Philippine Studies: Historical and Ethnographic Viewpoints

Ateneo de Manila University • Loyola Heights, Quezon City • 1108 Philippines

Guest Editors' Introduction

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Philippine Studies: Historical and Ethnographic Viewpoints
vol. 71 no. 1 (2023): 1–16

http://www.philippinestudies.net

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Introduction
STS in the Philippines

This introductory essay outlines at least two distinct approaches to the study of science and technology in the Philippines and details the process by which we devised this special issue. We remain uncomplacent with the idea that science and technology studies, in its Anglo-European conceptions and ongoing theoretical commitments, needs to be a new field in the Philippines. Guided by the Global Asias framework, which posits the possibility of "relational nonalignment," we, instead, introduce this special issue as but one way science and technology, most especially in the postwar period, may be investigated, critiqued, and reimagined.

KEYWORDS: SCIENCE AND TECHNOLOGY STUDIES • SCIENCE, TECHNOLOGY, AND SOCIETY • RELATIONAL NONALIGNMENT • POSTWAR SCIENCE • TRANSNATIONAL COLLABORATION

Science and technology studies (STS), as it emerged in the United States and in northern European countries, is today understood as an interdisciplinary field that examines science and technology as processes both impacted by political and social influences and with contingent structures, practices, discourses, and epistemological commitments of their own. In other words, STS pushes us to consider how, for instance, objectivity is a mutable project bound to historically shifting epistemic virtues (Daston and Galison 2007) or how technologies that make available one's genetic code may be informed by, reify, or dramatically upturn racial and ethnic categories as we know them (Reardon 2012; Reardon and TallBear 2012; TallBear 2013).

For many STS practitioners trained at US and European universities, the field is conventionally understood to have its deepest roots in the history of science before intensifying in the aftermath of the Second World War and during the Cold War. During this time, scholars investigated science's impact on society writ large. Concerns with nuclear power, militarization, and environmentalism influenced investigations that, on the whole, saw science as an intellectually impenetrable domain that could serve the whims of the power hungry and the violence mongering. In Europe particular schools of thought emerged and began to intensively study the process of knowing and knowledge making itself, the construction of fact, and dynamic practices of validating truth claims (Law 1991; Jasanoff 2016). These concerns informed the intellectual tenets by which contemporary STS abides, and since such developments the field has witnessed the outgrowth of largely overlapping subfields such as feminist (Haraway 1985; Harding 1986; Rivers 2019), area-based (Fu 2007; Rodriguez Medina 2018; Kreimer and Vessuri 2018), queer (Cipolla et al. 2017; Molldrem and Thakor 2017), postcolonial (Anderson 2002; Verran 2002), and, more recently, decolonial (Lyons et al. 2017) and indigenous (Indigenous Science, Technology and Society 2022; Kolopenuk 2020) science studies. These subfields have undoubtedly dislodged some of the earliest centers of STS thought to key universities in Taiwan, Mexico, Australia, Canada, and elsewhere.

STS has been gaining wider traction in scholarship on the Philippines. This is not to say that there is no history of critical engagement with science and technology across the islands—far from it. Science has historically been a topic for intellectuals, scholars, politicians, and activists invested in righting social wrongs or in discovering the sociopolitical dimensions

of scientific disciplines. Many now, however, are also taking interest in the construction of (dis)information, the infrastructures by which people and knowledge travel, and the social dimensions of scientific establishments and the instruments and notions of expertise on which they rely. In the same vein, they are rediscovering some alternative understandings and engagements with science and technology in the archipelago.

In this issue we explore science from several fresh disciplinary angles: history, visual studies, literature, geography, and community development. The contributors invite readers to view science in a socially and historically contingent manner (Haraway 1988) in order to prod its seemingly unquestioned modes of future building. The articles complicate positivist assumptions of science, interrogate parameters of measurement and practice—often with intellectual histories of their own emanating from the Philippines's colonial past—and disturb the conflation of "science," "progress," and "the future." This special issue also includes a collaboratively written commentary by self-identified Filipino and Filipino American scientists and science communicators practicing in the Philippines and abroad. Their reflection, alongside the positions of the articles, offers a sense of varied, even if at times intrinsically contradictory, definitions and interpretations of STS. Finally, given the present challenges facing Philippine society today, this special issue creates several vantage points for rethinking and tackling such challenges in ways we believe are nuanced, historically attentive, and relevant.

We, the guest coeditors, view this special issue as a timely follow-up to the 2007 *Philippine Studies* issue titled "Science." "Science should neither be reduced to its local circumstances or represented as blithely transcending them," writes Warwick Anderson (2007, 289) in his 2007 introduction. Indeed, science and technology in the Philippines demand analyses that can comfortably toggle between unique local contexts *and* wider material, intellectual, political, and social currents. Such an approach allows us, for instance, to recognize that the digital channels that catapulted Rodrigo Roa Duterte to presidency were entrenched within regional politics, cacique democracy, and the legacy of colonial electoral schemes (Anderson 1988; Rafael 2022, 6–17) while being constitutive of—and constituted by—cyberinfrastructures that have transformed how human and algorithmic networks amplify political information (and political demagoguery) globally (Arugay and Baquisal 2022; Bradshaw and Howard 2017; Cabañes and

Cornelio 2017; Hoffman 2018; Ong and Cabañes 2018; Williams 2017). Even more recently, such toggling allows us to see how digital media-savvy public relations networks aided in the reelection of yet another Marcos and another Duterte (CNN Philippines 2021). "The accelerant is technology," spoke Maria Ressa (2021) during her Nobel Prize lecture, "at a time when creative destruction takes new meaning"—a position we know as remarkably apropos of Philippine politics and yet shared and configured by other nations and global contexts.

As we see it, Anderson's view also applies to STS in the Philippines. We, therefore, pick up where the "Science" issue left off and offer a two-pronged approach: first, to consider what "STS in the Philippines" might mean; and second, to provide empirical case studies that begin with questions of science and technology in the postindependence period. For us, STS in the Philippines should neither be presented only in its local forms and manifestations nor is it a field indifferently above them *or* subservient to Anglo-European conceptions. Moreover, the articles consider the local textures of science in the Philippines and their more geographically expansive bearing. The whole issue also considers STS for its varied interpretations in the Philippines and elsewhere.

We come to the project with our own commitments to both Philippine studies and STS, and what these have meant for two scholars trained in the US. As colleagues and friends since 2009, we have shared a common interest in questions of science and technology in the Philippines: Paul Michael, an ethnographer of gay dating app technology in the cities of Manila and Los Angeles, and Kat, a historian of colonial botany. We both trained at US academic institutions, and we both presently hold faculty positions at public universities in California. We discuss the complexities of our location, the generative possibilities of multiply located research, and our stance on *not* constructing a new subfield below.

Prong One

In the first prong, we apprehend the polyvalent definition of what STS might be (Otsuki 2021) to us, to our contributors, and to our readers. After we released our call for abstracts in November of 2020, we reviewed a range of interpretations of STS: Most abstracts topically covered some aspect of "science" or "technology," some prioritized philosophy and theory, and others challenged our own conception of what we have known STS

to be. Soon after, we consulted with archaeologist Michelle S. Eusebio on the history of the Science and Society Program at the University of the Philippines (UP) Diliman, and her knowledge of the program's institutional history provided at least another way that STS can be understood in this special issue.

Following the fall of the first Marcos administration, UP launched its Science, Technology, and Society (STS) program in 1987 to explore how society and its varied dimensions interact with science (Sacay and Pascasio 2018). A call for a "scientific outlook," one rooted in the postcolonial conditions of the Philippines, underscored—and continues to underscore—its curriculum. UP's STS program forms part of the general education requirements for students to instill creative thinking and a "commitment to nationalism and social justice" (ibid.). On the occasion of the program's thirtieth anniversary, the *Manila Bulletin* reported,

> Through STS it is hoped that [students] are encouraged to come to a critical realization that empowering society through a more liberal and holistic employment of their learned [science and technologies] can contribute primarily to developing a truly Filipino culture of Science, and consequently a better developed nation. (ibid.)

In this sense, an objective of UP's STS program has been to couple a particular brand of Filipino-ness with science's universality in the interests of the Philippine nation.

The cry for a "truly Filipino culture of Science" was, however, not altogether unique to the end of the 1980s. The Philippine nation entered a crossroads at the end of the Second World War, when scientists took up the rallying call of civic duty and citizenship to address the newly independent country's practical needs (Anderson 2007, 309–11). Heads of state during the war and in the immediate postwar period, albeit to uneven levels of execution and with loose definition, drummed up support for a *Philippine science*. José P. Laurel's commendation of scientists in 1944 not only suggested that science was a borderless, universal phenomenon but also expressed that the unique scientific problems faced by the Philippines in the mid-twentieth century could be best addressed specifically by Filipino scientists (CuUnjieng 2017, 20–21). Ramon Magsaysay (1954) declared 8–14 March 1954 as "Science and Technology Week" to "give impetus to

science endeavors" with an eight-member board of government appointees to oversee the ceremonies associated with the week. During National Science Week in 1958, Carlos P. Garcia (1958) remarked on science's role in economic productivity, something the Philippines needed to fully harness in the age of outer space and the atom. Presidents touted "functional" and politically "strategic" goals that could erect infrastructures for economic development while parlaying the country's gilded position as "the leader of the free world in Southeast Asia," a position pedestaled upon US technical assistance (Neelakantan 2021, 54; Woods 2020, 137–46; cf. Ejercito in this issue). More well-known is how Ferdinand Marcos Sr. outfitted his dictatorship with science: from the 1973 institution of the Balik Scientist Program (literally, the "Return Scientist" Program, which was resurrected in 2018 through Republic Act 11035 under Duterte) to the incomplete construction of the Bataan Nuclear Power Plant and its investment in the Philippine Science High School. Marcos's program for science attempted to reformulate the Philippine population to have a "scientific outlook," but the administration's project fell short of meeting its goals (Gutierrez 2021, 393–94).

In the thick of Marcos's espousal of scientific priorities, civil society organizations composed of self-declared pro-people scientists emerged to oppose the government. With the increasing incidence of poverty under martial law (Aquino 1982, 160), organizations like Kilusan ng Siyentipikong Pilipino (founded in 1981) arose to critique the capital-driven, private-sector accumulation of foreign "appropriate technologies" that were seen as shackling the Philippines to neo-imperial projects (Gorospe and McNamara 1984, 416–21). Marcos's opponents—several from the science sector—proclaimed the possibility of a social justice-oriented science.

Today, organizations such as AGHAM (Advocates of Science and Technology for the People, founded in 1999; cf. Lagos et al. in this issue) maintain this mission and approach. Numerous science education programs in the country still pronounce both the universality of science and the particulars of Philippine society that can inform a new class of scientists, engineers, and technicians and, in the parlance of Fidel Nemenzo and UP's program, a populace with an "STS mindset" (Sacay and Pascasio 2018).

As we devised this special issue, we led with our own idea of STS, reflective of how we were trained and of the intellectual genealogies in the field to which we have been exposed. After receiving forty-eight abstracts,

we selected works for geographical and topical spread, valued contributions from the humanities, social sciences, and STEM (science, technology, engineering, and mathematics), and prioritized those that troubled the epistemological preeminence of science positioned by the government, development-oriented oligarchs, nongovernmental organizations, and certain historiographical traditions. To accommodate the number of novel topics covered by the contributors, we asked that the pieces be relatively shorter than a typical journal article: The pieces in this issue run from 5,000 to 7,000 words inclusive of bibliographies and endnotes. We picked ten abstracts and workshopped nine manuscripts collaboratively in July of 2021 to tighten our intellectual cohesion before anonymous peer review. Seven essays comprise the final issue. We chose to have a commentary penned by practicing Filipino and Filipino American scientists, whose perspective we seek not to elide. Four of the five commentary writers (Yasmin Tayag, Ingrid J. Paredes, Kalay Bertulfo, and John Paul Balmonte) participated in a January 2021 virtual salon titled "Science Takeover," at which Kat also spoke, and the three agreed—along with University of Santo Tomas-based biologist Rey Donne S. Papa—to review the manuscripts and produce a thoughtful account of their perspective on science today. Finally, we invited Warwick Anderson to write a reflection, which serves as the coda of this special issue.

We acknowledge that, in our effort not to build a field or to create a new intellectual formation, this special issue still pronounces particular sensibilities found in Anglo-European notions of STS that permeate the majority of our papers. As Sharon Traweek pointed out when Paul Michael presented on our special issue at the 2021 Society for Social Studies of Science conference, our project still disciplines based on our decision to include and exclude submissions. Also, we recognize the labor of contributors that we selected but who chose to set their own paths instead of moving forward with our process. We learned from their work, and this project would not have coalesced into its current form without them. We lift up our amazing colleagues including Salka'Tuwa Bondoc Mafla among others. In an effort to "not merely replace the old hierarchical orthodoxies, canons, complacencies, and peripheries with new ones," as Traweek cautioned, we stay *uncomplacent* with the idea that "STS in the Philippines," as captured in this special issue, needs to be a field of its own or some definitive body of texts on what STS should be.[1] By rendering this current work visible, other interpretations of STS and their attendant empirical case studies become

invisible. Our epistemic authority is not lost on us. Furthermore, in light of current debates and ongoing reports of abuses within the field of STS specifically and in academia generally, we believe that building an ethical research collective deserves attention and takes work, prudent listening, and inclusive care (Pearce 2022; Science and Justice Research Center 2022). We hope that this project inspires others to consider how else STS may be conceived in the Philippines and in its diaspora and what other venues can invite and permit scrutiny of science.

Prong Two

The articles in this issue begin by addressing problems at the end of formal empire in the Philippines. They take on postcolonial theoretical frameworks that are sensitive to the lingering impacts of colonization, its strange hybridities, and ongoing intellectual contestations within them. Taken together, the articles in this issue think about Philippine futures and persistent anxieties surrounding and, in some ways, emerging from science. How do the specters of US colonial science frequent the present? How do the political projects of the post-1946 Philippines attempt to uphold nationally independent forms of science that are nonetheless reflective of larger currents seen during the Cold War, the spread of global liberalism, and the ascent of authoritarianism? How are contemporary actors opposing state-backed technology and development schemes? What futures—and rather eerie predictions—lie in science fiction?

The US colonial period established a precedent for particular kinds of scientific practice and standards that have continued to loiter well after independence. Ruel Pagunsan opens his article with a Benigno Aquino III-era reforestation program, which aimed to "green" the nation with an astonishing 1.5 billion trees but drew pushback from critics for prioritizing fast-growing "exotic" tree species over relatively slower-growing "native" trees. Intrinsic to this debate, Pagunsan shows, is the history of colonial-era reforestation that touted exotic trees as more profitable to the timber markets upon which the colonial (and eventually, independent) state could rely. As Pagunsan wisely writes, the paradox surrounding two competing discourses (exotics versus natives) more so points to projects of national identity and development, which often recruit plants for varied political ends (Gutierrez 2018). Gideon Lasco similarly points to the early twentieth century as the moment when bureaucrats and physicians engendered metrics for pediatric

anthropometry. Assessing children's height and weight against standard growth charts is a contemporary global practice. Yet, as Lasco points out, the practice of measuring children is an inherently "comparative paradigm" held against a "normative 'reference standard'" (38). For the Philippine case, this establishment of standards coincided with the US institution of public health norms. Yet, as he also shows, the Philippines underwent three identifiable phases of pediatric anthropometry, and these reflected, not unlike the government's reforestation program, tense ideas of what a "national standard" could be versus what would ultimately be seen as "global" normative practice.

Following Lasco, Karlynne Ejercito's essay charts the chilling mid–twentieth-century expansion of the International Business Machines Corporation (IBM) in the Philippines. Founded in 1911 in New York, the parent company currently operates directly and through subsidiaries in over 171 countries. Today, IBM (2022) places itself at the mantle of progress such that "the application of intelligence, reason and science can improve business, society and the human condition." But, as Ejercito narrates, not much has been written on IBM's international presence. The company unveiled its first office in the Philippines in 1934 and spent the next several decades transforming information technology systems within the government bureaucracy. These systems played a crucial yet under-scrutinized role in the continued presence of the US military in the Philippines following the Second World War, in technical assistance programs buttressed by US counterinsurgency aid, and in the "elite consolidation" (62) of business and government interests. By the 1970s the Philippines hosted the highest number of data processing systems in Southeast Asia, a "distinction," Ejercito powerfully points out, that owed to the country's "longstanding relationships with the US military" (65).

In the following piece, Trisha Remetir applies a visual studies approach to the scientific archive of mid– to late–twentieth-century freshwater pisciculture. Not unlike other scientific programs following the Second World War, the Philippine government turned to aquaculture to meet domestic market, economic, and nutritional needs. Taking as her objects a documentary film, *The Mysterious Milkfish* (Mckee 1986), and program reports from the Southeast Asian Fisheries Development Center, Remetir proposes a visual approach she terms the "laboratory-to-landscape view" (75) that captures the webbed relations of fish, humans, and watery environments

during the Philippines's national intensification of aquaculture. She rightly reminds that the scientific archives surrounding aquaculture are very much "cultural participants" in configurations of Philippine space and far from the "impartial actors" they might be perceived to be (89).

Ethan Chua and Scott Lee Chua offer a literary analysis of writer Gregorio C. Brillantes's (1980) short story "The Apollo Centennial," published in 1980. In the story, Brillantes sketches a future in which Marcos Sr.'s martial law has never ended. Indeed, to be penning this special issue introduction following the landslide election of Ferdinand Marcos Jr. makes the prophetic quality of Brillantes's work—and also the Chuas', finalized before the 2022 elections—all the more disturbing. In their examination of the story, Chua and Chua approach "The Apollo Centennial" as a "sociohistorical artifact" to "enact, critique, and subvert possible futures" (96), with one future in particular painting an image of the possibilities lurking under continued dictatorship as well as the presence of protest and dissension against it. Thus, in a strange land wherein English and "Tagilocan" (a portmanteau of Tagalog, Ilocano, and Kapampangan) are spoken, the world celebrates the 100th anniversary of the Apollo landing, and although the Philippines seems politically suspended, there is perhaps some hope nestled in the ongoing insurgent civil war and the active decision to resist the Marcosian vision.

From the Chuas' piece, we turn to another collaboratively written essay by Devralin Lagos, Rodrigo Eco, Vito Hernandez, John Warner Carag, and Harianne Gasmen, volunteers of AGHAM and scholars with backgrounds in community development, archaeology, heritage studies, and earth and environmental sciences. In their article they reflect on their methodology as activist-scientists. Working together with fisher communities impacted by the Bulacan Aerotropolis project, the authors provide a detailed account of their collective efforts to confront the environmental impact assessment (EIA), a report typically designed to evaluate the potential environmental consequences wrought by a development project. In their community organizing approach with fisherfolk, they participated in and facilitated a number of activities that they call the "counter-EIA": a staunchly anti-EIA process that they sharply position as one that is more invested in the welfare of those who have been and will be impacted by the aerotropolis scheme. The authors provocatively confront their own expertise and the ways in which the counter-EIA still operates under a rubric that considers science a preeminent field of knowledge and its practitioners as principal

experts. In their efforts to demonstrate the profit-driven interests of the EIA and the Bulacan Aerotropolis, they dialectically contend with how "science" holds social authority and who, at the end of the day, will benefit from such community-organizing efforts. For them, local fisherfolk are the primary producers of knowledge, and the authors envision their collaborative, interdisciplinary orientation as foundational to a just science.

We close with Noah Theriault and Kristian Karlo Saguin's assessment of "smart" urban development in Metro Manila, an infrastructural ideal composed of networked artificial intelligence, real-time data mining, and digital mass communication. Much of what can be portended of smart cities rests, as they point out, upon the speculation of what such development schemes can actually address. The rhetoric tied to these projects, as they demonstrate, augurs some anticipatory someday (Atienza 2023). It is still as of yet unclear how quickly and to what extent Manila will take up smart design as a future-oriented set of "solutions." But what is clear, according to the authors, is the history of urban planning in Manila as tethered to the Marcos Sr.-era program of the New Society and, more recently, to Duterte's Build, Build, Build program. In their estimation, the "smart" infrastructural promises of the future are pegged to the rise of authoritarianism and to how the smart city's technopolitical landscape advances it. Most projects not only remain "in the future tense" but also portend results likely to clash with the "recalcitrant contingency of urban life" (149) in the National Capital Region.

Paths Ahead

We arrive at the special issue aware of the politics of multiply located collaboration and complicity with the inequitable structures that comprise US-based scholarship on the Philippines. As Filipinx-identifying scholars, we raise questions that tie back to our intellectual commitments that are nonetheless colored by our geographical and institutional positions. As Caroline Sy Hau (2014, 47) writes on teasing epistemic claims over who has the intellectual power and authority to write and study about Philippine societies and cultures, "Location matters insofar as it poses specific constraints on research and writing for multiple sites and audiences." Hau suggests that scholars promote multidirectional discourses along local, national, regional, and global conversations without falling for metropolitan silos. These forms of conversation promote confidence among scholars and institutions from many constellations. She adds that these exchanges can "provide ways

to think out of the boxes created by hegemonic academic cultures and traditions (whether from America or in the Philippines or other places) and think across disciplines, languages, and institutional settings" (ibid., 56). Our aim, therefore, is to promote an open dialogue and collaboration through our shared investments in creating and sustaining systems of support in our shared academic formations. What we aspire for is a larger coalitional conversation with other STS collaboratives in Latin America, East Asia, Southeast Asia, and Oceania that eagerly addresses the problems and promises of postcoloniality, nationalism, and indigeneity without pause.

We imagine this special issue as a multidisciplinary convergence in relational nonalignment—a concept from the Global Asias framework (Chen 2021; Chen and Hayot 2015) consonant with ideas from queer studies that embrace multiplicities, excesses, promiscuities, and the unresolved (Browne and Nash 2010; Chiang and Wong 2017; Huang 2022; Luibhéid and Chávez 2020; Race 2015). We recall the editorial team's introduction to the maiden issue of *Tapuya* on the possibility of holding "contradictory definitions" and "the productive tensions of simultaneously being part and not part of a specific community" (Rodriguez Medina 2018, 1), which we read as a postcolonial tension in knowledge production. We invite future connections among different cultural producers and STEM practitioners who have been providing critical analyses and public commentaries on the ways techno-scientific knowledges, methods, and practices have been used to back damaging policies and dismay lay people's support of science and technology toward the benefit of political elites and multinational corporations. This project is a collaborative experiment in assembling but one venue for intellectual and political engagements with science—one that foregrounds diverse genealogies and approaches attuned to the multiplicities of our present configurations and the possibilities of different futures.

Note

We would like to thank Michelle Eusebio for her insight and Casper Bruun Jensen for his comments on earlier drafts of this introduction. We appreciate the Envisioning and Building Transnational STS: Designs, Methods, Relations Panel II at the 2021 Society for Social Studies of Science conference for its feedback on this special issue. A considerable amount of learning came by way of the STS Futures Initiative and scholars such as Jaimie Morse, Grant Otsuki, Thao Phan, Fadjar Thufail, Leandro Rodriguez Medina, and Kim Fortun, who have given new

definition to the "global turn" in STS. Johanna Lyn Gatdula provided considerable research support and dedicated her organizational expertise to this project's development. We are grateful to the Philippine Studies: Historical and Ethnographic Viewpoints *editorial board and team for its guidance through this endeavor.*

1 We are inspired by the position upon which Kristina Lyons, Juno Salazar Parreñas, and Noah Tamarkin open their 2017 ***Catalyst*** special issue. Like theirs, we bring forth "propositional offerings" on the multiple conceptions of STS in the Philippines, elaborate upon one particular conception through our selection of articles, and hope the entirety of the special issue permits "entries into a conversation that, of course, does not start or end with us" (Lyons et al. 2017, 1–2).

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