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This innovative collection of twenty-six essays aims to contribute to the project of, as the title of the introduction suggests, reimagining epistemology and the philosophy of science from a global perspective. Rather than attempting to construct a volume that augments the coverage provided on traditional topics, such as explanation, laws, and reductionism, or that delivers an integrated global epistemology, the book explores how to think "with" the Global South. In assembling an impressively geographically diverse range of authors and in articulating the content of the volume, the editors commendably exemplify epistemic, methodological, and geographic inclusivity.

At the book's core, the editors place "global challenges such as climate change, food security, public health, and sustainable energy" that "require critical reflection on knowledge production and knowledge diversity" (p.1). The essays collectively inform both students and their teachers about philosophical discussions that often remain nascent or beyond the boundaries of reflection on the study of science and knowledge Students and instructors alike should find Global Epistemologies and Philosophies of Science a valuable resource.

There is an undeniable need for a reconceptualization of what epistemology means, what it entails, and whose knowledge is included within the philosophy of science canon. But a need for whom? The invitation issued in the volume's Introduction makes the intended audience clear: academic philosophers and their students chiefly from the Global North, rather than Indigenous experts, whose robust concepts and ontologies readers are invited to consider.

With this in mind, we can consider pluralistic and monistic approaches to knowledge diversity as a key theme of the volume as a whole, the first adopted by David Ludwig and the second by Inkeri Koskinen in their opening dialogue, "Philosophy or philosophies? Epistemology or epistemologies" (ch.1). Koskinen's monistic sense of epistemology views

diversity in terms of epistemic context, history, and position. Ludwig's contrasting pluralism takes diversity to run epistemically deeper. The stakes of the debate concern the normative scope of epistemological and political commitments. Koskinen worries that pluralising epistemology renders the enterprise toothless, relativizing and subsuming it to the political goal of supporting marginalized groups. Ludwig, surprisingly, agrees. To him, relativism is unimportant "compared to the continuing marginalization of local epistemic traditions." (p. 22) But he suggests the cost to epistemology may be overstated: he suggests that "'breaking epistemology apart' can be liberating" (p 23). While these concerns were helpfully framed, readers might have wished that more had been done to expand on the costs and concerns voiced by Koskinen, especially given that the remainder of the volume focuses on the methods and putative benefits of the pluralistic approach.

For instance, Ludwig highlights a general problem with pluralistic approaches that are nonetheless ethnocentric ones: that what are often discussed as 'global challenges' are determined by Europe and North American concerns requiring technological innovations. This problem is also manifest in several chapters that assume that epistemological efforts are based in the concepts, methods, and tools of Western Philosophy. Consider the admirable "Experimental philosophy" (ch.5) by Jordan Kiper et al. which provides a clear, quick, and concise articulation of experimental philosophy, focusing on recent work on epistemological intuitions and what they reveal about epistemological concepts. Although cross-cultural and comparative, this work is firmly anchored in showing how varying intuitions help one to understand Western epistemological concepts, such as knowledge, wisdom, and understanding.

Specific concerns about ethnocentrism are brought up succinctly in Chun-Ping Yen's "Linguistic diversity in philosophy" (ch.2), which identifies how positions, power, and prestige are concentrated in Anglophone countries, privileging researchers already working in those traditions and generating opportunity costs for those outside of it. An additional concern is that

the clustering of power and prestige prevents the discussion of other epistemological traditions and concepts, hindering philosophical reflection.

The remaining two chapters in Part 1 (Rethinking philosophical practices) also take up the range of normative and political epistemic commitments, focusing on the impact of colonialism and communism on science. In "Anti-colonial feminism and their philosophies of science: Latin American issues" (ch.3), Sandra Harding identifies modernity and coloniality as two historical forces that generated repression against women and native peoples, particularly in Latin America. Race, gender, and sexuality have been intertwined with the colonial situation since the 15th century. Harding navigates between miscegenation policies of the Iberian Crown in the early modern period and eugenic practices of the 19th century. Formulations of Latin American intellectuals, most prominently Gloria Anzaldúa's "border thinking" as a manifesto for using alternative knowledge traditions and alternative languages of expression, have been one reaction. Harding also draws attention to the essential tension that emerges from the ideal of inclusion of indigenous and other "subaltern" voices in reflections on the theoretical foundations of science and that stems from the allegedly materialistic and secularized character of modern science. For Harding, the "secularism of Western sciences distorts fundamental commitments of indigenous cultures" (p.45) and misinterprets indigenous knowledge on projects unrecognizable from indigenous perspectives.

In "Philosophy of science in China: Politicized, depoliticized, and repoliticized" (ch.4), Yuanlin Guo and David Ludwig identify how the development of philosophy of science in China has been intricately entangled with governmental mandates that appear to have shaped that development in more direct ways than they have in the United States. In China, the philosophy of science emerged only following the Chinese communist revolution and was rooted in canonical works of Marxism, primarily Frederick Engels' Dialectics of Nature, for the next 30 years. Following the death of Mao Zedong in 1976, philosophy of science was

depoliticized, drawing on standard works by Popper, Kuhn, Feyerabend, Lakatos, Putnam, and others. Since 2012, the teaching of philosophy of science has been repoliticized, whereby "professors must use the textbooks that have been compiled and published under the supervision of the Chinese government" (p.56). Guo and Ludwig use the context of discussions of the politics in the Vienna Circle's contributions to the philosophy of science in Europe and the United States to motivate the focal discussion of philosophy of science in China. Yet somewhat like James Liu and Pita King's contribution, "What is an appropriate philosophy of human science for 21st-century indigenous psychologies? (ch.19), one is left wondering what substantive contributions have emerged from the tidily reviewed history.

Part II (Reconfiguring scientific methods) begins with Luana Poliseli and Clarissa Machado Pinto Leite's, "Developing transdisciplinary practices: An interplay between disagreement and trust", highlighting the importance and necessity of collaborative research teams in addressing societal challenges, particularly those of biodiversity loss and poverty. Using the case of academic disagreement among an interdisciplinary research team in Brazil, the chapter shows the normative interplay between disagreement and trust and how research collaborators move "from a steadfast position to the suspension of judgment" (p.87). One worry with the move that the authors make here is that it assumes that suspension of judgement must always rely on "trust in each other's background knowledge" (p.87), where trust is understood as a committedly neutral attitude toward an issue or a decision not to take a firm position on a question. While it does seem that in the case study that the authors described, suspension of judgment is connected to trust, it is at least conceivable that they are not always so linked.

In "Sustainability science as a management science: Beyond the natural-social divide" (ch.7), Michiru Nagatsu and Henrik Thorén draw on Herbert Simon's conception of a management science to make the case that viewing sustainability science through that lens has fruitful payoffs with respect to how the natural-social science dichotomy is viewed. The essay

provides a neat, informative overview of sustainability science. One thread that runs through it, concerning the natural-social divide, receives an interesting, complementary discussion in Phila Mfundo Msimang's "Revising the question of race and biology in the South African social sciences" (Chapter 21). Given the volume's explicit aim to engage with literature on sustainable energy, however, the lack of Indigenous perspectives on sustainability is unfortunate. Indigenous perspectives arise other chapters—on biocentrism in environmental ethics (ch.17), on methodology (ch.10), and the "science must fall" movement in South Africa (ch.8), amongst others—yet not here.

In chapter 8, "'Science must fall' and the call for decolonization in South Africa," Chad Harris examines the debates forming part of the larger movement of #FeesMustFall in South Africa. Harris focuses his analysis on perceptions of science that motivate the "science must fall," argument and its implications. Harris starts off by reconstructing the argument that advocates rely upon and claims that Premise 2 of the argument—"Decolonization is about making a place for African knowledge in public discourse"—can be set aside because it is "a relatively uncontroversial characterization of the public perception of decolonization, and hence not worth challenging" (p.109). Why Harris thinks so is unclear, given that his subsequent discussion shows this to be a big issue for those adopting Fanonian or radical views of decolonization (see also Etieyibo 2018, 2021). Here this chapter is usefully juxtaposed against Zinhle Mncube's "On local medical traditions" (ch.20) on the decolonization of medicine in South Africa.

In "Structural epistemic (in)justice in global contexts," (ch.9) Inkeri Koskinen and Kristina Rolin highlight how global philosophies of science can benefit from discussions of epistemic injustices in feminist philosophy of science and the epistemologies of the Global South. Particularly important in this chapter is that it shows how scarce funding opportunities by scientists working in the Global South (as discussed in ch.14) and the use of the English

language in science or philosophy (as discussed in ch.2) are structural epistemic injustices. Such discussions contribute to the importance of diversifying methods in science and the scientific community, and of egalitarianism and the democratization of science (Navin 2013; Schroeder (2021).

Carl Mika's "Excess and indigenous worldview: Philosophizing on the problem of method" (ch.10) begins with the important demographic problem of Indigenous participation in the philosophy of science. Mika's diagnosis and solution adopt a Heideggerian perspective that views method-itself as antithetical to the holistic interconnection he views as typical of Indigenous metaphysics. But general statements (e.g., "for indigenous people the world does not exist due to one's mental representation of it, unlike in idealist traditions in dominant Western thought") strike us as misleading and reinforce rather than dissipate whatever tension there is to acknowledge between the multiplicity of perspectives here.

In "Radical alterity, representation, and the ontological turn" (ch.11), Mark Risjord provides a crisp summary of the so-called ontological turn in cultural anthropology, locating it clearly as the latest part of a long non-assimilationist tradition of grappling with radically different worldviews. Having identified what he sees as fatal problems for the ontological turn, Risjord argues instead for the prospects for an ecological approach to cognition that outright rejects the appeal to concepts, drawing here on the 4E (embodied, extended, embedded, enactive) movement. This signal of a new direction beyond the ontological turn is tantalising, but its development turns on the view (which we suspect is false) that the most promising forms of the 4E paradigm are representation-free.

Part III (Negotiating science in / with society) opens with Faik Kurtulmuş's "The democratization of science" (ch.12), which provides a good analysis of the debate concerning democratizing science and why the view of an autonomous or value-free science is mistaken. As Kurtulmuş rightly notes, the democratization of science is important, given that the

scientific enterprise affects people positively and negatively and that "all affected by a decision should have a say in it" (p.147). While Kurtulmuş' discussion focuses mostly on diversifying methods in science, the author omits an important aspect of the democratization of science, namely, the diversification of the scientific community that allows for the inclusion of Indigenous knowledge systems and producers and minorities.

In "Science and values: multi-strategic research and traditional saberes" (ch.13), Hugh Lacey sketches the institutional landscape of the debates surrounding the role of cognitive and non-cognitive values on the holding of hypotheses, the endorsement of them, and their use in practice before turning to advocate a surprising value-neutral ideal for science. Unlike previous such views, Lacey's is couched as a counterfactually justified normative ideal for science: that if science wants to be about all the world's phenomena, then it should be epistemically inclusive and include multiple strategies. An interesting reimagining of the value-neutral ideal promoting context sensitive methodologies and a welcome approach to seeing science as epistemologically and methodologically inclusive, the chapter nonetheless makes its argument without engaging with non-Western epistemologies or methodologies.

Manuela Pinto discusses the problem of privatizing science and how private interests have increasingly dictated the agenda of scientific research conducted on a global scale in "Negotiating science in/with society"(ch.14). Pinto presents the commercialization of science as a philosophical debate, focusing mainly on the "epistemic and social challenges that emerge with privatization." Such an approach underscores one of the chapter's central problems: the consequences of the phenomenon of privatization on scientific communities in the global south, particularly in Latin America and the Caribbean. From this perspective, Pinto raises the following questions: How does research based on the private sector affect scientific production in general? Consequently, what kinds of biases emerge in the production of scientific knowledge? Such questions are umbilically aligned with the problem of the "manufacture of

doubt" as an essential tool to mobilize public investments and political representation through lobbying to forward proposals based on private interests. This is exemplified by Merck pharmaceuticals and the different ways of producing ignorance and reproducing violence, whether in drug testing (see the scandalous case of Vioxx) or ordering scientific papers. In this context, problems of colonial continuities translate into the maintenance of asymmetrical power relations between countries in the Global North and the Global South. Here the scientific production chain (1) maintains unethical biomedical tests in the global south and (2) perpetuates the extraction and exploitation of natural resources, given presumed low levels of environmental regulation.

In "Innovations North and South" (ch.15), Marcos Barbosa de Oliveira discusses innovation and global investment policy in science based on the work of Christopher Freeman, founder and first director of the Science Policy Research Unit at the University of Sussex. In this framework, innovation is defined "as a profitable invention; an invention that a firm adopts in order to increase its profits." (p.174) Profit and market are approached as central axes of the concept of innovation, fundamentally arising in post-war developmental and neoliberal contexts. For Oliveira, such historical and conceptual content has informed ethical and geopolitical discrepancies: the denial of the public interest and the reproduction of coloniality and asymmetries in the context of the international division of labor. Oliveira's ethical criticism derives from current debates regarding the functions of science and the possibilities of dealing with its effects in society, an important example concerning the general negligence of researching the differential impact of agrochemistry on marginalized populations located in the Global South who end up as objects of technological applications produced in the Global North.

In "Post-truth and science: Looking beyond the Global North" (ch.16), Luis Ryes-Galindo identifies an important tension in the relationship between science, technology, and the state. While other authors (chapters 14 and 15) defend the importance of the public

character of science, Galindo posits that the public, guided by a centralizing state, can serve as a basis for asymmetries of investments in science, once lobbyists linked to agricultural, agrochemical, and health sectors control the political system. In the context of the Covid-19 pandemic in Brazil, Galindo mentions a critical and paradigmatic example of massive public investment in hydroxychloroquine in army laboratories after Bolsonaro followed the same line of action as Trump. The chapter has the pedagogical advantage of introducing a basic bibliography on STS to consider the post-truth problem. Galindo borrows the notion of agnotology from Robert Proctor and Londa Schiebingerin in considering the process by which the category of fake news should be expanded and considered in terms of ignorance produced through the misrepresentation or misappropriation of scientific consensus.

The chapters in Part IV (Situating the living world) cover environmental, cultural, medical, and biological dimensions to human life. In "Environmental thinking in African philosophy: A defence of biocentrism using the notion of *nma ndu*" (ch.17), Jonathan O. Chimakonam and L. Uchenna Ogbonnaya call for the notion of ecological balance (in African philosophy) by drawing on insight from the Igbo aphorism *ihe niile di bu nma ndu* to argue that "the beauty of life lies in the bio-diverse nature of the ecosystem" (p.200). Here they take the biocentric interpretation of the Igbo aphorism to facilitate ecological equilibrium. However, they haven't shown why this interpretation best captures the Igbo idiom or why it is better than an anthropocentric interpretation. There are other worries with the chapter worth noting. Chimakonam and Ogbannaya rightly talk about a possible interpretation of "Ubuntu and environmental ethics" being anthropocentric but they don't see that this interpretation is limited to Ubuntu and not extended to African philosophy more generally. Furthermore, they draw both on Placide Tempels' force/being or vital force (vitality or energy) thesis and Innocent Asouzu's view that "All realities are in mutual complementary relationship" (p.203), claiming that "in the Igbo parlance, 'being' and 'reality' are not distinguishable" (p.203). Given that the

ecosystem covers both animate beings or the biosphere and inanimate things, one would have thought an ecocentric rather than a biocentric interpretation for the Igbo aphorism was more appropriate.

A trade-off between epistemology and politics motivates "Cultural evolution: A case study in global epistemologies of science" (ch.18). Here Azita Chellappoo argues that the epistemic values endorsed in cultural evolutionary research lead to explanations that minimize agency and in turn orientalise and "other" non-Western populations. But does this mean epistemology should not care about generalizability? Or that detailed ethnographic explanations are incapable of othering? Though it seems incontrovertible that epistemological and political commitments might clash—as we saw in Chapter 1—it is sometimes hard to know what to do with the cautionary tales being told. Consider that cultural evolutionary researchers apply their generalized, "agency-minimizing" explanations symmetrically—to Western populations as much as to non-Western ones.

Following Mncube's interesting chapter on decolonizing medicine (ch. 20), Phila Mfundo Msimang explores the origins of racial classification in South Africa, navigating biological, economic, social, and political dimensions to the understanding of population history. Colonial racial classification thinking and discrimination begin with the 1652 arrival of Europeans to South Africa, but persist globally. The categories 'Black' and 'African', frequently used as code for 'sub-Saharan African', falsely demarcate between sub-Saharan Africa and North and East Africa. Msimang argues that this division is based on racist ideologies that sought to amplify contributions from the North and East whilst diminishing those from sub-Sahara, grounding the U.S. categorization of people from the Middle East and North Africa as "White" or "Caucasian" and those from sub-Saharan Africa as 'the real Black Africa' (p. 245). Tracking the history of migration and investigating the development of racialized categories and how these coincide with the beginnings of modern sciences, Msimang

identifies how both biological and social conceptions of race were used by colonists to differentially value people and how understanding this history of classification requires careful investigation of the relationships between social and biological sciences.

The chapters in Part V turn from the living world to abstract and physical worlds. Rasmus Winther's "Philosophical cartography" (ch.22), traces out the "cartographic impulse" across a variety of cultural contexts, drawing on Winther's recent book-length treatment of the topic in *When Maps Become the World*. Despite his final conclusion that "interesting and important conceptual and philosophical lessons follow from continuing to map-think the cartographies of global epistemologies" (p.263), the philosophical discussion here is somewhat thin (e.g., "representations and knowledge of the oceans are both empirically objective and culturally constructed … in the tireless philosophy of science debates among empiricists, constructivists, and realists, all identify some part of the truth.", p.261).

Kenji Ito's "Modeling the apparent spread of science" (ch.23) introduces critical issues in the historiography of science: the universalist claims of modern science, the perception of unity in science, and the problem of its origins. The text has the strength of summarily delineating each problem and proposing widely-discussed, theoretical solutions in the history of science. George Basalla's diffusion model, which Ito calls the Simple Diffusion Model (SDM), is based on the claim that "science started in one place (generally in Europe) and spread because it produced true, or at least valid, knowledge." (pp.266–67). The SDM twist inserts an explosive element into the general model: the claim that European science has historically spread not necessarily because it was true, but because it was colonial and violent. Ito outlines subsequent models, including the circulation of knowledge model (CKM) that remains influential today; its most prominent representatives, James Secord and Kapil Raj, draw attention to "how indigenous groups reacted to and appropriated knowledge from Europe and how they participated in the formation of scientific knowledge" (p.268). This model explains

several cases in the history of science in Japan, in particular, the knowledge production of seemingly European-style science and technology in Japan after the 19th century, which, Ito argues, "was often a syncretism of European and Japanese practices" (p.268).

Koji Tanaka's "Buddhist logic from a global perspective" (ch.24) offers several entry points into a vast literature for those unfamiliar with Buddhist logic. Here there are two ways of acquiring knowledge: through *pratyakṣa* (roughly translated as perception) and *anumāna* (frequently understood as inference). While *pratyakṣa* invokes immediate awareness caused by the particular that one is perceiving, *anumāna* is conceptually mediated awareness. Through both one attains truth. The attainment of knowledge through *anumāna* requires an assessment of whether knowledge-making possesses the right characteristics (*trairūpya*) necessary to mark the process as valid. The processual assessment emphasizes knowing inferentially, rather than possessing a particular cognitive state. Tanaka shows how this makes a real difference by discussing Buddhist psychologism. Since Buddhist logic pertains to cognitive awareness and the processes of knowing, psychologism and its emphasis on a logic that describes and depends on our experiences of coming to knowing is widely accepted (whereas very few Western logicians have adopted psychologism). In addition to anti-psychologism, Tanaka also shows that by attending to the differences between Buddhist logic (especially that attributed to Dignāgā, Dharmakīrti, and others), many commitments held in Western notions of logic, like apriorism, are challenged.

Smita Sirker's "Perspectives on the Indian mathematical tradition" (ch.25) provides a masterful introduction to the historical richness of Indian philosophy and the placement of mathematical reasoning within it. Yet the paper's overall orientation returns us to questions about ethnocentrism we raised earlier. The chapter's aim, after all, is to show that while this tradition was grounded in rigorous and explicit principles of reasoning, it nonetheless lacked a process corresponding to that of *proof* in Western mathematical traditions. One wants to ask:

Why should such a rich tradition be forced to justify itself in terms of Western mathematical practices? Why shouldn't careful philosophical analysis and exposition be sufficient? And, what is lost by forcing researchers to always relate their work to the Western Canon?

The final chapter of the collection, Harry Collins's "Science as craftwork with integrity" (ch. 26), raises corresponding questions about who "we" are. Collins points to the current COVID crises as an exemplar for why we need to focus on messy science and not the usual venerated examples such as the Michelson-Morely experiment, often taken as definitive in proving that the speed of light is constant. COVID research should be embraced, like other forms of scientific investigation in-process that sometimes (or often) gets it wrong but isn't bad because of it. Collins is rhapsodic for messy science because he argues that scientific work is the sort of craft one must always do with integrity, even if it is also the getting-it-wrong-a-lot science he says we should love. Discussing the replication crisis, Collins argues that what we need is not better statistics but better ways of finding ways of making more visible the mechanisms that underpin hypotheses (p. 303). For Collins, science is unabashedly Western and pragmatic: "we need to justify science in a way it can live up to" (Collins, p. 303). Yet who are the "we" and why are "we" only talking about democracies? This undeniably passionate chapter calls for us to 'love science' and includes justifiably critical comments on Brexit and Trump in order to argue against a "post-truth environment".

Global Epistemologies and Philosophies of Science delivers what it promises at the outset by providing an opportunity to think alongside its authors and with the Global South. What the volume as a whole shows—and arguably part of its success—is that epistemic disagreement across these voices need not be silenced by forcing the plurality of views to conform to an integrative whole. Those seeking an alternative, unified philosophy of science canon may be disappointed. But for those interested in listening to subaltern narratives that follow divergent epistemological paths, look no further!

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