Special Section

Nature, Data, and Power: How Hegemonies Shaped This Special Section*

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ABSTRACT: Systems of oppression—racism, colonialism, misogyny, cissexism, ableism, heteronormativity, and more—have long shaped the content and practice of science. But opportunities to reckon with these influences are rarely found within academic science, even though such critiques are well developed in the social sciences and humanities. In this special section, we attempt to bring cross-disciplinary conversations among ecology, evolution, behavior, and genetics on the one hand and critical perspectives from the social sciences and humanities on the other into the pages—and in front of the readers—of a scientific journal. In this introduction to the special section, we recount and reflect on the process of running this cross-disciplinary experiment to confront harms done in the name of science and envision alternatives.

Keywords: ecology, evolutionary biology, behavior, genetics, hegemony, power, systems of oppression.

Introduction

The sciences, including the fields of ecology, evolution, behavior, and genetics, have long and entrenched entanglements with systems of oppression (for just a few examples out of decades' worth of scholarship to this effect, see Levins and Lewontin 1985; Tuana 1989; Haraway 1991; Kingsland 1995; Graves 2003; Ordover 2003; Roughgarden 2004; Reardon 2017; TallBear 2013; Subramaniam 2014; Harding 2016; Nelson 2017; Liboiron 2021). These entanglements influence not just who gets to do science but also what science gets done and how (Herzig 2005; Traweek 2009; Reardon and TallBear 2012; Kimmerer 2013; Murphy 2017; Parreñas 2018). Every stage of the research process is shaped by power relations—topics, questions, hypotheses, experimental design, methods, statistics, results, and inferences—as is the entire process of peer review and publication. Moreover, the fields of ecology, evolution, behavior, and genetics in particular are privileged domains of knowledge, with tremendous power to make claims about what is "natural"—see, for example, the very name of this journal. In so doing, these fields help to produce and reinforce the very same systems of power that shape them—racism, colonialism, misogyny, cissexism, ableism, heteronormativity, capitalism—and more simply become facts of life (Schiebinger 1993; Cronon 1996; Moore et al. 2003; Haraway 2013; Tsing 2015; Mellor 1997; Wölfle Hazard 2022). But because scientific methods are rooted in a desire for an objective distancing from political and social context, these disciplines often elide how their practices perpetuate entanglements with systems of oppression (Daston 1992). This special section is an effort to both confront harms done in the name of science and envision alternatives.

In the wake of George Floyd's murder by the Minneapolis police in May 2020, various institutions were pushed anew to grapple with racism, both present and historic, in their midst. Academia was no exception, and scientific societies such as the American Society of Naturalists (ASN) began to consider what they might do. Following a statement made by ASN condemning anti-Black racism (Kalisz

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2000; see the supplemental PDF), a group of Executive Council, Diversity Committee, and interested ASN members met multiple times to discuss what justice-oriented actions the society could take. In addition to efforts to increase diversity and inclusion in ecology and evolutionary biology, the Executive Council of the ASN agreed to allocate pages of the journal to an experiment that aimed to address the continuing impact of white supremacy and other forms of oppression on the theories and practices of science. This special section is the outcome of that experiment, and this introductory overview contains our report of, and reflections on, the experiment itself.

The analyses and interventions proposed here are not necessarily new. Scholars working on questions of power in science and technology studies (STS) have, for several decades, fruitfully examined the creation, everyday practices, development, and consequences of science and technology in their historical, cultural, political, and social contexts. STS has its own history of exclusions—of sex, gender, race, sexuality, ability, nation, class—and with time, we have seen the emergence of STS scholarship that addresses these exclusions. This exciting new generation of work focuses on questions of power in knowledge formation and draws on interdisciplinary methods from a wide variety of fields like anthropology; history; sociology; critical Black studies; ethnic studies; postcolonial studies; Indigenous studies; women's, gender, and sexuality studies; queer studies; trans studies; and disability studies, among others (Hammonds and Herzig 2009; Harding 2011; Tuck and Yang 2012; Benjamin 2016; Cipolla 2017; Hamraie and Fitsch 2019). Much of this literature builds on and contributes to the critical racial justice and anticolonial frameworks that scientific institutions and scientists themselves might draw on in their (re)commitment to excavating relationships among nature, data, and power.

Given its subject matter, one might expect that results from such STS scholarship can and should interest and influence how scientists build their theories, design their experiments, and interpret and situate their results in a broader context. And, in fact, many STS scholars do engage with scientists and are themselves trained in scientific fields (hereafter, "science" or "the sciences," with "scientists" referring to practitioners in these fields). There is a robust feminist STS literature, for example, wherein scholars will collaborate on—or embed themselves within—publications, field sites, and laboratories in investigations of how social structures such as sex, gender, race, sexuality, class, ability, and nation shape and are in turn shaped by scientific and technological practices (TallBear and Bolnick 2004; Willey 2016; Giordano 2017; Woelfle-Erskine 2017; Liboiron 2021). Yet within the physical and natural sciences themselves we have seen little initiative to take up or transmute the self-reflexive tools such studies have to offer. There remains a chasm between the sciences and STS, with little influence of critical interrogations from STS on the content and context of science itself.

How, through a special section, might we better understand and build across this chasm? One cause for the chasm, of course, is that scientists do not read STS scholarship because of the technical language, their own lack of time, or simply a lack of awareness about the field as a whole. But the lack of engagement of scientists with STS also reflects different perspectives on which topics are of interest and what methods are valuable, as well as scientists' concern that some of the nuances and material constraints of scientific practice are not always readily appreciated by STS researchers. Indeed, one of the lessons we have learned in our own collaboration is that STS scholars benefit from learning about the material conditions of contemporary scientific knowledge production—that is, how scientific research is funded, resourced, produced, and published. Thus, our goal in this special section was to foster cross-disciplinary engagements and bring ideas of STS directly to scientists, in the pages of a journal read by scientists. We did not want this special section to simply feature scientists reinventing concepts already well established in STS nor copies of work already available in STS journals. We wanted something new, something closer to a good translation where the message is modified by the new cultural context. To achieve this, we encouraged cross-disciplinary collaborations among scholars from the natural sciences, social sciences, and humanities.

Several of us on the editorial team already engage in such collaborative interdisciplinary research (e.g., Cardozo and Subramaniam 2013; Bowman and Rebolleda-Gómez 2020; Kamath and Wesner 2020; De Wolfe et al. 2021) and have known of our shared interests and goals through conferences, social media, and institutional overlap. In issuing the call for proposals for manuscripts for this special section, we hoped to find and join forces with kindred spirits with similar scholarly goals and thereby nurture the intellectual community reckoning with the impact of systemic injustice on ecology, evolution, behavior, and genetics.

The Experiment

Our call for proposals (fig. 1) was issued in January 2021. We suggested that "papers should be written for an audience of biology researchers, and should both identify problems within current theories and practices, and make suggestions on how we can transform our thinking and produce more just science." We solicited 500-word submissions that described the proposed article. The journal was able to waive page charges for these articles because we were offered a fixed number of pages in the journal previously allocated to a vice presidential symposium section;

Call for Special Topics paper submissions

Nature, Data, and Power: How hegemonies shape biological knowledge

The American Naturalist calls for proposals of manuscripts that address how systems of power and oppression have shaped theory and practice in organismal biology (including but not limited to behavior, ecology, evolution, and genetics). Social relations of power, such as white supremacy, colonialism, misogyny, cissexism, ableism, and heteronormativity, have long shaped scientific understandings of the world. Investments in the maintenance of social hierarchies have manifested at the structural, institutional, and personal level--whether overtly or implicitly, intentionally or not--at all stages of the scientific process. They influence the kinds of questions scientists ask, the formation of scientific expertise and networks of knowledge production, and research outcomes themselves. In this Special Section, we will assemble papers that investigate the cultural, social, and political foundations of the theories and practices of contemporary organismal biology.

Papers should be written for an audience of biology researchers, and should both identify problems within current theories and practices, and make suggestions on how we can transform our thinking and produce more just science. Such contributions are aligned with Am Nat's mission to "pose new and significant problems, introduce novel subjects, develop conceptual unification, and change the way people think." We seek submissions from authors of varied disciplinary and interdisciplinary backgrounds in the social sciences, humanities, and natural sciences. We particularly encourage cross-disciplinary collaborations.

Proposal and manuscript review will be managed by a cross-disciplinary editorial team. Following proposal review, we will invite authors to submit full manuscripts. A**n invitation to submit a full manuscript does not guarantee publishing in the American Naturalist**. Publication charges will be waived for full manuscripts included in this special section.

Submission process/timeline:
Please submit a 500 word (maximum) proposal describing your paper idea and why you think it would be a good fit for this Special Section to amnat@press.uchicago.edu with subject line "Nature, Data, and Power Special Section" by **February 15 2021**. Invitations for full papers will be issued by March 15 2021. The deadline for full manuscripts will be June 15 2021. Anticipated publication of the section is before July 2022.

Papers will be handled by a special Editorial team, in consultation with the Editor-In-Chief (Daniel Bolnick):

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If you have any questions, please contact amnat@press.uchicago.edu.

Figure 1: Text posted to "From the Editor's Desk of *The American Naturalist*" on January 17, 2021 (http://comments.amnat.org/2021/01/call-for-special-topics-paper.html).

however, this required that we adhere to the constrained timeline of that section as well. We received 73 proposals and eventually invited 17 of those to submit full manuscripts, with the intent of including seven or eight of those in the special section.

Several patterns quickly emerged as we assessed the initial large pool of proposals. Submitted proposals ranged widely in topic and brought critiques of the role of a variety of systems of oppression in many subfields within the biological sciences. Strikingly, though, very few submissions tackled questions of race and racism. Many authors proposed broad theoretical explorations of entire axes of oppression or entire fields. For example, there was considerable interest among more than several proposals in thinking through the impact of sex binarism and implicit cisheteronormativity in biology writ large. Eventually, we invited full submissions for manuscripts that offered more focused analyses of specific issues that could be tackled in relatively short articles and prioritized those authored by cross-disciplinary teams. We also decided not to consider for publication articles that could be easily published by other scientific journals (e.g., data analyses of demographic or geographic biases). Finally, we saw that several proposals, particularly those authored by all-scientist teams, tended to re-create rather than build on scholarship from STS. We certainly share those authors' motivations of wanting to bring to light substantial problems with how biology is done. But platforming articles that do not engage with STS would simply replicate the pervasive power differential between the sciences on the one hand and the social sciences and humanities on the other. It would signal to scientist readers that an idea is not worth taking seriously until and unless it is taken seriously by another scientist, an attitude that would further disciplinary hubris rather than cultivate humility.

As the editorial team reflected on our own practices of knowledge production, we realized the limitations of short proposals as a method to assemble a cross-disciplinary special section. It was hard, it turned out, to judge the potential of what we hoped would be complex and nuanced articles from very short proposals. We worried that we might in the process privilege those who, for example, had the institutional experience or mentorship to write a strong abstract, were used to writing in English, belonged to networks that circulated the call, and had the time and job security to submit a proposal for a fairly nontraditional project. It did not help that through this initial proposal review the editorial team chose not to learn the names of the authors. Anonymous review processes might help against biases that often negatively impact non-Western, nonmale names or less famous authors (Tregenza 2002; Moss-Racusin et al. 2012; Seeber and Bachelli 2017; Tompkins et al. 2017; but see Enqvist and Frommen 2008; Webb et al. 2008). But it can, as in this case, also limit the ability to assess, on the basis of authors' previous scholarship or lived experiences, the kind of epistemic insight into power and oppression they might bring to a full-length article.

Material Conditions and Contexts of Science

The content of this special section has been shaped tremendously by the material constraints of scientific publishing—of both timeline and journal page limits and charges—in a manner that has meant a substantial scaling back of our ambitions for this special section. Given the quick turnaround time between issuing the calls for proposals and proposal submission, we largely received proposals from groups that were already in conversation or working with each other. Possibly as a result of this, we received fewer cross-disciplinary collaborations and fewer proposals for interdisciplinary analysis than we had hoped for. Such collaborations are difficult, even impeded in the academy, in part because of disciplinary silos that extend to an absence of venues where such work can be published, read, and taken seriously by scholars across disciplines. Specifically, if we want biologists to take insights from STS seriously, we need biology journals to commit to consistently publishing cross-disciplinary research. Journal article length limits can also impede such work. Within a limited space (5,000 words for this call), it can be near impossible to both introduce concepts from STS that are unfamiliar to scientists and detail new and creative scholarship using these concepts. We also speculate that broader issues of academic precarity shape the possibilities for cross-disciplinary collaboration, given the ways that publishing outside of one's own discipline or, for humanities scholars, with another author often do not "count" in decisions around tenure and hiring, such that there is little incentive and potentially considerable cost to do so. Finally, we should recognize that the many challenges introduced and/or exacerbated by the ongoing pandemic and the accompanying shifts toward (mostly) virtual work are not the most conducive to new interdisciplinary conversations.

We remained on a tight schedule after soliciting full manuscripts from a subset of submitted abstracts, compounded by the effects of the pandemic. Additionally, four members of the team, all early-career academics, relocated for jobs in the midst of the review process, and one member went on parental leave. As a result, both peer review and editorial processes were understandably slowed. We offer these constraints not as excuses but as a reminder that the material conditions and human labor shaping scholarship must not be forgotten, especially when doing work that goes against the grain. Ultimately, our experiences served as a reminder that scientific journals and the whole process of scientific publication are not simply a means of

knowledge dissemination; instead, as timely, generous, and well intentioned as they try to be, they must necessarily function within larger contexts of science and are institutions that shape, and perhaps confine, how scientific knowledge gets made, with little room for illness, care responsibilities, or life disruptions. This is indeed not unique to this journal or to the sciences in particular but a condition of contemporary knowledge production in the academy. For scientists to do work with a different political bent than the status quo, we will require both different thought and different material conditions.

Power Dynamics

If scientists want to encourage cross-disciplinary collaborative work in the future, we are going to have to tackle the fundamental challenge of taking the expertise of other disciplines seriously. One place where this challenge manifested most acutely was in the peer review and editorial process. All manuscripts were reviewed by at least one scientist and one social scientist or humanities scholar. After reviews, all manuscripts received editorial feedback from one scientist and one social scientist or humanities scholar from the editorial team as well as from the editor-in-chief of the journal. The entire process offered us a stark view of deep disciplinary divides. Primarily, we observed that methods, types of evidence, and prior conclusions employed by STS scholars were regarded as unconvincing and lacking rigor by some of the scientists involved. These scientists often requested revisions that would serve to pass the manuscript through a "scientific sieve," so to speak; the resulting revisions were often less challenging to scientific dogmas than they could have been. It is important to note, however, that many scientists also offered thoughtful and even critical feedback while remaining open to the broad premise that scientific inquiry is in fact socially, culturally, and politically situated—scientists are far from monolithically opposed to such cross-disciplinary investigation. Notwithstanding the imperfections with the process, we would like to recognize the effort of all of the reviewers that made this special section possible. Many reviewers stepped out of their comfort zone and provided very useful comments, pushing authors to seriously engage across disciplines, and this special section could not exist without their important contributions. In particular, between most manuscripts applying, rather than building on, STS concepts and the manuscripts being destined for a journal entirely outside the fields to which social sciences and humanities scholars are professionally obliged, we recognize the generosity of these scholars in investing considerable time and effort into this special section.

The experience of attempting to engage sometimes wildly contradictory feedback from scholars belonging to different disciplines taught both the authors and the editorial team a crucial lesson: learning to deal with ambiguity and contradictions between different ways of looking at the world without immediately privileging the more familiar way of knowing is absolutely essential to cross-disciplinary work. It is a skill that all of us—both scientists and STS scholars—are going to have to practice if we want to seriously reckon with the entanglements of our scholarship and systems of oppression. In particular, this skill is not often demanded of scientists who, thanks to our current conceptions of what counts as "objective" or "true," occupy positions of relative epistemic power. And these dynamics occur not in a vacuum but rather in an academy (and world) that privileges the sciences in terms of resources, funding, epistemic rigor, and overall prestige. Ultimately, all of us need to acknowledge that hierarchies, including knowledge hierarchies, hurt us all.

When we began this project, the editorial team framed an expected source of conflict in terms of "incommensurability" (Kuhn 1962). We assumed that we would run into situations in which our understanding of what counts as rigor, as legitimate knowledge, and as truth would so fundamentally diverge that it could not be resolved. What we found instead is that it was not these epistemic framings that were incommensurable so much as our relationships to power. Or in other words, the mismatch between science and STS is not so much about totally divergent knowledge as it is about whose knowledge counts as worthwhile. Ultimately, we will gain nothing by presenting cross-disciplinary work to scientists if scientists remain unwilling to consider the utility of methods from disciplines outside their own; STS scholars, meanwhile, will continue to be suspicious of scientific knowledge if scientists do not grapple with the social dimensions of their own knowledge practices.

Given the thorny power dynamics at issue here, in which scientific inquiry is privileged over other methods by existing knowledge-production infrastructures, it is worth asking whether this incommensurability renders cross-disciplinary exchange impossible within the confines of academic science. We believe we have at least some grounds for optimism, stemming primarily from conversations among us, the members of the editorial team. Through most of the process, we were all pleasantly surprised by how rarely we came into conflict about methodological validity or rigor across our respective disciplines, even though we often disagreed and almost invariably offered very different types of feedback to authors. We owe our positive interactions to explicit conversations about disciplinary power dynamics at the start of our collaboration, as well as a shared and deeply held political and ethical imperative to address systemic injustices embedded in the sciences. However, under the pressure of a timeline enforced by financial limitations

described above, our communication did eventually become strained, and our desire to achieve decisions by consensus became impractical. Through this process, it became clear that we lacked the collective power to enact within a single special section all of the interventions that we think are necessary for doing more just science.

Challenges notwithstanding, we were also able to solicit far more proposals than we expected, highlighting a hunger for thinking through and imagining how to do more just science. We were heartened to see that many of the proposals were authored by junior scholars, including graduate students, and we believe this bodes well for the future of cross-disciplinary scholarship addressing the intersections of nature, data, and power. To everyone who submitted a proposal or article for this special section: we are so deeply grateful to know you and your work better and for your time and effort. We hope this is but a step along the way of a long, exciting, and fruitful conversation.

The Results

Like the proposal submissions, the articles ultimately included in this special section indicate a need and hunger for reckoning with multiple systems of oppression across a diversity of topics within ecology, evolution, behavior, and genetics. Putting these articles in conversation with one another, which we would encourage the reader to do, reveal conjunctions that promise to be rich sites for future inquiry.

Three of the published articles (Branch et al. 2022; Packer and Lambert 2022; Simha et al. 2022) interrogate the notion of fitness from different angles—through its links with eugenics, capitalism, ableism, and sex binarism. All three articles reach a similar conclusion: the singular focus on fitness as the core metric of interest in evolutionary biology and the related focus on competitive success in ecology are very far from politically neutral. Thus, it behooves scientists in these fields to reckon with the political implications of this core concept. Fortunately, the concept of fitness is already one that biologists are used to revising and reworking, routinely discussing how to define and measure fitness in different subfields and with different questions of interest (e.g., Ariew and Lewontin 2004; Brommer et al. 2004; Reid et al. 2019). We thus think that carefully analyzing the concept of fitness with an eye to its alignments with systems of oppression is a potentially far-reaching intervention of STS into ecology, evolution, behavior, and genetics.

All of the articles engage with the sociopolitical dimensions of study design, but that angle is particularly apparent in two of the articles in the special section: Weasel (2022) and Mohammed et al. (2022). Weasel shows how an assumption of genetic difference between Africans and non-Africans has been "built into the experimental design" of studies of Neanderthal introgression into modern human DNA, while Mohammed and colleagues demonstrate how the material effects of colonialism continue to shape both the kinds of science and scientists present in the Caribbean. These authors remind us that the problems outlined in this special section are not merely a matter of interpretation or close reading into subtleties of scientific narratives but questions of funding, access to land, and the most quotidian aspects of scientific institutions and inquiries. Finally, two articles—Klein et al. (2022) and Silver et al. (2022)—more directly tackle the implications of cross-disciplinary interrogations for the implementation of environmental policy; while such work may seem outside the usual scope of this journal, we include these articles to emphasize that our academic contributions are materially embedded in complex contexts and have complex consequences outside academia. Carefully reckoning with these contexts and consequences are an integral part of the scientific process when it is directed toward justice.

Another theme, implicit across all articles and no surprise given our above account of the process of putting together this special section, was what counts as scientific rigor, and indeed what counts as science. Branch et al. (2022) included an author's note with their piece that we, the editors, found so applicable that we decided to place it here in this introduction to frame the entire section. They write:

> It is incredibly difficult to understand the wide-reaching effects of the cultural and social context on which this field was built. The ways in which we understand the world are formed through the ways we are taught. In addition, the white, male perspective from founders of the field and the lack of diversity that has persisted in evolutionary biology further exacerbate and constrain our ability to come up with innovative ideas to generate a more complex and diverse understanding of biological systems. We urge the reader to approach this [special section] with an open mind. While it is easy—and often automatic—to respond with "but not all evolutionary biologists!" (i.e. "not me!"), it is important to step beyond this automatic response and think in more depth about how our field perpetuates [hegemonic alignments with systems of oppression] and how this in turn deprives us of the insights to be gained from diversifying our field.

As all of these articles convey, explicitly or not, the task following this special section is not to continue on with the assertion that the best, most rigorous science is achieved by removing any and all forms of bias and attempting to think and research and write as though scientists are but

brains in jars, perhaps occasionally with hands. That has largely been the model so far, and it has led to the need for intervention articulated by these articles. We hope our readers will take this as an invitation to question their own ideas of what makes for good science.

We also note that the scope of this issue, in terms of the systems of oppression considered, is broad but not exhaustive and can certainly be deepened as well as widened in future cross-disciplinary work to include caste and casteism, class dynamics, the nation-state, and more. For such work to happen in a manner that truly impacts the practice of science, continued investment from scientific journals and funding agencies into cross-disciplinary engagement will be essential.

It tends to be the nature of experiments, scientific or otherwise, to raise more questions than they answer, and the same is true of this special section. We have learned a huge deal about the challenges and joys of working cross-disciplinarily within the structures of a heavily disciplined academia, and we would love to be in conversation with you if you are similarly invested in building scientific content and processes that are divested from hegemonic social, cultural, and political entanglements. We remain acutely aware of how substantially academic institutions will need to change to make spacious room for scientific research that builds on critique from STS, but we look forward to continually stretching our imaginations about what is possible for science through a diversity of "little experiments" (Kaba 2021).

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