

Land, livelihood, and language are intimately connected. What the Monchaks will lose, by relocating to urban areas and giving up their ancestral tongue, is cultural knowledge—how to live the traditional way of life that has sustained them up to now, and how to preserve remembered histories central to their identity as a people.²

Many adults know techniques for healing human and animal diseases, rituals for practicing animism, songs and oral histories never put to writing. They may not need any of these things to live in the city. But given the deep attachment many Monchaks have expressed for their history and language, it is hard to imagine they will not miss them. The community is now split: those who have moved to the city cannot imagine going back, and those in the country cannot imagine leaving it. Both factions are undergoing language shift and cultural assimilation, simply at different tempos. The momentum is with the urbanites, as more of those in the country give up the herding life and flock to join them. Those who do stay in the countryside, pressed on all sides by dominant Mongolian culture, are already shifting languages. Globalization and urbanization proceed, and in this particular community, they will soon snuff out the last word of this once vibrant nomadic tongue.

Угаанда тэнчү чок
Mind has no end.
—Tuvan saying

Language is the most massive and inclusive art we know,
a mountainous and unconscious work
of anonymous generations.

—Edward Sapir, *Language* (1921)

After trekking 12 hours in deep Siberian forests, I felt certain we were lost. We had set out, our party of three linguists plus a native Tofa guide, early that morning on foot from the remote village of Nersa. Set high in the Sayan Mountains, Nersa is the smallest of three villages inhabited by the reindeer-herding Tofa people. Home to just under a hundred hardy souls, the village is accessible only by helicopter, on reindeer-back, or on foot. The Tofa we met there subsisted on small vegetable plots, hunting, and gathering berries and other forest edibles, and a few supplies (flour, sugar, vodka) flown in occasionally on decrepit Russian helicopters. Their domestic reindeer herds, they told us, had long since turned wild and run off. As herding ceased to be a viable livelihood, many villagers sank into despair and alcoholism. Despite the bleak circumstances, our party was warmly welcomed, and we found people eager to share their stories. Perhaps this was because no one else ever asked to hear stories in the Tofa language. Indeed, no one under age 55 spoke Tofa anymore. “We were all sent away to boarding school,” explained 35-year-old Valentina S., “and that’s why we don’t know our language.”

For three days we canvassed tiny Nersa village, tracking down anyone who knew even a few words of Tofa. Eighteen-year-old Vova paused from a volleyball game with his buddies to tell us a bilingual joke. It was entirely in Russian except for the key words ‘pig’ and ‘penis’, spoken in Tofa and accompanied by loud guffaws. I faithfully wrote down Vova’s anecdote in my field notebook, hoping that he might turn out to be a young

bilingual speaker. But these two words in a joke about a well-endowed swine turned out to be the entirety of Vova's Tofa vocabulary.

At the extreme other end of the age and wisdom scale, we found Nersa's eldest resident, "Uncle Peter" B. (Born 1925) sitting alone in his rustic log cabin that contained nothing but a single cot. A red wooden star affixed to the cabin's front honored Peter as a veteran of the Great Patriotic War (World War II). We sat transfixed on the floor of Peter's rude cabin, brushing away fleas and grasping at his every word. He told us, haltingly but speaking only in Tofa, how in 1946 he had returned alone on foot from the eastern war front where he had been sent as a Red Army conscript to fight the Japanese in Manchuria. The trek, over 1,400 miles long, took him months, tested his superb survival and orientation skills, and left him with a permanent limp. Peter was clearly moved by our meeting. "I can't believe foreigners are talking with me in my own Tofa language," he remarked tearfully. "It's like in a dream."¹

Two houses down, Constantine M., a hale and deep-voiced 56-year-old, told us a Tofa story of three bothers turned into mountains as punishment after a quarrel over land inheritance. Pointing towards the Sayan range, he indicated the exact three peaks that had formerly been the three brothers. He also told us how he had been punished as a child for speaking his native language, beaten with a switch and held back in the first grade for five years because he could not answer his teacher in Russian. His story of shame and abandonment of the ancestral language turned out to be a typical Tofa tale.

Just across the way we found Svetlana A., a cheery lady of 62 and former elementary schoolteacher, weeding her potato garden. She too was of the generation that had been pressured to become Russian. "I lived in the boarding school dormitory for ten years," she told us. "During that time . . . I never even heard Tofa and wasn't aware that I knew the language. I guess it was forbidden to talk Tofa then—everybody spoke Russian. Such a beautiful, difficult language! Now it's all been forgotten. Everyone's become Russian."

Svetlana told us a poignant tale of a man and woman who lived so deep in the forest and saw no people for such a long time that they came to believe they were the only people left in the whole wide world. They were rescued from their solitude one day when their dog's barking attracted a wandering hunter who offered to lead them back to human settlement. But the hunter needed to depart at once, so the husband, gravely ill, sent his

young wife back to live with people and stayed behind alone to die. Svetlana framed this for us as a story of true love. Reading between the lines, we gathered that her story was also about solitude, perhaps similar to the kind that comes from having no one to talk to in one's native language.

Saddened, we departed Nersa, village of mostly forgotten stories. Loaded down with gifts of bread, berries, and our precious videotapes of Tofa stories, we set out with a native guide to return to the main village, Alydzher, situated 15 miles upstream as the crow flies. The route on foot was winding, but the village mayor, a hardy Siberian German, assured us it was a doable five-hour trek. Our guide was a young man of 25 who seemed reasonably spry and self-assured as he, on horseback, led us, on foot, up and into the mountain forests at 8 a.m. But as midnight that same day approached and we stumbled along through the marshy woods, exhausted, leg-cramped, and bug-bitten, our guide offered little reassurance. He had taken repeated wrong turns throughout the day, his horse stumbled, his confidence evaporated, and we straggled. To our great dismay, we realized he had even set out with a gun but no bullets and no knife—the height of foolhardiness in forests rife with bears.

We grew impatient, but our guide gave a different answer each time I asked him "How many more rivers do we have to cross?" At the bank of one large river, the umpteenth of the day, I actually caught him shaking his head and muttering "There didn't used to be water here." Our guide crossed over high and dry on his horse, taking our packs and leaving us to wade as best we could. We three stripped down to boots and boxer shorts (taking the opportunity to expel wood ticks from our clothing but exposing ourselves to hungry mosquitoes), balanced our clothing on our heads, and waded into the frigid chest-high currents. Drying off on the other side, I cursed our idiot guide and wondered at his sheer ignorance. "What's the name of this fucking river anyway?" I barked at him. "The Uda, probably," he laconically answered. How is it, I fumed, that with Tofa life so tied to forest and landscape, hunting and season, an able-bodied Tofa man could be ignorant of the locations of major rivers?

I did not have to wait too long for an answer. We did finally reach the main village at 2 a.m., shivering and dehydrated. The last river we needed to cross, this time the Uda for sure, was too deep. We were now on the wrong side, but in sight of the sleeping village. By building a huge bonfire and shouting, we awoke the ferryman, who came sleepily to fetch us. The next day our guide blew his entire \$30 fee on vodka and got falling-down



Figure 4.1
Aerial view of the Uda River as it flows past Alygdzher, the main Tofa village. Photograph by Thomas Hegenbart, courtesy of Contact Press Images

drunk, spreading the news of our fumbled expedition all over the village. We found ourselves the object of sympathy and considerable village gossip. “How could you hire such a guide?” people marveled. Elders shook their heads in dismay. “Our young people don’t know their own forests nowadays,” Aunt Marta K. said. She had spent decades hunting squirrels in the forests and herding reindeer, and knew by name every tributary and ridge, cave and hollow.

Aunt Marta had a good laugh at our expense, but the very idea that a local could get lost in the woods meant that her world had turned upside down. For her, this was not only a mental but a spiritual decay. In Marta’s younger years, the entire Tofa territory was divided into ancestral hunting grounds for exclusive use by individual clans. Boundaries existed solely in memory, passed down from father to daughter and son, and strictly observed. Though one could roam freely anywhere, no Tofa hunter would think of poaching on the territory of another clan, both out of fear of angering that clan, and also of arousing local spirits who might do harm. When hunting on their own clan territory, the Tofa faithfully made offerings of tea, squirrel meat, and reindeer milk to the fire, lake, and river gods to repay them for success in hunting and the use of the land. The land was to be worshipped, and it bestowed blessings in return.²

Worshipping the land was not merely a metaphor for the Tofa, it was daily practice. While out hunting, Tofa would collect *kastarma* stones—mysterious and perfectly symmetrical round pebbles, shaped like little spinning tops, flying saucers, or buttons, found along lakesides and riverbeds.³ Tofa people prized and revered the stones as gifts from *Kastarma*, deity of a local lake. Women sewed them as decorations onto buckskin clothing and saddlebags. Finding a *kastarma* stone meant a blessing bestowed or wish granted, and once taken, it would surely—they believed—be replenished later by the god, but only if he (or she) was satisfied with the balance of proper relations between animal and forest, spirits and people, water and clay. Our lost expedition was understood by some Tofa elders as an omen of imbalance, one requiring a propitiation of the spirits.

Our idiot guide sobered up fully three days after our trek and found that his horse had run away (presumably having no trouble finding *its* way home). Scolding him, I forced a confession that he had last made the trek between the two villages four years ago. I was shocked that between these two villages—the only two human habitations for hundreds of miles—people had ceased to venture. The elders, by contrast, knew every trail, every spring, every mountain ridge intimately and remembered a time when success in hunting and reindeer herding, indeed survival itself, depended on the sober application of such knowledge.

Mind versus Map

Like most native Siberian peoples, the Tofa oriented themselves first and foremost by rivers and secondarily by mountains. Their basic unit of distance, called a *kósh*, denoted how far one could ride in a day on reindeerback. European observers misunderstood this to be a unit of *distance*, about 25 kilometers.⁴ But for people inhabiting mountainous terrain, such as the Tofa, or the Sherpa of Nepal, units of linear distance have little utility.⁵ The Tofa *kósh* in fact is a unit of time *and* effort—the actual distance you can cover in a day on reindeer back will depend on terrain, snowfall, and other conditions.

Tofa elders possess intricate knowledge of the rivers, streams, and tributaries of the Uda River basin that drain a thousand square miles of forest. A local Russian who had lived among the Tofa for decades wrote down in a notebook over 600 Tofa geographic names, over half of these

being names of bodies of water. Unfortunately, the name collection was lost after being donated to the local museum. But the Tofa themselves never saw any need to write down these names. They simply kept a virtual atlas of Tofa-land in their heads, where it was more useful, but also much more fragile.

After the demise of reindeer herding in the 1980s, and a subsequent decline in hunting, young Tofa ventured less and less often into the forests. Many no longer knew the location of their ancestral hunting grounds and had never learned names of major rivers and mountains. Elders who possess the knowledge are no longer able to roam the forests, while youngsters remain in the villages ignorant of the forests and lacking any need to herd deer or hunt. All this knowledge, an entire atlas in the mind, has vanished in just two generations. We can, of course, view the Uda River basin from satellites or on Google Earth, capturing even the most minute details. But these land features no longer have a *human* geography, they no longer have Tofa names. This remote land, once criss-crossed with human footpaths and well mapped in Tofa stories, has once again become untraversed and largely unnamed territory.

Maps can capture only a fraction of people's mental knowledge of landscapes. Some Siberian native peoples independently developed graphic mapmaking traditions, etching maps of rivers, sky, or mountains onto birch bark or wood, or even sewing star and river maps as designs onto shamans' costumes.⁶ Others, like the Tofa, are reported to have lacked any notion of physical maps at the time of first European contact.

Fortunately, we have a historical snapshot of the Tofa mental atlas. In 1908 a Russian explorer named Vasilievich visited the nomadic Tofa reindeer herders. He recounted how they, lacking any notion of maps at all, marveled at his rudimentary maps of their territory. The Tofa had never drawn maps before, either in sand or on the snow, much less on paper. The Russian showed them his maps, then gave them paper and pencil and asked them to map their land. We should keep in mind that in 1908 the Tofa people were living on ancestral territory they had never left, limited to places they could reach on foot and on reindeer, and having trade and cultural contacts only with neighboring indigenous peoples, the Tuvsans and the Soyots.

The map the Tofa produced was impressive, given their lack of practice in an unfamiliar medium. It shows a bird's-eye view of the entire Uda River system, but also differs in telling ways from the actual topography.

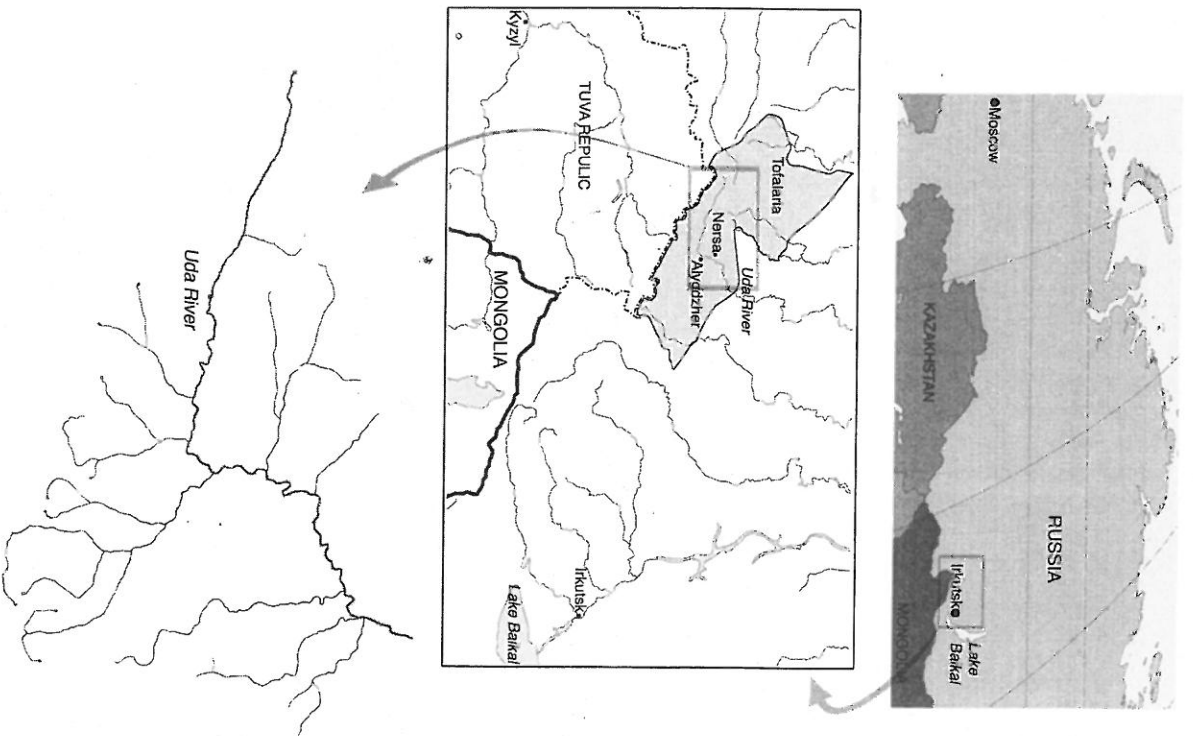


Figure 4.2
Northern Eurasia (top), the Tofa territory (middle), and the Uda
River basin (bottom). Graphic by Robbie Hart

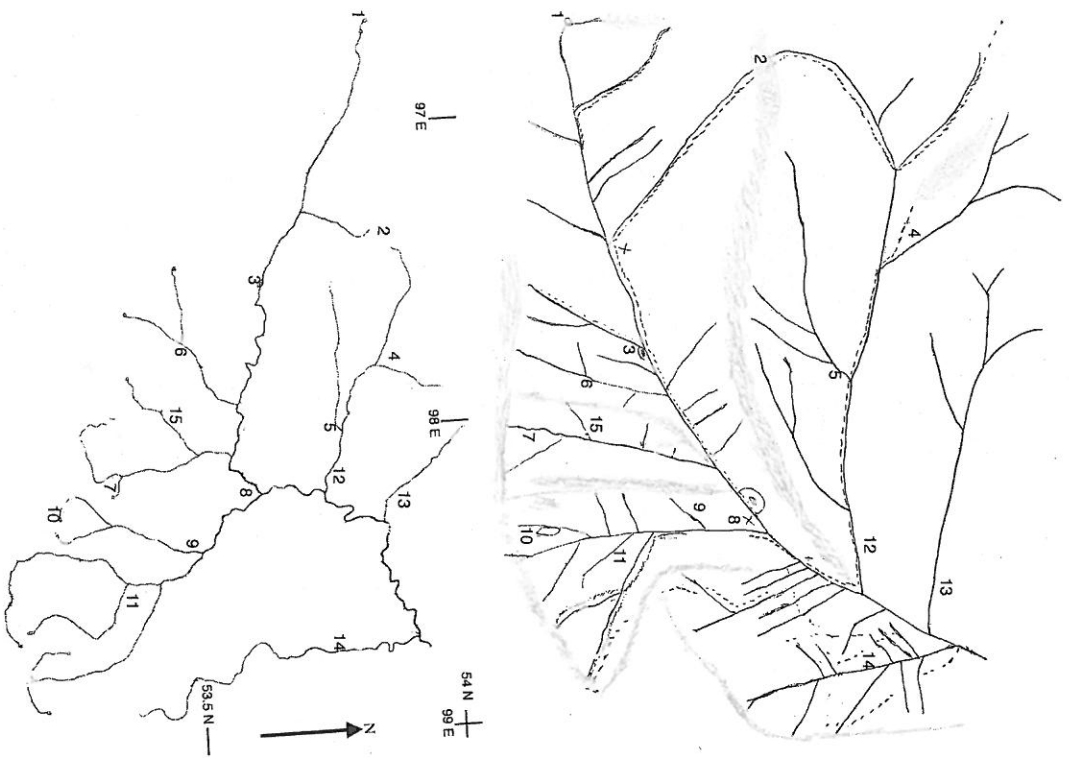


Figure 4.3
 A 'naïve' Toŋa map above (circa 1908) shows the Uda River system, mountains (in gray) and trails (dashed lines). Below is a modern geographic map. Names have been removed here for clarity. Locations have been numbered for comparative purposes. Reproduced from Adler 1910, with additional cartographic elements by Robbie Hart

First of all, it contains a lot more detail than even modern maps: twice as many rivers and four times as many named rivers. The map is not drawn to what we think of as true scale. Instead, it emphasizes important places. The center of the Toŋa territory is greatly enlarged, exaggerated even, with commonly used footpaths drawn in. Locations at the edge, though still shown in detail, are greatly shrunk in proportion to the center. One important exception is a lake that lies at the very edge of the territory and is actually quite small, but because of its religious significance (home to the powerful water deity *Kastarmna*), it is drawn as if it were enormous. Most strikingly, all the bends and meanders in the rivers are completely straightened out, leaving straight lines and neatly branching forks.

What we have in this century-old native Toŋa map may be as clear and direct a view as we can ever get of how traditional Siberian hunter-gatherers and reindeer herders viewed their known world. Topographic knowledge for the Toŋa extended beyond mere physical territory: they mapped their mythical world as an extension of their physical world. The Toŋa conceptualized the north as off to their left, and associated it with winter, night, and the lower world (inhabited by mythical devils). The south was to their right, connected to the upper world (deities), summer, and light. The east lay out in front, associated with the future, morning, spring; and the west lay behind them, symbolizing evening, autumn, and the past.⁷

Traditional Toŋa knowledge of the real earthly landscape (the Uda River basin) and its associated mythological terrain has now nearly faded from memory. The elders who know the land and the belief system lack the strong legs to trek their territory and make the necessary spirit offerings, while the younger generation declines to do so. At the same time Toŋa reindeer herds have dwindled to the extent that few Toŋa people have the opportunity or skill to ride reindeer anymore, and so they cannot reach remote areas in their land. By a combination of forgetfulness, the decline of reindeer-herding, language shift, and cultural change, the transmission of Toŋa topographic knowledge has been fully interrupted. The map has been erased.

Na(t)ive Maps

When asked by early explorers to draw maps, different native Siberian peoples employed entirely different schemes, suggesting that their culture influenced how they mentally represented landscapes. The Southern

Yukaghir, for example, consistently drew rivers as wide and curvy parallel lines (fig. 4.4). This was completely unlike the Tofa, who drew them as straight, branching single lines. Of course, putting pencil to paper was a novel and unnatural task for these people, and could not have adequately captured the richness of their knowledge. Their ideas about rivers and landscapes were transmitted by a variety of means, including songs, stories, and religious beliefs, but only orally, through language.

The Southern Yukaghir had many songs that narrated the unfolding of a journey along a river (usually the Kolyma). The songs, some collected by linguists, mention currents, notable rocks, tributaries, and point out prominent landmarks associated with myths (e.g., two brothers who turned into rocks). In one song, the river is referred to as being wide and open with people 'sliding' along its middle. Smaller tributaries (e.g., the Orook) are mentioned, as well as a landmark rock named *Kuntuk* that the river 'flirts' with. One Southern Yukaghir map song went like this:

Let's tell about our river. A long time ago we used to travel
sliding down the middle of our mother Kolyma.

We used to travel. Our mother Kolyma has many trees here.

Our mother Kolyma is flirting with Kuntuk.

It carries us, sitting on the top of mother Orook...

Many of us are moving in the middle of the river to the river
mouth. We are moving away from there, seeing our
people.

Mother earth had bad luck this year. It's bad luck to travel
against the stream.

We are sliding upstream in the middle of mother Orook on our
opened river.⁸

An entirely different view of rivers is adopted by the Tungus people of Siberia. On turn of the century 'naive' maps, they leave their primary river, the Yana, undrawn as an invisible void at the center of their world (fig. 4.5). Instead, they show only its many branching tributaries. Their main river is so central and obvious to them, functioning as their highway and main route for transport, that they perhaps saw no need to draw it.

Even further east in Siberia, the Nivkh people of Sakhalin Island drew what appears to be each single twist and turn in the rivers (as opposed to the Tofa and Yukaghir strategy of straightening out rivers). The Nivkh, able canoe travellers, did not terminate their drawn rivers at the seashore,

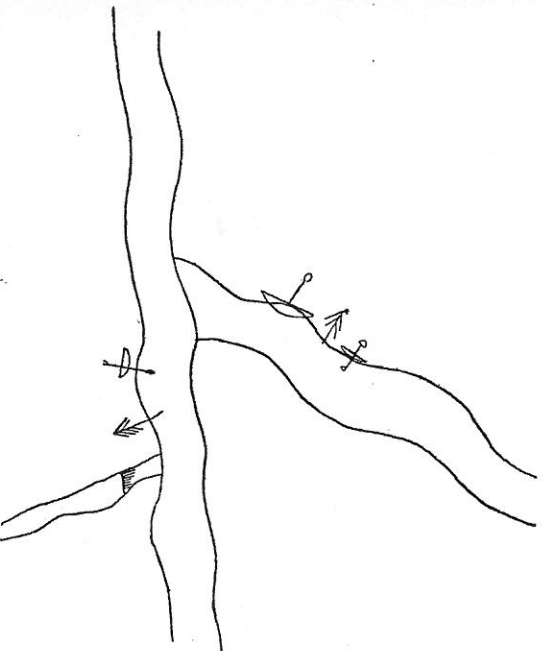


Figure 4.4
A Southern Yukaghir naive map from 1908 shows the confluence of the Kolyma River (center) with the Korkodon "curved" River (top). Also shown are trees, a dam, and three dugout canoes. Reproduced from Adler 1910: 86, figure 21

but drew lines extending far out to sea. The Yakut people drew lakes bisected by rivers (the river passes right through the middle of the lake in a straight line) while the Tungus drew lakes as physically detached from the rivers that feed or drain them.⁹ Clearly, Siberians had different cultural strategies for mapping land, lakes, and rivers.

We cannot know to what extent these schematic rivers spring from individual innovation or may be affected by culture and worldview. According to scientists who study patterns in native (or 'naive') maps, individuals within cultures tend to consistently draw rivers and landscapes in recognizably similar ways.¹⁰ This is, of course, an ethnographic observation, not a firm hypothesis, and it can no longer be tested among native Siberians since these populations have become thoroughly acculturated to Western maps. Nevertheless, such early maps provide valuable glimpses into the mental atlas. Not bound by strict topographic proportion, they can stretch significant features to a greater size, while shrinking more distant or less salient points. Native Siberian maps are also impressive in their level of detail and the intimate association with the land that they reveal.

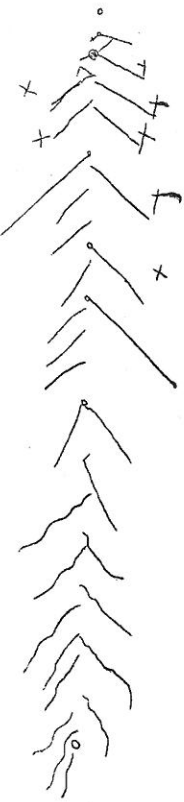


Figure 4.5
A Tungus people's naive map of the Yana River (not drawn) and its tributaries. Human settlements are marked by X and lakes by O. Reproduced from Adler 1910: 102, figure 30

In the following sections, we will see how language enables mental mapping, thus linking people to their land.

Topographic Talent

European scientists of the nineteenth and early twentieth century considered native-drawn maps primitive and deficient creations. Some viewed as a shortcoming that in the maps of 'primitive peoples' we do not get 'true' bearings based on cardinal directions, but instead orientations based on rivers, coastlines, and mountains. The Yenisei Ostryak, a Siberian people, had just begun, it was reported in 1910, to use cardinal points, and when shown a modern compass, "at once see its advantages."¹¹

A professor exploring German East Africa in the early 1900s admirably remarked of a native map: "The distances between various places *are wrong* . . . but otherwise it is *wonderfully correct*, considered as the work of an *entirely untrained* man."¹² The German professor declared that the Makonde people possessed a "marked topographic instinct" and enthusiastically drew maps of the southern end of Lake Tanganyika (in what is now Tanzania). Despite scientists' prejudice against non-cardinal direction systems, they did acknowledge topographic skills. In one encounter, a Russian astronomer on a 1908 arctic expedition asked a native Yukaghir reindeer herder named Nikolai Enkachan to draw a map and provided him with paper and pencils. What the astronomer witnessed next amazed him:

We simply gasped . . . so outstanding had he [Nikolai] drawn everything: rivers, mountains, the directions of all the ranges . . . We were surprised at such a completely clear presentation

of a large regions of hundreds of square *verst*s . . . moreover, he had probably never seen a geographic map, and likewise had no understanding of reading.¹³

Horizontal in the Himalayas

American children, when asked to draw maps, tend to adopt a bird's eye view, laying out houses and streets in neat grids as if viewed from above. A study done with Sherpa children in Nepal (<50,000 speakers) showed their strong tendency to emphasize the vertical dimension, better reflecting the *frictional distance* (difficulty in getting from A to B) between points and the importance of the vertical dimension in orienting oneself. A flat map showing only the horizontal is clearly inadequate for life in the Himalayas, as anthropologist James Fisher explains: "In a bird's eye view, two points that may look close together although they are actually far apart—but on a vertical, not a horizontal plane. . . . A destination may be only half a mile away but up a steep and difficult slope. Therefore, as any trekker in Nepal knows, distance is measured in time, not linear units." Fisher goes on to compare horizontal maps drawn by American school children with vertically oriented maps drawn by Nepalese Sherpa children. He concludes: "The Sherpa children thus tend to construct their maps to show the relation of higher and lower, sacrificing that of depth and width, so that the map represents a vertical cross-section rather than a bird's eye view."¹⁴

Linguist Robbie Hart spent time among the Bantawa Rai people of eastern Nepal, where he witnessed firsthand how a language, Bantawa, can adapt to talking about the vertical dimension. "The linguistic habit of specifying relative vertical location made little sense at first to him as a cultural outsider, Hart noted:

The pages of scratched out words and question marks in my field notes attest to the confusion I felt when I first tried to elicit Bantawa terms equivalent to 'here' and 'there.' Eventually, it became clear that these words each had different forms *depending on the relative altitude* of the place being referred to.

If you are heading down a steep vertical slope along a path, but your destination lies above you on the vertical plane, you would say you are going 'up' even though you happen to be descending at the moment. Speakers

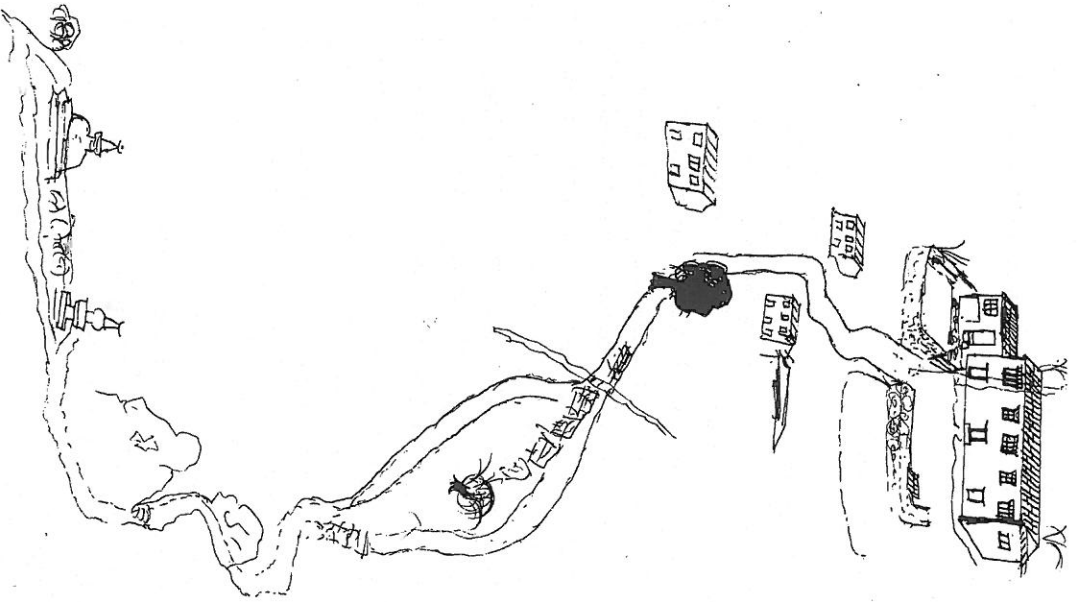


Figure 4.6
 A map drawn by Ang Rita Sherpa, of the Sherpa people of Nepal, reflects a cultural preference for expressing the vertical dimension when asked to draw two-dimensional maps. Courtesy of James Fisher

of Bantawa and related languages can also indicate whether any person, place, or thing they refer to is higher, level, or lower than the speaker. Their language provides them with the tools to highlight the vertical dimension, which translates into the amount of time and effort required:

The road was *modu* 'up there,' but the river *moyu* 'down there.'
 This made perfect sense when one actually walked these paths—though approximately the same distance from the house where the words were spoken, the extreme grade of the Himalayan hills made one a half-hour climb and the other an easy ten-minute walk.¹⁵

Culturally Sculpted Landscapes

What people pay attention to in the world, and what they name in the landscape, may be deeply influenced by the language they speak. I present evidence in this chapter that this holds true for many indigenous cultures. By 'indigenous' I mean inhabiting a particular land for as long as collective memory records and being well adapted by cultural habits to surviving on that land. Languages also adapt, quite rapidly, and equip their speakers with specialized tools to describe, divide, and manage the local environment and its resources. But this dynamic is not limited to small or indigenous cultures. If one Manhattanite says "I'm cabbieing it crosstown," another Manhattanite will understand perfectly, but outsiders may need a second to process the use of 'cab' as a verb, and figure out what exactly 'crosstown' refers to.

Languages reflect local geography, not only in their vocabulary, but in more deeply structural ways, in their grammar. This knowledge is often accumulated over many centuries, and so geographic terms can represent an ancient layer of cultural knowledge encoded in language. Of course, language change also happens fast. For example, it is easy to think of new words like 'blog' or 'emoticon' that have come into use just in the past few years. But these kinds of adaptations are fresh, they do not reflect hundreds or thousands of years of adaptation to a particular ecological niche, nor the accumulation of wisdom contained in geographic terms. In looking at indigenous cultures we will explore how language helps people adapt to landscapes.



Figure 4.7
In Nepal, Bantawa speakers and their neighbors dealing with the precipitous local topography by bridge building (top). The steep, rolling hills of the Bantawa area are carpeted with tea plants (bottom). Courtesy of Robbie Hart

On Mindoro, a lush tropical island in the central Philippines, the Hanunóo people (10,000 speakers) survive by practicing ‘swidden’ agriculture, in which they constantly clear, cut, and burn small garden plots on steep tropical forest slopes and grow yams and vegetables. The dense and rapidly growing vegetation covers old trails and garden plots quickly and new ones must be blazed. As anthropologist Harold Conklin notes: “In Hanunóo country, no trail is permanent.”¹⁶ In addition to trail-blazing, swidden farming requires exceptional skill with the use of controlled burning of vegetation to create new clearings. The Hanunóo, to orient themselves in the dense jungle growth, employ a relatively simple system of directional words on the ground. For all terrestrial directions they use a single system to encode both the upmountain/seaward distinction typical of many island peoples along with the upstream/downstream distinction.

Hanunóo Terrestrial Directions

sa bābaw above, toward the mountains, upstream
sa lāwud down, below, downstream, toward the coast

But for celestial events, the Hanunóo adopt a much more elaborate six-way directional system, based on how the winds blow. Conklin explains that “Winds are named after, and considered to originate from six cardinal points of the heavens.” Each wind direction has a name and one Hanunóo can rapidly orient another by mentioning these names.

Wind direction is part of a larger system of ecological knowledge, as Conklin explains: “Wind direction and duration, like phases of the moon, tides, apparent sidereal revolution, and especially various stages of plant growth . . . are ‘calendric’ signs and weather signals known to all Hanunóo.”

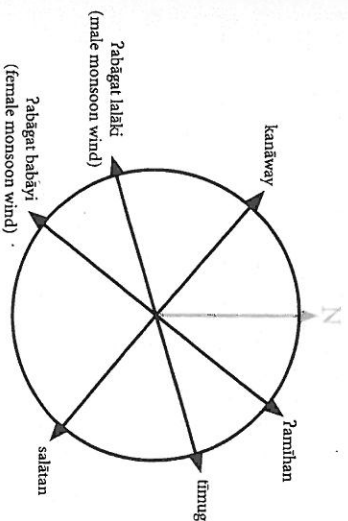


Figure 4.8
Hanunóo wind directions (English ‘North’ shown in gray for comparison).
After Harold C. Conklin [1957]1975

Further, “the relations between the six winds and seasonal changes in weather is intimately understood.”¹⁷

Another culture that pays great attention to winds are the Bedouin people of the Middle Eastern deserts. Nomadic Bedouins of Jordan, who live by herding sheep and goats, have verbs for ‘to go east’ and ‘to go west’ (these are pronounced *yisarrig* and *yigarrib*). As anthropologist Bill Young observed, there is an important link between linguistic structures and livelihood: Jordanian Bedouins name these directions because “they depend on eastern and western rains for pastoral production.” Bedouins of Sudan, by contrast, depend on northern and southern rains to sustain grazing lands for their animals. They have verbs for ‘go north’ (*yisʕamin*) and ‘go south’ (*yityamin*) but lack verbs for ‘go west’ or ‘go east’.¹⁸

Dividing Up Small Spaces

Island peoples who sail also care a great deal about wind. They adopt a radically different reference frame than do Siberian forest dwellers, and their languages provide them with tools to describe currents, winds, volcanic slopes, and the topographic patterns unique to islands (e.g., movement towards the sea is generally downwards, away from the sea is upwards). Lolovoli is a dialect of North-East Ambae (5,000 speakers), one of the 113 indigenous languages spoken in Vanuatu. On the small island of Ambae—site of a major volcanic eruption in December 2005—there is more than one way to ‘go’ and the local language distinguishes these possibilities with three distinct verbs. As in the Himalayas, the terrain on Ambae Island is steep, so clarifying movement as up, down, or across conveys substantially more information about the nature of the ‘going’. For instance, if your mother asks you to ‘go’ to a friend’s house carrying a bundle of coconuts, you can tell from her choice of verb whether this task would be a simple favor (downhill) or a reason to disappear (uphill). The three basic Ambae verbs for ‘to go’ are *hage*, ‘go up’, *vano*, ‘go across / levelly’, and *hivo*, ‘go down’.

These verbs represent a distinction of movement that is important in all different scales and contexts. For example, *hage* and *hivo* also refer to movement ‘inland’ and ‘seaward’. This extension of meaning is not a surprise, since on conical Ambae, going ‘inland’ usually exactly equivalent to

going ‘up’ and ‘seaward’ to going ‘down’. But other extended meanings of these verbs do not arise out of a simple correlation of direction and landscape, but are rather products of a culture-specific system to organize space. When talking about movement on different scales, the up/down distinction is applied to other salient oppositions. Take the use of *hage* and *hivo* presented in table 4.1.

Unless the direction of going is unknown (like when asking the question “Where did he go?”) either *hage* or *hivo* must be used, no matter how minor the relative change in elevation. Walking around a small village, it is easy to see how a speaker could readily know the height relations between known locations. In fact, this framework extends to very tiny domains, for example, the inside of a hut where the floor is level. In this case, the speaker will think of the general slope of land *outside* the hut, then use the appropriate verb to describe small movements *inside* the hut, for example, to say “Place the dish of meat *hage*” (meaning inland or uphill).

We can imagine however, that as the area over which people ‘go’ gets larger, and the terrain more varied, it becomes increasingly difficult to decide when to use *hage*, *hivo*, and *vano*. Ambae speakers have resolved this island-specific issue with a linguistic system that has evolved to fill this communication niche. For discussing travel around the island, you compare the known elevations of origin and destination. You then factor in other aspects of the island’s landscape and the mode of transport help determine which verb is appropriate. A schematic for this complex decision-making process is shown in figure 4.9. If you begin at the top edge of the diagram with the fundamental question of sea versus land, you can then proceed along the arrowed paths to decide which verb to use.

Table 4.1
Extension of directional terms on Ambae Island, Vanuatu

Smaller		Scale of movement ←—————→	Larger
<i>hage</i>	“up”	“inland”	“southeast when traveling to other islands”
<i>hivo</i>	“down”	“seaward”	“northwest when traveling to other islands”
			“to countries other than Vanuatu”
			“to Vanuatu from other countries”

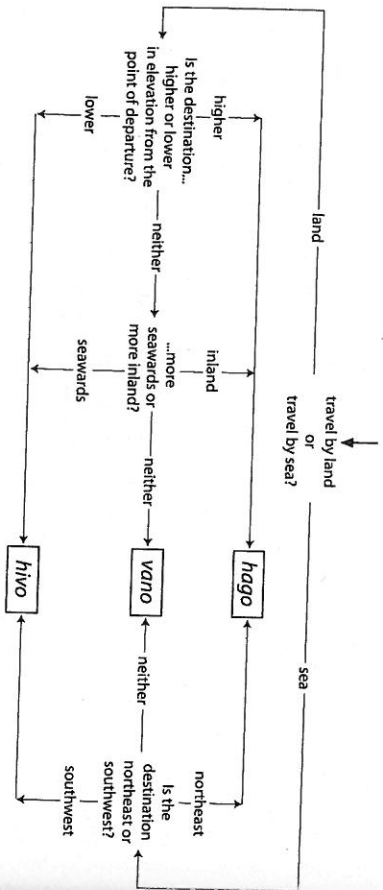


Figure 4.9
A decision chart for deciding which directional verb to use in Lolovoli.

When traveling to or from the coast, speakers say *hivo* to describe movement southwest and *hage* for movement northeast; this opposition is neither arbitrary nor based on magnetic fields, but rather corresponds to the logical division of the island along an axis that bisects it. The verbs *hage*, *hivo*, and *vano* are also used to contrast types of going between islands. In this context, however, the verbs refer to directional movement that is different from the ‘going’ described when talking about local movement (within a village, say) or movement within one island.

Comparing these different contexts, it becomes increasingly clear that semantically, *hage* and *hivo* describe opposite types of movement and *vano* describes movement that cannot readily be called *hage* or *hivo*. With intra-island travel, when relative height or movement towards or away from the sea is not salient, the axis which determines *hage* versus *hivo* is the lengthwise division of the island; movement across the island’s volcanic spine, in either direction, is *vano*.

When the Lolovoli travel in canoes between islands, relative height and landward/seaward judgments are unhelpful. Instead, the use of *hage* vs. *hivo* is determined by the direction of the prevailing wind. Like marching uphill or downhill with a heavy load, specifying sailing direction with respect to the wind tells a lot about the nature of the trip.

Comparing contexts of movement, *hage* trips are difficult (uphill or into a headwind) and *hivo* trips (downhill or with a tailwind) are easy. Interestingly, the one case where *vano* is used for inter-island travel is to Malakula, an island directly to the southwest of Ambae Island, perpen-

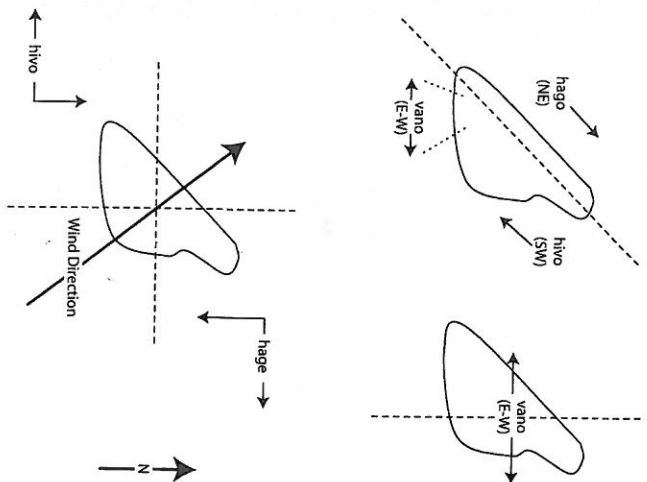


Figure 4.10
Lolovoli directional verbs to describe boat trips around the island or hikes across its axis (above) and sailing trips (below).

dicular to the direction of the wind. Trips to and from Malakula are equally easy, each involving sailing perpendicular to the wind.¹⁹

Culture exerts a robust influence on syntax: if a movement is known to be *hage* or *hivo*, it must be specified as such in order to construct a grammatical sentence.

Directional verbs in Lolovoli encode another layer of spatial description on top of their basic role in specifying absolute direction. By adding suffixes, the up/down/across movement is oriented towards or away from the speaker or item being discussed, or towards the addressee. The suffix for “towards the addressee” also refers to movement toward places in the past or future where the speaker was or will be. Taken together, any mention in Lolovoli of ‘going’ must include both absolute direction and the perspective of the speaker or item spoken about. This complex packaging of spatial information yields nine distinct verb plus suffix combinations, as shown in the table 4.2.²⁰

If you and I both spoke Lolovoli and I used the word *vano-atu* in a sentence, you would understand it to mean that something or someone is either moving levelly across land towards you (my addressee), or sailing

Table 4.2

Verbs of going in Lolovoli spoken on Ambae Island

Direction	Elevation		
	Across/levelly	Uphill/landward	Downhill/seaward
no suffix			
'Go away'	vano	hage	hivo
(from speaker or object spoken about)			
add suffix <i>-mai</i>			
'Come towards' (speaker or object spoken about)	vano-mai	hage-mai	hivo-mai
add suffix <i>-atu</i>			
'Come towards' (the addressee, or a location in the past or future)	vano-atu	hage-atu	hivo-atu

by sea to your unspecified location on the island of Malakula. If you said *hivo-mai* I would understand that something was moving towards me and downhill or towards the sea (or likely both).

Yak Herders and Mental Maps

Returning from the South Pacific back to where we started in the center of Siberia, let us consider one more way landscape knowledge permeates language and *vice versa*. In the mountainous ranges of Southern Siberia, Tuvan nomads herd yaks, camels, goats, and sheep. The nomads make no use of maps, compasses, or global positioning devices. In the course of a year's migrations, they may range over hundreds of square miles, crossing many dozens of rivers and streams, passing innumerable mountain ridges and valleys, chasing down straying goats or horses into remote valleys, and climbing above the tree line to hunt marmot and wolves.

The exact amount of roving a nomadic family will do in a year depends on the type of animals they raise. Herders of cattle, sheep, and goats follow a regular seasonal cycle that leads the animals to the best grass and

the nomads to a series of four to six campsites. Yak herders migrate greater distances. Their herds wander further seeking cooler, higher pastures in the summer, and unlike sheep and goats they do not regularly return to the camp at night. The yaks must be guarded in two-day shifts by young men—yak-boys—who ride out from the camp on horseback and sleep in the fields.

This constant movement fosters an intimate familiarity with the landscape. Thanks to this knowledge, the herders (and presumably the yaks) never get lost. I spent a great deal of time talking to Tuvan yak herders to understand how this knowledge is constructed and applied. In the following paragraphs, I describe the basic toolbox of Tuvan topographic knowledge.

While out riding or hiking with Tuvan nomads, I noticed that they could almost always identify even seemingly minute features of the landscape. A mountain ridge, for example, would have each visible protrusion along its crest descriptively named: 'white head', 'ice top', 'blue pointy', 'black sister', 'bear head', and so on. Even the tiniest natural spring or stream of water could have a name, or if unnamed, be named for the river it flowed into.

Any known landscape, for Tuvans, is dense with evocatively named places. This allows them to talk easily about exactly where they have been, where the herds are going, or where the neighbors are migrating. Sometimes instead of bestowing proper names, Tuvans will anthropomorphize the landscape, for example, by imagining protrusions of a mountain to be parts of a sleeping bear or a person. This system, highly culture-specific, is very useful for memorizing complex landscapes and using them to orient yourself. Shapes that Tuvans tend to interpret as animal- or human-like may bear no resemblance to New Hampshire's "Old man of the mountains" or Mt. Rushmore's giant presidential heads. Tuvan landscapes are far more abstract and not obvious to the casual outside observer who does not share the same cultural outlook.²¹

In naming landscapes, Tuvans deploy a complex system of mythical and religious beliefs. Many mountain peaks and ridges, bodies of water, and natural springs, are considered sacred and believed to be inhabited by spirits. Mountain passes, the exact point where a trail or road reaches its apex before descending, are of particular significance. One must not pass over without leaving an offering. A strip of cloth tied to a tree branch, a rock stacked on top of a cairn, or a piece of candy laid at the foot of the cairn are offerings to appease the local spirit and ensure safe passage. To

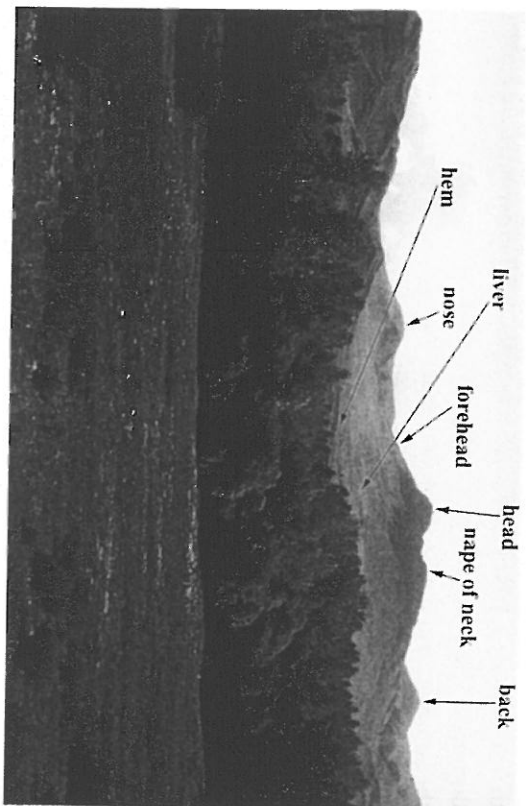


Figure 4.11
 Tuvan anthropomorphic naming of mountain features. Courtesy
 of Theodore Levin, topographic data from Anaroli Kunlar

visit a spring or cross a pass without making an offering is to risk the wrath of the local spirit who is capable of causing harm if offended. The presence of such spirits, and the places named for them, helps fix the landscape and rules about how to interact with it firmly in the collective memory.²²

Senses of Direction

A skill shared by many people who live in intimate connection to their land is an unfailing sense of direction. Tuvan nomads never get lost, even if they have ridden hours away on horseback or traversed many kilometers on foot. Their sense of orientation, as explained to me in many interviews with expert hunters and herders, relies on two distinct systems. First there are natural clues. Tuvan hunters pay close attention to which side of a tree the moss grows on, which sides of an ant hill slope more steeply, which way spiderwebs are oriented, and which side of a marmot's burrow the excavated dirt gets piled on. They can tell subtle slopes of ground from tracks left by falling raindrops in the dust. Such micro-signs provide clues about cardinal directions and local topography. Any of them can be refer-

enced in case the sun is not visible, or even if it is visible, to confirm general directions, to glean information about the coming change of seasons, or the weather forecast.

Second, Tuvans interact with landscapes through senses other than sight, and especially through their language. They use the balance organs of the ear to detect the slope of the ground under their feet. They use their hearing to experience the ambient soundscape. They pay close attention to the texture of the ground, based not only on how it feels but on the kinds of sounds it makes when walked upon. The Tuvan language has a vast and highly creative vocabulary of words to describe specific sounds made in the forest by people or animals. For example, *chzyr-chzyr* can be translated as 'the sound of the tree tops moving, swaying, cracking, or snapping as a result of bears marking trees by clawing at them and by scratching their backs up against them'. The word *daldyr* symbolizes the sound of a big horse's hooves, *dyllyr* a big bird's wings flapping, and *koyurt* human feet treading deep snow.²³

Tuvans pay close attention to and have a rich repertoire of words to describe animal sounds, water sounds, and echoes. The words *hir-hir* are understood to mean either the crackling of a campfire or the sudden rustling of a grouse's wings in the grass. *Shililir* is the sound of water in a nearby dried up river, or of snot being blown out of the nose. Tuvan not only provides many such words ready-made for use but also gives its speakers the tools to make up new *onomatopoeic* words on the fly (more on this in chapter 7).

Place names in Tuva often refer to acoustic properties those places evoke, whether on their own (a burbling brook) or through human and animal intervention (horse hooves clattering over loose rocks and causing miniature rock-slides). And, as musicologist Ted Levin has observed, the Tuvan musical tradition of throat-singing (also called 'overtone singing') springs in part from a heightened attention paid to ambient sounds and acoustic properties of landscapes.²⁴ For Tuvan nomads, knowledge about physical landscape is thus linked to a whole realm of environmental, biological, aesthetic, and religious knowledge—all expressed with the help of language—and providing a powerful technology for survival.

A third Tuvan orientation skill is the transmission of geographic knowledge, passed on in songs, stories, and lots of everyday conversation. Tuvan nomads talk frequently about where they have been, where the herds are roaming, and where the neighbors are. I was amazed while visiting

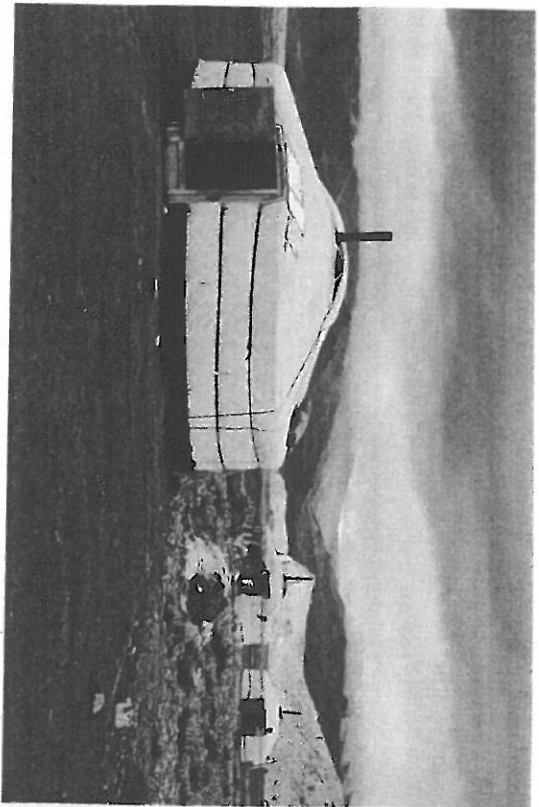


Figure 4.12
A Monchak Tuvan yurt encampment in Western Mongolia,
2004. Courtesy of Kelly Richardson

Tuvan nomads in Mongolia in 2000 and 2002 to find that my hosts always knew the exact locations of migrating friends and relatives many miles distant.

Nomads migrate on a fairly regular, predictable circuit, modulated by factors such as the condition of the grass, precipitation, weather, health of the animals, and so on. In 2002, I returned to the exact location ‘Snakey River’ that I had visited on an expedition in June 2000, and I arrived on the same date in June. I felt reasonably sure that friends I had visited in 2000 at that same spot would be found in the vicinity. My friends turned out not to be at that location, but the people camping there knew the exact location of my friends. “They’re over on the upper slope of the south bank of Black River Fork,” I was informed, “the river is too high to cross at the moment, but they’ll be moving in three days down to ‘Wet Meadow.’” Both of these locations were more than 30 kilometers away from our present location, across a flooded river.

With tools no more advanced than horses, binoculars, and gossip, the nomads in this tightly knit community managed to keep track of dozens of families, their exact locations, herd movements, and migration schedules. People would answer me with absolute confidence any time I inquired as to the location or migration date of almost any member of this com-



Figure 4.13
A Monchak Tuvan yak
herder in Western
Mongolia, 2004. Courtesy
of Kelly Richardson

munity of 1,200 persons. And they did all this in their heads, by daily observations through binoculars, by a great many conversations about migration, by relying on a rich naming system, and by distributing bits of knowledge across cognitive domains (religious, aesthetic, acoustic, linguistic) and among many members of society.

The complexity of the Tuvan topographic naming system goes beyond mere names and extends into the very grammar of the language, for example, verbs. Tuvans live in a land where level spaces are unusual, and nearly every patch of ground slopes in one direction or another. This provides another important system they use for orientation—the directions of watersheds and river currents. The Tuvan language has a general word for ‘go’ but it is rarely used. Most of the time, Tuvans use a ‘path’ verb meaning ‘go upstream’ (*còkta*) or ‘go downstream’ (*bàt*) or, as appropriate, ‘go cross-stream’ (*kes*). You would rarely hear “I’m going to Kyzyl” (the capital city of Tuva) but rather “I’m upstreaming” or “downstreaming” to Kyzyl. Proper use of path verbs demands constant awareness of the nearby streams and river systems and their direction of flow.

We can schematize this knowledge with the decision chart in figure 4.14. Starting at the left edge, the speaker could follow a decision path lead-

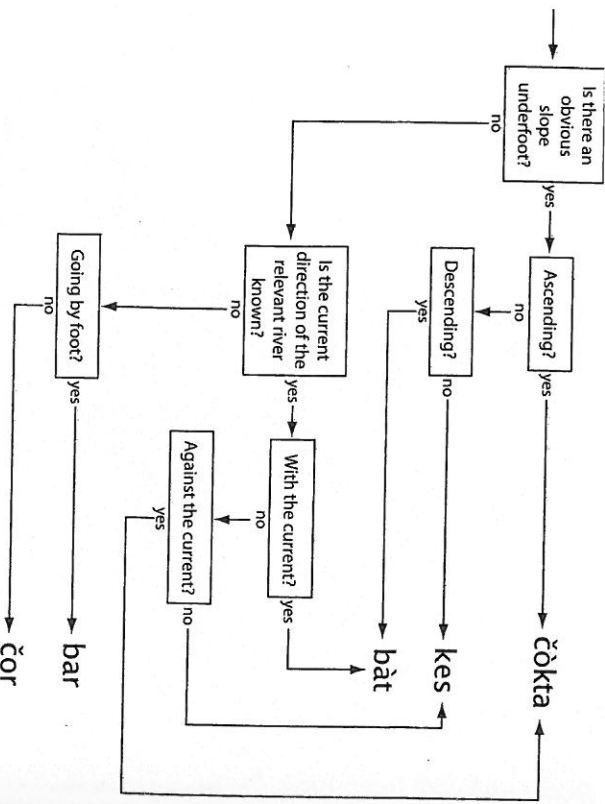


Figure 4.14 A decision chart for choosing the appropriate Tuvan word for 'go'.

ing him to the correct choice of the word for go in any given situation. If at any point the topographic information is unknown, he can fall back on the generic words for go: *bar* (go by foot) or *çör* (go by horseback or vehicle). But in Tuvan linguistic custom, topographically oriented path verbs with their richer information content are always preferred.

Tuvan river-based orientation is strictly local, leading to confusion for people (like myself) who know the language but may not know nearby rivers. When visiting the village of Aryg-Üzüü in 1998, I walked along the central dirt road looking for a friend's house. When I asked a local lady for directions, she said (pointing due west) "go *upstream* a bit more, it's the blue house." I thanked her and kept walking west. A hundred yards along the road, another lady pointed west again, but emphatically told me to "go *downstream*." The crucial difference turned out to be that each lady was referring to an unseen river behind her back as her point of orientation. The first lady stood with her back to the majestic Yenisei River, located 15 kilometers to the north and out of sight over a mountain ridge, but well known to all. The second stood with her back to the tiny (but much

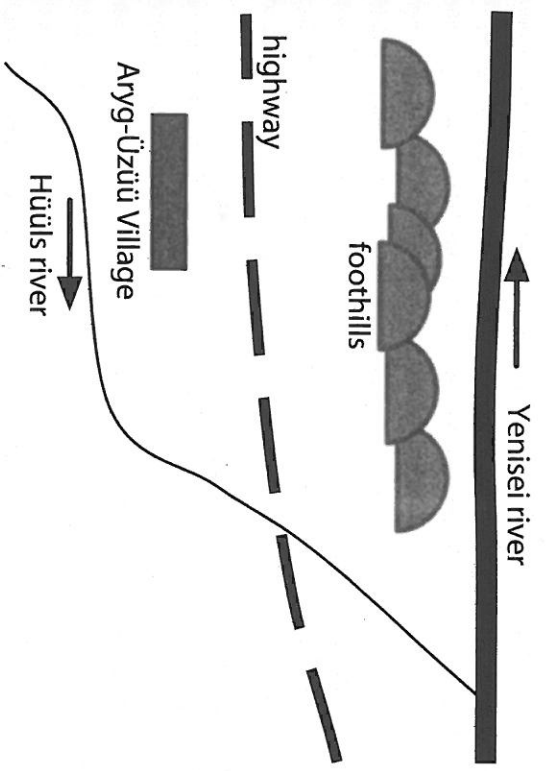


Figure 4.15 Two river systems at Aryg-Üzüü village in central Tuva.

closer) Hüül's River (actually a creek), running eastward in a thick woods about four miles south of the village.

My ignorance, as a non-local and non-native speaker, lay in not knowing the local river systems and (even if I had known them) failing to pick up subtle body-posture cues about which river system was being referenced.

I was pleased to find that sedentary villagers had maintained a system of river directional verbs that evolved to suit a purely nomadic culture. But I also noticed that more urban Tuvans, living in the capital city of Kyzyl, used the river directional system only infrequently. Even though the Yenisei River flows right through Kyzyl and everybody knows the direction of its currents, urban Tuvans usually simply say "go," omitting reference to river currents. When they use directional expressions, they are more likely to say "east" or "west." There is some evidence then, that when no longer needed, topographically embedded knowledge can fade from a spoken language, perhaps being exchanged for a more common cardinal direction system.

Systems like Tuvan river-flow orientation may be found in many cultures, where the local landscape takes priority over the more abstract car-

dinal directions. The Tabulahan people²⁵ of Sulawesi Island in Indonesia have two overlapping frames of reference for orientation. The first represents upstream/downstream/across (as on Ambae Island, any upstream direction will be inland, and any downstream will be seaward). This system is obligatory. For example, if a speaker is going to Tabulahan village, she can say 'I'm going across to Tabulahan' or 'I'm crossing', but she can never just say 'I'm going to Tabulahan'. This language forces its speakers to know and specify at all times whether they are moving up, down, or across relative to a stream.

The second frame of reference used in the Aralle-Tabulahan language (8,000 speakers) encodes the distinction level/up/down. It might seem redundant to have separate systems for talking about downstream and downhill. But it is possible to imagine a situation where the two systems might conflict: for example, if you have to walk down a hill to get to a place upstream of you. Keeping the two dimensions distinct allows these island dwellers to be very precise in defining not just the destination, but the contour and slope of a journey.²⁶

Tuvans and other people I have discussed here use at least three distinct linguistic skills to talk about movement across landscapes. The first is detailed naming of places, including names for even very minute features of the landscape. Topographic knowledge may be fixed in memory by projecting of animal or human features onto the landscape, by assigning religious significance to certain locations (as in Tuvan, done by veneration of local spirits), or by recruiting senses other than sight to interact with the land.

Second, speakers employ multiple frames of reference, including a local one such as island axis (like Ambae) or watershed/river flow (like Tuvan). They may also have a global set of coordinates (south, north), but they tend to favor coordinates tied to local land contour. This local frame gets extended in complex ways to areas outside the traditional territory, or micro-domains such as a chess board, the human body, or the inside of a nomad's yurt.

The third skill is a propensity to talk frequently about locations and landscapes, fixing them in memory.²⁷ These three skills combined give rise to a powerful mental mapping system. It explains, in part, the fact that nomads never get lost, that they guide their animals to greener pastures, and that they keep mental track of long cycles of migrations that may repeat only every 10 or 12 years. It also explains how, despite my best

maps and a global positioning device, I was never able to match even the abilities of young Tuvan children in orienting themselves in their native landscape. My sense of Tuvan nomads' geographic skill is merely anecdotal. I have never conducted experiments to test their actual performance in orienting themselves in familiar or strange landscapes. What I have argued here is that their language, like many indigenous languages, has adapted uniquely to the environment to provide them with enhanced orientation skills.

Some scientists have tested the extent to which linguistic concepts aid in constructing topographic knowledge and achieving real-world orientation success. The Hailom 'bushmen' people of Namibia (16,000 speakers) (the double bars "ll" in Hailom represent a click sound), regularly traverse long distance on foot for hunting and foraging. They must master a wide variety of landscapes (brush, sand dunes, rocks, grassland, etc.) with obscured or long-range views, and diverse flora and fauna. Ethnographer Thomas Widlok noticed the Hailom's seeming ease in traversing large, varied landscapes and orienting themselves with great skill. Wary that these skills had been over-hyped during a long history of colonial domination that depicted 'Bushmen' as super-human hunters, he decided to test their abilities using controlled experiments.

On a series of walks ranging as far as 40 kilometers, Widlok carried along a global positioning device and asked his Hailom walkers to point out landmarks, find their way to known destinations along unfamiliar routes, and talk about the journey. Widlok's findings are quite striking: Hailom fared far better than Europeans asked to perform similar tasks. A study of British people found that they performed poorly when trying to indicate the cardinal direction of their starting point after walking one kilometer through woods. Similarly, Dutch amateur mushroom collectors walking through 'semi-familiar' woods were asked to point out local and distant (but not visible) locations. The Dutch performed little better than at random chance levels in this task. The Hailom bushmen, in Widlok's experiments, pointed to known but not visible locations with only a 16.4° average deviation.²⁸

Widlok concludes that Hailom "orientation skills are real. . . . Their performance in orientation tasks is at a very high level, though not at the mythical level constructed by some observers, . . . and are far beyond the skills of Europeans." What mental tools do the Hailom use to achieve this mastery of the landscape? Widlok noticed that their language has a large

number of landscape terms. They also use a cardinal (north-south-east-west) direction system in which they talk about landmarks independent of the location of the speaker or hearer. Third, they engage in a great deal of pointing and what Widlok calls 'topographic gossip', or discussion of the landscape and how to traverse it. "Since they do not use any material maps," he concludes, "the communication of spatial information is of crucial importance, there is a continual flow of talk about places and where people and resources are located. This topographic gossip makes little use of person- or body-centered terms but uses a widely shared system of landscape terms."²⁹

A skeptic could argue that this ability is no different (and no more special) than my own ability to orient myself in Manhattan, and to walk, almost without thinking, from the corner of Fifth Avenue and Fifty-ninth Street on the upper east side down to Twentieth Street and Eighth Avenue in Chelsea. Or my ability to distinguish uptown-downtown-crosstown and east-west-north-south directions. But comparing Tuva's to Manhattanites' topographic knowledge is very superficial, and we would be missing something important if we stopped here.

The architecture and layout of cities is an organic thing that evolves over time—one can see the history of this by looking at archaeological digs of say, medieval London and its development into the present day. Cities do not spring up overnight, they accrete over centuries, based on thousands of decisions. Apart from conscious planning decisions, there are emergent or self-organizing factors, for example, merchants of similar goods will cluster together, butchers, tailors, car salesmen. Streets, when they are not planned in a grid, also evolve organically, just as footpaths appear on grass where people walk, and then get reinforced by more walkers until they define the most efficient trajectory from A to B.

So how is a New Yorker's knowledge of Manhattan different from a Tuvan's knowledge of the steppes? The difference is that we do not keep all these centuries of accumulated information about urban organization in our heads: we outsource the facts onto signposts, street names, streets, addresses, maps, atlases, tour guides, history books, and computer navigation systems.

In a vast open place like Tuva, where humans leave only a minimal footprint upon the environment, the landscape itself must be committed to memory, since no signposts, permanent buildings, or roads will be built. This memorization is of course easy for Tuva's. They spend their lives observing the face of the land, and easily commit to memory its

smallest wrinkles and features. But their language has also developed ways to encode space and package topographic information. These aid memory and are uniquely suited to the local environment. Since the language represents the accretion of knowledge over hundreds of generations, it is only grossly comparable to a mental map of Manhattan or terms like 'cross-town' we may use. The Tuvan knowledge is older, much more detailed, more embedded in language and memory. But is it also more ephemeral and less sticky. It depends for its survival on a continuous and intimate interaction with the land, and on oral, unwritten transmission of knowledge.

Another difference is how the entire system is integrated. Topographic terms are not just used for orientation in Tuva. They carry over into the spiritual realm and the practice of animism. Terms like 'upstream' and 'downstream' can even be extended to locations on the human body, parts of objects, and abstract concepts. Tuva's conceptualize the future as being to the north, behind their backs. They talk of the past as being out in front, to the south. Time concepts are built up out of spatial concepts. This is true of most languages: in English, when we say things like 'Spring break is approaching' we conceptualize it as being out in front, moving towards us in a linear direction. An English expression like 'Spring is just around the bend' could also be read as referring to a road or a river, but these expressions in English have become detached from their topographic metaphors and are simply understood as stock phrases.

So it is not that the Tuvan system is special, it is just that it is still part of everyday talk, it is highly specific to the landscape, and it is fully integrated with many behaviors such as migration, hunting, worship, and so on. The Tuvan nomads have inhabited the Siberian steppes for centuries, even millennia, and the knowledge they possess has been memorized, passed down, and cared for over centuries. It is the accumulated wisdom and keen observations of hundreds or even thousands of minds, pared down to its essence by continual testing and improvement over time. That is what makes these knowledge systems special.

Endangered Knowledge

Linguistic-topographic knowledge systems like those we have examined in Tofa, Tuvan, Bantawa, Ambae, and other languages differ greatly but

also share many features. I will briefly summarize here five ways in which these systems are similar to each other, and in which they may differ (by degree or by quality) from those found in large global languages.

First, each of these languages names a great density of points on the land, not limited to features mapmakers may think important, but extending to very small and subtle features as well. Many of these languages seem to name more topographic points than do languages of people living in Western industrialized societies. And names tend to be transparently meaningful, in a way that a name like 'Mississippi' is not (at least in English; to the 35,000 remaining speakers of Ojibwa it still means 'great river').

Second, these cultures use anthropomorphizing strategies—naming landmarks after parts of human or animal bodies as a way to retain them in memory. In some of the languages examined here, naming is assisted by a belief system that assigns sacred, historical or aesthetic significance to points on the landscape.

Third, they may use senses other than sight to aid memory in coding the landscape. There is great attention paid to rivers and watersheds, wind direction or to some essential local features of the environment. In the case of mountain and island cultures, this is often supplemented with attention to ground slope or the land/sea axis. Absolute directionals (North/South), when they are used in these cultures, are a secondary and often optional system, rarely the primary day-to-day one. What people pay attention to and name in the landscape often reflects their subsistence needs: hunting, gathering, herding, and navigation. Directional knowledge may be highly integrated with daily activities. But it can also reflect purely aesthetic concerns, such as how sounds echo in certain types of landscapes or what spiritual entities are believed to reside there.

Fourth, directional systems never stand alone in these cultures. They are always part of an integrated body of knowledge that includes meteorological patterns, animal behavior, nature signs, human migrations, and mythology.

Fifth, which properties of the landscape people ultimately notice, name, and keep track of can be both enabled and mandated by the language they speak. Certain languages, due to a process of long adaptation to a landscape, will force their speakers to notice and specify certain properties such as direction of river flow. They provide both greater efficiency and a greater cognitive burden. The efficiency comes by the fact that when knowledge is automatically encoded, it is always available to the learner

and thus learned without effort. The burden comes from the fact that speakers may be required to notice a certain property (e.g., direction of river flow) in order to be able to express the thought at all.

Each of these examples was chosen because it represents a culture that is intimately tied to a particular environmental niche. That does not imply that big, dispersed languages, such as Spanish, cannot equally adapt to a niche and encode knowledge of the land. But a language spoken in only one niche by a small population may adapt more intimately and rapidly to that niche, and may thus encode more information about human-environment interaction. If the small culture in question is also indigenous to its land, then the language reflects centuries of accumulated observations and generations of geographic wisdom.

Geographic knowledge and its cultural content is passed on in songs, stories, prayers, and many other ways of speaking. In a purely or primarily oral culture, like Tofa, Ambae, or Tuvan, that traditionally made no use of drawn maps, speech is the only means of transmission. Speakers of such a language, if they were to suddenly in the span of two or three generations give up the language and start speaking Spanish, would lose much of that environmental knowledge. Just as we cannot easily recover 'naïve' map drawing skills once people have been familiarized with modern maps and bird's-eye views, we cannot easily recover topographic knowledge—whether a place name like "Mississippi" or an entire mental atlas—once it is lost in translation.

When Languages Die

The Extinction of the World's Languages and
the Erosion of Human Knowledge

K. David Harrison

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