Conference Report:

# Low-Tech: Procedures, Actors, Concepts. 44th History of Technology Conference of the Iron Library

November 14-15, 2025, Schlatt

Organised by: Iron Library, Georg Fischer Ltd

Report by: **Martin Ullmann**, Department of History, Karlsruhe Institute of Technology

Were watermills in the Middle Ages and the Early Modern period actually advanced high-tech devices, or were they rather simple low-tech systems? Were iron railway bridges in Meiji-era Japan considered more modern than wooden pedestrian bridges? And how can we classify medical stimulus-response tests from the German Democratic Republic (GDR), which were created using recycled high-tech devices? In current discourse, the term high-tech is frequently used as an idea, a solution, or a promise. However, the term high-tech also implies the existence of low-tech. But what exactly is meant by low-tech? Low-tech is a term that has rarely been discussed in the history of technology, but it is more complex than it initially appears. Thirteen interdisciplinary submissions addressed this topic at the 44th History of Technology Conference of the Iron Library in Schaffhausen, Switzerland. Historians of technology, as well as speakers from related disciplines in the humanities and engineering, illuminated low-tech from diverse perspectives. Rather than seeking a uniform definition of low-tech, the conference focused on exploring the possibilities and limitations, as well as the strengths and weaknesses, that this term may bring to the field of the history of technology.

High-tech is widely associated with complexity, excessive costs, and high demand of energy and resources. If low-tech is understood as the opposite of high-tech, the question arises whether low-tech devices are necessarily cheaper, simpler, and more environmentally friendly. **BEATRIZ SILVA** (Schaffhausen) and **JOSHUA DAO-WEI SIM** (Singapore) explored this issue in their respective presentations, examining low-tech concepts in environments otherwise dominated by high-tech. Addressing artificial intelligence, Beatriz Silva challenged the widespread equation of technological progress with increasing complexity, high computing power, and resource-intensive infrastructures. She explained that many AI systems are based on the comparatively simple mathematical structure of directed acyclic graphs (DAGs). As the foundation of neural networks, DAGs enable transparent, step-by-step processes and are less computationally intensive than other AI models. Using historical examples, such as an English graph from 1837 depicting Napoleon's Russian campaign or Bayesian inference in drug research, Silva demonstrated that DAG-like structures have long been in use. She argued that high-performance technologies do not necessarily have to be complex and advocated

for accessible, resource-efficient solutions that move beyond dominant high-tech narratives. Joshua Dao-Wei Sim analyzed heat management strategies in Singapore as examples of low-tech approaches in a high-tech environment. The metropolis' hot and humid climate and the drive of modernization in the second half of the 20th century made air conditioning a symbol of progress, leading to Singapore identifying itself as an "air-conditioned nation." Sim showed that this focus obscured alternative strategies, which he categorized into three types. First, government-funded biomedical cooling measures for particularly vulnerable groups, such as construction workers and soldiers, for example, through medical guidelines and nutritional interventions. Second, a renewed interest in traditional Chinese medicine. Third, everyday practices such as acclimatization, wearing light clothing, or shifting activities. Sim termed these strategies low-tech because they are inexpensive, flexible, and largely independent of technical devices.

To address which attributes are associated with the term low-tech and how it differs from high-tech, ZOE SHIPLEY (Durham) and PATRYK WASIAK (Warsaw) focused their presentations on the narratives of low-tech. In her presentation, Zoe Shipley examined the concepts of high-tech and low-tech in the context of Japanese bridge construction during the Meiji era. At first glance, a simple categorization seems possible: older wooden or stone bridges from the pre-Meiji period can be classified as low-tech, while iron, steel, or concrete bridges built in the 19th century are considered high-tech. However, Shipley demonstrated that this juxtaposition proves problematic upon closer analysis. Complexly constructed wooden bridges and simple steel bridges illustrate that high-tech and low-tech are not solely dependent on the material. A separation based on Western or Japanese construction methods also proves to be of limited value. In conclusion, Shipley emphasized that while these terms are not contemporary source terms, they can be used as analytical tools. At the same time, she cautioned against perpetuating simplistic attributions such as modern or traditional, Western or Japanese. Patryk Wasiak addressed the narrative of progress within the computer industry, which is quickly evolving and widely perceived as high-tech. Given that hardware rapidly becomes outdated, Wasiak broadened the concept of low-tech by defining broken and outdated devices as low-tech, as well as systems that are simply no longer considered high-tech. Using several historical examples, Wasiak illustrated how the computer industry has employed utopian high-tech narratives in recent decades to emphasize its own progress. In line with recent research in the history of technology, he proposed to focus rather on the technology life cycle, including the environmental impact and electronic waste generated by discarded devices.

DOROTHEA HUTTERER (Munich) and RICCARDO BARBONE (Schaffhausen) explored which elements of historical use of hydropower can be classified as low-tech. In her presentation Dorothea Hutterer pointed out the inseparable economic and social functions of medieval and early modern watermills throughout pre-industrial Europe. She classified pre-industrial watermills as low-tech, as they were widespread, adaptable, tied to a specific location and a defined community, and characterized by simple mechanical functions that nevertheless required skilled craftsmanship. Hutterer underscored the significant economic and social importance of watermills with examples of historical

maps from the 16th to 18th centuries in southern Germany, in which watermills and hydraulic infrastructure such as millraces were not only depicted but sometimes also explicitly highlighted in color, thus visualizing them as part of the cultural landscape. In contrast, Riccardo Barbone offered a very broad overview of humankind's use of water as an energy source, from ancient aqueducts to water cooling in modern data centers. Barbone framed the use of water energy throughout history as a timeless low-tech design philosophy, since the true driving force is the natural power of gravity, merely guided in specific directions by human influence.

MAXIMILIAN GASCH (Dresden) and SILKE ZIMMER-MERKLE (Karlsruhe) approached the topic of low-tech practices, devices, and attributions from the perspective of mobility history. Focusing on the history of the Institute for Automotive Research at Dresden University of Technology in the Second World War, Maximilian Gasch demonstrated that, against the backdrop of autarky policies and scarcity economies, the development of rapid and simple solutions to problems of mobility was central during years of war. Gasch defined solutions, which aimed for easy manufacturing, operation, and repair, as low-tech approaches and illustrated this with the examples of the attempt to convert motor vehicles to wood gasification engines and the development of rubberless tires. In conclusion, Gasch noted that research, so far, has paid more attention to high-tech alternatives, such as coal liquefaction or synthetic rubber, than to simple and functional low-tech solutions. Silke Zimmer-Merkle investigated the ways and reasons children moved around in the past. Using the example of the kick scooter, Zimmer-Merkle noted some low-tech characteristics of children's mobility toys: straightforward design, mostly mechanical construction, robustness, and comparatively inexpensive production. Questioning this low-tech classification, Zimmer-Merkle pointed out that seemingly simple children's vehicles, upon closer inspection, are complex technical systems. The mobility historian raised the question of whether children's forms of mobility could also be described as "slow-tech." Although these forms of mobility are often slower compared to other means of transport, from a child's perspective, high speeds can certainly be achieved, allowing them to gain experience and enjoyment of high speeds at an early age.

MADHULIKA SONKAR (New Delhi), STEVEN LUBAR (Providence, RI), and CATHERINE ROSSI (Canterbury) addressed low-tech practices in crafts and their symbolic characterizations in their presentations. In her presentation, Madhulika Sonkar offered an insight into the tension between tradition and modernity in Zardozi manufacturing, an Indian craft often practiced by Muslim workers. Zardozi, which involves weaving metal threads into textiles, competes with other, cheaper, machine-made textiles. The speaker explored this everyday craft by considering gender, religion, and technology, drawing on historical sources as well as ethnographic fieldwork in the state of Uttar Pradesh. Sonkar reported that her research is showing that both governmental and private interventions have not focused on developing high-tech solutions but rather on a return to low-tech craftsmanship. Following David Edgerton, she emphasized the importance of the actual uses of technology over its invention. Steven Lubar focused on simple, often overlooked hand tools like hammers, shovels, and brooms, which nevertheless reveal much about human action, thought, and culture. Using sweeping

as an example, Lubar explained a form of knowledge known in ancient Greece as *metis*—a perceptiveness that, in contrast to prudence *(phronesis*), technical knowledge (*techne*), or scientific knowledge *(episteme*), represents a kind of practical, implicit knowledge acquired through execution. The speaker traced the historical decline of *metis*, often associated with marginalized social groups, by contrasting it with the rise of *techne* and *episteme*. Lubar argued for placing tools and the intelligence they demand more prominently at the center of both low- and high-tech technologies to emphasize human agency and blur the lines between making, using, and repairing. Art historian Cathrine Rossi addressed the rediscovery of craftsmanship in Western industrialized nations at the beginning of the 21st century, associated with values such as sustainability and ethics. Although both terms encompass the fields of technology and culture, the speaker did not equate craft with low-tech. Drawing on Julia Watson's work, Rossi argued that modern craftsmanship needs not necessarily be simple; the boundaries between low- and high-tech can be fluid. Instead, Rossi employed the concept of "post-craft," suggesting that craftsmanship should not be understood solely as an outdated technique superseded by the industrial revolution.

In their presentations, CLEMENS JANKE (Braunschweig), SIMON MAIER (Berlin), and HEIKE WEBER (Berlin) finally investigated examples of strategic approaches that promised long-term, simple, low-tech alternatives to complex, high-tech solutions. With the "Combitest II" as a case study, Clemens Janke demonstrated a scarcity-driven alternative to high-tech medical equipment developed in the GDR. This device served as a stimulus-response test for diagnosing brain damage and was manufactured using readily available materials, such as the casing of an intercom system, following a recycling, reuse, and repurpose strategy. Janke explained that from 1981 onward, engineers at GDR university hospitals developed highly sophisticated medical solutions at the local level. These reused, simpler devices, produced in small quantities and considered by Janke to be simplified versions of high-tech systems, were indispensable in the GDR healthcare system during the 1980s to ensure modern medical care. Janke explained that although the "Combitest II" was developed using low-tech strategies, it was nevertheless a high-tech application and could compete with other devices in its field. Simon Maier and Heike Weber examined the Interdisciplinary Project Group for Appropriate Technology (Interdisziplinäre Projektgruppe für Angepasste Technologie, IPAT) at the Technical University of Berlin during the 1970s and 1980s. As a grassroots democratic countermovement, engineers, and scientists within IPAT sought to develop alternative technologies for both developing and industrialized countries from an interdisciplinary perspective. Within the context of contemporary ecological discourse, the aim was to find particularly sustainable alternatives to basic needs such as access to water and energy. Using numerous examples, such as wind-powered pumps or a fishpond-greenhouse complex, Maier and Weber demonstrated that these were decentralized and accessible solutions, which, however, did not necessarily have to be simple low-tech approaches. Instead, the speakers introduced source terms such as "soft technology" ("*sanfte Technik*") or "intermediate technology" ("*mittlere Technik*"), whose narrative connotations also included a socially acceptable component.

The 44th History of Technology Conference made clear that low-tech is a multifaceted term that has rarely been systematically examined in the history of technology. The presentations demonstrated that high-tech and low-tech are often not contemporary source terms but rather ideologically charged labels whose use should be approached with caution to avoid anachronisms or Eurocentric perspectives. At the same time, the paired terms offer a productive tool for critically examining developments in the history of technology: It encourages us to consider what was perceived as modern, simple, or resource-efficient, when, and by whom, and it challenges supposedly teleological lines of technological development. Numerous further questions arose in the conference discussions: Can low-tech also be a temporary craze? Is low-tech more connected to nature? Is mainstream the opposite of low-tech? Through the presentations and discussions, the conference achieved its goal of not arriving at a single, unified definition but rather broadening the perspective of how the concept of low-tech could be used for historical inquiry.

Martin Ullmann

## Conference overview:

*Introduction*

Matthias Blumentrath (Schaffhausen): Welcome and official opening of the conference

Marcus Popplow (Karlsruhe): Introduction to the conference topic

*Panel I: Low Tech in High Tech Environments*

Chair: Marcus Popplow (Karlsruhe)

Beatriz Silva (Schaffhausen): Directed Acyclic Graphs (DAGs): A Low-Tech Conceptual Tool in AI and Beyond

Joshua Dao-Wei Sim (Singapore): Alternatives to the Aircon: Exertional and Vernacular Heat Management Strategies as "Low-Tech Cooling" in Singapore, 1970s to the present

*Panel II: Narratives*

Chair: Gisela Hürlimann (Dresden)

Zoe Shipley (Durham): Bridges of Japan: A low-tech/high-tech case study of Meiji technology, 1868 – 1912

Patryk Wasiak (Warsaw): Deconstructing "Low-tech" within the Narrative of Progress in "High-tech" as documented by the Computer Industry

*Panel III: Water Management*

Chair: Matthias Heymann (Aarhus)

Dorothea Hutterer (Munich): Mills on Maps - Low-Tech Continuity in the Cultural Landscape

Riccardo Barbone (Schaffhausen): Evolution of Piping Systems: A Low-Tech Perspective

*Panel IV: Mobilities*

Chair: Marcus Popplow (Karlsruhe)

Maximilian Gasch (Dresden): Low-tech as a necessity of German automotive research during the Second World War

Silke Zimmer-Merkle (Karlsruhe): Are children's mobilities (s)low-tech? Reflections on the historical example of the scooter

*Panel V: Artisans and Tools*

Chair: Gisela Hürliman (Dresden)

Madhulika Sonkar (New Delhi): "Handloom needs hunar (talent), not hi-tech tools": Pedagogies of revival and representation among zardozi artisans in Contemporary India

Steven Lubar (Providence, Rhode Island): Hand tools as a model for understanding technology

Catherine Rossi (Canterbury): A Recent History of the Handmade: From Modern Craft to Post Craft, from Making to Growing

*Panel VI: Strategic Approaches*

Chair: Matthias Heymann (Aarhus)

Clemens Janke (Braunschweig): Treating Brain Damage with an Intercom System. Re-Use Strategies of Departments of Scientific Medical Engineering at University Clinics in the GDR in the 1980s

Simon Maier (Berlin) / Heike Weber (Berlin): Low-tech Engineering: The example of IPAT at TU Berlin (1970s and 1980s)

*Resumé*

Stefan Krebs (Luxembourg): Conclusion and closing remarks

Franziska Eggimann (Schaffhausen): Closing words

Dieser Bericht erschien zuerst auf HSozKult: <https://www.hsozkult.de/conferencereport/id/fdkn-160980>.

Citation: Ullmann, Martin: Low-Tech: Procedures, Actors, Concepts. 44th History of Technology Conference of the Iron Library, infoclio.ch-Tagungsberichte, 16.3.2016. Online: <https://www.infoclio.ch/de/node/191773/>.