

## I

## Landscape of Mystery

Imagine that you have been transported to the middle of Siberia at the end of the first decade of the twentieth century. You are hiking through a bumpy, boggy forest when you come upon a spot where everything suddenly changes. Dense verdant conifers stop blocking your way. This is not because you have reached a river or a swamp, nor a meadow, a road, or a cultivated field. You do not know why the forest has ended. Curious, you climb a nearby hill to inspect. There you see rows upon rows of trees lying flat and pointing in the same direction, as if kneeling before you. They seem to go on forever. It almost looks like some massive logging operation had knocked down a city's worth of timber but then left the trees to rot away slowly. But the roots of many of these wooden victims have been torn out of the ground as well. When you trek closer, you notice standing groves with branches stripped away. Beyond these clusters of bare poles swaying in an open breeze, new rows of fallen trees shoot out: a sea of prostrate forest. (See Figures 1.1–1.2.)

What could have so eerily remade this landscape? A storm? But why, then, were the trees facing outward from a common point? Could people have done this? But, again, why? And how? You are in one of the least inhabited corners of the planet. Hundreds, if not thousands, of people would have been required to knock down so large an area of forest in this unusual pattern. Maybe some unknown technology was at play? Perhaps one of those new flying machines carrying a secret superweapon? Or maybe those canal-building Martians you saw in the newspapers had attacked? Or had an accident? Or something? If the trigger of this mysterious landscape indeed came from outer space, then it is probably better to suppose that a meteorite had caused the destruction. If a



FIGURE 1.1 Rows of trees fallen from the blast in the 1920s.



FIGURE 1.2 Bare trees standing at the site in the 1920s.

*Landscape of Mystery*

3

meteorite leveled this forest, then there should be a huge space rock and a massive crater. Right?

No, not as it turned out.

The source of this unsettling scene usually goes by the name of the Tunguska meteorite, though some still prefer to call it the Tunguska cosmic body and others insist that it was not cosmic at all. To this day, no crater has been located, nor has anyone recovered material that undeniably came from a meteorite. At the time when the devastation in Siberia took place on a June morning in 1908 those studying meteorites thought very differently about them than they do today. Scientists defined meteorites as rocky objects from space that hit the ground but were unsure if they originated mostly from other planets or from asteroids. Meteors, by contrast, referred simply to shooting stars visible in the night sky and the term meteoroid remained reserved for a meteorite that had not yet landed. By these strict definitions, almost no one would claim that a Tunguska meteorite ever existed.

But such clear demarcations have become antiquated. Planetary scientists now know that sizable objects coming in from space can explode in the air and release a violent burst of energy: one strong enough to knock down a surrounding forest, while perhaps leaving trees standing directly below the blast. A body that does this would contain much less iron than the ones sure to leave a crater. Iron meteorites were once seen as the most common type, but they are now recognized as a small minority. Nor would the space rock have been big enough to press the reset button on the entire species makeup of the region, let alone the planet. A medium-sized stony meteorite – though not necessarily an iron one or a hybrid called a stony-iron – could burst into so many tiny rocky fragments and specks of dust that they might soon become almost impossible to find. All of this thinking about meteorites offers a possible explanation of how the peculiar and denuded landscape you encountered might have come to be. Yet it does not supply incontrovertible proof that the singular event of the Tunguska explosion unfolded in this way. Uncertainty means that this devastated environment of 1908 remains enigmatic to many.

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Most likely, the Siberian blast of 1908 was the largest known impact of a space object on planet Earth in recorded history. It brought enough destructive power that it could have decimated a large city had it hit elsewhere. Hundreds of people witnessed a fireball in the sky, heard thunderous booms, or felt a shockwave ripple. Many more observed the atmospheric afterlives of the explosion. But only a small number of

individuals suffered injuries from the blast and even fewer died. Most of these victims were members of the Indigenous group the Evenki, which had managed to maintain a considerable degree of cultural autonomy from the Russian Empire. Some Evenki closest to the devastation later attributed the explosion to an angry spirit intervening on a shaman's behalf. (See Maps 1.1–1.2.)

Despite its size, Tunguska occurred in such a remote part of Russia that scientists did not pay it much heed until the 1920s. In that decade a compulsive and persistent meteorite hunter named Leonid Kulik inaugurated a series of arduous field campaigns to learn more about the explosion. The failure of these quests to find a meteorite transformed the forgotten Siberian blast into the Tunguska mystery. Henceforth, people across the planet puzzled over what had happened. They offered their own original and offbeat explanations and undertook expeditions to discover the truth. Soon the array of theories to account for Tunguska extended well beyond the parameters of meteorites to include aliens and antimatter, comets and tectonics. Fictional speculation inspired unconventional thinking, while mainstream science sometimes went in circles. It proposed that Tunguska had been caused by a meteorite, then a comet, and then a meteorite again. Whether one should even refer to Tunguska as a “mystery,” rather than an unsolved scientific problem, became itself a matter of rancorous debate.

Starting in the late 1950s, voluntary field research – in particular by an informal group known as the Complex Amateur Expedition (KSE) – took place almost annually. A cohort of Soviet youth spent summers in the Siberian wilderness searching for the answer to Tunguska, while also singing their own original songs around communal campfires. Many of these researchers eventually grew concerned about the need to preserve the land where the explosion had occurred. They lobbied successfully for the creation of a nature reserve, which would help protect any remaining evidence about the mystery while also restricting access to the area. But by the time this had happened, the Soviet Union had ceased to exist, and international teams of scientists had joined the efforts to inspect the site of the explosion. Tunguska today sits in the intriguing position of being better understood than ever before, while continuing to generate new creative speculation.

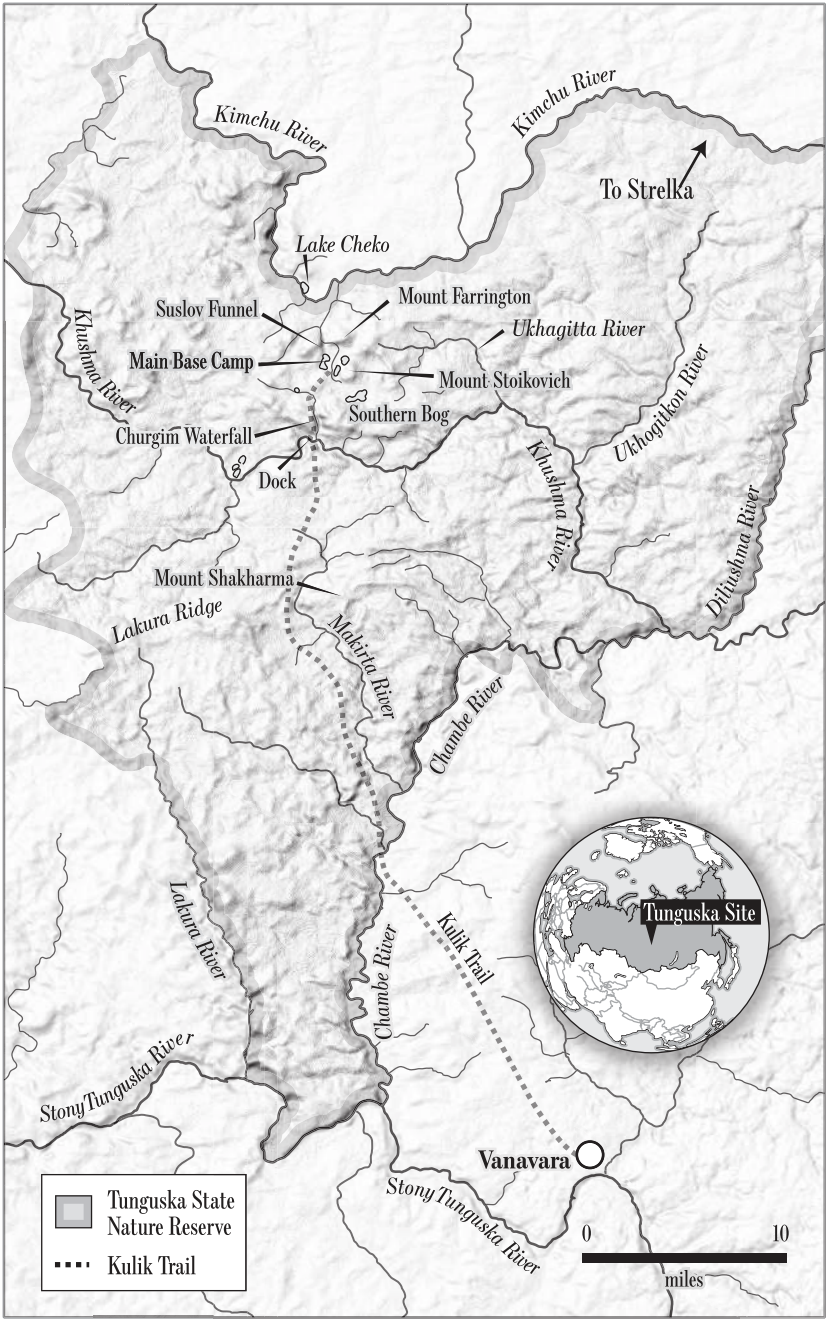
One hundred and ten years after the explosion I saw for myself the boreal forest of Siberia – the taiga – where it had taken place from the windows of a helicopter. (See Figure 1.3.) A green block of lush forest spread all around, with rugged wetlands shaded in chartreuse and olive



5



MAP 1.1 The Tunguska site in Russia.



MAP 1.2 The Tunguska epicenter.

*Landscape of Mystery*

7



FIGURE 1.3 The Tunguska epicenter from a helicopter in 2018.

spotting the scene. From this vantage point I found the land breathtaking and invigorating but not strange or surprising. In contrast to the scene that I asked you to envision shortly after the blast, the revived environment of 2018 no longer immediately revealed the traces of a cosmic collision. The landscape charmed me with its history and beauty but did not quite evoke the same sense of wonder as it had for so many observers in the past. Part of me really wishes that it had.

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Meteorites have long been thought of as mysterious and none more so than Tunguska. They very well may have supplied some of the key substances that allowed life to arise on Earth in the first place. But one day a meteorite may spell doom for most of the species currently inhabiting the planet, as has happened in the past. This duality of life and death has prompted some to attribute religious significance to meteorites, labeling them “the alpha and omega of geology.”<sup>1</sup> Imputing spiritual and supernatural meaning to meteorites predates even the biblical evocation of this alphabetic reference and reaches beyond it. Explicit mentions of rocks from space playing powerful roles in human life go back thousands of years to the Mesopotamian *Epic of Gilgamesh* and the official histories of ancient Chinese dynasties. The Black Stone at the Kaaba in Mecca – venerated by Muslims – may have originated in the cosmos.<sup>2</sup> A tie binding the exalted and the unknown has been deeply embedded in otherworldly rocks.

Similarly, mystery in its etymological sense evokes divinity and secrecy in equal measure. A mystic might best intuit the meaning of a mystery, even if it is left to a detective to solve it. Because so little has been known about the bodies from space that collide with the planet, many meteorite falls have spawned wonder and confusion, awe at unity with the great beyond and discomfort with the perplexing uncertainties that these objects bring. Meteorites almost seem to dare us to revel in the unknown, mocking the smallness of humanity and its inability to grasp all that is out there. Why should we have any confidence in what we think we understand today when we know how wrong we have been in the past? Why should we assume that we can conquer the cosmos, when our very existence is owed to the leftover debris of a forming solar system? By offering a glimpse at the immense cosmic and ancient order, meteorites disrupt any illusion that the scope of human knowledge and action can extend very far.

Tunguska shares this status of exposing the unknown, but it has done more than that in its relatively brief history – still less than the length of the longest human lives. Tunguska clearly reveals the potency of mystery as a force in environmental history and the planetary humanities.<sup>3</sup> Much of Tunguska's significance centers on its status as a mystery in two entwined ways. In the one sense, the Tunguska explosion and the efforts to understand it show the power of non-human elements of the physical world over human experiences and comprehension. The natural environment itself contributed mightily to making Tunguska mysterious. I mean this not simply in the sense that nature possesses secrets that scientists attempt to discover, but that places from Siberia to the far reaches of the solar system actively confounded investigators and shaped the knowledge that has come to exist about Tunguska.<sup>4</sup> Conversely, over the past century many people have opted to think about and engage with a particular territory in Siberia first and foremost as a container of a mystery with cosmic significance. The attempt to solve a mystery has dominated interactions with a landscape in a distinctive way, giving rise to a nuanced array of practices and experiences with a specific environment that depart from other dominant methods of human engagement with non-human nature in most other parts of the globe.

I contend that mystery in both of these environmental forms – as emanations from the natural world and cultural and social impositions upon a territory – have been at the heart of the history of Tunguska. Mystery has been a thread that has tied thoughts and behaviors to this particular place for much of the past century. The story I tell here tracks

how unknown forces destroyed a landscape in Siberia, how early research into the event transformed it into a mystery in human culture, how a longing to figure out the cause of the blast shaped people's experiences with Tunguska's environment for many decades, and how over time scenarios to effectively explain the explosion emerged, even if many still harbor doubts about their validity. Mystery's role as a key force in the history of Tunguska can be seen in several dimensions.

First, Tunguska gave rise to a set of environmental practices oriented primarily toward the objective of solving a mystery. The centrality of mystery-solving presents a distinctive environmental story that overlaps with familiar narratives of exploration, exploitation, and conservation, but possesses a different underlying logic. Throughout the Soviet and post-Soviet eras, the territory faced minimal intrusions from economic and military interests and remained largely unsettled for most of the year. In the absence of these other environmental uses, a special approach to this land predominated. A forensic agenda shaped the varied acts of engagement with the site, which ranged from draining wetlands to preserving traces of fallen forests.

Additionally, the puzzle of Tunguska triggered the involvement of unofficial actors – voluntary investigators and creators of science fiction – in the scientific enterprise. They proposed unconventional solutions to the riddle, undertook their own field research, and explored angles of the problem ignored by meteorite experts. Tunguska helped allow for alternative knowledge to flourish in corners of Soviet society and indeed played a fundamental role in the rise of the study of unidentified flying objects (UFOs) in the USSR. Fieldwork also became especially important for those who were convinced that the matter remained unsolved. On these expeditions a subculture of passionate and eccentric wilderness lovers arose because of an abiding mystery.<sup>5</sup>

Finally, the enigmatic character of Tunguska has compelled pondering the possibility of cosmic disasters.<sup>6</sup> When investigation of the 1908 explosion began, few saw objects from space as a major threat to life on this planet. The study of the hazards posed by asteroids and comets grew in tandem with efforts to understand what had happened at Tunguska. Today research on and monitoring of near-earth objects (asteroids and comets within possible striking distance of Earth) rely heavily on the science of Tunguska. Moreover, part of the need to speculate about other possible triggers of the blast stems from a wariness about what unknown culprits of catastrophe might also exist in the universe. Taken together, distinctive landscape interactions, alternative forms of knowledge, and



concern about catastrophe underscore the centrality of mystery in Tunguska's history.

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There are many accounts of the Tunguska phenomenon. Most are scientific papers by researchers in the natural sciences. Many popular accounts exist as well. Often these works aim to describe the competing theories about the cause of the blast and sometimes venture their own explanations.<sup>7</sup> Tunguska has also inspired plenty of science fiction writing and been used as a trope even more frequently in creative works.<sup>8</sup> Perhaps the least attention to Tunguska has been paid by scholars in the humanities and social sciences, though this is starting to change.

This book joins several insightful efforts to examine Tunguska as a topic of historical, literary, and philosophical inquiry. For philosopher Michael Hampe, the mystery of Tunguska is an invitation to reflect on the partiality of scientific knowledge, the uniqueness of singular occurrences, and the possibility of the end of nature. He does this through an imagined conversation among brilliant thinkers about the implications of Tunguska for comprehending the natural world.<sup>9</sup> Like Hampe, literary scholar Solvejg Nitzke stresses the destabilizing force of the Tunguska phenomenon. She shows how the fictional genre of mystery structured the behavior and thinking of many who have looked into the event. The failure to crack the case, however, possesses deep significance. In Nitzke's rendering, the inability to maintain consistent methodologies for investigation and rigid boundaries between fact and fiction has turned Tunguska into a disaster of a different sort: one that dislodges the confidence in modern scientific knowledge.<sup>10</sup> Other scholars have offered hermeneutic readings of the event, emphasized how it reflected religious and occultic elements of the Soviet Space Age, highlighted posthumanist motifs in cultural products concerning Tunguska, and developed insights about the social history of Soviet science from the voluntary investigations.<sup>11</sup>

I depart from this valuable work by exploring Tunguska as a landscape of mystery. This book offers a complete history of the Tunguska phenomenon from the time of the blast to the present, while offering glimpses of the deep past and the distant future. It travels to places around the globe and beyond the planet. But at the center of the story is a particular environment in Siberia where the destruction occurred in 1908. How people thought about and interacted with this part of the natural world over the decades is one main concern. A second is understanding what