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Ownership of Knowledge

Beyond Intellectual Property

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OWNERSHIP OF KNOWLEDGE: INTRODUCTION

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For many centuries, and still today, humans across the world have transformed the skins of dead animals into leather. Individuals develop and learn or teach tanning. Societies provide tools and production sites for making leather, or they might promote its trade. Now read this passage again, and see how in each of these activities, identifying how certain aspects of tanning can be known presupposes something being owned. Developing and learning or teaching tanning, for instance, implies notions of how knowledge is gained—and thus owned, and given away—through sharing. The reverse is also evident. Identifying which parts or aspects of tanning can be owned—flaying, preparing the hide, managing the production site or the end product rather than the working body or the tanning mixture—presets how tanning can be known. This mutual conditioning of knowing and owning, and how knowledge ownership is constructed around it, is the topic of this book.

Knowledge and property are important themes in historical, sociological, and anthropological research, and in recent decades a growing body of literature has come to investigate the long, and ongoing, history of their checkered relationship. Scholars of science, technology, medicine, and law have all come to emphasize knowledge as the *sum* of human understanding and the many *forms* it can take, and they have shed light on its ownership as possession by law, as well as in acts of social sharing. This book consolidates these two strands of research by approaching knowledge ownership as a complex process in which the first moment of having intrinsically anticipates owning, and in which ownership comprises enactments of possession that include, from the first grasp of understanding, all kinds of dispossession. Such dispossession may consist of ignorance by law, social silencing, outright denunciation, or nonactions such as the acceptance of material decay.

If we look at knowledge ownership in this comprehensive way, we can see how the actions that our modern world insists on distinguishing as knowing and owning

actually collapse into each other when society, for instance, spatially distances itself from the bloody flaying of carcasses by moving the sites of slaughter away from human settlements, not *wanting* to know the unpleasant and polluting effects of the trade. Regulating the sites of production *conditions* the possibilities of owning such knowledge. Knowing and owning also collapse into each other and are mutually conditioned when formulas for tanning hides are devised and either shared or guarded, when the end product alone is preserved, or when recipes are memorized through chants, and then later protected by law. Practitioners who know with their bodies may achieve a high status in some societies, whereas other communities cast out such experts because of the smell that sticks to their skins, even though this stench is essential to both knowing and owning the task. Each of these acts in the process of tanning facilitates possibilities of knowing and owning, or makes it impossible for knowledge to be known or owned.

Working from this viewpoint on the mutual conditioning of knowing and owning, this book builds on scholarship that has foregrounded the roles of practices and materiality.¹ Historical, sociological, and anthropological studies of technology have convincingly put materials and practices on par with words as statuses of knowledge.² In line with such scholarship, we suggest that all statuses of knowledge are equally concerned with owning and thus with acts of *kn/own/ing*. We critically engage with those strands that have long attempted to address injustices and imbalances of knowing and owning in our past and modern worlds, which might include key moments such as the work of Karl Marx, for whom the sciences and technology and alienated labor facilitated capitalist disappropriation;³ Michel Foucault's notion of "naming and power";⁴ and more recent attempts that have looked at "the ways in which we know and represent the world (both nature and society)."⁵ Inasmuch as knowledge is not a thing but a process realized in action, we suggest that its ownership is equally at stake at every moment; what can be known, the *knowable*, always defines what can be owned, the *ownable* (and vice versa). They are not separate, and there is no sequence of cause and effect. Only *kn/own/ables* exist, and hence when actors attempt to distinguish what can be known, they always also manipulate what can be owned (and vice versa). We refer to this as a mutual conditioning that produces knowables and ownables.

The analytical focus of this book is to explore how *kn/own/ables* are intrinsic to all negotiations of knowledge ownership: when scientists examine genes and make them intellectual property; when a tenth-century Chinese carver produces or destroys wood-blocks; or when a banana becomes the tool to explain the laws of physics to underprivileged students in US schools. In this context we propose technology as a useful heuristic to shed light on how an emphasis on law and science has given preference to words as a way to own knowledge, thus centering debates on knowledge as (legal)

property and on possessing knowledge as a form of intellectual achievement. Since we flag our approach to knowledge ownership in this book as one informed by technology studies, authors of the case studies reflect on the past and present of the development, circulation, and exchange of knowledge, and on its appropriation or decay, down to the role of current scholarship on science, technology, society, and law in such debates. We have arranged case studies to highlight four crucial tactics actors use to enable or disable knowledge ownership in attempting to split the kn/own/able—and thereby also create imbalances and inequalities, in the past and in our contemporary world. Focusing on these tactics, four corresponding sections investigate: (1) how different cultures and societies approach kn/own/ables in various ways and thus manipulate their mutual conditioning to set the structural premises for knowledge ownership; (2) how actors in these societies rely on or are constrained by these premises when employing the three practices of knowledge ownership—namely, performance, use, and naming; (3) how this consequently allows actors to apply these practices differently in different domains of society, economy, and epistemology to own knowledge; and (4) how scholarship interferes in a contemporary world where science and law exist.

Each individual case unfolds the rich ways in which actors, past and present, manifest knowledge ownership. In sum, these arguments spurred us to develop a theoretical framework for analyzing knowledge ownership, which we offer to readers in chapter 1. Since that framework developed directly out of the discussions that produced this scholarship, we have opted to locate the more in-depth summaries of the following case studies in that theoretical chapter rather than in this introduction, as would be customary for such a volume. In this introduction, we instead invite the reader to explore how kn/own/ables govern all knowledge ownership, at all times, and how this knowledge ownership is continuously manipulated—including how such manipulations set the premise for science and law today. This approach makes visible the possibilities—and benefits—that come from the work of scholars engaging in and with knowledge ownership. The book thus ultimately also aims to shed light on scholarship and its use as a powerful tool in the politics of knowledge, property rights, and knowledge ownership.

THREE PRACTICES AND THE PREMISES OF KNOWING AND OWNING

For historians of science and technology, anthropologists, and sociologists, what we identify as the three major practices of knowledge ownership—*performance*, *use*, and *naming*—resonates with research on different ways of knowing or owning in practices, in bodies, in materials, or through codification. Let us return for a moment to our introductory example of tanning to illustrate how we approach these three practices

of knowledge ownership as kn/own/ables and how the mutual conditioning of knowing and owning plays out in different scenarios. In *performing* tanning, the tanner at once knows and *has* (owns) that part of tanning knowledge. In pointing to bodily performance as practice, sociological, anthropological, and historical scholarship into the twenty-first century has addressed both the act of knowing and owning. Yet, it has examined these acts only as separate instances,⁶ whereas in fact, knowing and owning happen simultaneously. Scholars have recognized that an agency of knowledge can be inscribed into an object—for instance, Bruno Latour acknowledged this in the case of using scientific instruments.⁷ *Using* makes an inscription that entails both knowing and owning. When the tanner *uses* the knife, they know and own the use of the knife; when they wield the knife, they know and own through performance. When the tanner knows a recipe, they have (own) the knowledge that is *named*.⁸ We can see how each practice grasps an instance of a specific part of knowledge that can be known and owned: the kn/own/able. We can also see how our description has highlighted certain moments with regard to specific material instantiations. In performance as practice, knowing and owning are collapsed in the tanner's *body*. Use as practice collapses knowing and owning into the knife *object*. Naming as practice collapses knowledge and *word*.

We introduce a new terminology here—of kn/own/ables, mutual conditioning, and the three practices—to highlight the process of dis-/enabling that governs all ownership of knowledge. All three of these practices are practices of kn/own/ing, which past and present actors mobilize to produce knowables and ownables and distinguish them from each other. We describe such dis-/enabling as processes of *decision-making* to pinpoint one consequence of this mutuality: that actors condition possibilities of knowing and owning irrespective of how and when they make knowledge or ownership explicit, from the first performance, use, or naming, as well as in the refusal to perform, use, or name, or in the act of forgetting. Because of the mutual conditioning that governs all these practices, actors can also own knowledge in other ways, such as by ignoring or acknowledging only the knowing or owning part in each of these practices, and/or by silencing or emphasizing one or the other practice; or by reconsidering what instantiation, material or immaterial, matters most.

Listing these three practices in reverse order to how most scholars are accustomed serves as a reminder that regional and epistemic histories have prioritized codification—defined occasionally quite narrowly as the systematic, rule-based organization of knowledge in writing—over practices and materials when it comes to knowledge ownership, whereas in fact, every knowledge ownership is always a result of all three practices working *in combination*. We can see the mutual conditioning and combined usages of all three practices governing all negotiations of knowledge ownership, past and

present; and we find a rich variety of blends of how actors silence or emphasize one or the other of these practices for knowledge ownership. An early third-century Chinese philosophical text, for instance, showcases the cook Ding performing the knowledge he owns while his lord, Wenhui, learns the Way (*dao* 道) only when Ding describes his performance verbally. Cook Ding impresses his lord by cutting an ox up in perfect rhythm and time, “as if performing the [sacred] dance of the mulberry grove (*sanglin* 桑林) in a proper blend with the dancing rhythms of [the music of] the capital cantata (*jing shou* 經首).”⁹ Ding knows through his body’s performance and through his use of the knife. Grasping the entire animal’s body, he sees the spaces between the flesh and bones. He does not operate with his eyes alone. Instead, understanding the Way lies in his whole being. His “faculties knowing where to stop (*guan zhi zhi* 官知止)” is a form of owning that he further enforces by rejecting Lord Wenhui’s attempt to *name* his proficiency as *skills* (*ji* 技)—which would denote lesser abilities—and by *naming* it instead as “behavior guided by divine forces (*shen yu xing* 神欲行).”¹⁰ In contrast to Ding’s complex claiming of knowledge and its ownership, Lord Wenhui admits that his understanding and approach to the highest form of *zhi* 知 (i.e., *Erkenntnis* as knowledge and cognition), as quoted above, relies on Cook Ding’s explanations: “By listening to Cook Ding’s words, now finally I can learn the Way to lead a life in sound health.”¹¹

In this example, Cook Ding and Lord Wenhui negotiate knowledge ownership by claiming different combinations of knowing and owning the Way—through words, bodily performance, and the use of the knife as a tool. But whereas Ding accesses the Way through all three practices, the king achieves it through naming alone. How then do we understand the historical and social differences that exist in practices of knowledge ownership and the manner by which they come to be authorized?

THE KING’S WAY AND THE ROLE OF DOMAINS

This story of cook and lord brings up a third point in the mutual conditioning that this book explores, which we address as the historically changing role of three *domains*—namely, society, economy, and epistemology—for the authorization of knowledge ownership practices. Like the three practices, this trio of domains has been central in scholarship on knowing, especially as the history of technology and science and technology studies (STS) about the validation of knowledge ownership look out from our world (of science and law) to others.

When viewed from such “other” worlds, the roles of these three domains for knowing and owning are highly variable. In third-century China, cook and lord both negotiate the kn/own/able, without breaking apart knowing and owning. Both rely on the fact

that the practices of knowledge ownership they invoke can be authorized in any one of these domains. Cook Ding, for instance, owns his knowledge in the sense that he can decide whether to *share* such enactments with others, or not. He controls his relationships with others, so he knows and owns in the domain of society. He also owns by understanding—or to put it more literally, by grasping—the *use* of the knife. Thus, he makes a living and owns his knowledge in the domain of economy. And Cook Ding, like Lord Wenhui, also knows and owns by explaining and *naming* his knowledge, thus operating in the domain of epistemology. In the third century, for both lord and cook, society, economy, and epistemology were all *equally* authoritative for claiming knowledge ownership.

Certainly, in the reality of third-century China, power relations mattered in this complex negotiation of knowledge ownership, too. Lord Wenhui ultimately wielded the political power and social status to “own” Cook Ding and thus control his body and work. However, Cook Ding and Lord Wenhui’s story is informative in unexpected ways when considering that Wenhui is a king seeking advice about good government. It is thus the cook who, in aligning all three practices, *has* the Way and educates Wenhui. The lord makes no effort to mirror and *have* Cook Ding’s comprehensive—embodied, physical, and mental—knowledge of the Way. He is content with owning the Way through description alone—and because his practice is governing, not cooking.

Many early Chinese texts of this period depict lords and kings being challenged by practitioners’ complex ways of knowing and owning, and learning from them: “Yi Yin was a bartender, Tai Gong a butcher, Guanzi produced leather, Boli Xi was a slave clerk. But when within the four seas there was disorder, they stood up to be the teachers of the age.”¹² Inasmuch as power hierarchies—politics—came to play an increasingly dominant role in knowledge ownership in China during the subsequent centuries, however, elites past and present have emphasized such early examples of complex negotiations around knowledge ownership in favor of the “king’s way.” A pattern emerged here as successive generations of scholars accordingly came to interpret the practitioners’ status not only as a social failure but also as politically powerless in their own time, thereby downplaying that such early sources indeed depict practitioners as wise men, while also suggesting instead that practitioners were wise men humbly remaining in the low status of practitioners until needed.¹³ Such interpretations of an increasingly scholarly literati-elite throughout the centuries *also* came to highlight one singular practice of knowing and owning—to wit, naming—and constituted the *explicit* product of the mind, words, as being the highest epistemological standard.

While this Chinese approach to a king’s way is a historically distinct case (and should not be essentialized as cultural), it showcases that in many cases, past and present, power

is given to one way of owning and knowing (i.e., a king's way), and that elite actors also predominantly lessen the role of performance and use as knowledge and ownership practice, assigning naming a key role to control knowledge socially and politically and reap its economic benefits.

MANIPULATING OWNERSHIP OF KNOWLEDGE: LAW AND SCIENCE AS REFERENCE POINTS

One important difference becomes evident when comparing the abilities and possibilities of owning knowledge in third-century China and in our contemporary world: our world is bound to two reference points in a way that the cook and lord were not. Since (at least) the mid-nineteenth century, law has come into the picture and science has dominated debates on knowledge and epistemology all around the globe. Law matters because, even as modern states rely on it to equalize the power relation between the lord and the cook's ability to *know*, its introduction has meant that the king's way of *owning* knowledge, naming, has become the major reference point for owning *all* knowledge. This means that with the increased efforts to protect all kinds of knowledge *by* law, actors have made naming mandatory for owning *all* parts of knowledge as property, because law requires knowledge to be named—for instance, as performance or use—in order to qualify as knowledge that can be legally owned.¹⁴ Science matters because modern law (i.e., as performed in courts and referenced in public debates) adopts scientific discourse as the highest standard for the ownership of knowledge—both when it constructs modern copyright from a historical concern about scientific publishing and even more so when it asserts nature or natural as different from man-made and distinguishes conditions, materials, and artifacts as criteria for defining what can be patented or branded, or called an invention, innovation, or discovery.¹⁵

In our theoretical chapter, we trace in greater detail how the fixing of owning by naming to the discourse of law, as we find in knowledge politics and scholarly debates, has favored science even over technology as the major reference point or standard for ways of knowing. In this introduction, however, we need only note that we consider it crucial to understand that these developments have led actors in the contemporary world to lose sight of the *kn/own/able* and the mutual conditioning of knowing and owning, and to begin to own knowledge by highlighting or ignoring the three practices' roles as *either* knowing *or* owning. For this reason, too, actors in our modern world can *manipulate* knowledge ownership in a new fashion. We deliberately use the word *manipulate* here to point to political action when actors attribute certain practices

of owning and knowing only to certain domains—and then draw new relationships between knowing and owning *as if* they were not mutually conditioned.

This can be seen, for instance, in a recent case related to Chinese leather tanning practices. In 2007, the international *China Daily News* English website celebrated the excavation of a tannery site in Rome, “the largest ever found.”¹⁶ At that time, China, which historically defines itself as a culture rooted in silk, had not yet taken full ownership of its fur and leather traditions as aspects of its cultural heritage or intellectual property. When the article was published, a negative view of leather as a technology “made in China” with a high degree of pollution dominated the daily newspaper landscape in the People’s Republic of China. Wenzhou, an important center for industrial leather production since at least 1898, subsequently resituated its factories, forced major stakeholders to invest in improving their cleaning facilities, and suspended more than one hundred companies in 2007 alone.¹⁷ At the same time, though, the leading citizens of Wenzhou attempted to improve the reputation of leather technology by reframing it as knowledge and enthusiastically engaging in China’s launch of a national scheme to promote, and an international scheme to protect, intangible cultural heritage (ICH) (*feiwuzhi wenhua yichan* 非物質文化遺產).¹⁸ After the *China Daily News* article was published, three specific tanning techniques were added to the list of Chinese ICH.¹⁹

In this example, actors manipulate the ownership of knowledge by shifting how tanning is known or owned between different domains, while keeping in view that science and law have now become the gold standard for making ownership claims. The tanner as craftsman practiced knowledge socially as part of a particular community. Politicians claimed this as a knowledge practice to be owned as culture—indeed, as a form of culture that could no longer be defined as the proprietary knowledge of an individual. In order to enable legal ownership of such knowledge, as something not separable from the community, it was regulated as intangible cultural heritage. Through a series of naming actions, tanning was thus transformed from being knowledge that was performed and owned by singular bodies into a good owned by a collective as national asset. Yet, the part of tanning that was undesirable remained unnamed, and society thus also exercised ownership by sidelining the tanner’s body along with his knowledge. This knowledge gained economic credence as a technology that a master could perform and own legally as an industry, while the act of tanning itself, again inseparable from the body of the tanner, had to be performed as labor, in the economy. This example further highlights how consumers matter, in that they take ownership of tanned leather products as traditional craft, as local or global, and/or as the result of highly polluting technology or sustainable new sciences.

THE SCHOLARLY CONTRIBUTION

Our footnoting in the above passage flags the ways in which historical, anthropological, and sociological scholarship (and sciences examining the past) were actively involved in these debates in attempting to promote or protect craft knowledge. Our intention is to highlight that it was not only politicians who occasionally mobilized academic studies to verify “Chinese” crafts or ancient sciences. Contemporary physical material scientists, for instance, sequenced the chemical composition of a tanning solution used by one of Wenzhou’s companies against that used by another and unlocked recipes for tanning obtained from archaeological excavations on ancient sites—which were then given credence as historical material or even a trace of ancient scientific knowledge that was worth owning culturally and could be owned legally, too.

This interference of scholarly academic work—its active *and* implicit repercussions—is thus where our interest in mutual conditioning coalesces with our practical concerns about the current scholarly debates on knowledge equality or epistemic injustices and the role of scholarly work in the politics of knowledge ownership. In analyzing knowledge, scientists as well as historians, anthropologists, and sociologists become part and parcel of manipulations of knowledge ownership, too—sometimes deliberately, but often implicitly through the nature of their research methods or interests. This can happen, for instance, as simply as in a desire to elucidate the “science” behind the material manipulations of what others name craft, or by analyzing texts as epistemological objects and denoting performance as something identified as *tacit*—that is, as not normally explained in words or formula. In the Chinese politics of treating tanning as cultural heritage and industry, science and technology matter as the highest standard of knowledge for making it possible to transfer the legal ownership of a chemical composition’s sequencing, even as society as a whole ignores the actors who performed this practice or distances itself from its other aspects, such as flaying the animal and tanning the hide.

Scholars moreover affect the possibilities of owning knowledge when they object to notions of indigeneity and of traditional or local knowledge, as well as when they subtly shift attention to the importance of such practices as scientific or assign agency to materials and animals by calling them ontological. What is even more important to highlight here—because it remains much more implicit—is that (our) scholarship *always* and *inevitably* interferes with knowledge ownership, even if (we as) scholars do not wish to do so, and that such interferences arise often long *before* politics come into play. This happens both when a scientist takes interest in one or the other material of an archaeological excavation and when a scholar in historical, anthropological,

or sociological research *equates* historical or cultural practices of *owning* knowledge to contemporary notions of science and law, thereby relegating the preparation of the animal skin—and all the skills and knowledge required for it—entirely to the realms of economy and society, outside law and science. And it also happens when they *refuse to equate* historical or cultural practices of *owning* knowledge to contemporary notions of science and law and thereby also refuse to illustrate alternatives.

This is not least, then, a book with a reflexive scholarly aim: to shift the perspective within the academy regarding its own role in manipulating the relation between knowing and owning. If law is about justice, then the responsibility of a historian, sociologist of knowledge, or anthropologist is to reveal tensions in our normative frameworks of producing ownership of knowledge that come from privileging one practice of knowledge ownership over another. This is the core politics of the book.

Notes

1. Wiebe E. Bijker, Thomas P. Hughes, and Trevor Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (1987; repr., Cambridge, MA: MIT Press, 2012). For approaches to sciences, see Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Milton Keynes, UK: Open University Press, 1987); Donald MacKenzie and Judy Wajcman, eds., *The Social Shaping of Technology* (Buckingham, UK: Open University Press, 1985).

2. For representative approaches to practices from the viewpoint of technology and anthropology, see, e.g., Nelly Oudshoorn and Trevor Pinch, *How Users Matter: The Co-construction of Users and Technology* (Cambridge, MA: MIT Press, 2003). Stephen Shapin and Simon Schaffer have foregrounded practices in the sciences. Shapin and Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton, NJ: Princeton University Press, 1985). For an approach concentrating on words and semantics instead, see, e.g., Karine Chemla and Jacques Virbel, eds., *Texts, Textual Acts and the History of Science* (Cham, Switzerland: Springer, 2015), which, following speech act theory, identifies the structuring of words and information in texts from mathematics to zoology.

3. Karl Marx tackled alienated labor in *Ökonomisch-philosophische Manuskripte aus dem Jahre 1844* (Berlin: Contumax-Hofenberg, 2017). In his later work he described such alienation in various instances, such as the manner in which society becomes increasingly mediated by technology with large-scale industry. Karl Marx, *Grundrisse der Kritik der politischen Ökonomie (Rohentwurf, "raw draft," 1857–1858; first published 1939–1941, Marx-Engels-Lenin Institute, Moscow; repr. 1953, Dietz Verlag, Berlin, GDR; new ed. 1983, MEW 42, 47–768, Dietz Verlag; and MEGA II.1–2, 49–747)*. For an example of later debates, see Sean Sayers, *Marx and Alienation: Essays on Hegelian Themes* (London: Palgrave, 2011).

4. For Foucault's naming function as a means of giving forms to modes of knowledge, see Michel Foucault, "The Subject and Power," *Critical Inquiry* 8, no. 4 (1982): 777–795, esp. 781.

5. Sheila Jasanoff, *States of Knowledge: The Co-production of Science and the Social Order* (London: Routledge, 2004), 2.
6. Andrew Pickering, "From Science as Knowledge to Science as Practice," in *Science as Practice and Culture*, ed. Andrew Pickering (Chicago: University of Chicago Press, 1992), 1–26. For a recent review of this scholarship and its relation to STS studies, see Simon A. Cole and Alyse Bertenthal, "Science, Technology, Society, and Law," *Annual Review of Law and Social Science* 13 (2017): 351–371, <https://doi.org/10.1146/annurev-lawsocsci-110316-113550>.
7. Latour, *Science in Action*.
8. Propositional, codified, explicit knowledge that can be named in words. Harry Collins, *Tacit and Explicit Knowledge* (Chicago: University of Chicago Press, 2010).
9. *Zhuangzi* 莊子, chap. 3, our translation. Zhuangzi lived 369–286 BCE. Both dance forms/music pieces appear in the classics, but it is mostly later thinkers who attributed them to eras of high antiquity when dance and music were used as a cosmological tool to enhance their ritual authority. For a standard interpretation of Zhuangzi, see Chen Guyin 陳鼓應, *Zhuangzi jinzhū jinyi* 莊子今註今譯 (Beijing: Zhonghua Shuju, 1983).
10. *Zhuangzi*, chap. 3.
11. *Zhuangzi*, chap. 3, our translation. Multiple different translations exist, many highlighting different implications—a point that we also address in the theoretical chapter of this book. For the current standard translations, see Wm. Theodore de Bary and Irene Bloom, eds., *Sources of Chinese Tradition*, 2nd ed. (New York: Columbia University Press, 1999), 1:103–104.
12. He Guanzi 12:83/1–4, quoted with minor adjustments from Carine Defoort and Ho-kuan tzu, *The Pheasant Cap Master (He guan zi): A Rhetorical Reading* (Albany: State University of New York Press 1997), 129. We have used the literal translation "teachers of age/teachers of the generations" here to indicate to the importance of these men as transmitters of knowledge rather than their roles as political advisers, as most later Chinese comments emphasize.
13. For the role of craftsmanship in pre- and early imperial state literature and philosophy, see Michael Puett, *The Ambivalence of Creation: Debates concerning Innovation and Artifice in Early China* (Stanford, CA: Stanford University Press, 2001).
14. It is important to note here that the issue is not that performance and use are not protected or governed by law; they are. What is missing is that they do not act as practices of knowledge ownership; instead, law protects them as ways of knowing.
15. Mario Biagioli and Marius Buning, "Technologies of the Law/Law as a Technology," *History of Science* 57, no. 1 (2019): 3–17. See also Mario Biagioli, "Nature and the Commons: The Vegetable Roots of Intellectual Property," in *Living Properties: Making Knowledge and Controlling Ownership in the History of Biology*, ed. Jean-Paul Gaudillière, Daniel J. Kevles, and Hans-Jörg Rheinberger (Berlin: Max Planck Institute for the History of Science, 2009), 241–250.
16. See "Archaeologists Excavate Ancient Tannery," *China Daily*, last modified August 1, 2007, http://www.chinadaily.com.cn/world/2007-08/01/content_5447206.htm. The same story also made

it on *CTV News*; see “Archaeologists Excavate Ancient Tannery,” *CTV News*, last modified August 1, 2007, <https://www.ctvnews.ca/archeologists-excavate-ancient-tannery-1.251027>. Some websites from the United States such as *Washington Post*, *NBC News*, and *Sott.net* featured the news in sections such as “Tourism” or “News of the World,” but not in the general news sections.

17. Most articles mention 126 companies. Not all pursued tanning, though. In Shuitou 水头镇, Wenzhou 温州, 162 leather companies were suspended. For a summary, see “Liangge ‘lianxü san-nian’ zheshe Shuitou zhibian 两个‘连续三年’折射水头之变” [Two “consecutive three years” reflect the changes in Shuitou], Pingyang xinwen wang 平阳新闻网, last modified December 31, 2009, <http://py.66wz.com/system/2009/12/31/010162648.shtml>. While several articles are no longer available, websites feature initiatives of local officials. See also “Zhong wuran qiye weihe guan er bu ting?” 重污染企业为何关而不闭? [Why were the enterprises with heavy pollution not completely shut down?], Sina, last modified August 14, 2007, <http://news.sina.com.cn/c/2007-08-14/112912382093s.shtml>. For an overview of Wenzhou’s campaign since this period, see Wang Jinyan 王金燕, “Wenzhou feiwuzhi wenhua yichan de zhishi chanquan baohu yanjiu” 温州非物质文化遗产的知识产权保护研究 [Research on intellectual property protection of Wenzhou intangible cultural heritage], *Zhejiang gongmao zhiye jishu xueyuan xuebao* 4 (2011): 47–51. The notion of Wenzhou’s “long tradition” in leather production was invoked repeatedly in newspaper and scientific articles since at least 2001. See Li Minxiao 李民校, “Wenzhou bei guanming ‘Zhongguo xiedu’” 温州被冠名“中国鞋都” [Wenzhou was called “the capital of shoes in China”], *Xibu pige* 8 (2001): 9.

18. Originally, ICH was set up to help protect diverse local customs. By 2007, Chinese attempts increasingly targeted arts and crafts. Shadow puppet theater was added to the Chinese National List of ICH in 2006; see Chinese National List of ICH—First Batch 国家级非物质文化遗产名录——第一批, Sequence no. 235, item no. IV-91, Chinese Cultural Studies Center, accessed April 23, 2020, <https://www.culturalheritagechina.org/national-list-first-batch>. In 2011 it was also inscribed on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity; see “Chinese Shadow Puppetry,” UNESCO ICH, accessed April 23, 2020, <https://ich.unesco.org/en/RL/chinese-shadow-puppetry-00421>. An extraordinary session was held in 2007 in Beijing. The documents were not made public.

19. No. 894–897, accessed April 23, 2020, <http://www.ihchina.cn>. In this first inclusion, China’s view of leather favored “minority” practices. In the following decade, it shifted to also include “Chinese” knowledge.

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