their perceived properties can be transformed, as demonstrated by *asafetida*, sometimes viewed as a remedy, sometimes a poison. Just as the uses to which they are put and their relative value—economic and cultural—can vary, so too can the methods by which they are investigated, and even their status as compelling objects of study and knowledge. Such meanings and significance of materials and objects transmuted—sometimes drastically—as they traveled into and through new relational fields. The chapters in this volume demonstrate how materials and things altered as they moved and were mobilized in new systems of production and in new regimes of attention and knowledge-making and as they were codified in tools, techniques of production, objects, and writing. Materials, techniques, recipes, objects, and books both carried and made knowledge as they moved. These itineraries of materials never constituted placid, smooth streams of cumulative knowledge-making; rather, they were nonlinear, sometimes swelling in one relational field, and shrinking to almost nothing and disappearing into a substratum in another, from which a technique might sometimes emerge and reenter the textual tradition.¹ In this volume, we examine several such “relational fields” into which and through which materials moved. Some of these fields formed in busy, crowded, cosmopolitan cities such as Chang’an and Quanzhou during the Tang period in China (treated by Leung and Chen in chapter 7), or the Central Asian crossroads of Kucha, a hub for the trade of materials that could only to be obtained in the Central Asian heartland along the Tarim basin and the area called Bactria by the Greeks (touched upon by Yoeli-Tlalim in chapter 3), or the nexus for European and South East Asian trade formed by the region of Malacca (chapter 5), or the important cities of Rey and Baghdad, centers of Arabic scholarship written by Persian literati, the echoes of which resonated in Bursa in the Ottoman Empire (chapter 11), even in southern France (chapter 8), and in Assam during the British period (chapter 6). These hubs, nexuses, centers of exchange and calculation—places, or nodes, of convergence where people, materials, texts, objects, and practices came together—produced new sorts of objects (both material and intellectual), new techniques, knowledges, and epistemologies. Indeed, they produced new species of materials as well. The essays in this vol-



FIGURE 1.1. Google fusion map showing the hubs and nodes mentioned in this volume. All local place names have been included in the map.

ume follow materials such as *hing/urwei/asafedita* (chapter 7); spiritual, medicinal, and iatrochemical practices (chapters 3, 5, 8, 9, 11, 12); objects such as a wooden skeleton (chapter 12) and inkstones (chapter 10); knowledge systems such as alchemy (chapter 11); and peoples, as well, into these relational fields and their nodes of convergence, often but not always constituted by diverse centers of trade, which, by their very nature as human crossroads, constituted complex fields of relations—economic, social, cultural, and material. Materials, practices, objects, and people enter or are drawn into these fields, where they are transformed and thrust thereby into new paths of circulation and movement (figure 1.1).

Human-Material Interactions and the Formation of Material Complexes

Francesca Bray, in the epigraph above, makes a profound point. The declarative and positive knowledge of modern science proclaimed by the new philosophers in sixteenth- and seventeenth-century Europe, which culminated in nineteenth- and twentieth-century notions of scientific modernity, consisted not just in “knowledge” in the guise of abstract theories about matter, but itself emerged *through* matter. In other words, the skilled techniques by which humans manipulated materials brought into being knowledge systems. Materials undertake complex itineraries as they are worked by humans. Humans

have always interacted with their environment in a variety of ways for survival, and human communities have always manipulated natural materials—minerals, metals, plants, and animals, to name just a few—in order to produce effects and products, whether useful, spirit-filled, ornamental, or as models of the workings of nature. Out of the experience gained through these interactions, skills and knowledge emerge.² Through the reciprocal engagement of humans and materials that this working entails, humans come to know the properties of materials, which in turn engenders techniques and skills that grow up around these properties. Humans thereby come to assign value and meaning to the materials and their properties—they come to “know” them. “Knowing” always involves assigning value and meaning, but the principles of “knowing” are not always the same everywhere, as the history of epistemology has taught us. Social and cultural preoccupations vary, regimes of attention change, economic values fluctuate, which all transform the questions people ask and the methods they use to answer them. Thus, knowledge and epistemologies, too, are shaped by the itineraries that materials follow and the relational fields in which they are formed and employed.

We can thus trace the emergence of ideas, theories, and knowledge systems starting in the interaction of the human hand with the material world. This interaction with natural materials and the subsequent production of goods and knowledge emerge from very long *durée* systematic observation of patterns in nature, as well as long-term and sustained experimentation with natural substances. These engagements with the environment are often codified—sometimes in myths, songs, rituals, or mnemonic devices, and, while the manipulation of natural materials could be codified in texts, it was more often—and perhaps more effectively—transmitted, not in texts, but in persons, from master to apprentice, or via rituals and the spoken word. The process of “coming to know” through the manipulation and trading of materials is an always complex and often partially obscured process through which people, materials, techniques, theories, and ideas move across geographic and epistemic space to form “amalgams” or “assemblages”—the systems of knowledge that include materials, people, practices, and ideas—that in this volume we call “material complexes.”³ Conceiving of the movement of these material complexes in a staged way—as an “itinerary” through which the material complex forms—helps us trace the interaction among materials, human making, and the formation of knowledge systems over long spans of distance and time.



FIGURE 1.2. Abraham Ortelius, *Theatrum Orbis Terrarum* (Antwerp, 1570). Public domain.

Entangled Itineraries

“Itinerary” can connote linear movement, but the itineraries traced in this volume are looping, circuitous, and sometimes circulatory, returning again to the same relational nodes, to be transformed once more. It would be misleading to imagine these routes as threading across planar space, in the way we have been taught to see it since the fifteenth- and sixteenth-century flat projections constructed by European scholars and artisans (figure 1.2) and to imagine the movement of materials and ideas following linear, flattened itineraries, without boundaries, hindrances, filters, or blockages. We could also think of these staged routes as like those mapped out by the coastal place names in portolans (figure 1.3), and by many other diverse itinerary maps, such as an eleventh-century Egyptian map from the *Book of Curiosities* (figure 1.4); or the 1628 version of the *Wubei Zhi* chart of Zheng He showing his fifteenth-century voyages (figure 1.5), or the thirteen-meter-long “Routen-rolle” recording Duke August of Saxony’s journey in 1565, measured with an odometer and compass (held by the Sächsische Landes-Bibliothek), and even on our modern Google “Route finders.”

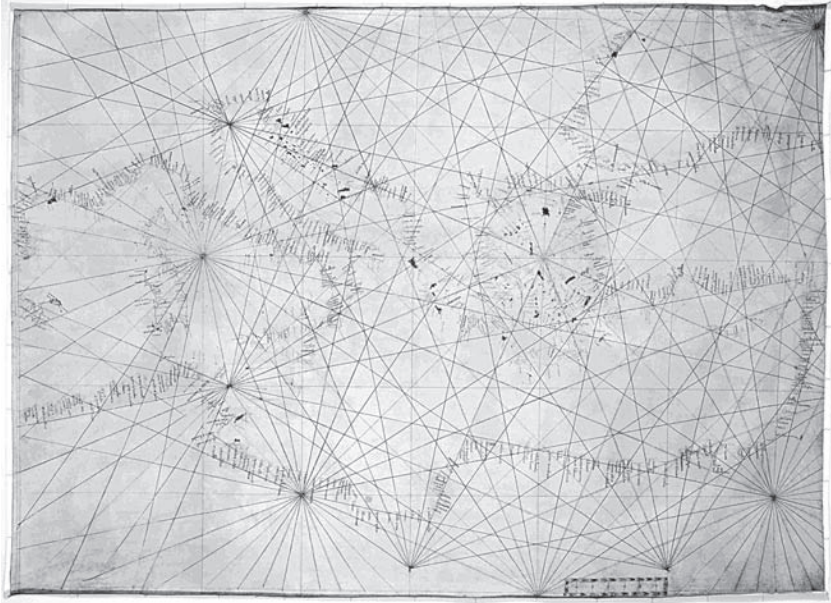


FIGURE I.3. Nautical portolan of the Mediterranean (fourteenth century). 43 x 59 cm. Names of coastal towns form the itinerary-style mapping, all set within points of the compass and directions of the winds. Geography and Map Division, Library of Congress. Public domain.

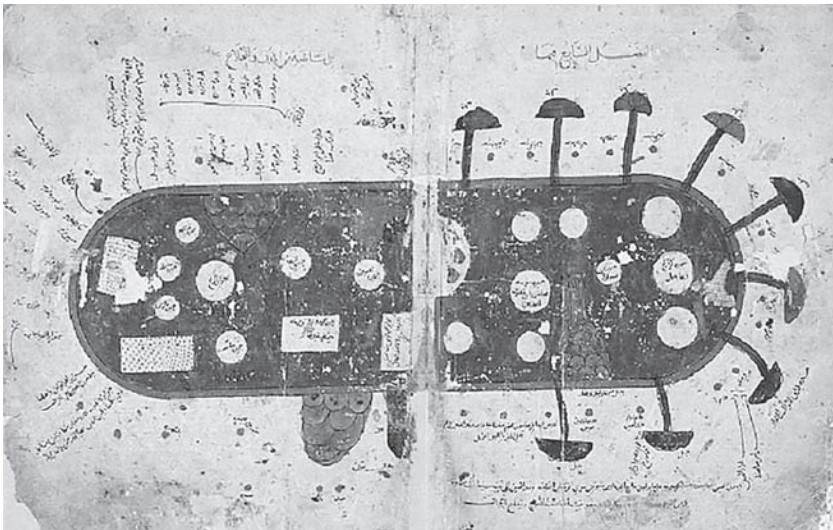


FIGURE I.4. *Kitāb Gharā'ib al-funūn wa-mulak al-uyūn* (The book of curiosities of the sciences and marvels for the eyes; Egypt, eleventh century), Map of the Indian Ocean: Book 2, Chapter 7: "On the cities and forts along the shore [of the Indian Ocean]" (MS. Arab. c. 90, fols. 29b-30a). © Bodleian Library.

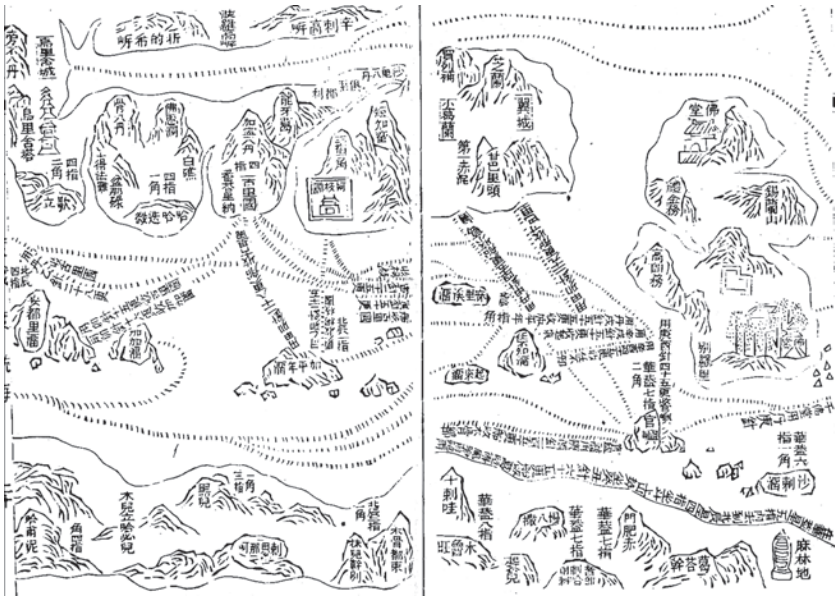


FIGURE 1.5. *Wubei Zhi* map, an ocean travel chart (1628) believed to be based on Zheng He's expeditions (1405–1433). Wikimedia, public domain.

But even such itinerary maps are flat, linear, and inert, and instead we must imagine their space alive with human beings acting in multiple communities and urban hubs, along sometimes intersecting, sometimes diverging routes—always replete with contingencies—with the traces of other systems of knowing, pieces of manuscripts and texts carried along to alight on new shores in fragments to be understood partially and translated into new languages and systems of knowing. These convoluted, collapsing, and crisscrossing routes perhaps resemble more a woven textile, or a textual palimpsest, in their intercalated, interwoven character. But textile and paper may also be too flat to make clear that the itineraries in this volume have peaks, hanging valleys, even cul-de-sacs. In the discussions that gave rise to this volume, the contributors came to see the necessity of devising a sort of three- or four-dimensional itinerary map, rather like Matthew of Paris's map (figure 1.6) when he gets close to the Holy Land (figure 1.7) and seems to need to amplify the place names with their spiritual significance, or the 1364 Japanese map of the Five Regions of India (*Go-Tenjiku zu*), which includes place names but also attempts to map the spiritual hubs and nodes of India based on the travel records of the Chinese monk Xuanzang (figure 1.8a–b). Our own attempt to plot the hubs and nodes of each chapter's itineraries on a Google Fusion

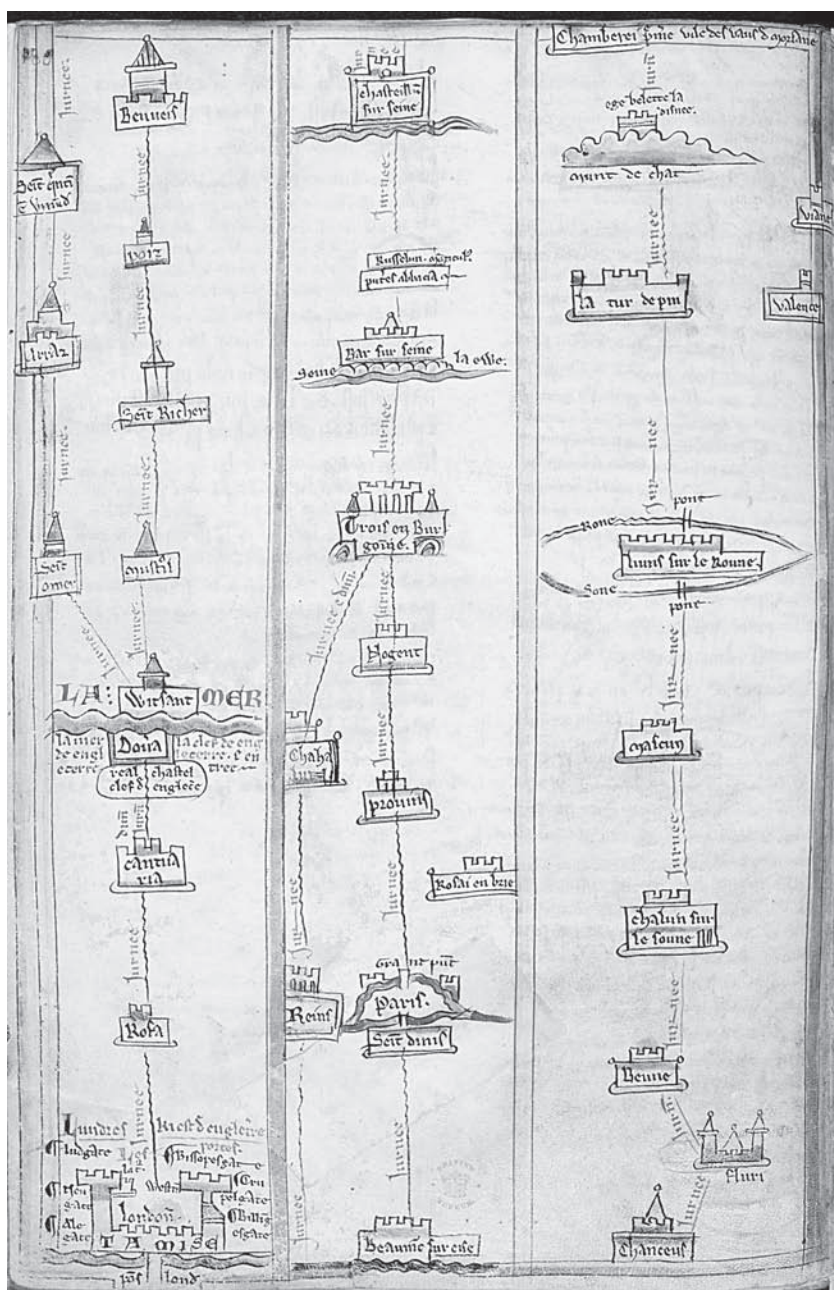


FIGURE 1.6. "Itinerary From London to Chambery." Matthew Paris (c. 1200–1259), *Book of Additions*. British Library/Bridgeman Images.





FIGURE 1.8A. *Go-Tenjiku zu* (Map of the Five Regions of India), 177 x 166.5 cm (1364). Lake Anotatta and the four great rivers are shown toward the top of the center. The entries in the boxes in the ocean portion of the map are extracts from the *Da Tang xiyu ji*. Horyuji Temple, Nara, Japan. Fair use.

table was of course far too flat (figure 1.1), while the visual complexity of the *Go-Tenjiku zu* map seemed illegible; thus, in the end, we settled for the power of written historical narrative to describe the hubs and nodes of each chapter's relational fields.

The essays in this volume contain both case studies of entangled itineraries of knowledge-making about specific materials and practices and methodological considerations of the mechanics of such knowledge-making—mechanics that involved the accretion of “material complexes” over long spans of distance and time. The authors are specialists of quite different fields of scholarship, and as we have learned from other collaborations, this has proved immensely productive, allowing the group to cross the boundaries of their individual fields to see in stark relief the “centrisms” of their own fields,



FIGURE 1.8B. Schematic rendering of the Horyuji *Go-Tenjikū zu* by Unno Kazutaka. "Cartography in Japan," 373.

which include taken-for-granted vocabularies, categories, and chronologies of periodization.

Place

Much recent work in the history of science has focused on the circulation of knowledge within Europe, across the Atlantic World, and between the two poles of East Asia and western Europe. Recent research has also begun to uncover the knowledge networks of East Asia, and, in the new "thalassology" with the focus on oceans, historians have begun to examine the circulation of knowledge around the Mediterranean and the Indian Ocean.⁴ This scholarship has resulted in much new information about circulation, exchange, and the transformations and translations of knowledge as well as new conceptual and methodological perspectives. For historians of science, technology, and medicine, this work has changed conceptualizations about circulation, about the interrelationship of local and global, and about the formation and consti-

tution of scientific knowledge. Much less researched—in part because of the nature of the sources—has been the movement of knowledge across Eurasia, and especially across Central Asia, during the same period, despite the long history of scholarship on the so-called silk routes.⁵ Scholarship on the relationship between East Asia and western Europe often takes no account of the space in between, as if people, commodities, books, and information traveled seamlessly across this space. This volume began in a series of workshops that sought to explore this neglected space, focusing on the movement and circulation of materials, peoples, practices, and knowledge across the Eurasian continent, in some cases over very long spans of time and distance. Our inspiration to give attention to this space came in part from the vision mapped out some time ago by Andre Gunder Frank in his short work, *The Centrality of Central Asia* in which he noted:

Central Asia is also central to the civilizations of the outlying peoples. . . . It is not clear where civilized peoples and spaces end, and where they interpenetrate with those of Central Asia. None of the civilizations are pristine. All of them were formed and even defined through interaction with Central Asia. Moreover, Central Asia is where all the outlying peoples and their civilizations connected and interacted with each other. Indeed, for millennia the Pulse of Asia (Huntington 1907) probably came from its Central Asian heartbeat. Central Asia is truly the “missing link” in Eurasian and world history. . . . Yet Central Asia is perhaps both the most important and the most neglected part of the world and its history.⁶

It could be argued that seagoing itineraries linking the Mediterranean Sea to the coastal regions of the Indian Ocean world are similarly neglected despite the fact that textual sources such as *Periplus of the Erythraean Sea*, a Greco-Roman work from the first century CE, and archaeological evidence from Arikamedu in southern India and even from the coastal regions of China indicate the movement of objects over vast distances ferried by boats and ships. Like traversing the varied and often difficult terrain of Central Asia, crossing this maritime space required distinct types of knowledge ranging from ship-building technologies to understanding patterns of monsoon winds.

Our aim to trace itineraries across the lands and waters of Eurasia raised many challenges: We found that the span of the itineraries expanded as we followed them. The period most interesting to us when we began our work together encompassed the period from about 1350 to about 1750 (“late me-

dieval/early modern,” as it is called by some) because of its importance in global history, as population and commerce began to burgeon and economic integration of the globe, especially with regard to the trade in precious metals and luxury commodities across long-distance commercial networks began its long development. From 1000 CE the lands across Eurasia had witnessed many shared developments: increased conflicts between nomads and settled urban dwellers as populations grew and cultivated land use expanded. With increased domestic animal husbandry and settled urban living, pandemics spread across the whole of Eurasia, the “Black Death” only one of them. During the early modern period, the lands of Eurasia also shared the bloody advent of gunpowder warfare, just as they had shared the new kinds of wounds and killing that bronze weaponry had first occasioned millennia before. This new warfare contributed to a greater consolidation of ruling power in the hands of fewer centers, whose growing numbers of bureaucratic functionaries began to harbor ideas of universal rule. At the same time, a remarkable vernacularization of canonical textual corpora took place, and millennial expectations flourished in the major religions around 1500. Of course, trade had flowed across Eurasia, around the Indian Ocean, and over the Mediterranean for thousands of years, but in this late medieval/early modern period, larger parts of the globe became connected by an increasing variety of sea and land routes. Commodities and tribute bounced and jostled over these routes, and knowledge was accreted along them. Embodied knowledge moved in individuals as they migrated or were resettled in new territories, and it moved along with sailors, soldiers, and merchants as they pursued trade and war. Knowledge traveled in objects, instruments, manuscripts, and printed books as trade routes opened up and collectors avidly sought rare and beautiful things, and it moved as factors sent back specimens and information to the metropolis. It moved as new institutions of rule, such as the remarkable civil bureaucracy of the Song dynasty, the Pax Mongolica, the “Mandalic” polities of mainland Southeast Asia and their coastal sultanates who dominated the trade routes of the maritime “silk road,” as well as Italian merchants, and then the European trading companies and colonial administrations all created new configurations of social and intellectual relational fields—and in some cases even sponsored information-gathering projects. Materials, objects, and knowledge moved within and among these fields not just geographically but also epistemically, as knowledge systems of different social and cultural groups intersected. Knowledge systems formed and transformed, were filtered

and sometimes disappeared, as goods and people traveled from local settings and vernacular modes of expression—such as the ships of many realms, the ceramics manufactories in Jingdezhen and Puebla, shipbuilding arsenals in Calcutta, Venice, Ragusa, and Istanbul, artisanal workshops, collectors' cabinets and gardens in all parts of Eurasia, to name only a few examples at random—to the knowledge and written forms of *Bencao* (materia medica) and *pulu* texts (catalogues of various things) or into the codifications of astronomy and astrology produced, for example, by the Mongols as they absorbed Chinese scholarship or by Rashid al-Din (1247–1318) as he surveyed the regions and practices surrounding him from his center at the Ilkanid court. These itineraries helped to shape at opposite ends of Eurasia the new epistemologies of *kaozheng* (evidential studies) and the new experimental philosophy in Europe. At the same time that this motion brought about the making of new knowledge, it also formed new hierarchies of intellectual authority.

While this late medieval/early modern period remains at the heart of this volume, we came to see that such a bounded period was inadequate, for, when we set out to follow itineraries of moving materials across Eurasia, we discovered that these materials possessed much longer histories, and it seemed artificial to contain the span of the volume by arbitrary chronological points (especially as those points often derived from Eurocentric historiography). This does not mean that we think of this long history of continuous movement around Eurasia as one placidly flowing continuous stream without major ruptures and discontinuities. On the contrary, the formation of new social and political groupings as people and empires moved often caused the meaning, indeed even the substances, of materials to be transformed, knowledge to be accreted or lost, regimes of attention to change, and what constituted “knowing” a material or thing (i.e., epistemology) to be reoriented. We think that our approach of following materials where they lead may point the way to new modes of periodizing global historical narratives. For example, the rise and decline of vibrant Central Asian urban centers from prehistoric times up to the present—crucial for the history of flows of materials across Eurasia—simply does not allow the telling of a linear narrative, much less a progressivist one (and includes sharp ruptures). This comes across clearly when one considers the ups and downs of, for example, the cities of Merv, Baghdad, and Rey. The largest city in the world in the twelfth century, Merv depended on trade in high value materials, such as lapis lazuli. At its height, Merv had twelve thousand hydraulic workers laboring on its sophisticated system of waterworks.⁷ A narrative that follows the object of historical inquiry—whether



FIGURE 1.9. Orthographic projection of Eurasia, showing the landmass. Creative Commons Attribution-Share Alike 3.0 Unported license. Public domain.

it is a material, an object, a knowledge system, or an idea—in and out of nodes of convergence can foster a new mode of periodization. This mode would not strive so much to mark out clearly delineated blocs of time as to focus on transformative nodes at particular moments, or over long temporal spans, to show how their relational fields—material, social, economic, infrastructural, intellectual—brought about transformation.⁸ In the same vein, a focus on the itineraries of material complexes through nodes and hubs rather than along linear and cumulative trajectories can show how attention (scholarly or economic), activity (intellectual or utilitarian), and knowledge (scientific or spiritual) swelled and receded around these complexes in different relational fields.⁹ The chapters in this volume focus on a diverse set of such material complexes, but they all aim to provide such narratives.

Distance

Another challenge confronting the contributors to this volume is the expansive spatial dimension of the area of study. Although we are fully aware that the concept of Eurasia itself has a history, we have chosen to approach this space simply as the largest continuous landmass and continent—covering around 55,000,000 square kilometers (21,000,000 square miles), or just over one-third of the Earth's total land area (figure 1.9). The division of Europe and Asia into two different continents is a historical and cultural construct. No clear natural or physical boundary separates them, of course, thus the entire span is of interest to the contributors in this volume because it formed the space for regular paths of human exchange—both by sea and by land—over the very long *longue durée*.

When the contributors to this volume came together in Berlin at the Max Planck Institute for the History of Science (MPIWG), we had initially set out to investigate the space of Eurasia strictly defined, but it soon became clear that this continental approach was simultaneously too vast and too restrictive—too vast in its temporal and geographical distances, as well as in the confusion of the various periodizing schemas imposed upon it, and too restrictive in the sense that the itineraries of materials and ideas flowing across “Eurasia” often moved through South Asia and Africa as well. This led us to seek out a methodology by which we could take on the vastness of time and (nearly global) space and thus gave rise both to the contributors' focus on individual cases and to the volume's framework of “entangled itineraries,” “material complexes,” and “nodes of convergence.” As a result, our focus shifted from tracing itineraries across a space strictly defined as “Eurasia” to a kind of road test of the method of tracing the routes of material complexes over long temporal and geographical spaces that inevitably encompassed more than Central Asia and Eurasia. While most essays in this volume simultaneously make methodological points and form case studies of material complexes in motion, those in Part 2, “Entangled Itineraries: Modes of Approach,” are explicitly methodological. The essays in Part 3, “Material Complexes in Motion,” are, by and large, case studies of the itineraries of materials and objects, and those in Part 4, “Convergences and the Emergence of New Objects of Knowledge,” trace the formation and transformation of new objects of knowledge within changing relational fields.

Another challenge for the volume's authors is the dynamism of itineraries—our materials, recipes, practices, and people are moving, and not just over

space. For, to take just one of these, materials are not necessarily stable things but, rather, are nexuses in knowledge systems around which meaning and practice cohere and agglomerate. When historical sources talk about rhubarb, for example, what are they talking about—a plant, a medicine, a food, or a spiritual practice (or all of these simultaneously)? Relational fields transformed knowledge systems and their material complexes. A central example of this can be found in *materia medica* and medicinal substances—particularly interesting materials to follow because they moved over long distances and across distant expanses of social stratifications, and they functioned simultaneously as desirable items of medicine, religion, and trade (chapters 3, 5, 7, 8). They thus formed one important component of the complex of materials, practices, and knowledge that formed and reformed around the vexed relationship of body and spirit—a relationship that was a locus of intensive conceptual and practical activity across the entire expanse of Eurasia.

Historical Sources

A final challenge confronted by the contributors to the volume is sources. Because they investigate the movement of materials, peoples, and practices (all carriers of components and types of knowledge that do not necessarily take a written form), the methodological and evidentiary challenges are multiple. When following nontextual materials and processes, a first question must be that of how materials, recipes, and techniques function as knowledge? It is one of the efforts of the contributors to this volume to trace the passage of matter and materials through practices of making and using into the realm of ideas and scientific theories, and to understand how the epistemic role of materials change and are sometimes stabilized as objects of intellectual and practical focus en route.

All historians rely upon material evidence that is already preselected for them both by archival intention and also, of course, very much by chance. The contributors in this volume had to come to terms with how much we historians, like archaeologists and art historians, rely upon the evidence of the elite, such as those things that have ended up as museum objects, as well as high-value portable things that traveled especially easily or well—textiles and spices, as well as the things that by their nature (some medicinals, for example) transcended local settings and temporalities. Like all historians, we saw how much we must always rely on words and texts to tell us about materials and things.

An additional problem of working on Eurasia is the dearth of source material that is easily accessible to scholars today in centers and institutions of scholarship. This was compounded for the contributors of this volume by the fact that the movement of our objects of study often left few traces of how their movement from one place to another was negotiated, mediated, or translated; instead, they suddenly appeared in a new place in a written record or as an artefact. Only rarely do we get a glimpse of the process of translation, such as that provided by the Khotanese translation of the Sanskrit *Siddhasāra* recounted in Yoeli-Tlalim's chapter 3. Indeed, most of the itineraries of this volume include silences and lacunae, where once a babble of different languages and a hum of human production and activity must have resounded. A vital part of recovering Eurasian transmissions of knowledge lies in a multitude of forgotten languages: languages either forgotten by mainstream history of science, such as Syriac or Uighur, or dead languages, only recovered and deciphered as a result of the archaeological digs in Central Asia of the early twentieth century, such as Khotanese or the two Tocharian languages (Agnean, also known as Tocharian A, and Kuchean, or Tocharian B). Sources in these languages—along with sources in Arabic, Persian, Turkish, Hebrew, Sanskrit, Tibetan, Manchu, Tangut, and Chinese—hold the promise of allowing us to write multicentric “Eurasian” histories of science. Such histories will always require multiple linguistic and historiographical expertises, and, although the challenges are by no means overcome by the contributors to this volume (especially as the MPIWG meetings shifted from a sole focus on “Eurasia” to concentrate instead on the methodology of tracing “entangled itineraries”), we hope the volume nevertheless forms a stepping stone along the way to realizing such histories.

The essays in this volume give insight into both the mechanics of knowledge-making and the content of the knowledge that gets made or “stabilized” in the process. One principal dimension of the mechanics of knowledge-making identified by the contributors was in the “flow” of materials, objects, techniques, and knowledge—as pointed out by Ko in chapter 10, asking what are the constraints and affordances of this flow? What are the causes of “fluid” or “sticky” flow? Are images less “sticky” than concepts, for example? Do they move more easily? Do materials and techniques flow more easily as “cultural stowaways”—as part of larger systems of meaning, such as religion? How might this transform them? As Marcia Norton points out in her examination of the introduction of chocolate into Europe, the place

of this substance within the complex of religious meaning made chocolate both stickier and more slippery, as European churchmen struggled with and appropriated its meaning.¹⁰

Another recurring question concerning the mechanics of movement was why some objects and materials were stripped of their religious or cultural value or their context as they moved from one place to another, as treated by Alberts in chapter 5.¹¹ Did this stripping of cultural value turn these into “thin things” that can be contrasted to “thick things,” as Harold Cook argues in *Matters of Exchange*. Things might not be stripped so much as filtered, as Thomas Allsen shows in the case of the Mongols.¹² Finally, the contributors took into account the perhaps obvious relational fields formed by large-scale structuring factors, such as states and empires, religious institutions, as well as manufacturing and production sequences, and even families and lineages, in their examinations of the relational fields of the hubs and nodes along the itineraries (chapters 5, 6, 9, 12).

The products and contents of the knowledge made by this movement includes materials of all kinds, such as commodities, medicines, products of industry, as well as objects of art, religious ritual, and household use; but also personae, professions, and specialists emerge and “are made” as a result of these material itineraries, as do these specialists’ modes of proof, authority, and “knowledge that works.” Regimes of attention and new epistemologies form around these materials and the specialists they bring into being. This specialist knowledge and specialist epistemologies are codified in written texts but also in ritual and workshop practices, in objects and tools, in oral and bodily systems of operation and knowledge, and in oral modes of expression—poetry, song, epics, and tales.

Our collective investigations in this volume illuminate how knowledge systems, epistemologies, objects, texts, materials, and practices that might appear to be stable or “natural” are, in fact, agglomerations accreted and transformed over time and space. They thus reveal the importance of tracing the routes over which they traveled. When we see how far in space and time the components of these agglomerations have traveled (across Eurasia and around the globe), it is puzzling to reflect on how historians could ever have imagined the fortunes and formation of knowledge systems as a story of uncovering the origins of recognizably stable bodies of knowledge. It reminds us once again just how powerful a tool historiography—and origin myths—have been in the formation of identity, whether ethnic, national, imperial, or epistem-

ic.¹³ Historiography, too, plays a role in the dynamics of relational fields, our own included. The “Eurasian histories” of this volume help reveal the multiple sources and the diverse and entangled itineraries from which materials and knowledges emerge.

Notes

Chapter 1: Nodes of Convergence, Material Complexes, and Entangled Itineraries

Although written primarily by Pamela Smith, this introduction emerged out of two workshops hosted by the MPIWG, which involved many more participants than appear in this volume. Most of the volume's authors met for a final two-week intensive conversation. I thank Tara Alberts, Dagmar Schäffer, Tansen Sen, and Ronit Yoeli-Tlalim for their contributions to this introduction. All contributors wish to express deep gratitude to the MPIWG for generously hosting these stimulating workshops.

Epigraphs: Ingold, *Perception of the Environment*, 345; Bray, "Science, Technique, Technology," 323.

1. Chandra Mukerji, in "Tacit Knowledge," provides a case study of such movement. Arjun Appadurai, Homi Bhabha, and Prasenjit Duara offer theoretical statements, as treated in the next chapter.

2. I treat this in Pamela H. Smith, "Science," and Smith, "Knowledge in Motion."

3. An exemplary study that starts from the materials available in the environment is Susan Naquin, "The Material Manifestations of Regional Culture" (unpublished paper, 2016). My thanks to Sue Naquin.

4. See, for example, Horden and Purcell, *The Corrupting Sea*; Abulafia, *The Great Sea*. For an overview, see Horden and Purcell, "The Mediterranean and the New Thalassology"; Wigen, "Oceans of History."

5. Beckwith, *Warriors of the Cloisters*; Beckwith, *Empires of the Silk Road*; Beckwith, *The Tibetan Empire in Central Asia*; Forêt and Kaplony, *Journey of Maps and Images*; Forêt, *Mapping Chengde*; Hansen, *The Silk Road*; Liu, *The Silk Road in World History*; Liu, *The Silk Road: Overland Trade*; Liu, "Silks and Religions in Eurasia"; Millward, *The Silk Road*; Millward, *Eurasian Crossroads*; Millward, Dunnell, Elliott, and Forêt, *New Qing Imperial History*; Millward, Yasushi, and Jun, *Studies on Xinjiang Historical Sources*; Starr, *Lost Enlightenment*; Starr, *Fergana Valley*; Starr, *The New Silk Roads*.

6. Frank, "The Centrality of Central Asia," 44. More recent work by Thomas Allsen and Nicola di Cosmo has also been influential for historians of science and medicine.

7. Starr, *Lost Enlightenment*, 39–40, in his study of what he calls such "cross-road civilizations" (69).

8. The publications in the series Transcultural Research—Heidelberg Studies on Asia and Europe in a Global Context, with editors Madeleine Herren, Axel Michaels, and Rudolf G. Wagner, aim for similar goals, albeit in a later period. Especially useful in rethinking historical narratives is Herren, Rüesch, and Sibille, *Transcultural History*. For the early modern period, Bleichmar and Martin, *Objects in Motion* provides useful case studies of the variety of meanings and dimensions “motion” can take. Grasskamp and Juneja, *EurAsian Matters* appeared after the present volume was complete.

9. In his examination of the city of Khwarizm, Starr in effect argues that intensive systems of water control gave rise to the skills of numeracy and techniques of algebra that were codified in the texts of Al-Khwarizmi (Starr, *Lost Enlightenment*, 66–67; for further examples of the effects of such hubs, see also 68–71, 94).

10. Norton, “Tasting Empire,” 691. See also Norton, *Sacred Gifts, Profane Pleasures*.

11. Schiebinger and Swan, *Colonial Botany*.

12. Cook, *Matters of Exchange*; Allsen, *Culture and Conquest in Mongol Eurasia*.

13. Herren, Rüesch, and Sibille also treat this, in a chapter of *Transcultural History* aptly titled “Fighting Zombies: Methodological Challenges of Transcultural History.”

Chapter 2: Trans-Eurasian Routes of Exchange

1. Some material in this chapter appeared in Smith, “Itineraries of Materials and Knowledge,” 31–61.

2. Appadurai, “How Histories Make Geographies,” 11.

3. Appadurai, “How Histories Make Geographies,” 9–10.

4. Appadurai, “How Histories Make Geographies,” 11.

5. Bhabha, “Introduction,” 8, 9.

6. Duara, *The Crisis of Global Modernity*, 73.

7. On the Austronesians, see Bellwood, “Austronesian Prehistory in Southeast Asia.” For early connections through the overland routes of Central Asia, see Kuzmina, *Prehistory of the Silk Road*.

8. V. Selvakumar, “Contacts between India and Southeast Asia.” On the contribution of the nomads in the transmission of ideas and technologies across Eurasia, see Kuzmina, *Prehistory of the Silk Road*; Golden, *Central Asia in World History*.

9. Hans Ulrich Vogel and Sabine Hieronymus have detailed the import of cowries into China in “Cowry Trade (Part I)” and “Cowry Trade (Part II).” See also Yang, “Horses, Silver, and Cowries.” For global trade in cowries, see Yang, *Cowrie Shells*; and Boomgaard, “Early Globalization.”

10. Vogel and Hieronymus, “Cowry Trade.” See also Yang, “Horses, Silver, and Cowries,” and Deyell, “Cowries and Coins.”

11. A detailed record of these findings is Xiong’s “The Hepu Han Tombs and the Maritime Silk Road.”

12. Stern, “Early Roman Export Glass.”

13. See specifically, Glover and Bellina. “Ban Don Ta Phet and Khao Sam Kaeo.”

14. Parker, *The Making of Roman India*, 170–1.