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Pluralist Ethnobiology: Between Philosophical Reflection and Transdisciplinary Action

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The development of ethnobiology has been shaped through a variety of aims from the economic exploitation of traditional plant knowledge to intercultural dialogue between different knowledge systems (Clément 1998; Hunn 2007). This multiplicity is reflected in a multidisciplinary identity in ethnobiology, which employs diverse methods from both natural and social sciences, such as archeology, biological systematics, cognitive psychology, cultural anthropology, human geography, and plant genetics. As ethnobiologists have highlighted rapid environmental change (Wyndham, Lepofsky, and Tiffany 2011; Wolverton 2013) and decolonization (McAlvey et al. 2021) as focal points of new phases of ethnobiology, the methodological diversity of the field has been further growing through normative projects such as action ethnobiology (Armstrong and McAlvay 2019) and transdisciplinary research (Athayde et al. 2016; Bollettin et al. 2023). Contemporary ethnobiology therefore focuses not only on the study of human and natural systems but also on interventions in areas such as environmental justice, conservation policy, agroecology, biocultural heritage, Indigenous rights, land conflicts, food security, and food sovereignty (Vandebroek et al. 2020; Renck et al. 2023).

While ethnobiologists commonly embrace the multidisciplinary nature of their field, the coexistence of diverse disciplinary agendas is often also a source of tension and contestation. Ethnobiologists who have been trained in different academic traditions of natural and social sciences do not only employ different methods but have also often positioned their respective disciplines as foundational for the field as a whole. For example, cognitive ethnobiology of the 1960s and 1970s centered on universals in folk biological reasoning as the foundation of the field while treating cultural diversity of ethnobiological practices as secondary (Ludwig 2018a). Conversely, the culturalist backlash against cognitive ethnobiology (and cognitive anthropology, more generally) of the 1980s and 1990s centered on ethnographies of cultural difference while marginalizing comparative research on cross-cultural similarities (Ludwig

2018b). As Viveiros de Castro expresses the common sentiment in cultural anthropology: “it is only worth comparing the incommensurable, comparing the commensurable is a task for accountants, not anthropologists” (2004, 11).

Priority disputes in ethnobiology do not only arise between cognitivist and culturalist traditions but can also concern relations between biological and social sciences. Evolutionary frameworks such as niche construction and adaptive systems (Albuquerque 2015; Albuquerque et al. 2020), for example, have been fruitful in ethnobiology but can give rise to new priority disputes if they are positioned as the foundation of the field as a whole. Furthermore, normative concerns from Indigenous livelihoods to decolonization are increasingly prominent in the field and raise new questions about their relation with theoretically-oriented research in ethnobiology. Priority questions can also arise between scholar activist projects that center on questions of equity and justice compared to traditions of ethnobiological research that focus on issues such as ethnotaxonomy or folk biological cognition.

This special issue explores ethnobiology as an inherently pluralist project beyond priority disputes. Philosophy of science has challenged unificationist accounts of science by highlighting that successful research progresses through productive tensions between different concepts, methods, ontologies, and theories (Ludwig and Ruphy 2021). Contrary to 20th-century visions of the “unity of science”, the recent history of science is largely characterized by the proliferation rather than unification of scientific disciplines. The plurality of science is particularly striking when exploring complex multispecies relations between humans and non-humans that cannot be addressed through isolated disciplinary perspectives. From climate change to food inequality, many planetary challenges are the product of complex multispecies relations in livelihood practices such as farming and fishing, in conservation management, or in industrial resource extraction. Ethnobiology has a unique potential to foster the intellectual

plurality necessary for understanding such multispecies relations along both inter- and transdisciplinary dimensions.

As an interdisciplinary field, ethnobiology addresses social-environmental (or biocultural) systems whose dynamics challenge narrow disciplinary perspectives. For example, Wilson and Neco's contribution to this special issue explores kinship and sociality as two complex phenomena that require insights from both biological and social sciences. Both Ellen's and Ross' contributions show how the cognitivist tradition can put in fruitful conversation with methods and theories from cultural anthropology. The articles from Sirakova, Simpson, Sclavo, and Silva and Cespedes mobilize a wide range of approaches from multispecies ethnography to virtue ethics to history of science in order to explore the complex interplay of biological, cultural, cognitive, economic, social, and political factors.

However, ethnobiology is not only a space for interdisciplinary engagement between different academic fields but also for transdisciplinary collaboration between academic and non-academic actors. As ethnobiologists increasingly highlight the urgency of social-environmental crises, emphasis is shifting from research *about* local communities to research *with* local communities. When it comes to innovations from agricultural practices to conservation management to ecological education to community health, collaborations are not limited to academic researchers but often rely on the expertise of non-academic actors, such as Indigenous elders, farmers, fishers, medical practitioners, policymakers, or schoolteachers (Peddi et al. 2023). Silva and Cespedes' contribution to this special issue, for example, explores the complex challenge of achieving collaborative stability in the OMORA Ethnobotanical Park in Chile, which involves a wide range of academic and non-academic actors.

Recognizing the inherent pluralism of ethnobiology means embracing its inter- and transdisciplinary diversity of concepts, methods, ontologies, and theories for creating fruitful

collaborative practices. While such a pluralism avoids the unificationism of priority disputes about general - e.g. culturalist, cognitivist, evolutionary - foundations of the field, it does not treat different disciplinary traditions as isolated from each other, either. Ethnobiology would have no added value if it would involve disciplines from archeology to zoology working in complete isolation from each other, without mutual learning.

In contrast with such an "isolationist pluralism" (Mitchell 2004), we propose a "synthetic pluralism" that actively explores connections between different epistemic practices. Synthesis does not always mean integration as collaborations across epistemic practices can be fruitful even in the light of disagreements that limit integration. Ludwig and El-Hani (2020) suggest a framework of partial overlaps to address the possibility of synthesis without full integration. While overlaps provide common ground for collaboration, partialities can limit mutual understanding and require recognition of tensions in collaborative practice (Renck et al. 2022).

Pluralist ethnobiology moves beyond priority disputes by recognizing that the foundations of the field are inherently diverse but still embraces intellectual synthesis that brings insights from various fields together. Complex issues such as biodiversity conservation require the synthesis of insights from many academic fields as well as the expertise of non-academic actors (Chambers et al. 2021). For example, plant genomics may be of crucial importance for understanding biodiversity distribution in a local environment, while political economy is crucial for understanding patterns of land use and biodiversity loss, and community expertise is crucial for understanding local ecological dynamics and their entanglement with livelihood practices. Pluralist ethnobiology embraces the need for bringing such diverse perspectives together without assuming that one can be positioned as a foundation for all the others.

While pluralist ethnobiology highlights the importance of collaboration, the irreducible plurality of ethnobiology also means that differences and tensions between epistemic practices

remain. The plurality of different ways of knowing does not always lead to fruitful integration but can also be marked by epistemic injustices (Fricker 2007) that involve hierarchical interactions in decision-making processes and differential valuations of knowledge systems (Anderson 2012). Rather than assuming harmonious knowledge integration, pluralist ethnobiology needs to recognize that relations between epistemic practices often come with deeply entrenched inequalities such as hierarchies between academic and Indigenous knowledge (Vijayan et al. 2021).

Navigating epistemic plurality requires both critical reflection and practical skill. On the one hand, synthesis is crucial for meeting the interventionist ambitions of applied ethnobiology in contributing to negotiations of pressing issues such as conservation management, environmental injustice, or food sovereignty. None of these issues can be successfully addressed through isolated disciplinary research but require collaboration between academic and non-academic actors with varied expertise. On the other hand, collaboration across different epistemic traditions tends to be complex and marked by inequalities that require critical reflectivity. These challenges are particularly striking in the case of transdisciplinary collaborations that involve academic researchers and local communities. While "applied ethnobiology" (Fowler 2019; Sillitoe 2006) is highlighting the importance of working together with communities for the benefit of communities, interventions can easily do more harm than good if they are not embedded in critical reflections about the complex relations between diverse actors and ways of knowing.

The recent emergence of a new philosophy of ethnobiology (Byskov 2020; Kendig 2020; Ludwig 2016; Massimi 2022; Villagómez-Reséndiz 2020; Weiskopf 2020) provides an opportunity for addressing this complexity at the interface of critical reflection and transdisciplinary action. In this special issue, we are embracing this opportunity by aiming to

show how philosophy and ethnobiology can stimulate each other in reflective action. Rather than philosophizing *about* ethnobiology from the distance, this special issue highlights how philosophy can contribute to ethnobiological research that navigates epistemic, ontological, and value diversity.

Pluralist ethnobiology aims to foster inter- and transdisciplinary collaboration while being reflective about the challenges and tensions in bringing diverse intellectual traditions together. In aiming for reflectivity about ethnobiological practice, this special issue also shows that philosophy and history of ethnobiology need to be considered together. In ethnobiology, the history of the field has been primarily told through the proclamation of (a constantly growing number of) phases. Clément (1998) divides the history of ethnobiology in three periods (pre-classical, classical, and postclassical) based on research mainly by U.S. and European researchers. Hunn (2007) generalizes towards a history of ethnobiology in four phases, while Wyndham, Lepofsky, and Tiffany (2011) add a fifth phase of applied engagement with rapid ecological change and McAlvay et al. (2021) envision a sixth phase of decolonial ethnobiology.

History of ethnobiology will eventually have to move beyond a linear periodization, especially when considering developments in the field beyond Europe and the United States such as Sclavo's contribution to this special issue on the development of Mexican ethnobotany in the 1970s and 1980s. At the same time, the proliferation of proclaimed phases in ethnobiology reflects the intellectual diversity and contested nature of the field, which requires scrutiny through the lens of what has become known as “integrated history and philosophy of science” (Arabatzis and Howard 2015).

For scholars in history and philosophy of science, ethnobiology provides a rich and currently still underexplored field for understanding the complex multispecies relations that are at the core of urgent social-environmental crises. Both the history and current state of the field reflect

a large plurality of inter- and transdisciplinary perspectives that can complement each other but, as argued above, also create conflicts and tensions. Developing a synthetic albeit pluralist vision of ethnobiology is therefore not merely an interesting intellectual exercise but can offer tools for navigating the plurality of epistemologies, ontologies, and values in ethnobiological practice. This special issue on ethnobiology and philosophy is both an invitation and a showcase of pluralist ethnobiology that navigates between philosophical reflectivity and transdisciplinary action. By taking the intellectual complexity and the applied urgency of the ethnobiological project equally seriously, the contributions of this special issue provide new entry points for recognizing ethnobiology as a fruitful "trading zone" (Galison 2010; Robles-Piñeros et al. 2020) between theory and practice.

Contributions

Robert A. Wilson and Lucia C. Neco's article "**Ethnobiology, the Ontological Turn, and Human Sociality"** addresses the complex relations and tensions between disciplinary traditions in ethnobiological theory. The ontological turn promises an attractive entry point that connects ethnobiological themes with *en vogue* theory across social sciences and humanities. However, Wilson and Neco are not convinced that the ontological turn provides ethnobiology with a robust synthesis. Instead of providing a framework that allows integration across natural and social sciences, they argue that the ontological turn continues a separatist tradition that has isolated cultural anthropology from the biological and cognitive sciences.

If the ontological turn is grounded in a separatist intellectual heritage, it does not provide a way forward for the inter- and transdisciplinary field of ethnobiology whose strength derives from its diversity of intellectual perspectives. However, Wilson and Neco do not only want to challenge the ontological turn but also outline an integrationist alternative that is naturalist in

taking biological and cognitive sciences seriously while resisting reductionist positions that have been defended by sociobiologists and evolutionary psychologists. Studies of sociality and kinship provide Wilson and Neco's case studies for the development of such an integrationist approach that embraces insights from biological and cognitive sciences - e.g. regarding plant cognition and progenerative kinship - without suggesting that social dynamics reduce to insights from the natural sciences. Rather than importing the ontological turn into ethnobiology, Wilson and Neco therefore envision an alternative future of ethnobiology in which natural and social sciences are actually engaged in a meaningful conversation rather than in an artificial methodological opposition.

Roy Ellen's contribution "**Identifying Plants as a Process of Cultural Cognition**" develops a novel entry point to ethnotaxonomic debates by shifting attention from plant classification to plant identification. Comparing contemporary professional taxonomists who rely on herbarium reference collections with plant identification practices of Nuaulu subsistence cultivators in eastern Indonesia, Ellen highlights the procedural character of plant identification that had been largely invisible in the static comparison of classification systems in cognitive ethnobiology.

By expanding the focus from classification to identification, Ellen opens up new comparative perspectives that acknowledge similarities as well as differences in the practices of professional taxonomists and Nuaulu cultivators. While Ellen highlights that such perspectives align with ontological pluralism and debates about "partial overlaps" in the philosophy of science, they challenge both the prioritization of cross-cultural similarities in cognitivist ethnobiology and the prioritization of cross-cultural difference in the ontological turn. Ellen's account of plant identification demonstrates how ethnobiologists can move beyond what we have called priority disputes by synthesizing insights from different disciplinary traditions. Ellen's account is synthetic in putting equal attention to biological, cognitive, and social factors that are shaping identification practices. Through such a synthetic perspective, Ellen offers an ethnographically

rich and intellectually nuanced account of biological identification practices that moves beyond what he calls a "false opposition perpetuated by arch relativists and universalists".

Norbert Ross uses the ontological turn, in his article "***Biologies* and *beings*: world making, cognition, and the making of self**", as a basis for thinking about his previous cognitivist work on folk biology. He uses research that explored how Itza' Maya from northern Guatemala understand and reason about the environment and how such thinking guides behavior, and his more recent work with Tzotzil Maya children from southern Mexico, in which he investigated their world-making efforts in relation to the biological world, to interrogate philosophical implications with respect to what constitutes reality, which means engaging in a conversation with anthropological work before and after the ontological turn. Ross invites us to question the "one reality paradigm of Western science" by considering what he calls "world making", a notion that highlights how different forms of being in and relating to the world not only entail identifying different entities in lived experience, but also define how to relate to them. This notion forces us, he argues, to look at folk biological data from a different perspective, as one can no longer consider "folk biolog**ies** as simply folk understandings of a shared biological world". Much in line with the ontological turn, Ross argues that they should be seen as representing "expressions of different worlds in and of themselves, describing and prescribing different ways of being in the world, different ways of being human, and hence different human beings".

Ross highlights that Tzotzil Maya children produce their own understandings, their own worlds as they are presented with a diversity of inputs, i.e., that they are "important architects of reality." His data on the children's construction of their worlds show that similar context, same language, and even self-acknowledged group affiliations do not entail agreement even on what we can take to be basic issues, such as our understandings of what is alive or what has a soul. Even though investigating ontologies is about exploring differences, Ross' data shows that, as

social phenomena, the distribution of ontologies does not necessarily match groups of people defined *a priori*. Besides, we cannot reduce the different worlds within which people live to alleged representations of one single reality. Ontologies are, in Ross' words, "experiments in being, and specifically in being differently." Western science itself includes, from this perspective, one such experiment, which leads to a particular way of constructing reality, which, no matter how powerful, should not be confused with some literal rendering of some single reality.

Justin Simpson, in his contribution "**Towards a joyful environmental ethic: open-ended curiosity as an environmental virtue**", proposes to advance Kimmerer's joyful environmental ethic of gratitude and reciprocity - related to an understanding of nonhumans as active, relational, dynamic, and surprising entities, rather than inert or passive objects or resources to humans - by developing an account of open-ended curiosity as an onto-epistemic virtue. Kimmerer's ethic is based on the idea that each person has a responsibility to share their unique gifts with the world as a return for the gifts received from nonhumans and, generally speaking, from Earth. Importantly, from this perspective what we receive are gifts, not rights, and therefore come with responsibilities to care for the gift and reciprocate, as gifts (re)establish a relationship between the giver and receiver, as Kimmerer stresses. This gratitude-based, joyful, reciprocity ethic is a perspective that challenges pessimistic environmental narratives that move too quickly from a specific environmental loss to complete loss. The importance of this challenge lies in the fact that despair paralyzes us, depriving us of agency, which is needed to face the very problems that led to despair, while hope and change can only be pursued if we think that the current state of nature and humans, with all their problems, is contingent and, accordingly, can be otherwise.

Simpson proposes to enrich the sense of gratitude in Kimmerer's ethic based on the argument that humans not only receive material gifts for physical sustenance (which are typically treated

as “resources”), but also ontological gifts from nonhumans. This argument derives from the view that nonhumans provide ontological gifts by co-constituting the very being of humans, by re-constituting what it is to be human and what is possible, an idea Simpson derives from the relational ontology of Karen Barad, whose work he considers to resonate with Kimmerer’s views and be “underappreciated in the ontological turns within ethnobiology”, and Bruno Latour’s account of nonhumans (despite the limitations he points out in the latter). Humans and nonhumans are not given, but rather the products of contingent, iterative, and open-ended practices/doings/actions. Nonhumans are “open-ended, relational singularities that can enact and undergo surprising changes”. This is one of the basis for Simpson’s claim that open-ended curiosity is an environmental virtue, since what qualifies as a good gift to be shared - as proposed in Kimmerer’s ethic - depends on the nonhuman, which delimits the set of possibilities of what is a (good) gift. Accordingly, the reciprocity included in that ethic will require understanding nonhumans, and, moreover, understanding them as open-ended, relational singularities, each with its own agency, its own “world-making activities” based on and generating its particular boundaries, meanings, and agential abilities. Therefore, in Simpson’s work, “world-making” is taken beyond the realm of humans - where Ross locates it in his contribution to this issue.

Open-ended curiosity is described by Simpson as both an ontological and epistemic virtue that allows humans to better understand and reciprocate nonhumans, involving an openness to transforming both - on the ontological side - our bodies, practices, and world, and - on the epistemological side - our beliefs, values, questions, and theories in relation to nonhumans, so as to be able to better hear and understand them. For Simpson, open-ended curiosity can be characterized as aiming “to enable humans to understand nonhumans by engaging with them in a way that creates the conditions for nonhumans to ‘speak’ for themselves.” They would be able to answer us through the very way they live, through the way they respond to changes,

and, therefore, open-ended curiosity, as a virtue, leads to understanding, based on how we are able to listen to and understand nonhumans in terms of the different ways they are affected by and affect others.

In her paper "**Forgotten stories of yogurt: cultivating multispecies wisdom**", Sevgi Mutlu Sirakova offers an ethnographic study in which philosophical connections are explored. She uses yogurt as a case study to explore from a multispecies perspective the problems and risks (for instance, to human health or to the quality of traditional fermented products) involved in the ongoing loss of both microbial diversity and the rich biocultural heritage related to practices of producing fermented foods, as industrial production standardizes them, decreasing the diversity of bacterial strains used. The approach put to work in her study focuses on multispecies relations coevolved and cultivated through traditional yogurt-making practices. She employs autoethnography and sensory and multispecies ethnography in fieldwork carried out along two years to trace (forgotten) stories of yogurt (involving relationships with ants, plants, and rain) passed down through generations in two remote rural communities where she spent the earlier part of her life and where her relatives still live, Nova Mahala, a village in the Rhodope Mountains, in Bulgaria, and Şirinköy, a village on the island of Gökçeada, in Turkey. Through these methods, she is able to explore how people from these communities perceive and engage with multispecies encounters in food practices, while learning about the unique local recipes associated with their biocultural heritage. As she herself highlights, the yogurt stories she tells us illuminate how we and microbes bring one another into being through the entangled relations involved in yogurt fermentation practices, which depend - from the animals providing the milk to the microbes fermenting it - "on the collaboration and co-creation of a diverse community of beings".

The stories Sirakova retrieves through her work show the richness of interspecies and sensorial connections involved in the biocultural practices related to yogurt production, which include

diverse multispecies relationships, offering several ethnobiological insights as well as place-specific insights that can, as she writes, “awaken our multispecies wisdom in a time of crisis”. Through fermentation and other practices, food cultures and biodiversity become inextricably linked, as microbes are turned into part of fermented products that are interconnected with the “multispecies stories of how to produce them”. We agree with her that the forgotten stories of yogurt she narrates give way to important reflections on how the current biodiversity crisis entails a substantial biocultural diversity loss, leading us to ponder about how the standardization of yogurt production in the food industry can make us lose the biocultural heritages sustaining diverse multispecies relations between microbes, ourselves, other animals, plants, etc. In particular, this is a loss related to a biocultural homogenization associated with globalization and involving a host of social and environmental injustices. The yogurt stories Sirakova shares provoke us to ponder about “how to revitalize our multispecies relations through foodways”, and “how we think about food, and indeed about ourselves”, as she writes.

In “**Three criteria for virtuous collaboration across epistemic practices: a case from sentimentalism and Field Environmental Philosophy”**, Nicolas Silva and Esteban Céspedes explore sentimentalist virtue epistemology as a methodology that can foster successful collaborations. Ethnobiologists today are increasingly aware of the need to establish inter- and transdisciplinary collaborations with varied actors to produce reliable, just, and useful knowledge. Actors involved in these collaborations can start with the best intentions. However, many of these end up as superfluous collaborations due to the many challenges faced. For example, these collaborations tend to involve bringing together different kinds of knowledges, from local to academic, with apparent unequal epistemic validity. There can also be academic disciplinary disagreements, scientific imperialism, as well as differences in values, goals, and language. All these problems contribute to collaborative instability. To overcome collaborative instability, it is important to set shared goals and a strong link between theory and practice. To

do that, Silva and Céspedes argue that it is necessary to adhere to a sentimentalist virtue epistemology. A sentimentalist virtue epistemology encourages attention to receptivity and decisiveness as virtues guiding collaborations. To fulfill these virtues, actors need to act following three desiderata to encourage (1) receptivity of others in every actor involved in these collaborations, (2) attention to practical needs of the actors involved, and (3) inclusion of all actors that need to be part of a collaboration.

To flesh out what a sentimentalist virtue epistemology looks like in practice, Silva and Céspedes introduce the example of the courses on Field Environmental Philosophy (FEP) imparted at the OMORA ecological reserve at Navarino Island in Chile. The courses that are part of FEP are mainly visited by university students who stay at the park for three weeks. These courses expose students to an intercultural and interdisciplinary experience. Participants are encouraged to experience nature by exploring different ways of perceiving it in order to change the values they attach to it. To do that, the courses combine arts, philosophy, science, and traditional ecological knowledge from the Yahgan people. The different stages of the course aim to change the way students see nature by promoting attention, awareness, and the use of poetry and metaphors. This change in the way nature is experienced promotes a change in values that can influence the creation of knowledge in interdisciplinary collaborations. Attention to values and goals allows participants to establish a new way of relating to others, fostering fruitful future collaborations.

The use of the concept of "traditional knowledge" is widespread in the field of ethnobiology, today mainly found in the literature as traditional ecological knowledge (TEK). But what does traditional knowledge mean? And who possesses' traditional knowledge? Daniela Sclavo's contribution **"Framing the Traditional: Counter-Revolution and Gender in Mexican Ethnobotanical Research through the 1970s and 1980s"** answers these questions. It analyzes

the political and gendered nature of the concept of "traditional knowledge", its historicity and its implications for who gets to be acknowledged as a knowledge bearer. Sclavo centers on the context of Mexican ethnobotany in the 1970s. At the time, it became clear to ethnobotanical researchers that technological promises in the field of agriculture like the Green Revolution were not solving the economic gap nor the social problems they promised to solve. On the contrary, these innovations were increasing such a gap. As a reaction, a group of Mexican scholars working in the field of ethnobotany and agriculture developed and promoted an interest in peasant and Indigenous knowledge as a solution. They investigated and wrote about the traditional agricultural practices of Indigenous groups located in a broad range of regions in Mexico and the management practices used by these groups to cultivate local crops. For them, these traditional practices represented not only valuable knowledge but also a political stand against national and foreign ideals of modernization and progress, what Sclavo calls a "counterrevolution". In the view of these scholars, traditional knowledge was an alternative that could boost rural development in Mexico, in contrast to the Green Revolution. This reappraisal of local agricultural practices led to a reconceptualization of the Indigenous and peasant interlocutors as bearers of important knowledge.

Interestingly, the process was extremely gendered and women were left outside of this reconceptualization. In the works produced by these scholars, women are not present at all or framed as passive. This could be explained by their minimal role in the agricultural field, which was the main focus of these works. But this answer is too simple. Sclavo shows that women did play a role in crop diversification and conservation practices by their influence in flavor selection and the culinary uses of crops. Despite this central role, ethnobiologists did not acknowledge women as main bearers of knowledges. This shows that what was considered valuable knowledge was mediated by implicit ideas of gender. In sum, Sclavo shows that the works of these scholars not only defined what "traditional knowledge" means, but also who

possesses that knowledge. This had an important impact in the development of the theories, methodologies and the community of ethnobiologists in Mexico to this day. This paper is an invitation to similar studies in other regions of the world where different actors have defined what "traditional" is.

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