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Gregory T. Cushman, *Guano and the Opening of the Pacific World: A Global Ecological History* (Cambridge: Cambridge University Press, 2013). ISBN: 9781107655966

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Introduction by Christopher F. Jones, Arizona State University

What does bird shit have to do with the modern world? Quite a lot, **Gregory Cushman** wonderfully demonstrates in *Guano and the Opening of the Pacific World*. In particular, the excrement of guano birds turned out to be enormously significant for feeding large populations around the world. Gathered in prodigious quantities from islands in the Pacific Ocean and along the coast of countries such as Peru, guano contained high levels of nitrogen that revitalized mature agricultural systems characterized by depleted soils. Before the development of fossil fuel-based fertilizers, guano enabled worn-out fields to continue to produce agricultural bounty.

Though guano traveled to nearly all parts of the globe and was used in the Pacific World, demand from Europe and its neo-European colonies catalyzed the trade. Much of this story, therefore, emphasizes the dynamics of “neo-ecological imperialism.” Europe and its colonies were able to continue their expansion, he argues, not only by conquering territory elsewhere, but also because they drew essential resources from these colonies to maintain their home environments.

Yet this is not a tale simply of the hegemony of European actors. Those in the Pacific World enter the story frequently as agents shaping their own destinies. Though vast and impersonal forces including capitalism, globalization, and climate changes frequently enter the picture, Cushman introduces us to locals such as Enrique Ávila, a Peruvian ornithologist and conservationist. The book moves with remarkable speed from local agents to international corporations, from small islands in the Pacific to the vast farmlands across the world that they supplied with nutrients, and from the local studies of Peruvian birds by William Vogt to the broad patterns of global conservation thinking.

Guano and the Opening of the Pacific World has deservedly won considerable acclaim from a wide range of audiences. The book was awarded the 2013 Henry Wallace Award for best book on agricultural history outside the United States from the Agricultural Historical Society; the 2014 Murdo J. MacLeod Book Prize in the fields of Latin America, Caribbean, American Borderlands and Frontiers, or Atlantic World history from the Southern History Association; the 2014 Jerry Bentley Prize in world history from the American Historical Association; and the 2015 Turku Prize in environmental history from the European Society for Environmental History and Rachel Carson Center for Environment and Society.

One of the delights of good scholarship is that it in the process of answering some questions it raises many others. And as our reviewers note, Cushman provides us with fertile soil for thinking about how to do environmental history. In particular, they inquire about how to balance what Cushman describes as a “following method” while still maintaining a coherent story and investigate the costs and benefits of

framing studies through the lens of the Pacific World. In his response, Cushman offers further reflections on these important topics.

I asked **Hugh Gorman** to participate in this roundtable because of his research into sustainability and the nitrogen cycle. As Gorman shows in *The Story of N: A Social History of the Nitrogen Cycle and the Challenge of Sustainability* (Rutgers, 2013), tackling the challenges and limits of the nitrogen cycle provides an effective lens to examine sustainability outside of the dominant paradigm of carbon and climate change.

As an expert in Latin American environmental history, **John Soluri** brings deep experience thinking about global commodity flows and local environmental consequences to the roundtable. His book, *Banana Cultures: Agriculture, Consumption, and Environmental Change in Honduras and the United States* (Texas, 2005) demonstrated the major consequences of multinational corporations, monoculture planting, and capitalism on the lives and lands of residents of central America.

Ryan Tucker Jones is a historian of the Pacific World. Befitting the vast reach of this region, he entered this geographic space through a very different coastline than Cushman. His recent book, *Empire of Extinction: Russians and the North Pacific's Strange Beasts of the Sea, 1741-1867* (Oxford, 2014) is situated within the northern reaches of the Pacific between Russia and what is now Alaska. He explores the development of scientific understandings of extinction in the context of Russia's increasing demand for seals and other fur-bearing animals, showing that some of the earliest conservation plans to save endangered species emerged in this region.

Christian Brannstrom completes our roundtable, lending his considerable experience analyzing nature-society relationships and commodity histories in Brazil and Latin America from a historical and geographic perspective. Author of dozens of articles and multiple edited books on topics including environmental governance, agriculture, and forestry, he frequently brings a transnational perspective to bear on questions, searching for similarities and differences across national borders.

Before turning to the first set of comments, I would like to pause here and thank all the roundtable participants for taking part. In addition, I would like to remind readers that as an open-access forum, *H-Environment Roundtable Reviews* is available to scholars and non-scholars alike, around the world, free of charge. Please circulate.

Comments by Hugh Gorman, Michigan Technical University

Gregory Cushman's *Guano and the Opening of the Pacific World* covers a broader range of topics than its title suggests. He indicates that he expected his original question—which was, “what did the guano industry mean for the marine birds that produced it?”—to make for “a short, sad tale” (p. xiii). But a body of interesting material emerged while researching the topic, raising the question of whether to write a broader book with a larger cast of characters, connections, and ecological flows than those directly connected to the birds that made the market for guano possible. The title suggests the narrower focus, but the book delivers a more expansive story.

From the title, one might assume that the central chapters of the book would be on the period between 1804, which is when the Alexander von Humboldt completed his scientific expedition to South America and carried samples of Peruvian guano back to Europe for chemists to analyze, and 1884, which is when Chile gained control over the main alternative to Peruvian guano (nitrate deposits in the Atacama desert) after the War of the Pacific. By that time, the huge deposits of guano that Humboldt had described were largely mined out, shifting the interest of merchants, who had established labor and transportation networks in the Pacific, to Chilean nitrates and other resources. If the “age of guano” were the main focus of the book, an opening chapter or two could set the stage by describing the ecological system that produced the guano and, perhaps, by examining uses and governance of the material before European merchants arrived on the scene. And a final chapter could tell the story of how Peruvians strived to manage their ecosystem to be a sustainable producer of fresh guano, even after the world had moved on to industrially fixed nitrogen and large-scale phosphate mines.

All of the above material is covered, and nicely so, but the emphasis is not on the “age of guano.” The book is more about what happens after the Pacific world is opened to European merchants and after the importance of guano in world markets has faded. For example, the book also examines the twentieth century sacrifice of Banaba Island and its indigenous culture to phosphate mining; the transformation of New Zealand and Australian soils due to additives such as phosphate and Chilean nitrate; the influence on Latin American affairs by technocrats who espoused the ideals of utilitarian conservation; the move by resource-poor Japan to gain a seat at the table of Pacific exploitation; and Cold War efforts to prevent a perceived Malthusian disaster by facilitating the spread of industrial agriculture through the Green Revolution and, rooted in the coastal ecology of western South America, the aquatic Blue Revolution. It was the last of these, according to Cushman, that provided the fatal blow to efforts by Peruvian conservationists to establish a sustainable system of guano production.

Given the range of the book's topics, a more accurate, though less interesting title, would be "A History of Neo-Ecological Imperialism in the Pacific World." Cushman nicely defines "neo-ecological imperialism" in the following passage:

Colonizing societies that hope to endure have three basic options: (1) they can leave and colonize new environments, (2) they can learn to live within the ecological limits imposed by local environments, or (3) they can import goods, services, and energy from other ecosystems and search for the "ultimate sink" where unwanted waste can be exported. . . . I call the more exploitative forms of this third pursuit "neo-ecological imperialism." (pp. 76-77)

From this perspective, the book is about colonizing societies—mainly Western Europe and its descendant societies—seeking to extract resources, services, and energy from the ecosystems of the Pacific world, including places not fully under their control. By services and energy, Cushman means, in addition to the services of human laborers and the extraction of fuels, something more. With the extraction of guano, for example, Europeans were also drawing on the services of the birds and fish that populate a highly productive ecosystem off the coasts of Chile and Peru. For that matter, Europeans were also drawing on the services of organisms from the past, alive during the centuries of guano accumulation or, in the case of Chilean nitrates, millennia. The energy that powers this Pacific ecosystem, which includes the sunlight falling on millions of acres of ocean and powerful currents that keep everything in motion, is also part of the story, as is the role of El Niño and La Niña in supporting or undermining human endeavors. Human laborers, some hauled in as slaves from distant places, along with the food needed to keep them alive are also part of the ecological mix. If Europeans had had to recreate such a system of ecological production in Europe, they could not do it. Sufficient land, energy, and time simply did not exist.

One of the many strengths of this book is that it establishes connections between familiar narratives. For example, Cushman links the enslavement of Easter Island's indigenous population to the demand for laborers in Peruvian cotton fields during the U.S. Civil War, the rise of the Progressive Era conservation movement in the United States to agricultural experts witnessing the rapid depletion of Peru's guano deposits, the improvement of Australia's poor soils to the exploitation of phosphate islands and Chilean nitrates, and the maturation of William Vogt's thought on carrying capacity and his influential book on the dangers of overpopulation, *The Road to Survival*, to his work as an ornithologist studying the guano-producing birds in Peru, etc. The list is extensive. For example, he also makes connections to conglomerates, W. R. Grace and Unilever. W. R. Grace, known for its role in several infamous environmental pollution cases, had its start in the guano mining and shipping business. And Unilever still carries the name of one of its predecessor companies, Lever Brothers, a soap manufacturer that turned to the South Pacific for the ingredients needed to keep people in the Northern Hemisphere clean. Such

connections speak to the importance of the Pacific world to developments in the twentieth century.

Another strength is the way in which the book links Latin America to the Pacific world, making this book an important contribution to both Latin American history and the history of the Pacific basin. The main action in the book takes place in Latin America and the Pacific world rather than in the boardrooms of decision makers thousands of miles away. And for every European that takes the stage, so does someone with their roots in Latin America or the Pacific world. For example, the chapter that focuses on the “anglo guano lord” John Arundel, who crisscrossed the Pacific in search of new guano islands and other business opportunities, also introduces a Niuean named Mouga, who played an important role as an intermediary between Arundel and the many islanders drawn into his empire. And alongside champions of conservation from the North, such as William Vogt and Robert Cushman Murphy, were champions of conservation from the South, such as José Antonia de Lavalle y Garcían and Enrique Beltrán.

What I would consider the broader aspects of the book are the parts that follow the story beyond the role of guano lords in opening the Pacific and beyond efforts in Peru to manage its guano-producing ecosystem after the great deposits of accumulated material had been mined out. These aspects include following the fate of phosphate islands such as Banaba and Nauru, the rise of Malthusian fears and the projection of Japanese power into the Pacific world, and Vogt’s translation of his studies on the population ecology of birds in Peru to his influential book on global overpopulation. The “following” method (p. xiii) that Cushman employs encourages the inclusions of these threads, but each thread introduces another cast of characters and issues, pulling the story—and perhaps even the argument—in several directions. A question, then, is how did the author determine which of the many potential threads to follow when using this type of method? How did he make decisions about which topics to pursue in greater depth and which to leave behind?

To some extent, starting with guano and following the salient threads, even after the connection to guano becomes stretched, sometimes leads Cushman to ascribe more importance to this material than is justified. Clearly, the development of the guano trade was important in opening the Pacific world to European exploitation, as was the early nineteenth century whaling industry. Both, along with mining of nitrates and phosphates and the production of sugar and palm oil, are good examples of how global markets allow consumers in one hemisphere to benefit from the altering and degrading of ecosystems in the other hemisphere. If Cushman had eased up on the device of tying everything back to guano, which is just one more resource in a long line of resources that can be used to tell the larger story of market-driven, colonizing societies ignoring ecological limits and outstripping their resources—which is the story that Cushman is really telling—the book, in my mind, would have been even stronger.

Cushman explicitly positions *Guano and the Opening of the Pacific World* as expanding on the work of Alfred Crosby. While Crosby focused on the biological and ecological conquest of the Americas by Europeans, Cushman examines what happens after colonial societies grow beyond their local resource base and seek to commandeer the natural resources and ecological systems of distant places without necessarily colonizing them directly. And he explicitly positions himself against Jared Diamond, who in *Guns, Germs, and Steel* used Yali's question (Why is it that you white people developed so much cargo?) as a device for providing an answer to that specific question. Cushman, after introducing a more complicated Yali than the one we meet in Diamond's book, writes "If Diamond had been more willing to listen, Yali would have been pleased to provide his own answer about the historical origin of global inequalities," (p. 237) with Cushman's version of Yali's answer being rooted in the messy history of neo-ecological imperialism rather than Diamond's (and, to some extent, Crosby's) focus on factors such as the long east-west axis of Eurasia and the chance distribution of plant and animal species among the various continents.

Although I see Diamond's argument, which was that the people of Eurasia had a ecological advantage over people in the Americas, as being fully compatible with one rooted in the history of ecological imperialism, I can also appreciate Cushman's frustration with the way in which Diamond did not concern himself with agency at a level needed to understand how and why specific events unfolded in the way that they did. Why, for example, was it Western Europe and not China that colonized the Americas? Diamond does not attempt to answer such questions. One historian who does is Kenneth Pomeranz in *The Great Divergence*, who roots Western Europe's growing urbanization and eventual industrialization to being able to access and make use of the resources, sun, soil, and ecological services of the Americas. Pomeranz does not examine the behavior of actors at the same level as Cushman, and he does not ascribe agency to people in the Americas, but his work perhaps can be seen as operating on a scale that connects Diamond's argument, which has been described as a form of geographic determinism, to Cushman's, which is full of agency and intent. What I would like to know—and invite the author to discuss in his response—is whether he sees Diamond's story as being fundamentally at odds with *Guano and the Opening of the Pacific World* or as simply being told at a different scale. If the two stories are fundamentally at odds with each other, could he say a little more about the ways in which they are?

Perhaps the best way to position the contribution of this book is to compare it to the literature on the Atlantic world. On that subject, Cushman notes, "whole libraries have been written," (p. xiv) while works on the Pacific world are few and far between. Scholars have begun to pay attention to the Pacific as is evident by works such as Edward Melillo's, *Strangers on Familiar Soil: Rediscovering the Chile-California Connection* (2015), Carol MacLennan's *Sovereign Sugar: Industry and Environment in Hawaii* (2014), and the dozen volumes or so in the Ashgate series "The Pacific World: Land, Peoples, and History of the Pacific," including *Environmental History of the Pacific World* (2001), edited by John McNeill, and *The*

Pacific in the Age of Early Industrialization (2009), edited by Kenneth Pomeranz. Cushman's volume is a significant contribution to this growing literature on the Pacific world.

Comments by John Soluri, Carnegie Mellon University

“One man’s trash, that’s another man’s come-up.”

“Thrift Shop,” Ryan S. Lewis and Ben Haggerty (2012)

I begin my comments on Greg Cushman’s provocative book with a lyric from the pop song “Thrift Shop,” not because it is performed by a resident of the Pacific World (Seattle-born Macklemore), but because the tune, like Cushman’s book, is an ode to the value in waste and the wastefulness of value creation. The book compels readers to reconsider the significance of excrement. Instead of viewing shit—mostly seabird turds in this case—as an intrinsically unhealthy, yucky “waste,” the author urges us to think about excrement as a vital part of what I’ll call “nature’s thrift shop:” the (re)cycling of matter that is central to life in general and agriculture in particular. Beginning with guano extraction in mid-nineteenth-century Peru, Cushman traces how rising demand for nitrogen and phosphorus inputs (i.e., fertilizers) impacted life in an astounding number of places.

Like a good thrift shop, *Guano and the Opening of the Pacific World* presents a reader with a tantalizing array of things to try on for size not the least of which is a trending geo-historical category: “Pacific World.” If most historians of Latin America are familiar with how the guano trade linked the Peruvian littoral to London and China, few would be able to anticipate that the quest for guano and other fertilizers would lead to Easter, Banaba and Nauru islands in the Pacific. Cushman’s ability to discern novel—and consequential—historical and geographical connections, along with a penchant for tangents, lend the book a “cabinet of curiosities” structure that if occasionally disorienting, is always thought provoking.

Cushman’s methodology also brings a thrift shop to mind: he has written a set of interrelated stories fashioned in part from “discards”—published sources, both new and old, that cover a range of disciplines rarely brought together. This is not the kind of haute couture history stitched from close readings of archival sources but more of a postmodern (and digital-age) blending of primary and secondary sources only achievable by a scholar with prodigious amounts of patience, creativity, and intellectual promiscuity (a full appreciation of which requires a thorough reading of the footnotes; the publisher’s economizing “select bibliography” obscures far more than it reveals).

In thrift shop spirit, I do some of my own mixing and matching of Cushman’s “seven-fold argument” (pp. 15-19) in posing three, open-ended questions inspired by my reading of the book:

(1) What do *environmental* historians gain by conceptualizing a “Pacific World”?

As a *Latin American* historian, I appreciate and fully endorse efforts to think about how countries like Peru, Mexico and Chile have had consequential ties to Pacific lands and waters. I also commend the effort to write “small places” and their inhabitants into large-scale histories. However, as an *environmental* historian interested in the interactions between human groups and non-human forces, I do not fully understand the value of conceptualizing a Pacific World *per se* for environmental history in general or for the story of fertilizers in particular. There can be little doubt after reading Cushman’s book that many places in the Pacific have supplied various kinds of raw materials, but so too have many other places that are not found in the Pacific. I sense that the author wants to assert the significance of the Pacific World vis a vis the now-institutionalized “Atlantic World” (other oceanic worlds, such as the Indian Ocean, go unmentioned).

However, for me, the greatest analytical power of Cushman’s use of an ecological lens to follow the movements of nitrogen and phosphorus-rich substances lay in its ability to reveal fundamental connections among modern agricultural practices and dynamic material worlds that existed on multiple geographical scales. Here, I am not suggesting that environmental historians ignore geopolitical categories. In the case of guano, nation-states like Peru and empires like Great Britain often mattered because they organized and legitimated power that influenced the production, movement, and consumption of fertilizers, as did more localized forms of organizing territories and resources, such as those practiced by the people of Banaba.

However, the significance of macro geo-historical units (including “global”) is far less clear to me. I am less convinced that the history of guano legitimates a Pacific World so much as it serves to undermine the coherency of the so-called Atlantic World by showing how the movement of people and stuff across the Pacific played a vital role in transforming agricultural practices and environmental consciousness in parts of Europe and the United States. The entwined histories of guano, nitrates, and phosphates also helps to show how forms of coercive labor endured and in some ways proliferated even as chattel slavery in the Americas was slowly abolished during the boom years of Peruvian guano. Cushman’s story raises rich possibilities for considering the historical relationships between fertilizer inputs and labor inputs in the transformation of modern, throughput agriculture. Twentieth-century farms and ranching operations increasingly relied on a *combination* of imported fertilizers and migrant laborers to create the surplus that was so important to neo-Malthusian policymakers and profit-seekers.

In a similar vein, Cushman’s book, along with the work of several other scholars, helps to re-interpret the twentieth century as an era when states (and I would add, businesses) became hell-bent on harnessing *both* the nitrogen and carbon cycles in the forms of fertilizers and fossil fuels. The powerful convergence of technosciences, power, and profits around nitrogen and carbon are vital for understanding the

world we live in today: alongside Timothy Mitchell's "carbon democracies" we now have Cushman's "N-P-K states." Here again, what I find most compelling are the connections between the histories of fertilizers and fossil fuels. Although Cushman does not provide detailed descriptions of how guano, nitrates and phosphates traversed the planet over time, one suspects that coal-fired steamships played a key role in achieving the economies of scale that made the long-distance movement of a bulky commodity economically viable. During and after WWII, carbon and nitrogen cycles would converge more literally when natural gas became critical "feed stock" in the industrial production of nitrogenous fertilizers: bird turds ceded power to the "devil's excrement" (i.e., petroleum) in Venezuelan Juan Pablo Pérez Alfonzo's haunting turn of phrase.

My overarching point here is that following the flows of matter and energy using an ecological lens does not necessarily require that scholars be beholden to any particular geo-historical category. So, on the one-hand, I applaud Cushman's decision to locate guano in worlds that break with hegemonic "Latin American" frameworks, but I would like for him to elaborate upon the relationship between emerging scholarly notions of a "Pacific World" and its relationship to environmental history.

(2) Is the answer blowing in the wind?

The author's deep knowledge of climate science and the people who have produced it is readily apparent throughout the book. El Niño and La Niña events (might *they* provide an ecological basis for a Pacific World?) are noted repeatedly throughout the book. In fact, they appear more frequently than any other single "actor" with the exception of William Vogt and the specter of Thomas Malthus. Cushman establishes a number of correlations between cycles of flooding/drought and human out-migrations, crop failures, and disease epidemics. He also argues that these El Niño/La Niña cycles influenced the timing and outcomes of imperial ventures. However, Cushman seems to hedge his bets regarding causal links between climate and social change.

For example, summing up the merits of an ecological perspective on history, he writes: "Who might have guessed that a global climate anomaly centered in the equatorial Pacific during the late 1910s could bring the workers of the world to the cusp of revolution, trigger the realignment of empires, and throw open the way for the most deadly pandemic of the industrial age?" However, he ends this very provocative paragraph by stating "this book has not argued that ecological factors were the main driving force behind all of these events, merely that they were essential contributors to a conjuncture of causes responsible for these great transformations" (p. 343). This is slippery language. Of course, many of us resort to this kind of "cover-your-ass" statement and my intent is not parse a single paragraph among 350 pages of prose.

My question, unsurprisingly given that we are talking about environmental history, relates to the seemingly perennial challenge of writing narratives in which non-human forces are consequential yet not all-powerful (and determining). Cushman includes the obligatory disclaimers, yet the frequent noting of El Niño/La Niña events throughout the book has the effect, intended or not, of leading a reader to conclude that climate played a determining role in the history of guano and by extension, modern agriculture more broadly. Here, temporal and spatial scales of analyses become vital to take into consideration (and hopefully reinforce the significance of my initial query about “Pacific World”): droughts and floods have often compelled short-term out-migrations, but presumably climate oscillations do little to explain the motivation for labor recruitment or the terms under which “climate migrants” worked? Can climate change and/or the widespread depletion of nutrients explain the dramatic rise in fertilizer use? Or, do changing patterns of consumption and wealth (e.g., eating lots of sugary sweets and domesticated meats) do a better job of accounting for long-term transformations? Of course, it need not be an either/or proposition, but I find myself increasingly unsatisfied with analyses that point to a set of “multiple forces/factors/contributors, etc.” that interact through vaguely described mechanisms. The danger is that historians end up saying little more than “things change.”

I would like to believe that there is room between reductionism and general statements about conjunctures that would enable us to say when, where, and how “essential contributors” converged and which ones may have contributed more than others. I therefore would like to tap into Cushman’s expertise regarding the history of climate science for advice as to how historians should approach the wealth of data and models developed by scientists preoccupied with predicting the outcomes of the very historical processes that many environmental historians try to elucidate.

My sense is that those of us advising students with interests in environmental history should encourage them to design research projects capable of yielding greater precision and nuanced understandings of the significance of large-scale ecological and/or climatological events. However, I am concerned that the growing allure of “global” ecological histories will discourage students from carrying out the trans-local or regional studies based on fine-grained scientific and archival research that can generate the nuanced and precise evidence needed to lend historical meaning to climate data. To restate the question: How can scholars test and/or build upon the provocative arguments regarding the significance of climate events found in *Guano and the Opening of the Pacific World*?

(3) “Who, then, was responsible for the “ever-widening wave of death” that has left so much of the world “ungraced by the curving wing of a bird in flight”” (p. 346)?

My third and final question reproduces one that Cushman bravely poses in his conclusion. He answers this question through an act of ventriloquism, quoting passages from Rachel Carson’s *Silent Spring* to both state and answer the question:

“the authoritarian temporarily entrusted with power . . . during a moment of inattention by millions to whom beauty and the ordered world of nature still have a meaning that is deep and imperative” (p. 347). Cushman then adds that one of the “most disturbing” findings of the book was how “authoritarians” used a growing awareness of nature’s limitations to justify augmenting their power and engaging in “neo-ecological imperialism,” a concept that he develops in the second chapter. The connections that Cushman draws between twentieth-century technocratic ideas and practices regarding food production, population control, and development (p. 288; and chapters 7-9) are among the most provocative and convincing arguments made in the book. Indeed, an alternative title for the book could be “Guano and the Rise of Global Technoscience.”

I would like to ask Cushman then to elaborate on the notion of “authoritarians” since he suggests that throughout the twentieth century, bureaucratic states, regardless of their ideological orientation, exercised power —often with horrific outcomes — in order to separate bad nitrogen (shit) from the good (fertilizer). Of course, this is a drastic oversimplification, but the point is that governments have tended to measure progress in terms of monocultures, shopping malls, and sewage treatment plants, not polycultures, thrift shops and compost piles. This broad point resonates with the work of a growing number of scholars who are identifying convergences among twentieth-century states that during the Cold War were often understood as pursuing highly divergent pathways. Nevertheless, here is a critical place where a bit more conceptual clarity is called for: just who or what was an “authoritarian?”

I wonder if here Cushman’s analysis is reductionist, since all power seems to lie with empires and nation-states. His interest in showing how scientists often aided and abetted state projects introduces many people (including Enrique Ávila, José Antonio de Lavalle, Raobeia Sigrah, and Mougá) who are seldom written into environmental histories, along others who are (e.g., Aldo Leopold, William Vogt, and Rachel Carson). In this regard, Cushman largely achieves his objective to demonstrate that “large-scale perspectives are possible without overreliance on theoretical abstractions that write the agency of individuals out of history” (p. 343).

However, scientists seem to be overrepresented; one wonders about other actors, individual and institutional, that played critical roles in transforming excrement into a commodity and input for throughput farming. This list begins with businesses (family and corporate) that sought to profit from controlling a piece of the N-P-K cycle. It also includes associations of farmers, laborers, consumers, indigenous people, and others who at times were quite attentive to the actions (or lack thereof) of those vested with authority to make decisions. An awareness of ecological limits might have contributed to the rise of authoritarian technocratic policies, but so too did the intransigence of elites driven to accumulate wealth and the push for reforms from “below.” There can be little doubt that both the Green and Blue revolutions represented technical solutions to problems of inequality, but Cold War-era governments might not have undertaken these measures in the absence of internal and/or external political pressures.

In fairness to Cushman, he is by no means insensitive to social forces, particularly in the chapters focused on neo-ecological imperialism on Pacific Islands. However, far less attention is given to social divisions (or affinities) within empires and nation-states that often motivate people to take extraordinary actions for good and for bad. The production and use of guanos, nitrates, and phosphorus produced some winners and perhaps many more losers, but the mixed outcomes and meanings (“One (hu)man’s trash/another (hu)man’s come-up”) require further elaboration, particularly on the farms and fields nourished by guano and other imported fertilizers.

Of course, Cushman’s book already covers a lot of territory; my comments are intended to inspire new research that can sprout from the well-nourished, richly textured field that *Guano and the Opening of the Pacific World* has created. Indeed, these relatively brief remarks only begin to describe the trove of insights and unanticipated connections that result from reading this imaginative and erudite work.

Comments by Ryan Tucker Jones, University of Auckland

One of the most difficult tasks I have encountered as a Pacific historian is to integrate the Pacific coast of South America into my writing and teaching. The need to consider this vast Pacific littoral seems obvious – it possesses one of that ocean’s longest coastlines after all, and it always looks accusingly at me when I introduce students to their first maps of the Pacific (Should I break it to them now that they can forget about most of the Pacific I just introduced?). And what of Moby Dick, one of the Pacific’s key characters, who may have died on the equator but whose inspiration, Mocha Dick, wreaked his havoc off the Chilean coast? Yet I’ve never found a satisfying way of putting Chilean, Peruvian, or Ecuadorian histories into the mainstream of Pacific history, despite O.H.K. Spate’s aging but venerable claim that the Pacific was first a “Spanish Lake” (and his many excellent examples of linkages between seventeenth-century South America and the Pacific Islands). My main problem, I now realize after reading Gregory Cushman’s book, is that I haven’t thought enough about shit.

Cushman argues that we need to tear off the blinders of a “terracentric perspective” (16), and focus instead on the ocean, a viewpoint with which I am quite in sympathy. What Cushman mostly means by this is that we must look at birds, and the wonderfully nitrous and phosphoric riches they have brought from ocean to land through consuming fish and excreting them on islands. Birds, plus the humans who mined their guano, not only connected the islands off the Chilean and Peruvian shore to the mainland, but also a host of other Pacific Islands and lands, and indeed to just about everywhere in the world. Cushman often bursts the bounds of the Pacific and the ocean entirely to trace the postmortem migrations of anchovetas (going as far as European Russia on at least one occasion), but the attention paid to the Humboldt Current and ENSO keeps dragging the anchor back through the Pacific. Cushman refers to El Niño as evidence of the “agency of nature” in the creation of the Pacific world (17), though ENSO’s effects as depicted in this book do not seem systematically connected to any specific outcomes, but rather emerge to periodically mislead Pacific humans into ecological overoptimism and then throw their plans into chaos.

I found Cushman’s early chapters the most relevant for Pacific history. He links nineteenth-century whaling ventures to the Eastern Pacific with the origins of guano mining by situating the former as exploratory ventures which drew the Pacific’s ferociously extractive maritime world to these shores. Whaling’s footprint extended far beyond its impact on whales, probably increasing the population of offal-eating birds and deforesting nearby coastlines (41). Most usefully for Pacific historians, Cushman also follows the story of guano beyond the blackbirding (kidnapping for labor) of Pacific islanders that forms the backbone of narratives of the mid-nineteenth century. Without minimizing the uniquely tragic story of Rapanuians and others forced to labor on the stinking guano islands, Cushman introduces us to the complex reverberations these men’s miseries set off in South America and the

ways their experiences rebounded into other corners of the Pacific. Guano was hell for Pacific Islanders (and other laborers), but it financed Peru's cessation of slavery while ironically creating the need for a new wave of captive labor there (53). The subsequent rush of Chinese migrants drew the Southeastern Pacific's nineteenth-century history closer to that of Hawai'i, California, Australia, and – in slightly different ways – Taiwan and New Zealand. The story of Chinese migrants' ecological impacts on the four corners (and nearly everywhere in between) of the Pacific remains to be told, and is not something Cushman attempts in this book.

Cushman's subsequent move into the equatorial central Pacific's phosphate-producing islands provides some of his most interesting, but also most problematic, stories. On the one hand, he expertly demonstrates the way that Chile, the United States, Australia, and New Zealand's successful transitions to European-dominated settler colonies required much more than the epidemiological takeover described by Alfred Crosby in *Ecological Imperialism*; they also needed the subsequent large-scale inputs of fertilizers to keep their grasslands productive. Later, Japan would join this rush for repurposed fish and rock, tying these predatory Pacific rimlands to the small but deep mountains of energy at the ocean's center. While ENSO and the many Pacific currents that transported fish and their avian and human benefactors could be described as circular, this relationship violently contravened these rhythms. In this way, guano mining mirrored the extractive industries of whaling, sealing, trepanning, and others that I have described elsewhere as characteristic of the nineteenth-century Pacific's energy drain that brought humans into its every corner and whose effects cascaded through local communities in often catastrophic ways.¹

Yet on the other hand, it is in these local communities where Cushman's history enters more treacherous historiographical waters. He claims that "Unlike many studies of the relationship between ecology and empire, [his] account will give sustained attention to the agency of indigenous peoples in these transformations" (78). While broadly true, Cushman's work as pioneer must be placed alongside excellent work by Gregory Rosenthal ("Life and Labor in a Seabird Colony: Hawaiian Guano Workers, 1857 – 70, *Environmental History*, 2012) and Katerina Teaiwa's *Consuming Ocean Island* (2014), the latter published subsequent to Cushman's book. These histories examine in close detail the indigenous experience of seeing one's land mined away or contributing semi-free labor to that destruction. Historians should not forget, either, that Crosby was also quite attentive to indigenous agency in shaping ecological imperialism. As for Cushman, he examines several Pacific Islanders' accounts of their work on equatorial guano islands. One, a Niuean named Mouga, kept a diary which should certainly be published and made available to Pacific scholars (on the strength of Cushman's excerpts, I would certainly use it for my classes). Banabans, already familiar with resource extraction from around the Pacific, welcomed Australian mining companies' arrival in 1900.

¹ Ryan Tucker Jones, "The Environment," in David Armitage and Alison Bashford, eds., *Pacific Histories: Oceans, Lands, People* (New York: Palgrave-Macmillan, 2014).

These Pacific people seem to have worked the islands for reasons very similar to those of Europeans, wanting to escape the longstanding ecological limits of their own homelands. No one seemed to care much about the deforestation and species extinction they foisted upon other lands. Despite their enthusiasm for exploitation, Mougá and other Pacific Islanders experienced nearly uniformly frustrating and often tragic fates, ending up as dupes of Euro-Austral-American colonialism. Their actions “foisted these island societies straight onto the path to underdevelopment” (99). While colonists could return home after the damage was done, Pacific Islanders had to live with the results or accept permanent relocation.

If these stories from so-called “rock guano” islands (created not by bird effluvia, but by organic matter from the ocean) stray rather far from the birds of the Humboldt Current, later chapters return to Peru but leave much of the rest of the Pacific behind. Cushman’s story grows increasingly global and correspondingly less Pacific as the twentieth century progresses, a trend which probably mirrors the broad story of the ocean. This is, after all, *A Global Ecological History*, as the subtitle states, and one of its major concerns is to place the eastern Pacific into global history. As a result, though, Pacific Islanders largely disappear from the story, and I wonder what to make of this. This is, after all, one of the great conundrums of global history, and Pacific history in particular; how to tell large, important stories without losing sight of those people and environments who often move from the center to the periphery of the action in the twentieth century. It is a challenge I struggle with in my own work, so I invite Cushman to tell us more about how he attempted to strike a proper balance. Despite the book’s really quite nimble integration of Pacific peoples’ decisions into what is often told strictly as a story of outside domination, the end result is the same: a hollowed-out Pacific at the mercy of Western imperialism and its twentieth-century manifestations of technocratic management. After 1945 in particular, Peru and the rest of the Pacific’s histories converged in so far as they became subordinated to global concerns over population, food supply, and conservation largely emanating from the new imperial centers. The guano islands did have an important role to play in developing ideas about ecosystem management and in the creation of the now standard 200 mile Exclusive Economic Zone. “Once again,” writes Cushman, “the history of the Pacific world was profoundly shaped by events emanating from the coast of South America” (296). Quite true, but the story as presented here is really a global one, though (as Cushman briefly notes), the effects of the EEZ were probably most significant for those small Pacific Island states who suddenly controlled some of the largest expanses of tuna-rich ocean in the world.

I am certainly not arguing for a longer book; Cushman has already bitten off a major chunk of modern environmental and global history and he does an admirable job in not letting the narrative spin completely out of control in later chapters. Instead, I selfishly wished for a tighter Pacific focus in later chapters. The alternative chosen here – the relationship between certain parts of the Pacific and the world – offers its own satisfactions. Cushman claims that the Anthropocene originated in 1830 in the Pacific, when the “bottleneck in the nitrogen cycle” was broken open with the export

of Peruvian nitrates and guano to England. As the Pacific Ocean increasingly comes into focus as a key barometer of global climate change, this historicization of the Anthropocene will move to the center of arguments about Pacific history and *Guano and the Opening of the Pacific World* may be seen as one of the founding texts in this move. These future histories, though, are likely to focus on what Pacific Islanders made of these changes and how they impacted their lives on a far more local scale.

That said, how should one re-conceptualize Pacific narratives and chronologies in the wake of this book? Without doubt, guano history should play a more prominent role in the classic stories of nineteenth-century Pacific resource extraction and labor migration. Cushman's book opens up a wealth of fascinating detail about the actors and ecologies involved in the eastern Pacific portion of this story. The 1830s are probably a key turning point for Pacific history in many areas, as whaling reached an early peak and missionary work was experiencing its first real success. A second significant moment can probably be located around 1900, when Australia, New Zealand, Chile, and the United States cemented their linkages to the Pacific via phosphate and nitrate, while helping the Pacific down the road to the sidelines of global history. After 1945, the history of the guano islands seems far less Pacific and much more global, very likely the reason that Pacific history – a creation of the postwar period – has forgotten about the eastern Pacific. In the end, I come back to Cushman's beginning, where he calls for an aquacentric history of the Pacific. He offers admirable examples of the benefits of such a focus for certain parts of the ocean, and this is the agenda I would like to see Pacific historians take up more broadly. Look below the waves, think about the interface between birds, humans, and fish throughout the Pacific, and some surprising stories of connection and convergence are likely to appear. We now have the history of these connections in the Humboldt Current – many more remain.

Comments by Christian Brannstrom, Texas A&M University

Greg Cushman alerts readers early in this magnificent book that he is interested in “following.” He tells us that he followed “guano birds, their poop, and the people who cared about them around the world, no matter where they went” (xiii). For Cushman, “following” is a “useful way to make sense of how the ocean and soil have been integral to the history of our species” (xiv).

A few hundred pages later, I have followed Cushman on a fantastic journey that starts on Peru’s guano islands, then moves to the Pacific, where he focuses on Banaba’s natives, who lived on or near resources that British industrialists coveted, then turns to U.S. and Peruvian conservationists, then to U.S. fisheries and Mexican agriculture, and then finally back to Peru, witnessing the collapse of the anchoveta fishery and demise of the guano birds. This is guano inside-out, a book of extraordinary breadth that makes interconnected arguments about diverse phenomena, and blending biographical, commodity, and ecosystem narratives. It is about guano and so much more, yet always rooted in the materiality of guano and the ecosystems that produce it. Cushman’s “followings” take him to several archival collections, including William Vogt’s papers in the Denver Public Library to holdings at the Scripps Institution of Oceanography, to Peruvian, Australian, and British archives. Cushman has given us a superb book that tells a compelling story in a way that is relevant to one of our most difficult current environmental problems, centering on how we produce food and at what cost. In a 2014 publication in *Nature* (vol 515, p. 518-22), David Tilman described this as the “diet-environment-health trilemma,” one of the leading global challenges in our time. Cushman helps explain the historical processes that helped produce this “trilemma” in elegant and passionate prose.

Cushman starts with guano birds and their valuable excrement. The guano birds show us how conservationist technocrats tried to manage renewable resources, how fertilizer became a global commodity, and how demand for fertilizer (guano, nitrates, and phosphates) related to ideas, people, and technology. His core argument is that fishing industrialists, in alliance with certain conservation technocrats, sacrificed guano birds so that a fleet of fishing vessels could catch anchoveta off coastal Peru and an array of polluting and foul-smelling fishmeal processors could feed distant pigs and chickens, while a domestic synthetic fertilizer industry substituted the nitrogen contained in the guano. The complicated relations between “experts” and bureaucratic entities aiming to manage resources form a major portion of Cushman’s book. As he puts it, “consciousness of nature’s limitations has often provided authoritarians and experts with a pretext for increasing their power” (p. 347).

He starts the book by telling the remarkable story of a sixteenth-century stone tablet that guano workers uncovered in the 1840s but had been lost in the British

Museum until 2006. Cushman's interpretation of its engravings (did he encourage Museum officials to search their holdings for this item?) is a wonderful start to the book, reinforcing the importance of excrement to history and outlining the multilevel arguments the book makes about the agency of nature in creating the modern Pacific, the importance of guano and nitrates in developing high-input agricultural systems, linkages to ecological thought and governance systems, and the ethical implications of these processes.

We get our first experience with "following" in the chapter on the "Guano age," which tells the story of Peruvian guano. This is less about the mining of guano and more about how European scientists understood guano and what that meant for people who worried about agricultural improvements, how the guano boom helped define a technocratic approach among Peruvian elites, and how Peruvian guano helped motivate a search for related substances, such as nitrates in the Atacama Desert and phosphate and guano on Pacific islands. Nitrates, in turn, helped sustain chemical and explosives industries. Cushman argues that from its origin in the mid 1800s, the guano trade "opened the gateway to modern farming's addiction to inputs" (p. 74) and motivated imperialism in the Pacific, moving well beyond previous accounts of Peruvian guano.

One of the many compelling arguments Cushman makes is for "neo-ecological imperialism," which he defines as the extraction of resources needed for the survival of the Neo-Europes. Advancing Alfred Crosby's discussion of ecological imperialism, Cushman argues that the "neo-ecological" type of imperialism "subordinated some of the earth's most isolated territories and peoples to improve the lives of neo-European societies elsewhere" (p. 79). As he argues, "guano and soap," a product of the phosphate and coconut oil that industrialists obtained in the Pacific, "may have made the industrial North greener and cleaner, but they did so at the direct expense of the native birds, forests, and peoples of the Pacific Islands" (p. 108). He returns to this point with regard to the appalling working conditions, noting how dysentery devastated the Pacific workers who helped make industrialists rich and made "growing swarms of ethnic Europeans around the world well fed and squeaky clean" (p. 122). Instead of "move, adapt, or die," it's "move, adapt, or import resources." We have seen this story before, in many variations. Sven Beckert's *Empire of Cotton* shows how cotton frontiers in the Americas, Africa, and Asia fed distant textile mills, and Richard Tucker's *Insatiable Appetite* linked US consumerism to tropical deforestation.

Cushman then turns the narrative to conservation technocrats, the "experts" who helped sustain the "billion dollar [guano] birds" as the "most valuable birds in the world" (p. 204, 149). This story involves Peruvian, British, and U.S. scientists who studied bird populations and advised Peruvian guano administrators, organized bureaucratically into an agency in 1909 that managed the guano industry for export and to supply Peru's agricultural sectors. It is here that Cushman introduces readers to William Vogt, whose work with guano birds starting in the late 1930s helped Vogt develop his Malthusian book *Road to Survival* (1948), an important text

in the development of twentieth-century environmentalism. Sustained-yield conservationist thought helped Peruvian administrators grow fertilizer by maintaining bird populations under conditions of a changing environment produced by El Niño-induced fisheries fluctuations. Cushman also “follows” early and mid-twentieth-century Malthusian thought to “population technocrats” who believed that “obtaining scientific mastery over human numbers was essential to improving the quality of human life” (p. 242).

The next pivotal moment in Cushman’s “following” is the theme of input-dependent agriculture, but this time the global forces of technology and profit put the guano birds on a dramatic collision course with the fish that sustained them. Cushman focuses his attention on debates regarding whether the guano birds were truly valuable, or whether industrialists should exploit the anchoveta fishery that sustain the birds and produce fertilizer from fossil fuels, rather than scooping up the excrement that fish-eating birds produce. So, at one historical moment, the guano birds were valuable, but in another, they were a disposable intermediary. In the end, technocrats sacrifice the birds by unleashing new fish-finding technologies and the abomination known as the fish-meal processing industry upon the anchoveta, mainly for the purpose of animal feed, resulting in the demise of the guano birds. The “blue revolution” of industrialized fishery development, coupled with fertilizer production that substituted guano, helped Peru become an “extreme form of neo-ecological imperialism that had the further effect of teaching the world to think that development would allow everyone to eat large quantities of meat and fish” (p. 305).

Cushman writes that he started with the guano birds. But he could have told me a different, alternative story about the book, and I would have been equally persuaded. He could have told me that he started with the question, “why do we feed soymeal and fishmeal, extracted from land and sea at enormous cost, to chickens, pigs, and cattle that produce animal protein that the world’s affluent people over-consume?” In other words, how, why, and at what cost did our industrialized system for producing animal protein originate and develop? One answer to this question indeed begins with guano birds in nineteenth-century Peru, but Cushman invites us to think about other possible answers and starting points that include other environmental systems, organizations, technologies, and people.

Cushman has set a high standard for other environmental historians seeking to construct a global narrative of a particular commodity that has massive present-day importance. The essential problem is, when to stop “following”? What sorts of boundaries should confine a narrative on a global environmental problem? Cushman does not answer this question, leaving it to others to navigate this difficult issue.

Cushman’s “following” merits comparison with other sorts of “followings” that used particular boundaries, resulting in a compelling narrative strategy implemented in many ways. William Cronon’s classic essay “Kennebec Journey” invited readers to think about the paths in and out of a ghost town that had been a copper mining

center. In *Nature's Metropolis*, Cronon followed meat, wood, and grain into and out of Chicago, with attention to key people, technologies, and financial instruments. John Soluri's *Banana Cultures* followed bananas from plantations in Honduras to corporate and culinary strategies to increase banana consumption in North America. Sterling Evans, in *Bound in Twine*, followed henequen from Mexico to wheat farmers in the North American Plains. Is there an emerging consensus on "global environmental history," what its aims are, and what its narrative strategies should be? If there is, Cushman's book offers an important guide to blend of commodity story, biography, and ecological analysis. His book makes us think not only about how we arrived at our input-intensive agricultural systems, but also how we impose (or remove) the boundaries on our intellectual journeys.

Response by Gregory T. Cushman, University of Kansas

Guano Inside-Out

What can we learn from an exacting examination of the entrails of a book, which at its core, is about the global circulation of poop? My long quest to understand the comings and goings of guano started with recognition of its fundamental biological nature, but ended with the entirely unforeseen discovery that bird excrement can teach us just as much about the life of the mind and intricacies of culture as it can about the materiality of modern existence. In this essay, I will address, in turn, four broad issues that have been repeatedly raised by the gracious participants in this roundtable and twenty-plus reviews of the book that have appeared to date:

1. The challenges of *following* as a methodology for developing border-crossing perspectives on history;
2. The value of the *Pacific World* as a frame for contemplating global history;
3. The perils of making neat generalizations about the *influence of El Niño* on society and culture;
4. The emerging synthesis regarding the relationship between *colonialism and commodification* that has been revealed by an agro-ecological approach to modern history.

As part of this dissection, I will divulge some idiosyncratic aspects of the digestive process that produced this wide-ranging book. I hope researchers find this useful when deciding whether such approaches are right for them, as we struggle together to reduce the history of existence to manageable chunks that nonetheless appeal to a wide variety of tastes.

Where can “following” lead us?

John Soluri boldly compared the experience of reading *Guano and the Opening of the Pacific World* to Macklemore and Lewis’s braggadochio rap “Thrift Shop.” I agree that this comparison reveals something fundamental about the book’s genesis and perhaps its bravado. The book does have a certain self-conscious shagginess that I hope brings to mind a state college thrift store hipster, rather than the sleek, stylish, off-the-rack shimmer of the latest Ivy League grad school application, turned dissertation, turned book. This may not be to everyone’s taste, but it reveals much about the book’s social origin and sensibility.

A perennial source of fascination for those who have become interested in guano has been the almost magical ease with which shit can be converted to silver. Guano is the modern archetype of trash turned into treasure. Before pet detective Ace Ventura saved a sacred bat, African tribe, and fortune in guano from a nefarious British capitalist in a comedic film starring Jim Carrey, many people’s first

introduction to guano came from Eduardo Galeano's *Open Veins of Latin America*.² For him, this filthy substance not only reveals the fictitious character of the prosperity enjoyed by the rulers of nineteenth-century Peru, but also encapsulates the foundation of Latin America's relationship with the rest of the world over the past half millennium: as a site of extraction, often amounting to rape.

I was (blessedly) ignorant of both sources of inspiration, and instead started my investigation with a simpler query—Where does guano come from? This led to the simplest of acts of contemporary scholarship: typing the search term 'guano' into the University of Texas Library database, which spilled out crate loads of historical books and Peruvian governmental reports on the topic. But why were most of them from the twentieth century, long after Peru's wealth of guano had supposedly been mined out? And why were the reports so preoccupied with El Niño, long before the rest of the world came to recognize the phenomenon? In the process of answering these questions, I began to embrace an investigative philosophy inspired by my subject matter. I self-consciously became an aficionado of "All things rude and nasty, all creatures short and squat,"³ to the point of searching out little used libraries and archives in Peru and the United States, including one abandoned on a guano island.

This investigative philosophy also influenced my perspective on authoritarianism, a perennial issue among Latin Americanists. I use this concept figuratively in the book for a social type that has taken many guises through history. To answer Soluri's query, for me an authoritarian is someone for whom the little people and little things are unworthy of concern; someone who prefers to govern by fiat, or let the invisible hand or faceless data determine decisions, often in the belief that there is one optimal answer to any problem. Such attitudes have had a powerful influence on the rise of expertise, particularly during the 1990s, the salad days of neoliberalism. That historical moment is partly responsible for the overrepresentation of technocrats in the book.

The essence of "following" as a methodology requires the courage and tenacity to follow specific people, things, and phenomena across the boundary lines we conventionally use to organize scholarship. Hugh Gorman was curious to learn how I chose which of many possible threads to follow. There is no simple answer to this query, just as there is no natural path through the archives to answer any historical question. One guide to my decisions was to always be attentive to the ways in which a thread addressed major conceptual concerns. As Gorman and Christian Brannstrom point out, an explicit rhetorical strategy of the book was to establish "connections between familiar narratives," such as Al Crosby's concept of ecological imperialism and how we produce food, at what cost. By far the greatest challenge in

² *Ace Ventura: When Nature Calls* (1995); Eduardo Galeano, *Open Veins of Latin America: Five Centuries of the Pillage of a Continent*, trans. Cedric Belfrage (1971; New York: Monthly Review Press, 1997), 137-41.

³ See Monty Python's parody "All Things Dull and Ugly" of a nineteenth-century hymn to intelligent design "All Things Bright and Beautiful," available (for now) at <https://www.youtube.com/watch?v=aPriOQkKd6k>.

writing this book was how to establishing meaningful connections between the parochial interests of a wide range of readers without marooning anyone in a backwater for too long.

These choices could also be deeply personal. Back when I initiated this investigation, Latin American environmental history barely existed as a field (unless one journeyed over to the geography department, a discovery that led me decisively down the path of disciplinary border crossing.) I was also frustrated by the insularity of U.S. environmental histories I devoured to learn that field. For all its brilliance and gravity as an exemplar of following as a methodology, Bill Cronon's *Nature's Metropolis* had no interest in following its story to a strikingly similar metropolis on the other end of the world on the Argentine pampas, populated by some of the exact same companies as Chicago.⁴ Historians of self-evidently important places in the Global North have long had the luxury of neglecting to pursue such transregional links, while historians of so-called peripheral locations like the Andes or Pacific *have* to be aware of such connections in order to explain what happened, much less have a prayer of influencing broader scholarship. Northern scientists, as it turned out, have populated the guano industry since a day in 1802 when a barge full of guano in the port of Callao set Alexander von Humboldt into a fit of sneezing. The scattered personal archives of these scientists provided an invaluable perspective on how people perceived and interacted with nature in far-flung locales in a way that a national archive never could.

My preoccupation with following scientists had a marked downside. As I moved through grad school and the job market to my current department, I came to feel increasingly marginalized because I had chosen to study scientists, instead of slaves and other subalterns, the "proper" subject for southern histories. These feelings crystallized into anger when the story of Enrique Ávila—a Quechua-speaking native of the Lake Titicaca region who had been dogged by racism throughout his career, then ended up studying with Aldo Leopold and at the Scripps Institution of Oceanography with a Guggenheim, before dying of cancer contracted while doing radiation research in Puerto Rico—was openly dismissed at a job talk as having little to do with authentic indigenous history.

While working to compose brief sketches of the guano history's extension into the Pacific and back to the colonial era, I stumbled across a rich collection of source materials available by inter-library loan concerned with indigenous histories far out on the Pacific Islands. British Museum staff also helped me rediscover a long-lost coat of arms belonging to a sixteenth-century indigenous lord. Finally, here were the subaltern histories that would certify me as an authentic historian of the colonized world! Ironically, this exact line of investigation, which grew to occupy a third of the final book, took me even farther away from being considered a dedicated Latin Americanist by friends and colleagues. It was pivotal, however, in enabling me to see

⁴ William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton, 1991).

the history of guano as fundamental to the emergence of the Pacific World in modern history.

To sum up, the availability of little-used source materials and a dedication to rescuing the stories of obscure people, places, and substances from the thrift shop of history determined the paths that I followed—helped along by shamelessly “promiscuous” reading. Following never stopped during the writing process. Ryan Tucker Jones wonders why Pacific Islanders tend to drop out of the narrative later in the book. In fact, the whole chapter on Japan and interwar Malthusianism developed as a last-ditch strategy to link the overpopulation rhetoric of Bill Vogt and the Banaban and Phoenix Island resettlement projects. Otherwise, I might not have been able to fit them at all! An obsession with connectivity and willingness to discard or recompose tens of thousands of words that no longer fit the overarching narrative eventually made it possible to make these disparate strands fit together.

In the end, to answer Christian Brannstrom’s question, one never stops “following.” I recently visited Tyntesfield, a luxurious Victorian manor house and estate near Bristol, England, which has become one of the National Trust’s most popular properties. William Gibbs built it in the mid nineteenth century, back when the Peruvian guano trade had made him the richest commoner in the UK. One would never know that avian feces were the source of the family fortune, except for a stained glass window on the way to the billiards and gunroom, next to the butler’s pantry (fig. 1). Its panes show realistic images of the northern gannet or *alcatraz común* (*Morus bassanus*)—the closest local relative to some of Peru’s guano-producing birds—portrayed wearing pearls, golden bracelets, and other accouterments of wealth.

Following inevitably leads to other projects. I am currently writing a book on the Anthropocene that grew out of my preoccupation with climate and N-P-K, and have nearly completed researching another book inspired by this sixteenth-century coat of arms that explores indigenous perspectives on ecological imperialism in the colonial Andes and Pacific. I am not confident I can recommend “following” as a rigorous methodology or career development strategy. However, I can highly recommend it if you want to understand the workings of the world in unconventional ways.

What makes the Pacific World a valuable concept?

At a recent meeting of the American Society for Environmental History, Richard White asked a roundtable of Pacific environmental historians to identify the most fundamental source of interest of the Pacific World concept. For him and many others, the story of bondage and liberation of African-derived slaves and colonized peoples in the Americas provides the most striking attraction of the Atlantic World concept. Interestingly, the Atlantic World concept loses its usefulness in the mid nineteenth century at the exact moment when the advent of whaling, guano mining, missionization, and the trans-Pacific labor trade begins to give currency to the idea

of an integrated Pacific World. (Likewise, the Atlantic World concept begins to have utility in the sixteenth century at the exact time when the Indian Ocean World lost containment as European-derived traders and tyrants began pouring into that region from the Atlantic and Pacific.)

As Ryan Tucker Jones points out, one of the great challenges for historians has been how to incorporate the southeastern Pacific—sometimes referred to as the ocean’s “empty quarter”—into Pacific narratives. It is now possible to integrate the Pacific coast of South America into ancient perspectives of a Pacific World. The planet’s oldest known urban civilization took root on the Peruvian coast at Caral suggesting, as Michael Moseley argued long ago, that Andean civilization has maritime foundations.⁵ The Americas, in fact, may have been originally peopled by settlers arriving by sea back in the Pleistocene—much like regions to the east of Wallace’s Line in Australasia. The development of Pacific history as a field has also been profoundly shaped by the colonial aspirations of continental powers surrounding it, a story that now includes connections between Chile and California.⁶ Peru’s moment of greatest influence over Pacific affairs actually came after World War II. The spectacular growth, first of its tuna and bonito canning industries, then of its fishmeal industry, as well as its defense of a 200-mile territorial sea played a powerful role in convincing Pacific nations, old and new, that a Blue Revolution based on “plowing the sea” could provide a sure path to development. Jones’s critique regarding the loss of ocean-wide integration toward the end of the book makes me regret, somewhat, the large amount of material I cut out regarding the expansion of industrial fisheries elsewhere in the Pacific during this era.

In answer to White, I propose that the Pacific Ocean itself, its sheer vastness as an environment, the isolation and fragility of its islands, and all that this has entailed for societies in close interaction with this ocean, provides the heart and soul of emerging Pacific World historiography. More than any other province, the Pacific World compels us to reject terracentric assumptions regarding the possibilities of human existence. To answer Soluri’s query regarding the Pacific World’s value as a concept for environmental historians: it may provide us with a whole scholarly industry to rule!

How does El Niño impact societies?

With a powerful event brewing in the equatorial Pacific, El Niño is again sending the world into a tizzy. Warm El Niño events and their cool opposite La Niña provide another source of potential unity for the Pacific World concept. For a good while, the research project that produced this book actually aimed at producing a study of El Niño. One of the major discoveries of that line of investigation, which focused on the

⁵ Michael Moseley, *The Maritime Foundations of Andean Civilization* (Menlo Park, CA: Cummings Publishing, 1974).

⁶ Edward Melillo, *Strangers on Familiar Soil: Rediscovering the Chile-California Connection* (New Haven: Yale University Press, 2015).

history of human understanding of El Niño, is how difficult it is to make accurate generalizations about its societal impact. This is true even for a place like Peru—all the more so for the whole Pacific Ocean, much less the globe. The inherent diversity and unpredictability of El Niño events is the exact thing that makes them so dangerous. The rapid pace of change of modern societies only magnifies this hazard.

Nevertheless, a range of societies scattered around the Pacific have developed robust techniques for predicting its occurrence and anticipating its consequences. Thanks to my following of this story back to colonial Peru, I can now provide the name and portrait of the world's first known El Niño forecaster from the sixteenth century: Juan Yunpa of Uchucmarca (fig. 2). According to Guaman Poma, he provided the archetype for those “indigenous philosophers” and “poet astrologers who knew the circuits of the sun, and of the moon and eclipses, and of the stars and comets; the hours, weeks, months, and years; and of the four winds of the world, . . . and *thus see what time to sow the fields, early and late.*” He did so in the hope of ensuring an ample harvest, no matter what El Niño or La Niña might bring, and is even shown carrying a knotted *kipu* to record his observations for posterity.⁷

My book has sometimes been criticized for not arriving at more systematic conclusions regarding the societal impact of El Niño. I am still planning to write a book about the discovery of El Niño, and did not want to show all of my cards on that subject, particularly with so much else already going on in the book. Some of the best advice I received in the course of this investigation, from those who know the science of El Niño best, was to be exceedingly cautious about making generalizations about this slippery phenomenon. For one thing, the science of El Niño has developed rapidly since the last major event of 1997-98. Mike Davis's presentation of the science of El Niño in *Late Victorian Holocausts* has long been obsolete and frequently conflates El Niño and La Niña events (though I do not think this undermines his main argument.)⁸ I have written some harsh reviews of scholarship that has neglected to keep up with these innovations and fallen victim to climate reductionism.

Overall, I think El Niño is best understood as a foil to human aspiration that, nonetheless, gives a broad rhythm to the history of the Pacific World through its influence on the timing and conjuncture of events with other basic causes. I do feel comfortable making one emphatic generalization, however. The whole world calls this phenomenon ‘El Niño’ because of events detailed in this book, rooted in the history of the Peruvian guano industry.

⁷ Emphasis added; quoted in Gregory T. Cushman, “The Environmental Contexts of Guaman Poma: Interethnic Conflict over Forest Resources and Place in Huamanga (Peru), 1540-1600,” in *Unlocking the Doors to the Worlds of Guaman Poma and his Nueva Corónica*, ed. Rolena Adorno and Ivan Boserup (Copenhagen: Museum Tusulanum Press, 2015), 87-140, p. 90.

⁸ Mike Davis, *Late Victorian Holocausts: El Niño Famines and the Making of the Third World* (London and New York: Verso, 2001).

Adapt, move, or extract

Christian Brannstrom neatly encapsulates one of the book's central findings regarding the relationship between colonialism and the commodification of nature. The societal threat posed by environmental degradation is often presented in dire terms: "Adapt, move, or die!" In fact, Easter Island (Rapa Nui) and other Pacific locales have often been held up as object lessons of this supposed truth. The history of the commodification of guano reveals another possibility. Societies also have the option of importing resources from other environments to help sustain local practices over the long term. This extractivist drive, I argue, provided a potent motivation for colonialism during the nineteenth and twentieth centuries, especially for neo-European "frontier" societies in the United States, Australia, and New Zealand. Extractivism was a fundamental driving force behind the opening of the Pacific environment and peoples to exploitation by outsiders, and it may have been one of the primary drivers of colonialism throughout history. Brannstrom's comment also sheds light on the discourses we use to legitimate colonial exploitation. Invasion and extraction are often presented as do-or-die propositions with no good alternative—or even more perversely, as the only viable means to improve the world.

With so many fine studies of commodities that have come out in recent years, the time indeed seems ripe for drawing a few synthetic conclusions regarding the place of commodities in global environmental history. These varied histories each describe a small part of a much larger process—commodification—that has been absolutely fundamental to the emergence of capitalism as a modern historical force. This process seems natural, in retrospect, because it has done such an effective job at hiding the violence of extraction of things from their ecological and sociocultural contexts. Commodification's success at hiding exploitation is akin to the wondrous way our personal offerings of excrement disappear, each day, beneath porcelain altars into the watery void. Only you know the violence of the bowel movement that produced this offering. Only sewage plant operators are intimate with the filters, bacteria, chemical treatments, and waterways that will ultimately receive them. Following as a methodology can help to demystify the role of human choice in such activities.

Guano deserves special recognition within the history of commodities. In the hands of industrial society, guano helped bring about a whole new human relationship with N-P-K—three elements that are just as important to the opening of the Anthropocene as fossil fuels. Guano also illustrates an essential truth about commodities. Their specific histories are intimately, sometimes indivisibly connected: cotton and sugar with slaves; henequen and wheat with farming machinery; guano with nitrates, phosphates, fishmeal, and ultimately meat.

There is nothing natural about narrating the history of a thing as a commodity. In fact, my book was never intended to be a commodity history. The very first thing I ever read that called itself an environmental history was Don Worster's call for an

agro-ecological perspective in the Leopoldian vein.⁹ I had no plans of becoming a professional historian at that juncture—I was studying to become an ecologist—but was fascinated by the possibility of an ecological view of history that included humans at its core. This book is really about the ecological role and sociocultural meaning of guano and related substances. One central finding of the book is that guano has had a profound influence over the basic ways we *think* about our relationship to nature. For similar reasons, I have become fascinated by the Anthropocene concept, which promises to bring a geological perspective to human activities and aspirations.

To answer Hugh Gorman's question regarding the compatibility of my perspective with those of my former teacher Al Crosby and Jared Diamond: we all share a dedication to using ecological principles to understand historical change. Where we are at odds is an issue of privileged perspective. The perspectives of the colonized are equally vital to understanding colonialism as those of colonizers and their biological allies. Our viewpoints are complementary rather than incommensurable. However, there is one thing I cannot reconcile. Just because fundamental aspects of modern colonialism operate according to ecological laws does not make colonialism, itself, a natural outcome. As I show again and again in the book, modern colonialism would not exist without the self-conscious intent to exploit, profit, and thereby "improve." History at the largest scale also need not be impersonal. This is why Yali's story had to be in the book. However tenuous its exact linkage to guano extraction, it provided a meaningful counter from an individual's viewpoint of the colonizer's perspective of the world. Yali was acutely aware that he had been treated as a means to someone else's end, and that this was morally wrong. This raises a troubling question. As historians, when we compose stories of the past, are we treating historical subjects as means to our own ends?

To conclude, I want to heartily thank the participants in this roundtable for the incisive effort they put into evaluating my work. It is both ingratiating and humbling to receive so much attention for what is inevitably a flawed work, and to be asked to think so carefully about what I have accomplished and left undone. To the extent that this book is a work of synthesis, it is best understood as *part of a broad movement* to better understand the connectivities of our world and their role in altering the fundamental trajectory of the planet. I am deeply indebted to a host of mentors, collaborators, and contributors on this count. I hope these comments are enlightening to past and future readers; that they assist others in their quest to integrate knowledge; and in the end, to more thoroughly reveal the genesis and architecture of power.

⁹ Donald Worster, "Transformations of the Earth: Toward an Agroecological Perspective in History," *Journal of American History* 76, no. 4 (1990): 1087-1106.



Fig. 1 Stained glass window at Tyntesfield subtly portraying the source of the Gibbs family fortune (photo by author; all rights reserved; do not reproduce without permission).



Fig. 2 *El astrólogo* Juan Yunpa of Uchucmarca, the world's first known El Niño forecaster (Source: Felipe Guaman Poma de Ayala, *El primer nueva corónica y buen gobierno*, 1615, The Royal Library, Copenhagen, GKS 2232 4º, p. 883 [897]; used with permission.)

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