

HOSC
2026

Workshop: Historiography of Science in China

中国的科学编史学工作坊



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Workshop Description

In the past two centuries, China witnessed first-hand the radical restructuring of the world as a result of the Industrial Revolution. Accompanying such a restructuring was a dominance of the world view undergirded by Western sciences among China's intellectual elites during the 19th and 20th centuries. Indeed, before the middle of the 19th century, at least some Chinese literati in the late Ming and early Qing periods were already aware of the superiority of Western sciences (natural philosophy). Starting from the late 19th century, applying scientific knowledge to resolve the issues and tensions within the broader landscape of society, institutions, culture, and thought became the automatic response from the mainstream Chinese scholars whose existential anxiety concerning the future of China was entangled with the desire for a science-driven modernization. After the Opening and Reform in the late 20th century, Chinese intellectual elites have turned to the West again for advanced science and technology. As such, what China stood for traditionally before the arrival of the Industrial Revolution was largely sidelined by a reconfiguration of knowledge that orientated the Chinese understanding toward the sciences — a Copernican Revolution forcing the eastern learning into an active negotiation with Western frameworks.

It is within this backdrop that this special issue proves to be timely. Put simply, we seek to assemble the best of critiques and contemplations that reflect upon the scholarship of Chinese historiography of science within the framework of socio-technical relationships. How have the Chinese intellectuals viewed Western sciences? What have been the different responses? Have the sciences been viewed as compatible with the Chinese intellectual tradition? How have the Chinese scholars written the history of the sciences, either Western or Chinese? What have been the historiographical, methodological, and philosophical responses?

This workshop aims to bring together potential contributors to *Historiography of Science in China*, a special issue of *Transversal: International Journal for the Historiography of Science*.

A letter from Mauro Condé

Hello everyone!

Dear Chinese colleagues,

My name is Mauro Condé, and I am the Editor-in-Chief of *Transversal: International Journal for the Historiography of Science*.

This is a brief message to introduce our journal.

Over the past ten years, *Transversal* has sought to establish itself as a space for reflection on the historiography of science, understood as a historical and philosophical approach to scientific knowledge. While maintaining a primary focus on the historiography, philosophy of science, and history of science, the journal has consistently welcomed contributions from related fields, such as the sociology of science and science education, thereby broadening the scope of its intellectual engagement.

Since its inception, *Transversal* has never aspired to be merely a Brazilian journal that publishes articles in English. Rather, it has sought to become a genuine platform for connecting researchers across the globe. During its first decade, the journal has transcended geographical boundaries in the production and circulation of knowledge. With contributions from authors representing approximately thirty countries, ranging from Mexico to China and from South Africa to Sweden, among many others, we have built an intellectual cartography that challenges conventional maps of knowledge production and circulation. In doing so, the journal has sought to overcome the traditional North-South dichotomy that frequently structures the international division of scientific labor.

Transversality is not merely an epistemological concept that inspires the journal's title; it is also an intellectual and political commitment that defines its very identity.

China's presence in our journal dates back many years. We have had the honor of publishing the work of Chinese scholars in *Transversal*. Moreover, we are deeply interested in fostering academic partnerships with China, given its role as a major global actor and its significant influence in the contemporary world in economic, technological, scientific, and cultural terms. For our journal in particular, the presence of the Confucius Institute at our university has created valuable opportunities for academic and cultural exchange.

With regard to the historiography of science, we are especially interested in making *Transversal* a platform through which Chinese scholars can engage with our international readership on issues related to the history and philosophy of science around the world and, in particular, in China.

We look forward to receiving your contributions.

Thank you very much!

Organisation

Host

School of Philosophy, Zhejiang University
主办单位：浙江大学哲学学院

Local Organizer

Institute of Science, Technology and Social Development
School of Philosophy, Zhejiang University
经办机构：浙江大学哲学学院科技与社会发展研究所

Co-host and Co-organizer

Center for Philosophy of Science
The Hong Kong University of Science and Technology
联合主办和经办机构：香港科技大学科学哲学中心

Organizing Committee

- Yafeng Shan | Hong Kong University of Science and Technology
- Qinyi Wang | Hong Kong University of Science and Technology
- Qiyue Zhang | Hong Kong University of Science and Technology
- Bohang Chen | Zhejiang University
- Yuzhe Sha | Zhejiang University
- Jingwen Xiao | Zhejiang University
- Haohao Li | Zhejiang University
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Venue and Maps

All sessions take place in Room 429, Building 4, Chengjunyuan, Zijingang Campus, Zhejiang University.

浙江大学紫金港校区成均苑4幢429会议室

Campus address: 866 Yuhangtang Road, Hangzhou, Zhejiang, China.

For navigation, search for 浙江大学紫金港校区成均苑4幢 on any map app.

Venue Location

The blue location pin marks Building 4, Chengjunyuan. All workshop sessions are in Room 429.



Official Campus Map



Scan for a wider campus view.

Destination
Building 4, Chengjunyuan
Meeting room
429

Should you have any questions, please contact: Yuzhe Sha (12444042@zju.edu.cn) .

Day 1 Programme - 24 October 2026

Note: a presentation is kindly requested to consist of a 30 min lecture + a 15 min Q&A session.

Time	Sessions
10:00 AM – 10:15 AM	Opening Address 1. Bohang Chen (ZJU) and Yafeng Shan (HKUST) 2. Huaxin Huang (ZJU) 3. Group Picture
Session 1. Chair: Yuzhe Sha (ZJU)	
10:15 AM – 11:00 AM	A Remark from Leibniz (almost) Solves the Needham Problem(s) Bohang Chen (Zhejiang University)
11:00 AM – 11:45 AM	Reconsider the Historiography of Technology: A Return to Internal History Centered on Macro-Inventions Tianze Lv (Northwestern Polytechnic University)
11:45 AM – 01:15 PM	Lunch Break (on campus)
Session 2. Chair: Jingwen Xiao (ZJU)	
01:15 PM – 02:00 PM	Genetics, and the Dialectics of Nature: From the Gene Concept to the Formation of an Autonomous Tradition in Chinese Life Sciences Jiazhen Cheng (Soochow University)
02:00 PM – 02:45 PM	Who was the First to Discover the Living Metasequoia? An Unanswerable Question in the Historiography of Science Qiyue Zhang (HKUST) & Jingwu Gu (Waseda University)
02:45 PM – 03:15 PM	Coffee Break
Session 3. Chair: Mingyue Zhang (ZJU)	
03:15 PM – 04:00 PM	Historicizing Natural History: Historiographical Divergence in Modern China and Japan Che Jiang (Tsinghua University)
04:00 PM – 04:45 PM	Hans Driesch’s Vitalism among Chinese Biologists (1922–1928): An Ecology of Reception Shan Diao (Chinese Academy of Sciences)
05:30 PM – 07:00 PM	Conference Dinner

Day 2 Programme - 25 October 2026

Note: a presentation is kindly requested to consist of a 30 min lecture + a 15 min Q&A session.

Time	Sessions
Session 4. Chair: Haohao Li (ZJU)	
09:00 AM – 09:45 AM	The Jian-Bai Debate (堅白) between Mohism and the School of Name: a Case of Scientific Debate in Psychology in Pre-Qin Dynasty China Wai Fu (Hong Kong Shue Yan University)
09:45 AM – 10:30 AM	Rethinking the Historiography of the Continental Drift Debate Qinyi Wang (HKUST)
10:30 AM – 10:45 AM	Coffee Break
Session 5. Chair: Bohang Chen (ZJU)	
10:45 AM – 11:30 AM	Starting from Land Surveying: A Practice-Oriented Approach to the Historiography of Mathematics in Ming China Sichen Wang (Xidian University)
11:30 AM – 12:15 PM	The Cultural Manifold Approach and the Historiography of Traditional Chinese Astronomy Tengyue Xiong & Haohao Zhu (University of Science and Technology of China)
12:15 PM – 12:30 PM	Concluding Address Bohang Chen (Zhejiang University)
12:40 PM – 02:00 PM	Lunch (on Campus)

Abstract 01

24 October / 10:15-11:00

A Remark from Leibniz (almost) Solves the Needham Problem(s)

Bohang Chen

Zhejiang University

In his *Magnus Opus, Science and Civilisation in China*, the distinguished historian of Chinese science and technology Joseph Needham raised the following two questions: “why, between the first century BC and the fifteenth century AD, Chinese civilization was much more efficient than occidental in applying human natural knowledge to practical human needs?” and “why modern science had not developed in Chinese civilization (or Indian) but only in Europe?” Subsequently scholars from various fields (history, economics, sociology, political science, philosophy, etc.) have addressed (and re-formulated) Needham’s original problem via different perspectives, regarding issues such as scientific progress, pre-industrial technological advancement, the industrial revolution(s), and economic prosperity. Several solutions to the Needham problem(s) that hinge on supposed differences between China and the West have been put forward, including distinctive economic systems, divergent political institutions, contrasting scholarly environments, and even essential cultural differences. It might also be noted that the Needham problem(s) is also ideologically sensitive, both in the West and in China. In the West, progressive and liberal intellectuals have long attempted to destroy Western centralism and emphasize the non-Western contributions to the rise and development of modern science and technology; in contrast, conservatives are still implicitly (if not explicitly) committed to various kinds of Western triumphism that emphasize the unique contributions of the Western civilization. Conversely, in China nationalist conservatives are happy to agree with Western liberals on dismantling Western centralism, while the liberals turn to Western triumphism, partly to advance their own reformist agendas of several forms.

Based on existing scholarly literature, the present contribution suggests that, if the following remark from G. Leibniz were more comprehensively developed, it would adequately address the Needham problem(s). In his “Preface to the NOVISSIMA SINICA (1697/99)”, Leibniz curiously noted that “we are their equals in the industrial arts, and ahead of them in contemplative sciences, certainly they surpass us (though it is almost shameful to confess this) in practical philosophy, that is, in the precepts of ethics and politics adapted to the present life and use of mortals”. Leibniz’s remark draws three comparisons, with respect to “contemplative sciences” such as mathematics and natural philosophy (what we call theoretical sciences today), “industrial arts” which are roughly identical to technological inventions, and “practical philosophy” that concerns precepts of ethics and politics. Leibniz’s remark is ideologically neutral and relies solely on logic and evidence. While it emphasizes the unique contributions to modern science and technology from the West (and adopts therefore an apparently Western centric tone), it does not discriminate against any non-Western civilization from any cultural essentialist perspective.

Inspired by Leibniz’s remark, first, the present contribution suggests that there have been, as a matter of fact, several different (but certainly inter-connected) versions of the Needham problem, and it is more desirable to speak of Needham problems which deserve separate treatments. More specifically, it is useful to draw precisely several subtle distinctions among science (further: theoretical/contemplative or empirical), technology (further: industrial or pre-industrial), and broader practical arrangements of ethics and politics (further: economic prosperity, state capacity or human welfare), and raise thereafter comparative questions between China and the West accordingly. After all, it is fairly well-known in philosophy of science that scientific knowledge is different from its technological applications; it is widely agreed in history of science and technology that at least the Second Industrial Revolution relied heavily on precedent scientific achievements; and it is also commonly accepted among economic historians that strong state capacities in directing infrastructural progress do not necessarily improve human welfare. Unlike Leibniz who maintained relatively clear-cut distinctions, scholars today often conflate different issues when addressing the ideologically sensitive Needham problem(s).

Second, while Leibniz’s remark might be correct for his own time, it needs revisions for long-term historical periods. To start, Leibniz’s insight on “contemplative science” (further developed by the historian of science F. Cohen’s *The Rise of Modern Science Explained: A Comparative History*) is valid for most historical periods. The core difference between China and the West at the Eve of modern science was that the former lacked a strong theoretical tradition in its scientific discourse on nature, and this difference dates back perhaps even to the ancient Greek and Pre-Qin periods. Moreover, Leibniz’s insight on “industrial arts” needs to be revised at two levels. Before 1700 (when Leibniz made his remark), technological development observed a strong empirical direction and remained largely independent from theoretical scientific progress, and China might surpass the West in particular historical periods (e.g., the Song dynasty). But After 1700, at the dawn of the Industrial Revolutions (especially the second one), technological advancement relied more heavily on scientific progress at the theoretical level, then China fell far behind the West, especially in the late 18th and 19th centuries. Furthermore, Leibniz’s insight on “practical philosophy” and “the precepts of ethics and politics” is the most controversial, since it might not even be valid in his own time. Although China remained under the unified Qing empire ruled by three successive despotic emperors (Kangxi, Yongzheng, and Qianlong), Chinese people were forbidden to conduct international trade, and Confucian philosophers were scared to speak openly against the court. But more broadly speaking, in longer historical periods, under the rules of at least some enlightened and open-minded emperors, international trade and free communication of knowledge remained possible both within the unified Chinese empire and across the international border (e.g., the Song dynasty). In these scenarios, the practical arrangements in ethics and politics available in the Chinese empire were especially receptive to the implementation of technological advancement (based on science or not) at a much larger scale (although the benefits often went unevenly to the state rather than Chinese people). Overall, attempts to address the Needham problem(s) by appealing to differences in economic systems, political

institutions, scholarly environments, and even essential cultural traits, often commit the fallacy of over-generalization and miss the real explanans target.

Finally, it should also be noted that Leibniz's insight on "practical philosophy" and the "precepts of ethics and politics" moves far beyond the mere creation of an adequate social environment receptive to scientific and technological progress, and it concerns more fundamental questions like, the goal of such progress. The present contribution concludes by suggesting that the drive to answer these questions motivates the Needham problems, but the solutions themselves simply lie beyond scientific and technological progress.

Abstract 02

24 October / 11:00-11:45

Reconsider the Historiography of Technology: A Return to Internal History Centered on Macro-Inventions

Tianze Lv

Northwestern Polytechnic University

I. Dominant Traditions and Paradigm Shifts in the Historiography of Technology

The historiographical tradition of the history of technology has undergone three distinct phases:

1. The Internalist Tradition (Prior to the 1980s)

This initial phase focused on the internal evolution of technology itself. Exemplified by the monumental multi-volume *A History of Technology* edited by Charles Singer et al., alongside the comprehensive general histories (e.g. *Histoire générale des techniques*) authored by French historians of technology such as Maurice Daumas and Bertrand Gille, this scholarship centered on inventions, manufacturing processes, and the progress of apparatuses. However, this tradition often exhibited a Whiggish view of history: technological evolution was typically organized into a linear progression from simple to complex, and from inefficient to efficient. Such kind of historiography implied that technological progress was the inherent direction of history, often overlooking regression, stagnation, multi-path competitions, localized specificities, and historical contingencies.

2. The Social Constructivist Turn (Emerging in the 1980s)

The second phase was marked by the rise of constructivist approaches, most notably the Social Construction of Technology (SCOT) framework. This paradigm rejected the notion of unilinear progress, arguing instead that technological artifacts are shaped through interpretive flexibility, controversies, and negotiations among relevant social groups. Classic case studies—such as Trevor Pinch and Wiebe Bijker's analysis of the bicycle, David Noble's study of automated machine tools, and Thomas P. Hughes's examination of electric power systems—tried to demonstrate that the triumph of a technological design is rarely determined solely by technical superiority. Rather, it is deeply entangled with user demands, market structures, professional communities, and social values.

3. The Actor-Network Theory (ANT) and Global Turn (21st Century Onward)

The third phase incorporates Actor-Network Theory (ANT) and the global history of technology. Drawing on the sociology of translation developed by Bruno Latour and Michel Callon, ANT dismantles the ontological divide between human and non-human actors, positing that technology, humans, materials, and institutions collectively constitute heterogeneous networks of action. Technology is no longer seen as a discrete, isolated artifact, but as an assemblage of heterogeneous elements. Concurrently, the global turn in the history of technology critiques the Eurocentric, unidirectional diffusionist model. Instead, it advances a polycentric narrative emphasizing localized adaptation, translation, appropriation, and asymmetrical power relations in cross-regional exchanges. Consequently, the field has increasingly shifted toward analyzing the mutually constitutive relations among technology, society, and global networks.

As a consequence of these successive turns, the historiography of technology has become increasingly externalist. Social, political, and cultural factors have taken center stage, while the internal logic of technology have gradually been relegated to a secondary status, leading to a relative scarcity of dedicated internalist studies over recent decades.

II. Limitations of Contemporary Paradigms and the Irreplaceability of Internal History

While dismantling the Whiggish, linear progressivism of traditional internalism, the post-1980s turns introduced a new systematic bias: by reducing technological design primarily to social negotiation, power dynamics, or institutional incentives, these externalist frameworks often obscure the physical constraints and internal logic of technology itself, resulting in over-socialized explanations.

David Noble's account of numerical control (NC) machine tools exemplifies this tendency. Noble argued that automation was designed as a managerial mechanism to discipline and control shop-floor labor. However, subsequent scholarship demonstrated that his argument underestimated the technical maturity of NC programming, the precision limits of sensors and feedback loops. Similarly, while Donald MacKenzie's *Inventing Accuracy* illustrated how strategic discourses and bureaucratic politics shaped Cold War missile guidance, strong constructivist readings tend to downplay fundamental engineering constraints—such as gyroscope drift rates, processing speeds, and material stability under extreme thermal stress. Missile accuracy was never a metric that could be arbitrarily negotiated through political rhetoric alone.

Actor-Network Theory (ANT) posits a generalized symmetry between human and non-human actors. Yet, this ontological equivalence remains an a priori assumption lacking robust empirical grounding. In *longue durée* historical analyses, material constraints—such as tensile strength, thermodynamic efficiency, and information transmission speed—often exert far greater structural influence than the transient intentions or rhetorical strategies of specific historical actors. Preemptively flattening asymmetric constraints obscures the central explanatory question: why certain limits decisively outweigh others.

Consequently, an internalist perspective retains indispensable explanatory power, substantiated by two arguments:

1. **The Relative Autonomy of Technology (Particularly Macro-Inventions):** Many foundational breakthroughs—such as Alexander Fleming’s penicillin or Wilhelm Röntgen’s X-rays—did not emerge as direct responses to social demand or market signals. Instead, they were products of cumulative knowledge, cross-disciplinary recombination, and serendipity, externalist frameworks struggle to account for such non-demand-driven, radical innovations.

2. **Cross-Civilizational Universality and Technological Convergence:** When disparate sociopolitical and cultural systems encounter the same underlying principle (e.g., gunpowder), they independently converge toward remarkably similar technological solutions. This convergence can only be explained by the universality of material properties and engineering constraints. It also highlights that the history of technology is inherently global and unconfined by geographic boundaries: understanding one nation’s technological trajectory inevitably requires understanding the technological trajectory of other countries at the same time.

However, this does not advocate a simple regression to pre-1970s internalism. The fundamental flaw of the old internalism lay in organizing history strictly by functional categories (e.g., history of transport) or chronological periods (e.g., nineteenth-century technology). This taxonomy severed the genealogical linkages among artifacts sharing common underlying mechanisms, obscured the actual transmission pathways of technical knowledge, and blurred the distinction between first-order principle and subsequent refinement. Therefore, what is needed is a new organizational logic for internalist history.

III. A New Internalist Approach Centered on Macro-Inventions

In *The Lever of Riches*, Joel Mokyr introduces a pivotal distinction between “macro-invention” (radical breakthroughs unlocking novel technological possibilities) and “micro-invention” (incremental refinements optimizing efficiency, cost, reliability, and application). Beyond economic history, this distinction holds profound historiographical value: macro-inventions serve as foundational nodes on the evolutionary tree of technology, triggering cascades of subsequent innovations.

Epistemologically, this taxonomy delineates the explanatory bounds of different historiographical frameworks. Macro-inventions are governed primarily by the autonomous logic of cumulative knowledge, cross-domain recombination, and serendipity, rendering socioeconomic incentives of limited explanatory value. Conversely, micro-inventions are heavily shaped by market pressures, capital investment, and labor organization. Social constructivism’s overreach stems largely from conflating the two—erroneously deploying micro-level explanatory tools (negotiation, power, institutional incentives) to account for macro-level breakthroughs.

Accordingly, the new internalist approach takes macro-inventions as genealogical nodes to reconstruct a non-linear, non-teleological evolutionary tree. Abandoning functional classifications such as “history of communication”, it examines how foundational breakthroughs emerge from recombining disparate, seemingly unrelated domains. The steam engine, for example, did not evolve endogenously within prime-mover technology; rather, it crystallized at the intersection of physics (vacuum experiments), chemistry (atmospheric pressure study), and mine-drainage engineering. This evolutionary framework captures the cross-fertilization, principle transfer, and radical recombination that functionalist classifications fragment and obscure.

This paradigm does not reject social factors; rather, it establishes a layered synthesis that delineates their proper domain: At the macro-invention level, internalist tracing takes precedence to reconstruct knowledge lineages; At the micro-invention level, externalist socioeconomic analyses (capital, labor, markets, policy) are deployed to explain incremental optimization, scaling, and diffusion. By assigning distinct explanatory models to appropriate nodes on the technological tree, this new internalist framework integrates technical logic and social context without conflating their roles.

IV. Case Studies Illustrating the New Historiographical Approach

1. The Haber-Bosch Process

At the close of the nineteenth century, the impending depletion of natural nitrate reserves posed a severe societal crisis for fertilizer and munitions supplies. Yet, while social demand framed the problem space, it did not dictate the technical solution. Among several theoretical possibilities (e.g., the electric arc and cyanamide processes), Fritz Haber’s 1909 catalytic route was not deduced from societal demand, but emerged from empirical experimentation rooted in chemical kinetics and thermodynamic equilibria. Demand defined what to solve, while internal technical logic dictated how.

The leap from Haber’s bench-scale breakthrough to industrial synthesis required an extensive sequence of micro-inventions led by Carl Bosch at BASF. These addressed fundamental engineering bottlenecks: discovering robust iron-based catalysts (developed by Alwin Mittasch), overcoming hydrogen embrittlement in high-pressure reactor vessels, and engineering continuous gas compression and purification systems.

Rather than serving a single end-use, this process established a high-pressure catalytic engineering platform. It branched into new technical domains—such as methanol synthesis, Fischer-Tropsch fuel synthesis, and coal liquefaction—while profoundly transforming global agriculture (the Green Revolution), chemical manufacturing, and geopolitical strategies (German wartime production). Here, internal genealogy and external socioeconomic contexts integrate seamlessly across the evolutionary tree.

2. The Mechanical Spring

At the macro-invention level, the spring represents a first-order breakthrough in the controllable storage and release of elastic potential energy, co-evolving with the metallurgy of spring steel in fourteenth- and fifteenth-century horology. This macro-

breakthrough catalyzed a proliferation of micro-inventions: specialized heat treatments and quenching techniques, morphological innovations (leaf, coil, spiral, and torsion springs), and functional couplings with escapements, gears, triggers, and ratchets. In turn, these components diffused across diverse technological systems, enabling decisive advancements in clocks, locks, firearms, vehicle suspensions, machine tools, and precision instrumentation.

V. Methodological Reflections and Challenges

The primary operational challenge of this approach lies in narrative control. Demarcating macro- from micro-inventions relies on historiographical judgment. Without rigorous analytical discipline, tracing cross-domain genealogies risks degenerating into an unstructured mosaic of disparate facts rather than a coherent explanatory narrative. Reconstructing the evolutionary tree requires high synthesis and evidentiary rigor to prevent deep epistemic lineages from collapsing into superficial technical analogies.

VI. Conclusion

The multifaceted nature of technology precludes any singular, all-encompassing historiographical paradigm. While social constructivism shows the role of power, negotiation, and institutions in shaping artifacts, internalist perspective recovers the semi-autonomy of technology rooted in material, mechanical, and epistemic constraints. Operating at distinct analytical tiers, these frameworks are complementary rather than mutually exclusive. The future of the historiography of technology lies not in proclaiming new “paradigm shifts”, but in fostering a “layered pluralism”—where diverse traditions deepen within their respective domains, critically cross-examine one another, and collectively construct a more comprehensive understanding of technological evolution.

Abstract 03

24 October / 13:15-14:00

Genetics, and the Dialectics of Nature: From the Gene Concept to the Formation of an Autonomous Tradition in Chinese Life Sciences

Jiazhen Cheng

Soochow University

Unlike the rapid dissemination of Darwinian evolutionary theory in late nineteenth-century China, the introduction and indigenous development of modern genetics encountered profound theoretical and practical challenges. Existing scholarship has tended to treat Tan Jia-zhen's (C. C. Tan) pioneering experimental research and his later efforts in scientific institution-building as separate episodes, while largely overlooking the philosophical framework that linked them: the Dialectics of Nature. This paper argues that Tan's genetics emerged through a historically grounded reworking of dialectical philosophy within scientific practice. Rather than treating dialectical philosophy as an external ideological framework imposed upon genetics, or regarding Tan's ideas as the endogenous outcome of genetics alone, this study demonstrates how dialectical categories were transformed into working principles for genetic research while being simultaneously reinterpreted through scientific practice itself. This intellectual trajectory unfolded across three interconnected levels: the conceptual reconstruction of the gene at the micro level, the theoretical reconfiguration of genetics amid ideological controversy at the meso level, and the extension of biological knowledge into broader social and political contexts at the macro level. By reinterpreting Tan's career as a key intellectual nexus linking Morganian genetics, Theodosius Dobzhansky's Modern Synthesis, and the localization of modern genetics in China, this study demonstrates how this historically situated reconstruction informed both the development of modern Chinese genetics and the emergence of an autonomous tradition in the Chinese life sciences.

Tan's early research was firmly grounded in classical genetics. Working with *Harmonia axyridis* (the Asian ladybird beetle), *Drosophila melanogaster*, and *Macaca mulatta* (the rhesus macaque), he investigated the material basis of heredity across multiple experimental systems. Rather than treating genes as fixed hereditary units operating through a simple linear causal mechanism, Tan demonstrated through his studies of mosaic colour patterns in *Harmonia axyridis* that gene expression was a dynamic, spatiotemporally regulated process shaped by developmental timing and environmental conditions. His identification of genetic mosaicism provided important empirical support for the theory of position effects, contributing to a reconceptualization of the gene from a static chromosomal locus to a dynamic structure-process entity—a contribution that Theodosius Dobzhansky regarded as particularly significant. Tan subsequently extended this line of inquiry to the radiation genetics of *Macaca mulatta*, where he systematically examined the dosage-dependent and cumulative effects of induced mutations. By relating chromosomal alterations to phenotypic variation, this work helped establish an experimental foundation for later developments in mutation breeding and radiation biology.

During the mid-twentieth century, Chinese genetics became the site of an intense ideological confrontation between the Mendel-Morgan school and the Soviet-backed Michurin-Lysenko school. Rather than embracing the categorical rejection of Lysenkoism associated with Western geneticists such as Jacques Monod, or the retrospective critiques later advanced by Richard Lewontin, Tan worked within the controversy itself, drawing on the philosophical principles articulated in Mao Zedong's *On Practice* (《实践论》) and *On Contradiction* (《矛盾论》) to develop a dialectical synthesis of competing genetic traditions. He reinterpreted philosophical categories in genetic terms, identifying the inherited chromosomal structures emphasized by Morganian genetics as the "internal cause" of biological change and the environmental factors stressed by the Lysenko school as the "external cause," while maintaining that environmental influences affect heredity only through metabolic processes acting upon genetic material. Through careful conceptual analysis, Tan distinguished the scientifically untenable doctrine of the "inheritance of acquired characters" from experimentally supported phenomena such as genetic assimilation, which he interpreted in terms of gene pleiotropy and polygenic modifier systems. In doing so, he defended a materialist conception of genetics, arguing that the gene should be understood not as a fixed and idealized entity but as a historically evolving, dynamic molecular system whose functions emerge through biological processes.

Following the launch of China's Reform and Opening-up in the late 1970s, Tan expanded his dialectical understanding of genetics into a broader conception of the life sciences, a transition he regarded as the dialectical development of scientific disciplines. He conceived the life sciences as an integrated intellectual framework organized around four interrelated principles: the unity of living matter, the diversity of biological forms, the historical continuity of evolution, and the reciprocal adaptation of organisms and their environments. Convinced that scientific knowledge should ultimately serve social development, Tan became a leading advocate of the industrial application of genetic engineering, seeking to bridge fundamental research and technological innovation. At the same time, he developed one of the earliest indigenous socio-ethical reflections on modern biotechnology. Rejecting both class-based and genetic determinist interpretations of eugenics, he proposed "euthenics" (youjingxue, 优境学), arguing that improvements in educational, cultural, and environmental conditions—particularly in rural China—provided the most effective means of fostering human development. Confronting the emerging problem of biopiracy, Tan also called for legislative protection of China's rich human and biological genetic resources, maintaining that developing countries should retain sovereign authority over their biological heritage rather than becoming suppliers of genetic resources for more technologically advanced nations.

In conclusion, Tan Jia-zhen's intellectual trajectory demonstrates that the Dialectics of Nature functioned not as an external philosophical framework imposed upon scientific inquiry, but as an internalized methodological orientation that shaped the development of modern genetics in China. By integrating materiality, experimental practice, and historical development, Tan brought together Western and Soviet scientific traditions while forging an autonomous path for the Chinese life sciences. More broadly, his work provides an important historical case for understanding how scientific communities outside the Euro-American mainstream developed distinctive intellectual traditions while remaining engaged with global scientific knowledge. In this sense, Tan's legacy offers valuable methodological perspectives for the contemporary philosophy and history of science, illustrating how empirical investigation, philosophical reflection, and social responsibility could be productively integrated in the making of modern scientific knowledge.

Abstract 04

24 October / 14:00-14:45

Who was the First to Discover the Living Metasequoia? An Unanswerable Question in the Historiography of Science

Qiyue Zhang (HKUST); Jingwu Gu (Waseda University)

The discovery of a living Metasequoia in China is widely regarded as one of the most important botanical discoveries of the twentieth century (Ma, 2003). Yet there has been a persistent debate over who first discovered this living tree, and the controversy continues today (Hu, 1948; Cheng, 1980; Cheng, 1984; Ma, 2002; Ma & Shao, 2003; Wang et al., 2004; Qian et al., 2024; Zhen et al., 2024; Wang et al., 2024; Wang, 2025; Liu et al., 2026). This paper argues that, from a historiographical perspective, the question is unanswerable: not merely because the historical record is incomplete, but because no single individual can be identified as the discoverer of a scientific discovery.

We first review different versions of the discovery and the debate they have generated. We then identify three necessary elements in the history of scientific discovery: (1) the identification of a scientific problem recognized within an exemplar practice (Shan, 2020); (2) the determination of a solution to that problem and its acceptance by the community (Kuhn, 1962); and (3) the recording and preservation of the discovery process (Yale, 2016; Laloë, 2017) —through publications, conference presentations, or, in botany, the retention of specimens, photographs, or drawings (Del Rio, 2023). These three elements are equally important and none is dispensable. In the Metasequoia case, they were fulfilled by different researchers, which is why the dispute over individual priority arises.

Some historiographical accounts (Wang et al., 2004) give credit to individuals based on the assessment of relevance (Clark & Khosrowi, 2022). We argue that this analysis is problematic. Such analysis typically relies on counterfactual statements of the form “without X, Y would not have happened” to identify contributions. However, this form identifies enabling conditions, rather than contribution to scientific discovery. To advance science, credit should be given only to those whose contribution is a “science-internal manner” (Duerr & Mills, 2025).

We therefore conclude that no single individual can be credited as “the first” to discover the living Metasequoia. The case shows that scientific discovery is a collective process that cannot be accomplished by any individual alone. It must include the complete process of problem identification, problem resolution, and record preservation.

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Abstract 05

24 October | 15:15-16:00

Historicizing Natural History: Historiographical Divergence in Modern China and Japan

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Modern China and Japan confronted a similar problem: how should premodern forms of knowledge about natural things, including materia medica, studies of names and things, and accounts of local products, be related to modern biology? Yet the two countries subsequently developed different historiographical configurations. Beginning with Shirai Mitsutarō's *Nihon hakubutsugaku nenpyō*, Japanese scholars relatively early reorganized heterogeneous traditions such as *honzōgaku*, studies of local products, and Dutch learning into a continuous history of "Japanese natural history". Ueno Masuzō and others later consolidated this framework, making the history of Japanese natural history a relatively stable object of research. China was not without comparable attempts. Zhong Guangguang, Hu Xiansu, Wu Jiaxu, and Xue Fengchang all drew on historical materials to reconstruct earlier knowledge of natural things or to pursue the identification of names and objects. These efforts, however, did not develop into a sustained historiographical tradition. As the history of science became institutionalized in China, categories derived from modern disciplines, such as the "history of biology", increasingly displaced "the history of natural history". Only in the twenty first century was "natural history" reintroduced as a serious historiographical category by scholars such as Liu Huajie, Wu Guosheng, and Yu Xin.

This divergence raises a broader historiographical question. Must a history of natural history begin by assuming that "natural history" already existed as a coherent object in the past? The Chinese case suggests another possibility. Because no canonical history of "Chinese natural history" became firmly established, historians today need not begin with a fixed genealogy, a stable disciplinary boundary, or a predetermined set of canonical figures. They can instead ask how particular practices of naming, identifying, describing, collecting, illustrating, and recording natural things became associated with one another in some historical settings and separated in others.

A comparison with China, Japan and Europe may therefore help clarify the historical conditions under which "natural history" became a recognizable field and a retrospective historiographical category. European natural history likewise did not inherit an unbroken disciplinary tradition from antiquity, while Japanese and Chinese scholars made different choices in relating premodern knowledge to modern science. Historical epistemology offers a useful framework for such comparison, especially through attention to epistemic virtues and epistemic genres. Rather than treating "natural history" as a transhistorical category, this approach allows it to be used more cautiously as a comparative historiographical concept. This, in turn, may help explain why the concept still retains considerable interpretive flexibility and contemporary relevance.

Abstract 06

24 October | 16:00-16:45

Hans Driesch's Vitalism among Chinese Biologists (1922–1928): An Ecology of Reception

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In the early twentieth century, vitalism, represented by figures such as Hans Driesch and Henri Bergson, gave rise to a widely influential “vitalist moment” across the globe. In 1922, Driesch’s visit to China introduced vitalist thought into the country and attracted considerable attention among Chinese intellectuals. By the late 1920s, however, amid the professionalization of science and the growing influence of materialism, vitalism was increasingly marginalized and came to be regarded as a “metaphysical heresy” lying beyond the legitimate boundaries of science. Consequently, this episode in the reception of vitalism has long been neglected in the historiography of science in China.

Yet assessing its historical significance solely in light of its eventual rejection risks falling into the trap of presentism. Over the past decade, a growing body of scholarship has called for a “return to vitalism,” arguing that historians of science should not reconstruct the past exclusively according to the contemporary standards of science, thereby rendering past concepts obsolete or invalid, but should instead attend to the historical processes and intellectual contexts in which scientific knowledge was produced. Following this approach, this article revisits this largely forgotten “vitalist moment” in China. By systematically examining the reception of vitalism within the Chinese biological community during the 1920s, it offers a new perspective on the processes of knowledge construction in Republican China.

The article begins with a brief introduction to Hans Driesch and his vitalist thought, before turning to three key recipients of vitalism in China, examining the circumstances in which they encountered vitalism and the different interpretations they developed. Fei Hongnian (费鸿年) was the most enthusiastic “advocate”. He regarded vitalism as a frontier theory and presented expertise in it as a scholarly specialization through which to establish his academic identity. Bing Zhi (秉志), by contrast, was a “measured commentator.” His reverence for the problem of life and his balanced assessment of vitalism reflected, above all, the responsibility and caution befitting his roles as an educator and a pioneer of biology as a discipline in China. Hu Buchan’s (胡步蟾) position remained less clearly defined at this early stage. As a translator, he offered a comprehensive account of the historical development of vitalism and its moral implications, while maintaining the stance of a “cautious explorer.” The divergent positions of these three biologists reflected not only their respective intellectual backgrounds and professional identities but also foreshadowed subsequent shifts in their attitudes toward vitalism.

Within the special intellectual and social context of the New Culture Movement, these biologists were not passive recipients but active agents in the reinterpretation of vitalism. They were also closely involved with periodicals such as *The Eastern Miscellany* (东方杂志) and scholarly associations such as the Society Wissen und Wissenschaft (中华学艺社) and the Science Society of China (中国科学社). Together, these individuals, periodicals, and associations formed a differentiated and multilayered ecology of reception characterized by continuous interaction, negotiation and adaption. Within this ecology, individual scholars and institutional platforms collaborated with and reinforced one another, creating a number of distinct “microclimates” for the circulation of vitalism. Differences in institutional orientation, and conceptions of science meant that these “microclimates” varied considerably in their receptiveness to vitalism. As a broader intellectual “climate”, increasingly shaped by the consolidation of materialist approaches to science and the rapid development of genetics, came to prevail, vitalism gradually declined within the Chinese biological community, while its principal early recipients successively revised or abandoned their earlier positions.

In this process, vitalism was reinterpreted and reframed, acquiring multiple layers of meaning. On the one hand, it was regarded as an as-yet-unverified “frontier theory” that posited a distinctive form of biological causality and suggested the possibility of establishing biology as an autonomous fundamental science. At the same time, vitalism was invested with moral significance: it was interpreted as a symbol of the autonomy and freedom of life and as a potential corrective to “ethical materialism.” On the other hand, vitalism was criticized as a philosophical “speculation” and questioned as a marginal, non-mainstream doctrine, with some suspecting that it implicitly endorsed “doctrine of special creation.” Such criticisms reveal both its marginal position within the contemporary system of knowledge and its deeply contested status. These rich historical details demonstrate that even theories destined to decline were by no means devoid of significance; they, too, contributed to the formation and maturation of biologists’ intellectual frameworks.

In sum, the reception of vitalism in Chinese intellectual circles during the 1920s was marked by a dynamic ecology marked by controversy, competition, adjustment and revision. The article concludes by arguing that the reception and eventual abandonment of vitalism should not be understood simply as a judgment between what was “right” and what was “wrong.” Rather, this history reveals Chinese scientists’ sustained inquiry into the problem of life and their attempts to seek new points of convergence among culture, science, and conceptions of human life. Reconstructing this process not only enables us to recover the “vitalist moment” that once unfolded in China and to illuminate the multiple meanings of vitalism, but also brings into the intellectual explorations and adjustments of historical actors shaped by the combined forces of scholarly commitments, scientific norms, and social responsibilities. Historical inquiry should trace not only the ideas and achievements that ultimately endured, but also those intellectual trajectories that faded

from view—marginal and faintly voiced, yet charged with tension. An “ecology of reception” provides a valuable perspective from which to recover precisely these neglected dimensions of the past.

Abstract 07

25 October / 09:00-09:45

The Jian-Bai Debate (堅白) between Mohism and the School of Name: a Case of Scientific Debate in Psychology in Pre-Qin Dynasty China

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In Chapter “The World” in Book of Zhuang Zi (《莊子?天下》), it was described that a branch of followers of Mozi (墨翟) drilled in depth in the proposition of “Jian-Bai” (堅白, hardness and whiteness) and “Tong-Yi” (同異, on similarity and differences). While “同異” (similarity and differences) was well elaborated in book of “Xiao Qu” (Small Decision) in Book of Mozi (《墨子?小誡》), the proposition of “Jian Bai” is not so straight-forward. In entry 116 of The Script and Annotation II (經說下) in Book of Mozi, “無堅得白, 必相盈也” (in case of Jian Bai, the relationship between Jian and Bai must be complementary). In entry 139 of The Script and Annotation II (經說下), it was mentioned that, “於石一也, 堅白二也, 而在石。故有智焉, 有不智焉, 可。” (Stone is an entity, which included two quality: hardness, and whiteness. These qualities are included in the object “stone”. Sometimes, we perceive (智) one aspect, sometimes we omit one aspect (不智), but it is still possible, and “Jian and Bai are two” is still a valid statement). Then Mohist followers explained, 智 : 以目見。而目以火見, 而火不見。惟以五路智, 久不當, 以目見若以火見。 ” (To illustrate what is perception, for example, vision is conducted by eyes. However, the perquisite is that there are light, and the light alone does not lead to vision. However, as we use our sense for so long, we perceive that we use our eyes to see even we are seeing based on lights).

On the other hand, Gongsun Long (circa 320 B.C. – 250 B.C.), who is the leader and the biggest critique of Mohism, reject such notion. In Chapter of “Hardiness-Whiteness” of Book of Gongsun Longzi (《公孫龍子?堅白》), they argue that the position of Mohism, which stated that the quality of “stone” included two essences (hardiness, and whiteness” (he summarized this position as “Stone, Hardiness, and Whiteness” are three qualities 堅白石三 as invalid. He refused Mohist position that “the qualities are inclusive in the objective existence of “a stone”, but suggested that these are psychic qualities that were rooted from our perception. (有自藏也, 非藏而藏也。). These was further elaborated in Gongsun Long’s arguments: when we perceive “white”, we temporarily separate the sensation of “Jian” out of our phenomenological world. (得其白, 得其堅, 見與不見離). Therefore, in psychological dimension, we would not at the same time hold the “white” and “hard” in a stone, but is in a volatile state of “white” or “hard”. In the end of the debate, Gongsun Long argued that “white” (the domain of vision) and “hard” (the domain of tactile) could be detached from physical reality. He proposed the phenomena of afterimage – seeing even the external stimulus is removed (目以火見, 而火不見。則火與目不見而神見。神不見, 而見離) (We see when there is light, but when we remove the light, even though there is not light to stimulate the eyes, we still see the image with our conscious (神), when conscious can’t see the image, it means that the “vision” is dissociated from our conscious). He even adopted another example in tactile sensation, which could be understood in psychological term as “reflex act”. “堅以手, 而手以捶, 是捶與手知而不知。而神與不知。神乎, 是之謂離焉。” (We hit our hand with a hammer, but even the hammer touches the hand, we don’t have the sensation and the hand response. In this situation, our conscious is not able to perceive that. Therefore, in this case, the conscious is in the state of dissociation). When one’s conscious is dissociated, one slips into a state of “the world”, which could not be proved and could only be self-explanatory. (離也者天下, 故獨而正。)

The Gongsun Long –Mohism debate on “Jian Bai” marked one of the earliest example in debate in psychology (circa 3th century B.C.), which is an epitome of pre-Qin Dynasty scientific debate in the area of sensation and perception. The proposal of different state of consciousness (perception 知, conscious 神, dissociation 離, and phenomenological world 天下) could be comparable with contemporary argument from Maurice Merleau-Ponty in Phenomenology of perception (1945), which adopted phenomenological perspective to argue against Neo-Realist Position of Behaviorism that perception is a natural response to external stimulus. Significance of Gongsun Long-Mohism debate could be regarded as a showcase of psychology in ancient China.

Abstract 08

25 October / 09:45-10:30

Rethinking the Historiography of the Continental Drift Debate

Qinyi Wang

HKUST

How to understand the history of Wegener's continental drift theory? There are three main history narratives for his theory, including the rationalist narrative, the contextualist narrative, and the styles-of-thought narrative. The traditional rationalist narrative holds that scientists are rational decision-makers and that a theory naturally becomes mainstream once sufficient evidences emerge. When Wegener proposed his theory, he lacked an explanation of the driving mechanism of continental drift and his argument of tidal and pole-flight forces were erroneous, thus the theory was not accepted by the geographic scientific community (Press & Siever, 1974; Uyeda, 1978). However, Oreskes (1999) found that after Wegener's continental drift theory was proposed in 1915, at least three theories were put forward to explain the kinematics of drift, including Daly's (1926) gravity sliding, Joly's (1925) periodic melting, and Holmes's (1929) mantle convection. Oreskes proposed the contextualist narrative and argues that American geoscientists rejected the continental drift theory not because it lacked evidence or mechanisms, but because it violated the methodological practices of American geographic scientific community at that time. For example, T. C. Chamberlin's method of multiple working hypotheses, which required scientists to start from observed facts and gradually form theories, was highly recognized. Wegener's theory was the opposite. He began with a conclusion that continents had once been joined, and then sought evidence to prove it. For the American geologists, this was violated with their methodology, and thus the scientific community did not accept Wegener's theory. Then, Pellegrini (2019) proposed the styles-of-thought narrative and argues that the controversy over Wegener's theory is a dispute between two thought styles, namely fixism and mobilism. Because these two thought styles possess independent standards, Wegener's theory was not accepted. Pellegrini points out that Wegener was not the first scholar to propose continental drift theory and geologists have long tradition of the classification of two continental theories, namely fixism and mobilism (Argand, 1922). Fixism holds that continents are essentially fixed in place, and changes are mainly degradation, subsidence, and the collapse of land bridges. Mobilism, by contrast, holds that continents were once joined, then split apart and drifted. Pellegrini argues that even when new evidence such as paleomagnetism and seafloor spreading emerged in the 1960s, it did not immediately persuade fixists to believe in mobilism. Rather, because mobilists occupied universities and trained a new generation of geologists, most young geologists supported mobilism, and only then did the mainstream scientific community accept Wegener's continental drift theory. Pellegrini argues that scientific consensus is not determined by evidence alone, but by the styles of thought.

I argue that these three narratives all have problems. The rationalist narrative oversimplifies the complex process of scientific consensus's formation and the increase of evidence does not necessarily lead to the increase in a theory's acceptance. The contextualist narrative overgeneralizes American geological practice because not all American geologists adhered to the method of multiple working hypotheses. The styles-of-thought narrative suffers from vague boundaries between fixism and mobilism. Fixism contains multiple different theories, and how to distinguish fixism from mobilism is ambiguous. For example, the theory that explains fossils' similarities through transoceanic land bridges and the theory that explains mountains' formation through the Earth's cooling and contraction have nothing in common. If they are labeled as one fixist style of thought, then this category can not distinguish the differences between different theories and risks being ad hoc explanations.

Building on Vagelli's stylistic pluralism, I propose a pluralist narrative approach to understand the history of Wegener's continental drift theory. Vagelli's stylistic pluralism proposes that different styles of reasoning introduce different ways in which statements can be true or false, thereby showing how historicity and objectivity may be reconciled rather than opposed (Vagelli, 2025). Within Vagelli's framework, different styles of reasoning produce different conclusions, and this framework allows us to retain all three narratives without having to make an exclusive choice among them. I argue that the history of Wegener's theory can be understood as three dimensions, including rational judgment of evidences, social contextual influence, and influence of thought styles. The task of historians is not to choose one narrative but to show how these dimensions shape the scientific history. Take the paleomagnetic evidence of the 1960s as an example. On the one hand, within the mobilist thought style, the symmetry of seafloor magnetic anomaly stripes was assumed as key confirmation of seafloor spreading, but within the fixist thought style, the same data could be regarded as different interpretations of geomagnetic polar wander. On the other hand, the tradition of American geoscientists led some fixists to prefer waiting for more evidence, while the younger generation of geologists made rational judgments within the mobilist thought style. The three dimensions do not operate independently but are operate mutually.

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Abstract 09

25 October / 10:45-11:30

Starting from Land Surveying: A Practice-Oriented Approach to the Historiography of Mathematics in Ming China

Sichen Wang

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Research on the history of Chinese mathematics has accumulated a substantial body of scholarship over several generations, and understandings of mathematics in Ming China have likewise continued to expand. For a considerable period, mathematics in the Ming dynasty was situated within a narrative of decline following the high achievements of Chinese mathematics in the Song and Yuan dynasties. Yoshio Mikami, for example, characterized the Ming period after the publication of Zhu Shijie(朱世杰)'s Siyuan yujian (四元玉鉴, Jade Mirror of the Four Unknowns) as an "age of decline in mathematics." Qian Baozong(钱宝琮) similarly described the nearly three centuries following the Siyuan yujian as a "dark period" in the history of Chinese mathematics, while Joseph Needham remarked that during roughly the first century and a half of the Ming dynasty there was "scarcely anything noteworthy" in the history of mathematics. Although these assessments arose from different schemes for periodizing the history of Chinese mathematics, they largely took advances in mathematical theory, methods, and major achievements as important points of reference, with the result that the early and middle Ming received comparatively limited attention. As mathematical texts from the Ming dynasty have been progressively recovered and studied, and as research on abacus calculation, practical arithmetic, mathematical mnemonics, and the transmission of mathematical knowledge has deepened, this picture has changed considerably. Scholars such as Li Di(李迪), Lao Hansheng(劳汉生), and Guo Shirong(郭世荣) have reconsidered mathematics in Ming China from the perspectives of the spread of abacus calculation and the popularization and practical orientation of mathematics. Scholarly attention has thus gradually shifted from emphasizing the relative lack of theoretical innovation to exploring the distinctive forms of mathematical knowledge and historical characteristics of the period.

Building on these substantial achievements, apparently ordinary "small problems" may still open up further questions worthy of investigation in the history of mathematics. This article takes land surveying as its principal case. Problems concerning land area were among the most common topics in traditional Chinese mathematical texts and did not necessarily involve particularly sophisticated theoretical innovations. Yet once attention moves from fangtian(方田) problems in mathematical books to actual land-surveying practices, the issue is no longer simply whether a formula for area is mathematically correct. Real plots of land had complex boundaries and shapes, while surveying was also conditioned by measuring instruments, computational efficiency, the skills of practitioners, administrative requirements, and land institutions. The Ming state repeatedly carried out land surveys and cadastral compilation, and the large-scale surveys of the Wanli period in particular left behind a substantial body of fish-scale registers (yulin tuce, 鱼鳞图册) and related cadastral documents. Reading mathematical texts alongside surveying records, land registers, and materials concerning taxation and corvée makes it possible to investigate more closely how mathematical knowledge entered surveying practice and how practical operations, in turn, affected the selection, simplification, and adjustment of algorithms. From this perspective, the "practicality" of mathematics in Ming China may be understood not only in terms of the real-life origins of problems found in mathematical texts, but also through the ways mathematical knowledge actually operated within concrete practices. Comparable questions can also be found in the "Algorithms" sections (suanfa men, 算法门) of daily-use encyclopedias, in abacus calculation, shortcut algorithms, and other forms of practical mathematical knowledge. These cases suggest that mathematical texts can be studied more closely in relation to their contexts of use, while drawing selectively on materials from economic history, political history, institutional history, and the history of material culture.

In recent years, scholarship on the history of Chinese mathematics has increasingly turned to the study of mathematical practices, with growing attention to procedures, calculating instruments, social contexts, and sources beyond canonical mathematical texts. These studies provide an important foundation for further work. This article seeks to continue in this direction by moving more closely toward concrete practices. The significance of land surveying lies not in uncovering an entirely unknown form of mathematics in Ming China, but in using an apparently ordinary practice as an entry point for observing how already familiar mathematical knowledge was used, selected, and adjusted once it entered particular historical settings. Bringing different kinds of sources into dialogue may also connect questions in the history of mathematics with related issues in economic, political, and institutional history, thereby providing further historical clues for understanding why mathematics in Ming China developed such pronounced practical and algorithmic orientations, together with a strong concern for computational convenience and efficiency.

Land surveying also provides a shared problem through which cross-cultural comparison can be pursued. The European mathematical tradition possessed a strong deductive and demonstrative strand represented by Euclidean geometry, but medieval and early modern Europe also maintained long-standing traditions of practical geometry and surveying. The works of Fibonacci, Pacioli, Tartaglia, and others reveal, in different ways, connections among geometrical knowledge, computational methods, and practical problems of measurement. Taking land surveying and similar problems shared across different civilizations as objects of comparison therefore makes it possible to investigate more closely how proof, algorithm, and practice were combined within different mathematical traditions. Such comparison may not only help us understand the practical characteristics of mathematics in Ming China from another

perspective, but may also provide a concrete case for considering how comparable questions can be constructed within a global history of mathematics while preserving the historical particularities of different knowledge traditions.

This article therefore seeks to suggest a line of inquiry that may be further explored within the already extensive scholarship on the history of Chinese mathematics: beginning with apparently ordinary problems such as land surveying, abacus calculation, shortcut algorithms, and commercial computation; reading mathematical texts in conjunction with practices, instruments, and institutional materials; and comparing different mathematical traditions through concrete problems shared across civilizations. Moving from such “small problems” into broader historical contexts may allow us not only to continue asking what mathematics existed in Ming China and how calculations were performed, but also to ask why particular forms of mathematical knowledge took the shape they did, how they entered actual practice, and what kinds of relationships mathematics formed with Ming society. Such research may, on the basis of existing scholarship, add new scales of observation to some familiar questions in the history of Chinese mathematics.



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