On the Margins of Science:

Boundary-Crossing Work and the "Making Chinese Medicine Scientific" movement in the 1930s and 1940s

Abstract

When a marginalized knowledge tradition is excluded from the dominant definition of "science," how do its practitioners respond? The concept of boundary-work offers powerful tools for analyzing how dominant groups demarcate science from non-science. It has less to say, however, about what unfolds on the other side of the boundary, among those whom the demarcation is meant to exclude. This article reveals the epistemic responses of Chinese medicine practitioners who, during the "Making Chinese Medicine Scientific" movement of the 1930s and 1940s, refused to accept their exclusion from science. Instead, they undertook what I call *boundary-crossing work*, the strategic and contested practice of simultaneously redefining both science and Chinese medicine to forge epistemic pathways across the boundary that biomedicine had established. Drawing on medical periodicals, the article distinguishes three main epistemic strategies. *Pragmatic validation* redefined science as therapeutic efficacy and Chinese medicine as an archive of clinically proven formulas and case records. *Western reduction* recast science as positivism and Chinese medicine as a store of material remedies, above all herbs, whose validation required discarding the theory that had governed their use. *Theoretical reconstructio*n interpreted science as systematic reasoning and Chinese medicine as an obscured theoretical system awaiting purification. These divergent epistemic practices helped produce the pluralistic landscape of medicine in modern China. By shifting analytical attention from boundary-work to *boundary-crossing work*, the article reorients the study of demarcation toward the epistemic agency of marginalized groups and shows that the outcome of an epistemic contest is not necessarily demarcation but may instead be pluralization.

Keywords: boundary-work, demarcation, medical pluralism, Republican China, Chinese medicine

Introduction

In November 1936, medical historian Fan Xingzhun published an article "An Autopsy of Hybrid Medicine" in *Chinese-Western Medicine*, a leading medical journal in which Chinese medicine practitioners debated the fate of their tradition. In this article, he criticized the "Making Chinese Medicine Scientific" movement that gained traction during the 1930s[1]:

> Can Chinese and Western medicine be united to create a distinct form of medicine? It would be akin to breeding a horse with a donkey, yielding a mule that is neither horse nor donkey… The project "Making Chinese Medicine Scientific" … has failed to resolve even a single disease name or a single symptom. Its efficacy, therefore, is plain for all to see.[2]

The excerpt captures the predicament of Chinese medicine practitioners in early twentieth-century China. By the 1920s, state-backed public health campaigns had secured institutional dominance for Western-trained practitioners, placing their medicine inside the field of science and Chinese medicine outside it, as pseudoscience deserving

[1] The reason of using "Chinese Medicine" rather than the common name "Traditional Chinese Medicine (TCM)" is that TCM typically refers to the system of Chinese medicine that emerged after the People's Republic of China was established in 1949, following a series of efforts to organize and standardize medical knowledge.

[2] Fan Xingzhun, "An Autopsy of Hybrid Medicine" (*Za zhong yi zhi pou shi*), *Zhong xi yi yao* (Chinese-Western Medicine), vol. 2, no. 11, November 1936, CCMPO (Compilation of Chinese Medicine Periodicals Online) no. 5-12-13.

elimination. In response, Chinese medicine practitioners launched the "Making Chinese Medicine Scientific" movement of the 1930s and 1940s. While movements defending traditional medicine against biomedical encroachment also unfolded in other Asian contexts — Japan, colonial Taiwan, and colonial Korea (Clark, 2020; Dongwon, 2008; Lewis and Macpherson, 2008; Suh, 2017) — the Chinese movement differed from them in degree rather than in kind. What set it apart was the explicitness of its program: "making scientific" became the movement's formal banner and slogan, so that redefining the tradition's relationship with science was pursued not as a by-product of preservation or revival but as its declared task.

Fan's critique presupposes that "Making Chinese Medicine Scientific" was a unified endeavor, with practitioners sharing a single understanding of science and a common path toward it. Drawing on a systematic examination of medical journals published by Chinese medicine practitioners during this period, this article reveals a far more complex picture. Practitioners disagreed fundamentally over what counted as "scientific," which elements of their tradition should be preserved or discarded, and whether Western biomedicine constituted the sole model of scientific medicine. The movement was defined not only by collective resistance against abolition but by internal epistemic contestation. What held it together was a slogan rather than a shared epistemology: practitioners who agreed that "Chinese medicine" must survive disagreed fundamentally about what it was, what made it knowledge, and what scientization should do to it. I therefore treat Chinese medicine in this period as a nominal category, a label under which mutually incompatible programs coexisted.

A rich historical scholarship has documented the "heterogenization" and "hybridization" of Chinese medicine in modern China, challenging essentialist portrayals of a static, homogeneous tradition (Andrews, 2014; Chiang, 2015; Furth, 1999; Kuriyama, 1999; Lei, 2002; Scheid, 2002, 2007). This scientization movement has found its most influential interpretation in Sean Hsiang-lin Lei's (2014) *Neither Donkey nor Horse*, whose title invokes the same equine idiom of mongrel medicine that Fan deployed. Lei reconstructs how, under the threat of abolition, reform-minded practitioners remade their craft in the image of biomedicine, producing a medicine half Chinese and half Western. This article builds on that account but departs from it in two respects. First, the hybrid medicine half Chinese and half Western was one epistemic strategy among several rather than the signature of the movement as a whole. Restored to the pages of the journal press, the movement appears as a field of rival programs, in which assimilation competed with pathways that refused to route scientific legitimacy through biomedicine at all. Second, Lei's analytical center of gravity lies in the politics of the state, in sovereignty, professional institutions, and the struggle over who could speak for modern medicine in China. Epistemological disagreements within the movement therefore function as background variety rather than as an explanandum. This article takes those disagreements as its object: it treats practitioners' divergent definitions of science as the axis along which the movement can be mapped, and it asks what the coexistence of those definitions did to "Chinese medicine" itself, a single name under which rival orientations gathered.

For medical practitioners in the 1930s and 1940s, "science" was a contested concept whose meaning was itself at stake. Although Western medicine was institutionally dominant, it held no monopoly over "science" in China. The scientization movement undertaken by practitioners of Chinese medicine was therefore not merely a negotiation with Western medicine. This article asks: how did Chinese medicine practitioners interpret the

relationship between their medical knowledge and the field of "science"? I demonstrate that practitioners did not passively accept Western medicine's claim to scientific authority but constructed diverse pathways toward it. These pathways diverged because practitioners held competing definitions of science and, simultaneously, competing visions of the essential core of Chinese medicine.

Each redefinition of "what is science" entailed a reconceptualization of "what is Chinese medicine". To theorize this process, I extend the concept of boundary-work (Gieryn, 1983, 1999), which illuminates how dominant groups draw epistemic boundaries to exclude competitors but offers limited purchase on cases where marginalized knowledge neither accepts exclusion nor seeks inclusion on the dominant group's terms. I introduce the concept of *boundary-crossing work* to capture the strategic practices through which excluded groups challenge established boundaries by simultaneously redefining the criteria of science and reconceptualizing their own knowledge system. What distinguishes crossing from demarcation is an asymmetry of position: practitioners had to reach a center they did not occupy, by criteria they had no part in setting. Viewed through *boundary-crossing work*, epistemological pluralism is therefore better understood as an outcome than a condition: where both terms remain open, combination admits no unique solution, and the encounter yields a field of competing settlements rather than a single hybrid form.

The article first develops the concept of *boundary-crossing work* from the literature on boundary-work and demarcation. After discussing methods and data, it analyzes the movement through three epistemic strategies: pragmatic validation, western reduction, and theoretical reconstruction. Each strategy redefined what science meant while reconceptualizing what Chinese medicine was. It then traces the long-term outcomes: far from competing in a contest only one could win, the three strategies coexisted, rendering Chinese medicine a malleable category and an enduring object of internal contestation.

Theoretical Background

Scholarship in science and technology studies (STS) and the history of science has shifted analytical attention away from scientific truth as an intrinsic property of knowledge to the social and epistemic processes through which claims come to be recognized as science (Gieryn, 1983, 1999; Pickstone, 1993; Shapin, 2011; Whooley, 2010, 2013). Although scholars agree that science is one whose contours are drawn and redrawn through ongoing "epistemic contests" (Gieryn, 1999: 32; Whooley, 2013), the existing literature has answered the question largely from the winning side, leaving open the question of what those on the wrong side of the line do in response.

Gieryn's concept of boundary-work has been the principal lens for analyzing such contests: "the discursive attribution of selected qualities to scientists, scientific methods, and scientific claims for the purpose of drawing a rhetorical boundary between science and some less authoritative residual non-science" (Gieryn, 1999: 4–5). Cases in his book center on the allocation and defense of cultural authority. The strategic repertoire he catalogs (expulsion, expansion, monopolization, and the protection of autonomy) is the repertoire of actors who already command epistemic authority and act to enlarge, police, or defend science's boundaries (Gieryn, 1983). What remains undertheorized is the view from outside the gate: not only what those whom a demarcation excludes do with, to, and

against a boundary once it has been drawn against them, but what the attempt to cross does to their own tradition, and how a community pressed against one boundary may splinter into several ways of redrawing it.

This asymmetry has not gone unaddressed. Boundary analysis has since become a general relational program concerned not only with how symbolic distinctions are drawn and policed but with how they are contested, bridged, and dissolved (Lamont and Molnár, 2002). Within the sociology of medicine, extensions follow two lines. The first restored structure and power to demarcation, showing that the line between orthodox and heterodox medicine is drawn on an uneven field, shaped less by argument than by differential command of state sanction, market position, and institutional capital (Saks, 2019; Willis, 1983). The second documented what those positioned as "non-science" actually do. For instance, the lasting debates over randomized controlled trial (RCT) between practitioners of complementary and alternative medicine (CAM) and biomedicine continue (Derkatch, 2008, 2016; Keshet, 2009, 2010). Yet these lines take the boundary as already drawn. They illuminate how the excluded contest, expose, or soften a line that incumbents have fixed, but not how the excluded might redraw it from their own side, nor what they do to their own tradition in the attempt.

The excluded side is rarely unified. Multiplicity characterizes the field of "non-science" no less than biomedicine (Berg and Mol, 1998; Brosnan et al., 2018). Marginalized traditions pressed to become "scientific" can fracture along epistemic lines. CAM, for example, is divided between a professionalizing wing pursuing scientific, exclusive knowledge and a countercultural wing defending vitalist, experiential knowledge (Hirschkorn, 2006); university Chinese medicine embraces biomedical science even as osteopathy resists positivism (Brosnan, 2016); scientific, traditional, and pragmatic-healing ethos coexist within contemporary Chinese medicine (Quah, 2003), which has also generated distinct variations across transnational settings (Zhan, 2009). This literature, however, tacitly assumes that biomedicine's monopoly on the definition of science is fixed, examining how marginalized traditions negotiate their position within pre-existing boundaries. What it brackets are the moments before such boundaries settle, when competing actors seek not merely to negotiate them but to define them, producing rival understandings of both what counts as science and what the marginalized tradition itself ought to be.

Read against this trajectory, three dimensions of epistemic contestation remain obscured in a literature calibrated to the vantage point of dominant actors. The first is positionality. An epistemic arena is, in Bourdieusian terms, a structured field constituted by the unequal distribution of capital (Bourdieu, 1975). Gieryn's (1999: 22) tripartite distinction among contestants, producers, and audiences identifies the key actors in boundary disputes but leaves underspecified how structural distance from the center of science conditions what each can plausibly claim, know, or do. The second blind spot is the standing of the excluded. Read from the inside, boundary-work risks letting a group labeled non-science slip from view as a live epistemic agent, settling into a residual category defined wholly by what it is not (Bowker and Star, 1999). Yet actors so labeled prompt epistemic pluralization (Decoteau, 2021; Tan, 2024). The third is the range of admissible outcomes. The Kuhnian repertoire models demarcation as moving toward a single settlement in which one paradigm comes to stand for science (Amsterdamska, 2005; Rothstein, 1972). But epistemic coexistence is routine rather than anomalous: groups working from divergent frameworks co-produce knowledge without reaching consensus (Star and Griesemer, 1989), and the history of science repeatedly yields plural, durable settlements rather than lone victors (Daston and Galison, 2007; Pickstone,

1993). To read demarcation as zero-sum is to ignore outcomes the literature has repeatedly found: negotiated pluralism, managed coexistence, hybrid knowledge (Keshet, 2010; Mizrachi et al., 2005).

Together these dimensions reveal a pattern that boundary-work tends to background: epistemic boundary-making as an asymmetric process in which structurally unequal actors negotiate over time, and excluded actors' resistance does not merely contest exclusion but refashions the terms on which scientific legitimacy is defined. The puzzle is what contestation from outsiders does to the boundary itself. Boundary-work explains how a line is defended but cannot explain how challenging that line from outside multiplies it.

Boundary-crossing work:

I introduce the concept of *boundary-crossing work* as a sensitizing concept (Blumer, 1954) to capture this mode of epistemic struggle. It names the strategic practices through which marginalized epistemic groups challenge their exclusion from science by simultaneously reconstructing the epistemological criteria of science and reconceptualizing boundaries as well as the content of their own knowledge system. The two operations are mutually constitutive. Each redefinition of what counts as "scientific" entails a corresponding vision of which elements of the marginalized knowledge are worth preserving, transforming, or discarding, while each judgment about the tradition's essential core shapes which definition of science the group finds plausible. *Boundary-crossing work* is therefore not a one-sided assault on the dominant group's epistemic fortress but a dual reconstruction that transforms both sides of the boundary at once.

The concept extends the boundary-work program in three respects, addressing the three neglected dimensions noted above. First, it shifts the analytic center of gravity from incumbents' practices of exclusion to marginalized groups' agency: not merely contestation from below but active reconceptualization of both the field they seek to enter and the tradition they carry with them. Second, it specifies a mechanism complementary to exclusion. Boundaries are negotiated not only when insiders draw them but when the excluded redefine, from their side, both what "science" means and what their own knowledge "is" (Barry, 2006; Hirschkorn, 2006; Villanueva-Russell, 2005). Third, it relaxes the zero-sum expectation. Because the excluded cannot know in advance which definition of science will secure legitimacy, strategic uncertainty generates multiple competing dual redefinitions within a single community, each pairing a distinct vision of science with a corresponding reconceptualization of the tradition. The result is epistemic pluralization, characterized by a simultaneous proliferation of positions within the field of science and within the tradition itself, as well as the durable though contested coexistence of multiple approaches, since no dual redefinition achieves monopoly.

Boundary-crossing work shifts the boundary-work research program from the dominant side of the boundary to the internal epistemic politics of the excluded, relegated to the boundary's other side. The "Making Chinese Medicine Scientific" movement vividly illustrates this dynamic. Facing exclusion from state-sanctioned science, Chinese medical practitioners collectively engaged in boundary-crossing work, contesting Western medicine's monopoly on the definition of science. Yet the community's response fractured into three strategies, each answering the question "what is science in medicine?" in a different way. This is where the Chinese case earns its analytic keep. In the Western case, science's authority has long been naturalized, its criteria are enforced without being argued, and the labor of crossing is correspondingly difficult to observe. In contrast, for practitioners in China,

modern science arrived as an imported authority whose content no party could take for granted, and those who sought entry had to say what science was in the same breath as they claimed to belong to it. These were distinct strategic orientations, each embodying a different judgment about what made Chinese medicine valuable, what relationship with Western medicine was desirable, and what form of scientific legitimacy was achievable. Where historians have explained why the movement arose and how the state adjudicated its claims (Andrews, 2014; Croizier, 1968; Lei, 2014), *boundary-crossing work* supplies what that literature leaves untheorized: an analytic for the epistemic disagreements through which a community pressed to become scientific fractured from within.

Method

In this article, I reconstruct the complex and diverse responses to Western biomedicine in China during the Republican period (1912–1949). To do so, I draw mainly from medical journals, which emerged as a central arena for epistemic contestation among Chinese medicine practitioners at the time. Unlike formal institutional channels, which biomedical professionals and state actors largely dominated, medical periodicals offered Chinese medicine practitioners a discursive space in which they could articulate, debate, and refine their responses to mounting competitive pressure.

I retrieved my primary sources from the Compilation of Chinese Medicine Periodicals Online (1897–1952) and the Chinese Periodical Full-text Database (1911–1949). I traced the "Making Chinese Medicine Scientific" movement through three key terms that Chinese medicine practitioners themselves used to frame the movement: making scientific (*kexuehua*), making Chinese medicine scientific (*zhongyi kexuehua*), and making national medicine scientific (*guoyi kexuehua*). To capture the full range of epistemic positions, I supplemented the database search with materials that marked critical turning points or boundary-crossing moments: the two special issues of *Chinese-Western Medicine* that crystallized the movement's central points in the "Debates around Making Chinese Medicine Scientific," Tan Cizhong's extended polemics over competing boundary-crossing strategies, and Chinese translations of the Japanese Kampo practitioner Watanabe Hiroshi's writings, which Chinese practitioners invoked to situate scientification within a broader East Asian epistemic politics.

Following the methodological insight of Jeffrey Haydu's problem-solving model (Haydu, 1998, 2010), I traced how different practitioners of Chinese medicine answered the essential question, "how to make Chinese medicine scientific", in their attempts to cross the boundary established by biomedical professionals. Through iterative close reading, I found that the practitioner's responses to the same question did not necessarily lead to the formation of a single medical epistemology but instead diversified the relationship between Chinese medicine, Western biomedicine, and science. Comparing this finding against the STS literature led me to probe the theoretical limits of boundary-work and to further theorize the epistemic practices of marginalized groups. The seemingly unified community of Chinese medicine practitioners, I show, was actually divided into three epistemic strategies based on their differing responses to this question, pragmatic validation, western reduction, and theoretical reconstruction which I analyze below.

Three clarifications about these categories are in order before proceeding. First, the labels are analytic constructs rather than actors' self-designations. Second, they classify discursive strategies rather than coherent

groups, that is, they identify recurrent ways of pairing a definition of science with a conception of Chinese medicine, not bounded camps of people. Third, the strategies cut across stances toward the slogan itself: practitioners who insisted that Chinese medicine "need not" or "could not" be made scientific were, in arguing so, redefining science in ways that placed their tradition already inside it, and they therefore belong to the analysis as fully as the slogan's champions.

Bridging Chinese Medicine with Science: Three Epistemic Strategies

The "Making Chinese Medicine Scientific" movement emerged in the early 1930s, at the third moment of a longer history in which Western medicine monopolized the medical field and demarcated Chinese medicine out of it. Lacking its epistemic standing, Chinese medicine practitioners mobilized three strategies, each answering differently the question of what makes medicine scientific. The movement inherited both the institutional advantages Western biomedicine had accumulated and the questions the two earlier encounters had left unsettled.

Western medicine arrived in the mid-nineteenth century through medical missionaries and at first produced negotiation rather than confrontation (Karchmer, 2013; Lei, 2012; Luesink, 2017; Ma et al., 2026). Under the idiom of convergence (*zhongxi yi huitong*), the question was compatibility rather than authority. The 1894 Hong Kong plague and the 1910 Manchurian epidemic ended that accommodation (Choa, 1993; Du, 2024; Summers, 2012; Tang et al., 2025), and the state came to treat Western medicine as authoritative scientific truth (Benedict, 1993; Wu, 1995), a position secured through privileged institutional linkage with the state rather than through superior argument in open debate. In 1929, Western-medical practitioners proposed the outright abolition of Chinese medicine. Chinese practitioners defeated the proposal through medical associations, journals, and a broad social movement, securing the Institute of National Medicine in 1931 (Andrews, 2014; Croizier, 1968; Scheid and Lei, 2014). The community thereby ceased to be a residual non-science and became an epistemic challenger with an institutional space for coexistence. In the early 1930s, this defensive victory turned into epistemic negotiation. Practitioners launched the "Making Chinese Medicine Scientific" movement, refused their assigned status as the non-scientific Other, and set out to redefine the domain of science while reconceptualizing their own tradition.

Pragmatic Validation: Therapeutic Efficacy as the Criterion of Science

For practitioners committed to the strategy pragmatic validation, *boundary-crossing work* operated through a distinctive dual redefinition. On one side, they redefined the criterion of science as therapeutic efficacy, the demonstrated ability to cure, rather than theoretical frameworks or experimental methods. On the other, they reconceptualized Chinese medicine. It was no longer an integrated cosmological system anchored in concepts, such as Yin-Yang, Five Phases, and Qi, but a cumulative empirical tradition built upon millennia of clinical trial-and-error. The two operations were mutually constitutive. Only by redefining science as efficacy could Chinese medicine's clinical record count as scientific evidence, and only by recasting Chinese medicine as an empirical tradition could the efficacy standard appear both natural and sufficient. Crucially, this reconceptualization of Chinese medicine was not an inherent self-understanding of the tradition. For millennia, medical development in China had been driven more by theoretical innovation than by systematic attention to therapeutic outcomes (Hsu,

2001; Wu, 2010). It was only after Western medicine's institutional challenge that practitioners began to frame medical experience as the essence of their tradition (Lei, 2002).

This redefinition rested on three interlocking claims. First, what made a body of knowledge scientific was the orderly arrangement of verified experience, and no experience was more thoroughly verified than a patient who recovered. Xi Kejie wrote, "Science consists in the systematic organization of empirical facts, while the cure of disease represents the manifestation of such facts. The ability to heal thus demonstrates the realization of science." [3] Second, efficacy was no accident but depended on disciplined expertise: "medicines themselves are inert; their effectiveness depends on the practitioners' skillful application." [4] If efficacy required expert knowledge, the tradition that produced effective practitioners must itself be a rigorous knowledge system. Third, historical continuity was read as cumulative validation. As Song Airen argued, "If national medicine lacked real therapeutic effectiveness, it would long since have been abandoned by the people."[5] In their views, survival functioned as a large-scale, long-duration experiment that Western medicine, with barely a century of clinical application in China, could not match. Together these claims constructed Chinese medicine as precisely the knowledge their redefined science valued most: empirically grounded, clinically validated, historically tested.

The efficacy criterion made it possible to dismantle the equation, widespread among Chinese intellectuals since the mid-nineteenth century, between Western medicine's scientific legitimacy and its anatomical and surgical practices (Ma et al., 2026). The supporters' most rhetorically effective strategy was deploying the testimony of Watanabe Hiroshi, a Japanese physician who had obtained a medical doctorate in Germany. Zeng Juesou reported that Watanabe himself acknowledged that "the certificate in experimental science he earned during his studies in Germany amounted to little more than a diploma, of no practical value in curing disease."[6] This insider critique was strategically powerful, because a reformist trained at the foremost center of modern medical science had concluded that experimental credentials did not translate into therapeutic competence. Gu Tisheng further attacked anatomy as a criterion of science, arguing that "if dissecting corpses is taken as science… such a way of making medicine scientific differs little from turning the living into the dead." [7] In his view, anatomy took the corpse as its model of the body, and the physician trained in western medicine examined the living patient as though already opened. By severing the link between Western medicine's technologies and the capacity to heal, practitioners destabilized its monopoly on the definition of science and cleared the ground for Chinese medicine's clinical record to serve as an alternative foundation of legitimacy.

The criterion of efficacy did more than authorize Chinese medicine's therapeutic legitimacy. Essentially, it shaped the advocates' answer about what parts of the medicine were worth defending. When biomedical method was

[3] Xi Kejie, "An Understanding of Science" (*Kexue zhi renshi*), *Zhong xi yi yao* (Chinese-Western Medicine), vol. 2, no. 2, February 1936, CCMPO no. 5-10-435.

[4] Ling Shuren, "Making Chinese Medicine Scientific and Modernization" (*Zhongyi kexuehua yu xiandaihua*), *Xiandai zhongyi* (Modern Chinese Medicine), January 18, 1934, CCMPO no. 4-42-57.

[5] Song Airen, "Science Is Insufficient to Determine the Abolition or Preservation of Chinese Medicine" (*Kexue buzu cunfei zhongyi lun*), *Yijie chunqiu* (Annals of the Medical World), December 15, 1933, CCMPO no. 3-10-421.

[6] Zeng Juesou, "Chinese Medicine Need Not Be Scientified" (Zhongyi wuxu kexuehua), Zhong xi yi yao (Chinese-Western Medicine), vol. 2, no. 2, February 1936, CCMPO no. 5-10-431.

[7] Gu Tisheng, "A Critique of Making Chinese Medicine Scientific" (*Zhongyi kexuehua zhi shangdui*), *Yijie chunqiu* (Annals of the Medical World), no. 44, February 10, 1930, CCMPO no. 3-7-195.

viewed as the criterion of science, as proponents of the strategy western reduction claimed (see below), experimentation was what earns scientific standing. Whatever in Chinese medicine has not been examined by experimentation becomes a liability. Under a criterion of efficacy, however, the incentive runs the other way. If Chinese medicine cured cases that biomedicine could not, its value lay in whatever accounted for that difference. Advocates of pragmatic validation therefore needed an account of what in the tradition did the curing, and holism that treats the whole person rather than isolated illness or specific symptoms was their answer (Zhang, 2007).

Holism suited this role for two reasons. It was the feature that most conspicuously distinguished Chinese from Western therapeutics, and it supplied a reason why the difference had been interpreted to produce different outcomes. Western medicine was criticized as "almost entirely constructed upon localized material forms," reducing disease to the presence of bacteria and treating the body as a collection of discrete parts rather than an integrated organism. Chinese medicine approached the patient as a whole, "categorizing conditions into patterns of cold, heat, deficiency, and excess, thereby restoring the body's natural functions." [8] What a method-based criterion would count as vagueness became, under an efficacy criterion, the very explanation of cure. Holistic treatment addressed "root causes" rather than isolated symptoms.

Emotions furnished the strongest case for this argument, because there biomedicine's own causal requirements barred it from acting at all. In the Chinese medical tradition, emotional imbalance is understood as a direct cause of somatic disease, so treatment requires attending to the patient's psychological and spiritual condition (Karchmer, 2013; Zhang, 2007). Western medicine, grounded in "anatomical structures and fixed lesions, reductive causality, and mechanical influence"(Zhang, 2007: 79–80), dismissed this approach as unscientific, insisting that "a physical pain must be accompanied by a physical cause" (Zhang, 2007: 34). Pragmatism challenged this dismissal by expanding the definition of science itself. Xi Kejie proposed a distinction between material science (*wuzhi kexue*) and spiritual science (*jingshen kexue*), arguing that Chinese medicine has attained one part of the science of the spirit, while Western medicine has attained one part of the science of matter.[9] By expanding the definition of science to include the "spiritual" domain, pragmatic validation enlarged the territory of legitimate science itself. In sum, efficacy as the criterion of science selected holism as the core of Chinese medicine, and holism in turn required that science be enlarged to include a domain from which biomedicine had excluded itself. Those advocates claimed that science, properly bounded, was larger than biomedicine had allowed, and that their tradition already occupied the part biomedicine could not reach.

This strategy also favored a fundamentally archival and compilatory approach to "Making Chinese Medicine Scientific." The task was to organize, collate, and systematize the vast body of existing clinical experience. As Wang Xianmin urged, "the writings of past sages in national medicine are overwhelmingly voluminous, while effective folk remedies are widely scattered… We must apply meticulous organization and precise collation to these myriad texts."[10] The remarkable historical continuity of this approach merits note.

[8] Fang Yaozhong, "The Greatest Crisis Facing Chinese Medicine Today: The So-Called Making Chinese Medicine Scientific, with Brief Remarks on the Essence of Chinese Medicine" (*Muqian zhongyijie yige zuida de weiji: yiban suowei de zhongyi kexuehua, bing lüeshuo Zhongguo yiyao zhi jingyi*), *Zhongguo yiyao yuekan* (Chinese Medicine Monthly, Chongqing), vol. 1, no. 5, 1944, pp. 7–9. Source: Chinese Periodical Full-text Database (CPFTD).

[9] Xi Kejie, "An Understanding of Science."

[10] Wang Xianmin, "Prerequisites for Making National Medicine Scientific" (*Guoyi kexuehua zhi xianjue wenti*), *Xin zhongyi kan* (New Chinese Medicine Journal), July 1, 1941, CCMPO no. 5-20-578.

Following the Civil War (1945-1949), the socialist government launched a nationwide "donating prescriptions" movement (*xianfang yundong*), urging practitioners to compile and share their effective clinical formulas. This institutional appropriation suggests that its redefinition of science proved the most politically legible and administratively actionable of the three strategic reactions identified in this paper (Hechun et al., 2024; Ruixian and Wei, 2009; Taylor, 2011: 168) .

Western Reduction: Biomedicine as "Obligatory Passage Point"

Advocates of western reduction redefined science in strictly positivist terms, as the observation and analysis of material phenomena through experimental methods. As Tan Cizhong argued, world medicine followed an inexorable progression "from religion to philosophy, from philosophy to science, in accordance with the order of evolution." [11] The demarcation between science and philosophy "lies entirely in the presence or absence of material form." [12] Where there was no observable matter, there could be no inquiry, only speculation. Chinese medicine, insofar as it remained entangled with philosophical reasoning, was trapped at a stage that history had already surpassed. They correspondingly reconceptualized Chinese medicine itself as a repository of material remedies, above all its herbs, buried beneath layers of metaphysical speculation that must be removed.

In these practitioners' eyes, the western biomedical framework was an "obligatory passage point" (Callon, 1984: 205), a strategic node through which all medical knowledge had to pass to acquire scientific legitimacy. Specifically, the exclusion of Chinese medicine was not merely institutional but epistemic. Ding Fubao diagnosed that traditional practitioners were "systematically excluded from institutional representation" precisely because they lacked foundational biomedical knowledge. Even at joint consultations at a patient's bedside, "only western medical theories could be articulated, while the traditional practitioner could not contribute a single word." [13] This practical silencing confirmed that biomedicine constituted the non-negotiable gateway to scientific status.

This redefinition of science entailed a radical reconceptualization of Chinese medicine. If science required material observability and experimental verification, the entire theoretical edifice of the tradition fell outside legitimate medical knowledge, belonging to a superseded epistemic stage. The attitude around Qi theory shows how far this went. Qi theory was the concept on which the tradition's account of physiology, pathology, and cure alike rested, and Lu Yuanlei nonetheless framed his rejection of Qi theory as a logical ultimatum: "Unless the invalidity of anatomy can be thoroughly proven, Qi and anatomy cannot logically coexist… the philosophical doctrine of Qi lacks empirical experimentation to verify its truth; therefore, it still cannot stand on its own." [14] The same test disposed of the rest of the tradition's vocabulary. Any concept that named no observable structure was taken to name nothing at all. Tan Cizhong mocked attributions of dizziness to Wind (*feng*) or indigestion to Dampness (*shi*) as covers for anatomical ignorance, and dismissed appeals to clinical efficacy as a category error in Chinese medicine:

[11] Tan Cizhong, "A Discussion on Making Chinese Medicine Scientific" (*Zhongyi kexuehua zhi shangque*), *Shehui yibao* (The Public Health and Medical Journal), no. 148, 1931, pp. 2203–2205. Source: CPFTD.

[12] Tan Cizhong and Xue Yucheng, "On the Necessity of Making Chinese Medicine Scientific" (*Lun zhongyi kexuehua zhi biyao*), *Zhongyi kexue* (Chinese Medicine Science), vol. 1, no. 8, 1937, pp. 443–445. Source: CPFTD.

[13] Ding Fubao, "My Views on Making National Medicine Scientific" (*Guoyi kexuehua zhi wo jian*), *Fuxing zhongyi* (Journal of New Chinese Medicine), no. 12, November 1942, CCMPO no. 5-31-679.

[14] Lu Yuanlei, "Draft Outline for the Reorganization of National Medicine" (*Guoyi xueshu zhengli dagang cao'an*), *Zhong xi yi yao* (Chinese-Western Medicine), vol. 2, no. 2, February 1936, CCMPO no. 5-10-454.

"Facts and theories do not necessarily stand in a causal relationship." [15] A treatment might cure for reasons unrelated to the theory invoked to explain it.

Not all advocates embraced complete theoretical demolition. Some sought to salvage individual concepts by locating their biomedical referents, treating traditional terms as imprecise designations for entities that anatomy and physiology could name properly. Chinese medicine had long organized diagnosis through the Eight Principles (*bagang*), four paired oppositions by which a practitioner characterized any illness: yin and yang, exterior and interior, cold and heat, deficiency and excess. Ye Juquan retained the last three pairs and dropped the first. Yin and yang were what tied the scheme to Qi and to the cosmology underwriting it, whereas the remaining six terms could be read as descriptions of the sick body alone. Reinterpreted as "indicators of the body's natural resistance to disease," they no longer named states of Qi but features of a defensive process, an idiom approximating the immunological concepts then entering Chinese medical writing.[16] The divergence between Lu Yuanlei's categorical rejection and Ye's selective translation reveals that even within the advocates, the reconceptualization of Chinese medicine was internally contested. How much of the tradition could survive the passage through the positivist gate remained an open question.

If destructive in its theoretical dimension, western reduction was constructive in its empirical dimension. The question was no longer whether Chinese medical theory was scientific but whether its empirical residue could survive biomedical validation. Tan Cizhong applied this test to the tradition's founding canon. The three texts he examined had anchored medical training for close to two millennia. *Inner Canon of the Yellow Emperor* supplied the theoretical vocabulary of Qi, yin and yang, and the meridians; *Classic of Materia Medica* was the earliest systematic pharmacopoeia; *Treatise on Cold Damage* established the pattern-based method of prescribing that practitioners still practiced (Unschuld, 2010). Tan sorted them along epistemological rather than chronological lines and assigned each a different fate. *Inner Canon* represented metaphysical theory to be discarded; *Materia Medica* represented drugs to be pharmacologically tested, and *Treatise* represented credible clinical records. The canon thereby ceased to function as a canon. It became a body of material to be triaged according to whether a given text recorded observations or propounded doctrine.[17] Lu Yuanlei extended the same logic into a historical periodization. For him, the Northern Song (A.D. 960–1279) marked medicine's turn from recording observation to elaborating theory, as Neo-Confucian cosmology supplied a systematizing vocabulary and later practitioners built competing schools upon it. Earlier texts "recorded empirical facts more faithfully," and the later elaboration, he argued, must be "excised."[18]

The same decoupling extended to practice. Herbs were to be detached from their traditional classificatory framework and re-examined pharmacologically, with Japan's extraction of active compounds from herbal formulas as the model.[19] Acupuncture's demonstrable results were to be freed from "the abstruse doctrines of Qi and

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[15] Tan Cizhong, "On the Inevitable Demise of National Medicine without Scientification, with a Brief Outline of Methods for Scientific Reorganization" (*Lun guoyi fei kexuehua ze bi wang ji lüejü kexue zhengli zhi fangfa*), *Zhong xi yi yao* (Chinese-Western Medicine), vol. 2, no. 2, February 1936, CCMPO no. 5-10-467.

[16] Ye Juquan, "Fallacies of Making National Medicine Scientific" (*Guoyiyao kexuehua de miujian*), *Zhong xi yi yao* (Chinese-Western Medicine), vol. 2, no. 2, February 1936, CCMPO no. 5-10-486.

[17] Tan Cizhong, "A Discussion on Making Chinese Medicine Scientific."

[18] Lu Yuanlei, "Draft Outline for the Reorganization of National Medicine."

[19] Ye Juquan, "Fallacies of Making National Medicine Scientific."

meridians." [20] The qualification to perform this surgery, however, was mastery of Western medicine itself. As Ding Fubao declared, "Once the mind has been scientificized, one can immediately judge the truth or falsehood of our ancient medical texts."[21] To be a competent practitioner of Chinese medicine, one first had to become a disciple of Western medicine.

Theoretical Reconstruction: Medicine is reasoning

The third epistemic strategy redefined science as the internal consistency and systematic coherence of a theoretical framework. Science was neither therapeutic efficacy nor experimental verification but logical systematicity, the capacity of a body of knowledge to cohere into a unified, transmissible, and internally non-contradictory structure. As He Peiyu argued, "The meaning of the term 'science' lies in establishing a particular doctrine based on a certain understanding. When the principles that run through it remain consistent, coherent, and firmly unchanging, it constitutes a particular science."[22] What this criterion demanded of Chinese medicine was that its terms be used consistently and its inferences follow stable rules. Theoretical reconstruction accordingly cast the tradition as a system that had once met this demand. Three founding texts mentioned before had laid out an architecture in which diagnostic categories, physiological principles, and therapeutic rules stood in determinate relation to one another. What accumulated afterward was inconsistency, as the sedimentation of competing schools no longer answered to a single logic. The tradition's scientific principles were therefore buried, and the work required was excavation rather than replacement.

Advocates drew on the same historiography as Lu Yuanlei but reached the opposite conclusion from it. All accepted that Chinese medical theory had fragmented into competing schools after the Northern Song (Bian, 2020; Goldschmidt, 2009; Hanson, 2013; Unschuld, 2010), and treated the pre-Song canon as the more reliable stratum. What they salvaged from that stratum differed entirely. Lu Yuanlei valued the early texts for the observations they recorded and discarded the reasoning that framed them. He Peiyu, a supporter of theoretical reconstruction, valued them for precisely that reasoning, reading the *Treatise* as a model of systematic inference and later doctrinal proliferation as the loss of a logic the tradition had once possessed. Even the *Inner Canon*, which Lu rejected in full, "must be viewed as a combination of the refined and the rough." [23] A tradition narrated in these terms needed neither replacement nor clinical validation, but restoration to its original systematic clarity.

This reconceptualization set theoretical reconstruction against pragmatic validation on the question of theoretical complexity. Where pragmatic validation reinterpreted Chinese medicine as a body of clinical outputs and discarded the frameworks guiding their application, Ye Juanqing countered with a legal analogy. Medicine has general principles but no two identical cases, and practitioners, like judges, must reason each case through to a decision. The analogy carried a claim about why theories of Chinese medicine grow elaborate. Doctrine expands because the cases it must cover vary, and a body of knowledge facing uniform phenomena would require no such

[20] Chen Tonghou, "On Making Chinese Medicine Scientific (Editorial)" (*Lun zhongyi kexuehua (juantouyan)*), *Nanhui yixue yuekan* (Nanhui Medical Monthly), vol. 2, no. 12, 1949, front cover. Source: CPFTD.
[21] Ding Fubao, "My Views on Making National Medicine Scientific."
[22] He Peiyu, "A Letter to the Institute of National Medicine" (*Shang guoyiguan shu*), *Zhong xi yi yao* (Chinese-Western Medicine), vol. 2, no. 2, February 1936, CCMPO no. 5-10-441.
[23] Ibid.

apparatus. This reversed the value that western reduction had placed on theoretical density. For those believing in biomedical frameworks, the elaboration of Chinese medical theory marked a stage of knowledge that observation had not yet disciplined. For Ye it marked the opposite, a tradition that had accumulated the conceptual resources to handle variation which simpler systems could only ignore. [24]

Unlike western reduction's abolition of traditional theories, theoretical reconstruction set out to preserve them. Specifically, they attempted to bring Qi theory and science into alignment, but practitioners admitted more than one way of doing so. For Zeng Juesou and He Peiyu, Qi was the philosophical ground on which practice rested. As Zeng Juesou put it, "Although the scope of Chinese medicine encompasses science, its root lies in the philosophy of Qi transformation." To keep Qi was therefore to insist that science make room for philosophical reasoning, because a science confined to "rigid forms and substances" would leave nothing to distinguish the tradition from biomedicine.[25] He Peiyu warned that if Qi theory had been abolished, "the entire field of traditional Chinese medicine would end up becoming indistinguishable from Western medicine"[26]. Others accepted the boundary of science where western reduction had drawn it, at objective causality, and relocated Qi inside it. Liu Yuelun believed that Qi named "invisible yet objectively existing natural forces," and although it "provides no tangible material for direct observation or experimentation, much like certain facts and abstract thoughts," its existence could still be established by inference. Stripped of its cosmological dimensions, Qi became an empirically inferable natural mechanism confined to clinical etiology rather than speculative metaphysics.[27] This divergence shows that the strategic uncertainty inherent in *boundary-crossing work* operates not only between competing strategies but within a single one: even practitioners who agreed on the broad goal of theoretical preservation disagreed on the epistemological terms on which to pursue it.

Theoretical reconstruction's criterion also yielded a distinctive position toward Western medicine, one of autonomous systematization. Amid the extensive discussions surrounding "Making Chinese Medicine Scientific," Qin Bowei observed "two bizarre phenomena." The first strategy was to force Western doctrines and terminology onto the classics, assuming that grounding the classics in the vocabulary of biomedicine was already to have scientized them. The second was to urge practitioners to take up physics and chemistry, assuming that because these were sciences, only one who knew them could make medicine scientific.[28] Supporters of theoretical reconstruction rejected both because its dual redefinition rendered such translation unnecessary: if science meant internal coherence, Chinese medicine could achieve scientific status through its own systematic reorganization, without passing through the obligatory passage point of Western biomedicine. As Zhang Ren'an stated bluntly, "our scientization is simply scientization, not westernization."[29] For practitioners on the wing of this strategy, what western reduction proposed to excise was, in Ye Juanqing's words, "precisely where the essence of Chinese

[24] Ye Juanqing, "A Critique of Making Chinese Medicine Scientific" (*Zhongyi kexuehua pingyi*), *Beiping yiyao yuekan* (Beiping Medical Monthly), January 31, 1935, CCMPO no. 5-9-151.

[25] Zeng Juesou, "A Letter to Colleagues on Why Chinese Medicine Cannot Be Scientified" (Yi Zhongyi buneng kexuehua zhi liyou jinggao tongrenshu), *Guoyi Zhengyan* (Orthodox Statements on National Medicine), no. 9, February 1, 1935, CCMPO no. 5-3-423.

[26] He Peiyu, "A Letter to the Institute of National Medicine."

[27] Liu Yuelun, "On the Impossibility of National Medicine's Survival without Scientification" (*Guoyi fei kexuehua buneng tucun shuo*), *Guoyi gongbao* (National Medicine Bulletin), vol. 3, no. 3, January 1936, CCMPO no. 4-24-383.

[28] Qin Bowei, "National Medicine and Science" (*Guoyi yu kexue*), *Zhongyi shijie* (World of Chinese Medicine), vol. 5, no. 2, January 1933, CCMPO no. 3-30-373.

medicine resides." [30] Theoretical reconstruction therefore preserved what western reduction eliminated and ordered what pragmatic validation was content to leave unordered.

For advocates of theoretical reconstruction, transmissibility was an important aspect of a single demand. As Qin Bowei put it, "A fundamental prerequisite of any discipline is its transmissibility... If I expend immense effort to acquire new knowledge and impart it to others, they can absorb it with less effort, allowing them to dedicate their own energies to generating further new knowledge."[31] By this measure the obstacle facing Chinese medicine was not the absence of Western biomedical knowledge but the manner in which medical learning was reproduced. Knowledge passed from master to disciple within lineages and families, often as a closely held secret, so that what one practitioner learned seldom reached those outside his line. Establishing modern schools, standardized textbooks, and uniform licensing were therefore the means by which Chinese medicine would become so.

Behind the Nominal Category: Epistemic Pluralization within Medicine

Distinguishing these three strategies is not simply a sketch of a certain historical moment because none of them ended with the debates that produced them. Each strategy was carried forward by the practitioners who had argued for it and lodged in institutions that outlived those practitioners, and because each won only a partial victory, none was ever positioned to absorb the others. These divergences persisted in part because their carriers did. Many protagonists of the "Making Chinese Medicine Scientific" movement were absorbed into the institutions of the new state.

Pragmatic validation, which proposed to organize, collate, and systematize the scattered record of clinical experience, found its most consequential afterlife in institutions. What practitioners could only urge in the periodical press of the 1930s and 1940s was enacted at national scale by the socialist state in the donating-prescriptions campaign (*xianfang yundong*) of the 1950s. Citizens, folk healers, and practitioners were called upon to surrender the secret and family formulas that had been at once their inheritance and their livelihood, and to yield them up as a patriotic contribution. Local health authorities gathered the submissions, screened them, and compiled them into printed collections for distribution to clinics and to the public (Zhang et al., 2020). Chinese medicine appeared in these campaigns exactly as pragmatic validation had reconceived it, as a reservoir of efficacious recipes to be excavated, verified, and redistributed. What made a prescription worth collecting was that it worked, and nothing further was asked of it. An and colleagues (2024) describe the operative principle as "efficacy before theory" (*xiao zai li xian*). Donated formulas dispensed with the classical requirement that theory license a prescription for a pattern in the individual patient. A recipe was attached directly to a complaint, could be used by anyone who possessed it, and, without diagnostic reasoning, "floated outside" the canonical system (An et al., 2024). The campaign thus kept the formula while bracketing the doctrine, detaching the remedy from the theory that had made it intelligible. What endured under the name Chinese medicine was a long list of prescriptions.

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[29] Zhang Ren'an, "Making National Medicine Scientific" (*Guoyi kexuehua*), *Yijie chunqiu* (Annals of the Medical World), December 15, 1933, CCMPO no. 3-10-423.

[30] Ye Juanqing, "A Critique of Making Chinese Medicine Scientific."

[31] Qin Bowei, "National Medicine and Science."

Western reduction endured as a paradox; it was the most institutionally successful of the three strategies and the one that left least of Chinese medicine standing. To make Chinese medicine scientific was to abolish all theories and set the herbs aside to be examined by Western biomedical frameworks. What they won was modern scientific standing for the materials of Chinese medicine, purchased by the disappearance of Chinese medicine as a way of knowing. What Chinese medicine experienced via this strategy could be summarized as what Sean Hsiang-lin Lei (2014) calls a re-networking: a substance embedded in the relational logic of Chinese medical practice was lifted into the laboratory, chemically analyzed, clinically tested, and re-anchored in the network of biomedicine and its journals. The materia medica, severed from the reasoning that had specified when and for whom a substance was used, became raw material. The practitioner, severed from the drug, became dispensable, since a compound isolated and standardized in a laboratory requires no one trained in the tradition to prescribe it. The trail runs from the 1920s to the present. Scientific study of Chinese herbs took Ephedra (*mahuang*) and Dichroa febrifuga (*changshan*) as its exemplary objects, and in both cases a traditional drug was resolved into a chemical compound that could circulate without it (Liu and Fu, 2024). Under the socialist state the procedure acquired an industrial infrastructure. Private drug firms were absorbed, and a national lattice of pharmaceutical companies and herb collection stations funneled raw materials to factory laboratories where they were worked up into standardized drugs (Chee, 2021). The result, in Liz Chee's words (2021: 29), was a set of "new enactments of Chinese medicine as a more material (i.e., drug-focused) system and less a body of theory, heritage, and skill embodied in the physician." The plants entered the world's pharmacopoeias, but the medicine that had known how to use them did not.

Theoretical reconstruction had a long and unfinished afterlife, shaped by two tensions: an outward one with biomedicine over the distinctiveness of Chinese medical theory, and an inward one over who held the authority to standardize it. Biomedical critics held that Chinese medical theory was irredeemably metaphysical. To answer the question of what makes medicine scientific by adopting biomedical concepts would have conceded the field to biomedicine. Advocates therefore organized systematization around what distinguished Chinese medicine from biomedicine, emphasizing its distinctively Chinese characteristics and defining them against biomedicine's acknowledged strengths (Karchmer, 2022). For instance, where biomedicine held acute and infectious disease, Chinese medicine claimed chronic and complex conditions and the regulation of bodily balance. The division was distilled in a maxim opposing root (*ben*) to branch (*biao*), the underlying disorder to its manifest symptom: Western medicine treats the branch but not the root, while Chinese medicine treats the root but not the branch. Besides, standardization did not dissolve the plurality internal to Chinese medical theory. The colleges never monopolized transmission. Alongside them, two older channels continued to operate: family transmission (jiachuan) and discipleship under a single master (shitu). The state certified graduates of both channels as equally qualified, yet the channels differed in what counted as medical knowledge and how it was validated (Scheid, 2002, 2007). The credential was standardized, but the epistemology was not. Theoretical reconstruction had begun by naming lineage transmission as the obstacle to scientific status, and it ended by coexisting with that transmission under a common license.

Read together, the three afterlives converge on one outcome by three different routes. None of the orientations made Chinese medicine scientific in the sense its advocates had imagined. Each instead broke apart the

integrated system of theory, method, formula, and herbs that had once made Chinese medicine a single thing, and each retained a different fragment. Pragmatic validation preserved the formula, western reduction the herbs, and theoretical reconstruction the theory, which itself became dispersed into rival lineages. What survived in every case was the name.

Chinese medicine and its institutional successor persist, accordingly, as a nominal category, robust enough to gather an archive of prescriptions, a re-networked pharmacopoeia, and a plurality of competing doctrines under one heading, yet too internally divergent to constitute the systematic body of knowledge the label implies. This should not be read as a failure because pluralization was itself an accomplishment of *boundary-crossing work*. No strategy won outright, but each secured enough of a foothold to keep the others from being extinguished, and their combined presence denied biomedicine the complete absorption it had sought in 1929. The *boundary-crossing work* of the 1930s and 1940s did not settle whether Chinese medicine was scientific. It multiplied the ways in which the question could be answered, and left the tradition held together by a name rather than by an answer.

Conclusion

In the classic *History of Chinese Medicine*, K. Chimin Wong and Wu Lien-Teh close the long narrative of Chinese medicine by citing famous words from *Faust*, "Wisdom becomes nonsense; kindness, oppression: To be a grandson is a curse", lamenting that Chinese medicine practitioners remained captive to tradition and reluctant to embrace modern medicine (Wong and Wu, 1936: 257). What this verdict overlooks is that the very practitioners it pities were carrying out an enormous labor of epistemic innovation in response to a Western medicine bent on demarcating Chinese medicine from science.

This article brings that labor into view and theorizes it as *boundary-crossing work*. On one side, practitioners refused and repelled the epistemic monopoly biomedicine claimed and renegotiated the relationship between their medicine and science, defining science variously as therapeutic efficacy, as the positivist observation of material phenomena, and as internal theoretical coherence. In doing so they unsettled the assumption that Western medicine was science's only avatar and opened their own routes into the scientific field. On the other side, they reconceived Chinese medicine in correspondingly different ways. Pragmatic validation cast it as a vast archive of prescriptions and case records that trained the practitioner's clinical judgment and diagnosis. Western reduction treated it as a repository of empirical experience and a store of herbs awaiting close examination. Theoretical reconstruction read it as an obscured theoretical system in need of purification. They contested biomedical hegemony, made room for a medical pluralism in which Chinese and Western medicine could coexist, and multiplied the meanings of Chinese medicine itself, unsettling the assumption that it had ever been a solid and systematic body of knowledge. As a consequence, the line drawn in 1929 to keep Chinese medicine outside science did not hold. Practitioners crossed it in three places at once, each with a different account of what science required, and defeating one crossing left the other two standing. The boundary was never a bulwark against epistemic diversity. It was a porous line that could be crossed in more ways than its defenders could defend against.

Boundary-work is built to explain how incumbents keep others out. It explains less well what the excluded do next, and it does not easily register an outcome in which a contest ends in a plurality of ways to be scientific (Harding, 1998). This mismatch further clarifies the scope within which the concept applies. Boundary-work remains the better instrument for understanding the dominant group, including how it maintains its boundary and

how an epistemic hierarchy comes to be, as in the naming of complementary and alternative medicine (Gale, 2014). *Boundary-crossing work* takes the opposite vantage. It asks what those on the far side do with a boundary drawn against them: how they press their knowledge through it, on what terms they seek entry, and what the attempt costs the tradition they carry. The answer in this case was a pair of redefinitions performed together. Practitioners specified what science required and, in the same act, specified what in Chinese medicine would answer to that requirement. Seen from this perspective, a line gets drawn and holds only where one party controls the criteria. Where the criteria are themselves in play, the excluded need neither accept a place outside nor petition for admission on terms set by others. They can multiply the terms and widen the field of science from within.

This is where a non-Western case earns its analytic keep. Where science's authority has long been naturalized, its criteria are enforced without being argued, and the labor of crossing is correspondingly difficult to observe. The case in this article supplied the opposite condition. For practitioners in non-Western countries or areas, modern science arrived as an imported authority whose content no party could take for granted, and those who sought entry had to say what science was in the same breath as they claimed to belong to it. Non-Western cases are therefore the settings in which that process becomes more visible, and the pluralization/hybridization documented here is unlikely to be peculiar to China. It should be expected wherever a tradition confronts a science whose boundaries are still being fixed. In sum, *boundary-crossing work* is a complement to boundary-work, a second vantage from which to watch boundaries break, get repaired, and re-form. Read together, the two concepts show that legitimacy is never won at a single stroke. Each attempt to cross alters what the boundary is taken to enclose, and the altered boundary changes what the next attempt must do, a looping effect of the kind Ian Hacking (1999) describes.

Broadly, STS has furnished a rich vocabulary for theorizing how different bodies of knowledge meet, from boundary objects (Star and Griesemer, 1989), to trading zones (Galison, 1997), and interactional expertise (Collins, 2004). Each of these has illuminated how actors drawn from distinct epistemic cultures manage to cooperate, communicate, and co-produce knowledge. Yet each rest on an assumption that boundary-work shares as well, namely that the parties to the encounter are, in some measure, able to take part in it. When one party has been shut out of the epistemic dialogue altogether, these concepts can no longer describe what the excluded do. Boundary-crossing work fills that gap by placing the excluded at the center of analysis and asking how marginalized groups force an epistemic breakthrough from a position of exclusion. This added vantage makes visible what the dominant group labors to conceal, that its claim to an "objective" standpoint rest on a steady refusal to register what the excluded have accomplished, just as Wong and Wu's borrowed lament unwittingly betrays.

Finally, the dynamics that *boundary-crossing work* captures belong to any society marked by medical pluralism. Medical pluralism has anchored medical sociology and medical anthropology for decades, yielding rich accounts of how patients move among therapeutic options (Cant and Sharma, 1999; Kleinman, 1980), how professionals negotiate the limits of legitimate practice (Gale, 2014), and how states govern the coexistence of rival medical traditions (Shim, 2018). What these accounts tend to share is a habit of treating the pluralistic structure itself as a given backdrop, a stage on which actors make choices, negotiate positions, and pursue strategies. Far less attention has gone to how that stage was built in the first place. *Boundary-crossing work* treats a plural medical field not as the condition under which epistemic contest occurs but as one of the outcomes such contest can produce. On

this account, the "Making Chinese Medicine Scientific" movement was not merely a chapter in the history of Chinese medicine. It was a constitutive episode in the making of China's plural medical landscape, the moment at which the simultaneous redefinition of science and of Chinese medicine established terms on which two knowledge systems could occupy one institutional space without either being reduced to the other. The implication reaches well beyond China. Pluralism is a condition that has to be won and then kept. It is won when those excluded from science contest the criteria of science instead of accepting a place outside them, and it is kept only for as long as no single party regains control of those criteria. Where control is recovered, plurality begins to resolve into hierarchy, one medicine authorized and the rest tolerated. The practitioners whom Wong and Wu pitied did not surrender their tradition to modern medicine. They remade science to make room for it, and the plural medicine now taken for granted in China is the legacy of their boundary-crossing work.

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