Chapter 8

PENCIL LINES ON A MAP

THE WORLD'S LAST BUREAUCRATICALLY ADMINISTERED system of elephant-based transportation is run by the Kachin Independence Army, or KIA, in the far north of Burma. Here dozens of elephants link camps, villages, secret manufacturing sites, and other strategic locations otherwise separated by seasonal flooding and roadless forest. As we've seen, the presence of "fugitive" peoples avoiding powerful states helps explain the persistence of elephant domestication in this part of the world. The KIA's elephant transport convoys illustrate this dynamic in an especially pronounced way.

The KIA formed in response to the Burmese military takeover of the country in the early 1960s. A quasi-government (the governing counterpart is officially called the Kachin Independence Organization, or KIO), the KIA has controlled significant swaths of the Kachin Hills for the past half century. As of the 2010s, its elephant teams are still very active. Sending elephant convoys through the jungle allows the group to move supplies beyond the view of the Burmese army, or Tatmadaw, whose ground vehicles can travel only on the region's sparse network of roads. I came to think of these furtive routes, which elephants and rebels follow together in the forest, as like so many erasable pencil lines on a map. While

the Tatmadaw's jeeps and trucks have to follow the map's inked-in permanent thoroughfares, the paths of elephant convoys are always flexible and movable, leaving hardly any trace of themselves.

The KIA's use of elephants for transportation, rather than for logging, is significant. As we've seen, elephant logging presents a serious limitation: by definition, it is destructive of forest cover. In order to be profitable, especially in the short term, logging has to be ecologically destructive. But elephants who carry cargo and passengers across rivers and forests do not present this problem.

This means the KIA has unique knowledge about how to organize environmentally friendly elephant work. In turn, its elephant system ought to be of great interest to governments throughout the Asian elephant's natural range: in India, Indonesia, Thailand, the rest of Burma, and so forth. These governments might bristle at the more subversive aspects of the Kachin militia's logistical network, but they all administer territory that suffers a paralyzing monsoon season, when roads become flooded or obstructed by mudslides. Indeed, the severity of monsoon is precisely what turns the Kachin forest into the KIA's political refuge, inaccessible to the Tatmadaw's motorized transport. Elephants' off-road abilities are strong regardless of what makes the roads impassible, be it weather or warfare. So why shouldn't governments throughout South and Southeast Asia institute their own departments of elephant-borne logistics?

Thus far, governmental authorities have overlooked the KIA's elephant system—and so, for that matter, has the international elephant conservation community. But knowledge about what exists in the present shapes our assumptions about what is possible in the future. I had a notion like this on my mind when I traveled to Myitkyina, the main city in Kachin State, in 2015. There I spoke with a KIA colonel, Nan, who had several decades of experience leading the KIA's elephant transport convoys. In part, I wanted to better understand this "half-wild" transport system that elephants and

rebels have created together over the last six decades. Do the elephants have freedom in the forest each night? What cargo are they carrying? How have the secret elephant trails interlocked with the region's wider geopolitics? In addition to piecing together this picture of what the elephant transport teams have been doing, I hoped to gain a better sense of what they *could* be doing—that is, of their potential.

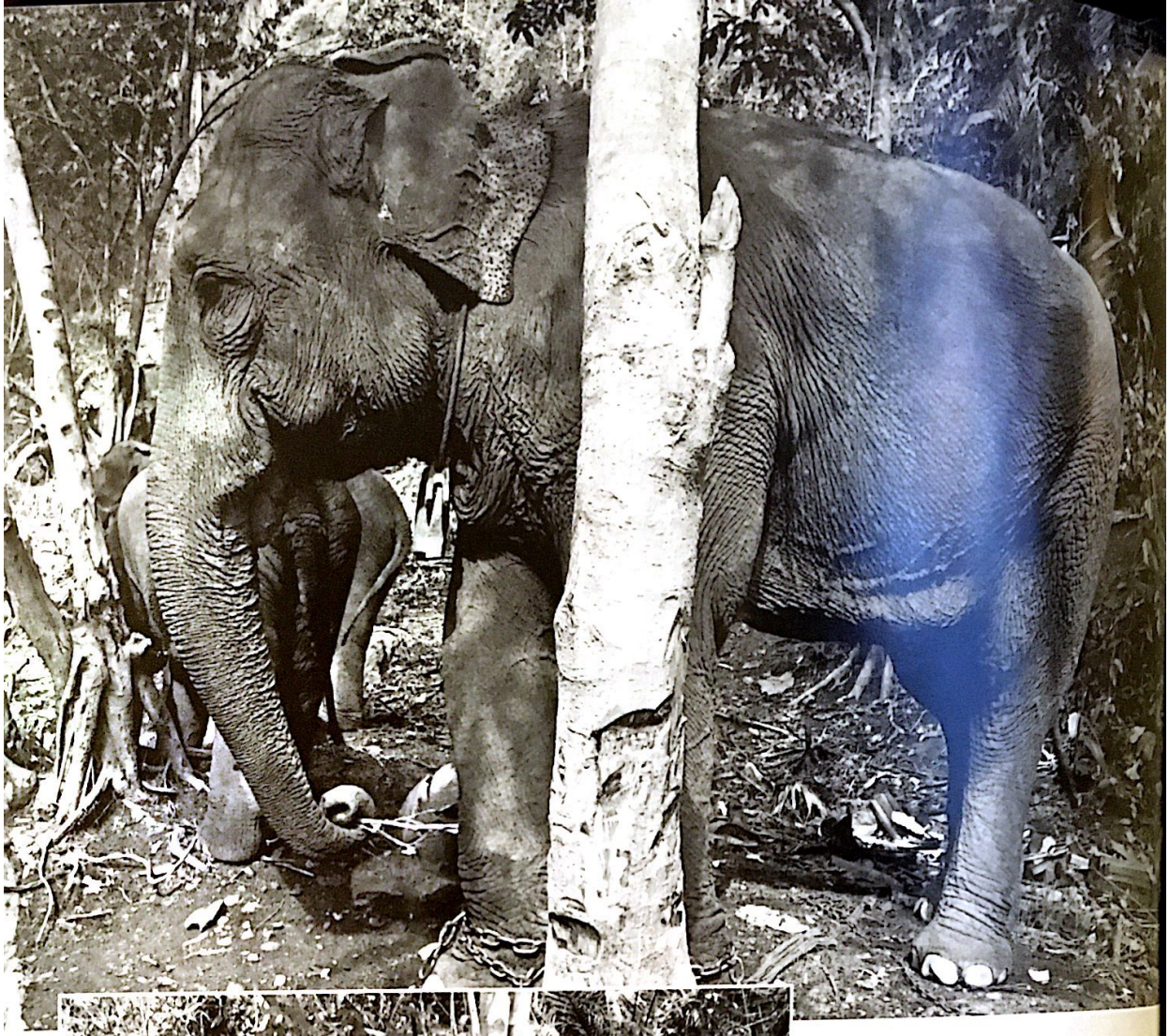
Warfare has caused much human suffering in Kachin State. In recent years, the conflict has accelerated, as the Tatmadaw has surged into the forest to bring more territory under its control. Between 2011 and 2018, over one hundred thousand people, mainly rural Kachins, have fled the violence and destruction, either to other countries or to displaced-persons camps inside Burma.[1] I owe a great debt to those who, despite the surrounding circumstances, kept me out of harm's way and found time to speak with me. The elephant culture of the Kachin Hills is one of many aspects of life here that deserves to last. Hopefully, the near future will bring the people of this region peace, justice, and survival.

"MY FAVORITE MAHOUT WAS a Hkamti, actually, not a Kachin," Colonel Nan, who led the KIA's elephant brigade in the Hukawng Valley during the 1980s, told me through our talented translator, Nkumgam. The three of us were having tea. The rain had let up outside, and the sun was momentarily peering in through the window.[2]

"His name was Mong Shwe," the colonel continued, "the apple of my eye. He was the most careful with the elephants and always knew what to do when they were sick. The elephants always had a good relationship with him. He's since passed away."

The colonel paused and drank his tea, reflecting on this part of his life.

Elephant logging village in central Burma, 2013.
Photo by Jacob Shell.



ABOVE Pwa Oo the elephant, at Mong Cho's logging camp, Kachin State, northern Burma, 2015. *Photo by Jacob Shell.*

LEFT Neh Ong the elephant, at Mong Cho's logging camp, Kachin State, northern Burma, 2015. *Photo by Jacob Shell.*

Mong Cho with a calf of Neh Ong and Pwa Oo. Neh Ong is the large, shadowed elephant in the background behind the tree. Kachin State, northern Burma, 2015. *Photo by Jacob Shell.*

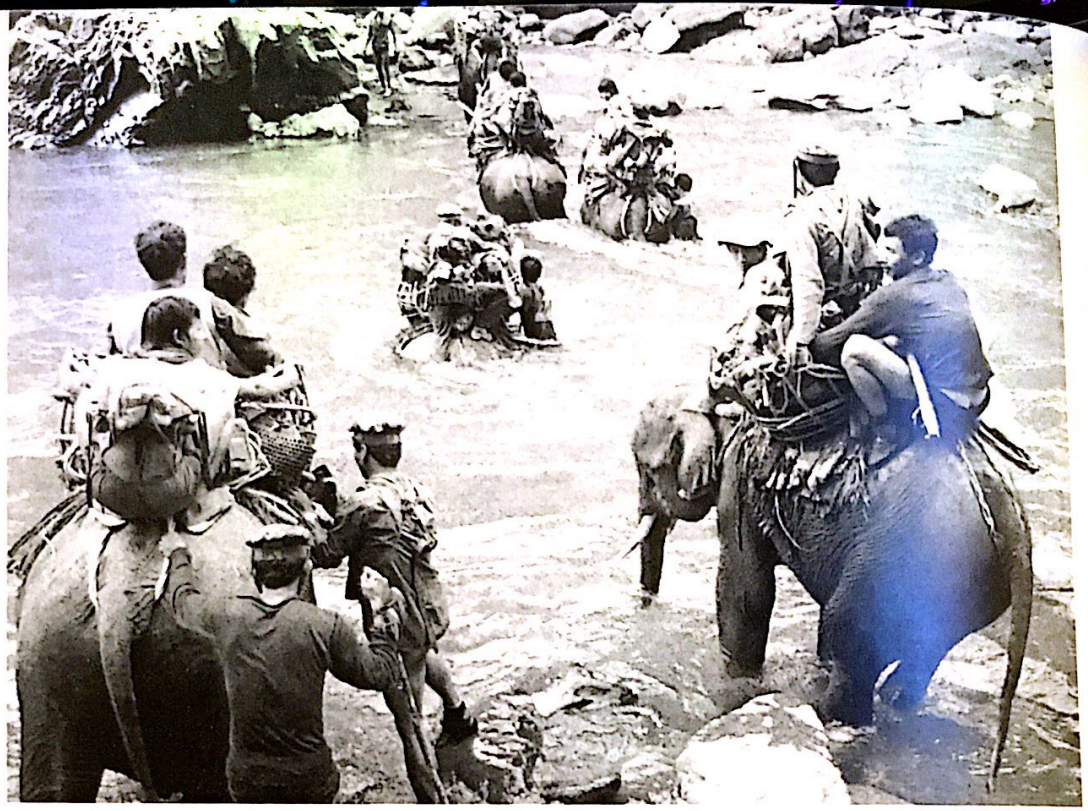
A forest mahout's tools, Kachin Hills, northern Burma, 2015

A mahout and his wife with a work elephant. On the right, a hut is being rebuilt in preparation for coming monsoon storms. Elephant logging village, central Burma, 2013.
Photo by Jacob Shell.

Imow (*left*) and Timeh (*right*), the retired mahout couple, central Burma, 2016. *Photo by Jacob Shell.*

Elephant-mounted KIA soldiers, Kachin State, northern Burma, 2012.
Photo by Will Baxter.

A KIA mahout climbing onto a brigade elephant,
Kachin State, northern Burma, 2011.
Photo by Ryan Libre.



KIA elephants cross the Tawang Hka (river) in the Hukawng Valley, Kachin State, northern Burma, 1989.
Photo by Shelby Tucker.

A relief elephant in Banda Aceh, Indonesia, immediately after the 2004 Indian Ocean tsunami.
Photo by Chris Stremmer.

"Are there still Hkamti mahouts in the KIA?" I asked.

"No, it's all Kachin now. The Hkamti mahouts today are all in civilian work. It's not like before. Some of the Hkamtis are very good mahouts, but our mahouts are good too. Not all the brigade mahouts are soldiers—some are civilian mahouts who help us during certain times of the year."

Nan had grown up in an area of southern Kachin State where there were relatively few elephants. Like Xuan Thieu of the Ho Chi Minh Trail, he had never worked with elephants before, when he suddenly found himself leading a rebel army's elephant brigade. In the early 1980s, the KIA's high command decided to expand its elephant-based transport operations through the Kachin forest country. One look at a map would explain why: Kachin State was the most heavily forested region of Burma and had relatively few year-round roads. Nan was assigned to the largest elephant brigade of all, which ranged in size from twenty to thirty elephants. This group's main area was in the Hukawng Valley, where the best mahouts were either Hkamtis or from a Kachin tribe called the Jinghpaws.

The Hkamtis and the Jinghpaws historically alternated between friendship and violence. Nan had likely been picked for the assignment because he was neither Jinghpaw nor Hkamti but hailed from a smaller and less powerful Kachin tribe in southern Kachin State. Furthermore, while the Hkamti mahouts in his brigade were Buddhist, and the Jinghpaws mostly Baptist, Nan was from a smaller Christian denomination. He was well positioned to serve as an arbiter, a neutral force in a potentially polarized situation. Certainly, the command hadn't sent him to the transport brigade for his elephant skills.

I had many questions but let the conversation pause so Nan could rest. We had more tea. Nkumgam, brilliant with languages but poor in geography, looked with some confusion at a map I'd brought,

onto which Nan had been penciling in various routes taken by convoys of elephants carrying food and arms. We were in the main Myitkyina office of the KIA's governing counterpart, the KIO.

It felt odd to me that this office existed at all. It had been set up as part of a treaty between the KIO and the Burmese government.[3] But the treaty had collapsed, and the Tatmadaw and the rebels were currently fighting. I'd been stuck in Myitkyina for over a week, waiting for the fighting to subside.

Across the street was a large grassy area, the Manau park. Manau is an important Kachin cultural festival, and at the center of the park was a colorful performance stand built in front of six large decorated poles, each around thirty feet high. These high poles were painted in bright reds, yellows, and blues, and capped by a carving of a stylized hornbill or crossed swords. The aesthetic called to mind the totem poles of the Pacific Northwest. The park had been constructed recently, on a spot where an old river oxbow, long since filled in for paddy fields, met the Irrawaddy. Upstream was the leafy Shatapru neighborhood and a restaurant on the water specializing in delicious spiced satays and ginger sautéed with chilis and mountain herbs. Downstream was the city's main market area, which was shaded beneath hundreds of rainbow umbrellas. River fish were for sale, as were snails and periwinkles. A hunter was selling deer skulls and bear claws. Shan seamstresses were fitting and selling clothes.

Surrounding the market area were several large religious structures: a Buddhist monastery, a Baptist compound, a Roman Catholic church, a gated mosque, and a large Hindu temple overlooking the water. I was told that due to the fighting, the city's economy had stalled, but everywhere people seemed busy shopping for groceries, phones, and motorcycles. There were more women out in the streets than I'd seen in other cities in this part of the world—puttering along on scooters, going to work or school or running

errands. Many of the men were somewhere else. There was clearly some additional input of wealth.

"There are three elephant groups," Nan continued. "One is with the Second Brigade, in the Hukawng Valley. Then there's the First, which is near the Chinese border, and the Fifth, which is to the south. There are maybe fifty or sixty elephants overall, I don't know the exact number these days. The Second always has the most elephants. At any given time, most of the elephants are around the Hukawng Valley and the Hpakant jade mines, or else they're near Laiza." Laiza was the Kachin Independence Organization's de facto capital, on the Chinese border.

The colonel explained the organization of the transport missions. Each mission usually consists of three or four elephants. A brigade has fifteen to thirty elephants total, but never assigns a large number of elephants to a single convoy, for fear of attracting attention. Occasionally a convoy has to cross a busy road, like the Ledo Road in the Hukawng Valley, and waits until nightfall to slip across, one elephant at a time.

Nan recalled some memorable brigade elephants from his youth. "One of my favorites was Lah Ong, a Kachin name. He'd been donated by a villager near Shadazup, at the entry to the Hukawng Valley, in 1965. He was sensitive to human words and always knew to be extra careful and diligent when he was told that the enemy was approaching. Even with a huge amount of ammunition on his back, he could be incredibly quiet while moving in the forest." My mind drifted to Pak Chan, the elephant who moved ammunition on the Ho Chi Minh Trail. "Lah Ong's prime was when I was brigade leader, in the 1980s, but he stayed with the brigade until he died, in 2009."

The dangers and challenges of the terrain were manifold: fast-moving rivers, steep slopes, landslides, mud, quicksand, mosquitoes, and leeches. "Some of the places we go in the independence

army, the things we do, we really couldn't do it without the elephants. There are a lot of villages in the Hukawng Valley area and elsewhere that you can't get to by jeep or even on a dirt bike. And the number of inaccessible places like that only expands during the rainy season."

The brigade elephants carried an impressive array of cargo items: Nan mentioned clean water, tent supplies, rice, clothes, arms and ammunition, forest gems like jade, gold, and amber, medical supplies, papers, appliances such as radios, and construction materials. They gave rides to civilian passengers sometimes, from village to village. Nan remembered an incident where, wishing to be helpful, a brigade had tried to carry a sick villager on elephant-back toward Tanai, the one real town in the whole Hukawng Valley, so this man could find a clinic there. "The rocking back and forth of the elephant made him feel even sicker, so he had to get down," the colonel recalled. "We had to be careful about that—some people get motion sickness on elephants."

Like all the mahouts of the Trans-Patkai and the Burmese logging forests, the mahouts of the KIA brigades release their elephants into the forest each night. I asked Nan if it ever worried him, watching the brigade's logistical lifeline wander off into the jungle every evening. "What if an elephant ran away? Couldn't the brigade become stranded?"

The brigade mahouts tend to be more concerned about thieves than runaways, he explained. To discourage elephant thefts, the soldiers mark the elephants' ears with a small hole, or with a star on their rump. "But our elephants aren't so hard to track in the morning. They wear a long chain and a bell"—like those at the government logging camps. "I remember that sometimes, when we knew the Tatmadaw was nearby, we'd stuff the bells with mud and leaves to silence them. But"—he leaned back in his chair, holding his tea—

"at night it would sometimes happen that a wild herd would cross paths with our route. This is what really created the problems with losing elephants. Our elephants would follow the wild ones, in search of a mate. But even this wasn't the main problem, because they'd always come back. If they tried to join the wild herd, the herd would reject them." The bigger issue, he explained, was that the brigade's males would start fights with the wild males. "My mahouts' feeling was that it's good to let the males fight a little bit, because otherwise our own males would take out their aggression on us. But if the fight became too intense, we had to intervene."

Staying with the theme of mating, Nan turned to the issue of pregnancies. These could be inconvenient, he explained, because "a female who is well into her pregnancy can't do the brigade work." If she was a KIA elephant, she would go to the KIA's elephant camps in the forest, where soldier-mahouts would raise the calf. But if she was an elephant lent to the brigade by a civilian mahout (likely from Hpakant or the Hukawng Valley) for a short-term mission, the calf belonged to the mahout and would receive tutelage in the mahout's own village.

Musth presented another inconvenience. As in the logging camps, the KIA mahouts give extra time off in the forest to adult males showing the "black tears" of hormonal aggression. Brigade mahouts tried to anticipate periods of musth so that males who seemed due were not sent on sensitive transport missions.

I still had many questions for the colonel about KIA transport elephants, but he had office work to attend to. He finished his tea. We agreed to continue the discussion the next day over lunch. But that night the Tatmadaw shelled several Kachin villages in southern Kachin State, not far from where the colonel had grown up. He became busy and had no time to reminisce about elephants. Our follow-up meeting was delayed by several weeks.

THE WAR BETWEEN the Tatmadaw and the KIA is nearly six decades old, by some measures the longest-running conflict in the world today. But the origins of the conflict date to the time of British colonialism in Burma. During the nineteenth century the British won all three Anglo-Burmese wars and brought the populous valley sections of the country under their direct control. They recognized early on, however, that the Kachin Hills would be difficult to seize through military force. In the 1880s, a geographic scout on a British expedition to the Kachin Hills described the road as surrounded on all sides by shadowy mountain fastnesses, full of bandits and intimidating tribespeople. Here, wrote the scout, "any three might make a new Thermopylae"—a reference to the ancient Greek battle where a small group of Spartans reputedly held off a much larger invading army of Persians in a narrow mountain pass. The geographic report noted that many of the people of the Kachin Hills had elephants and appeared to "breed" them.[4] Such phrasing was typical of how British colonists described Burmese forest mahouts' practice of letting their elephants roam at night.

By the early twentieth century, British colonists had established friendly relations with the inhabitants of the Kachin Hills, mainly by ceding local authority and resources to tribal and clan leaders. The colonial government granted partial control of the region's lucrative jade mines to Kachin *duwas*, or chiefs.[5] British military and police had presence up the Irrawaddy to Myitkyina, but beyond this the only British military outpost was at Fort Hertz, in an area that was mostly Hkamti rather than Kachin. The main Kachin areas—the Hukawng Valley and a large hill range at the headwaters of the Irrawaddy called the Triangle—were left firmly in control of the Kachin elites.

Christian missionaries also reinforced friendly Anglo-Kachin

relations during the colonial period, though the missionaries were mostly American. In the decades preceding World War II, then, Kachins were redefining themselves around experiences with the missionaries and with the English-speaking world—and against the dominant Burmese culture associated with the lower Irrawaddy Valley.[6] This trend all but ensured that, with the outbreak of war, the loyalties of the Kachin duwas were almost entirely with the British, not with the Japanese. In 1942 the leaders of Burma's major anticolonial, pro-independence faction sided with the Japanese, while the Kachins remained aligned with the British. This Anglo-Kachin coalition was essential for the elephant-mounted escapes at the Chaukan and Pangsau passes. Rungdot and Maggie were both Kachin elephants.

Other groups in Burma were unsettled in their loyalties. The Japanese relied on ethnic Burmese, Karen, and Mon mahouts for their elephant-based operations, which included logging, railroad construction, and the invasion of Manipur. But these mahouts changed sides as soon as the war's tide changed, as was the case in late 1944. Aung San (the father of Aung San Suu Kyi), one of the principal leaders of the Burmese independence movement, was able to shift the movement's allegiances just when the Allies' fortunes were beginning to turn. The switch and its impeccable timing reflected Aung San's political cunning and proved highly effective in positioning his own anticolonial faction as the natural heir to national power.[7]

In 1948 Burma achieved independence from the British Empire. This would prove a pivotal historical moment for Kachins. Some British statesmen proposed to the tribal leaders in Kachin State that the area remain a British protectorate rather than joining independent Burma. However, the new Burmese state's constitution offered good terms to ethnic minorities like the Kachins. In addition to establishing a parliamentary democratic system, the constitution declared that country's seven major ethnic minority areas could

hold a referendum within a decade, to determine if they wanted to stay in the Burmese union or not. The excitement of independence was in the air, and just as Aung San had anticipated, the British Empire's panicked retreat out of the country in 1942 had cost it a tremendous amount of legitimacy. The Kachin leaders chose to join the union of Burma.[8]

In many ways, the 1950s were a golden age for Burma. In addition to having democratic elections, it was, during that time, the most economically developed country in all of Southeast Asia. Simmering beneath the surface, though, were intractable tensions, especially between the country's majority-Burmese ruling elites and the ethnic minority areas. Such tensions kept the country's fledgling parliamentary system in a perpetual state of dysfunction. Burma's hopeful but crisis-prone postwar period came to an end in 1962, with a coup and the installation of a military junta. The referendums on ethnic minority independence never took place.[9]

In response to the coup, numerous insurgencies broke out in the country's peripheral highlands, lasting in several cases through the 1980s, and in Kachin State's case to the present day. Several of these insurgencies, especially in the Shan Plateau, one of the world's major poppy-growing areas, were partially financed through the opium trade. Frequently, the central government's counteroperations were financed this way as well. But much of the financing for the Kachin insurgency came from jade. The jade, though mostly borne by truck, is essential for understanding why, to this day, the Kachin militants are so reliant upon their unique convoys of trained elephants.[10]

VIRTUALLY ALL the world's high-quality jade comes from Kachin State's Hpakant mining region, which lies at the headwaters of the Uyu River (and just a few hills over from Mong Cho's

elephant camp). Hpakant jade is in great demand in China, where it holds enormous cultural value. Jade has nowhere near the same significance in the West as it does in China, and so for many Westerners, the scale and intensity of Chinese demand for Kachin jade, and the ways this demand shapes the region's geopolitics, may be hard to imagine. A 2015 study, reported on by the BBC and the *Guardian*, estimated that $30 billion worth of black-market jade flows from Kachin State into China annually. The number is astounding. For comparison, Burma's formally reported, non-black-market GDP in 2015 was $60 billion.[11]

The jade mines are geographically immense: mile after mile of once hilly, forested landscape has been turned inside out by great fleets of bulldozers and backhoes. The operation is at the scale of Chinese industrialism in the twenty-first century and stands in disorienting contrast to the traditional agrarian and forest-based livelihoods just a valley over. These mines are mostly owned and controlled by Burma's ruling military circles: generals and former generals and generals' family members and so on. Much of the jade wealth flows to the new Burmese capital of Naypyidaw. Some of the mines, however, are owned by Kachin people, and so a significant amount of wealth also flows toward Myitkyina, which explains why, in spite of the fighting, the city's economy has remained relatively strong.

Between 1994 and 2011, when the Tatmadaw and the KIA observed an official cease-fire, the Burmese and Kachin interests in the Hpakant jade mines coexisted uneasily. During the 2000s, though, the Burmese regime started asserting more control over Kachin State development projects financed by Chinese companies. These included proposed oil and gas pipelines that would link China to the Indian Ocean, partially by crossing through Kachin State. Most consequentially, the projects included a proposal to build a huge dam at the headwaters of the Irrawaddy River, at Myitsone.

This dam, if built, would flood a portion of the Triangle region, displacing a large number of Kachin villages. The Kachin Independence Organization (along with many Burmese people throughout the country) protested the project, and shortly thereafter the cease-fire between the Tatmadaw and the Kachin rebels fell apart.

As the cease-fire disintegrated and the Kachin conflict started anew, the ruling regime's powerful military families grasped for greater control over the lucrative jade mines. In 2014, after a Kachin mine owner found an extremely rare thirty-seven-ton slab of jade, the military temporarily closed off the entire mining valley and placed the Kachin owner in custody.[12] And yet despite such tactics, the central military is in a poor position to control the flow of jade out of these mines—mostly because the Kachin mine owners, unlike the Burmese generals, have elephants.

In 1996 an American specialist in rare gems, Richard Hughes, visited Hpakant and was impressed by the number of times elephants were required to drag his ride, a cargo truck, out of the mud.[13] The main road to Hpakant has been improved since then, but the severity of the monsoon conditions, and the unwillingness or inability of the military government to direct jade wealth toward infrastructure, has preserved the elephants' fundamental usefulness for transporting the gems to their eastern markets. Most of the gem tonnage still travels by truck, but the elephants' ability to dislodge trapped gem trucks and to carry the jade off-road makes them strategically important for embattled Kachin mine owners.[14]

Elephants carry other precious gems as well: amber from the Hukawng Valley and gold panned from Kachin mountain streams. These resources, as well as the elephants themselves, give Kachin elites clout in the region. These elephant-owning elites have unusually strong political and economic incentives against destroying forest cover. Thus, Kachin State remains the most heavily forested

region in Burma and one of the most heavily forested zones in all of South and Southeast Asia, despite all these mining operations.

Both "civilian" elephants, like Mong Cho's tusker Neh Ong, and KIA elephants have hauled cargoes of the precious gems. To get from Hpakant to the big jade markets in Laiza, on the Chinese border, Colonel Nan said his convoys would pass by the plain of Indawgyi Lake and then walk through the mountain pass at Japi Bum. They then had to cross a railroad and highway corridor, which required caution and good timing to avoid being seen by a patrol. Then they'd enter the large Kaukkwe forest country, more or less following civilian elephant logging routes. But rather than turning southward toward Shan State, as Mong Cho might do in search of teak, the rebels' elephants would proceed eastward, swimming across the Irrawaddy River around Sinbo, sometimes with huge, valuable jade rocks strapped on their backs. They'd continue through the eastern hills to Laiza, where buyers from all over China, as one journalist has written, have "made the KIA one of the richest rebel armies in Burma."[15]

"**IF YOU GO** a different way from the jade mines," said Nan—that is, not southeast toward Laiza but northeast—"you can get to our elephant training camps." I had returned to see the colonel once the violence in the south of Kachin State had calmed down earlier in the week. On a coffee table in the common room of the Kachin Independence Organization's Myitkyina office, I had unfolded my map. Nan rattled off a number of village and river names for which the map showed no corresponding labels. Poor Nkumgam, the translator, clearly taxed by the geographic turn the conservation had taken, looked exhausted. As a geographer, I relished the details. The trails the brigade would use were sometimes cut in deliberately mazelike patterns, a device aimed at confusing the Burmese

military. Such patterns rendered my map at this particular spot, between the Hpakant jade mines and the KIA elephant training camps, a confusing tangle of pencil scratches.

"From Hpakant we head toward the Hukawng Valley, usually along the Nam Jan Hka. We ford the Mogaung River and approach the Ledo Road. But rather than follow the Ledo Road toward the main part of the Hukawng Valley, we cross the road and go through some other hills toward the uppermost section of the Tanai River."

I knew the upper Tanai was a tiny valley that crept through the Kumon Mountains. The valley was well positioned but also very secluded: the epicenter of the great swirl of mountain ranges formed by the Kumons, the Patkais, and the Kachin Hills. Local Kachins sometimes called the Kumons the Maji Bum, "Mountains of Quiet Hunters." Other locals called them, simply, the "bad mountains."[16] This was heavily forested country, full of gibbons and macaques. The headquarters of the Second Brigade were usually located somewhere in this vicinity, nestled beneath the tree canopy, changing location two or three times per decade.

This small valley was also where the Second Brigade trained its newly caught elephants. Two Western journalists passed through here in the 1980s in separate voyages, both escorted by Kachin soldiers. Each saw the rebels' elephant training camps. Shelby Tucker, an American writer who was being escorted from Kachin State's eastern border west to the Indian frontier, noted at this spot that KIA mahouts, along with one khoonkie elephant, were training a baby. The small elephant was being marched up and down a sandbank, and the elephant trainers were singing lullabies to "allay the baby elephant's fears."[17] Bertil Lintner, a Swedish journalist who became a leading expert on Burma's armed ethnic conflicts, was escorted in the other direction, from India toward China. He had more time to spend with the rebel elephant trainers and kept his notes from the encounter. KIA fandis were mixing the inner part of a banana plant

with water and salt—a treat for elephants in training. The fandis were Kachins. One of them explained to Lintner that historically the Kachin people didn't have elephants; they learned their elephant skills from the Hkamti Shans many generations ago. Originally, the Kachin fandi went on, the Kachins caught elephants using the pit method, but as their skills improved, they embraced the superior lasso method, or mela shekar.[18] The camp area was called Tanai Yang, which in Kachin means something like, "Clearing on the Tanai."

During our discussions in 2015, Nan confirmed for me that the militia was still doing elephant training around here, though likely not at the exact same spot. The camp would change locations periodically, not only for security purposes but also because the camp's swidden garden clearings needed to shift every few years.[19] In 2018, the KIA appeared to withdraw from the vicinity, due to a Tatmadaw assault there.[20]

During my travels in Kachin State, I happened upon a map showing two types of armed bases in the Hukawng Valley: the rebels' and the government's. The rebels' bases follow a roadless chain perpendicular to the Ledo Road, the Hukawng Valley's only thoroughfare for motor traffic. Some of the bases on this chain could possibly be linked by riverboat, but many of them would have to be linked by porters walking on foot—or by convoys of elephants. By contrast, the Tatmadaw's bases were all on the Ledo Road, linked by jeep or by truck.[21] This road is, of course, the one built by the Allied forces during World War II, to link British Assam with the Chinese resistance armies by way of the Pangsau Pass. After the war, the road became dilapidated, an ugly scar of mud, gravel, and tar slicing across the forestlands of the Hukawng Valley. The military's control of the road has enabled it to award lucrative sugar plantation contracts along the corridor. These plantations erase forest cover and spill into an area that, at least on paper, is supposed to be the Hukawng Valley Tiger Reserve.[22]

The experience of another journalist, an Indian, Rajeev Bhattacharyya, indicates where many of the KIA's elephant trainers have been catching their elephants in recent years. In 2011 Bhattacharyya was engaged in an intensive months-long project to meet with and interview the leader of a different rebel militia, the National Socialist Council of Nagaland. Though Nagaland is in India rather than in Burma, there's a substantial Naga population in the Burmese Patkais, between Homalin and Pangsau Pass. This Naga area is claimed, and mostly controlled, by Naga militants, who refer to the area as "Eastern Nagaland." Eastern Nagaland is very close to the KIA's westernmost territories. They meet in the isolated Taro Plain.

Escorted by Naga rebel soldiers, Bhattacharyya had spent five or six weeks hiking from India into Eastern Nagaland, hoping to meet with the Naga militants' head commander. One day in late December, while walking along the mountain trail, he and the Naga soldiers had to step aside for a "convoy of five elephants steered by olive-clad Kachin Independence Army mahouts." The men were chopping tree branches to clear the path ahead of them. Bhattacharyya noted that "the mid-sized elephants seemed suited to walking the narrow hill trails." These were the KIA's fandis, its elephant catchers. The Kachin and Naga militants had a friendly rapport, and the two groups shared a meal. "This place is swarming with elephants," one of the Kachins explained to the Indian journalist as they ate. The two rebel groups had an arrangement: the Kachin fandis were permitted to catch elephants in this area but had to split their haul with the Naga militia.[23]

Civilian fandis told me the same thing: that this particular stretch of the mountains has been a very good spot, in recent years, for catching wild elephants. The area is lush with bamboo, watering holes, and salt springs. Also, opium production in the area is quite lucrative, which tends to direct locals away from hunting and ivory poaching.[24]

In 1987 Bertil Lintner followed the route from this elephant-catching zone back toward the KIA elephant-training camps. He entered Burma through Eastern Nagaland with his wife, a Shan reporter named Hseng Noung, and their newborn baby, Ee Ying. They were traveling with a KIA escort. The militia leadership hoped that the journalists' trek across the region would make the Kachins' struggle better known to the outside world. The following year Shelby Tucker found himself with a similar escort, for largely the same reason.

On the way from the Eastern Nagaland Patkais to the upper Tanai, Lintner and his party followed a mountain stream called the Taka, which merges with the upper Chindwin River at the Taro Plain.[25] British and American forces retaking Burma in 1943 noted that Taro "is like a small closet adjacent to the long narrow room of the Hukawng and the Mogaung valleys. He who wishes to enter the long narrow room from its northern door must be sure no one is lurking in the closet."[26]

A dugout canoe was fetched for Lintner's party, and they drifted downstream, passing by rare species of waterfowl. They disembarked at Wan Phalang, a small Lisu village on the riverbank that appeared to survive by trading with gold panners in the nearby hills. The party then proceeded on foot (they had no elephants at this stage) across an especially difficult hill range, "a vast natural labyrinth of dense jungle streams and sharp ridges."[27] They slept in abandoned gold panners' huts. Partway through the trek across these hills, Lintner's health declined due to blood poisoning. The culprit was leeches. Wading across the streams in the hill region had exposed his legs to constant attack. A leech bite was becoming infected. Seeing his health worsen, the Kachin escorts determined that the party needed an elephant, to keep him out of the water.[28]

Tucker, though never injured like Lintner, faced similar problems with leeches in the forests of this region. In a single day, he

later recalled, he had to remove 241 leeches. A friend traveling with Tucker, a Swede named Mats, found a leech in his nostril. Mats developed a blood poisoning ailment similar to Lintner's and was in similarly poor condition by the time he and Tucker limped into India.[29] Though passengers on elephant-back in these hills are not impervious to leeches (some of which drop from the trees), riding elephants does significantly reduce the severity of the problem and minimizes the likelihood of infection from trail-kicked dust.[30]

The KIA's elephant came to retrieve the injured Lintner at a riverside area where the rebels had set up a large secret fishing camp. Fish were caught from the river and then dried out and sold to miners in Hpakant, one valley over. Lintner marveled at the scale of the operation, just one among many covert industries the Kachin independence fighters had established under the cover of the forest canopy. From here the party proceeded toward Tanai Yang, following the narrow gorge of the secluded upper Tanai, where "hundreds of fish swirled around my mount's massive legs," Lintner recalled. At Tanai Yang, Lintner's foot finally began to heal.[31]

ONE ELDERLY Kachin mahout told me about another important branch of this clandestine network, from the area around Tanai Yang into India, by way of the Chaukan Pass. The elephant convoys retrieve supplies from a mountain hamlet on the Indian side of the mountainous border. This had been occurring, the mahout said, for many years, and it was still occurring during the period I was conducting my research.

I knew of this remote hamlet nestled in the Indian Patkais. Just a few thousand people lived there, mostly Lisus, growing dry rice and vegetables for subsistence, and cardamoms and ginger for cash. It was extremely isolated, with no all-year road or airfield. The Indian military did an occasional airdrop. A dirt jeep trail that

went toward the village was unusable for many months due to rain and mud. For parts of the year, the only way to reach this remote outpost was on the back of an elephant. Indian mahouts from Miao brought regular supplies there this way: bags of rice, farm appliances, concrete blocks, iron rods, corrugated iron sheets, and so on.

But this Kachin mahout was telling me about transport elephants getting there from the other direction: from Burma. It was raining hard as we spoke together inside a cabin. His son, a schoolteacher, was there to translate. The old mahout said that the Chaukan Pass was still the main passageway across the border for riders of elephants—though other, even more isolated passes could be used as well. The Chaukan was especially useful to the Kachin soldiers during the wet summer months. When the rain came, leeches made the terrain totally inhospitable to foot patrols. Riding on pachyderms with thick-skinned, leech-resistant legs, the KIA mahouts dominated the Chaukan environs during monsoon time. As thunder echoed above, the mahout, his son, and I discussed the "great game" of Trans-Patkai geopolitics, and the organization (whose identity I've chosen to keep anonymous) that, according to the mahout, was bringing supplies to the elephant-borne rebels.[32]

Shelby Tucker gives us a good sense of what it must be like for the KIA's elephant brigade to approach this outpost along the difficult Chaukan paths. Tucker's elephant escort in 1989 brought him in this direction by following the Tawang Hka watercourse. "With their trunks," Tucker wrote of the elephants along the Tawang Hka, "they explored the always-tricky bottom before committing themselves, and whenever need arose they were superb swimmers."[33] But Tucker's elephant-mounted party didn't actually cross into India. He and his companion Mats parted ways with the Kachin soldiers prior to reaching the Indian border, and the two proceeded the rest of the way on foot. They made use, of course, of that same mountain pass, Chaukan, through which the railway party had fled in

1942, to be rescued by Rungdot and many other elephants in the foothills above Assam.

The history of elephant-mounted movements through the Chaukan Pass stretches even farther back in time. Centuries ago elephant convoys through the Chaukan linked the Hkamti Long kingdom of the Putao Plain in northern Burma with fledgling areas of Hkamti settlement along the Brahmaputra Valley in India.[34] Likely, the Hkamti flight from far northern Burma during the Kachin invasions there was aided by elephants through the same passage, as well as through the Pangsau Pass. For anyone without elephants, the pass was an unforgiving upland barrier. But for people with elephants, it was an intercultural bridge, escape hatch, smugglers' gate, and means of militant revolt, all rolled into one.

AN EASTERN ARC of the KIA's convoy network branches off from the training camps on the upper Tanai and crosses the Kumon range at Daru Pass.[35] Here in the summer months, air blowing from the Himalayas brings in icy mists, which patter fine crystalline hail against tents in the early morning. The route passes by swidden farms lined with coxcomb flowers. From these small hill farms, which shift in location every few years, people grow dry rice, maize, ginger, chilis, gourds, taro, coarse peas, mint, lemongrass, and other mountain-friendly crops. There are jungle deer here, mountain ox, and wild pigs. These animals are sometimes hunted, the meat then left to dry out on pikes in the sun or cooked over slow fires. Mixed with herbs and wild mushrooms, the hill food of the Kumon range can be mind-expanding for visitors.

Beyond the Kumons is the Triangle, and here the convoys pass over the two main feeder streams to the Irrawaddy: the Mali Hka and the N'mai Hka. The convoys then bend their way southward

toward China, exiting the range of wild elephants, who find these eastern mountains along the border too high and cold. The convoy route continues along the international border, where the mahouts might cross paths with muleteers from Yunnan.[36] Hugging the frontier, the convoy reaches Laiza.

"So the routes make a kind of circle," I remarked.

Nan considered. "That's partly true, but it's misleading, because really the elephants can go anywhere, and the whole point of them is that the Burmese military can't predict where they'll be or where they'll go. A route might be used once and then never again." Even the mountain passes, he further explained, were not "single point" locations where the Tatmadaw could simply crouch and wait for a KIA convoy to approach. The passes were really fields of many different possible trails across the broad "saddle" of a mountain range. The trails could be many miles apart, separated by especially difficult and isolated jungle terrain. Furthermore, the annual monsoon storms tended to obliterate the previous year's configuration—as the railway party had discovered to its dismay when crossing through the Chaukan Pass in 1942.

Certainly, this wasn't a transport circle like Chicago's Loop or London's M25 highway. But it was, perhaps, a symbolic circle: a belt enveloping the official Kachin capital at Myitkyina, with branches going toward India, and an eastern terminus at the Kachin "alternative" capital, Laiza, with its jade markets serving buyers from China. During these interviews, Nan had been marking routes with his pencil on my map. The paper now showed a circular pattern. Beneath the penciled-in routes, the original published ink of the map showed a transportation infrastructure as conventionally conceived by a modern state: lines symbolizing the routes of railroads, highways, and country roads. Some of these inked-in lines were, I knew from personal experience, mere projection: the highways

were sometimes just dirt tracks, and the back roads might not even be footpaths. But most of the inked routes referred to permanent thoroughfares that were used by motor vehicles for most of the year.

By contrast, the penciled lines, composing a ringlike shape, marked the projection of an alternative kind of power, hovering in the background of the "hard" network of railroads and highways. This alternative was hidden in the shadows of the jungle and rarely acknowledged on maps or in writing. And yet it connected the world's two most populous nations—India in the west and China in the east—and commanded the movement of significant resources: gems, arms, and timber. The penciled lines conveyed the possibility of clandestine connections between forest communities, and of such secret journalistic tours as those taken by Lintner and Tucker. Motor equipment and road-bound patrols attempting to follow the brigades found themselves blocked by spiraling forces of land, water, and air: the vortex of churning plates and jagged topography where the Patkais crash into the Himalayas; or the swirling veil of clouds and rainfall, which stir a muddy rebellion against the advance of the Ledo Road.

WHY DOESN'T the Tatmadaw use elephants? The Burmese state has, by far, the world's most sophisticated bureaucratic relationship with work elephants, employing thousands in the government-managed teak industry. Why not send some of those elephants to the Kachin Hills to do patrol work? Then the central military's patrols would no longer be confined to the region's sparse network of roads.

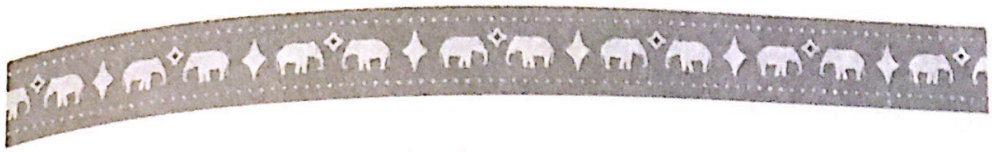
The main obstacle, for the Tatmadaw, is the practice of the morning elephant fetch. It's impossible for an outside power to set up local elephant patrols without having strong loyalties from a local group of mahouts . If the military brought in outside mahouts (say, ethnic Burmese or Karens from the south), they would have to fetch

elephants every morning in unfamiliar, hostile forest terrain. If, on the other hand, the military attempted to coerce local mahouts into assisting in patrol work, the mahouts might use the morning fetch as an opportunity to desert. In either scenario, the government patrol would risk winding up stranded in the forest. Nor could the military solve the problem by simply keeping the elephants chained up at night, cutting the morning fetch out of the patrol scenario altogether. The elephants' daily feeding requirements are just too large: the soldiers on the patrol would have to work day and night to gather the hundreds of pounds of fodder per elephant.

In theory, local political, ethnolinguistic, or religious wedges could emerge among the Kachin Hill mahouts, which could become, at some future stage, substantial enough for the Tatmadaw to exploit. The Hkamti mahouts, who as Nan pointed out have drifted away from the KIA in recent years, are generally Buddhist, while the Kachins are generally Christian. But the Hkamti-Kachin relationship is intricate and complex: the two groups' histories are interwoven in ways that the present-day religious divide does not at all capture or reflect. At any rate, the Hkamti mahouts seem to want nothing to do with the central military, preferring to stick to "civilian" elephant work.

Other internal differences exist as well, such as language, but none of these differences has proven meaningful enough for the central military to manipulate for the purpose of creating its own local elephant corps. For the foreseeable future, then, the Kachin Independence Organization will likely remain the world's only governing body with an elephant-based system of transportation. As the last entity of its kind, the Kachin system presents a model for governments, and quasi-governments, throughout South and Southeast Asia that are looking for ways to incorporate elephants into human-inhabited landscapes. If elephants are to thrive by doing forest work that does not destroy forest cover, the insights of

the KIA's elephant brigades will prove invaluable. Kachin mahouts and brigade leaders like Nan offer rare, irreplaceable knowledge about the elephants' capabilities and limits. During the rest of this century, the region's violence will hopefully fade. But usefulness of the elephants, for linking communities separated by jungle and monsoon conditions, need not fade as well.



Chapter 9

FLOOD RELIEF ELEPHANT

I'LL SKETCH OUT ONE HOPEFUL SCENARIO FOR THE ASIAN elephants' future. This scenario begins, though, with a premise that is perhaps *not* so hopeful: that the species' future cannot be secured through tourism or through wildlife preserves. This grim assumption merits some explanation.

For elephant tourism parks to generate revenue, a tourist infrastructure has to be in place: roads, hotels, restaurants, and so on. All this development creates a significant pressure on forests. In 2015 I visited an elephant park designed for tourists in North Sumatra. From the point of view of the elephants, the conditions there were excellent. The park was located deep in the forest. Near the elephants' large leafy stockade flowed a wide, fast-moving river that the elephants happily walked along every day, both for exercise and to give tourists spectacular forest rides. But this park was a five-hour drive from the nearest city—a mostly industrial metropolis with very little tourist appeal of its own—along poor roads that passed by mile after mile of unattractive palm plantations. The park's issue wasn't so much its remoteness, perhaps, as its remoteness from other tourist sites. And due to its isolation, it was not drawing a sufficient number of visitors to expand its operation beyond a mere ten elephants.

An elephant park I visited in Thailand exemplified the opposite problem. Here the park was conveniently set in a city amid other key tourist attractions, which included museums, restaurants, markets, and ancient ruins. The city had a large railroad station and a major bus hub, with convenient connections to Bangkok. It was easy for visitors to get to the elephants, and the elephant park drew many people. The park was making plenty of money and was able to afford several dozen elephants. With more space, it could have had many more—but there was no forest. The same forces and conditions that had made these elephants accessible to tourists, and therefore so profitable, had negated virtually all this particular region's forestlands, leaving the elephants with nowhere to roam, nowhere to forage for fresh leaves and shrubs, and no wild herds with which to mate. The elephants mostly ate dried fodder, brought to them in barns: the same dietary situation as elephants living in zoos.

Some elephant tourism parks do manage to be a kind of "best of both worlds," drawing a substantial number of tourists to remote forest locations. A park located outside Chiang Mai, in northern Thailand, is a standard-setting example. But such parks aren't just rare—they *have* to be rare. It is the rarity of the experience that makes tourists willing to spend large amounts of time and money to get to such locales. And this is probably the most fundamental limitation of elephant tourism as a strategy of elephant conservation: the more elephants are in such parks, the smaller the revenue-generating capacity of each individual elephant becomes. Where "best of both worlds" parks exist, they are best understood as a reflection of the current rarity of elephants rather than as models for other parks—let alone as a basis for a future re-expansion of the species.

Elephant wildlife preserves funded primarily through the altruism of taxpayers and donors, rather than through tourism revenues, present a somewhat different, though comparable, set of problems.

Such wildlife preserves have been most successful in South India, which has a quarter of the world's remaining Asian elephant population but very little remaining tradition of training and utilizing elephants for work. Most of this region's elephants live in wildlife preserves—but the preserves exist in large part because the region as a whole has been intensively developed. Large tax revenues from both urban and agricultural economies, combined with a deeper aristocratic tradition, in India, of protecting elephant forests from encroaching farmlands, have created the economic and institutional resources necessary to sustain these preserves.

But the preserves are surrounded on all sides by deforested land and cannot possibly be expanded. The limitation of these wildlife preserves is the same as for well-managed elephant tourist parks. The preserves' existence, and size, reflects the extent to which local forces of deforestation proved willing to leave a few pockets of forest—of rareness—behind. Creating a comparable system of preserves in, say, the Trans-Patkai region would almost certainly require intensified urban and agricultural development, to create a taxpayer base willing to support the new parklands. Paradoxically, formal forest preservation would require deforestation.

By contrast, elephant-based logging is able to pay for the elephant caretakers' troubles (that is, the income of the mahouts) without depending upon an expansion of tourist infrastructure, or on adjacent urban and agricultural activities. Nor does it depend upon the elephants' rareness. Rather, the funding comes from economic activities that give the elephants periods of freedom in the forest. Of course, the logging industry requires periodic destruction of forestlands, but unlike urban development and irrigated mass-agriculture, logging—at least when well managed—does not replace forestlands permanently. Generally, harvested areas are left alone for many decades, to permit new saplings to take root and mature.

Nonetheless, an industry predicated on the destruction of scarce forestlands offers limited possibilities for conservation. Furthermore, as all-weather road networks proliferate, and as the global timber industry gradually converges around motorized methods, the logging industries of Burma and northeastern India may well abandon the timber-skidding elephant altogether.

BUT THERE IS, we know, another vital use for elephants: for transportation across flooded areas. We know this from following Burmay-Moti and Pradip across the Sissiri River near the village of Dambuk, observing the pair's provision of a monsoon-time "ferry" service for local travelers. We know it from following elephants like Maggie and Rungdot across many swollen mountain river courses in May and June 1942. We traced the path of the Kachin rebels' elephants across the Irrawaddy River and through forests where the roads were washed over.

In some areas, all-weather roads will make elephants redundant. In recent years, the Indian government has been building an all-weather highway to link the mountain valleys of Arunachal Pradesh, a project that will open many new areas to urban and agricultural development. But even when this project is completed, there will still be large swaths of the state that will be hard to reach during monsoon. The Indian government might be able to "all-weatherize" one or even several road corridors—but to do so with *every* road, in one of the most rain- and flood-prone areas on the planet, would be a Herculean feat. Thoroughfares would have to be carefully reengineered to permit the runoff of huge amounts of rainfall, elevated above seasonal high-water marks, and buttressed against mudslides. Public works at this scale would be unlike anything currently found in rural and agricultural areas of far wealthier countries than India.[1] As for the Burmese side of the Patkai

Mountains, roads here are still primitive compared with India. It appears elephants will remain essential to travelers in much of the Trans-Patkai during monsoon.

It should be stressed, here, that some of these communities that become especially isolated during the monsoon flooding do also have other means of flood-time transport at their disposal. In addition to mahouts and their elephants, the Arunachali village of Dambuk has a number of extremely skilled raftsmen, most of them ethnic Adis. On my last day in that remote village, during the monsoon season of 2017, both rivers surrounding the Dambuk environs—the Sissiri and Dibang—flooded. I could not get hold of a local mahout to get me across the water back to the "mainland." (I had a flight to catch in Dibrugarh.) The village's taxi service, which coordinates with the mahouts, had learned of a landslide on the Pasighat highway, meaning that with or without the elephant crossing, the trek to Pasighat would still be extremely slow going. The taxi men had determined to wait until later in the week to try to organize transport across the flooding Sissiri. With no fording work to do, the mahouts had all taken their elephants into the forest for the day, for logging or hunting.

I appeared to be trapped. But then some local boatmen offered to take me across the Dibang in their rubber whitewater raft. It was well past the point in the season when rafting would be considered the safe, normal way across. But these Adi boatmen had some experience racing in national whitewater rafting competitions. They were eager to show off their skills.

That crossing was far more dangerous than the elephant ride I'd been expecting. First we rode for twenty minutes on a tractor, with the rubber raft in tow, across a flooding swamp to the river's edge. Then we bushwhacked sharp thistles and creepers out of our way. Then came the frightening boat ride itself, down and across four white-capped river channels that were heaving with water runoff

from the mountains. The channels were broken up by rocky shoals, where we portaged with the raft on our shoulders. It was pouring rain, and wave after wave splashed into the little vessel. By the end of this ordeal, which took about an hour overall, my luggage was soaked through. Nonetheless, the Adi boatmen had proved their mettle.

While spending time in Dambuk, I noted that the village also has a helicopter landing pad. It is generally used only by VIPs—elites from Itanagar, Arunachal Pradesh's capital city. But a number of people in Dambuk remarked to me that, really, during bad rainstorms, a helicopter is the most dangerous transport option of all. Riding an elephant or rubber raft is safer than navigating midair in conditions of high winds and poor visibility. In general, Dambuk residents preferred to get across by elephant.

Eastern Arunachal Pradesh has a history of employing elephants not just for routine fords during the rainy season, as at Dambuk's Sissiri crossing, but also during emergencies. In the early 1950s, Sadiya, the district capital for the Lohit and Dihing valleys, was destroyed by a huge earthquake and subsequent flooding. The earthquake, which measured 8.6 on the Richter scale, was so severe that it caused the Lohit River to shift in its course following the earthquake, deluging the town.[2] During the floods, the town's many elephants, which numbered in the hundreds, carried people and possessions out of the worst-affected areas and toward safety. The town ultimately washed away, replaced by the new course of the great river. In the years afterward, the former Sadiya elephants assisted in the construction of new district capital at Tezu, where the Mithong logging elephant Air Singh was born.[3]

A settlement dating to medieval times, Sadiya had been known as a "city of elephants." British colonists arriving there in the nineteenth century noted the festivals at Sadiya, where the local Hkamti and Kachin duwas would parade on elephant-back.[4] During the

1940s, the well-off tribal families in the town each had several elephants. Sadiya's immediate hinterlands were heavily forested, so elephants would roam these nearby forests at night and do transport work during the day. Logging was secondary, providing only seasonal income. Today the situation in the region is the inverse.[5]

Massive rural floods at the scale of the Sadiya disaster still occur throughout South and Southeast Asia, brought about by earthquakes, landslides, and abnormal monsoon rains. A shattered glacial ice-dam can swamp a valley, especially one with diminished ground absorbance due to deforestation. A large force of elephants could provide logistical relief during such crises. But one has to go all the way back to that Sadiya flood for the last time hundreds of elephants were systematically utilized in a large rescue and relief operation.

The Burmese government, despite its thousands of highly skilled elephants, does not mobilize its logging elephants into flooded rural areas. At most, the elephants might help move supplies in and out of the logging villages during monsoon, when main access roads become flooded (a constant occurrence). A logging village with fifty or sixty elephants might send just three or four elephants for this relatively minor task, leaving the remainder in the village area to drag timber for the day. Timber and forestry officials could send extra elephants to bring needed supplies to neighboring villages full of farmers and hunters who are also stranded by the monsoon storms. Currently, they don't. The KIA does send elephant brigades to help cut-off communities, but their monsoon-time logistical operations are obviously complicated by warfare with the Tatmadaw.

But what if countries developed official departments of flood-time logistics that were organized around the abilities of elephants? Such bureaucratic organizations, if developed, could employ large crews of trained elephants and mahouts, perhaps operating in the

mode of the Kachin elephant convoys, or of lost elephant "hubs" like Sadiya. This would connect the elephants with the growing human need to live with large flooding events, while also keeping the work elephants located in the forest for much of the year.

The idea has its limits, to be sure, not least of which is that though elephants are dexterous and mobile in flooded areas unreachable by jeeps or boats, the composition of the floodwaters in certain areas can be hazardous to their welfare. This would be, unfortunately, especially true in most urban areas, where floodwaters often become intermixed with sewage, chemical pollutants, and dangerous debris. During flooding in Ayutthaya, Thailand, in 2011, elephants from a nearby major elephant park waded through flooded urban neighborhoods to high ground, carrying their mahouts and sometimes passengers or salvaged possessions. Photographs show them navigating skillfully along streets submerged in two or three feet of water—too deep for wheeled vehicles but too shallow for boats. But the water was brown with pollutants and full of metal debris, a clear hazard for the elephants.[6]

An even more dramatic example of elephants helping in flooded areas occurred in Banda Aceh, at the northern tip of the Indonesian island of Sumatra, in late 2004 and early 2005. This city, the one-time capital of the Aceh Sultanate and the current provincial capital of Sumatra's Aceh Province, was the major city closest to the epicenter of the 2004 Indian Ocean earthquake and tsunami, which killed a quarter-million people worldwide. In Banda Aceh the tsunami wave reached forty feet in height. A quarter of the city's population was killed.[7]

Banda Aceh's horrific destruction and the subsequent local, national, and international efforts at rebuilding the city is a vast and multifaceted story of suffering and resolve. The story of the eight elephants who were brought from the Acehnese forests to help in the disaster relief effort is just a small part of that larger story,

but it ought to be told, and more widely known, not least because of how it showcases elephants' abilities and limitations during a massive human emergency. Early in my research, I knew about Banda Aceh's "tsunami elephants" only from a few newspaper articles from January 2005, which provided very little useful information.[8] I went to the city in 2015 to learn more from elephant experts there who were familiar with the episode.

The city was in far better shape than I expected. Many of its flooded areas had been rebuilt, and some of the worst-hit districts were left (for the time being) as development-free wetlands. Banda Aceh can be scenic, especially along its river harbor, which is lined by fine wooden fishing boats painted in bright reds and blues. Scents of fish and crab fill the air, and mallets clatter as boat hulls are finished or repaired. I wound up spending a long afternoon here speaking with a forest official, Wahdi Azmi, and an elephant veterinarian, Chris Stremmer, an immigrant from Germany. The three of us chatted in Wahdi's office, drinking Acehnese coffee and snacking on fried sundries.

A few days after the tsunami struck, one of the Acehnese elephant conservation officials, who had been stranded in the uplands during the flood, returned to the city to find that his home had washed away. He'd lost his wife and one of his children. This official was very close with his mahouts, many of whom had families who lived in the same destroyed residential neighborhood. Many of the mahouts had lost loved ones as well. The official and his mahouts went back to their elephant camp in the uplands and rounded up the best work elephants they had there, eight in all, to come back with them to the wreckage in Banda Aceh.[9]

Mostly the elephants hauled debris out of the way: torn-up beams from destroyed homes, smashed cars and motorcycles, twisted sheets of metal, and so on. With the debris removed, tsunami survivors could access the areas where their homes had once stood, to

recover possessions or possibly locate the bodies of loved ones. The elephants were in great demand: wheeled relief vehicles couldn't access these areas, at least not during the initial weeks after the catastrophe. Photographs of the tsunami elephants taken by fascinated journalists convey the unique usefulness of the elephants in this ruined landscape. Everywhere the ground was covered in mud and rife with debris. Even a tank would have become bogged down, but the elephants were mobile.

Chris Stremmer arrived in the area shortly after the disaster, and as a veterinarian, he was alarmed at the condition of the elephants. Their feet and trunks were getting cut from sharp metal objects or broken glass or huge splinters of wood that were everywhere. The cuts were getting infected from the dirt and grime in the standing floodwater. The elephants also weren't receiving adequate nutrition, since they were no longer in the forest, and they weren't getting anywhere near enough fresh drinking water. Nonetheless, Chris recognized that for many of the people at the scene, who'd undergone such a terrible trauma, the presence of the elephants was both practically and emotionally significant. Despite his qualms about this use of the elephants, Chris decided to help over the subsequent months, mending the elephants' wounds, treating their infections, and organizing a steady supply of nutrients and fresh water from the major relief agencies camped nearby.

"It was fucking hard work," he remembered, "both for the elephants and for the mahouts. It was basically a war zone, and the elephants were in an area where elephants should not be." But the official who brought the elephants to the city was "just trying to *do* something, during such an awful time." The official (whom both Wahdi and Chris opted not to name) had started out as a mahout and wanted his mahouts and elephants near him for companionship. And the mahouts all wanted to be at the site of their former homes, where they'd last seen their family members. The mahouts

kept themselves busy, and two and a half months later, all eight elephants returned to the Acehnese forest, all in reasonably good health. "It sounds absurd, I know," Chris remarked, "but for me it was actually a *good* time. I started building a close relationship with the mahouts and the elephants . . . and it was really full-dive-in, yeah? The kind of work I like to do."

Wahdi joined in the conversation and talked about the unusual history of elephant domestication in Sumatra. I knew some of this history from books and articles. Historically, Sumatra had domesticated elephants for only two or three centuries, during the period of the precolonial Aceh Sultanate. Under this regime, elephants were caught from the Sumatran forest and trained for logging, transport, parades, and occasionally warfare. In Java too, people had caught and trained elephants prior to the colonial period, but elephants disappeared from Java's dwindling forest interior during the eighteenth century (whereas elephants persisted on the more heavily forested island of Sumatra).

After the Sultanate period in Sumatra came Dutch colonial rule, during the nineteenth and early twentieth centuries. Elephant capture and taming in Sumatra ceased, partly because the Dutch, unlike the British in India and Burma, were uninterested in investing in elephant-centered methods of extracting forest resources.[10] However, the speed with which elephant culture disappeared from Sumatra also indicates that elephant domestication here, while it existed, had been organized primarily by the island's most powerful rulers, the Acehnese sultans. Once these figures were deposed or replaced by Dutch governors, there were no indigenous social structures to keep the local traditions of elephant domestication in place. By contrast, on the Asian mainland, elephant domestication was organized both by powerful kings and also by forest peoples and hill tribes. So even when local kings and emperors fell, traditions of elephant capture and

domestication were sustained by groups on the margins of power, like the Hkamtis and the Morans.

All of Sumatra's domesticated elephants were released back into the forest and joined wild herds there, and from the early nineteenth through the late twentieth century, Sumatra's elephant population was entirely wild. This wild population, though, clashed with farmers who were expanding into Sumatra's interior. The problem became pronounced during the 1950s and 1960s, as the post-independence Indonesian government encouraged large migrations of Javanese to Sumatra, to relieve the island of Java of its long-standing overcrowding problems. In Sumatra, the Javanese primarily engaged in agricultural work. In turn, conflicts between farmers and wild elephants became more frequent, as elephants wandered through farmers' crops and farmers sometimes responded by killing the elephants.

During the 1980s, the Indonesian government tried a new strategy for reducing these farmer-elephant conflicts: turn the wild elephants, or at least a large number of them, into trained work elephants, whose movements could then be controlled. The Indonesian forestry department had in mind something like the Burmese forestry model, where elephants would be captured and trained to do logging work, which in turn would help pay for expanded forest and elephant conservation efforts. The forestry department hired mahouts from Thailand to teach locals how to capture and train elephants.[11] Given that the forestry model the Indonesian officials had in mind was the Burmese one, it likely would have been better to bring in Burmese mahouts, but Burma's political isolation during that period made this difficult.

Several hundred of Sumatra's three to four thousand elephants were captured this way, then sent to a network of new conservation camps to engage in logging. But the logging camps never proved especially profitable, as Sumatran lumber was susceptible to global

market forces: economic protections were lacking, and the types of timber that proliferate in the Sumatran forests were relatively widely available. In the 1990s, forestry officials repurposed many of the caught elephants for tourism, either by building new elephant parks in the Sumatran forest or, in many cases, by sending caught elephants to the island of Bali, which has a higher concentration of tourists than anywhere in Sumatra. But this strategy also had limits. The camps in Bali generated plenty of revenue but didn't place elephants near sufficient forestlands. The camps in Sumatra had ample forestlands but couldn't draw enough tourists.

Perceiving the weaknesses of both the logging and the tourism strategies, Wahdi Azri and other officials initiated a third utilization for the caught elephants: for "patrol" work. Wahdi explained the concept: "In many areas the issue with farmer-elephant conflicts is that there's no 'buffer' between the two, and the farmer communities only see elephants as a negative in their lives. To address this issue, we move along the forest periphery with our patrol elephants, and when we hear of a farmer-elephant conflict, where a wild elephant has wandered onto a farmer's land, we go to that area and pressure the wild elephant back toward the forest. Sometimes we need to use sound cannons to do this, but usually what happens is that the moment the wild elephant sees our patrol elephants, it understands it has to go back in the other direction, toward the forest."

He continued: "The farming communities get used to the patrols and start to see them as a benefit to the community. Sometimes they get very attached to the patrol elephants, which is a completely different cultural mentality than a decade ago, when most local people just saw elephants as a nuisance."

"It happened recently," Chris cut in, "that a community in South Sumatra learned that their favorite patrol elephant was being sent to another area, to a park. And they became so enraged that they

threatened to burn the park headquarters down if they didn't get their elephant back!" The German grinned.

Wahdi seemed a bit embarrassed by the story but clearly appreciated its implications. "The main problem with how the elephant domestication program was designed here in the 1980s and 1990s," he went on, "was that for the forest officials, it wasn't a 'trained work elephant' that had value. No, it was a 'caught elephant' that had value: the value of no longer presenting a nuisance to the farmers." This meant that this earlier generation of forestry officials had never entirely thought through the question of what to do with the elephants once they were caught. "The legacy of that mindset is still very much in the forestry department today," Wahdi explained. The patrols had much potential as a model, but they couldn't give all of Sumatra's caught elephants, of which there were many hundreds, something to do. "And if they don't have something to do, they don't receive good care," he added. Chris nodded in agreement.

I knew there was another major restraint in Sumatra's young, or "relaunched," tradition of elephant capture and mahoutship: in Sumatra they do not let their trained elephants roam the forest at night. That practice, so key to the elephant cultures in Burma and northeastern India, would require people who were willing to spend a large portion of their lives in the forest—and a government, or some other funding source, willing to pay for that kind of commitment. This limits the elephants' usefulness for logging and closes off the use of elephants for transportation during the monsoon season, a task which Sumatra's trained elephants don't do at all.

Hearing about these challenges within Sumatra's elephant conservation programs, I wondered whether the official who had brought the elephants to Banda Aceh after the tsunami was aware of this ongoing problem, of finding a "use" for the caught Sumatran elephants. Perhaps, in some way, he was trying to demonstrate a

value that his fellow officials had not yet perceived: the elephants' value during floods. Banda Aceh was likely not the best place to demonstrate that worth, due to the dangerous conditions left in the tsunami's wake. But Banda Aceh wasn't the only tsunami-hit area where elephants aided relief efforts. In southern Thailand, elephants from some tourist parks were brought into destroyed sections of a beach area called Khao Lak. There the working conditions were better for the elephants than in Banda Aceh, as the scale of the wreckage was not as severe.[12]

THE REAL LIMITATION in deploying elephants for relief work in places like Banda Aceh is not so much that these places are cities as that, infrastructurally, they are not designed to flood "cleanly"—that is, to keep floodwaters unpolluted as they surge in. To some extent, this is a problem in all flood-prone cities. But it's far more severe in cities, which, due to poverty or age, can't easily engineer a hydraulic infrastructure that quarantines the sewage system during a flooding event. To expect relatively poor places like Banda Aceh to have such sophisticated infrastructure in place, when even many developed cities don't have anything like this, would be unrealistic and unreasonable. But what about wealthier cities within the Asian elephant's natural range? Singapore is a pocket of incredible wealth located at the southern tip of mainland Southeast Asia—but at this point the tiny city-state has almost no forestland, which is also true of the portion of Malaysia adjacent to Singapore.

What about Brunei? A small and lesser-known sovereign state on the northern coast of the island of Borneo, Brunei is within the Asian elephant's natural range. Since its major industry is offshore gas rather than agriculture, it has a generous amount of forest cover. Its towns become highly flood-prone during monsoon, as does its one major city, called Bandar Seri Begawan. The coun-

try's gas deposits have made the country extremely wealthy, not just by Southeast Asian standards: Brunei has one of the top five gross domestic products per capita on earth—ahead of those of the United States, Saudi Arabia, and Norway.

Brunei is so small that elephants from the Borneo interior rarely wander into its forests. Generally, the country doesn't even turn up on official lists of countries with wild Asian elephants. Yet the herds of Borneo elephants are present—if not literally within Brunei's borders, then certainly in the nearby Malaysian and Indonesian sections of Borneo's huge forest interior. The Borneo elephant, which is a subspecies of the Asian elephant, has a nebulous past. Some experts say that Borneo's elephants are actually the last remaining Javanese elephants, who were brought to Borneo by the Sultan of Sulu in the seventeenth century, prior to elephants' eventual disappearance from the island of Java.

An alternative theory is that Borneo's population of elephants is indigenous and goes back for millennia.[13] The elephants got there, this theory goes, the way they got to Java and Sumatra: some ten thousand years ago, all three of these islands were connected to the Asian mainland. During that epoch, Southeast Asia was not divided into a mainland half and a maritime half, as it is today, but rather constituted a huge and united subcontinental landmass that paleogeographers refer to as Sundaland. The southern half of Sundaland rapidly flooded during the melting of the Arctic ice sheet, which raised global sea levels. All that remains of southern Sundaland today is the Indonesian archipelago west of Lombok (at the so-called Wallace Line), in particular the three large islands of Java, Sumatra, and Borneo. Of course, it's plausible that both theories are right, that Javanese elephants transplanted to Borneo mated with indigenous Borneo elephants. All these animals are, after all, simply Asian elephants.

I visited Brunei in 2016, not to see elephants but to see Brunei's

main city. Could this place *have* elephants, I wondered, even though it is a modern urban environment? Bandar Seri Begawan feels very much like two completely separate cities superimposed on top of each other. One is a kind of "pile dwelling" settlement. Residential neighborhoods built entirely on stilts sprawl into the city's main waterway, the Brunei River, linked by a labyrinthine network of wooden planks and gangways.

These districts exemplify a traditional Malayan urban form, the *kampong*, or water village, built partly in anticipation of periodic flooding. Bandar Seri Begawan has several of these water villages, the largest of which, Kampong Ayer, is effectively a man-made island on stilts in the middle of the river. People get from kampong to kampong on private boats or water taxis, which are well organized throughout the city. The kampong style of settlement, where many urban residents live over the water rather than in the city's plains and hills, keeps many of those plains and hills clear of development, so the city is heavily penetrated by lush forest.

The city's other layer feels much more like the Islamic petrometropolises of the Persian Gulf. While some of Brunei's gas wealth has gone toward the kampong settlements, most of it has gone toward a more conventionally modern city. This other urban layer has wide streets, concrete apartment buildings, an office downtown (with a rather colorless shopping complex), and a distinctive neotraditional gold-domed mosque. The city was a British imperial outpost during part of its history—called Brunei Town then—and this legacy shows up in the demographics of the city's workforce, which often hails from India, the U.K., Australia, and New Zealand. Workers come from nearby Malaysia and Indonesia as well. To a solitary visitor wandering Bandar's streets, the city feels a bit like a large American college town during the summer months when everything is a bit too quiet and one's only company is the chilly wealth on display in the surrounding institutional architec-

ture. At the same time, Bandar Seri Begawan is very much its own place, with a unique and startling presence of nature in the heart of the city. During my visit, macaque monkeys were everywhere, sometimes lingering by street markets. Enduring the hot midday sun in one of the kampong districts, I spotted small crocodiles and a monitor lizard lurking in the water below.

Several forest corridors begin near the downtown area and wind their way toward the larger forest country beyond the city's edge. These corridors are full of bamboo and vines and creepers, as well as many macaques and the famous Borneo proboscis monkeys. To me, the fact that the city already had these urban forest corridors in place, virtually all them with a substantial amount of uninterrupted connectivity to the vast Borneo rainforest beyond, seemed extraordinary. Of course, the city has had the luxury to be developed in this way because of the offshore gas, which is environmentally damaging but not in ways that a wanderer here would perceive or experience directly. Given the spatial layout of the city, its wealth, its kampong-like structuring around the inevitability of annual flooding, and its proximity to the Borneo rainforest, I thought it incredible that the place didn't have a few domesticated elephants already.

It could. Trained work elephants here could assist in transport and logistics during the rainy season, moving passengers and supplies across flooded roads, both within the city and between the towns and villages that dot Brunei's forested hinterland. A Bruneian department of floodtime logistics could hire mahouts from the Trans-Patkai region or from central Burma—areas where mahouts still tend to be skilled at using their elephants during the rainy season. Over time, these skills might be picked up by Malay-speaking Bruneians, Malaysians, Indonesians, and other groups already in Brunei, just as the Kachins learned mahoutship skills

from the Hkamtis. Administrative expertise could come from the Burmese forestry department, with its knowledge about setting up elephant villages, and from the Kachin Independence Army, with its knowledge about conducting elephant-based transportation during floodtime on a systematic basis.

The work elephants, too, would likely at first come from elsewhere. The elephants could spend much of the year in the rainforest beyond the limits of Bandar Seri Begawan, tended to by their mahouts. During the rainy season, they would come with their human attendants into the city, to do far safer work than elephants did in Banda Aceh in early 2005. If such a model were shown to be effective in Brunei, it might be replicated in other parts of South and Southeast Asia, as other regions urbanize and develop. Even some cities in China, within the Asian elephant's range dating from ancient times, could foster these kinds of government-managed elephant teams for floodtime logistics.

Using elephants in this way could open up exciting new possibilities in planning human-inhabited landscapes around "soft," flexible infrastructure. Rather than requiring every new development in flood-prone terrain to involve construction of huge new levees, concrete run-off channels, and expensive, hulking road viaducts, more watercourses could be left to meander naturally. Communities could live alongside these courses, following some version of the Sissiri river-crossing model: temporary bridges would cross the rivers during the dry season, barges would cross during transitional times of year, and elephants would cross during the wet season (when unpredictable channel shifts create problems for barges). Not only would such communities be well positioned to absorb the shock of major flooding events, they would be able to capitalize on the benefits (agricultural and aquacultural) of being set on riparian ecosystems with healthy, dynamic flooding cycles.

It's just a dream, of course. But elephants' usefulness in flooded areas, rural and urban, is real. Investing in elephants to help during floods is the kind of thing that could connect elephants' unique abilities to a set of human needs that is likely to grow in coming years—a linkage that could even, in turn, help reverse Asian elephants' population decline. Until now, the Asian elephants' principal working alliance has been with those who ride them in the forest. But this alliance could grow to include many other human beings as well.

CONCLUSION

THE PROSPECTS FOR THE ASIAN ELEPHANT ARE BLEAK. Just twenty years ago, there were sixty thousand Asian elephants on Earth, already a calamitously small number. Today the number seems closer to forty thousand. This drop has occurred despite the efforts of a vigorous international conservation community and despite the presence of relatively stable political conditions throughout South and Southeast Asia. In fact, elephants have done relatively well in areas adjacent to zones of political instability (in particular around Burma's Kachin State), while improved economic development throughout this part of the world has gone hand in hand with dramatic rates of deforestation. In the section of the planet most densely settled with humans, little room is left over for the planet's second-largest land animal.

Any hopeful future for the species likely has to entail those who know them best: the people who fetch elephants out of the forest every morning and return them every night. Such people have the most sophisticated understanding of how humans and elephants can coexist within the same social and environmental setting. And yet in the global community of professional conservationists, veterinarians, scientists, and development experts committed to protecting Asian elephants, virtually no one involved hails from mahouts'

camps or villages. The global elephant conservation community holds many conferences. Fandis like Miloswar and mahouts like Mong Cho ought to be involved in them. The conferences are usually held in major cities—London, Singapore, Bangkok, Bangalore—but sometimes they should be in Chowkham, Miao, or Tanai, places with lots of people who've spent long years living and working with elephants deep in the forest—catching them, training them, riding them, fetching them, finding that one has become pregnant, raising and training the calf, and so on. Their involvement would broaden and improve the professional conversation about what to do with these giants in an upcoming era when Asia's human population and agricultural output will surely continue to expand.

Also usually in attendance at these conferences are representatives from the forest and wildlife bureaucracies of the states that have large elephant populations. But people like Colonel Nan, who is in a quasi-governmental, militant independence organization, ought to be there as well. Indeed, the demographic and environmental situation of Asia in the twenty-first century may make the Kachin Independence Army's "elephant brigade" model, which organizes an elephant management bureaucracy around the imperative of transportation, even more valuable and instructive than the Burmese government's current "timber enterprise" model, which organizes elephant management around the goal of logging.

Asian elephants would likely also benefit from a correction of a few misperceptions that are still widespread among many people in parts of the world that do not naturally have elephants of their own—and this includes most of the developed or "first" world. An all-too-common perceptual conflation of Asian with African elephants, combined with frequent and visually graphic news reporting on ivory poaching in Africa, has left many people with the mistaken impression that the main problem afflicting elephants

today is that they're receiving insufficient antipoaching protections from police. And that impression may be accurate for parts of Africa and may correctly comprehend a significant threat facing the African elephant species.

But the fact is that Africa has half a million elephants, while Asia has a tenth the number. Even if we grant that ivory poaching is a major problem and that better protections are needed, the main problem afflicting elephants in Asia is not ivory poaching but deforestation. The reason Asian elephants' numbers are so low compared with those of African elephants is that thus far, deforestation between the Indus and Yangtze rivers has been a vastly more intensive historical process than has deforestation between the Senegal and the Zambezi. This strongly suggests that whatever hope the Asian species has rests in the hands of those human communities with a proven, ongoing ability to base their livelihoods on elephant domestication practices that keep elephants situated within the forest.

This problem of the perception, or misperception, of ivory poaching gets to a much deeper issue, a moral one. To many outsiders interested in the welfare of the elephants, support for antipoaching measures, or for larger wildlife reserves, may seem morally very intuitive, offering a particular appeal to the conscience, whereas the capture and conscription of individual elephants is much more morally fraught. Even if one of the core aims of forest-based domestication, looked at in totally "utilitarian" terms, is to keep a larger percentage of Asian elephants situated within forest ranges, and to give them plenty of free roaming and mating time in the forest, the sheer *domination* of these elephants' lives—they are literally in chains, after all—may strike a morally distressing note for many outside observers, and for readers of this book, who want to see elephants free and in the wild.

I have attempted to complicate this picture of domination. The

chains are breakable. Many elephants seem to have profound feelings of loyalty and protectiveness to their mahouts and their mahouts' comrades. The whole system of the nighttime release depends upon the elephants' not taking advantage of a constant opportunity to escape. The elephants might even, to some extent, be the ones innovating some of the work tasks that they perform, or aspects of those work tasks, as a kind of collective strategy of survival. What I would urge outsiders concerned for elephants' long-term welfare to consider is that the desire (an all-too-human desire) to gravitate toward holding the "pure" or "perfect" positions is *not* the same thing as Asian elephants' desire to survive in a human-dominated world. The elephants do not have the luxury to ignore Voltaire's old aphorism that the perfect is the enemy of the good.

The relationship between the elephants and their forest mahouts certainly contains problems and frustrations. Currently, mahouts have to fetch their elephants in the forest on a daily basis, sometimes for many years on end. This keeps the mahouts more or less permanently wedded to the forest, as long as they're attending to their elephant. For some mahouts, like Mong Cho, even visiting close family members in a nearby village occurs only on occasion. Camp and forest life, and the bond with the elephants, reign supreme.

This situation could perhaps be ameliorated by the introduction of recent technology. For instance, the elephants could wear lightweight GPS devices, allowing mahouts to find them even if they've wandered many miles away. During the off season, elephants could be given multiple days or even weeks in a row in the forest, with fetters loosened, and the mahout could get more time participating in village or town life. Perhaps an elephant could be given months—years, even!—in the forest, permitted to wander for a hundred miles or more, as the mahout watches the route on a computer screen and eventually "fetches" the elephant in a truck-pulled portable stable.

This GPS-enabled scenario would grant more personal freedom

and autonomy to both forest mahout and elephant, allowing them to live as more "regular" members of their respective species. Of course, overlong separations could pull the human and elephant apart. But perhaps carefully staggered, short "vacations" could improve the interspecies bond rather than undermine it.

UPSTREAM FROM the fording spot where Burmay-Moti and her mahout Pradip cross the Sissiri with their passengers and cargo, a concrete viaduct is under construction: the Trans-Arunachal Highway. Intended to follow the long, Himalaya-hugging arc of Arunachal Pradesh, and to help assert Indian sovereignty in territory still claimed by China, the highway must pass over many high viaducts to traverse the floodplains of Himalayan rivers draining toward the Brahmaputra: the Sissiri, the Dibang, the Siang, the Lohit, the Dihing, and others, all of which have a gigantic water discharge during monsoon and can become, in multiple cases, several miles wide. The viaducts have to be both higher and wider than the reach of the most severe floods, so as not to be submerged. The viaduct projects are attempting to overcome a daunting engineering challenge, and once completed, they may prove insufficient in the event of a major rivercourse-altering earthquake, of the type that struck in 1950 and forced the total abandonment of the town of Sadiya.[1]

These lumbering concrete viaducts are, of course, the sort of transportation infrastructure with which the modern world is very familiar. Their construction should not come as any great surprise. The greater surprise for most outside observers is, surely, the persistence of elephant-based transportation as the highest-value means of passage across the Sissiri during monsoon. And visiting this spot and watching Burmay-Moti and Pradip at work, I could not help but suppose that if the Indian state involved itself more

in such elephant "ferries," at river-crossing points along the forest frontier, and less in throwing huge sums of money at concrete projects of questionable soundness or finishability, it could in fact project far greater control over the area than it is currently able to do. The predictable, prosaic insistence of the modern technocratic state on the great concrete highway may actually undermine control. Thus far the only form of state leverage the project has brought is the ability of government officials to give out payoffs to local tribal leaders.[2]

No doubt, many development projects in Arunachal and elsewhere in the region do require investment in the form of concrete and steel, but there are limits to what this kind of hard infrastructure can do. The landscape of Arunachal Pradesh, like the landscape of the Kachin Hills, is not the hard, arid earth of, say, southern California—that is, the sort of landscape where the distinction between land and water is more rigid and predictable, and where the automobile seems most to come into its own as a creature of transport. The Trans-Arunachal Highway project is an attempt, and one not yet proven effective, to harness modern building materials at a massive scale to erect a huge fiction that the landscape is something other than what it is. But the hydra-like advance of water, mud, and silt in the area during monsoon is sublime—thunderous forces conjured up by elemental gods. Ultimately, such power may prove to be too much for the new paved leviathan.

ONE AFTERNOON on the way to one of the hill ranges of central Burma, I passed through Naypyidaw, Burma's new capital city, built by the military government during the late 2000s and early '10s. It is the only major urban settlement in Burma far from any waterway. Billions of dollars have gone into the rapid construction of the sprawling new metropolis, and at every turn the place begs

comparison with the previous capital, Yangon. While Yangon is forever suffering power outages, Naypyidaw's bright, tall lights are kept on through the night. Yangon's streets are full of crowds, food stands, and honking traffic jams of taxis and motorcycles, while Naypyidaw is planned around empty superhighways of absurd width (one is twenty lanes across, with hardly any traffic at all). Yangon's downtown is arranged on a tightly knit street grid similar to New York's. With its more sprawling fabric of curvilinear arterials and cul-de-sacs, Naypyidaw's analogous "model" could be Lake Havasu or Palm Springs.

Naypyidaw is a kind of bubble of gleaming first-world luxury in one of the poorest countries on earth. It hosted the World Economic Forum in June 2013, a few days after I passed through. The metropolis is equipped with high-end supermarkets (unused), sweeping office parks (mostly unused), and an army of landscapers and gardeners to keep the many highway medians looking trim and pristine. Precious little street life was anywhere to be found, except at an unplanned open-air market at the edge of town, used by the capital's workforce and by the inhabitants of Pyinmana, the district's preexisting town, which Naypyidaw has swallowed up and annexed. No one I spoke with cares for the new capital city; one person told me curtly, "It's a sore subject," and left it at that. Some told me the idea for the new capital came to one of the generals' astrologers in a dream. Another said that during the run-up to the U.S. invasion of Iraq, the Burmese regime's leading military officials convinced each other that they were next. Naypyidaw's position between the Bago Hills and the Karen Hills seemed easier to defend than Yangon, which faces the sea.

Later in my travels, I was in a hotel in Yangon, going through notes and photographs. I considered Naypyidaw's landscape of vacant superhighways alongside various scenes of transport by elephant: a logging village's well-trod elephant trails, the elephant

convoys of the KIA winding their way through the forest, the elephant ford at the Sissiri River, the "relief" elephants who rescued refugees in the Patkai Mountains in 1942 and who cleared tsunami wreckage in Indonesia in 2005. I considered the elephants I had met in my travels or had come to know from mahouts' tales or records from history: Air Singh, Neh Ong, Maggie, Rungdot, Sokona, Pak Chan, and many others. Naypyidaw's planners intend the new capital, more exurb than city, as a vision of a "modern," newly opened Burma. But in the contrast between landscapes of mobility, the freshly hardened ribbons of asphalt appeared regressive and constricting. The animals and their riders seemed to be carving out unknown frontiers that were otherworldly and everywhere.