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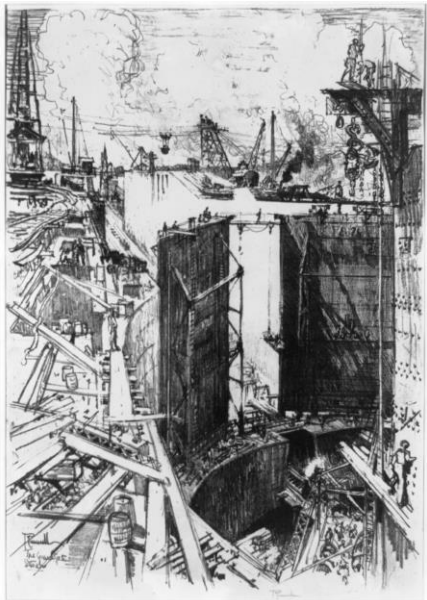
Mosquitoes, Malaria, and Cold Butter: Discourses of Hygiene and Health in the Panama Canal Zone in the Early Twentieth Century

Sarah J. Moore, Professor of Art History, School of Art, University of Arizona

In a 1921 article enumerating the many successes of the Panama Canal since its opening six years earlier, geographer and editor R. H. Whitbeck described in triumphal terms what he called America’s transformation of the Panama Canal Zone:

Today the swamps are filled, the mosquitoes are gone, the streets are paved and clean, and the zone is as healthy as Massachusetts. This is what man has done at a place where geographical conditions induced him to build an interoceanic canal. It is an inspiring example of man’s conquest of adverse nature; not man’s response to a hostile environment, but his defiance of it and his subjugation of it; an example of so-called geographic control upon which is superimposed a still more impressive example of man’s control.¹

Whitbeck’s soaring rhetoric of mastery paralleled contemporary perceptions of and reactions to the canal at the time of its completion. Moreover, it shared with other observers the prevailing assumption that the herculean task was enacted by a powerful, manly nation



Figures 1, 2. Left: Joseph Pennell, *The Guard Gate, Gatun*, (Panama Canal Series), 1912. Transfer lithograph, 22 x 16 in. Collection of the Library of Congress Prints and Drawings Division, Washington, D.C., Call Number: FP-XIX-P420, no. 225. Right: Jonas Lie, *The Conquerors (Culebra Cut, Panama Canal)*, 1913. Oil on canvas, 60 x 50 in. Collection of The Metropolitan Museum of Art, New York George A. Hearn Fund, 1914 (14.18) Image copyright @ The Metropolitan Museum of Art Image Source: Art Resource, NY

that transformed the vexing imperial problem of a hostile environment—the tropics—into a meaningful and coherent zone of progress, health, indeed civilization itself.

Contemporary visual images of the Panama Canal, almost without exception, were equally celebratory and affirmed the anthropocentrism of enterprise. Joseph Pennell (1857–1926), Alson Skinner Clark (1856–1949), and Jonas Lie (1880–1940), for example, traveled to the Canal Zone near the end of the construction phase and created images—lithographs and paintings—that canonized the epic nature of the engineering feat. Often utilizing a view from above—a common compositional strategy in nineteenth-century landscape painting to disclose the viewer’s privilege and dominance over a broad swath of land—Pennell and Lie conveyed the enormity and complexity of the canal project in their sublime images and defined them in equally epic terms: *The Apotheosis of the Wonder of Work* (by Pennell) and *The Conquerors* (by Lie) (figs. 1, 2).²

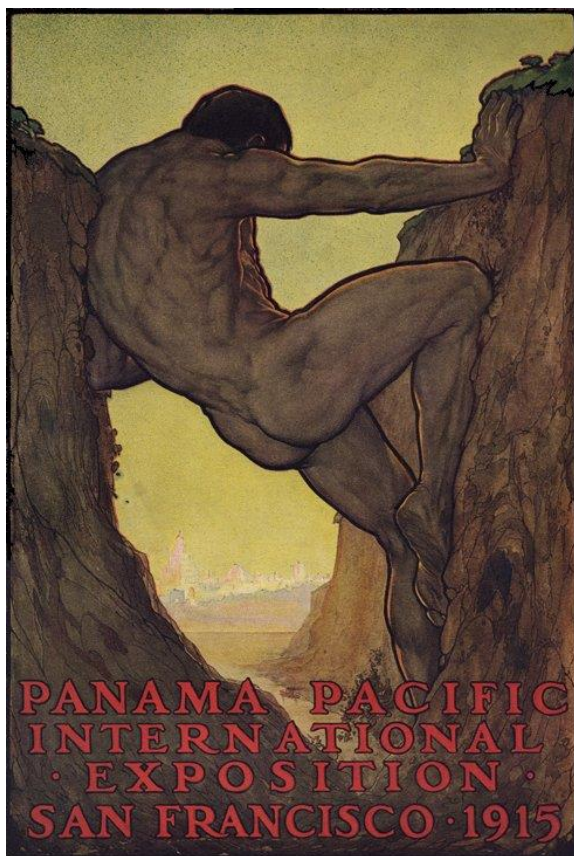


Figure 3. Perham Nahl, *The Thirteenth Labor of Hercules*, 1915. Color offset lithograph published by PPIE Co. Collection of California Historical Society, San Francisco, California

A particularly striking example of such celebratory images, and one that enjoyed wide circulation, is the official poster for the Panama-Pacific International Exposition held in San Francisco in 1915; the world’s fair was designed to celebrate the completion of the Panama Canal. *Thirteenth Labor of Hercules* (fig. 3), by California artist Perham Nahl (the nephew of painter Charles Nahl, who traveled to the Panamanian isthmus in the 1860s), depicts a nude, hypermuscular male thrusting apart the continental barrier at the famed Culebra Cut—pushing back the forces of wilderness—to allow the seas to meet and give rise to civilization as evidenced, below Hercules’s feet, by the domes and pinnacles of the fairgrounds rising in the misty distance. Although previous world’s fairs in the United States employed a similar visual device for their publicity images—a representative figure of America gestures from above to a bird’s eye view of the fairgrounds below—Nahl’s gargantuan figure departs from the more common allegorical representation of the nation in the guise of a female figure such as Columbia or Liberty. Hercules is a modern hero/engineer whose prowess, healthful vigor, and supreme fitness are demonstrated by his ability to redeem and surmount the inefficient

forces of nature and recreate it for his own needs. Indeed, the figure is an explicit expression of anthropocentric thinking that underscored the imperial project as a whole and assumed the supremacy of human needs and desires. This heroic superman embodies both the history of the United States and its taming of the frontier in the nineteenth century and its global future, naturalizing material evidence of the inevitability of American progress.³ Moreover, Nahl depicts Hercules as a discrete body, impenetrable to the forces of chaos and

disorder—or mosquito bites, one imagines—and bound by distinct borders between subject (the imperial body) and object (the Panamanian landscape).

Indeed, the radical transformation of the land in Panama during the building of the canal was widely understood as the most magnificent modern expression of progress and civilization that has defined the complex relationship of America to nature since European colonists first encountered the North American continent. Moreover, it rendered in tons of concrete and steel the Cartesian dualism of nature and human being, itself at the root of anthropocentrism, seeing nature as something out there and into which civilization could and would encroach and triumph. Although its history as an imperialist project of continental expansion would not be fully addressed until several decades later, the global implications of the venture were noted by most.⁴

What most contemporary observers failed to consider, however, is what I would call the ecology of the project and the fact that the tropical environment was not only the most formidable and often lethal obstacle to its realization but also unstable, changing, and capable of producing change. To be sure, the geography and climate of the region were widely recognized as compromising the productivity of the venture. However, each was seen as a discrete location or definable problem that could be compartmentalized, measured, mapped, and otherwise contained so as to transform the tropics from a torrid zone to a temperate one. This so-called transformation of the tropics, however, was not a one-way street: transforming agent (United States technology) plus labor (largely West Indian) surmounts natural forces and objects (continental divide, torrential rains, mudslides, disease-carrying mosquitoes). Indeed, many of the objects against which the enterprise struggled—perhaps none more than the lowly mosquito—were transformative agents themselves that threatened the builders’ (real and imagined) efforts to separate themselves from the natural world.

In this essay, I would like to shift attention away from the building of the Panama Canal as an enactment of United States imperial prowess, technological know-how, and masculine chest beating—this terrain has been well covered by recent scholarship—and instead turn to the idea of the Panama Canal as a hybrid and shifting landscape, a zone in which the entanglements between human and nature as well as economy, technology, and politics proliferated and often contradicted one another. Despite material attempts to subdue the Panamanian landscape—both by the very act of physically cutting through the isthmus to make a canal and through the containment and eradication of disease—Panama’s non-human inhabitants proved to be stunningly resilient. Plants overgrew construction equipment, thwarted work, and complicated travel, while insects, particularly disease-carrying mosquitoes, proliferated in tropical humidity and migrated freely across spaces and bodies. The resulting hybrid landscape even created disease, facilitating the spread of malaria, although this reality was largely invisible in contemporary discussions and views of the region. Entrenched anthropocentrism disallowed even imagining nature as a potent agent.⁵

Following the lead of cultural historian Monique Allewaert in her work on what she calls the American Plantation Zone, I propose the term Panama Canal zone not as descriptive of a discrete place but constitutive of multiple interacting and overlapping systems.⁶ Discourses of health, hygiene, and progress—visual and textual—provide the primary metric with which to recalibrate thinking about the Panama Canal enterprise and zone as an ecology located at the nexus of intersecting discourses. To be sure, the Panama Canal zone—its landscape,

technology, documentation, and human and nonhuman subjects—was managed by a powerful ideological and bureaucratic structure and an archive of visual images and written texts that valorized ideas about American ingenuity, progress, modernity, health, and superior fitness. At the same time, it is a fluid terrain—a borderland—that encourages the view of Nahl’s Hercules as an ecological body, instead of a discrete entity, just as is the water that passes through the canal: neither Atlantic nor Pacific but instead a hybrid, flowing across boundaries of all kinds.

Ecocriticism provides a transdisciplinary lens with which to compromise the long shadow cast by Cartesian dualisms and recalibrate critical understanding of the Panama Canal zone as an ecology in which an amalgam of interpenetrating forces—human, natural, insect, medical, vegetal, climatic, microbial—were entangled. Not simply an account of the so-called nature of the region, an examination of place, or an accounting of the “conjoined problems of economic and environmental exploitation,”⁷ an ecocritical reading interrogates how the human and nonhuman, corporeal and noncorporeal, organic and inorganic are entangled and amalgamate into a hybrid and unbound landscape that denies discrete borders between interior and exterior, subject and object, national and transnational. Instead of thinking of the Panama Canal region as an enclosed boundary, subject to technological, medical, and sanitary interventions from the outside, as well as aesthetic conventions that transformed the Panamanian isthmus into a landscape—a backdrop for human habitation and dominion—ecocriticism invites us to think of the Panama Canal zone as a set of relational media extending into, transformed by, and transforming events, places, and forces outside of it. Shifting away from the technological and medical heroism of modernization and disease eradication, and its fundamental anthropocentrism, interpretations of the zone in Panama can be interpreted as a “disaggregated and opened body” in light of environmental relationships, entanglements, and the agency of the nonhuman.⁸

“Rude Corner of the World”

President Theodore Roosevelt faced any number of obstacles between 1903 and 1904, vying for support of Congress and the nation to take on the enormous task of building the Panama Canal. Among those was the widely held and quite horrifying image of the canal zone as a formidable jungle of chaotic and inhospitable nature—distinctly outside of civilization, savage, and teeming with pestilence and danger—in the minds of Americans, most of whom had never set foot in Panama, by reports and images of visitors to the area. Noted author and editor James Anthony Froude wrote of Panama in 1885, “In all the world there is not perhaps concentrated in any single spot so much swindling and villainy, so much foul disease, such a hideous dung heap of physical and moral abomination.”⁹ Equally stinging were the words of Marie Gorgas, wife of the sanitation director, William Gorgas, regarding her husband’s first trip to the Canal Zone in March 1904. “Nature herself seems to have set aside the Isthmus as the headquarters of the worst manifestations of the human spirit.” She continued, “The whole forty-seven-mile stretch was one sweltering miasma of death and disease.”¹⁰ Gorgas’s remarks echoed a chorus of cautions about the hostile and vile nature of the tropical Isthmus, going back at least as far as the building of the Panama Railway in the 1850s. With the obvious reminders of the failed effort of France in the construction of the canal between 1880 and 1888, such as discarded machinery and numerous cemeteries—one doubter of the French effort noted in 1885 that “there will not be enough trees on the

Isthmus to make crosses for the graves of your laborers”¹¹—it is no wonder Roosevelt and the recently instituted Isthmian Canal Commission (ICC) recognized the gravity of the formidable task ahead and set their sights on sanitation and disease control as their first and most pressing issue in the Canal Zone.

No figure was more central to the early endeavor to combat disease in Panama than Army physician William Gorgas, whose efforts to eradicate yellow fever, malaria, and other diseases while recreating Panama as a modern and healthful environment, as defined by those living in temperate zones such as the United States and western Europe, were hailed as a fitting example of the civilizing force of the nation. Gorgas got his start fighting mosquitoes in Havana during and after the brief war with Spain and was the obvious choice to assemble an army of “health workers,” as they were known, to combat disease in the newest imperial arena of the United States. Gorgas believed he was restoring health and hygiene, indeed civilization, to this “rude corner of the world,” as he called the Panamanian tropics. His alignment of cleanliness, health, social discipline, and moral authority were not unprecedented, being invoked most recently in the American intervention in the Philippines following the Spanish-American War. The assumed racial superiority of the United States to enact this cleansing ritual—the “poetics of cleanliness” in the words of anthropologist Anne McClintock¹²—was clear in Gorgas’s 1909 article, “The Conquest of the Tropics for the White Race,” in which he likened the prevalence of disease in the jungle to what was widely perceived as indolence and barbarism in those native to the tropics.¹³

Many contemporary accounts included before-and-after descriptions and pictures that contrasted the depravity and lack of hygiene before the arrival of workers and engineers from the United States with clean cities, paved streets, bakeries, houses with screened windows, telephones, porcelain baths, and iceboxes owing to Gorgas and his army of health workers. A contemporary observer applauded the enormously successful transformation by Gorgas of the “most pestilential region on earth . . . into a practical winter health resort.”¹⁴ The modernity and civility of the canal zone, as a result of the United States sanitation efforts there, led one British tourist to remark, “Who ever heard of an American without an icebox? It is his country’s emblem. It asserts his nationality as conclusively as the Stars and Stripes afloat from this roof-tree, besides being much more useful in keeping his butter cool.”¹⁵ Implicit in such accounts is an anthropocentric and imperialist perspective on the enterprise.

The Trouble with the Tropics

At the turn of the twentieth century, tropical nature had become “a global and imperial environmental problem of the first order,” with the Panamanian isthmus as ground zero.¹⁶ Throughout the nineteenth century, the tropics were both an empirical fact—a geographical region of the world with mappable coordinates between the Tropics of Cancer and Capricorn (twelve degrees latitude north and south, respectively) and distinctive flora, fauna, and topographical details—and an imaginative construct that was defined as much by nostalgia, desires, and fears and as an identity counterpoint to everything the civilized world was not. Binary oppositions were routinely enlisted to define what was and was not the so-called torrid zone: wild/tame; uncivilized/civilized; humid/temperate; torpid/productive; slothful/energetic; south/north; unfamiliar/recognizable; illegible/decipherable; female/male; diseased/healthy; pestilential/paradise. Moreover, during the course of the

nineteenth century, the imagined tropics shifted dramatically from Humboldt’s richly detailed and aestheticized assessment of tropical abundance as a sublime landscape—a view that inspires terror and overwhelms rational assessment yet allows the viewer to see and experience fear without any actual danger—to a darker view of tropical nature defined by excess, degradation, disease, and resistance to the forces of civilization. This nature cannot be aestheticized and disarmed into a sublime landscape and refuses to be controlled by such human constructions.¹⁷ The presumption of environmental disorder extended to the inhabitants of the tropics who were widely discussed as racially inferior to those from more temperate zones. The assumed indolence and flaccid moral, mental, and physical tone of the native population were understood as evidence of their inferiority—a direct corollary to the vigor-sapping and morality-diminishing environmental effects of the tropics—and as justification for intervention from the outside.

Environmental historian David Arnold uses the term “tropicality” to discuss the discursive refashioning of the tropics—its landscape and inhabitants—at the turn of the twentieth century in response to, among other forces, the ideological imperatives of the imperial age.¹⁸ It can be argued that such ideological and representational shifts began a half century earlier, as the image of the tropics as a diseased and hostile environment was widely circulated by artists and writers following the discovery of gold in California, an episode that forever changed the United States engagement with the slender but recalcitrant isthmus in Panama.

“Beyond the Chagres River, All Paths Lead Straight to Hell!”

Although the story of nineteenth-century westward expansion is often conceptualized on an east-to-west trajectory, in fact the most practicable route between the east and west coasts was southerly, via Panama. One needs to remember that at mid-century, the territory west of the State of Missouri was often depicted as a blank space across which were printed the words, “Great American Desert.”¹⁹ And the four-to-five-month passage around Cape Horn—some fourteen thousand miles—was far too long for most impatient travelers and certainly for those seeking their fortune in California gold. By the late 1840s, the so-called Panama route was facilitated by two steamship lines operating between New York and San Francisco respectively; with the discovery of gold in California in 1849, demand on both lines increased dramatically.

The sixty-mile journey from the Caribbean to the city of Panama, on the Pacific, was not for the faint of heart. The first stage of the journey was made on the Chagres River, forty-odd miles, in wooden canoes propelled by native men using steering poles. In addition to the staggering heat and disease-carrying mosquitoes, the river swarmed with alligators, venomous snakes, and stretches of rough water. The final stage of the passage across the isthmus was on foot or on the back of a mule. The paths were narrow and swampy, often filled with mud due to incessant heavy rains. Contemporary descriptions underscored the wretchedness of the passage, including that by Frank Marryat, British sailor, artist, and writer, who traversed the Panamanian isthmus in 1850 on his way to California. His memoir of the journey, which was illustrated by the author, was published in 1855 in London and New York; his New York publisher, Harper and Brothers, printed a review of his book, including illustrations, in their periodical, *Harper’s New Monthly Magazine*, assuring a wide readership.

Marryat’s narrative aligned with widely held perceptions of the future canal zone as the “foremost pest-hole of the earth, infamous for its fevers, and interesting only because of the variety of its malarial disorders and pestilences.”²⁰ He described the town of Chagres, where the river passage begins: “The town of Chagres deserves notice, inasmuch as it is the birthplace of a malignant fever, that became excessively popular among California emigrants, many of whom have acknowledged the superiority of this malady by giving up the ghost a very few hours after landing.”²¹ His illustration *Crossing the Isthmus* (fig. 4) visually captures many of the hardships of the journey he described. Against an impenetrable jungle backdrop complete with jagged rocky peaks, a precipitous crevasse, palm trees entangled with vines, and incongruous cacti are vignettes of hapless foreign travelers, utterly ill-equipped for the journey across the jungle—some on foot, others on mules up to their bellies in mud, still others wrestling with or having been bucked off their obstinate mounts. In contrast with the fully dressed Anglo travelers, including one woman—referencing the anticipated domestication of the region—four Panamanian natives, dressed in loincloths, conform to widely held racial stereotypes; the male figure in the background gestures violently, aligning his behavior with the wildness of the jungle in which he is embedded.



Figure 4. *Crossing the Isthmus*, as illustrated in Frank Marryat, *Mountains and Molehills: Or Recollections of a Burnt Journal* (London: Longman, Brown, Green, and Longmans, 1855), 406.

The eye moves across the image from right to left, as do the Anglo travelers and their pack mules that struggle with their heavy parcels. One such creature has stumbled on the rocky terrain, and its parcel, clearly marked with the instructions “This Side Up,” lists precipitously. Two travelers depicted in small scale are being transported in makeshift chairs strapped to the backs of native men. This rather perplexing section of the image may allude to the fact that outsiders depended on the local knowledge and willingness of native inhabitants to successfully navigate the challenging terrain; this seems to contradict contemporary viewers’ knee-jerk alignment of tropical natives with the chaotic landscape. Two dogs accompany the travelers in the foreground; their partial domestication contrasts

dramatically with the wildness of the scene, including its native inhabitants, and, if obliquely, disrupts the defining binary quality of the image. This image was reprinted in a number of texts on the history of the Panama Canal written during the first two decades of the twentieth century, suggesting its visual currency as a marker of the canal zone prior to its transformation into a region of hygiene, progress, and civilization. Moreover, it contrasts dramatically with the bird’s eye views that would come to define images of the Canal Zone during the construction phase and after and that offer long views and horizons for guidance and perspective. “Up close,” as Marryat’s image suggests and art historian Darcy Grimaldo Grigsby later observed, “Panama was confusing.”²²



Figure 5. Charles Nahl, *Incident on the Chagres River*, 1867. Oil on canvas, 26 x 27 in. University of California Berkeley Bancroft Library, BANC-PIC 1963.002:1361-FR

German-born artist Charles Nahl (1818–78) also traveled through Panama on his way to California in 1850 and created a series of drawings, some of which he later transformed into paintings and/or used to illustrate articles about emigrants seeking work in the California.²³ *Incident on the Chagres River*, 1867 (fig. 5), depicts one of the many hazards of the journey. Flat-bottomed boats were commonly used to ferry people down the river; native men with long poles for maneuvering stand at the front of the boat, while the back has a shade cloth to protect the travelers from the blistering sun. The boat has suddenly encountered rapids, causing one of the pole men to topple overboard; one of the passengers hangs precariously off the edge of the boat to size up the danger. A similar boat, wrecked and wedged under a flotsam-laden rocky outcropping in the river, stands as grim evidence of the journey’s risks. Dense, lush vegetation rises up on both sides of the riverbanks. Unlike many landscapes of the nineteenth century that utilize the panoramic view from above—a view that implies a degree of mastery over and safe distance from the scene depicted, much like the aesthetic theory of the sublime articulated by Edmund Burke in the eighteenth century, which depends upon the clear distinction between viewer and landscape—Nahl positions the viewer at river level. The jutting embankment on the right side impedes a glimpse into the distance, heightening the sense of danger and fear from which the viewer cannot retreat into the thrilling safety of the sublime.

Nahl studied with Horace Vernet in Paris before coming to the United States in the late 1840s.²⁴ Such academic training can be seen in his treatment of the native men whose naked-to-the-waist bodies allow the artist to show off his rendering skills; their three positions could be isolated as an academic exercise revealing the body from various viewpoints. In contrast with the native inhabitants in Marryat's image discussed earlier, whose chaotic and unidealized bodies are a referent for the Panamanian jungle, Nahl aestheticizes the native bodies and as such renders them as hybrids: academic nude and brown-skinned native. Further evidence of the artist's unconventional approach are the two cows on the hillside to the left, whose presence in the otherwise jungle setting suggests the pastoral tradition and a landscape, however delimited, that has graciously adapted itself to the forces of civilization. Indeed, Nahl's image creates a hybrid and contradictory scene: subject to the civilizing and benevolent aesthetic imperatives of the pastoral tradition, yet advancing the narrative of the inherent risks of travel through a wild and, by extension, unhealthy landscape through the aesthetic convention of the sublime.²⁵

The Chagres River in particular and the Panamanian jungle in general continued to inspire fear and repugnance throughout the pre-canal decades. One author defined the journey across the isthmus as "traversing the waste spaces."²⁶ James Gilbert, who worked in the 1880s and 1890s for the Panama Railroad Company and later the United Fruit Company, was the self-declared poet of the Isthmus of Panama and transcribed his experiences there into a book of poetry, *Panama Patchwork*, published at the turn of the twentieth century. The poem "Beyond the Chagres River" etched in readers' minds the vile and deadly nature of his adopted home, and ironically, the place of his death from "yellow eyes," the descriptive term used for those suffering from malaria.

Beyond the Chagres River
 Are paths that lead to death—
 To the fever's deadly breezes,
 To malaria's poisonous breath!
 Beyond the tropic foliage,
 Where the alligator waits,
 Are the mansions of the Devil—
 His original estates!²⁷

Such words rang frighteningly familiar to those who labored in the Canal Zone and who set their sights on the eradication of disease.

The fraught experiences of Nahl and many others who crossed the isthmus before the building of the Panama Railroad could not stand in sharper contrast than with those who made the passage after the completion of the railroad in 1855. In contrast with a six-odd week passage that was punctuated by deep morasses, dense and intractable jungle, malaria- and yellow-fever-carrying mosquitoes, noxious reptiles, venomous insects, staggering heat, and nearly incessant rain, the train journey—some forty-seven miles—across the "Yankee strip" of the continent took an average of two hours.²⁸ One contemporary chronicler noted,

"From the car windows we enjoyed rare glimpses of the virgin jungle, a tropical hortus of blooming trees with orchids and flowering vines . . . Cane huts, primitive as those pictured by the old chroniclers in the woodcuts of their first editions, basked in the shade of coconut [*sic*] palms." Remarking on the speed with which the journey could now be made, he continued, "This is the only place upon the hemisphere where it is now possible to behold both oceans in a single day."²⁹ The aesthetic of the sublime now defined the journey across the isthmus: thrilling in its passage through the jungle, safe in its distance from danger. Moreover, the journey on the train could be understood as a corporeal parallel to the view from above that reassures the viewer with a sense of mastery and order over the chaos below.

Such contrasts between the modern railroad and the primitive depravities of the Panamanian tropics and its inhabitants animated the feature article in *Harper's New Monthly Magazine*, published in January 1859, that was designed to familiarize the readers with the "pioneering spirit" of its builders who faced a daunting prospect. As a modern historian of the Panama Railroad observed, "The character and geographical position of the country through which the line of the road had been carried was such as might well have made the hardest projectors shrink from attempting its construction."³⁰ The 1859 article was copiously illustrated and included portraits of most of the key players, including the New York financiers who paid the staggering sum of \$8 million for the project, and illustrations of the enterprise underway. *Running the Lines* (fig. 6), for example, offers a view of dense jungle foliage, a monkey hanging from the top of a coconut palm, and a native boy, naked to the waist, holding a long spear. Embedded amid the foliage to the left, the boy is rendered as a part of, rather than distinct from, the chaotic environment; his youthfulness acts as a biological corollary to the assumed primitive nature of the Panamanian jungle. At the center of the composition is one of the engineers on the project, fully dressed and wearing a wide-brimmed hat. He is shown in profile view and looking through the telescope of the theodolite, part of his geodetic survey equipment, mounted on a tripod. Depicted as qualitatively distinct from the natural world, the engineer, with his swagger, is an agent in the imperial project of making nature into a disciplined, hygienic, and orderly space: mapping, measuring, and instrumentalizing the environment while ostensibly immune to its disintegrating forces of excessive heat, humidity, and of course the bite of a disease-carrying mosquito. The cartographic information he produces will provide knowledge for the disciplining of the land through technological innovations: steam-powered machines, railroads, and photography.

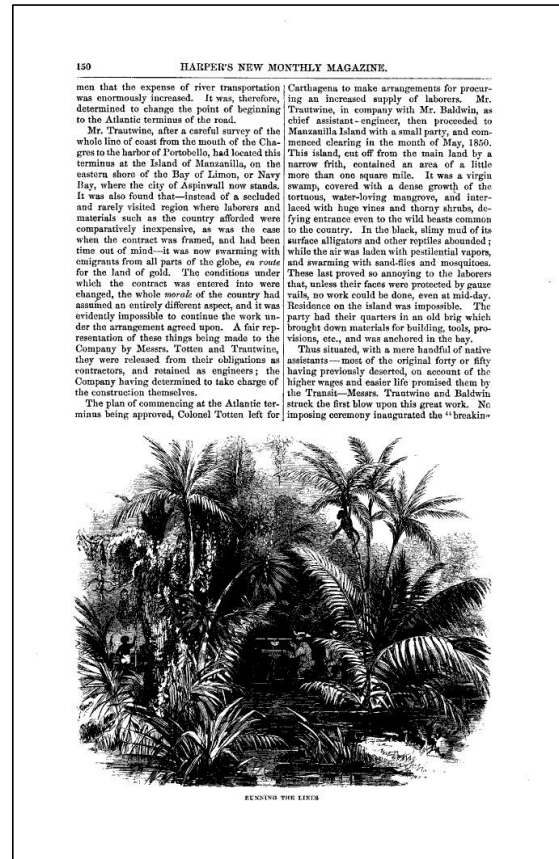


Figure 6. *Running the Lines*, as illustrated in Oran, "Tropical Journeys," *Harper's New Monthly Magazine* (January 1859), 150.

The contrast between the unruly wilderness and native population, which this article defined as “too indolent and unaccustomed to labor to be depended on to any great extent,” and the technologies of progress—surveying tools, railroad lines, modern railway stations—and those who deploy them, was designed to underscore the heroic nature of the undertaking and the inevitability of the imposition of healthful forces of civilization on the jungle. The image therefore easily conforms to the underlying anthropocentric and imperialist assumptions that undergirded the enterprise of building the Panama Railroad and later the canal. Hidden from view was the staggering cost in human lives of the building of the railway; nearly nine thousand laborers died during the five-year construction period—“a life for every railroad tie”—from malaria and abysmal working and environmental conditions. Such costs, however, did not deter the overwhelming consensus of the success of the enterprise. Indeed, until the completion of the continental railroad in the United States in 1869, the Panama Railroad provided the safest and fastest travel from east to west coast. Moreover, it reasserted the historical position of Panama as the keystone of global trade and imperial fantasies about a navigable passage between East and West. It can therefore be argued that the Panama Railroad served as a vital dress rehearsal for the future canal—overseas expansion as an extension of westward expansion—and articulated the coordinates of progress and empire along racial, environmental, and geographical lines.³¹

Man Against Mosquito

It is no surprise that William Gorgas, with his exceptional pedigree as a mosquito fighter, was selected to be the director of sanitation in the Canal Zone. Following the brief war with Spain, Major Gorgas was named the sanitary director of Havana and was charged with “the hopeless-appearing task of breaking a grip which yellow fever had had upon the city for a hundred and fifty years.”³² Indeed, Havana’s centuries-old association with yellow fever, and fear of the potential spread of the disease to the United States, were cited by many as among the rationales for the war with Spain. Gorgas himself, in a report to Congress in July 1902, stated: “The primary object of the war with Spain was the liberation of Cuba from Spanish domination, this of course being the official *casus belli*, but at the same time, the United States had hoped to accomplish a good deal in improving the sanitary condition of the island.”³³

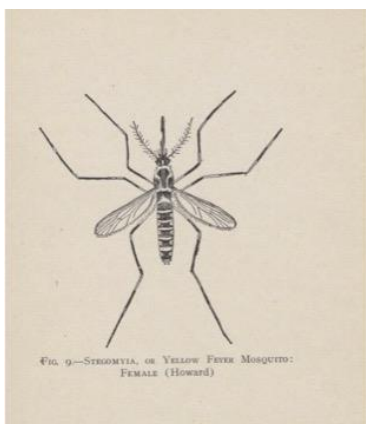


FIG. 9.—*Stegomyia*, or Yellow Fever Mosquito: FEMALE (HOWARD)

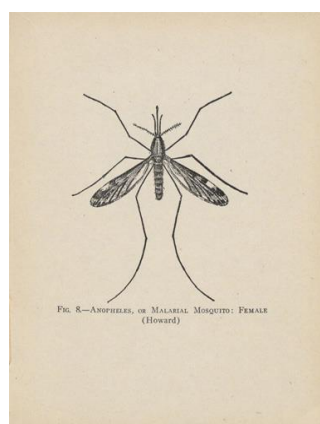


FIG. 8.—*Anopheles*, or Malarial Mosquito: FEMALE (HOWARD)

Figures 7, 8. *Stegomyia*, or Yellow Fever Mosquito and *Anopheles*, or Malarial Mosquito, as illustrated in Alvah H. Doty, *The Mosquito: Its Relation to Disease and Its Extermination* (New York: D. Appleton and Company, 1912), 33 and 29.

Gorgas was an army major, a medical doctor, and part of an elite, international cadre of physicians—Alphonse Laveran in Algeria, Ronald Ross in India, Carlos Finlay in Cuba, and Walter Reed and Surgeon General George Sternberg in the United States—seeking to eradicate malaria and yellow fever. By 1904, medical researchers had firmly established that both diseases were mosquito-borne: yellow fever was transmitted by the *Aedes aegypti* species of mosquito; the female *Anopheles* transmits the disease-

carrying parasite for malaria. A number of illustrated articles and books were published at the time that provided details about the breeding and feeding habits and lifespan of these insects as well as guidelines for their eradication. These works failed to take into consideration the fact that many of the modernizing efforts that took place in the canal zone actually increased mosquito breeding grounds and thereby accelerated the possibility of disease. *The Mosquito: Its Relation to Disease and Its Extermination*, published in 1912, for example, included numerous illustrations (figs. 7, 8) designed to provide researchers and sanitary engineers with the latest scientific findings. Noted entomologist L. O. Howard, another key player in identifying the disease-carrying mosquito vectors, provided illustrations of the two mosquitoes implicated in yellow fever and malaria, respectively. Adjacent pages provided details about the particular insect and prescriptions for its eradication.³⁴ The images render the insects as a coherent entity with all parts labeled and identified. Much like the display of insects in fledgling natural history museums at the time, these images rendered the mosquitoes as aesthetic, static, and controllable.

Each of these men played a defining role in identifying the mosquito vectors as the cause of the diseases, completely undermining earlier theories of disease transmission that located the contagion in foul air and filth. With the identification of specific mosquitoes as the agents that carry and transmit the infectious pathogens into other living beings, scientists, doctors, and sanitarians had to rethink the calculus of war to combat a previously unrecognized adversary to imperial expansion: the lowly mosquito.

Indeed, the discovery of links between mosquitoes and civilization-thwarting diseases such as malaria and yellow fever transformed the airborne nuisance into an agent of history and a frightful adversary. Images of mosquitoes appeared in the popular press at the time that showed the diminutive pests as formidable giants, mutated “like B-movie monsters.”³⁵ The French periodical *Chanteclair*, for example, published a drawing of Alphonse Laveran, the French physician whose work toward the eradication of malaria led to his receipt of the Nobel Prize in Medicine in 1907 (fig. 9). The image depicts Laveran riding a camel in the desert, slaying larger-than-life mosquitoes with a lance. The location is likely Algeria, where Laveran was posted as a military doctor in the late 1870s and early 1880s and began experiments that led to the discovery of microbial germs as the cause of malaria. The alignment of the harsh desert environment with disease and disorder, much like the Panamanian tropics, is made clear by the scale of the insects. Laveran’s, and by extension western Europeans’, superior intellect—indicated by the monumental size of his head that towers over the landscape—is nearly undermined by the lumbering camel about to topple under the weight of the mosquito fighter. Contemporary viewers may well have associated the

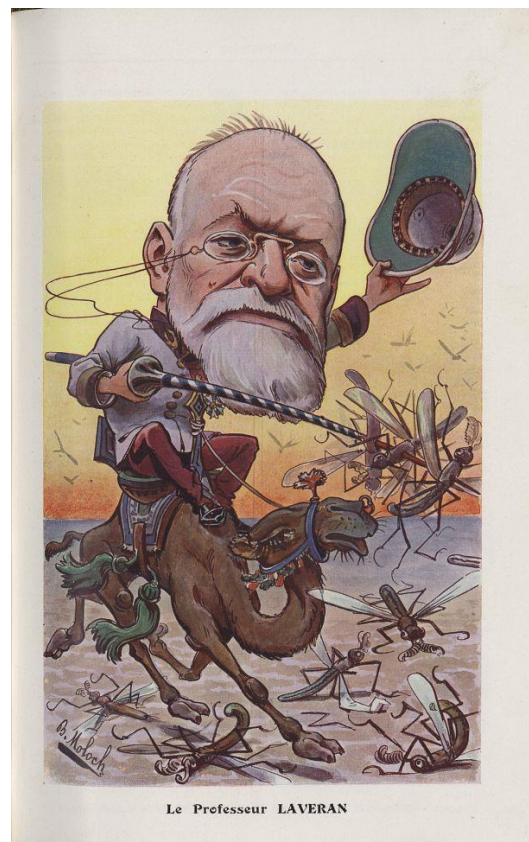


Figure 9. *Le Professeur Laveran*, as illustrated in B. Moloch, *Chanteclair* (Paris), January 20, 1909, 31.

image with another French adventurer into the wilderness, Ferdinand de Lesseps, whose success in the building of the Suez Canal, completed in 1869, was utterly derailed by the abysmal failure of his subsequent effort to build a canal in Panama due to disease. This image could therefore be understood as destabilizing the anthropocentric narrative and confidence that underscored the lion’s share of visual and textual discourse regarding the United States enterprise in the canal zone.

It is no surprise that the French debacle in Panama was widely reported and foremost in the minds of the Americans as they took over the massive undertaking, not just of building the canal but in combating disease. The outline of the French defeat was well known. After the enormous success of the construction of the Suez Canal, which was largely credited to the efforts and advocacy of diplomat and entrepreneur Ferdinand de Lesseps, the French negotiated the right to build a sea-level canal in Panama in 1881. Diminishing the regional reputation for deadly epidemics of malaria and yellow fever and disregarding the warnings that the Panamanian isthmus was not suited to a sea-level canal, de Lesseps and his engineers began preparing the region for the massive construction project. At the outset, mosquitoes were understood only as a nuisance; most of the support structures built to house and care for the workers—barracks, homes, hospitals, compounds, eateries, and entertainment venues—were without screens, featured lavish gardens, and used water as a barrier against pests such as ants. Unknowingly, these newly created environments provided ideal breeding grounds for mosquitoes and offered no protection from their potentially lethal bite.



Figure 10. *Aftermath in the Jungle, Near Tavernilla*, as illustrated in Miles DuVal, *And Mountains Will Move: The Story of the Building of the Panama Canal* (Stanford: Stanford University Press, 1947), opposite 142.

The first malaria deaths came months “before a single ton of earth was moved”³⁶; dozens died during the planning stage of the project, and by the end of 1884, the death toll of more than two thousand was impossible to deny. Coupled with landslides, a recalcitrant geography, and beset by financial scandals, the de Lesseps canal was never completed and the French abandoned the site in 1889, leaving stunning evidence of their failure. A widely reproduced image of the time, *Aftermath in the Jungle, Near Tavernilla* (fig. 10) featured a

massive French land excavator, twisted and abandoned on the side of a mountain, out of which grew tangled vines and dense foliage. As if to underscore further the impotence of the French efforts in the face of the Panamanian jungle, a lieutenant from the United States Army Corps of Engineers is perched on top of the crane. Although this image would have likely been understood as a reference to the United States and its imperial prowess and future success in the Panamanian endeavor, it is also a stunning reminder of the power of the nonhuman world to alter the course of civilization and render useless the mightiest of technological interventions. One need not have a vivid imagination to imagine the thousands of disease-carrying mosquitoes embedded in this chaotic terrain.

To be fair, not all contemporary chroniclers decried the French efforts as marred by corruption and inefficiency. One observer identified disease as the cause of their undoing. “The French undertook the job a little too early. Medical science had not yet taught men how to combat the tropical diseases effectively.”³⁷ Indeed, the timing of the United States engagement in Panama was fortuitous with respect to scientific understanding of so-called tropical diseases. As Paul Sutter has argued, the older miasmatic theories linked specific geographies with the origins of disease—“places that allegedly produced unhealthy or poisonous emanations”³⁸—and found the tropics to be environmentally culpable. Vector theory, by contrast, narrowed the focus on discrete agents of disease, the *aedes aegypti* and *anopheles* mosquitoes, and called for rigorous environmental management. Much as the engineers were overcoming geographical obstacles in the construction of the canal, so the sanitarians planned their attack on a hostile climate and biota: Panamanian nature.

Disciplining Disease

By the time the United States took control of the Panama Canal Zone in May 1904, disease-carrying mosquitoes were recognized as among the most formidable adversary the nation faced in its mission. In response, President Roosevelt appointed a chief engineer of the project, John Findley Wallace, whose first tasks were to oversee the construction of the vast infrastructure needed for the thousands of incoming workers and tons of equipment, and also a chief sanitation officer. William C. Gorgas’s primary charge was to implement a wide range of sanitation measures to minimize, and ultimately eradicate, the spread of yellow fever and malaria. The cover image of *Harper’s Weekly* on July 24, 1905, *The First Mountain to be Moved* (fig. 11), underscored the formidable task ahead. Uncle Sam and Theodore Roosevelt, sporting his Rough Rider uniform, are shown from the rear and point to a mountainous landscape. The background peak identifies the scene as Panama while the foreground mountain is topped by a gruesome death mask, under which are etched the words “Yellow Jack,” the common term



Figure 11. *The First Mountain to be Moved*, as illustrated in *Harper’s Weekly* (New York), July 24, 1905, cover.

for yellow fever; vultures circle overhead and perch on the hat’s massive brim. The caption locates disease within the tropical landscape and compares its eradication with the actual digging of the canal. Yellow fever was the first and most formidable task faced by the Gorgas team.

Gorgas and his team of sanitation workers had no time to spare, as the first cases of yellow fever were reported shortly after the Americans arrived in the isthmus. In his extensively detailed, three hundred–odd page book devoted to the topic of sanitation in Panama, Gorgas noted that efforts early on to eradicate disease went from bad to worse, leading to the death of several high-level officials by yellow fever in the spring of 1905. This led to widespread demoralization and panic by some who believed “they were doomed just as had been the French before them.”³⁹ Among other original supplies that were taken to the isthmus with Gorgas and his sanitation team were coffins that, when unloaded on the dock at Colón, caused considerable comment and concern. Among these coffins were six set aside from the others and made of metal rather than wood. When questioned about the higher quality coffins by one of the six Isthmian Canal Commission officials in residence at the time, the officer in charge of unloading replied that they were designated for superior officers. Gorgas notes that, “The inference was so obvious that the Commissioner is said to have returned home and taken to his bed at once. I am glad to say, however, that none of the Commission ever had any use for those caskets.”⁴⁰

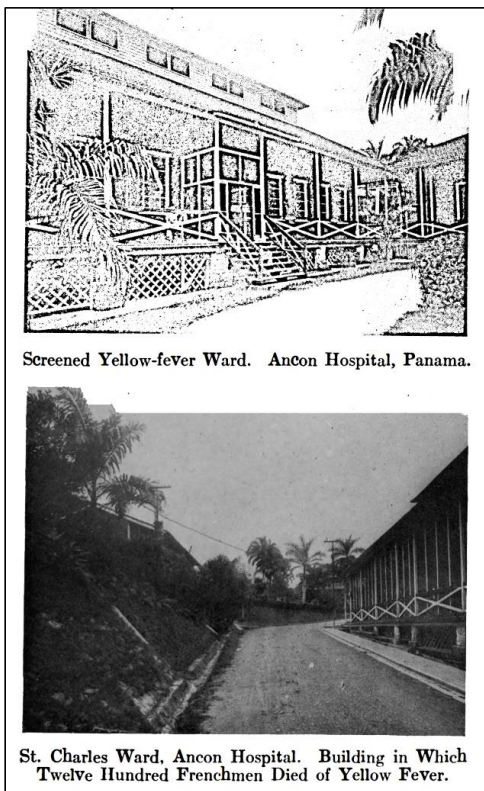


Figure 12. *Screened Yellow-fever Ward, Ancon Hospital, Panama. and St. Charles Ward, Ancon Hospital. Building in Which Twelve Hundred Frenchmen Died of Yellow Fever.*, as illustrated in William C. Gorgas, *Sanitation in Panama* (New York: D. Appleton, 1915), opposite 150.

Gorgas structured the Sanitary Department into three principal divisions: hospital, quarantine, and sanitary. Two large hospitals were constructed on the Atlantic and Pacific sides of the Canal Zone; a specially fitted hospital train crossed the isthmus one to two times daily to pick up the sick at specified stations to be transported to the hospital.⁴¹ Quarantine measures were established along the canal zone and featured, among other things, a portable yellow fever cage in which patients were screened in the infectious stage so as to prevent other mosquitoes from becoming infected and carrying the disease further (fig. 12). Such measures, and the images of them, evoke a rationalization of the space and the imposition of discrete boundaries—screens in this case—between the diseased and the healthy that mirrored, in spirit, the excavations being carried out in the zone itself. Each conceived of a contagion—yellow fever in the former, Panamanian jungle in the latter—as discrete, definable, and ultimately malleable to the will of human needs.

The largest task, however, fell to the sanitation division, which subdivided the entire zone into twenty-four districts, each of which had its officers, hygiene workers, inspectors, and mosquito brigades who worked directly with the engineering division to combat disease. The administration of quinine—derived from the bark of trees indigenous to South

and Central America—was the standard medical therapy for malaria at the time. However, the approach Gorgas took to sanitary engineering was far more aggressive and focused on eliminating mosquitoes through environmental management, doing everything from eradicating areas of stagnant water, draining and filling ditches, clearing vegetation, paving streets, inspecting houses for compliance with sanitation regulations on a monthly basis, and fitting residences and public buildings with screens. Gorgas was vigilant in identifying and removing all areas of stagnant water, going so far as to insist that the holy water in the baptismal font in the Panama cathedral be periodically changed to prevent the propagation of mosquito larvae.⁴²

Vast areas of the landscape, where water could not be drained, were treated by spraying insecticide (fig. 13). This image shows a so-called knapsack sprayer, a West Indian laborer with a larvicide sprayer on his back. Embedded knee-deep in weeds and shown in profile view, the sprayer is steps away from the noxious smoke emerging from the burning treated landscape. The larvicide used, known as the Panama Mix—a decidedly toxic mix of sawdust, kerosene, pine rosin, caustic soda, and crude oil—had to work rapidly (due to regular rains and consequent dilution), mix freely with brackish water, and be inexpensive, given the sheer amount required.⁴³ Indeed, the mixture was cheap to produce, about eighteen cents a gallon, and highly toxic to mosquito larvae, killing a full-grown *Anopheles* larvae in three to ten minutes.⁴⁴ The Panama Mix was first sprayed onto the landscape and then set afire. Although a decisive assault in the arsenal of sanitation efforts, such labor was relegated to workers on the silver roll, that is the majority of non-white laborers in Panama. Such a precaution indicates an awareness of the potentially harmful effects of close contact with the larvicide and references the two-tiered system of labor—the so-called gold and silver roles—which was clearly etched along racial lines.

Silver workers, who were by far the most numerous and almost exclusively West Indian, were largely unskilled. Gold workers, by contrast, were all white, skilled, and from the United States. Modeled on the system of segregated pay dating back to the building of the Panama Railway in the middle of the nineteenth century, strict racial divisions (and by extension, national divisions, as all gold workers were from the United States) became official policy in the Canal Zone and cut across all aspects of life and work on the isthmus, with different pay scales, housing, benefits, vacations, schools, hospitalization, and access to services and public buildings.⁴⁵ Such internal boundaries defined entire towns as well: Ancón, Balboa, Cristobal, and Gatun were gold towns while La Boca, Paraiso, Rainbow City, and Red Tank were silver.⁴⁶ The terms referred to the currency in which workers were paid. The silver workers were paid in Panamanian silver—balboas, as the coins were known (an obvious reference to the imperial history in the Canal Zone)—while gold workers were paid in gold, tied to the monetary currency in the United States.



Oilers at Work in Marsh.



Burning Out Ditch With Oil Spray.

Figure 13. *Oilers at Work in Marsh and Burning Out Ditch with Oil Spray*, as illustrated in William C. Gorgas, *Sanitation in Panama* (New York: D. Appleton, 1915), opposite 184.

Wallace, the first chief engineer of the Panama Canal Project, believed his hands were tied by disease, a dilapidated French infrastructure, and the dense bureaucratic structure of the ICC; he resigned his position in June 1905, with little work to show for his enormous frustration. He was quickly replaced by John Frank Stevens, who turned his energy to building the infrastructure to support the digging of the canal: warehouses, machine shops, shipyards, hospitals, housing, hotels, churches, and schools. Unlike his predecessor, who was stymied by the sometimes glacial pace of the ICC in providing funding and resources, Stevens would appeal directly to Roosevelt, and progress on infrastructure and disease eradication accelerated rapidly. Sanitation workers more than tripled by late 1905, and Gorgas's annual budget, which had been \$50,000, was dramatically increased. Stevens approved a requisition of ninety thousand dollars for wire screening alone.⁴⁷ British medical doctor Ronald Ross, one of the international cadre of researchers working to eradicate malaria, published a book on the prevention of the disease in 1910 and devoted a number of sections to the work accomplished in Panama. Defining infectious disease within a political, economic, and humanitarian context and as capable of defying even the hardest attempts at progress and civilization, Ross praised the work of Gorgas and Stevens and referred to their disease eradication efforts as “sanitary statesmanship.” Charts published in Ross's book documented the dramatic decrease of malarial deaths during this critical phase of the canal project.⁴⁸

Although Stevens's most important contributions to the ultimate success of the canal project were the refitting of the Panama Railway and construction of a rail-based system that could accommodate the removal of soil from the excavation sites, his first concern was that of sanitation. In fact, for the first several months of Stevens's tenure in the isthmus, excavations were halted completely. “The digging is the least thing of all,” he declared.⁴⁹ Stevens's pedigree as the chief engineer of the Great Northern Railroad made him an obvious choice for his role in Panama, and it was during his watch that the decision to build a lock rather than a sea-level canal was reached. However, much to the surprise and consternation of his staunchest supporters, progress continued very sporadically, surveys remained incomplete, plans for the locks and Gatun Dam were still in the design phase, and little excavation was done. In fact, Roosevelt's historic visit to the Canal Zone in late 1906 was a dramatic effort to save the foundering enterprise.

Roosevelt recognized the potential jeopardy of the undertaking. Grindingly slow progress on the excavation and construction, far higher expenses than predicted, the looming threat of disease (in spite of the fact that the last reported case of yellow fever was in May 1906), and flagging national support convinced him that a bold and unprecedented move was needed to reenergize the national will to complete the herculean task. Roosevelt's two-week visit to the Canal Zone in November—notable for being the first time a president of the United States left American soil during his term in office—was a successful wager and marked a turning point in the history of the project. The primary focus of work in the zone thereafter shifted from disease eradication to control and from infrastructure building to the construction of the canal itself.

Roosevelt's journey on the USS *Louisiana* was lavishly reported in the press with articles and images, including numerous photographs of him aboard ship, landing at Colón and crossing the isthmus, of the Hotel Tivoli, where he and his entourage stayed, talking with canal employees, and inspecting the operations from a work train and at the controls of a ninety-ton Bucyrus shovel. The cover of the *New York Tribune* typified the periodical coverage of this historic visit and included a number of reassuring details that would

diminish fears and worries about the lingering dangers of the canal zone (fig. 14). The top image frames a distant view of Hotel Tivoli, where the presidential party stayed during their visit. The hotel, so-named as it was perched on Tivoli Hill in Ancón—the Pacific Ocean border of the Canal Zone—had just opened, and Roosevelt was among its first guests. The multistory building was fitted with all the latest amenities for environmental management,

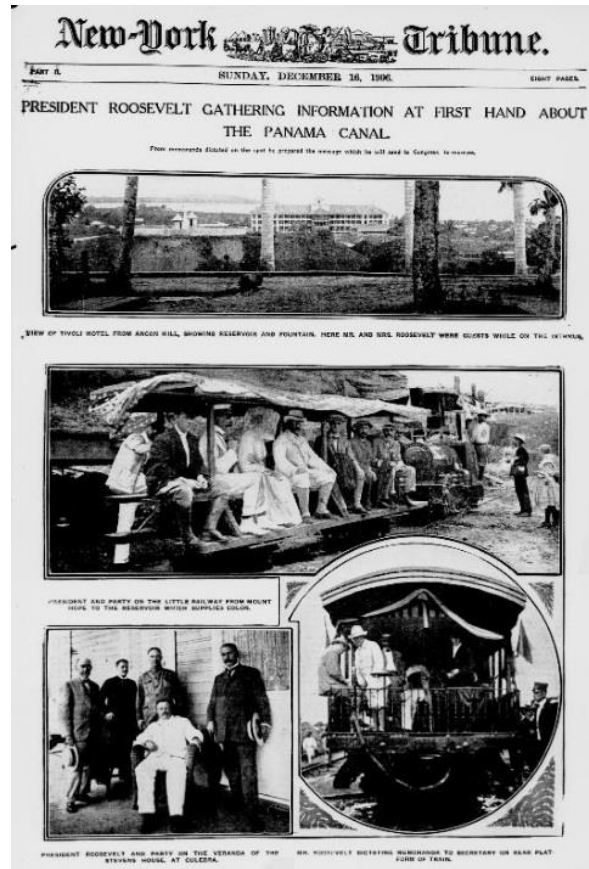


Figure 14. *President Roosevelt Gathering Information at First Hand About the Panama Canal*, as illustrated in *New York Tribune* (New York), December 16, 1906, part 2, 1.

former was identified as the “first great problem to be solved, upon the solution of which the success of the rest of the work depended.” The report detailed Roosevelt’s daily activities, including spending the greater part of his first day familiarizing himself with and inspecting the hygienic labor of Gorgas’s sanitation committee, commenting on everything including drainage ditches, sewers, street paving, mosquito screens, hospitals, temporary work camps, married quarters, and water-closets. Regarding mosquitoes, he noted with pride, “As a matter of fact, but a single mosquito, and this not of the dangerous species, was seen by any member of our party during my three days on the Isthmus.”⁵²

Of the twenty-six illustrations included in the report, seven depict excavations: steam shovels, drills, and crushers at work in Culebra and San Obispo Cuts. An overview of Culebra Cut contrasts the level reached by the French and that by the Americans, some sixty-five feet below. Images of the railroad, railway yard, Marine camp, supply houses, hospitals, and various quarters for married and unmarried workers stand for the vast

and its grounds were landscaped with palm and banyan trees and a massive manicured lawn. The landscape in the foreground is regularized and orderly. Other images show Roosevelt and his entourage on specially fitted train cars from which to view the construction sites and address workers and troops. Roosevelt made particular note of the timing of his visit—November, the rainiest month—as “the month in which the work goes forward at the greatest disadvantage.” Even given such obstacles, Roosevelt was quick to declare that after two years of American occupation, the Panama Canal Zone death rate compared favorably with “reasonably healthy localities” in the United States.⁵⁰

Roosevelt clearly understood the power of his image and of images in general to construct and mold contemporary perceptions of the United States undertaking in the canal zone. In fact, his official report regarding the trip to the isthmus, presented to Congress on December 17, 1906, was unprecedented in its inclusion of twenty-six illustrations to support the document.⁵¹ Roosevelt’s report provided an overview of the journey and considered, in detail, two primary arenas of work in the canal zone: sanitation and the containment of disease, and excavations in Culebra Cut. The

infrastructure in the canal zone. Only one image of Roosevelt is included in the report—the sixth illustration in the series shows the president in his signature white linen suit and boater inspecting a steam shovel near the entrance of Culebra cut—although the tenth image shows a view of the railroad line in Culebra Cut over which is draped an American flag. The caption reads, *Awaiting Approach of Presidential Train*.

Sanitation efforts, unsurprisingly, feature prominently in the report, including images of screened quarters, mosquito netting over beds, paved streets, and sewer construction. One image of this group, *Street Paving Scene in Panama in Which an Old and Muddy Thoroughfare is Being Supplied with a Vitriified Brick Pavement Laid Upon Concrete* (fig. 15), is representative of the visual and rhetorical device used in this report and many such images and descriptions of the before and after in the Canal Zone. In contrast to the suggestions of filth and inefficiency of the region prior to the United States intervention—muddy thoroughfares, ramshackle homes, and West Indian laborers and children fill the foreground of the image—efficiency, hygiene, and order are evidenced by newly constructed buildings with screened windows and paved streets in the background. Moreover, the detritus and chaotic details in the foreground evoke the many images of landslides during the course of construction. In the middle ground, a laborer bends over a stack of bricks with which to transform the uneven, muddy terrain into a thoroughfare. The photograph effectively compresses time and reassuringly renders the process of civilizing and sanitizing the canal zone within a single image.



Figure 15. *Street Paving Scene in Panama in Which an Old and Muddy Thoroughfare is Being Supplied with a Vitriified Brick Pavement Laid Upon Concrete*, as illustrated in Theodore Roosevelt, *Special Message of the President of the United States Concerning the December 17, 1906* (Washington, DC: United States Congress, 1906), n.p.

The appointment of George Washington Goethals as the third (and final) chief engineer of the project in the spring of 1907, not long after Roosevelt’s historical visit to the isthmus, marked a turning point in the history of the construction of the canal. Infrastructure building and intermittent excavations prior to Goethals’s tenure gave way to a three-part engineering undertaking: the creation of the artificial canyon, the Culebra Cut, which was more than three hundred feet wide, nine miles long, and at its highest point, nearly 580 feet above sea level; the containment of the Chagres River with the Gatun Dam, and the

adjacent artificial Gatun Lake, whose waters would fill the chambers of the lock system; and the construction of twelve pairs of cement locks a thousand feet long and one hundred and ten feet wide. Statistics regarding this engineering colossus were a regular feature of most contemporaneous publications, as were illustrations, which attempted to render legible the enormity of the project.

Although sanitation efforts continued in the canal zone under the watch of Goethals, the monumentality and wonder of the structural and technological engineering underway grabbed the preponderance of critical attention; this was especially true as the canal was nearing completion. To be sure, the efforts to eradicate yellow fever had been largely successful and received fulsome praise by many observers who construed the success not simply as a triumph over disease but as evidence of the United States conquest of tropical nature in Panama. Prominent scientist and entomologist L. O. Howard, for example, referred to the ICC sanitary engineering as “an object lesson for the sanitarians around the world,” and as one that demonstrated “the vitally important fact that it is possible for the white race to live healthfully in the tropics.” Unsurprisingly, Gorgas himself joined the triumphal chorus in declaring the tropics, once anathema to civilization, as a healthful region open to settlement owing to the American sanitary achievements.⁵³

Malaria, however, proved to be a more trenchant adversary and raised the specter, as environmental historian Paul Sutter has argued, of the disease being a product of the environmental transformation of the Panamanian isthmus during the construction of the canal instead of being intrinsic to tropical nature. More broadly, Sutter proposes that sanitary engineering, in particular mosquito control for the eradication of disease, operated at the dynamic intersection of two competing forces: the “environmental ideology of tropical triumphalism,” on the one hand, and the “ecology of malaria,” on the other.⁵⁴ The former refers to the national metanarrative of anthropocentrism, triumphalism, and progress in the post-Turnerian era, when the tropics became both the actual and the imaginary place of American expansion within an extracontinental context, just as the western wilderness had functioned during continental expansion in the nineteenth century. The latter, by contrast, considers the environment in the Panamanian isthmus as one of the material dimensions shaping American imperial expansion. As the tropical landscape was transformed from raw jungle to technological marvel, so it provided environmental conditions that promoted the spread of malaria vectors. Prominent entomologists were engaged by the ICC Sanitary Division to work on the eradication of malaria in the Canal Zone, and many found that the mosquitoes that carried the malaria virus had a particular affinity for “landscapes of human disturbance,” such as those found on the isthmus.⁵⁵ The United States Department of Agriculture’s August Busck, for example, visited Panama in 1907 and found that environmental changes caused by the construction of the canal were partially attributable to the successful breeding of mosquitoes and noted, “The progress of each steam shovel or of each of the extensive dumps produces new problems to be solved.”⁵⁶ Allan Jennings, Busck’s former assistant, went even farther in implicating the role of canal construction—that is, the human-altered landscape—in the ubiquity of the particular mosquito species in question. He noted the close association of the malaria vector mosquito “with man and finds its most congenial surroundings about his habitations and in conditions he creates in the course of agricultural, engineering, and other work.”⁵⁷ *Mosquito Control in Panama*, published in 1916, drew on the work of several entomologists, sanitary engineers, and physicians and was the most conclusive to date in its assertion that malarial outbreaks in the Panamanian tropics were not inherent to the setting—an indigenous disease unearthed by the

construction, or a product of an inherently unhealthful local environment—but instead was the result of meteorological and topographical conditions and standing water in ditches created by the excavation and removal of earth.⁵⁸

“Unruly Jungle Giving Way to Finely Cropped Lawn”

Shifts in the administrative structure of the ICC following the appointment of Goethals as chief engineer in 1907 affected all departments in the Canal Zone. Prior to this time, all efforts related to sanitation and disease control, including the cutting of grass, fell to Gorgas’s team of sanitation workers. Under the new system, the Quartermaster’s Department assumed responsibility for grass cutting and shifted this practice from the domain of health and sanitation in the hands of hygiene experts to one of routine maintenance and appearances. Sutter details the controversy over grass cutting that erupted between Goethals and Gorgas and argues that it speaks more broadly about discourse relating to conquest and “an aesthetic of imperial environmental mastery” than it did about departmental squabbles.⁵⁹ In fact, environmental management and the eradication of diseases were the primary factors in shifting American attitudes about the tropics rather than the technological and engineering triumph of the canal itself.

In the years immediately following the completion of the canal, a number of illustrated publications and travel brochures promoted the newly tamed tropics. A representative example of the former is *Mosquito Control in Panama*. Although the text unequivocally advanced the argument that human labor and environmental disruption were primary factors in the spread of disease, it featured several illustrations in which the canal is only present by association. *Types of Screened Houses: Colon Hospital Grounds* (fig. 16), for example, features a long view of multistory screened houses that form an arc on the right side; the Colon Hospital is in the background. Palm trees, a ubiquitous symbol of the tropics, dot the highly manicured lawn



Figure 16. *Types of screened houses: Colon Hospital grounds*, as illustrated in Joseph A. LePrince and A.J. Orenstein, *Mosquito Control in Panama* (New York: Putnam’s, 1916), opposite 204.

surrounding the buildings; a paved walkway sweeps across the composition, leading the eye into the distance. In contrast to earlier images of the impenetrable jungle of palm trees ensnarled with twisted vines, here the palms serve as aesthetic features of the manicured landscape and the vines decorate a low fence that stretches across the immediate foreground. Two telegraph poles in the far distance are the only reference to the engineering marvel and environmental disruption that set this aestheticized landscape in motion.

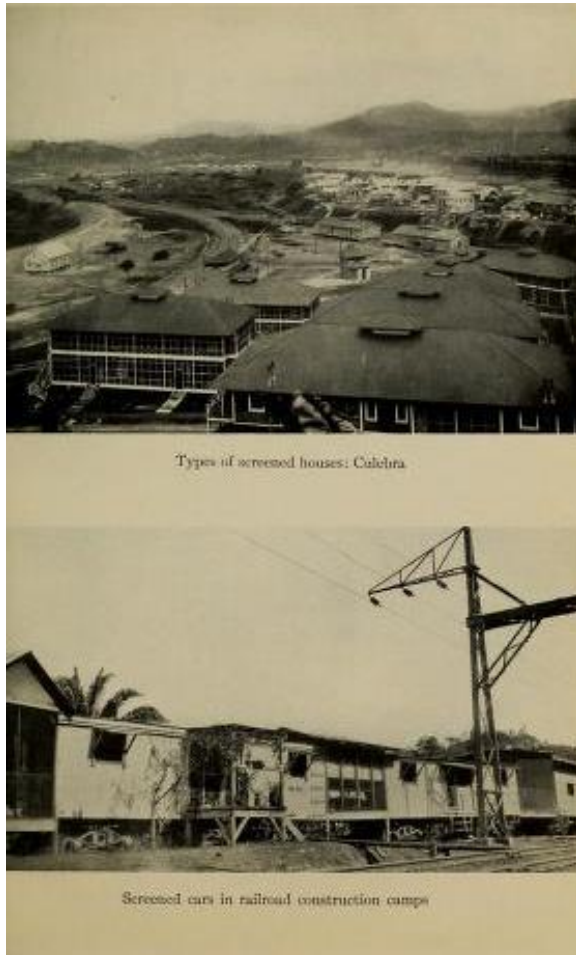


Figure 17. *Types of Screened Houses: Culebra and Screened cars in railroad construction camps*, as illustrated in Joseph A. LePrince and A.J. Orenstein, *Mosquito Control in Panama* (New York: Putnam's, 1916), opposite 206.

Perhaps even more striking is *Types of Screened Houses, Culebra* (fig. 17). From an elevated view—a widely used compositional device in nineteenth-century landscape images—the eye moves across a vast swath of screened houses, buildings, and manicured land. Culebra, the most notorious and trenchant obstacle to overcome in the construction of the canal, is regularized, sanitized, and rendered hospitable. The only vestiges of the untamed jungle are along the hills rising in the distance. *Picturesque Panama*, an illustrated travel guide and history of the region published in 1928, presents Panama as salubrious, delightful, and utterly civilized, with modern hotels; regular steamship, postal, radio, and cable services; and shops selling everything from French perfume to Oriental rugs and Panama hats.⁶⁰

These images and texts evoke reassuring narratives of health, sanitation, hygiene, and order—“a veritable health resort for white outsiders”—and stand in sharp contrast to the pestilential and civilization-thwarting tropical jungle in which this remarkable transformation took place.⁶¹ Moreover, they are a testament to the environmental management practices orchestrated by Gorgas and his sanitation team to control diseases in the Canal Zone. Gorgas’s biographer credited the sanitation efforts with “reclaiming the tropics” and noted, “The mosquito-killer and other health workers on

the Isthmus had demonstrated that languor, inefficiency, disease and death are not the inevitable concomitants of hot weather and tropical conditions generally.”⁶²

What these images and texts of conquest and triumph displace, however, is the fact that mosquito control in Panama, which screened buildings and cropped lawns helped to advance, struggled to conquer a hybrid nature that the United States enterprise had helped to create.⁶³ Environmental changes to the Panamanian landscape—the scale of which was aptly described by James Bryce, then the British Ambassador to the United States, following a trip to the Canal Zone in 1913, as “the greatest liberty man has ever taken with nature”⁶⁴—promoted and perpetuated the spread of disease. Without the eradication, or at least containment, of yellow fever and malaria, the entire United States mission would have failed. To be sure, mosquito control was recognized by many as a defining factor in the transformation of tropical nature. However, triumphal and anthropocentric rhetoric dominated discussions and images of the massive canal-building enterprise, framing nature as something out there—inert, passive, awaiting the transformative touch of human agency and imperial desire—with which to struggle and ultimately overcome. Such views continue

to construe Panama as a pristine and unalloyed nature to be conquered and failed to recognize the Panamanian environment as “an active historical force” and a hybrid nature whose very hybridity was, at least in part, the result of the anthropocentric endeavor as a whole and the cause of the disease the sanitation workers were sent to eradicate.⁶⁵

An ecocritical reading of the enterprise, by contrast, compromises such anthropocentric rhetoric and insists upon the centrality and agency of the environment. The Panamanian isthmus is a particularly rich material site for such an inquiry, as it does not constitute one object of analysis, a bounded geography, or a monologic discourse. Instead, as environmental historian J. R. McNeill argues, history, as a rule, is a “co-evolutionary process involving society and nature,” and the “links between human history and ecological history are robust, sometimes to the point where mosquitoes and viruses infringe on the fortunes of humankind in ways that seem unflattering to our species, making us seem mere playthings in dramas wrought (not directed) by tiny, mindless creatures.” He adds, “Mosquitoes and pathogens could not make history on their own; human actions set the stage.”⁶⁶ Indeed, the land in Panama became hybridized during the course of the construction of the canal, ironically increasing the breeding grounds for the mosquitoes that transmit malaria. Moreover, the insects themselves were never fully eradicated but merely controlled. It is those links and entanglements that offer the possibility of reading the history of American empire building in the Panama Canal zone as one embedded within and defined by the local ecology as much as by international politics and imperial desires. Just as the water that passes beneath the feet of Nahl’s Hercules—neither Atlantic nor Pacific but a hybrid of the two—so the Panamanian isthmus and its transformation with the building of the Panama Canal insist upon a reading of entanglements between desire, technology, anthropocentrism, economics, politics, disease, sanitation, hygiene, and the environment, with each as active players in its history.

Notes

- ¹ Ray Hughes Whitbeck, “Geography and Man at Panama,” *Bulletin of the Geographical Society of Philadelphia* 19 (1921): 8.
- ² See, for example, Joseph Pennell, *Joseph Pennell’s Pictures of the Panama Canal* (Philadelphia: J. B. Lippincott Company, 1913), 9; and *Oh Panama! Jonas Lie Paints the Panama Canal* (Yonkers: Hudson River Museum, 2016).
- ³ For a fuller discussion of this image see Sarah J. Moore, *Empire on Display: San Francisco’s Panama-Pacific International Exposition of 1915* (Norman: University of Oklahoma Press, 2013), 169–89.
- ⁴ See, for example, Amy Kaplan and Donald E. Pease, eds., *Cultures of U.S. Imperialism* (Durham: Duke University Press, 1993); Walter LaFeber, *The New Empire: An Interpretation of American Expansion, 1860–1898* (Ithaca: Cornell University Press, 1963); Paul S. Sutter, “Tropical Conquest and the Rise of the Environmental Management State: The Case of U.S. Sanitary Efforts in Panama,” in *Colonial Crucible: Empire in the Making of the Modern American State*, eds. Alfred W. McCoy and Francisco A. Scarano (Madison: University of Wisconsin Press, 2009), 317–26, 605–6.
- ⁵ For ecocriticism and the hybrid landscape, see Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham: Duke University Press, 2010); Stehen Frenkel, “Jungle Stories: North American Representations of Tropical Panama,” *Geographical Review* 86, no. 3 (July 1996): 317–33; Alan C. Braddock, “From Nature to Ecology: The Emergence of Ecocritical Art History,” in *A Companion to American Art*, eds. John Davis, Jennifer A. Greenhill, and Jason D. LaFountain (West Sussex: Wiley Blackwell, 2015), 447–67; Timothy Morton, *Ecology Without Nature: Rethinking Environmental*

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- Aesthetics* (Cambridge: Harvard University Press, 2007); Richard White, "From Wilderness to Hybrid Landscapes: The Cultural Turn in Environmental History," *The Historian* (2004): 557–64; William Cronon, ed., *Uncommon Ground: Rethinking the Human Place in Nature* (New York: W. W. Norton, 1996).
- ⁶ Monique Allewaert, *Ariel's Ecology: Plantations, Personhood, and Colonialism in the American Tropics* (Minneapolis: University of Minnesota Press, 2013), 29, 195.
- ⁷ *Ibid.*, 18.
- ⁸ *Ibid.*, 19.
- ⁹ Cited in John M. Gibson, *Physician to the World: The Life of General William C. Gorgas* (Durham: Duke University Press, 1950), 97.
- ¹⁰ Marie D. Gorgas and Burton J. Hendrick, *William Crawford Gorgas: His Life and Work* (Garden City, N.Y.: Doubleday, Page, 1924), 139–40.
- ¹¹ Gibson, *Physician to the World: The Life of General William C. Gorgas*, 97.
- ¹² Anne McClintock, *Imperial Leather: Race, Gender and Sexuality in the Colonial Conquest* (New York: Routledge, 1995), 226.
- ¹³ William Gorgas, "The Conquest of the Tropics for the White Race: President's Address at the Sixteenth Annual Session of the American Medical Association, June 9, 1909," *Journal of the American Medical Association* 52 (1909): 1967–69.
- ¹⁴ Charles Francis Adams, *The Panama Canal Zone: An Epochal Event in Sanitation* (Boston, 1911), 26.
- ¹⁵ Winifred James, *The Mulberry Tree* (London: Chapman and Hall, 1913), 226. See also Sutter, "Tropical Conquest and the Rise of the Environmental Management State," 318.
- ¹⁶ Sutter, "Tropical Conquest and the Rise of the Environmental Management State," 318. See also Stephen Jay Gould, "Church, Humboldt, and Darwin: The Tension and Harmony of Art and Science," in *Frederic Edwin Church*, ed. Franklin Kelly (Washington: National Gallery of Art, 1989), 94–125.
- ¹⁷ Katherine Emma Manthorne, *Tropical Renaissance: North American Artists Exploring Latin America, 1839–1879*, *New Directions in American Art* (Washington, D.C.: Smithsonian Institution Press, 1989). See also David Arnold, *The Problem of Nature: Environment, Culture, and European Expansion* (Oxford: Blackwell Publishers, 1996), 141–68.
- ¹⁸ Nancy Leys Stepan, *Picturing Tropical Nature* (Ithaca: Cornell University Press, 2001).
- ¹⁹ Sarah J. Moore, "'The Great American Desert Is No More': Mapping Progress and the American West at the Trans-Mississippi and International Exposition," in *The Trans-Mississippi Exposition of 1898: Art, Anthropology, and Popular Culture*, ed. Wendy Katz (Lincoln: University of Nebraska Press, 2017), 240–75.
- ²⁰ Adams, *The Panama Canal Zone: An Epochal Event in Sanitation*, 5.
- ²¹ Frank Marryat, *Mountains and Molehills; Or Recollections of a Burnt Journal* (London: Longman, Brown, Green, and Longmans, 1855), 2.
- ²² Darcy Grimaldo Grigsby, *Colossal: Engineering the Suez Canal, Statue of Liberty, Eiffel Tower, and Panama Canal* (Pittsburgh and New York: Periscope Publishing, 2012), 122.
- ²³ Manthorne, *Tropical Renaissance*: Katherine Emma Manthorne, *Tropical Renaissance: North American Artists Exploring Latin America, 1839–1879*, 187.

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- ²⁴ Nahl was the uncle of Perham Nahl, whose image was selected for the official poster of the Panama-Pacific International Exposition in San Francisco in 1915.
- ²⁵ Julius H. Pratt, "To California by Panama in '49," *Century Magazine* 41 (April 1891): 901–16.
- ²⁶ Ellsworth Huntington, *Civilization and Climate* (New Haven: Yale University Press, 1924), 68.
- ²⁷ James Stanley Gilbert, *Panama Patchwork* (New York: The Burr Printing House, 1901), 6.
- ²⁸ Michael E. Donoghue, *Borderland on the Isthmus: Race, Culture, and the Struggle for the Canal Zone*, ed. Gilbert M. and Emily S. Rosenberg Joseph, *American Encounters/Global Interactions* (Durham: Duke University Press, 2014), 12.
- ²⁹ Ernest Peixotto, *Pacific Shores from Panama* (New York: Charles Scribner's Sons, 1913), 19, 22. For a discussion of overseas expansion in the 1890s and after as a continuation of earlier projects of continental expansion, see also Oran, "Tropical Journeys," *Harper's New Monthly Magazine* 18, no. 104 (1859): 148.
- ³⁰ Aims McGuinness, *Path of Empire: Panama and the California Gold Rush* (Ithaca, N.Y.: Cornell University Press, 2008).
- ³¹ Walter LaFeber, *The Panama Canal: The Crisis in Historical Perspective*, 2nd ed. (New York: Oxford University Press, 1989), 7.
- ³² Gibson, *Physician to the World: The Life of General William C. Gorgas*, 56.
- ³³ Cited in Gordon Harrison, *Mosquitoes, Malaria, and Man: A History of the Hostilities Since 1880* (New York: E. P. Dutton, 1978), 159.
- ³⁴ Alvah H. Doty, *The Mosquito: Its Relation to Disease and Its Extermination* (New York: D. Appleton and Company, 1912).
- ³⁵ Richard Jones, *Mosquito* (London: Reaktion Books, 2012), 104. The details of the French debacle were widely reported in the contemporary press and in subsequent studies of the Panama Canal. See, for example, Andrew Spielman and Michael D'Antonio, *Mosquito: A Natural History of Our Most Persistent and Deadly Foe* (New York: Hyperion, 2001), 120.
- ³⁶ David McCullough, *The Path Between the Seas: The Creation of the Panama Canal, 1870–1914* (New York: Simon and Schuster, 1977), 124–203.
- ³⁷ Whitbeck, "Geography and Man at Panama," 2.
- ³⁸ Sutter, "Tropical Conquest and the Rise of the Environmental Management State," 321–23.
- ³⁹ William Crawford Gorgas, *Sanitation in Panama* (New York: D. Appleton, 1915), 154.
- ⁴⁰ *Ibid.*, 240.
- ⁴¹ Charles F. Mason, "Sanitation in the Panama Canal Zone," in *Transactions of the International Engineering Congress, 1915: The Panama Canal, General Papers and Construction in Three Divisions of the Canal*, ed. International Engineering Congress (San Francisco: Neal Publishing Company, 1916), 88. See also Jones, *Mosquito*, 133.
- ⁴² John Robert McNeill, *Mosquito Empire: Ecology and War in the Greater Caribbean, 1620–1914* (Cambridge: Cambridge University Press, 2010), 310.
- ⁴³ Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley: University of California Press, 2006), 107.

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- 44 Joseph LePrince and Alexander Jeremiah Orenstein, *Mosquito Control in Panama: The Eradication of Malaria and Yellow Fever in Cuba and Panama* (New York: Putnam’s, 1916), 173–79. See also Julie Greene, *The Canal Builders: Making America’s Empire at the Panama Canal* (New York: The Penguin Press, 2009), 62–64.
- 45 McCullough, *The Path Between the Seas: The Creation of the Panama Canal, 1870–1914*, 472–73.
- 46 Donoghue, *Borderland on the Isthmus: Race, Culture, and the Struggle for the Canal Zone*, 26.
- 47 McCullough, *The Path Between the Seas: The Creation of the Panama Canal, 1870–1914*, 466.
- 48 Ronald Ross, *The Prevention of Malaria* (New York: E. P. Dutton and Company, 1910), vii, xii.
- 49 McCullough, *The Path Between the Seas: The Creation of the Panama Canal, 1870–1914*, 465.
- 50 Cited in Gibson, *Physician to the World: The Life of General William C. Gorgas*, 157.
- 51 Theodore Roosevelt, “Special Message of the President of the United States Concerning the Panama Canal Communicated to the Two Houses of Congress on December 17, 1906,” (Washington: Government Printing Office, 1906).
- 52 *Ibid.*, 7–8.
- 53 Gorgas, *Sanitation in Panama*, 289.
- 54 Paul S. Sutter, “Nature’s Agents or Agents of Empire? Entomological Workers and Environmental Change During the Construction of the Panama Canal,” *History of Science Society* 98, no. 4 (December 2007): 726.
- 55 *Ibid.*, 743.
- 56 August Busck, “Report on a Trip for the Purpose of Studying the Mosquito Fauna in Panama,” *Smithsonian Miscellaneous Collections* 52 (May 1, 1908): 53.
- 57 Allan Jennings, “Some Problems of Mosquito Control in the Tropics,” *Journal of Economic Entomology* 5 (April 1912): 133.
- 58 LePrince and Orenstein, *Mosquito Control in Panama: The Eradication of Malaria and Yellow Fever in Cuba and Panama*, 87.
- 59 Sutter, “Nature’s Agents or Agents of Empire? Entomological Workers and Environmental Change During the Construction of the Panama Canal,” 749, 751.
- 60 Jean Sadler Heald, *Picturesque Panama: The Panama Railroad, the Panama Canal* (Chicago: Curt Teich and Company, 1928).
- 61 Sutter, “Tropical Conquest and the Rise of the Environmental Management State: The Case of U.S. Sanitary Efforts in Panama,” 317.
- 62 Gibson, *Physician to the World: The Life of General William C. Gorgas*, 192.
- 63 Sutter defines Panama as “a second nature” created by Americans. Sutter, “Tropical Conquest and the Rise of the Environmental Management State: The Case of U.S. Sanitary Efforts in Panama,” 319.
- 64 James Bryce, *South America: Observations and Impressions* (New York: Macmillan, 1913), 36. See also David Philip Miller and Peter Hanns Reill, eds., *Visions of Empire: Voyages, Botany, and Representations of Nature* (Cambridge: Cambridge University Press, 1996).

⁶⁵ Sutter, “Nature’s Agents or Agents of Empire? Entomological Workers and Environmental Change During the Construction of the Panama Canal,” 728.

⁶⁶ McNeill, *Mosquito Empire: Ecology and War in the Greater Caribbean, 1620–1914*, 7, 15.