Guano and the Opening of the Pacific World

A Global Ecological History

For centuries, guano and the birds that produce it have played a pivotal role in the cultural activities of indigenous peoples in Latin America and Oceania. As the populations of North American and European powers ballooned during the Industrial Revolution, they came to depend on this unique resource as well. They did so to help meet their ever-increasing farming needs and imperial aspirations, until the Pacific's fertilizer supplies were appropriated by developmentalists in Peru, Japan, Australia, and other postcolonial states. This book explores how the production, commodification, and cultural impact of guano, nitrates, phosphates, coconuts, and fishmeal have shaped the modern Pacific Basin and the world's relationship to the region. Marrying traditional methods of historical analysis with a broad interdisciplinary approach, Gregory T. Cushman casts these once little-known commodities as engines of Western industrialization, offering new insight into uniquely modern developments such as the growth of environmental consciousness; conservation and cleanliness movements; the ascendance of science, technology, and expertise; international geopolitics; colonialism; and world war.

Gregory T. Cushman is an Associate Professor of History at the University of Kansas, where he teaches courses on Latin America and international environmental history. He works closely with environmental scientists in interdisciplinary research and teaching, and has published a number of articles on climate history and the history of climate science.

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For my family
past, present, & future

With minute and amateurish interest, I found atop a scoop in the base of a big, drifted, scorched tree trunk five little piles of fox dung, a big owl's puke ball full of hair and rat skulls, and three fresher piles of what had to be coon droppings, brown and small, shaped like a dog's or a human's.

Why intrigued ignorance asked, did wild things so often choose to stool on rocks, stumps, and other elevations? Common sense replied: Maybe for the view. . . .

The trouble was, I *was* ignorant. Even in that country where I belonged, my ken of natural things didn't include a little bird that went *heap-heap*. . . . Or a million other matters worth the kenning. . . .

With a box gushing refrigerated air (or warmed, seasonally depending) into a sealed house and another box flashing loud bright images into our jaded heads, . . . why should we sweat ourselves where the Eskimo curlew went?

– John Graves, *Goodbye to a River* (1960)

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Preface

This project started with birds. Historians have long recognized the significance of guano to modern Peru. The fact that English speakers today use a Peruvian term to refer to bird and bat excrement is testimony to the former importance of international trade of this malodorous commodity. But what did the guano industry mean for the marine birds that produced it? I expected the answer to this would be a short, sad tale, in which greedy merchants and miners pushed the guano birds aside to get rich quick. I did not expect to discover that the Peruvian government organized one of history's most elaborate and successful bird conservation programs to maximize fertilizer production and drive Peruvian progress. I never dreamed that I would find guano and guano birds at the heart of Aldo Leopold's famous essay on our moral relationship to the earth, at the base of New Zealand and Australia's rise to First World status, or at the core of the identity of several Pacific peoples. This book demonstrates that marine bird excrement is at the root of modern existence and fundamental to the incorporation of the Pacific Ocean into global history – to the opening of the Pacific World.

I made these discoveries because I had the fortitude (or foolhardiness) to follow guano birds, their poop, and the people who cared about them around the world, no matter where they went. Many of the phenomena in this book have little respect for the borders we typically use to delineate ecosystems, regions, nation-states, or continents, much less for the boundaries that delimit the archives, academic disciplines, and languages we use to study them. I recently learned that there is a name for the "following" methodology. I used to produce this book.[1] I cannot recommend it enthusiastically to those concerned with establishing an academic career, raising a family, retaining their self-esteem, or doing things the easy way. However, I can highly recommend it if you want to learn how individual actions and

[1] Ian Cook et al., "Geographies of Food 1: Following," *Progress in Human Geography* 30 (2006): 655–66.

local histories were involved in building the modern world. This methodology provides a useful way to make sense of how the ocean and soil have been integral to the history of our species. Curiously, these two environments are little studied by historians, even though they cover most of the earth's surface. As this book shows, the earth's hydrosphere and pedosphere are connected to urban existence in unexpected ways, down to the "chicken from the sea" many of us eat.

At its root, this book is about interconnections, one of the central preoccupations of the fields of environmental and global history. A wide variety of readers will therefore find subjects of interest in this book, including many that are dear to American, British, and social history. Many readers will find some of my excursions to be disconcerting. Few of us, for example, think of Peru as part of the Pacific World. For that matter, most of us give little thought to the Pacific's place in history. Whole libraries have been written about the Atlantic World, but readers will be hard pressed to find a single historical monograph with "Pacific World" in its title – a truth that speaks volumes about my profession's tunnel vision.[2]

Others will find the sheer bulk of this book to be daunting. This book demonstrates how a host of remote territories, obscure peoples, and little-known organisms influenced some of the most powerful currents of modern history. No one needs to be convinced that the Black Death, African slave trade, or Second World War fundamentally altered the course of human development. It is quite another thing to convince you that guano is of comparable importance. Big claims of this sort require lots of evidence. A few years back, Richard White argued that one of environmental history's greatest shortcomings was its failure to establish causal connections between its locally based arguments and its global claims.[3] It is much easier to make such links when we make an effort to study places other than our own backyards.

Some conventions in this book require a bit of explanation. I have reported all monetary amounts in their original currencies, but whenever possible, I have converted them into 2007 US dollars. Historical conversions and calculations of real value over time for British, Australian, and U.S. currencies use the gross domestic product deflator, a conservative estimation applicable to a range of consumer goods, services, and financial products. These are derived from Lawrence Officer and Samuel Williamson's Institute of Measuring Worth, http://www.measuringworth.com. Calculations of real

[2] See "Special Issue: Oceans Connect," *Geographical Review* 89, no. 2 (1999); "AHR Forum: Oceans of History," *American Historical Review* 111, no. 3; "Forum: Beyond the Atlantic," *William & Mary Quarterly* 63, no. 4 (2006). Ashgate has published a series of compilations titled "The Pacific World: Lands, Peoples and History of the Pacific, 1500–1900."

[3] White, "Environmental History, Ecology, and Meaning," *Journal of American History* 76 (1990): 1111–16.

value for Peruvian soles (S/.) are based on Felipe Portocarrero et al.'s *Compendio estadístico del Perú*. These conversions are meant to provide a rough but meaningful standard for comparison of values across time and place understandable to a diverse international audience. For similar reasons, all other units have been converted to the metric system. To eliminate confusion in identifying species – which often take on different names when they move to new places – I always provide the most widely accepted scientific name, and in most instances common names as well.

As a direct result of some of the events described in this book, scientists have come to the realization that the El Niño–Southern Oscillation (ENSO), a climate phenomenon centered in the equatorial Pacific and Indian Oceans, is the single most important determinant of year-to-year variation in the earth's climate. It had a profound impact on the history traced here. Nonetheless, connecting specific environmental phenomena to the incidence of anomalously warm El Niño and cool La Niña events is a tricky business, and it becomes trickier the farther back we move in time. I have preferentially used a new monthly chronology called the Coupled ENSO Index (CEI) for defining events, because it combines consideration of oceanic and atmospheric features of this phenomenon, is based partly on instrumental records, and is most similar to the definitions used by scientists to define more recent ENSO events.[4] Secondarily, I have used a new chronology based on proxy records (or paleoarchives) such as coral reef cores, historical records of droughts and floods in certain regions, and tropical ice cores.[5] It goes back much farther in history but does not always line up neatly with the instrumental chronology. I give much less credence to older proxy chronologies developed by William Quinn and his associates, which are overly biased toward Peru.[6] All ascriptions of environmental phenomena to El Niño or La Niña in this book are somewhat tentative. The footnotes clarify whether CEI or paleoarchives provided the main basis for these determinations. The citation of more traditional archival sources follows the convention: archive-collection, box/folder. Frequently used archival collections and periodicals are abbreviated in accordance with a list following this preface. Full publication information will be provided at first citation in the footnotes for sources not in the select bibliography.

I want to thank a number of people and institutions that took a risk on me, believed in me, or at least tolerated my foibles, failings, and fascination with bird shit. My parents and grandparents taught me to be a naturalist. To them, this not only meant learning the names and habits of birds, bees, stars, and trees, but also the places you could find them and the people who cared about or threatened these treasures. To them, Nature provided

[4] Gergis and Fowler, "Classification of Synchronous Oceanic and Atmospheric ENSO Events."
[5] Gergis and Fowler, "A History of ENSO Events since A.D. 1525."
[6] Quinn and Neal, "The Historical Record of El Niño Events."

a revelation of the wisdom of the Creator, and its degradation prophesied the soon coming of the time "for judging the dead, and for rewarding your servants . . . and for destroying those who destroy the earth."[7] (If only I could still believe this were true.) As you will learn in this book, great evil and destruction sometimes resulted from my own forefathers' and foremothers' moral quest to improve the earth at the expense of others. This was probably my most enlightening and humbling discovery.

In Peru, Magnolia and Amanda Velásquez Jara opened their home to me – and made it feel like home; my cousin Chris Finch and his family did the same in San Diego; Beatriz Benítez did so in London. Several teachers provided me with the guidance and tools I needed to embark on this project. These include Gary Bradley, Karl Butzer, Marjorie Coon, Al Crosby, Joe Galusha, Mauricio Tenorio and especially Richard Graham, Bruce Hunt, and Rennie Schoepflin. I criticize some of Crosby's ideas here but see this book as a direct extension of the research program he laid out and credit to his inspiration. Participation in the Pacific Centuries conference series organized by Dennis Flynn and Arturo Giráldez and an NEH Institute on the Environment and World History organized by Terry Burke had a formative influence on the conceptualization of this project that is still growing. In Peru, Scarlett O'Phelan, Marcos Cueto, and several scientists connected to IMARPE provided encouragement and insight. On Easter Island, Pau Hito, Alberto Hotus, and Oscar provided invaluable help in familiarizing me with the people and environment of Rapa Nui. The American Meteorological Society History of Science Dissertation Fellowship provided vital support at an early stage in this project that, unlike many grants, enabled me to do multinational research. Ever since, Jim Fleming, the mastermind behind the creation of this program, has continued to serve as an advocate, mentor, and now a close friend. The University of Kansas has provided an extraordinary climate for the sort of interdisciplinary engagement needed for projects like this; I especially want to thank Chris Brown, Byron Caminero-Santangelo, Johan Feddema, Sara Gregg, Joane Nagel, Bill Tsutsui, Joy Ward, Bill Woods, and especially Don Worster for their interest and support. The KU Center for Research provided a series of summer research grants that enabled me to follow my research subjects to new places. The Hall Center for the Humanities Nature and Culture Seminar generated many other opportunities, including the ability to gain relevant insights from Deborah Fitzgerald, Susan Flader, Brett Walker, Kären Wigen, and Verena Winiwarter. A Fulbright Scholarship to Hungary presented the opportunity to work further with Winiwarter, Zoltán Alföldi, and Wenqi Ma on soil and ethical issues. Henning Krause provided admirable research assistance in Germany. An award from the Friends of the Hall Center helped support publication of the book. Santa

[7] Revelation 11:18, New International Version.

Arias accompanied me to the ends of the earth in seeing this book through to its finale.

Many research libraries, archives, institutions, and people who experienced these events opened their doors to me; most are cited in the bibliography. However, I want to express special gratitude to Deborah Day at SIO, the staff at IMARPE and PROABONOS, and to Basilia Díaz, the widow of Enrique Ávila. Her husband was "mostly Indian" and grew up close to Lake Titicaca; he became Peru's first native-born professional marine scientist. She tearfully gave me the few remaining papers of his that remained from the El Niño flood of 1982. This disaster destroyed boxes of personal archives and photographs from the guano islands, along with most of her possessions. Her husband died cursed with the knowledge that the birds and fish he had dedicated his life to studying and conserving had been wiped out by human overdevelopment. He personally experienced Rachel Carson's nightmare of a silent spring on Peru's guano islands.

I hope you appreciate the new perspective of the world that can come from contemplating heaps of bird manure. Perhaps this book will also make you "sweat where the Eskimo curlew went."

Abbreviations and Acronyms

ACAG	Archivos de la Compañía Administradora del Guano
ACL	Auckland City Libraries
AMFom	Archivo del Ministerio de Fomento y Obras Públicas
ATA	American Tunaboat Association
BCAG	*Boletín de la Compañía Administradora del Guano*
BCCAG	*Boletín científico de la Compañía Administradora del Guano*
BCIM	*Boletín del Cuerpo de Ingenieros de Minas*
BCNPN	*Boletín del Comité Nacional de Protección a la Naturaleza*
BCONAFER	*Boletín de la Corporación Nacional de Fertilizantes*
BMFom	*Boletín del Ministerio de Fomento*
Bol.Inst.Mar	*Boletín del Instituto del Mar del Perú*
BPC	British Phosphate Commission
CAG	Compañía Administradora del Guano
CEPAL	Comisión Económica para América Latina
DPL	Denver Public Library
ENSO	El Niño–Southern Oscillation
FAO	Food and Agricultural Organization of the United Nations
G&EI	Gilbert and Ellice Islands
IMARPE	Instituto del Mar del Perú
Inf.Inst.Mar	*Informe del Instituto del Mar del Perú*
IREMAR	Instituto de Investigaciones de los Recursos Marinos
IUCN	International Union for Conservation of Nature and Natural Resources
JLAS	*Journal of Latin American Studies*
MCAG	*Memoria del Directorio de la Compañía Administradora del Guano*
MCONAFER	*Memoria de la Corporación Nacional de Fertilizantes*

Mem.Inst.Mar	*Memoria anual del Instituto del Mar del Perú*
MMFom	*Memoria del Ministerio de Fomento*
NAUK-BFO	National Archives, UK–British Foreign Office
PMB	Pacific Manuscripts Bureau
PPC	Pacific Phosphates Company
PROABONOS	Proyecto Especial de Promoción del Aprovechamiento de Abonos Provenientes de Aves Marinas
S/.	Peruvian soles
SIO	Scripps Institution of Oceanography
SNP	Sociedad Nacional de Pesquería
UWDC-ALA	University of Wisconsin Digital Collections, Aldo Leopold Archives
WHOI	Woods Hole Oceanographic Institution

Prologue

Once there was a female *huaca* named Cauillaca, the woman of the ocean depths. Cauillaca had always remained a virgin. Because she was very beautiful, everyone longed for her. "I've got to sleep with her!" they thought, but she never consented. One day, this woman was weaving beneath a *lúcuma* tree. The wandering trickster Cuniraya Viracocha – provider of flowing water – turned himself into a bird and flew into the lúcuma tree. He put his white semen into a ripened fruit and plopped it next to Cauillaca. She swallowed its yellow flesh delightedly. Thus, she got pregnant even though she remained untouched by a man.

One year after this child's birth, she called everyone together on the bleak *altiplano* to find out who was the child's father. The local male huacas were overjoyed, and they all came dressed in their best clothes, each saying to himself, "It's me she'll love" – all, that is, except Cuniraya Viracocha. He often walked about as a miserably poor and kinless orphan (*guaccha*), dressed in rags, and covered with lice.

Cauillaca addressed the child: "Go, find your father." The child began at one end of the group and crawled along on all fours until it reached the other end where its father sat. On reaching him, the baby instantly brightened and climbed onto its father's knee. When its mother saw this, she became indignant, "*Atatay*, magical child, what a disgrace! How could I have given birth to the child of a beggar like that?" And taking her child in disgust, she headed down the river valley, straight for the deep sea below the painted temple of He Who Gives Motion to the World, Pachacamac. When she and her child reached her dwelling in the sea, they turned to stone where, today, two white guano islands that look like people still stand.

And then, while all the local huacas stood in awe, Cuniraya Viracocha changed into his golden garment and called after her: "Sister Cauillaca! Here, look at me now! I'm actually beautiful," as his raiment shimmered like sunlight on a pool of water.

He ran after her down the valley, shouting out to her from a distance, but soon lost sight of her. First, he met up with a condor and asked, "Brother, did you run into that woman?"

"Yes, right near here. You'll soon find her," replied the condor.

Cuniraya Viracocha answered back: "You will live a long life. You alone will feast on the dead guanacos and vicuñas of the wild mountain slopes. And if anybody should kill you, he also will die."

In similar fashion, Cuniraya Viracocha met up with a skunk, a puma, a fox, a falcon, and finally some parakeets. "She's already gone far away. You'll never find her now! You'll never find her now!" the parakeets told him.

"As for you," replied Cuniraya Viracocha, "although you may scream 'We'll spoil your crops! We'll spoil your crops!' when people hear you, they'll chase you away at once. You'll live in great misery as a pest amidst the hatred of humans." And so he traveled on. Whenever he met anyone who gave him good news, he conferred a good fortune, but he viciously cursed those who gave him bad news.

Finally, he reached the seashore at the place where Pachacamac's wife and two daughters lived guarded by a snake. Their mother had just gone into the deep sea to visit Cauillaca. In those days, there was not a single fish in the ocean. Only the girls' mother bred them, in a small, coastal lagoon. In anger, Cuniraya Viracocha came down like a flood and threw the fish into the sea. Ever since, fish have filled the ocean. He raped the older daughter, but her sister turned into a bird and flew away. That is why her mother's name, Urpi Huachac, means "she who gives birth to birds."

When Urpi Huachac heard of this from her daughters, she flew after him in fury down the seashore. She called out to him, again and again, and eventually he turned and waited for her. "Yes?" he answered.

"Oh Cuni, I just want to remove your lice." But while she preened him, feasting on this emblem of the great multitudes his hidden fertilizing powers could feed, she opened a huge abyss next to him. Cuniraya Viracocha recognized his danger and said, "*Hold on a minute, Sister. I really need to take a shit.*" And with that, he made his getaway into the fields of a nearby village. He escaped death in the sea, and tricked many more huacas and people, too.[1]

In this way, life- and death-giving torrents flow from mountain to coast, birds took to the air and fish to the sea, and guano attained its place in fertilizing the world.

[1] Based on a Quechua text from circa 1608, *The Huarochirí Manuscript*, ch. 2.