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Technology as a Resource: Material Culture and Processes in the Pre-Modern World

Interrogating Technology as a Resource in Pre-Modern Global History

Questionner la technique comme ressource à l'époque moderne

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Interrogating Technology as a Resource in Pre-Modern Global History

Anne Gerritsen, Liliane Hilaire-Pérez, Giorgio Riello

The materiality of past societies and economies has long challenged historians. Its study means attributing importance to objects, tasks, skills, and tacit knowledge. It relies upon strong intellectual and political foundations formed by the work of, for example, the *Annales* school in the 1930s.¹ It starts from the premise that technology is a major component of society, politics, and the economy. The integration of technology into history is then a crucial task. This approach has two significant consequences.

First, although it has long been taken for granted that technology is among the factors spurring economic growth—technology has suited a purely economic narrative in which innovation plays a leading role—a whole stream of studies over the last two decades have critically examined the teleology of progress and innovation. This stream is mainly concerned with the environmental impact of technology, notions of risk, breakdowns, accidents, workers' fights against machines, and the democratic opposition to ideologies of power and modernity. Moreover, some current studies attempt to disentangle techniques from reductive economic perspectives.²

1. Coupaye, 2022; Tesnière, 2021; Schlanger, 1991, 2023; Verna, Dillmann, 2018.

2. Lamouroux, 2010, p. 161 (“In the face of the often simplistic discourse that the spectacular transformations of present-day Chinese society give rise to, it seemed essential to us to recall that these depend on a history, a history during which the activity and technical knowledge that bring about change have never depended solely on economic conditions, and techniques here cover the unequal capacity of different groups and individuals to act on their environment and to legitimize this activity.”).

” Anne Gerritsen, Liliane Hilaire-Pérez, Giorgio Riello, «Interrogating Technology as a Resource in Pre-Modern Global History», *Artefact*, n° 20, 2024, p. 15-22.

In response to the question of which technologies may have generated productivity gains, historians examine the multiple issues connected to techniques, their fitness for purpose, and their vernacular transmissions before embarking on large-scale comparisons and grand narratives of globalization whose significant paradigms are growth and development.

Second, inspired by a historiography of technology that has greatly benefited from the contributions of the humanities and social sciences without equating the usefulness of techniques with their efficiency nor reducing technology to the application of science to industry, we consider technology as a resource for action and “technical action as a social fact,” hence the “lived and pragmatic techniques” as Marcel Mauss considered them.³ This position is in line with recent studies of materiality that expand the understanding of technology to include the diversity and sophistication of techniques, which has long been a resource for societies to cope with constraints and to devise artefacts adapted to their needs and serving their ambitions. Such reflections go beyond the question of use and users that has had a tangible impact on the global history of technology. David Edgerton conceived of globalisation as a means of studying “all places that use technology, not just the small number of places where invention and innovation [are] concentrated.”⁴ Analysing how technologies are used rather than invented, he considered globalisation a real-life situation. New research now tackles the abilities, skills, and thought involved in such a definition of technology beyond usefulness. In that sense, technology is to be understood as “technique,” the material manifestation of sets of actions and processes that accumulate, as sediments, in the objects by which human beings transform the world and themselves. Considered as “technique,” technology is an interface between us and our environment. Beyond economy and usefulness, it is a constitutive resource for our experience as living beings.

As such approaches underline, technology understood as technique is constitutive for human communities. In a recent study on Parisian artisans, Catherine Lanoë borrows the *milieu technique* concept from André Leroi-Gourhan to describe the “horizontal socio-technical structuration that constantly shapes labour within workshops.”⁵ She notes that for Leroi-Gourhan:

3. Mauss, 1950 [1935]; Schlanger, 1991.

4. Edgerton, 2006, p. XIII.

5. Lanoë, 2023.

“ [w]hether we talk about a society in which the various technical tasks are practised by specialized professions, or a society in which each individual is more or less capable of doing everything to ensure her/his existence, the technical environment remains continuous; even if the professions ignore each other, there is still sufficient cohesion for an individual, from time to time, to bring together several technical tasks and to derive new technical characteristics from them by association.⁶

In a recent book, the anthropologist Pierre Lemonnier, a Pacific studies expert, devotes himself to the magical techniques that constitute a “technical milieu” in societies that share whole and complete “operative sequences” (*chaînes opératoires*). Thanks to their networking qualities,⁷ such phenomena suggest that techniques ensure communities’ social and spiritual cohesion.⁸

Technology may thus be understood as a repository of processes and a resource for life. It faces the urgent task of contextualizing different technology material cultures far beyond traditional narratives of techno-scientific developments and schemes of applied science. Considered first and foremost as a resource for action, it defines the range of methods, devices and solutions that shape and mobilize knowledge to achieve goals, reduce constraints, decrease costs and gain profit. The history of technology then has a programmatic scope: it places the rationalities of material practices at its centre, while applications of learned and normative models become just one of its dimensions. It highlights the fundamental but often forgotten interpretation of “technology as a human science” (“*la technologie science humaine*”).⁹

6. Leroi-Gourhan, 1973 [1945], p. 348 (“*Qu’il s’agisse d’une société où les différents corps techniques sont exercés par des professions spécialisées ou d’une société dont chaque individu est plus ou moins capable de tout faire pour assurer son existence, le milieu technique reste continu; alors même que les professions ignorent mutuellement, la cohésion reste suffisante pour que de loin en loin un individu réalise la jonction de plusieurs corps techniques et en tire par association des traits techniques nouveaux.*”).

7. From an anthropological perspective, Catherine Lanoë draws attention to the “expansivity” and “trespassing nature” (“*nature dépassante*”) of technology that Nathan Schlanger has stressed in Mauss’s thought. She focuses on the commensurability and the transcending dimension of technique by recalling the “*esprit de la technique.*”

8. Lemonnier, 2023.

9. Haudricourt, 1988.

18 In recent years, a growing interest in the history of doing and making has changed our understanding of pre-industrial manufacturing and raised new questions about expertise, skills and artisanal training within and beyond guild structures. Proposing the notion of “artisanal epistemology,” Pamela H. Smith argued that during the Renaissance, “[t]he ability of craftspeople to produce material things rests upon experientially derived bodies of knowledge that can be employed rigorously and methodically to extend, categorize, innovate, and accumulate new knowledge.”¹⁰ This configuration was not restricted to the sixteenth century. In the eighteenth century, since complex chains of fabrication developed in tune with intense subcontracting, artisans kept on imitating, transferring, and substituting materials, models, pieces of mechanisms, tools and processes even across long-distance chains of making. New global comparative and connected histories have also provided a corrective to Europe-centred stories, uncovering similarities and differences in productive techniques, gender division of labour, epistemic systems, knowledge codification and transfers. New studies for China, India, the Middle East, the Americas, and pre-modern Africa have brought to the fore the role played by materials (textiles and fibres, wood, porcelain), their creation processes (weaving, enamelling, firing in kilns, iron and steel production), and the different properties and cultural attributes of artefacts (cloth properties, porcelain translucency, lacquer luminescence).

This special issue investigates how the history of material cultures and the history of technology intersect by bringing together a group of scholars from different disciplines, such as economic and art historians, scholars of material culture, curators, and archaeologists. It results from conversations that started five years ago. A workshop entitled “East and West: Dialogues in History of Science and Technology” was held at Université Paris Cité in April 2019 as a collaboration between the Centre Identités, Cultures, Territoires – Les Europes dans le monde (ICT), the Centre de recherche sur les civilisations de l’Asie orientale (CRCAO), the Centre Alexandre-Koyré (EHESS/CNRS/MNHN) and the Global History and Culture Centre at the University of Warwick. The COVID 19 pandemic delayed our meeting entitled “Techniques as resources,” which took place in April 2022 at the musée du quai Branly – Jacques Chirac (mqB-JC)

10. Smith, 2018, p. 1; 2004.

as a collaboration between the editors of this issue, the mqB-JC and the musée des Arts décoratifs. We are particularly grateful to Gaëlle Beaujean and Vincent Guigueno for their personal and institutional support at the mqB-JC, where African, Asian and European collections were our entry point into thinking about material categories such as textiles, metals, ivory, glass, and building materials. At the World Economic History Congress held in Paris in July 2022, a session bearing the title of this issue allowed us to pre-circulate and present short papers, leading to a general discussion on the main themes considered in this issue.

The papers published today explore technology as a resource from two vantage points. Technology can be considered a repository or repertoire of production processes and practices—a resource—and the activity of transforming matter into objects, or “traditional efficient act[s],” as Marcel Mauss called it. Nowadays, much literature addressing production processes and practices includes works on the role of skills and skilled workers in manufacturing. As Liliane Hilaire-Pérez and Marcos Camolezi observe in this issue, different forms of knowledge have been identified in studies on technical codifications and transfers, as well as in discussions on the relations and limits between theory and practice, demonstrative knowledge and know-how, and science and technology. Research on guilds, for instance, has addressed knowledge through embodied and applied knowledge, highlighting the momentum created by training institutions. Work at the intersection between the history of knowledge and history of science has underlined instead the role played by expertise and experts in the codification of practices and the evaluation of commodities and material goods.¹¹ Papers published in this issue examine these questions by drawing on specific creation processes, from weaving to firing in kilns, constructing vessels, and pearl fishing.

The way materials and matter are considered resources is crucial to this special issue. Clay, calcium, fibres, cellulose, stone, and gold are examples of natural materials used in the early modern period to create a wide range of artefacts, such as porcelain and earthenware, paper, cloth and clothing, and jewellery. Over the recent years, a historiographical “material turn” has drawn attention to the ability to identify the qualities or characters of matter and materials. Treatises on stones and considerations on clay’s

11. Gems, for instance. Bycroft, Dupré (ed.), 2020.

properties are examples of how pre-modern societies understood the connection between their environment and material resources, created hierarchies of materials, and reflected on the transformation of natural resources. Particular attention has been paid to mimesis as an “act of material resembling” that includes practices as different as the creation of stone from composite materials, the production of pearls from animal substances, and the imitation of precious metals through silver or gold plating processes. In this issue, contributors examine extant artefacts in conversations with museum specialists. Drawing on material culture studies, they explore how the symbolic value of artefacts shapes contemporary and present-day understanding of technology as a resource.

From specific cases, this issue reflects on broader narratives and methodologies in a comparative and global context. It asks in what ways material culture and its methodology contribute to the history of technology and how new approaches in the history of technology help us to rethink matter and material culture. It also proposes an epistemological perspective on the links between the history of technology and central disciplines (archaeology, archaeometry, anthropology, and ethnology) to the history of material culture.

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