PREFACE

I've thought about rivers and streams for a long time, though only recently in a serious, scholarly way. Before, my acquaintance was both casual and recreational. Growing up along the Delaware River when it was at its most polluted, twenty miles upstream from Philadelphia on the New Jersey side, I swam and fished its waters for eels. Later, with two high school friends, I canoed the upper Potomac for several days until we capsized and lost most of our gear on the bank opposite Harper's Ferry. Our accident took on a lengthy afterlife in my family's lore. While we scrambled to hitchhike to the cars we had left at either end of the planned route, I didn't think to call home. As luck, both bad and good, would have it, a local fisher angling from a flat-bottomed boat happened to hook onto my submerged blue jeans containing my wallet and driver's license. Imagining the worst, he found my home phone number and called to break the news about what he had found. Having heard nothing from me or my companions, my mother assumed the worst about the fate of her youngest son. She suffered two days of panic followed

by grief before I innocently called home. My mother never forgave me for what I had put her through.

Much later, I spent six or seven consecutive summers living with my own family in a rustic hunting cabin on the bank of Penn's Creek, a well-known trout stream in central Pennsylvania. Instructed by my extended family and local subsistence hunters and fishers, I moved from rank amateur to proud mediocrity in my fishing and canoeing skills.

Never, in the course of my casual acquaintance with rivers and streams, did I imagine that I would one day presume to teach about rivers, let alone dare to write about them. That I could safely leave in the hands of brilliant authors such as John McPhee, Wallace Stegner, Ellen Wohl, and Mark Twain.

My long-standing interest in rivers and my scholarly life came together in a thoroughly opportunistic fashion. Having spent a mesmerizing year in Burma well before I began graduate school, I yearned to make it my terrain of research. But it was essentially off limits to any such endeavors from 1962 until 2011. When I finally returned, I was eager to throw myself at the language and see as much of the country as possible. Travel within Burma was still restricted, and I was frequently stopped at police and army checkpoints and asked for my passport and visa and to explain my presence. I was often followed. Since I had traveled a good deal of the country by boat along the Ayeyarwady, and since this great river, along with its tributaries (and distributaries), covers much of the country, I hit upon it as a convenient and plausible explanation for my presence. Whenever I was stopped, chances were that it would be close to the Ayeyarwady or one of its branches. I would simply say that I was studying the Ayeyarwady and, for the most part, this tactic worked. What began largely as

a deception gradually became a preoccupation as, willy-nilly, I learned more and more about the river.

When it eventually dawned on me that I might actually try to learn more about rivers by teaching an undergraduate seminar on the subject, there were at least two nagging questions that had been bedeviling me about rivers, each related to my casual acquaintance with them, that I had to solve first.

The first arose from an amiable conversation suddenly gone awry with a hydrologist. It occurred at a residential conference site where two meetings were being convened in the late 1970s—one for Southeast Asianists like myself and another for engineer-hydrologists. As we dined together at lunch and dinner, we were urged by our hosts to get to know one another and converse across our narrow specializations. Taking this large-spirited advice to heart, I found myself sitting next to a widely read Filipino hydrologist on the third evening of the conferences. Casting about for an opening, I recalled having learned in the previous year that the Colorado River, diverted and impounded by dams, never reached the Sea of Cortez for much of the year. The fact itself had stuck with me and triggered a distinct sense of sadness on behalf of a river that was "denied" its natural destiny: to flow into the sea.

So, in my effort to please my hosts, I told him what I had learned about the Colorado River and asked, "Wasn't it sad, given all our poems about rivers running down to the sea, that the Colorado was prevented from achieving its destiny?" He abruptly put down his fork, turned to face me directly, and declared: "No, no, no! It is not a sad thing at all! It is wonderful; it means that all the water in the Colorado is used for important human purposes and not a drop is wasted!" That the Colorado didn't

get to the sea, he believed, should be a source of jubilation rather than sadness. I realized, then and there, that we would not have a long conversation.

This encounter was, in its way, diagnostic; it sprang to mind again and again as I read through the literature on rivers. My Filipino engineer was a perfect example of the sort of utilitarianism that views nature as "natural resources"—as a factor of production in the satisfaction of needs—most specifically the needs of a single species, *Homo sapiens.* He was hardly alone in his conviction; his view was, at the time, hegemonic. It was what one would have expected from the American Bureau of Reclamation or the Army Corps of Engineers. In speaking of the storied Nile River, even Winston Churchill echoed this idea (as quoted by Patrick McCully in *Silenced Rivers*), though more lyrically than my Filipino hydrologist: "One day, every last drop of water that drains into the whole valley of the Nile shall be equally and amicably divided among the river people and the Nile itself . . . shall perish gloriously and never reach the sea."

Joseph Stalin, whose aspirations for reengineering rivers were far more expansive than Churchill's, shared his views (as quoted in Steven Solomon's *Water: The Epic Struggle for Wealth, Power and Civilization*), if in more prosaic terms: "Water which is allowed to enter the sea is wasted."

What is notable here and what will preoccupy us in this long essay on rivers is the way in which, for Churchill and Stalin, there were only two variables at play. The river is reduced to water, just so much H_2O that must be divided between rival claimants. And the claimants? They are, in turn, reduced to us—*Homo sapiens.* Gone are all the other beings in and around the river for whom the waterway is their indispensable lifeworld; fish, amphibians, reptiles, shellfish, water birds, wading birds, raptors, riverine

mammals, insects, microbial life, and algae. Gone from the water itself is what it carries: silt, soil, gravel, clay, sand, and organic matter that, if left to its own devices, will be distributed along the floodplain as the river wends its way to the sea. Cost-benefit calculations are so much easier when there are only two variables to consider: water and humans. This book is motivated by my effort to understand what happens when humans endeavor to "tame" the river, to sculpt and script its movements to serve the (short-term) interest of humankind alone. What we have done to rivers and the consequences of our actions seems a powerful metaphor for understanding the troubled and possibly cataclysmic relationship between humans and nature generally.

The second question that dogged my thoughts arose from what I thought I knew about the movement of rivers from nearly a decade of summers spent along Penn's Creek. The old hunting cabin in which we lived was within thirty feet of the creek and, though raised a bit off the ground by stone slabs, not more than a couple of feet above the average spring high-water levels. A visit in February after a quick thaw would often reveal broken ice floes leaning against the upstream side of the cabin. The force of the current was gradually eating away at the bank near the cabin. Over the previous decade, the early spring current had swept away a large oak stump that had been used to delineate the western extremity of the property. Observing this process near the cabin and at other bends and meanders where I fished year after year, I thought of the stream as an ever-moving, ever-changing process defying our sense of immobility as implied by mapmaking. It was, I thought, a gradual process as the creek, little by little, year by year, carved out a slightly new course, thus remaking the landscape. (As an amateur hydrologist myself, I spent part of one summer piling up rocks from the streambed to build

a small diversion upstream from the cabin to redirect some of the flow away from the eroding bank. The flood of 1972 instantly erased any trace of my embankment.)

My gradualist view of stream morphology was abruptly destroyed near the end of June 1972 by a huge flood that submerged the first floor of the cabin and knocked out an old bridge a few hundred feet downstream. In several places, thanks to Hurricane Agnes, the stream had jumped its banks and carved out an entirely new channel. This was not gradualism; this was sudden and explosive. I realized then that most of the consequential changes in Penn's Creek channel over the past several decades had occurred in a few short hours of rampaging high water at the peak of the flood. The gradual change I had observed over the years was, by comparison, on a long view, trivial; much of the channel was obliterated in these few short hours. The creek was moving, alright, but to understand the nature of that movement I had to open the temporal lens far wider than a decade of summers. Even my perception of gradual change was defective. My time along the creek was mostly from June through August, when water levels are lower than average and variability modest. What I had discerned as gradual change year by year was probably accomplished suddenly in the few hours, typically in mid- to late February, when snowmelt, a good rain, and broken-up ice floes created an annual mini-flood stage. The changes I had interpreted as "accretion" were, in fact, largely the result of what is technically known as "avulsion." The two are treated differently in international law and property law. Thus, when a jurisdictional boundary is demarcated by a river channel, and when the river channel gradually shifts by accretion, the boundary moves with the river. If, however, the river channel makes a

sudden and decisive change—say, in a great flood surge—the law provides that the boundary remains defined by the old, now-abandoned river channel. (One imagines thousands of court cases in which the precise line between accretion and avulsion is the point of contention.) On the widest possible temporal view, of course, many of the greatest changes in rivers have been the result of geological events.

My fascination with Burma and its people, cultures, and landscapes, not to mention its main river the Ayeyarwady, predates my graduate training. A series of improbable mistakes and coincidences led me to write a senior thesis on the political economy of Burma. Until then, I was headed to law school, in part as a way of postponing more confining career choices. On a whim, I applied for a Rotary International Fellowship to Burma, and, to my astonishment, was selected.

The academic years 1958–60 in Burma, at Rangoon University and then Mandalay University, were punctuated by long trips with Burmese friends throughout the country by motorcycle—in my case, a decrepit 1940 Triumph. The friendships and experiences from that year changed my life. I switched from law school to political science and began to think of myself as a specialist in Burma and Southeast Asia. When the time came to pick a thesis topic, the Ne Win military regime had all but prohibited research by foreigners. By default, I became a Malaysian specialist and would subsequently spend a year and a half there living in and studying a rice-farming village.

It was only in the early days of the 2000s that travel requirements to Burma were relaxed, and only from 2010 to 2020 when, thanks to Aung San Suu Kyi and power sharing, the country

became a relatively open society. Seizing the opportunity of pursuing my first love, I returned regularly and worked to hone my Burmese speaking, reading, and writing skills.

Alas, as I write this in November 2023, the curtain has fallen on that brief decade of opening since the junta annulled the legitimate elections of 2020 and seized absolute power on February 1, 2021. The country has suffered killings, detentions, bombings, arson, and brutal repression. Resistance by ethnic armed groups (themselves no strangers to military repression), and now by huge segments of the general Burman population, has resulted in a bloody stalemate. As a political scientist and student of resistance, I don't believe I have ever encountered a civil war over democracy and federalism of this magnitude. Essentially, the entire civil society is arrayed, passively or militantly, against a cocooned military with its own schools, hospitals, supply chains, and pensions. The military has no legitimacy among the civilian population. Soldiers once proud to wear their uniforms in public now don civilian dress to avoid the hostile stares and comments of the population. The army, or Sit-Tat, apart from their allied and subsidized militias, is encouraged to plunder and burn villages. Regardless of the eventual outcome, this democratic rebellion of the civil society as a whole against an isolated military will find a distinctive and diagnostic place in the study of revolutionary movements.

The reader may notice that I usually employ the name Burma instead of Myanmar. Both terms refer to the same nation-state. The reason is baldly political and, alas, entirely performative. Myanmar came into official use as a way of whitewashing the badly tarnished reputation of military rule in "Burma." (Recall

how the "Congo" became "Zaire" and later the "Democratic Republic of the Congo"!)

The book before you contains more disjunctions than I would have preferred. They are due to a perfect storm of research complications. Because of the violence unleashed by the coup, trips and interviews I had contemplated conducting along the Ayeyarwady River were suddenly impossible. Even prior to the junta coup of early 2021, the COVID pandemic precluded travel to Burma for the Ayeyarwady-related research I had planned. Once the coup occurred, I, along with many others openly associated with the democratic opposition, were barred from travel to, let alone cleared for research in, Burma. My role in establishing Mutualaidmyanmar, a charitable website designed to support civil servants engaged in peaceful resistance, together with my public appearances and published writing, made it inconceivable that I would be permitted to return as long as the junta was still in power. Even in the absence of these insurmountable barriers, my own age-related infirmities would have made the research I envisioned difficult if not impossible.

Several of the commentators evaluating this book in manuscript noticed that the section on river spirits (*nats*) and the much larger section describing the eco zones, hydrology of the Ayeyarwady, and the mapping of major human interventions represent something of a rupture from the preceding narrative on rivers. They are correct. I envisioned spending another two years of intensive field work together with my Burmese collaborators to knit these elements together but was unable to do so, for reasons outlined above. Thus, for understanding the role of *nats* and local explanations for the decline in the fish catch, and

especially the hydrology and geomorphology of the Ayeyarwady itself, I have had to rely on the collaboration of Burmese friends and international authorities on the Ayeyarwady watershed. Needless to say, they write with their own voices—often preferable to mine! I hope that the differences in voice are more than compensated for by the knowledge they convey.