CHAPTER NINE

Attitudes toward Mountains

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Mountains today are almost universally viewed with admiration and affection. Positive attitudes toward mountains have not, however, always been universal. During the Middle Ages and much of the Renaissance, many people in Europe, the English in particular, shunned mountain ranges such as the Alps as demonic, abhorrent places to avoid whenever possible (Nicholson 1959; Mathieu 2006). However, earlier Europeans, such as the Celts and the Greeks, revered hills and mountains as divine palaces and abodes of deities whom they looked up to and worshipped (Bernbaum 1997). Positive attitudes have had a longer continuous history in other parts of the world, such as Asia (Mathieu 2011) and the Middle East, where they date back thousands of years. People have been attracted by mountains for millennia; as discussed in the following chapters, they have traveled through them, used different altitudinal environments on a seasonal basis for hunting and gathering and the grazing of their animals, built permanent homes in them, and tilled the soil. But throughout recorded history, humans have regarded mountains ambiguously, with both fear and fascination—a characteristic response to the experience of places regarded as sacred (Otto 1950). In order to understand our modern love of mountains, it is necessary to trace the development of these ideas through time and to place them in historical perspective.

The Prehistoric Era

Very little is known about early views of mountains. Much of the evidence is based on the study of indigenous societies who still follow prehistoric ways of life. Impressed by volcanic eruptions, storms, avalanches, and other physical manifestations of power, many of these societies view mountains as the homes of powerful deities and demons that have to be treated with great care and respect. Accordingly, various cultures in the prehistoric period probably established elaborate taboos, ceremonies, and sacrifices to appease the wrath of the gods and invoke their blessings.

Early societies probably identified mountains with the weather. Mountains are the homes of storms, lightning, strong winds, cold, and clouds. Mountains are also associated with snow, a phenomenon which may or may not occur in the lowlands; in any event, snow is much more persistent at high altitudes, transforming the mountain peak into an unearthly site (and sight), a natural abode of spirits and gods. The association with weather probably led to widespread reverence of mountains as sources of life-giving water in the form of rain and rivers—a reverence that continues in societies today, from the Andes to the Himalaya (Reinhard 2006)

Another observation probably made by early visitors to mountain peaks was of the reaction that took place within their bodies. Symptoms of high-altitude sickness such as stomachache, vomiting, dizziness, and shortness of breath may well have led early people to conclude that they were transgressing on hallowed ground and should go no higher. One notable exception was the ancient Incas, who regularly ascended to heights of 6,800 m (21,760 ft) and more for worship and human sacrifice (Reinhard and Constanza 2010; Reinhard 2006; Besom 2009).

While many of the features associated with mountains and weather evoked terror, mountains also had positive attributes. As noted above, they were considered sources of life and fertility, and as a major source of water through rainfall, clouds, streams, and rivers. They also provided sanctuaries and refuges from enemy attacks as well as cooler, more habitable climates than many of the plains and jungle areas below them.

Mountains were often considered the home of strange (sometimes mythical) and dangerous beasts. Some of these beasts were real, animals that lived in the dense mountain forests but occasionally wandered into the snow

zone, such as the snow leopard and other large cats, bears, eagles, wolves, monkeys, and apes. Many were large predators that were elusive and seldom seen in the lowlands, made larger than life in legends and superstitions. Some of the legends, like that of the Yeti (Abominable Snowman) of the Himalaya and the Sasquatch (Bigfoot) in the mountains of western North America, have persisted to the present day.

We do not know just when human settlement of the mountains began. In the Alps and the mountains of the Middle East, archaeological sites indicate the presence of humans since at least the Stone Age (100,000 years ago). These include the alpine components of the so-called Mousterian and Paleolithic cultures (Charlesworth 1957; DeSonnerville-Bordes 1963; Young and Smith 1966; Schmid 1972, Champion et al. 2009). These mountain groups were composed primarily of transient hunting parties, but some also made permanent settlements. They lived in caves and manufactured stone hunting tools; later (about 40,000 years ago), they used tools of bone, ivory, and antlers. Eventually they began to paint on cave walls and to make a custom of burying their dead (often preserved by mummification in the dry alpine air). A steady cultural development continued in Eurasian mountains down through the Bronze and Iron Ages (Anati 1960; Reinhold 2003).

The Americas

Radiocarbon dating of bone, shells, and artifacts indicates human presence in the Rocky Mountains 10,000 to 11,000 years ago (Husted 1965, 1974; Benedict and Olson 1973, 1978; Kornfeld et al. 2001). The alpine tundra zone was used primarily by summer hunting parties, who apparently employed a technique of driving game resembling that used in the Arctic. The target of the game drives was probably mountain sheep. Since, unlike the arctic caribou, it is next to impossible to corral mountain sheep, it is thought that the drives were designed to direct the sheep to concealed hunters (Husted 1974). Archaeological findings show that late prehistoric peoples occupied village sites in subalpine zones near tree line (Adams 2010).

In North America, it seems fairly clear that migration to and from the mountains depended on favorable climatic conditions and the availability of food. There is evidence that some groups utilized the mountains and the plains on an annual cycle according to the resources available. In winter, they hunted antelope and bison on the plains; in summer, they went to the mountains to hunt and gather (Adams 2010).

Mountains played and continue to play an important role in the religion and culture of American Indians (Bernbaum 1997). Many mountains have Indian and Native Alaskan names; among the most famous are Tacoma or Tacobet (Mount Rainier) and Denali (Mount McKinley). The Hopi revere the San Francisco Peaks of Arizona as the abode of the *Katsinas,* ancestral rain deities on whom they depend for their existence, while the Navajo or Diné include these remnants of an ancient volcano as one of four sacred mountains that enclose and protect the land where they dwell (Bernbaum 1997). Volcanic peaks in the Cascades, such as Mount Shasta and Mount Rainier, have inspired many myths and legends (Clark 1953).

Only a few North American alpine archaeological remains have religious significance. One possible candidate is located above timberline at an altitude of 2,940 m (9,640 ft) in the Big Horn Mountains of northern Wyoming. It consists of a crude circle of stones 25 m (80 ft) in diameter with a central cairn 4 m (13 ft) across from which 28 spokes radiate to the rim (Eddy 1974). Early observers thought that the structure was a medicine wheel constructed as a replica of the medicine lodge to allow the observance of the Sun Dance ceremony in the mountains (Grinnell 1922). However, later researchers have posited that it was an early astronomical observatory, but with some mystical and/or aesthetic connotations as well, since its astronomical purpose could just as easily have been served on the plains (Eddy 1974; Sliverman 1999).

Perhaps the most spectacular display the world has ever known of human settlement in mountains is found in the Andes. Here, thousands of years before the birth of Christ, at elevations up to 4,500 m (14,400 ft), there flourished civilizations that are still a wonder to the modern world. The culmination of these cultures is reflected in the ruins of Tiahuanaco and Machu Picchu (Fig. 9.1) and the Inca capital of Cuzco. Even today, it is difficult to imagine the techniques involved in the building of their famous stone structures.

Although Andean peoples were initially hunter gatherers, food was reasonably plentiful at the higher elevations, and the basis for the civilizations to come was agriculture. Several plant species, including potatoes, corn, squash, and beans, were first domesticated in the highlands of Central and South America (Sauer 1936; Linares et al. 1975; Iriarte and Vrydaghs 2009). The production of food, which released man from the constant burden of hunting, allowed greater numbers of people to settle in a small area and, eventually, to evolve the highly organized and complex cultures of Tiahuanaco and the Inca.

What attitude did these people have toward the mountains that were their home? We know that among their many deities were the sun, the moon, stars, and mountains. Like the ziggurats of Near Eastern cultures, the stepped pyramids of civilizations such as the ancient Maya and Aztec in Central America and Mexico were essentially man-made mountains with temples of deities on their summits (Quaritch-Wales 1953). It was usually on these artificial mountains that priests carried out sacrifices of foodstuffs, precious metals, animals, and humans. Pre-Columbian peoples in Central and South America also revered mountains as the abodes of deities who controlled the weather

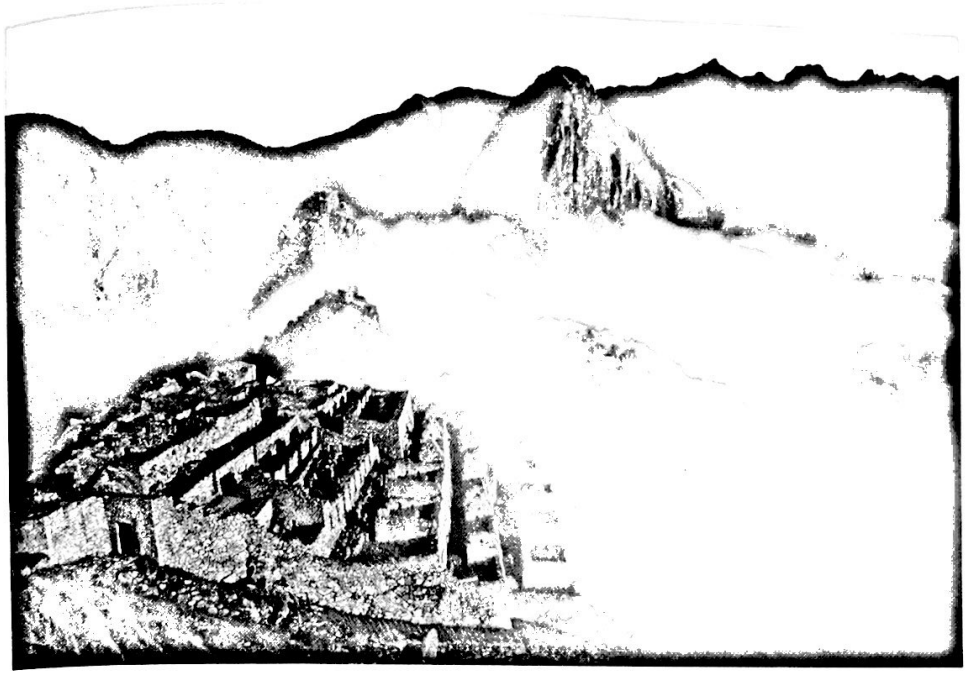

FIGURE 9.1 Machu Picchu, ancient Inca settlement and religious site at 2,300 m (7,500 ft) amid precipitous terrain in the Peruvian Andes. Extensive terracing has increased the amount of usable land. Even the high peak on the right displays terracing near the summit. This was used as a lookout; soldiers stationed there grew their own food. (Photo by E. Bernbaum.)

and the water on which they depended for their survival (Reinhard 2006).

Mountains were frequently linked in legend with the origin of a tribe or people. The Panzaleo of highland Ecuador traced their descent from the volcano Tungurahua. Another tribe, the Puruha, believed that they were created by the union between two volcanoes, the feminine Tungurahua and the masculine Chimborazo (Trimborn 1969). Many cultures have viewed mountains as male and female, or have in other ways associated them with fertility and members of human families. An Algonquin legend from the northeastern United States provides a typical example: There was once an Indian girl gathering blueberries on Mount Ktaadn, and, being lonely, she said, "I would that I had a husband." Seeing the great mountain in all its glory rising on high, with red sunlight on the top, she added: "I wish Ktaadn were a man, and would marry me." Her wish came true, and she gave birth to a son who used his great supernatural powers to help his people (Bent 1913). Mountains could also be female: The Yakutat Tlingit regard Mount Fairweather as the estranged wife of Mount St. Elias, 240 km (150 mi) up the Alaskan Coast (Laguna 1972).

Many of the higher mountains of the Andes were considered to be the home of deities (Reinhard and Constanza 2010; Reinhard 2006). In the cosmology of a remote village located east of Cuzco, Peru, at 4,265 m (14,000 ft), a number of the surrounding peaks have special religious significance. The villagers still make offerings of coca leaves and foodstuffs every August to the gods of the mountains, as protection against disease and to ensure good crops. According to local tradition, the *Apu* or mountain lord of the highest peak, Ausangate, at 6,400 m (21,000 ft) resides in a palace inside the mountain; if he is not given enough food he becomes angry and wraps the mountain in clouds, sending down lightning and hail to destroy the fields (Mishkin 1940). He also watches over the wildlife and livestock of the region.

The Western Tradition

The Biblical Period

Mountains were objects of veneration and symbols of strength and peace to the people of the Old Testament. The three most important events in the *Torah,* the first five books of the Bible, the covenants with God, are all associated with mountains, beginning with the coming to rest of Noah's Ark on Mount Ararat after the flood (Genesis 8:4). Every Bible-school child knows the story of Moses receiving the Ten Commandments on Mount Sinai (Exodus 19, 20, 24) and how Abraham took his son Isaac to a mountain in the land of Moriah to sacrifice him to God (Genesis 22:2). In later books of the Bible, David established his capital on Mount Zion, the fortress hill where the Jebusite city that became Jerusalem was located (Psalms 78: 68–70). Tradition places the temple he and Solomon built, the sacred center of the Jewish people, on the site of Mount Moriah, the place of the primordial sacrifice performed by Abraham (Bernbaum 1997).

Other mountains, such as Mount Carmel, Calvary, and the Mount of Olives, were also considered sacred (Bernbaum 1997). It is important to realize that a number of these are no more than hills. Ancient Near Eastern religions referred to mountains as "the center of fertility, the primeval hillock of creation, the meeting place of the gods, the dwelling place of the high god, the meeting place of heaven and earth, the monument effectively upholding the order of creation, the place where god meets man, a place of theophany" (Clifford 1972: 5).

Many of the most important events in the New Testament also take place on mountains. Satan takes Jesus up on a mountain and tempts him with the power and wealth of the world. Like Moses on Mount Sinai, Jesus is transfigured with light on Mount Tabor and is there revealed, for Christians, as the Son of God. The most famous of his sermons is the Sermon on the Mount, delivered on a hill above Galilee. Jesus is crucified on the hill of Golgotha and ascends to heaven from the Mount of Olives (Bernbaum 1997).

Classical Heritage

GREEKS

For the Greeks, high peaks were primarily the abodes of gods and other deities. The twelve major gods and goddesses resided in a fortress paradise on top of Mount Olympus. Zeus, the king of the gods, was born and raised in remote mountain caves in Crete, and had numerous altars and shrines dedicated to him on the tops of mountains throughout Greece. The Muses, who inspired literature, art, music, drama, and science, lived originally on neighboring Mount Preiria and then moved in later mythology to Mounts Hellicon and Parnassus. Mountains were also the haunts of nymphs, wild beasts, and centaurs (Bernbaum 1997).

The wildness and isolation of mountains also impressed the ancient Greeks. Homer was very much aware of mountain weather and describes its force vividly:

> In spring, snow-water torrents risen and flowing down the mountainsides hurl at a confluence their mighty waters out of gorges, filled by tributaries, and far away upon the hills a shepherd hears the roar. As south wind and the southeast wind, contending in mountain groves, make all the forest thrash . . . swaying their pointed boughs toward one another in roaring wind, and snapping branches crack. (ILIAD, Book 16)

The mountain that figures most prominently in Greek mythology and literature is, of course, Mount Olympus in Thessaly. Olympus, a word that predated the Greeks, apparently meant "peak" or "mountain" in a generic sense, for a number of other Greek mountains are named Olympus. Several of these, like Olympus in Thessaly, were associated with weather cults. Olympus is often mentioned as the home of Zeus in his role as the god of storms and weather. Through his ability to strike with lightning and thunder, Zeus controls both gods and men from the mountaintop (Nilsson 1972).

Because of the association of mountain heights with deities, the ancient Greeks placed many of their shrines and temples on the slopes and summits of mountains, or oriented these structures with respect to sacred peaks. The early Minoan civilization of Crete tended to associate mountains with female deities and saw in them reflections of female shapes and body parts. They constructed a number of peak sanctuaries for making offerings to goddesses and other deities. Some of these peak sanctuaries appear to have been sites of human sacrifice (Sculley 1962).

The Greeks recognized the wild, rugged, and untamed nature of mountain scenery, but they preferred the more harmonious aspects of nature. They were engrossed with man and his works. Socrates, for example, was totally absorbed by the perplexities of the city. He is quoted as answering the reproach of his friend Phaedrus, who complained that he never left the city, by saying "he was fond of knowledge and could learn nothing from the trees and the country, but only from the people in the city" (Hyde 1915–1916: 71). The human form was considered the highest level of beauty, and even their gods appeared in human form. What was good in nature was that which provided comfort and harmony for man. Beauty was symmetry and order. Ruskin, in his interpretation of Greek art and literature, says, "Thus, as far as I recollect without a single exception, every Homeric landscape, intended to be beautiful, is composed of a fountain, a meadow, and a shady grove" (1856, Vol. 4, ch. 13, sec. 15).

The observations of mountain weather in *The Iliad* noted above prefigure the scientific curiosity of later Greeks about the origins of mountains and the causes of phenomena associated with them. Herodotus, for example, commented on the work of rivers and their ability to erode and deposit. To him is attributed the saying, "Egypt is the gift of the river." Having discovered fossil marine shells in the mountains, he speculated that the peaks had at one time been under water. He also thought it likely that earthquakes, rather than the wrath of the gods, were responsible for breaking apart the Earth and uplifting mountains. Aristotle observed the unequal distribution of mountains, the significance of springs flowing from mountainsides, and the changes in climate that occurred with altitude. He believed that earthquakes and volcanoes were closely related and that they were involved in the formation of mountains. One of Aristotle's students, Theophrastus, investigated mountain plants; another, Dicaearchus, attempted to calculate the heights of mountains. In his famous geography, Strabo described mountains of the ancient world, distinguishing them from plateaus (Sengor 2003).

ROMANS

Italy, like Greece, is a mountainous country: The Apennines run its entire length and the Alps form its northern border. Although some Romans—notably the philosopher Seneca and the encyclopedist Pliny—made important observations concerning mountains, on the whole the Romans did not share the Greeks' appreciation of mountains, except perhaps as distant vistas to be seen from the porches of their villas. Among the Latin poets, only Lucretius discerned a sublime beauty in the Alps (Geikie 1912; Nicolson 1959). These practical people viewed mountains primarily as wastelands and as obstacles to commerce and conquest. The Romans were regularly crossing the Alps by Caesar's time, but apparently never overcame their initial dread of them. To appease the primarily Celtic deities of the Alpine passes and to commemorate safe journeys, they

made offerings of coins and small bronze tablets inscribed with the names of the deity and the traveler. The hospice museum at the Great St. Bernard Pass has gathered a large collection of these offerings from the surrounding area (Bernbaum 1997; personal observation).

The prevailing Roman attitude toward mountains was aptly expressed by Silius Italicus in his description of Hannibal's famous crossing of the Alps in 218 B.C.:

> Here everything is wrapped in eternal frost, white with snow, and held in the grip of primeval ice. The mountain steeps are so stiff with cold that although they tower up into the sky, the warmth of the sunshine cannot soften their hardened rime. Deep as the Tartarean abyss of the underworld lies beneath the ground, even so far does the earth here mount into the air, shutting out with its shade the light of heaven. No Spring comes to this region, nor the charms of Summer. Misshapen Winter dwells alone on these dread crests, and guards them as her perpetual abode. Thither from all sides she gathers the sombre mists and the thunder-clouds mingled with hail. Here, too, in this Alpine home, have the winds and the tempests fixed their furious dominion. Men grow dizzy amidst the lofty crags, and the mountains disappear in the Clouds. (PUNICA 111: 479–495, in GEIKIE 1912)

Literally thousands of pages have been written concerning Hannibal's crossing, many of which debate the question of his exact route. DeBeer (1946: 405) mused:

> I often wonder whether Polybius and Livy realized what a blessing they conferred on humanity by couching their accounts of Hannibal's passage of the Alps on a level of precision insufficient to make the tracing of his route obvious, but just enough to encourage their readers to think that there is sufficient internal evidence to give them a sporting chance of solving the puzzle of where he went.

The titles of works published by Freshfield are typical: "The Pass of Hannibal" (1883) and "Further Notes on the Pass of Hannibal" (1886) (both in the *Alpine Journal*), and his book *Hannibal Once More* (1914). DeBeer himself could not resist the temptation, producing *Alps and Elephants: Hannibal's March* (1955).

The Roman opinion of mountains remained almost consistently negative. They apparently never acquired a taste for mountain scenery, as the Greeks did. The implicit dualism in the attitudes of these two peoples toward mountains became part of the legacy for Western Europe (Nicolson 1959). Ultimately, as we know, the spirit of the Greeks, who worshipped their gods on Mount Olympus, and the Children of Israel, who lifted up their eyes to the everlasting hills, would triumph, but not before several centuries of antipathy toward mountains had passed.

From Medieval Fears to Romantic Enthusiasm

During the Middle Ages, mountains in Europe were primarily viewed as haunts of demonic beings such as dragons and witches. Medieval people, like their Roman predecessors, paid little attention to the grander aspects of nature, and there are few favorable references to mountains in either their literature or their graphic art (Mathieu 2006). What does exist is often distorted by allegory, abstraction, and moralization. Dante made mountains the guardians of hell, yet the central book of the *Divine Comedy*, the *Purgatorio*, describes the ascent of a mountain leading to the earthly paradise on its summit and Paradiso or Heaven beyond (Freshfield 1881; Noyce 1950; Schama 1995). Dante's ambivalent view of mountains reflects the fear and fascination characteristically evoked by sacred places charged with a power that can be experienced as both demonic and divine (Otto 1950). Records of Celtic beliefs preserved by monks in Ireland strongly suggest that, before Christianity took over Europe and demonized natural sacred sites central to the practice of pre-Christian religions, the Celts viewed the Alps and other European mountains in a positive, divine sense as the palaces and abodes of their gods (Bernbaum 1997).

Following conversion to Christianity, Europeans tended to regard mountains as dangerous places, sacred in a predominantly negative, demonic sense (Bernbaum 1997). As a consequence, medieval travelers disliked mountains, but nevertheless traversed them regularly. To ease the journey, Alpine villages provided inns and supplied guides; churches and hospices were constructed along the most popular routes. Pilgrims on their way to Rome from western and northern Europe favored the Great St. Bernard Pass, where a monastery has stood since A.D. 812, and a hospice since 859 (Coolidge 1889). Although August was considered the best month for mountain travel, the passes were attempted at all seasons (Tyler 1930). Master John de Bremble, a monk of Christ Church, Canterbury, England, who had been sent to Rome on business, sent a letter home describing his passage of the Great St. Bernard in February 1188:

> Pardon me for not writing. I have been on the Mount of Jove [the Roman name for the Great St. Bernard Pass]; on the one hand looking up to the heavens of the mountains, on the other shuddering at the hell of the valleys, feeling myself so much nearer heaven that I was more sure that my prayer would be heard. "Lord," I said, "restore me to my brethren, that I may tell them, that they come not into this place of torment." Place of torment, indeed, where the marble pavement of the stony ground is ice alone, and you cannot set your foot safely; where, strange to say, although it is so slippery that you cannot stand, the death (into which there is every facility for a fall) is certain death. (COOLIDGE 1889: 8–9)

Tales of monsters and supernatural perils added to the fears of travelers and mountain dwellers. King Peter III of Aragon (b. 1236) set out to prove it was possible to climb Pic Canig (2,785 m, 9,135 ft), then believed to be the highest peak in the Pyrenees. Resting by a small lake near the summit, he absently threw a stone into the water. Suddenly, "a horrible dragon of enormous size came out of it, and

began to fly about in the air, and to darken the air with its breath." The full account may be found in Gribble's *The Early Mountaineers* (1899).

Perhaps the most famous legend is that of Mount Pilatus (2,129 m, 6,985 ft) in the Swiss Alps. As the story goes, Caesar was angry with Pilate for crucifying Jesus, so he had Pilate brought to Rome to be put to death. His body was tied to a stone and dropped into the Tiber River, where it caused a great turmoil. The body was therefore retrieved, and was eventually placed in a small lake on Mount Pilatus, in the Swiss territory of Lucerne. From that time on, if anybody shouted or threw a stone into the lake, Pilate would avenge himself by stirring up a great tempest. He also rose from the water on each Good Friday and sat on a nearby rock; if anybody saw him, that person would surely die. So great was their fear of the tempests he might cause that the government of Lucerne forbade anybody to approach the lake; in 1387, six men who broke this regulation were imprisoned (Coolidge 1889).

An excellent collection of these beliefs is contained in Johann Jacob Scheuchzer's *Itinera per Helvetia Alpinas regionses*, published in 1723. Scheuchzer, a professor at the University of Zurich, was a highly respected botanist who was credited with being the first to attempt to formulate a theory of glacier formation and movement (Gribble 1899). He had a penchant for the extraordinary, however, and firmly believed that dragons lived in mountains. His book is a mixture of the real and unreal, containing many accounts of sightings of these creatures, with several illustrations of the various dragon forms.

Belief in dragons had almost died out before the time of Scheuchzer, however. In 1518, four scholars climbed Mount Pilatus and visited the lake with no ill effects and, in 1555, Conrad Gesner, a professor of medicine at the University of Zurich, climbed the mountain by special permission of the Lucerne Magistrates, to prove that there was nothing to fear. Only 30 years later, a group of villagers, led by the pastor of Lucerne, climbed to the lake, threw stones, and defiantly mocked the spirit of Pilate, chanting *"Pilat, wirf aus dein kath!"* ("Pilate, cast out your crud!") (Gribble 1899: 46–50).

It is probably fair to say that many medieval Europeans who had any acquaintance with mountains feared them or, at the very least, would have considered it a waste of time to climb to the top of one, but there were exceptions. In 1336, the poet Petrarch climbed Mont Ventoux in Provence simply "for the sake of seeing the remarkable altitude of the place" (Gribble 1899: 18–19). Petrarch's climb is often cited as the first evidence of Renaissance appreciation of natural beauty, but much of his account has so allegorical a cast that some scholars have suspected he never made the climb (Noyce 1950). Much more clear-cut evidence of a new interest in natural beauty and natural phenomena is Leonardo da Vinci's observations of mountains, both in his art and in his scientific notebooks, at the end of the fifteenth century (Schama 1995).

The person usually credited as being the first European to appreciate and love mountains for their own sake is the sixteenth-century Swiss naturalist Conrad Gesner. In a letter to a friend in 1541, Gesner wrote:

> I am resolved henceforth, most learned Avienus, that as long as it may please God to grant me life, I will ascend several mountains, or at least one, every year, at the season when the flowers are in their glory, partly for the sake of examining them, and partly for the sake of good bodily exercise and of mental delight. For how great a pleasure, think you, is it, how great delight for a man touched as he ought to be, to wonder at the mass of the mountains as one gazes on their vastness, and to lift up one's head as it were amongst the clouds? The understanding is deeply moved, I know not wherefore, by their amazing height, and is driven to think of the Great Architect who made them. (COOLIDGE 1889: 12–13)

He not only carried out this resolve, but took other Renaissance naturalists along on his Alpine excursions, awakening their interest in mountain plants and opening their eyes to the glories of the mountains. His student and successor at the University of Zurich, Josias Simler, published a learned treatise in 1574 on snow and ice travel; in it, he discussed such things as crampons, alpine sticks, use of eye shades, and how to cross crevasses (Gribble 1899).

The hold of theology on science and philosophy was very strong throughout the Middle Ages, and the general antipathy felt toward mountains was reinforced by religious sanctions and ideas. When Christianity became the official religion of the Roman Empire in the first half of the first millennium, its leaders reduced the divinities of the natural landscape to demons antagonistic to the new religion. Christian missionaries deliberately cut down sacred groves where pagan rituals traditionally took place, as a means of putting such practices to an end. Inspired by the writings of early theologians such as St. Augustine, they tended to view the wilderness—and the mountains that formed a particularly wild and uncontrollable part of it—as the corrupt domain of the evil powers of nature that the Church had to suppress in order to establish the kingdom of heaven on earth (Bernbaum 1997).

An influential post-medieval spokesman for this idea was Thomas Burnet, who asserted in *The Sacred Theory of the Earth* (1684) that the Earth was originally a perfectly smooth sphere, the "Mundane Egg"; as punishment for man's sins, the surface was ruptured and the interior fluids boiled out as "vast and undigested heaps of stones and earth."

By the end of the seventeenth century, on the verge of the Enlightenment, publications began to appear supporting the idea of a purposefully designed Earth and the usefulness of mountains. Mountains were recognized as being valuable as wildlife preserves, as sources of minerals, and as a means of converting salt water to fresh (Rees 1975a). But mountains were still not generally appreciated for their beauty. The wild disarray of mountains and their utter lack of symmetry and proportion were difficult for the early modern mind to accept. Mountains represented

confusion, and were quite unlike the order and uniformity these thinkers sought in the natural world. Their ideals were the classical ones of order, reason, and restraint. Yet, appalled as they were at these "warts, wens, blisters, and imposthumes" on the fair face of the Earth, they were also profoundly impressed by the vastness and enormity of mountains. This is well expressed in Burnet's *The Sacred Theory of the Earth:*

> The greatest objects of nature are, methinks, the most pleasing to behold; . . . there is nothing that I look upon with more pleasure than the wide sea and the mountains of earth. There is something august and stately in the air to these things, that inspires the mind with great thoughts and passions; we do naturally, upon such occasions, think of God and his greatness: And whatsoever hath but the shadow and appearance of the infinite, as all things have that are too big for our comprehension, they fill and overbear the mind with their excess and cast it into a pleasing kind of stupor and admiration. Still . . . although we justly admire its greatness, we cannot at all admire its beauty or elegancy for 'tis as deformed and irregular as it is great. (NICOLSON 1959: 214–215)

The feelings of "delightful horror" and "terrible joy" expressed by Burnet and his contemporaries are the first signs of the romantic enthusiasm that has typified European attitudes toward mountains since the eighteenth century (Mathieu 2011). In 1732, Albrecht Haller published *Die Alpen,* a book of poems in praise of the Alps and their inhabitants which became something of a best-seller in Europe. The journals and letters of another poet, Thomas Gray, describing his tour of the Alps in 1739, evoked a similar response in England. The most influential writer of all was Jean-Jacques Rousseau (Hyde 1917; Noyce 1950). In his *La Nouvelle Héloïse,* published in 1759, he enthuses:

> The nearer I came to Switzerland, the more were my feelings moved. The moment when from the heights of Jura I descried the Lake of Geneva was a moment of ecstasy and rapture. The sight of my country, that so-beloved country, where torrents of pleasure had overwhelmed my heart, the wholesome, pure air of the Alps; the soft air of home, sweeter than the perfumes of the East; this rich and fertile soil; this unrivaled landscape, the most beautiful that human eye has ever seen, this charming spot of which I had never beheld the like in my journey; the sight of a happy and free people; the softness of the season; the gentleness of the climate; a thousand delicious memories that recalled all the emotions I had felt,—all these things threw me into transports that I cannot describe. (PERRY 1879: 305)

Rousseau's writings had an almost revolutionary impact. Although the love of nature was not new, Rousseau's expression of it, particularly with respect to mountains, greatly increased popular appreciation of Switzerland as a place of beauty. Among those who came under Rousseau's spell were the famous German philosopher and poet Goethe, and the English poet Wordsworth, who was perhaps the greatest interpreter of nature in all of literature. Rousseau also influenced Horace Benedict de Saussure, the Swiss doctor who offered a prize for the first ascent of Mont Blanc—accomplished by Jacques Balmat and Dr. Michel Paccard in 1786—and is considered the father of Alpinism. After four attempts between 1760 and 1787, he himself succeeded in reaching the summit in 1787. It is no coincidence that the birth of modern mountaineering coincided with the emergence of Romantic views of the Alps as symbols of the infinite and the sublime (Bernbaum 1997). In a sense, we can say that one sacred view of mountains—a positive, divine one—had replaced another, negative view of mountains as demonic places that had prevailed during the Middle Ages.

De Saussure initiated a great boom in scientific interest in mountains; in the following half-century, for scientific purposes, Swiss alpinists ascended many other mountains never before climbed (Noyce 1950). By the middle of the nineteenth century, however, the scientific focus gave way to the English sense of sport. When Hudson, Hadow, and Lord Douglas lost their lives on the Matterhorn in 1865, the disaster seemed to serve as a challenge rather than a deterrent, and in the years that followed, English climbers and tourists swarmed into the remote regions of the Alps (Peattie 1936; Schama 1995). The modern period of mountain adoration had begun.

The East

The development of attitudes toward mountains in the East contrasts greatly with that of the West. Attitudes in both civilizations changed from initial feelings of awe and aversion to admiration and love (Tuan 1974; Bernbaum 1997), but in the East, the appreciation of mountains began very early. According to the origin myth of the Korean people, they are descended from the union of a sky god and a bear woman on the sacred mountain of Paekdu (Henthorn 1971). In Japan, China, Tibet, and India, mountains have long been adored and worshipped. Mountains were considered sacred in China at least 2,000 years before the birth of Christ (Sullivan 1962; DeSilva 1967; Bernbaum 1997). Buddhism, Taoism, Confucianism, Shintoism, and Hinduism all incorporated mountain reverence into their beliefs.

The impact of mountains on early Chinese culture was profound. The mountain ranges that course through China were considered to be the body of a cosmic being (according to some, a dragon), the rocks his bones, the water his blood, the vegetation his hair, and the clouds and mists his breath (Sullivan 1962: 1). This belief probably sprang from the ancient cult of the Earth and, although largely replaced by other concepts, remains basic to Chinese philosophy. It also had to do with ancient views of mountains as divine sources of rain and water on which the agrarian society of China depended for its existence. Man is viewed as an

integral part of nature. Inanimate objects have spirits and souls, just as do animate objects.

At first, there were four sacred mountains in China situated in the four quarters of the compass (later a fifth was added in the center): The eastern mountain, T'ai Shan, was the most holy and famous (Mathieu 2011). These mountains are usually associated with Taoist and Confucian thought, but were worshipped as far back as the Hsia Dynasty (2205–1176 B.C.) (Sowerby 1940). The ancient annals say that the legendary first emperors of China would go on ritual tours of inspection of the empire every five years and would climb these mountains and perform sacrifices on them to establish their sovereignty over the princes of the realm. Later historical emperors would climb T'ai Shan if they felt that they had brought their dynasties to the heights of glory and would perform sacrifices thanking Heaven and Earth for their successes (Chavannes 1910; Bernbaum 1997).

There are, in addition, four mountains of special significance to Buddhism, also situated in the four directions, of which Omei Shan in the west is probably the most famous (Shields 1913; Mullikin and Hotchkis 1973). Omei Shan was reputed to have over 50 pagodas and temples. Pilgrims still climb the mountain to see the Buddha's Glory from its summit: a Spectre of Brocken effect of a figure projected in mist surrounded by a rainbow halo. Another such effect was viewed, in a contrasting manner, as demonic in the Harz Mountains of Germany (Bernbaum 1997).

Many other mountains have local religious significance. One such peak is Dragon Mountain near the ancient city of Anking, celebrated in this poem:

There is a dragon mountain in Hsu
With a spring which waters the fields
On the mountain is the spring
And upon the hill sides are tilled fields
From the earliest ages the men of Hsu have
received this help,
In time of trouble all heads are turned toward the mountain.

High above the hills float the clouds,
And within them is a spirit who changes their shapes
continually.

The people wondered who the spirit was
Until they found that it was the Lung Wang.

Hence they rebuilt the temple,
So that sacrifices might be made for a thousand years.

These sacrifices are still continued
And the people reap the reward.
(SHRYOCK 1931:118)

The mountain as a source of water is a religious motif found in many cultures: It was central to the Israelites of the Old Testament and to the Babylonians, as well as throughout Asia and Latin America (Van Buren 1943; Quaritch-Wales 1953; Reinhard and Constanza 2010). Clouds have a special fascination for the Chinese, and appear in their earliest

FIGURE 9.2 Yamabushi descend Omine San, one of the most important sacred mountains for practitioners of the Japanese mountain climbing religion of Shugendo (Photo by E. Bernbaum.)

art. Mountains are frequently shown rising out of clouds or enshrouded by them, not as a symbol of gloom or dreariness, but of beauty. Sometimes clouds are shown as dragons. To the Asian mind, dragons do not generally have an evil connotation as they do to the Westerner; they are benevolent creatures controlling the elements and guarding sources of wisdom (Sowerby 1940: 154).

Until the third century A.D., the Chinese regarded mountains as dangerous places of supernatural power that only those with proper spiritual preparation could enter safely to engage in religious practices. Around the fourth century, as result of a shift of the Chinese capital to more attractive mountains in the south and growing discontent with the confining strictures of imperial bureaucracy, literati from the court began going to the mountains for recreation, pursuing painting and poetry as they walked and sought inspiration in beautiful mountain landscapes. A similar transformation of attitudes took place in Europe more than a thousand years later (Mathieu 2011). In a very real sense, the modern practice of going to the mountains for sport and recreation actually had its birth in China. The

following poem, composed in the fifth century, reflects this early shift in views of mountains:

In the mountains all is pure, all is calm;
All complication is cut off.

Rare are they who know to listen;
Happy they who possess wisdom.

If the cold wind stings and bothers you,
Sit in the sun: it is always warm there.

Its hot rays burn like flames,
While, opposite, in the shade, all is frost and snow.

One pauses on ledges, one climbs to the foot of high clouds;
One sits in the depths of a gorge, one passes windy grottos.

Here is the realm of harmony and joy,
Where the past and the present become eternal.
(BERNBAUM 1997: 27)

Perhaps it is only natural, given East Asian sentiments toward mountains, that mountains should occupy a dominant position in their art. The very term for landscape in Chinese is *Shan Shui,* literally "mountains and water." Painting is considered a branch of calligraphy; the Chinese character for mountain 山 is a pictorial representation of a mountain (DeSilva 1967), and the characters for a hermit or Taoist immortal 仙 are those of a man (person) and a mountain. The mountain motif appears on the earliest known Chinese pottery and stone carvings, and in landscape paintings from the Han Dynasty (206 B.C.–A.D. 220) onward (DeSilva 1967).

The Japanese also view mountains as symbols of divine beauty and power. The use of stones to represent mountains is an ancient art form practiced in both Chinese and Japanese gardens. The culmination of this is what the Japanese call *Iskiyarna:* A natural stone about 15 cm (6 in.) high is placed vertically on a small wooden base. This simple piece of nature sculpture, a mountain landscape in miniature, is kept inside the house on a shelf or table, and often has great value and meaning to its owner. Japan has many sacred mountains, of which Fuji is perhaps the most famous. Up to 300,000 people climb the mountain each year during the July–August climbing season; it is still climbed annually by members of Fuji devotional sects as a sacred pilgrimage. When a commercial proposal was made for constructing a funicular railway to the summit, the Japanese angrily rejected the idea as a desecration of the holy mountain (Fickeler 1962). Until the mid-nineteenth century, perhaps the most widespread form of religion in Japanese village life was Shugendo, a blend of Buddhism and Shintoism based on the practice of climbing mountains as a metaphor for following the Buddhist path to enlightenment and acquiring spiritual powers. Practitioners of this religion are called *yamabushi,* meaning "those who lie down (or sleep) in mountains" (Fig. 9.2). Japanese also revere many of their sacred mountains as the abodes of ancestral spirits on whom they depend for water to grow their crops (Bernbaum 1997).

The people of Cambodia, Thailand, Bali, Java, and the Philippines also practice mountain worship (Quaritch-Wales 1953). Mount Popa in Burma has been considered sacred for over 2,000 years (Aung 1962). Rulers of many Southeast Asian kingdoms identified their capitals with Mount Meru—the mythical mountain at the center of the universe with the palace of the king of the gods on its summit—or with Mount Kailas, the abode of the Hindu deity Shiva, regarded by over a billion Asians as the most sacred mountain in the world (Bernbaum 1997).

Mountains have a particular significance in India (Saxena et al. 1998). The Himalayas, extending for 2,500 km (1,500 mi) along its northern border, have many religious and mythological associations. They are the source of major sacred rivers, such as the Indus, Brahmaputra, and Ganges, on whose waters hundreds of millions of people in the plains depend for their existence. The source of the Ganges is considered especially holy and is visited by many as a sacred pilgrimage. The Himalayas are the home of many Hindu deities, the most important of whom is Shiva, the archetypal yogi and one of the three forms of the supreme deity, who resides on Mount Kailas. Shiva's wife, Parvati, is the daughter of Himalaya (Bernbaum 1997). The range is also considered a favored place for meditation and the idyllic retreat of sages intent on attaining the ultimate goal of *moksha* or spiritual liberation.

In Tibet, as well as in the smaller Himalayan states of Kashmir, Nepal, Sikkim, and Bhutan, mountains have been natural shrines since very ancient times, even before the advent of Buddhism and Hinduism (Nebesky-Wojkowitz 1956). Cultural influences from both China and India are now evident, but the inhabitants have retained many of their indigenous beliefs. Thus, it is common for persons to make such pious gestures as tying strips of cloth on bushes, or placing stones or pieces of wood in sacred heaps at a pass they have reached after a steep climb along a mountain trail (Shaw 1872). Circumambulation of mountains is also widely practiced by Buddhists, particularly in Tibet. Among the most famous Tibetan mountains are Am-nye-rMachen and Kang Tise or Mount Kailas. Regarded as the most sacred mountain in the world by Hindus and Tibetan Buddhists, as well as by followers of two other religions, Jainism and the indigenous Tibetan tradition of Bon, Kailas is a dome-shaped peak of singular beauty and a favorite for circumambulation (Mathieu 2011; Fig. 9.3). The trip over the rocky trail around the mountain is nearly 50 km (30 mi) long and takes up to three days; many Tibetan pilgrims do the entire circuit, crossing a pass nearly 5,700 meters (18,240 ft) high, in one long day (Bernbaum 1997).

Many of the higher peaks are considered sacred by the people of the Himalaya. With the onslaught of modem mountain climbers, governments have had to restrict activities in certain areas. In Nepal, for example, the summits

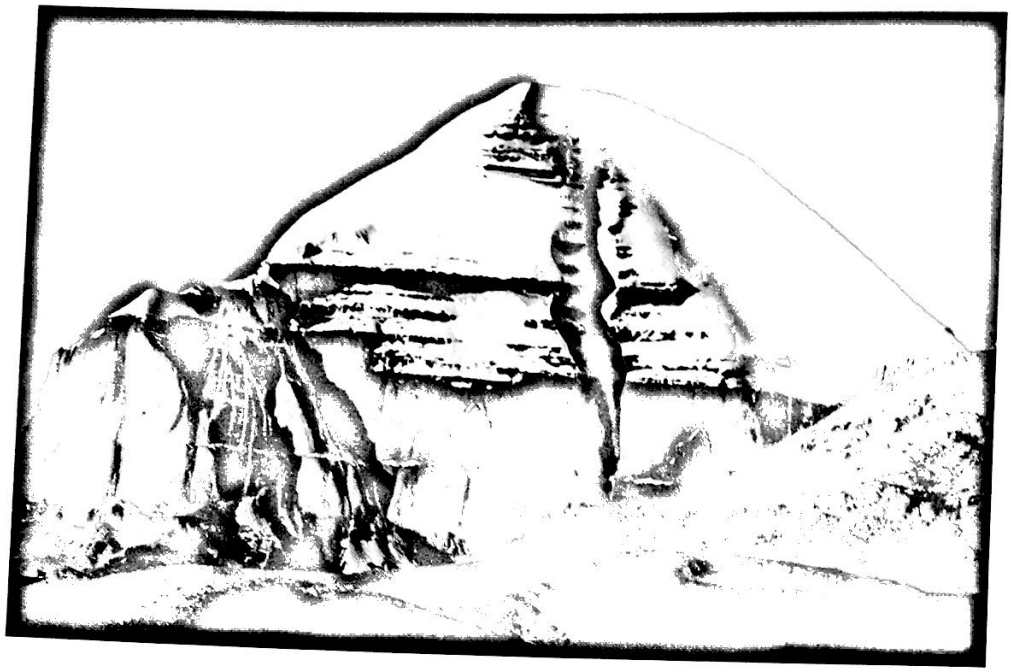

FIGURE 9.3 Mount Kailas, 6,714 m (22,028 ft), the most sacred mountain in the world for more than a billion people in Asia. Followers of Hinduism, Buddhism, Jainism, and the indigenous Tibetan religion of Bon all revere the remote peak, which lies in northwest Tibet and is the focal point of one of the longest and most arduous pilgrimages in the world. (Photo by E. Bernbaum.)

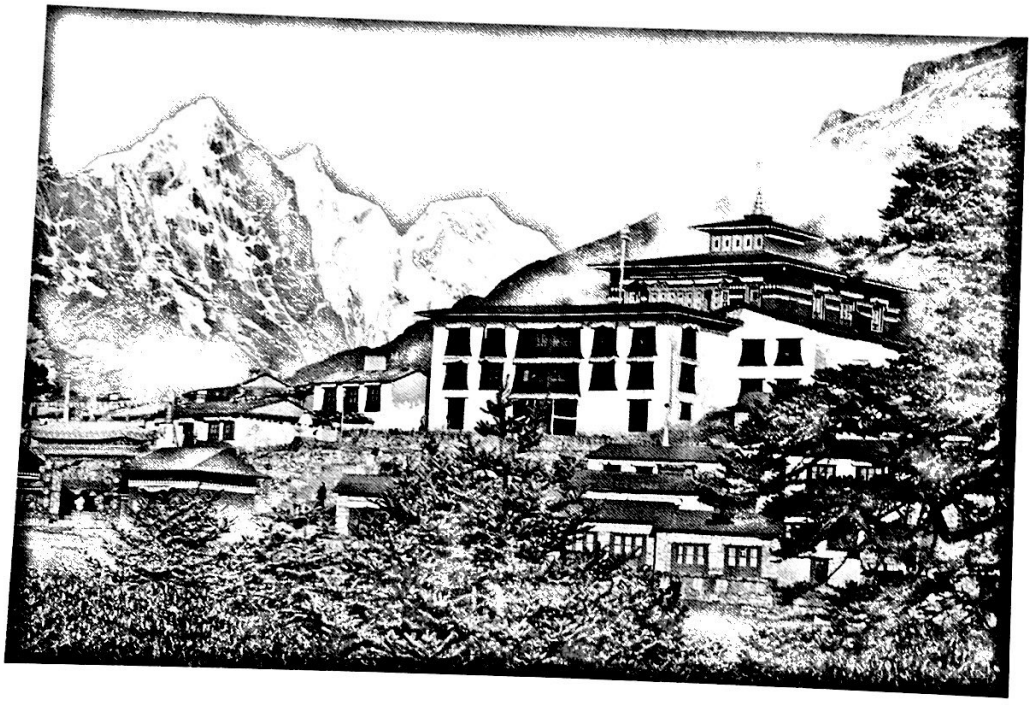

FIGURE 9.4 Tibetan Buddhist Monastery of Tengboche near the foot of Mount Everest in the Nepal Himalaya at 3,873 m (12,715 ft). (Photo by E. Bernbaum.)

of Machapuchare (6,991 m, 22,371 ft) and Kangchenjunga (8,586 m, 28,169 ft) are both off-limits for religious reasons (Siiger 1955; Bernbaum 1997). Airplane flights are also prohibited over these peaks. This prohibition has been eased somewhat with familiarity and with the advent of high-altitude jets, but when aviation first began, a planned flight over Mount Everest in 1934 by two English airplanes raised quite a stir in India and Tibet (Fickeler 1962). Transcending the pure worship of ancient times is the zest for life in the mountains. This is exemplified by the Sherpa dance ceremony "Mani Rimdu," a three-day festival held during full moon in the spring. This ceremony has deep religious aspects, but it is also a vehicle for exhilaration and glorification of the way of life of a very proud people in the highest mountains in the world (Kohn 2001). Mount Everest itself is a sacred mountain, albeit a minor one. The Tibetan name of Mount Everest, Chomolungma or Jomolangma, is short for the name of the goddess of the peak, Jomo Miyolangsangma, one of the Five Sisters of Long Life, whom Tibetans and Sherpas invoke for the lesser mundane blessings of long life, food, and wealth (Bernbaum 1999; Fig. 9.4).

The Modern Period

The beginnings of the modern period of Western romantic adoration of mountains can be found in the writings of Albrecht Von Haller, Thomas Gray, Jean-Jacques Rousseau, and Horace Benedict de Saussure. By the nineteenth

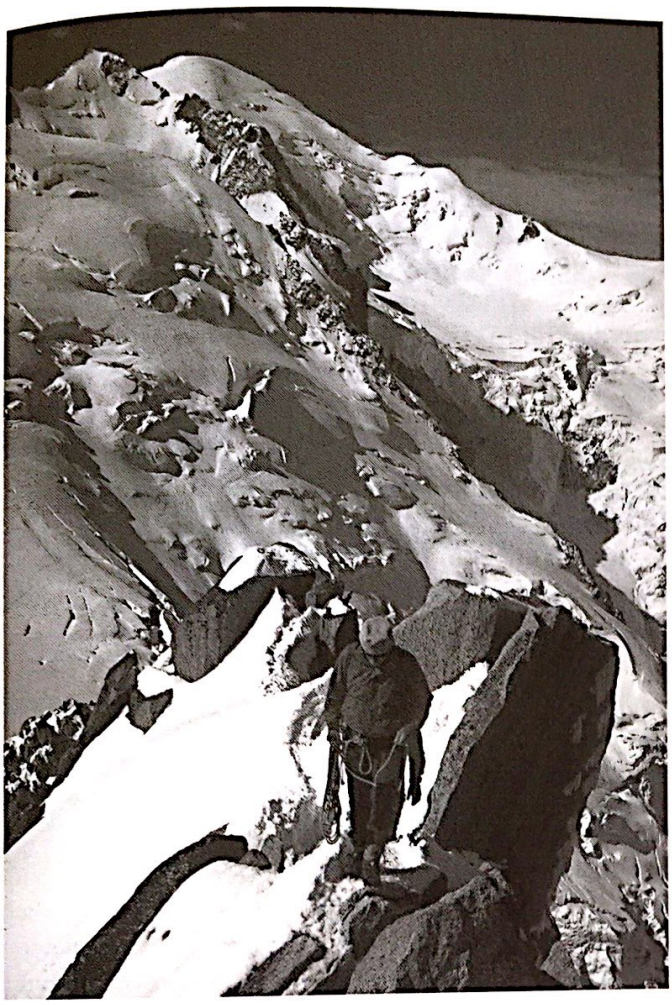

FIGURE 9.5 An alpinist on the Aiguille du Midi, with Mont Blanc in the background. The first ascent of Mont Blanc in 1786 marked the birth of the modern sport of alpinism in the West. (Photo by E. Bernbaum.)

century, the beauty of mountains was a common theme for poets and philosophers; scientists began to take a serious interest in the origins of mountains and alpine phenomena, and popular accounts of scientific findings were published in newspapers and periodicals; and mountains became a favorite of landscape painters (Ruskin 1856; Lunn 1912; Rees 1975a, 1975b; Schama 1995). By the 1860s, railways provided relatively easy access to the Alps. Tourist resorts sprang up, and sanitariums were built to accommodate sufferers from consumption (tuberculosis), since the dry clean air of the mountains was found to have excellent therapeutic results (Barton 2008). The popular image of mountains was no longer that of a cold, inhospitable land of horrors, but that of an attractive, healthy environment (Mathieu 2011).

In 1857 the (British) Alpine Club was formed, and shortly thereafter other mountaineering clubs were established on the continent of Europe. It was the British, however, who inundated the Alps during the ensuing decades. An article on the history of the Alpine Club states: "It is impossible to dwell in detail on this wonderful period, and a mere enumeration of its first ascents and first passages would be intolerably tedious. At the end of it hardly any of the greater summits of the Alps remained unconquered, and of the new ascents made, a very large share had fallen to the British climbers" (Mumm 1921). The Matterhorn tragedy of 1865 gave the Alpine Club, and the world, pause for thought but, after a few years, other younger members took up the challenge of unconquered peaks with renewed zeal (Fig. 9.5).

Alpine clubs gradually spread around the world (the first in the United States, the Appalachian Mountain Club, was formed in 1876), and many of these were quite exclusive: One had to be invited to join, and the requirements for admission were not easily met. Mountaineering became a consuming passion, almost a religion (Parker 2008). Peattie (1936: 6) called the development a "cult of mountains," a modern, more conscious phase of the ancient worship of mountains. An article entitled "Mountaineering as a Religion" was typical of this point of view:

> [W]e must seek for some homogeneous and inward spiritual characteristics marking us off as a caste apart from other men. For myself, I find these characteristics in a certain mental predisposition, a distinct individual and moral bent, common to all mountaineers, but rarely found in those who are not addicted to mountain climbing. The true mountaineer is not a mere gymnast, but a man who worships the mountains. (STRUTFIELD 1918: 242)

The cult of mountains had many prophets and a large following. The journals published by the various alpine clubs are full of articles praising mountains (e.g., Freshfield 1904; Fay 1905; Lunn 1912; Godley 1925; Young 1943; Howard 1949; Vandeleur 1952; Thorington 1957). Perhaps the most far-reaching claim of any zealot is that advanced by Geoffrey W. Young, a respected and long-time member of the Alpine Club, at a lecture before the University of Glasgow in 1956, that mountains have been influential in the development of human intelligence:

> It is a bold claim to make for mountains, that they contributed a third dimension, of height and depth, to man's intelligence; and, by means of it, adumbrated even a fourth dimension, that of spirit, not permeating it but placed above it. And yet, when mind first grew capable of comparison, when man's mastery began to move upon the earth, and he was released from labour only and from a surrounding darkness of fear, a mountain peak first sighted upon the skyline must indeed have seemed to belong to some sphere "visited all night by troops of stars," just as the first flash of sunrise upon a snow summit, for the first time realised, must have revealed the golden throne of a god. (YOUNG 1957: 14–15)

Further, in discussing the various components of landscape, he argued:

> In all this visual balance, and in the influence it has exercised, the mountains play, and have played, the principal part. It is the heights which have given the measure. They are set like upright rulers, to mark the scale, against the perspectives of plain and sea and sky. In their constant

> contemplation, illuminated by a lighting definite and brilliant, upon colour and shadow positive and luminous, primitive mind had no alternative but to acquire, as part of its growth, laws of measure, of order, of proportion, in thought no less than in vision. From the acquired ability to compare, to discriminate, reasoning, speculation, with measure and proportion, dawning upon the human mind in the genius of the first Greek philosophers and in the sculpture and building of the first Greek artists, began or hastened the beginnings of civilisation and culture in every western race. (YOUNG 1957: 24–25)

Some of the alpine clubs became very powerful financially, socially, and politically, and it has been argued that expeditions in Africa, Asia, and South America were part of the era of neocolonialism in the early twentieth century (Ellis 2001). The (British) Alpine Club has supported a large number of projects, from polar exploration to the search for the Yeti or Abominable Snowman. Its members have traditionally been among the elite of British society. Hillary and Hunt, after climbing Mount Everest, were knighted by the Queen. Most of these clubs have diversified now, but they are still powerful. A good example in the United States is the Sierra Club, which now has a membership of about 1.4 million. It employs full-time lobbyists in Washington, D.C., and has considerable political clout. One of its most impressive achievements was to galvanize public opinion through a highly effective advertising campaign that forced the U.S. Congress to block the proposed construction of dams on the Colorado River that would have flooded parts of Grand Canyon National Park (Cohen 1988).

Mountains are no longer the private preserve of elitist clubs or of special-interest groups, but a "cult of mountains" continues. This has been beautifully expressed by René Dubos:

> Man has now succeeded in humanizing most of the earth's surface but paradoxically, he is developing simultaneously a cult for wilderness. After having been for so long frightened by the primeval forest, he has come to realize that its eerie light evokes in him a mood of wonder that cannot be experienced in an orchard or a garden. Likewise, he recognizes in the vastness of the ocean and in the endless ebb and flow of its waves a mystic quality not found in humanized environments. His response to the thunderous silence of deep canyons, the solitude of high mountains, the luminosity of the deserts is the expression of an aspect of his fundamental being that is still in resonance with cosmic events. (DUBOS 1973: 772)

From a pastime pursued by a small group of aficionados, mountaineering has become a major sport that has captured the attention of numerous people and become a source of income for a growing number of guiding services who take clients to the summits of the world's highest peaks, including Mount Everest, sometimes with devastating results that get widespread publicity among the general public (Krakauer 1997). In addition to developing a commercial side, mountain climbing has also become a highly competitive endeavor, with races to see who can climb celebrated routes in the shortest time. Rock climbing has spun off as a sport in itself, often practiced exclusively indoors on artificial walls. People now climb mountains around the world for a plethora of reasons, ranging from the competitive to the contemplative, from the profane to the sacred (Bartlett 1993; Bernbaum 1997).

UNESCO's designation of "associative cultural landscapes" as a category of World Heritage Site in 1992 has raised to prominence the cultural and spiritual significance that people and traditions place on natural sites—in particular, sacred mountains such as Tongariro in New Zealand, Uluru or Ayers Rock in Australia, and Taishan in China. In the cases of Tongariro and Uluru, this designation has strengthened the role of indigenous peoples in managing places that have special value for them in their natural states (Bernbaum 2008). In addition, the growing impact of global cultural, political, economic, and environmental change, and particularly climate change, has focused attention on the cultural and spiritual importance of mountains and the responses by mountain communities to those changes (Bernbaum 2010).

As the world becomes increasingly populated and urbanized and the need to escape the pressures of the city grows, mountains become more and more a focus of attention (Macfarlane 2003). Mountains are now almost universally viewed as havens of retreat and symbols of freedom, and mountain tourism is one of the fastest growing industries in the world (see Chapter 12). Not content with brief visits, many people are taking advantage of technology and communications to move to and live in remote mountain communities like Aspen in the Colorado Rockies, participating in a modern phenomenon that scholars refer to as amenity migration, as discussed in Chapter 10. The city is no longer viewed as Socrates saw it, as the center of action where everything good happens, but more and more as the center of evil. This is particularly evident in the return-to-nature movement that took place among the young during the late 1960s and early 1970s, with its emphasis on casting off the artificiality of modern urbanized life. This trend, reminiscent of that advocated by Rousseau more than 200 years ago and by Thoreau a century later, is an important influence in our times.

Mountains are a favorite refuge for those seeking to commune with nature, whether they be motor tourists or backpackers (Parker 2008). This influx of tourists has created unprecedented pressures on mountain landscapes. Permits and other restrictions are being imposed in many areas, with waiting lists and reservations now required to trek and camp in some mountain areas. But mountains have never been in such demand or regarded with such favor in all the history of humankind. They comprise a major and praiseworthy theme in contemporary art, literature, and music.

Mountains are considered the embodiment of the good, the beautiful, and the sublime.

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CHAPTER TEN

People in the Mountains

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Many people have traveled to and through, settled in, moved from, and used mountain areas for a very long period of time. They may have been driven to the mountains seeking refuge from persecution elsewhere and, in the process, founded rich agriculturally based societies. They may have been pulled to the mountains in search of food and other resources, or they may have been attracted for spiritual purposes, as discussed in Chapter 9. They may have explored for ways through the mountains in search of more land and better livelihoods. They may have been driven to or from the mountains by shifts in weather and climate. The discovery of the "Iceman" (Fowler 2001) in a patch of melting ice high on the mountain border between Austria and Italy in 1990 raised speculation as to why he was there, and how he came to be buried by snow and ice approximately 5,000 years ago. Despite the long-standing connections between mountain areas and the wider world, we do know that groups with distinctive cultural and economic characteristics, and people with adaptations to altitude, cold, and steep slopes have occupied mountain areas for millennia. Current changes have pulled traditional mountain people into a globalized world (Cook and Butz 2011), where sharp distinctions between lowland and highland cultures and economies are increasingly blurred.

This chapter is the first of three that provide an overview of mountains and people, past and present, with emphasis on the status of mountain people and change in the early twenty-first century. This chapter focuses on people living in mountain areas. Chapter 11 considers land uses in mountain areas, particularly those relating to agriculture, which remains a primary source of livelihood for most of the world's mountain people. Chapter 12 addresses sustainable mountain development, which involves both mountain people and others living outside mountain areas; the chapter therefore stresses interactions between mountain and other regions.

Although mountains in the past have provided a refuge and a degree of isolation for their permanent inhabitants, the present era is a time when the tentacles of globalization reach to the most distant and marginal parts of the Earth, including mountain areas. New technologies, especially those related to mass transport and rapid communications, are increasingly facilitating the movement of people, goods, services, and information between the mountains and the lowlands, strengthening linkages and dependencies and driving changes in all aspects of life (Conover 2010; Stadel 1993; Fig. 10.1). Persistence and change among people in the mountains are a central focus of this chapter. With the past and the future in mind, human populations, their relationships with their environment, their livelihoods, and their life with hazards are described.

Mountain Populations

Having settled in and utilized the resources of mountain areas for many generations, people have adapted to the environmental conditions even while modifying those conditions to sustain their livelihoods. Most general references relating to mountain populations, and there are many, describe cultures, settlement patterns, economic activities, political issues, and development challenges (e.g., Price 1981; Stadel 1982a, 1982b; Stone 1992; Messerli and Ives 1997; Funnell and Parish 2001; Rhoades 2007; Löffler and Stadelbauer 2008). Some studies have focused on the impacts of global changes, rooted in natural and human causes, on mountain people and environment (e.g., Björnsen et al. 2005; Price 2006). Links between specific mountain populations and environmental factors, and their influence on livelihoods and development, have received extensive coverage (e.g., Kreutzmann 2006; Stadel 1985, 2003a, 2003b, 2006, 2008, 2010; Rhoades 2006; Sarmiento 2008; Borsdorf and Stadel 2013).

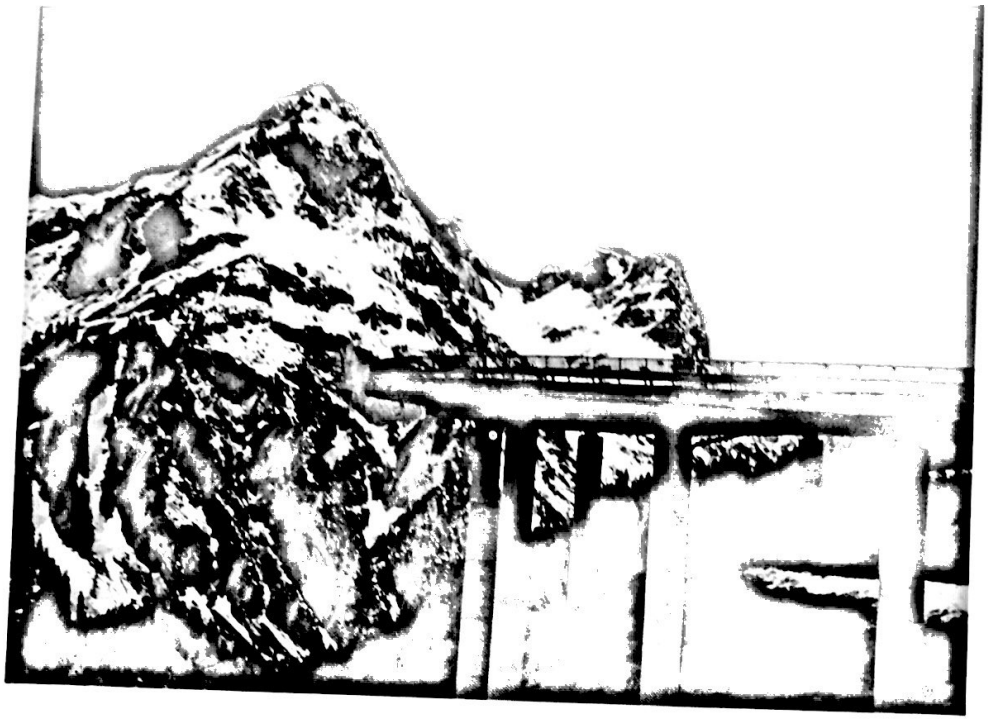

FIGURE 10.1 The world of mountain people has changed radically through the introduction of new transportation technologies such as the 'slope bridge' of the Hochtannberg Pass in Vorarlberg, Austria (Photo by C. Stadel)

About 10–12 percent of the global population lives in mountains, depending on the definition of "mountain" and recognizing that such data have limited validity. This would amount to a mountain population of about 700 million in 2011. This population is highly concentrated in developing and transitional countries such as Nepal, Peru, India, and China. Approximately half the mountain population is in Asia, followed by populations in the mountains of South and Central America. These regions have also witnessed the greatest population growth in mountain areas during the past 50 years. On a regional basis, the largest proportion of mountain dwellers is found in Central America (>50 percent). Although mountain populations in Asia account for only about 10 percent of the region's total population, they include nearly half of the world's mountain population (Huddleston et al. 2003). Globally, the distribution of the mountain population shows an association with altitude, referred to as "hypsographic demography" (Cohen and Small 1998). Most people (70 percent) live below an elevation of 1,500 m; less than 10 percent live above 2,500 m. Only in Latin American mountains is the trend somewhat different, with some 24 percent living at altitudes above 2,500 m. In the Himalaya and the Andes, a few people live permanently at altitudes above 4,500 m. The proportion of mountain people as a share of the national population varies greatly. Of developing and transitional countries, the following nations have the highest proportion of mountain people: Bhutan (89 percent), Rwanda (75 percent), Lesotho (73 percent), Armenia (70 percent), Guatemala (64 percent), Costa Rica (63 percent), and Yemen (61 percent) (Huddleston et al. 2003).

In developing regions, a significant number of mountain people are the rural poor who rely on scarce or dwindling resources and opportunities relative to demand, resources derived from agriculture, animal husbandry, forestry, mining, industries, and a variety of formal and informal service jobs. Many are unemployed or underemployed and migrate temporarily or permanently to seek work in lowland industrial agriculture, large cities, and abroad. The migration of mountain people may alleviate the population pressure on the scant resource base of rural areas and generate additional income in the form of cash remittances sent back to families. However, this may generate a sometimes precarious dependence on external resources, create social problems around divided families and communities, and place added pressure on the remaining women, children, and elders. In the economically developed mountain regions of Europe and North America, many people now enjoy a relatively high standard of living, though prior to the twentieth century, they generally experienced conditions of socioeconomic underdevelopment. Much of this has come about through the development of roads (Fig. 10.1), railroads, and air links, which have facilitated a variety of new livelihoods, a topic addressed below and in Chapter 12. Throughout the mountain world, in the twentieth century and continuing, there have been enormous shifts in population numbers and distributions, characterized by growth and urbanization in general, with some specific cases of rural depopulation.

The cultural fabric of mountain populations is diverse. Many cultural groups have been formally and informally identified in mountain regions. In most cases, they constitute a minority of national populations, but they may be a majority locally. Examples include: Quechua and Aymara in the Andes; Kurds in eastern Turkey and northern Iraq; Amhars in Ethiopia; Tibetans, Naxi, Miao, Yi, and Ughuri in China; numerous tribal groups in the Indian Himalaya;

FIGURE 10.2 A typical Himalayan village in which intensive terraced cultivation of grains (inset shows rice cultivation) has been a primary source of livelihood for generations in the Yamuna River Valley, Uttarkashi Himalaya, Uttarakhand, India. (Photo by J. S. Gardner.)

Sherpa and Bhoti in Nepal; and a multitude of First Nations and Aboriginal groups in the North American Cordillera. As national minorities, these distinct cultural groups have often suffered in their relationships with the majority through epidemic disease, discrimination and persecution, forced relocation and assimilation, genocide, and in-migration.

People living in and adjacent to the mountains amount to about 25 percent of the global population, or 1.7 billion people (Meybeck et al. 2001), who are wholly or partially dependent on mountain resources such as water, timber, minerals, and agricultural products. For example, the approximately 700 million people in the Indo-Gangetic Plain region of Pakistan, India, and Bangladesh rely on water from the Himalayan and trans-Himalayan ranges. Similarly high levels of reliance on mountain water are found in Europe, the Americas, East Africa, and China.

The population density of a place is a relatively sensitive measure of human population. Generally, the population density of mountain areas is relatively low. However, people are not distributed evenly, and specific regions are densely populated—for example, the East African highlands, Mesoamerican highlands, and parts of the central Andes. Grötzbach and Stadel (1997) draw a distinction between "physiological density," which is based on the area of agricultural land, and "arithmetic density," which is based on the total land area. In some areas, as in fertile and well-watered locations in the Himalaya and Andes, physiological density may be high while arithmetic density in the region is low. In the Alps, with an area of 190,568 km^2, the population is about 14 million people, giving an arithmetic density of 73 inhabitants/km^2. However, as only 17.3 percent of the Alpine area is suitable for permanent settlement, the physiological density is 414 inhabitants/km^2, comparable to other densely populated regions in Europe (Tappeiner et al. 2008). In a growing number of regions throughout the mountain world, both physiological and arithmetic densities are high as a result of urbanization and lifestyles that place demands on resources that far exceed the available resources of the region, creating large ecological footprints (Cole and Sinclair 2002).

The geography of mountain people may be described on the basis of their numbers and period of habitation. In mountain areas in the tropics and subtropics, such as the Andes, East African highlands, and South and Southeast Asian highlands, there are some relatively large, agriculturally based populations that have been in place for long periods of time (Fig. 10.2). In contrast, in the North American Cordillera, for example, large areas have been inhabited more sparsely by mobile people engaged in hunting, gathering, and fishing. These differences are important, but are insufficient for of a full understanding of mountain people today. As knowledge has advanced, we have come to know that, at one time, North American mountain areas supported relatively dense populations and that the region has been inhabited for over 30,000 years. In the Andes, large and dense populations with complex socioeconomic systems once inhabited areas which now support only small, mobile populations (Funnell and Parish 2001; Mann 2006). Populations have waxed and waned in response to global forces such as the introduction of new and highly productive crops, such as maize and the potato, and the arrival of devastating infectious diseases, like smallpox and measles. Even with spatial and temporal variability and diversity

FIGURE 10.3 Metropolization has crept into some high mountain environments, as shown by the city of Bogotá, Colombia, at an altitude of some 2,650 m, with a metropolitan population of close to 8 million (2005). (Photo by C. Stadel.)

among mountain populations and cultures, a close relationship with the environment and resulting livelihood opportunities and limitations have been important to mountain people (Rhoades 1979). By adapting to and altering environmental conditions, distinctive populations, cultures, languages, forms of governance, and economies have developed in the mountains. Today, many other global forces are impacting mountain people and, while distinctions and artifacts of the past are important and valuable, a more dynamic or process-oriented approach is needed for a full understanding of people in the mountains.

Urbanizing Mountain Populations

Urbanization and the rapid growth of cities were common features of the twentieth century and continue to the present, affecting mountain populations in many ways. Cities within and at the edge of mountains are often integrated into the global economy, as Borsdorf and Paal (2000) demonstrated for the Alps. Close to a third of the world's mountain people live in urban areas. The largest urban areas are located on mountain margins and high plateaus, some at high altitudes. The degree to which they have been and are integrated with the mountain environment historically and socioeconomically varies, but all are influenced geoecologically by proximity and/or altitude. They differ geoecologically, historically, and socioeconomically somewhat from those cities located in the mountains, which tend to be smaller. Large mountain margin or plateau cities (population >1 million) include Mexico City, Carácas, Bogotá (Fig. 10.3), Quito, La Paz, Santiago, Denver, Seattle, Vancouver, Calgary, Geneva, Zurich, Addis Ababa, Nairobi, Tehran, Chandigarh, Dehra Dun, Siliguri, Kathmandu, Chengdu, and Kunming. Some, such as Vancouver and

FIGURE 10.4 Darjeeling, in the front ranges of the Sikkim Himalaya, India, is a ridgetop settlement founded in 1840 as an administrative, health, tourist, and tea cultivation center, attracting thousands of economic and amenity migrant/settlers from surrounding parts of India and Nepal. Kangchenjunga, third highest mountain in the world, is in the background. (Photo by J. S. Gardner.)

Chandigarh, are at a very low altitude, but nonetheless are bordered and influenced by mountains. Others, especially those in Latin America, are at very high elevations, including La Paz, Bolivia (3,500–3,800 m), and the new city of El Alto on the *Altiplano* (3,850–4,100 m), Quito, Ecuador (2,850 m), Bogotá, Colombia (2,650 m), and Mexico City (2,250 m) with a population of about 21 million.

Urban and suburban areas that are fully enclosed by and closely integrated with the mountain environment tend to be much smaller but nonetheless functionally diverse (Bätzing et al. 1996; Perlik and Messerli 2004; Stadel 1986). Most are located in valleys and a few on ridge tops (Fig. 10.4). Examples include Innsbruck, Austria; Chamonix-Mt. Blanc/Sallanches, Grenoble, France; Trento and Bozen/Bolzano, Italy; the Martigny-Brig-Visp conurbation, Switzerland; Kullu-Manali, Shimla, and Darjeeling, India; Lijiang, China; Huaraz and surroundings, Peru; Aspen, Colorado; and Canmore-Banff, Canada. While some of these settlements have retained aspects of their original agricultural, mining, manufacturing, or transportation functions, many now have a multifunctional orientation and a polycentric spatial dimension (Dematteis 2009). Important driving forces in the urbanization process include: expanding tourism, recreation, and amenity migration; revitalization of resource extractive and processing industries; administrative functions; and the growth of service needs with population increase and socioeconomic change. Whereas traditional agriculturally based mountain settlements were relatively self-sufficient, the resource demands resulting from contemporary urban growth far exceed the resources of the immediate area, creating a large external dependence and ecological footprint.

Common to all urban areas, whether in the mountains or on their margins, are rapid population growth and densification, physical expansion, growth of infrastructure, and diversification of functions. The cities are powerful attractions for migrants: Many, though not all, come from the mountains in search of employment, security, education, and other services and opportunities. This has been especially the case in developing countries, leading to the growth of large, densely populated squatter or informal settlements on city margins and in deteriorating core areas. While the growth of the megacities is impressive, the proportional growth of secondary cities has often been greater, presenting a more attractive alternative to migrants and better options for sustainable urban living. Mountain and mountain-margin cities also serve as financial and labor feeders for resource exploitation and as sources of large numbers of recreationists, tourists, and semipermanent residents in the mountains.

Permanent Residents

Among the permanent residents are people who gain much of their family livelihood from activities in the mountain setting and have generational familial connections with a particular mountain area. As in any environment, some people are born, raised, live, and die in the same village or valley. Others have been forced to move for a variety reasons, but remain in a mountain setting. Examples include the hundreds or thousands of indigenous people in the Andes who were forced into resettlement schemes during the Inca and early part of the Spanish colonial periods (Rhoades 2006); large numbers of Kikuyu who were resettled on the western slopes of Mount Kenya during the British colonial period in East Africa (Elkins 2005); over 200,000 people forced from their homes in Garhwal Himalaya during the Gurkha invasion from Nepal in the early nineteenth century (Rangan 2000); and people displaced by large-scale hydroelectric schemes in mountain areas of northern India and southwestern China.

FIGURE 10.5 A nomadic Gaddi pastoralist and his flock returning from summer high pastures in the Pir Panjal Himalaya, Himachal Pradesh, India. (Photo by J. S. Gardner.)

In a different category are prospectors, miners, loggers, and, today, workers in secondary or tertiary forms of employment, who live their entire lives in the mountains but continually shift location within the mountains. The gold and silver rush era of the nineteenth century in the mountains of western North America provides examples. Prospectors examined a promising area, staked claims, maybe worked the site for a short period, and then moved on. Miners likewise tended to move from place to place, following the new finds and "rushes." More recently, the same pattern of shifting to sites of exploitation has existed within the community of loggers, tree planters, and construction workers. With the advent of more rapid and reliable transportation, such resource exploitation can take place from distant permanent homes, usually in established and diversified mountain communities.

It is not uncommon for some members of mountain families and settlements to have employment outside the mountains. Just as the Swiss and Scottish Highlanders were once the mercenaries of Europe, the Gurkha of the Indian and Nepal Himalaya have sought employment elsewhere as professional soldiers for several generations. Large numbers of young people in mountain areas of Afghanistan, Pakistan, India, and Nepal have gained employment as far away as the Gulf States, providing cash remittances to family members remaining in the mountain home. This pattern also is common in parts of the Andes, where males move annually to work on agricultural plantations on the coastal plains of Peru and Ecuador to harvest sugar cane, rice, bananas, and other products, or to work in the oilfields of the Amazon lowlands adjacent to the Cordilleras. The same pattern can be observed among residents of the Andes who work in the United States, Spain, and other European countries. They may periodically visit their home villages for *fiestas* or family events, and they also send remittances to family members left behind. Material testimonies to this practice are modern, but often empty, "urban-style" houses, built as showpiece investments and future retirement homes. The periodic absence of males from mountain communities obviously places new responsibilities, in terms of the family, the home, and the community, on the remaining members, many of whom are women, children, and older people. The process of out-migration with periodic return is described by the term *circular migration* or *circulation* (Flora 2006). Thus, it is important to recognize that permanence is a relative phenomenon and that, among the permanent people, there may be members of communities who are absent for long periods of time but who remain intimately connected to the mountain home through family connections and responsibilities.

In the mountains of the economically advanced countries, important daily commuter flows between the residences of workers and their places of employment can be observed (Tappeiner et al. 2008). Ever-expanding transportation infrastructure and services facilitate these daily movements.

Semipermanent Residents

The common types of semipermanent residents in mountain areas are people engaged in nomadic transhumance activities, economic migrants who take advantage of seasonal employment opportunities, and amenity migrants who maintain secondary residences in the mountains to take advantage of recreational opportunities and other amenities offered by the mountain environment. Nomads, such as Gaddis and Gujjars in the western Himalaya, are seasonal inhabitants who have traditionally taken advantage of the rich grazing resources offered by the forests, meadows, and pastures of the high mountain environments (Fig. 10.5). Similarly in the past, Aboriginal people in western North America utilized the high mountain areas

FIGURE 10.6 Construction projects, especially roads, have attracted large numbers of local and migratory workers such as these seasonal workers on NH 21, Pir Panjal Himalaya, Himachal Pradesh, India. (Photo by J. S. Gardner.)

on a seasonal basis for hunting and gathering. In both cases, livelihoods are or were tied directly to this periodic use of mountain resources.

Seasonal economic migrants also seek employment opportunities in tourism, agriculture, industry, and construction. In the European Alps and the North American Cordillera, many young people move to the summer tourist and winter ski resorts for seasonal employment. These might be considered amenity migrants seeking alternative lifestyles. They contrast to the hundreds of thousands of Nepalese, Biharis, and other poverty-stricken South Asians who migrate seasonally to construction projects and tourist sites at high altitude in the Himalaya. Such people are usually the primary source of manual labor in road building and maintenance and on construction projects (Fig. 10.6). A similar pattern has been more recently found in western China, where poor and usually landless peasants (from nonmountain areas) are employed in the construction of roads, railroads, and hydroelectric projects in the mountains. Seasonal or limited-term economic migrants are also found at construction sites in the Alps and the Cordilleras of the Americas. Other forms of seasonal economic migration into mountain areas include people engaged in reforestation or tree planting on a large scale, a very common occurrence in western North America, and those engaged to harvest cash crops. Many Sherpa people of the Everest region have become so wealthy through tourism that seasonal Rai laborers now perform the bulk of the agricultural, portering, lodge operation, and yak-herding work.

Seasonal economic migration that is persistent over time produces a form of semipermanent residency in the mountains. Although more common now than in the past, it was not unknown in the past. Trade across mountain ranges between people from different sides of the mountains often took place at well-established sites within the mountains that persisted for generations. Well-documented examples are found along the great trans-Himalayan trade routes between India and Tibet and Central Asia (Rizvi 1999). Wool, salt, hides, and borax from north of the Himalaya were traded for agricultural products, timber, and textiles from the southern Himalaya, or further south, at predetermined locations. Likewise, in western North America, prehistoric trade across the mountains took place at long-established locations within the mountains, creating a semipermanent footprint and some semipermanent residents there. In the Alps, since the Roman period, but especially since late medieval times, roads over mountain passes facilitated the trans-Alpine trade between the Mediterranean region and the dynamic commercial centers in Central and Western Europe. The Alpine passes served as routes for pilgrims and soldiers as well. Many of these routes remain in use to the present: Great St. Bernard Pass, Gotthard Pass, Simplon Pass, Brenner Pass, and Col d'Agnel are examples.

Affluence, particularly in Europe and North America, and increasingly in the emerging economies of India and China, has made possible widespread *amenity migration:* "migration to places that people perceive as having greater environmental quality and differentiated culture" (Moss 2006a: 3). This has produced forms of semipermanent residency in mountains around the world. The phenomenon has ancient roots, reaching back to early China and Greece; but it has expanded rapidly since the mid-twentieth century in the mountains not only of industrialized countries (Moss 2006b), but also of many developing countries including Argentina, Chile, China, Costa Rica, India, Indonesia, Laos, Malaysia, Mexico, Morocco, the Philippines, South Africa, and Thailand (Chaverri 2006; Glorioso 2006; Moss 2006a; Otero et al. 2006). Proponents of this trend argue that it brings affluence, enhanced infrastructure and services,

FIGURE 10.7 Mountains hold great spiritual value for residents and outsiders alike. Shown here is a sacrifice to Pachamama (Mother Earth) by native Uros on the Bolivian Altiplano near Lake Titicaca. (Photo by C. Stadel.)

and modernization to the mountains. Opponents warn of a speculative real estate market with exorbitantly rising housing prices, of potentially unsustainable economic growth, of cultural alienation, and of increased environmental stress (Sandford 2008). For example, in the Alps, there is considerable debate over the widespread proliferation of apartments and second homes and the ensuing seasonal influx of outsiders. Some communities are today seeking to curb the proliferation of second-home ownership by foreigners, and in 2012, following a national referendum in Switzerland, a law imposed a 20 percent ceiling on the number of second homes in any community.

In the Andes, the rural *hacienda* or *finca* of wealthy urbanites has a long tradition since colonial time and is seen as a symbol of social prestige and sophistication. Today, people build second residences in and around ski and golf resorts, and at or near natural amenities such as scenic river valleys and lakes. Verbier and Davos, Switzerland, Whistler, British Columbia, and Vail, Colorado, are examples of such settlements in Europe and North America. Indeed, the economic viability of some destination resorts is based on the sales of real estate to private individuals or groups. The owners visit their second homes on a periodic basis and form a distinctive social/cultural community that pays local taxes and feels it has a stake in local issues. Such groups may find themselves at odds with long-term traditional residents who rely more directly on local natural resources for their livelihoods. A new feature in this context is the emergence of "time share units," where clients purchase a certain period of time/year in a chalet or apartment for a period of 20 to 40 years. The semipermanent resident in the classical case may wish to preserve the amenities that attracted them, while the permanent residents may wish to preserve their traditional values and livelihoods, which may be dependent on the use, sustainable or not, of the amenity resources. This type of conflict is common in western North America (Moss 2006b).

The so-called "hill stations" that developed in India during the British colonial period are early products of amenity migration to mountain and hill areas that led to semipermanent residency and permanent towns and cities of some size. The best known are located in the southern ranges and foothills of the Himalaya; they include Shimla, Murree (now in Pakistan), Mussoorie, Nainital, and Darjeeling (Kanwar 1990; Fig. 10.4). All were established and/or developed in the nineteenth century as retreats from the spring and summer heat in the Indo-Gangetic Plain region of British India. Colonial and state administrative services and personnel were moved annually to the hill stations in the April to September period. The annual migrations involved not only the British colonial officers and their families but office workers, servants, and entertainers, mostly of Indian origin, and their families. Significant numbers purchased property and settled in the adjacent areas upon retirement from the colonial service. Following Indian independence and the creation of Pakistan, many of the properties in the hill stations were purchased by wealthy and influential Indians and Pakistanis for use as second homes during holidays and the summer heat. Today, they also serve as retirement communities and tourist destinations, primarily for Indians and Pakistanis.

As discussed in Chapter 9, mountains hold significant spiritual value for mountain people (Fig. 10.7), as well as for many from outside the mountains. In addition to pilgrimage, this has given rise to a particular form of amenity migration and semipermanent residency. Most pilgrims travel only occasionally to sacred sites in the mountains in a manner akin to tourists, and thus are considered transients. Some make pilgrimages to mountain sacred sites on an annual basis and spend significant amounts of time in

the mountains as *de facto* semipermanent residents. Many return annually to ashrams or teaching centers in places like Rishikesh on the Ganges River and Kullu on the Beas River, where they rent or build second homes.

Semipermanent residency in the mountains may lead to permanent residency. In fact, it is not uncommon for economic migrants working in tourism to stay on permanently because of a combination of economic opportunity and the amenities offered by the mountain environment. Increasingly, with the advent of home-based businesses and the use of the Internet, amenity migrants are choosing to establish permanency in their mountain homes. Others choose to retire to their mountain homes and establish a form of permanency in this way. This is particularly the case for scenic lake locations or for spas and health resorts, the latter offering a wide range of medicinal services.

Transient People

Transients are not considered people of the mountains in the strictest sense, but some spend large amounts of time in the mountains through frequent visits. However, they do not live there, nor do most gain their livelihoods directly from the mountain regions. Tourists, recreationists, businesspeople, and pilgrims are some of the important transient groups. They are discussed further in Chapters 9 and 12.

Environmental Relationships

The presence of people in, and their relationships with, the mountain environment are mediated by geoecological conditions that both support and constrain life (Stadel 1992). The geoecological conditions form the subject matter of most preceding chapters and therefore the focus here is on relationships with people. As both people and environment are spatially and temporally variable, so are these relationships. Three general characteristics of mountain geoecology are of particular importance in understanding people in the mountains: altitudinal variability; variability of microenvironments; and seasonality. To these may be added longer-term variation and changes in temperature and precipitation.

A constraint at one point may be useful at another point, the tipping point being determined by people and environment. For example, people travel to mountain areas for winter recreation, the attractions being scenery, terrain, snow, and social ambience. This was not always the case, as snow and steep terrain imposed many costs and inconveniences, so much so that some settlements were and are vacated during the winter in the Alps, North American Cordillera, and Himalaya (De Scally and Gardner 1994). Snow and cold make agriculture impossible, animals need to be protected and fed, travel may be difficult, heating of homes is expensive, and terrain, snow, and weather conditions interact to produce landslides, flash floods, or avalanche hazards. Yet today, millions of people are attracted, not repelled, by snow and cold for the recreational value, and their presence in the mountains is facilitated by many forms of modern transportation, housing, and hazard mitigation technologies. Other examples occur where forested land is cleared for the expansion of agriculture, roads, and ski slopes. The clearing may result in increased surface runoff of water, leading to floods, erosion, and damage to land, property, and people. This is a form of negative feedback in people–environment relationships, arising from actions that produce negative or costly outcomes.

Geoecological factors influence, but do not determine, the numbers and distribution of people and livelihoods and risks to which they are exposed. Important factors include geology, topography, climate and weather, and atmospheric pressure, all interacting to influence the distribution and characteristics of water, vegetation, and soils. The combination of factors produces a diversity of microenvironments, niches, and *ecological complementarity* in the relationships between people and environment (e.g., Moats and Campbell 2006).

Geological Conditions

Tectonics, geological structure, and rock types are conditions that have important implications for mountain people. Tectonic forces are relevant through processes such as earthquakes and volcanic eruptions. While contributing to mountain building and shaping the mountain stage with negative and positive effects, these processes also are part of everyday life for many mountain people (Hewitt 1997a), posing a hazard and, in the case of some volcanoes, augmenting the soil resource base, among other things. For example, the 2005 Kashmir and 2008 Wenchuan (Sichuan, China) earthquakes had devastating impacts on millions of mountain people but also set the stage for some positive redevelopment processes (Zimmermann and Issa 2009; Schutte and Kreutzmann 2011). The volcanoes of Java (Indonesia) are among the most densely populated mountain areas on Earth, in part because of their altitude-driven ecological complementarity and rich volcanic soils that contribute to an agricultural economy, even as they pose a hazard and a high risk of disaster. Geological structure primarily impacts human activities through its role in shaping mountain topography, a topic discussed below.

Rock types and their genesis have a strong bearing on the presence of valuable minerals. Mining for ores, gemstones, fossil fuels, and rock salt has been, and is, important in shaping human settlement in the Alps and other European ranges, the central and southern Andes, and the North American Cordillera. It has been associated with mountain areas since preindustrial times and continues today at an unprecedented scale (Fox 1997; Schweizer and Preiser 1997). The exploitation of rock, gravel and sand,