

PART II
in a Rivers Trilogy
following *The Colorado*

The
AMAZON

A Tribute. A Chronicle.
A Clarion.





A TRIBUTE

The largest river in the world runs through the largest forest. Fancy, if you can, two million square miles of forest, uninterrupted save by the streams that traverse it.

Richard Spruce, botanist, October 1851



A CHRONICLE

Although the rivers of these lands are the greatest in the world, the settlers' greed is greater than their waters.

Antônio Vieira, Jesuit priest, November 1659



A CLARION

We are sleepwalking towards the edge of a cliff.

Mike Barrett, WWF, October 2018

A TRIBUTE

Waters of Catarata del Gocta plunge 2,530 feet (771 meters) from its perennial source in Chachapoyas province, Amazonas, Peru.

Life on Earth, in its broadest sense, is nowhere more intense, diverse, or unique than in Amazonia. It is fair to say that the biological dynamism of our planet reaches its apogee where Earth's largest river drains its largest forest. Life here is most intense because the growth rate of the Amazon rainforest is five times that of the forests in temperate climates. It is most diverse because Amazonia is home to the greatest density of plant, animal, fish, and bird species that exists anywhere. And it is most unique because so many of these species exist only in Amazonia.

Described by one explorer as a "freshwater ocean," the Amazon River discharges one-fifth of all the water that flows from the world's rivers. Its volume is ten times that of the Mississippi and sixty times that of the Nile. The most distant source of the Amazon River starts in the Andean heights of Peru and continues for 4,650 miles (7,484 kilometers) to the Atlantic coast, making it some 500 miles (805 kilometers) longer than its African rival.

The enormous basin of the Amazon River, three-fourths the size of the continental United States, is home to the world's largest closed-canopy forest, roughly the size of Western Europe. A densely textured green carpet when viewed from the air and a thick tangle of competing trunks, creepers, lianas, and roots on the ground, the Amazonian rainforest offers a staggering variety of nearly 30,000 species of trees.

These forests and the countless rivers that run through them are home to some of the most spectacular wonders of creation: pink freshwater dolphins, giant otters, the goliath catfish that swim several thousand miles upriver to spawn, colorful toucans with beaks as large as their bodies, the archaic hoatzin with claws at the end of its wings, the frightening black caiman, the gentle tapir, and the formidable jaguar.

These lands are also the crucible of human experience in the Western Hemisphere. People started populating the basin at the end of the last ice age. Over millennia, they have learned the potential of myriad plants for food, medicine, and building materials, and in so doing, they have perfected their knowledge of living sustainably in the forest.

Despite centuries of colonization, war, exploitation, and decimation by disease, indigenous communities continue to thrive in all Amazonian nations today, speaking no fewer than 275 distinct languages. In the recesses of the forest and in the savannas, there exist communities that have never made contact with the outside world, others that have withdrawn to a state of voluntary isolation, and still others that continuously negotiate the degree and nature of their relations with the world at large. While diverse, their attitudes towards land and water share a common thread: their modest lifeways stand in illuminating counterpoint to prevailing global trends of consumption and exploitation. ■

A CHRONICLE



Europeans have always floundered in tropical forests where indigenous people learned to hunt, fish, farm, and forage sustainably. Here a European traveler has to be carried to a canoe by Indians.

About 15 million years ago, the Andes Cordillera began to rise along the Pacific coast of South America. Countless streams tumbled down the eastern slopes of this steep, young mountain range, collecting in the heart of the continent, and eventually forming Earth's largest and longest river, the Amazon.

A kaleidoscope of native tribes inhabited this vast region for at least a dozen millennia. They domesticated wild plants, built irrigation systems, and modified the impoverished tropical soil to nourish their crops. Their societies ranged from complex civilizations with unparalleled stone architecture to nomadic groups of hunter-gatherers whose wood and thatch dwellings the forest consumed as soon as they were abandoned.

In 1494, Pope Alexander VI partitioned the globe between Portugal and Spain with a mandate to Christianize the newly discovered lands. Gold more than gospel, however, drove the Europeans' early explorations. The first descent of the entire length of the Amazon by Francisco de Orellana and his men, starting in late 1541, reported populous indigenous villages thriving on the banks of the river.

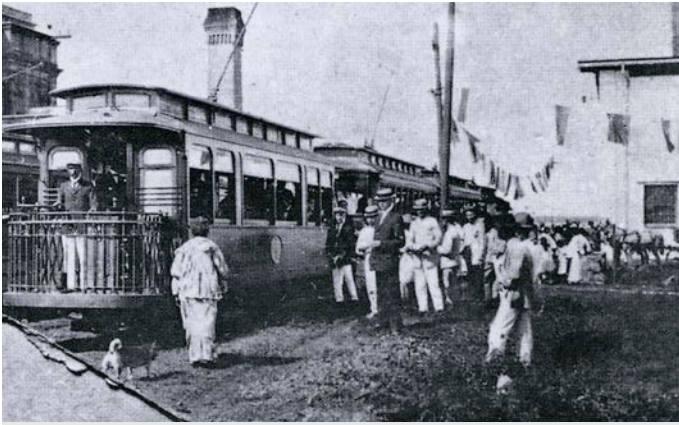
For the Europeans, the forest was not so much a resource as a source of frustration, quashing their every hope, whether for finding cities of gold or for farming and ranching in the manner to which

they were accustomed. Nevertheless, the Europeans and their progeny pressed on, and over the next three centuries, by dint of conquest, colonization, and the enslavement of native laborers—and despite periodic and ineffective religious objection—a few of the newcomers accumulated great wealth. Their enrichment entailed immense cultural destruction and suffering for the indigenous people of the basin.

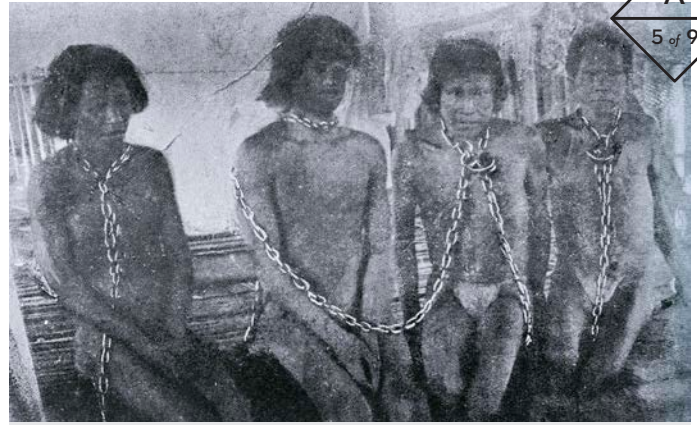


The oratory of the Jesuit father António Vieira (1608–1697) was legendary. He was an influential voice at the Portuguese court and an advocate for indigenous peoples.

During the decades bridging the 19th and 20th centuries, global markets developed a ravenous hunger for a new and versatile commodity: rubber. And until rubber trees were smuggled to other tropical regions, the only place to get it was the



Flush with funds from the rubber industry, Manaus prospered. It was one of the first South American cities to have electric trams.



Heinous treatment of Indians was a corollary to this prosperity. Enslaved Witoto Indians were photographed by the young advocate Walter Hardenburg circa 1908.

Amazon. In the ensuing rush to riches, a small class of flamboyant rubber barons accumulated mythic wealth, while the natives who tapped the rubber trees suffered misery so abject that the abuses of the rubber trade soon scandalized the world.

During the early 20th century this brutal industry collapsed. For a brief few decades, it looked as if a 400-year period of relentless exploitation of the resources of the forest—both natural and human—had come to a close. The human cost of those four centuries was immeasurable and tragic, as hundreds of thousands, if not millions, of people succumbed to disease, forced labor, and violence, rendering extinct innumerable languages and cultures. Yet the forest, lofty and imperturbable, survived.

But in the mid-20th century new threats arose. The period when Brazil decided to open its heartland to development coincided with an unprecedented worldwide increase in population. Water and energy consumption also reached record levels, accompanied by a secondary surge in greenhouse gas emissions.

While aviation made isolated communities much more accessible, thousands of miles of new roads started connecting Amazonian towns to one another. Spearheaded by the Belém-Brasília Highway in 1958, these roads were intended to offer—in the words of Brazil’s military president Emílio Médici—“a land without people for a people without land.”

Starting with the Tucuruí Dam in the 1970s, major dams began to appear in the basin, each one flooding inordinate stretches of the forest because of the immense flatness of Brazilian Amazonia.

With roads providing access while bulldozers and chainsaws made it all too easy to clear the forest, “people without land” started settling in Amazonia. New towns mushroomed and the population grew by tenfold in a matter of decades.

South Asian forests were increasingly depleted and international logging firms turned to the Amazon, especially for mahogany. The damage has been exponential; the felling of one great tree leads, on average, to the collateral mortality of 27 others to which it is tightly connected by lianas and other vines.



An aerial view of the landscape near Sinop, Mato Grosso shows the extent of land conversion to agriculture.

Among all the threats to the forest, perhaps the greatest is the world’s appetite for meat. The Brazilian cattle herd is estimated to exceed 200 million head, and it ranges deep into the Amazon. Additionally, vast areas of forest, stretching from horizon to horizon, continue to be cleared for the cultivation of soybeans for cattle feed. Today, soybeans constitute Brazil’s largest international export, an economic dominance that comes at an enormous and still growing cost to the natural world. ■

This overview is indebted to John Hemming, *Three of Rivers: The Story of the Amazon*, (New York: Thames Hudson, 2008).

A CLARION

According to Brazil's National Institute of Space Research (INPE), September 2017 was the worst month for forest fires on record. Experts say that most of the 106,000 fires that month were started for land use conversion. (Photograph by Hans Silvester. Getty Images.)

Since 1970, one-fifth of Amazonia has been cleared of forest. The area of denudation is roughly equal to the size of Spain and the United Kingdom put together. Although the rate of deforestation has slowed since 2005, it has begun to rise again in recent years. Worse, recent political developments promise a return to earlier levels of rampant destruction.¹

In addition to deforestation, fragmentation of the forest by roads, towns, fields, mining pits, oil fields, and the like remains a major problem. Studies drawing on four decades of data show that all aspects of fragmentation—reduced area, increased isolation, and increased edge—degrade core ecosystem functions. The effects include loss of large and old trees, reduced species richness, and altered patterns of wildlife movement and predation. Even when a seemingly large section of a forest is preserved, “edge effects” undermine its integrity around its periphery and often deep into its interior.²

New findings on the capacity of Amazonian forests to sequester carbon add urgency to the cause of forest protection. Tropical forests across the world have historically stored a quarter to one-third of all human-generated CO₂ emissions. Studies show, however, that severe droughts in 2005, 2010, and 2015 temporarily converted Amazonia from a carbon sink to a net carbon source.³ Parallel studies have concluded that gains

from reduced deforestation in recent years have been cancelled out by carbon emissions from drought-related fires.⁴

Amazonia's rivers are also under threat. There are currently 142 active and under-construction dams in the Andean headwaters of the Amazon alone, and 160 additional dams are proposed. Considering that an estimated 93% of the sediments carried by the Amazon River originate from the draining of the Andes, the current and proposed dams signify fundamental shifts in river morphology and an array of ecological functions. The disrupted river connectivity also poses a threat to well over 3,500 species of freshwater fishes and to the communities that rely on them for income and subsistence.⁵

¹ Instituto Nacional de Pesquisas Espaciais, <http://www.obt.inpe.br>

² Nick M. Haddad et al., "Habitat fragmentation and its lasting impact on Earth's ecosystems," *Science Advances*, 20 Mar. 2015.

³ Yan Yang et al., "Post-drought decline of the Amazon carbon sink," *Nature Communications*, 09 Aug. 2018.

⁴ Luiz E.O.C. Aragno et al., "21st Century drought-related fires counteract the decline of Amazon deforestation carbon emissions," *Nature Communications*, 13 Feb. 2018.

⁵ Elizabeth P. Anderson et al., "Fragmentation of Andes-to-Amazon connectivity by hydropower dams," *Science Advances*, 31 Jan. 2018.

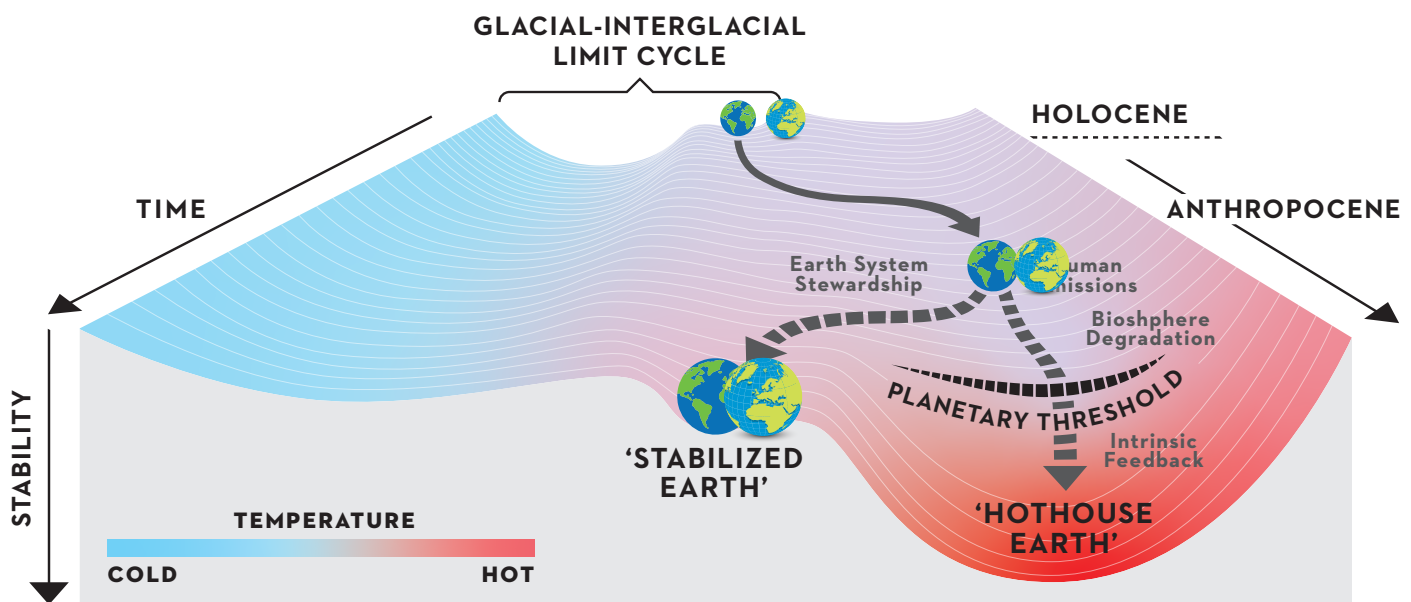
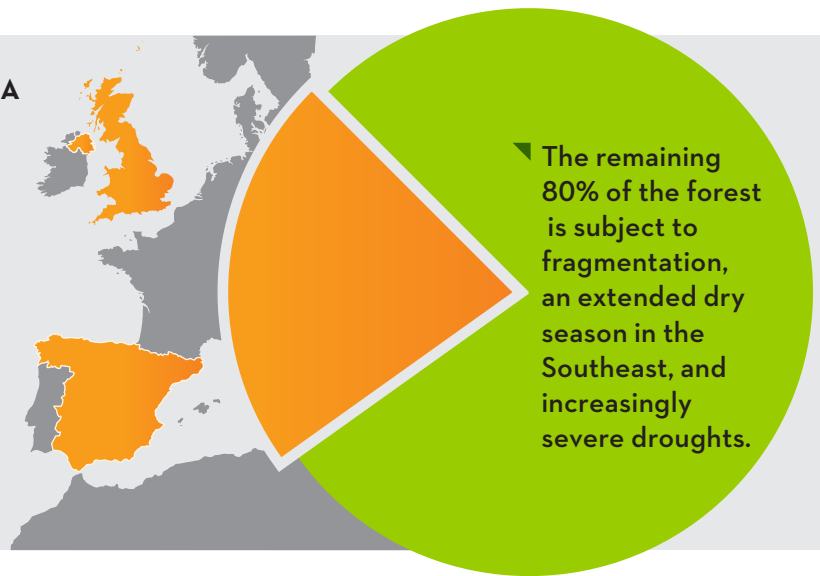
The ultimate question is at what point human-induced change will push the hydrological and carbon cycles of Amazonia beyond a point of no return. Extended dry seasons and the severity of recent droughts may be signs that even a 1.5 to 2°C rise in temperature, although within the targets set by the Paris Agreement, might constitute a tipping point for Amazonia. A forest-to-savanna transition in Amazonia would have planetary consequences, perhaps rendering control of global climate change impossible.⁶ Similarly, disturbances in any of the other major eco-regions of the world, such as the North American Boreal Forest or the Western Antarctic Ice Sheet, would precipitate Amazonia itself towards a tipping point.⁶

With the end of the last glacial period came the Holocene, the geological epoch whose climatic conditions allowed human societies to flourish. During this time humans developed agriculture, formed advanced civilizations, and spread across the world. Amazonia also thrived during this period and gave life on Earth its most diverse and magnificent expression. Its future now hangs in the balance. The great challenge today is to stay within the life-giving parameters of the Holocene. It is not too late. ■

⁶Will Steffen et al., "Trajectories of the Earth System in the Anthropocene," PNAS, 14 Aug. 2018. ©2018, National Academy of Sciences.

DEFORESTATION IN BRAZILIAN AMAZONIA

- Since 1970, an area as large as **Spain** and the **United Kingdom** put together has been lost to deforestation in Brazil. This is nearly 20% of the forest.
- Even with significantly reduced deforestation rates, an area the size of Rhode Island and Delaware combined was still lost to deforestation during 2018.



This 3-D chart presents two scenarios for the Earth. Staying on the current path would lead to crossing a threshold into uncharted and catastrophic territory. Changing the current path, through stewardship and policy, would allow the Earth to stay within the stable conditions of the past millennia. © 2018 National Academy of Sciences.

MISSION

The realities of the Anthropocene, our current epoch of human-driven change, compel us to cultivate new relationships between humans and the land and water that sustain them.

We believe that empathy must characterize these new relationships.

In order to cultivate an empathetic connection between humans and the natural world, we need to combine an empirical understanding of the Earth with an aesthetic appreciation of its beauty and complexity.

Our watershed projects—**The Colorado** (2016) and **The Amazon** (2021)—are driven by these beliefs. ■

OUR TEAM

▼ FILMMAKERS

Sylvestre Campe
Murat Eyuboglu
Marcelo Fortaleza Flores
David Sarno

▼ COMPOSERS

Marlui Miranda
Paola Prestini
Pauchi Sasaki

▼ ADVISERS

William deBuys
Renée Fleming
John Hemming
Betty Mindlin

▼ MUSIC DIRECTOR

Jeffrey Zeigler

▼ PRODUCERS

National Sawdust
Senaya Filmes

PRODUCERS

**NATIONAL
SAWDUST**

National Sawdust Projects brings together emerging and established artists with experts in music, film, history, science, and beyond to create new works that speak to themes of social justice, untold stories from untold voices, technology and the environment. National Sawdust Projects is the producing arm of National Sawdust, a state-of-the-art concert venue and nonprofit in Brooklyn, New York.



Senaya Filmes is a full-service production company based in São Paulo, Brazil. The company specializes in high-quality environmental and ethnographic projects across South America. The mission of Senaya Filmes is to bring the transformative power of cinema to bear upon social and environmental issues through in-depth explorations of local perspectives.

All text and photographs are by **Murat Eyuboglu** unless otherwise specified. Graphic design by **Adam Frint**.

Building on the experience of

THE COLORADO

THE KENNEDY CENTER

STANFORD LIVE

THE MET

DA CAMERA

ART WORKS

UTAH FILM CENTER

TAOS ENVIRONMENTAL FILM FESTIVAL

XVI FESTIVAL DE OCTUBRE 2017

The COLORADO

A
9 of 9

OFFICIAL SELECTION
TAOS ENVIRONMENTAL FILM FESTIVAL
2017

OFFICIAL SELECTION
INDEPENDENT DOCUMENTARY
2017

OFFICIAL SELECTION
ENVIRONMENTAL FILM FESTIVAL
MONTICELLO, VIRGINIA
2017

WISCONSIN FILM FESTIVAL
2017

GOLDEN TREE
International Documentary Film Festival

CRESTED BUTTE
FILM FESTIVAL

The Colorado, the first installment in National Sawdust’s watershed projects, was completed in April 2016.

Since then, the live version of *The Colorado* has been performed to sold-out audiences in venues such as the Metropolitan Museum of Art in New York City and the Kennedy Center in Washington, DC. The film version continues to participate in the film festival circuit and is regularly screened at universities, high schools, and libraries in both the United States and in Mexico.

The similarly titled companion volume of the project was released in May 2018. This book is designed with general readers and classroom use in mind, and it expands on all the topics explored in the film. With more than 400 illustrations, including historical and current photos, graphs, maps, and timelines, it is available through This Earth Press, National Sawdust, Amazon, and independent bookstores. ■



The New York Times
NYTIMES.COM

“visually captivating and unsettling”

“performed by some of the most innovative soundsmiths around”

nature

“emotionally and intellectually rich”