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Long-Term History of Mountains: Southeast Asia and South America Compared

Abstract

This article compares the historical trajectories of the mountain areas of Southeast Asia and South America in order to assess the impact of environmental constraints over time. The two areas have been selected because of the striking contrast they present in the early modern period. In Southeast Asia, the core population area was located in the lowlands, whereas in South America, power and population were concentrated in the uplands. These regional examples are complemented by modern evidence from different continents. I argue that we can distinguish two phases of mountain development: in a first phase, regional trajectories can vary widely, privileging either the plains or the uplands. In a second phase, most uplands can no longer compete with the plains. In areas where the first phase of development had privileged the plains, the second phase accelerated this pattern. In areas where development had been centered first in the mountains, the second phase saw the lowlands incrementally replace them as core zones of modern development. Mountain

histories thus illustrate a change from “path dependence” to “context dependence.”

INTRODUCTION

Variations in the use of mountain areas point to the relative importance of environmental constraints and have long been observed by scholars. In 1949, French historian Fernand Braudel highlighted the constant contact between the populations of the Mediterranean hills and those of the lowlands. He contrasted this frequent contact to Asian patterns, noting that “None of the Mediterranean ranges resembles the impenetrable mountains to be found in the Far East, in China, Japan, Indochina, India, and as far as the Malacca peninsula.”¹ In arriving at this assessment, Braudel relied heavily on the geographer Jules Blache and his book *L'Homme et la Montagne* (Man and Mountains) of 1934. One chapter of Blache’s work, titled “The Separation of the Mountains and the Plains in the Far East,” describes the great differences in population density and agrarian intensity of lowlands and highlands. According to Blache, in Asia there was, as a rule, little exchange between the two areas. Very often the relationships were characterized by clear boundaries, cultural differences, and open conflicts. “These two worlds are juxtaposed but not associated, they ignore and hate each other.”²

Blache’s investigation was global in its outlook, thus making it a pioneering enterprise. No one up to that point had ventured to examine the relations between people and mountains from a worldwide perspective. Besides observing regional variations, the book also describes chronological change. Generally speaking, the author remained skeptical of the prospects of development for upland regions. He believed that some of their characteristics, notably their rough topography, were impediments to economic activity and communication. More importantly, according to Blache, these disadvantages increased over time and hence enlarged the disparities between highlands and lowlands in the course of history and modernization. The book concludes with a gloomy statement: “Whereas the mountains had played a crucial role in the early settlement period, now people seemed to be turning away from them.”³

A major problem for Blache was the unequal availability of information. When he began his work, his *Institut de Géographie Alpine* in France had already acquired considerable research experience in the western Alps. Other European mountain regions were accessible through numerous periodicals. The situation was altogether different in the regions outside of Europe where colonial geography had not yet made much headway and tropical geography was still in its infancy. Information on mountains on other continents, therefore, had to be gathered from heterogeneous and, in some cases, dubious sources. This is

one of the reasons why the world's mountains are so unevenly represented in *Man and Mountains*. Whereas Blache's objective was global, this was impossible in practice. The small regions within the horizon of the institute were treated in detail, but vast mountainous regions of Asia—in China, Russia, and the Southeast—received no mention.⁴

The state of available information and scholarly research is altogether different today. If we want to reconsider the reasoning of this pioneering generation under the premises of current ideas in environmental history, we can rely on a great many studies on mountain areas in many corners of the world. Of course, they differ according to academic discipline and tradition, as well as in research context and multiple other factors. In general, however, the possibility of getting acquainted with a given upland region and its past has increased dramatically. Recently regional studies have also been complemented by global, or at least decidedly comparative, studies of mountain history. Some of them are the result of historical, anthropological, and geographic conferences and collective publications.⁵ Some were produced in smaller teams and by single authors.⁶

The present article is informed by these new research currents. I compare the long-term trajectories of mountain areas in order to assess the impact of environmental constraints over time. I argue that because human–environment relationships are intrinsically complex and difficult to untangle, a historic perspective contributes important insights to an interdisciplinary discussion. Second, I argue that mountain studies must include the surrounding lowlands. Only when we see them against the background of adjacent regions can we understand upland regions properly.

The first two sections of the article outline different historical trajectories of the mountain areas of Southeast Asia and South America. The two areas have been selected because of the striking contrast they present in the early modern period. The core populated area of Southeast Asia was in the lowlands, whereas South America's population was concentrated in the uplands. The third section complements these regional views with global data from the modern period up to the present time. Finally, the fourth section offers conclusions about the two-phased model of development and the change from path dependence to context dependence.

SOUTHEAST ASIA

In China, according to available estimates, the population grew by a factor of 3 to 4 between 1500 and 1800. Traditionally, the Han population settled in the river valleys and the great plains, and they made little use of the numerous mountain regions.⁷ As population pressure rose in the second half of the seventeenth century and the empire began an explicitly expansionist policy under the new Qing dynasty,

the settlement of mountain regions and the integration of the indigenous populations there increased. The southwestern upland province of Guizhou—which covered around 175,000 square kilometers but exhibited, according to popular saying, “not three feet of flat country”—was inhabited by many tribal groups, among them the Miao.

The Miao settled in fortified villages on the hilltops, often practiced shifting cultivation, and in general they maintained a warlike disposition. For a long time, Han China limited its rule over the province to tribute relations with the area’s leading families. But immigration, with its increasing contacts and conflicts, and the growing tendency toward forced assimilation into Chinese culture led the court in 1726 to build up a massive local military presence and put an end to Miao autonomy. The result was years of rebellion, bloody massacres, and retaliatory actions. Finally, the Chinese army gained the upper hand, in part by means of a split among the Miao into the assimilated, or “cooked” (*shu*), and the rebellious, “raw” (*sheng*) factions. Still the conflict was not laid to rest, for it flared up again in the Great Miao War of 1795–1806 and in the Miao Rebellion of 1854–73.⁸

The province of Guizhou belongs to the Southeast Asian mountain region of *Zomia*, a term coined by historian Willem van Schendel and used by James C. Scott in his 2009 book, *The Art of Not Being Governed*. Zomia encompasses all the territories above roughly 300 meters running from the Central Highlands of Vietnam to eastern India, traversing several present-day nations (see figure 1). It stretches over 2.5 million square kilometers and, according to the author, contains a population of about 100 million people “of a truly bewildering ethnic and linguistic variety.” “My thesis is simple, suggestive, and controversial,” Scott states. “Zomia is the largest remaining region of the world whose peoples have not yet been fully incorporated into nation-states. Its days are numbered. Not so very long ago, however, such self-governing peoples were the great majority of humankind . . . I argue that hill peoples are best understood as runaway, fugitive, maroon communities who have, over the course of two millennia, been fleeing the oppressions of state-making projects in the valleys—slavery, conscription, taxes, corvée labor, epidemics, and warfare. Most of the areas in which they reside may be aptly called shatter zones or zones of refuge.”⁹

Scott’s argument begins by contrasting the densely populated kingdoms in the lowlands with the scarcely populated areas in the uplands. In the lowlands, endowed with an ecologically favorable setting with river valleys and well-watered plateaus, the premodern economy was dominated by irrigated rice cultivation. Before the twentieth century, this form of sedentary agriculture was the only means to feed a substantial population and to concentrate the labor force in Southeast Asia. And the concentration of labor, in turn, was the key to state building and political power. Central elements of the unfolding state machineries, such as military forces and continuous taxation,

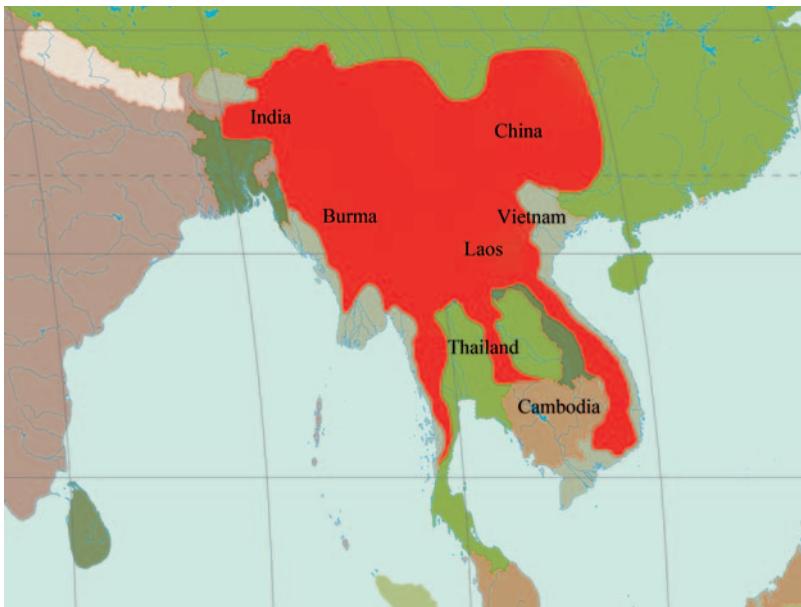


Figure 1: The Zomia region as envisaged by James C. Scott. The region, here marked with red, consists of lands above 300 meters in India, Burma, China, Thailand, Laos, Cambodia, and Vietnam. Up to the mid-twentieth century, according to Scott, it was a region of refuge and state evasion from the core area in the lowlands. Credit: James C. Scott, *Art of Not Being Governed: An Anarchist History of Upland Southeast Asia* (New Haven: Yale University Press, 2010), 17 (color design by David Föhn).

were dependent on this agro-demographic pattern. The upland region of Zomia, in contrast, was characterized by a dispersed population, an abundance of land and shifting cultivation (i.e., a labor-saving yet land-consuming form of mobile agriculture). Unlike the strongly hierarchic and often extensive lowland kingdoms, upland societies mostly developed on smaller scales and more egalitarian terms. Zomia, therefore, was a home of cultural diversity, whereas the lowlands underwent a process of cultural homogenization driven by the courts and elites. At the same time, the expanding centers developed a self-perception of being civilized in contrast to people of the uplands, who were seen as barbarians. In the previously mentioned example of Guizhou, the “cooking” of the “raw” Miao was the sign of putting them under Chinese rule.¹⁰

Scott's analysis deals with the long run and does not provide many chronological indications. According to him, the first kingdoms in the lowlands of Southeast Asia appeared around the middle of the first millennium AD, developing on the model of earlier states in China and India and their respective cultures. Experiencing very diverse trajectories of boom and decay, they gained in strength during the period before, and especially after, the sixteenth century. Although transportation

conditions improved somewhat, the general pattern of lowland core and upland periphery remained virtually the same during the colonial period. After World War II and the end of colonization, independent states deployed new transport and communication technologies. It was only then that real changes happened in the relationship between core and periphery. Scott argues that it is at this point, after independence, that the Zomia model ceases to apply. The nation-states could now integrate the upland zone and break the earlier balance between centers and self-governing peoples.¹¹

The Art of Not Being Governed is very much focused on strategies of political domination and resistance, on state oppression and intentional reactions to it. Scott largely portrays the upland region of Southeast Asia as a product of lowland developments. He even puts the settling of the mountain areas and the form of mountain agriculture under the heading of anti-state agency. By and large Zomia, in his view, was a refuge zone, and the fugitive state evaders chose shifting cultivation deliberately as a form of “escape agriculture” with “escape crops.”¹²

The geographic extent and exact location of Zomia are debatable as well. Anthropologist Heinz Peter Znoj, for instance, extends the model to maritime Southeast Asia and offers another interpretation. He looks at long-term relationships between highland Jambi in central Sumatra and the states on the east and west coasts of the island and observes similar contrasts to those Scott describes. Yet he focuses less on domination and resistance than on environmental necessities and opportunities. Given the jungle-covered, partly swampy, and mountainous terrain of the interior, low population densities, and pre-industrial technologies, it was hardly possible for the lowland states of Sumatra to control the uplands or for upland states to emerge on their own. The precolonial relationships were shaped by cooperation rather than by antagonism, even if the cooperation was somewhat unstable, one sided, and rife with conflict. The highlands lost their claim on their mineral wealth and their strategic grip on long-distance trade, however, when the Netherlands invaded the highlands at the beginning of the twentieth century and built a transportation infrastructure for their purposes. This resulted in a strong antagonism of the highlands toward the state. Znoj suggests that the colonial watershed may have similarly changed the position of highlands in other parts of Southeast Asia, and he calls for a historically informed revision of the Zomia model.¹³

SOUTH AMERICA

South America poses a provocative challenge to the Zomia model, for on this continent, the historical lowland-upland relations were nearly the reverse of those observed in Southeast Asia. The center of South America’s indigenous population and power lay in the mountains, not in the

lowlands. Many scholars have highlighted this particular phenomenon and offered explanations—for example, the German naturalist Alexander von Humboldt in his classic 1807 *Essay on the Geography of Plants*:

From the surface of the ocean up to the eternal snows, the Andean mountain range is inhabited by copper-colored Indians and by African and European settlers. The mountain region was called 'Antisuyu' in the political organization of the Inca, and it is, in general, cultivated much more than the plain (Cuntisuyu). The farming effort of the peoples, and nearly all the primitive civilization of humankind, stand in a reverse relationship to the fertility of the soil and the beneficence of the surrounding nature. The more meager the environment and the more difficult the impediments nature provides, the stronger the human forces are stimulated, the earlier these are developed through application. The mountain peoples of Anahuac, Cundinamarca and Antisuyu formed already great, well-organized societies; they had an intellectual culture that closely resembled the culture of China and Japan, at a time when the people in the fertile plains running from the east of the Andean range to the sea still conducted a beastlike life, naked and dispersed.¹⁴

With his climate-determinist argument and his "civilized" values, Humboldt's text echoes widespread ideas of the European Enlightenment (figure 2). It was certainly true, however, that the mountain region was more populated and cultivated than the lowlands by his time, and that the region had an ancient cultural and political history that goes back well before the Inca Empire (figure 3). There is a consensus that the rapid and successful formation of this Andean Empire in the centuries before 1500 was only possible because it could build on demographic, technological, and cultural conditions that were produced over a series of earlier civilizations.¹⁵ When the Spanish arrived in 1532, according to historian Carlos Sempat Assadourian, the land had been "full" of people, a description in keeping with the self-assessment found in Incan mythological tradition. More precise details are available only from the second half of the sixteenth century when a massive assault had already been inflicted through the introduction of new diseases and brutal exploitation. By 1570, according to the available sources, there was a native population of more than a million in the highlands of the central Andes, whereas the coast had only around 250,000 people. During the next fifty years, the number of inhabitants continued to fall by 44 percent in the mountains and by as much as 65 percent on the coast. A similar pattern can be established in the parts of the Andes now belonging to Ecuador and Colombia, although

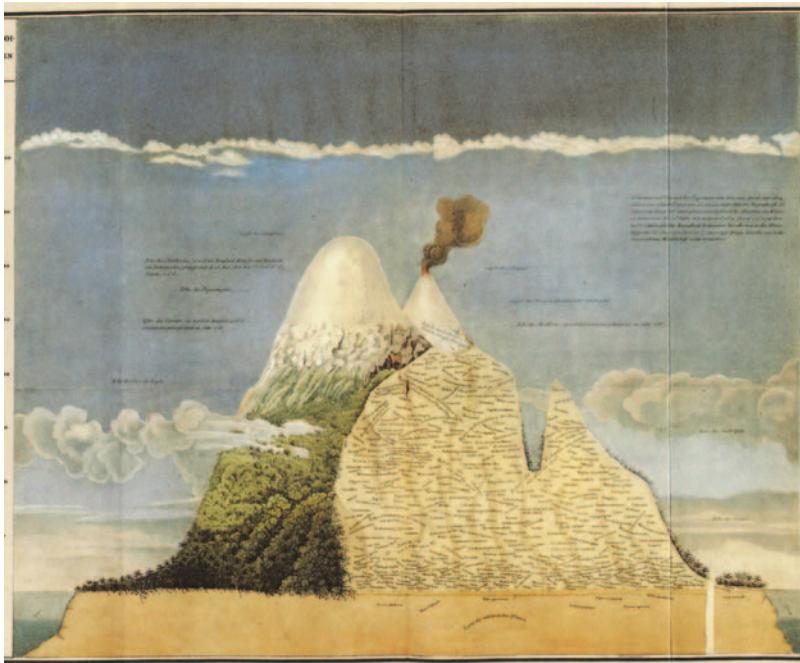


Figure 2: In his 1807 essay on the geography of plants, Alexander von Humboldt included this large color plate with a transect of the Andes. The plate listed numerous plant names and included comparative observations on altitude, refraction, air, eternal snow, and cultivation of the soil. The focus here was on the mountain range alone, whereas the large plain of Amazonia was cut off by the design. Credit: Alexander von Humboldt and Aimée Bonpland, *Ideen zu einer Geographie der Pflanzen nebst einem Naturgemäld der Tropenländer* (Tübingen: F.G. Cotta, 1807).

here the lowlands, as a rule, did not decline more sharply in population than the mountain areas.¹⁶

One factor that led to decisive change in many places was the Spanish imposition of mining. The most spectacular case was Potosí, a city at an altitude of 4,100 meters that was founded in the mid-sixteenth century and counted an estimated 120,000 inhabitants in its final days; at the time, it was among the larger cities of the world. Its rapid growth resulted from the discovery of immense silver deposits and the importance attributed to this precious metal in Europe. Potosí generated a huge demand for labor, foodstuffs, and capital, thereby creating an extensive urban supply area for itself. Indigenous corvée workers from many places were sent to the silver city to work in the mining and processing sectors. To satisfy the demand for food and other essential items, numerous other regions had to reduce their self-sufficiency and instead produce a surplus to be sent to Potosí. People carrying loads or leading pack animals traveled across thousands of kilometers to meet the city's needs.¹⁷



Figure 3: Approximate extension of the Inca Empire before the arrival of the Spanish in 1532. The realm, here marked with red, spanned over five thousands kilometers, mainly in the uplands. Its center was Cusco, located at 3,300 meters above sea level. The rapid expansion of the Inca in the fourteenth and fifteenth centuries was rendered possible by the agricultural landscape created by earlier civilizations (color design by David Föhn).

Although the patterns and distribution of settlement were therefore subject to change, it should not be overlooked that the Spanish were, just as the Incas before them, bound by historical constraints. In fact, they imposed their dominion, the viceroyalty of Peru, mostly over the old settled lands where they could find and use an indigenous workforce. The existence and location of this workforce was the historical precondition of the colonial power structure erected by the Spanish. Such a development can best be described by the model of path dependence. The model exists in various formats, yet the central idea relates to the interlinking of decisions over time: the range of possibilities one faces in any given situation is restricted by the decision made in the past, even though past circumstances may not be relevant anymore.¹⁸ In this sense, the Spanish mountain settlement depended on its Inca predecessors of the fourteenth and fifteenth centuries just as the Inca had depended on earlier civilizations. For one reason or another—this lies outside the model's scope—some of these civilizations had already by the first millennium AD, “reclaimed more than a million acres of crop-land from mountainsides that almost anywhere else would have been regarded as impossibly dry, steep, and cold,” as one author states.¹⁹

And what about “the fertile plains running from the east of the Andean range to the sea” where Humboldt found only “naked and dispersed” peoples? In fact, population density in the lowlands of South America was on the whole much lower than in the uplands. According to systematic estimates, the lowland population was about half of the upland population in the period around 1500, although the lowlands accounted for a much bigger territory. Already in this period the different demographic density and political organization resulted in a cultural hierarchy. Civilization first made its home in the highlands; already in the Inca period, the lowlanders of the Amazon were condescendingly referred to as “wild.”²⁰

There is a remarkable divergence in opinion about the development potential of lowland South America, as presented by European colonialism and later by the environmental movement. Whereas some observers have focused on the region’s vigorous vegetative growth, others have emphasized the unhealthy aspects of the tropical climate and the speedy exhaustion of its soil. At the beginning of the twentieth century, the more positive attitude was rather widespread, as seen, for instance, in the leading German research. But after World War II, the opinion changed, as exemplified by the well-known pessimistic 1971 work of Betty J. Meggers, *Amazonia: Man and Culture in a Counterfeit Paradise*. This sea change of estimation was certainly related to the more general “ecological turn” of the period. In spite of enduring environmental skepticism, research in recent decades seems to return to earlier views, putting more stress on the potential of the tropical lowlands. There are quite a few new projects emerging that uncover a richer human past than previously assumed.²¹ But regardless of who is right, for us the contrasting opinions are also an indication of how difficult it can be to ascertain the natural favor or disfavor of a region and its impact over time.

URBANIZATION TAKES COMMAND

The examples of Southeast Asia and South America illustrate a striking contrast in the history of mountains during the early modern period, from the sixteenth to the eighteenth centuries. In Southeast Asia, the core area with dense population and elaborate statehood and culture was located in the lowlands; the reverse was true for South America. Let us recall that the two cases have been selected for analytical purposes. They represent extremes of a spectrum in the history of mountain regions and are therefore especially legible in a comparative endeavor. The contrast raises the question: What happened to these trajectories during the modern period, especially in the nineteenth and twentieth centuries? Did the spectrum of possibilities open even more widely, or did it close and lead to a more homogeneous development? And how

can we find indicators and sources that help us gain a somewhat representative view of modern change?

When population figures are reliable for an older period and when they are able to distinguish between different geographic zones, they provide a good start. Bolivia, with its huge difference in altitude and its tradition of highland centers, is a case in point. In 1847, the lowland provinces of the country had scarcely 10 percent of the country's total population but more than half of the country's area. Until 1950, lowland proportion rose only slightly to 12 percent of the country's total population. In the second half of the twentieth century, population increased markedly throughout Bolivia. By far the strongest growth was in the lowlands, which by 2001 accounted for 30 percent of the population and now claimed a greater share of political power. This development was all the more remarkable since La Paz, the *de facto* capital of the country, is located in the uplands. With advanced urbanization, large and politically privileged cities usually exert an important effect on population distribution. But in this example, the effect was outpaced by the high-speed change in the lowlands.²²

In order to assess how exceptional or typical the Bolivian case was, I will use urban population, not total population, as an indicator for regional development and disparities. There are several reasons for this decision. Processes of urbanization do often have similar conditions and effects. All other things being equal, for instance, urban growth is favored by growing population density.²³ But towns and cities are easier to locate than total population, which is very important in the highland-lowland question with its difficult problems of demarcation. Moreover, available historical sources usually provide more information about urban population than about total population.

Let us first look at the most recent past. Table 1 lists the number of cities in 2000 with 1 million or more inhabitants, sorted by altitude level and continent. The distribution is quite skewed; 323 metropolises, representing 82 percent of all major cities, are found at the lowest altitude level of 0 to 500 meters, with the number of cities declining first sharply and then more gradually up to the highest elevation of 2,000 meters and above. Latin America shows a pattern that deviates most from the global average: here we find only 39 major urban centers, or 56 percent of cities, at the lowest elevation, with a much greater than average number of urban centers located at higher altitudes, some even found in the highest elevation category. The highest city in the world, with over 1 million inhabitants, was the previously mentioned Bolivian capital of La Paz, at approximately 3,600 meters.²⁴

In order to trace the historical development leading to this particular situation of the year 2000, we have to change the criteria by including cities of a smaller size and accepting a geographic demarcation of mountain areas operable for such exercises. Cities were much smaller in the past, and sometimes it is not possible to organize the collective

Table 1: Major cities by altitude and continent, 2000

Continent	Altitude in meters				
	0–500	500–1,000	1,000–1,500	1,500–2,000	2,000 +
Africa	25	1	6	3	1
North America	40	1	0	1	–
Latin America	29	10	3	4	6
Asia	170	19	7	5	1
Europe	53	3	–	–	–
Oceania	6	–	–	–	–
Global	323	34	16	13	8

Note: Number of urban centers with one million or more inhabitants, according to UN statistics for 2001.

Regions: North America to the United States; Europe to the Ural Mountains.

Sources: United Nations, ed., *Urban Agglomerations 2001* (New York: UN Population Division, 2003); Google Earth and diverse statements for the altitude classification of urban areas.

Table 2: Urbanization in mountain regions of three continents, 1700–2000

Continent/Mountain region	Percentage of major cities in mountain regions			
	1700	1800	1900	2000
South America/Andean countries	79	58	34	27
Indian subcontinent/Himalayas	5	–	5	1
Europe/Alps-Pyrenees	1	1	0	0

Note: Recorded are cities with more than 20,000 and/or more than 100,000 inhabitants; for the period 1700–1900, the percentage refers mostly to the lower criterion; for 2000 it always refers to the higher one. Regions: Andean countries = Bolivia, Chile, Ecuador, Colombia, Peru. Himalayas, Alps, and Pyrenees = excluding cities located at the base of the mountains. Europe = excluding Russia.

Source: Jon Mathieu, "The Mountains in Urban Development: Lessons from a Comparative View," *Histoire des Alpes* 8 (2003): 22.

information about them in layers based on elevation. In an earlier comparative study, I gathered historical data about urban growth in highlands and lowlands on three continents. As standard measures for the inclusion of a given settlement in the urban sample, I used the threshold value of over 20,000 inhabitants or, for later periods, over 100,000 inhabitants.²⁵ Generally, the data are less frequent and less reliable the more we go back in time. Therefore we leave the data for the beginning of the modern period aside and start only at the end of the seventeenth century. Table 2 points to the percentage of cities of the mentioned size that were located in certain mountain regions of South America, the Indian subcontinent, and Europe.

Around 1700, four fifths of the recorded cities in South America were located in the Andean countries, and a large number of these were in the Andes themselves. This percentage declined step by step down to 27 percent in the time around 2000. Relatively young centers such as Rio de Janeiro, São Paolo, or Buenos Aires were growing faster than the mountain cities. They were founded in the early modern period and had 10.8, 18.3, and 12.1 million inhabitants, respectively, in 2000. Within the Andean countries, the disparities likewise grew. The coastal city of Lima, founded by the Spanish in 1535, already had a population of 7.6 million in 2000, whereas Cusco, the formerly large Inca center at 3,300 meters, reached a population of only around 300,000 at that time.²⁶ On the Indian subcontinent (with the Himalayas) and in Europe (with the Alps and the Pyrenees) the mountains, from the beginning, had few cities compared to the surrounding regions. Thus the chosen historical starting point was altogether different: relatively few mountain cities, on one hand, and relatively many mountain cities, on the other hand. Yet modernization seems to have

had similar effects on the three continents. After 1800 or 1900, the number of cities rose less rapidly in mountain regions than in lowland regions, which increased the urban disparities between highlands and their surroundings. And let me recall that we are using urban population as a proxy for total regional population.²⁷

It can be assumed that there were certain exceptions to these trends on the global level. Yet there are reasons to assume that they were limited in scope. Since urbanization became an important factor for population distribution, particularly in the twentieth century, the exceptions from the mentioned tendencies are most likely to be found in countries with high-lying metropolises. In 2000, one finds cities with over a million inhabitants at the altitude of over 2,000 meters in six countries. According to the available, although not very reliable, data, the mountain and upland population grew faster than the lowland population only in two of them (Mexico and Yemen); in the other four countries (Ethiopia, Colombia, Bolivia, and Ecuador), this was apparently not the case.²⁸ Moreover, the low-altitude location of most metropolises at the time indicates that upland-lowland disparities were widespread (see table 1). Jules Blache, the French geographer quoted in the introduction, might have been right eighty years ago when he assumed that people by and large turned away from the mountains in modernity.

CONCLUSION

The examples and data presented so far suggest that we can distinguish two phases of mountain development: in a first phase, illustrated here mainly with evidence from the early modern period in Southeast Asia and South America, the regional trajectories could vary widely, privileging either the plains or the uplands. In a second phase, outlined with some quantitative data on urbanization in the nineteenth and twentieth centuries, most uplands could no longer compete with the plains. In areas where earlier urban development had privileged the plains, this pattern continued in a speedier manner. In areas where earlier development had been concentrated in the mountains, the surroundings were replacing them step by step as the core zones of modern development.

What conclusions can we draw from these observations? There are, of course, many specific opinions about factors affecting the history of a given region in a given period. I will restrict myself to a short selection of possible reasons and explanations.

James C. Scott and Alexander von Humboldt, the two chief commentators discussed in the preceding sections, are cautious in their ecological interpretations. Scott argues that the relationship between wet rice production and environmental characteristics in the lowlands of Zomia were important but not deterministic: “Padi fields are easier to create and maintain in river valleys and well-watered plateaus. But

they can and have been created, through prodigious feats of terracing, in steep mountainous areas where we might least expect them, such as among the Hani along the upper reaches of the Red River in Vietnam, among the Ifugao in northern Luzon, and in Bali. Similarly, there are ecological settings suitable for padi fields where they have not been developed.”²⁹ Although there was, of course, a link between land use and land characteristics, it was not invariable.

Alexander von Humboldt, our second witness, was convinced that agricultural civilization developed first in difficult environments, such as the Northern Hemisphere or the high Andes, rather than amid the fertility of the tropics. But when the early stages of development were accomplished, motivations changed, and the question arose of why the “already civilized, farming man” does not move to places where nature spontaneously produces everything that must be produced by the hardest labor in the colder, poorer zone: “What makes the Indian till a stony soil at 3,313 meters (1700 toises) of elevation, under an icy unfriendly sky, while there are very fertile, uninhabited plains hardly a day’s travel away from his hut, at the foot of the mountains? What is attractive about a terrain where snow falls in every season, where the water freezes every night, and where the rocky ground is only covered by a few crippled bushes? This attraction is the one of the fatherland; the reason lies in the power of habit.”³⁰

This quote from 1807 sounds like a prefiguration of theoretical arguments about path dependence of more recent decades. As already mentioned, path dependence, as opposed to context dependence, emphasizes the chronological relationship between phenomena. Sometimes it takes the form of the proverbial “small causes, large effects”: a specific, possibly “insignificant” and historically “coincidental” constellation of phenomena can have a decisive influence on development, by prejudicing a direction forward that will be abandoned later only under strong contextual pressure. This implies, among other things, that synchronic relationships often assumed a suboptimal quality. As for the relationship between human society and the environment, the much cited adaptation may therefore have been in many cases more improvisation and patchwork than a *fait accompli*.³¹

It is tempting to put the examined contrast between the regional trajectories in early modern Southeast Asia and South America in this framework. The first choice for the lowlands or the uplands could have been rather open. It may have been influenced by many factors including configurations of power, social hierarchy, and warfare that are difficult to reconstruct after the fact. Ecologically, there were different options, and when one form of land occupation started and expanded, it developed a dynamic of its own and was continued by the “power of habit,” in Humboldt’s words. The historical evidence shows with great clarity that, in the Andean case, huge amounts of cropland on

mountainsides was reclaimed, maintained, and expanded that would have been judged unsuitable under other circumstances.

In the course of demographic and technological development, however, circumstances changed and the contextual impact increased. Under the pressure of a growing population, it was often possible to raise land productivity substantially, although this usually required great expenditure and the acceptance of a decline in labor productivity. There are many examples showing that such a process of agrarian growth represented an option in mountain regions as well, although only up to a certain level of intensity: eventually, the mountain setting posed an obstacle. This was our theoretical breaking point between phase 1 and phase 2 of mountain development. Rice production, for example, was possible in different environments. Very intensive rice production, with a high level of multicropping, however, was not a realistic choice for upland regions. In this view, therefore, the mountain handicap exhibited a period-specific character. It developed with strength only in a second phase of transition to modernity when intensification of land use became a generalized phenomenon.³²

Equally significant, and leading in the same direction, were the changes in communication and transportation, hinted at by Jules Blache in his pioneering work on the mountains of the planet. In an early period, the rough topography of the highlands might hinder exchange, raise its price, and promote isolation. But this factor grew much more important in the modern period when transportation systems such as railroads became crucial for development and were both more expensive and less adaptable to difficult terrain. We can assume that the increasing disparities in urbanization between highlands and lowlands that we can observe in the records of the nineteenth and twentieth centuries were not least the result of this effect. In an interdependent world, good accessibility with easy connections are key factors for economic growth, a challenge for many mountain regions.

The impact of environmental constraints on society is complex and difficult to untangle. On the level of research strategy, this article has made a case for focusing on the time dimension by using comparative clues. If the environmental constraints vary over time—and they often do—historians are in a good position to make an important contribution to the ongoing interdisciplinary debate.

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Notes

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- 1 Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Philip II*, vol. 1 (Berkeley: University of California Press, 1995), 41.
- 2 Jules Blache, *L'Homme et la Montagne* (1934; repr., Paris: Gallimard, 1950), 111–23; quote on 112 (original French); on the author and the work, see Jon Mathieu, "Gibt es eine Geschichte der Berge? *L'Homme et la Montagne* von Jules Blache neu gelesen," *Historische Anthropologie* 14, no. 2 (2006): 305–16.
- 3 Blache, *Homme*, 181 (original in French).
- 4 Blache's bibliographical basis is detailed by Anne Sgard, "Voyage dans les montagnes du monde. Sur les traces de Jules Blache en 1934," *Revue de Géographie Alpine* 89 (2001): 107–20; here 110–3.
- 5 Benjamin S. Orlove and David W. Guillet, eds., *Convergences and Differences in Mountain Economies and Societies. A Comparison of the Andes and Himalaya* (International Mountain Society, 1985); Thomas Busset et al., eds., *Andes–Himalaya–Alpes*, ed. by Thomas Busset et al. (Histoire des Alpes 8, 2003); *Terres hautes, terres basses: histoire des disparités*, ed. by Reto Furter et al. (Histoire des Alpes 17, 2012).
- 6 Bernard Debarbieux and Gilles Rudaz, *Les faiseurs de montagne. Imaginaires politiques et territorialités: XVIIIe–XXIe siècle* (Paris: CNRS Editions, 2010); Jon Mathieu, *The Third Dimension. A Comparative History of the Modern Era* (Cambridge: The White Horse Press, 2011); Fabrice Mounthon, *Histoire des anciennes populations de montagne. Des origines à la modernité. Essai d'histoire comparée* (Paris: L'Harmattan, 2011).
- 7 For population estimates, see Jean-Noël Biraben, "Essai sur l'évolution du nombre des hommes," *Population* 34 (1979): 13–25, here 16; and Colin McEvedy and Richard Jones, *Atlas of World Population History* (Harmondsworth: Penguin, 1978), 171. For a general survey of Chinese history in this period with a view to environmental and mountain issues, see Mark Elvin and Liu Ts'ui-jung, eds., *Sediments of Time. Environment and Society in Chinese History* (Cambridge: Cambridge University Press, 1998); and John F. Richards, *The Unending Frontier. An Environmental History of the Early Modern World* (Berkeley: University of California Press, 2005), 112–47.
- 8 Claudine Lombard-Salmon, *Un exemple d'acculturation chinoise. La province du Gui Zhou au XVIII siècle* (Paris: Ecole française d'Extrême Orient, 1972); on environmental aspects, Mark Elvin, *The Retreat of the Elephants. An Environmental History of China* (New Haven: Yale University Press, 2004), 216–72.
- 9 Willem van Schendel, "Geographies of Knowing, Geographies of Ignorance: Jumping Scale in Southeast Asia," *Environment and Planning D: Society and Space* 20, no. 6 (2002): 647–68; James C. Scott, *The Art of Not Being Governed. An Anarchist History of Upland Southeast Asia* (New Haven: Yale University Press, 2009), ix–x.
- 10 Scott, *Art*, *passim*.
- 11 Scott, *Art* (e.g., xii, 4–5, 80–5, 111–13, 253).
- 12 Many scholars critique these aspects of Scott's analysis, pointing to a lack of empirical evidence and to alternative interpretations that they argue are more plausible; see, for example, the collection of articles published in *Journal of Global History* 5, no. 2 (2010) under the title "Zomia and Beyond," especially the detailed review of Scott's book by Victor Liebermann (333–46).

- 13 Heinzpeter Znoj, "Die koloniale Transformation der Hochland-Tiefland-Beziehungen in Zentralsumatra," *Histoire des Alpes* 17 (2012): 35–53.
- 14 Alexander von Humboldt and Aimé Bonpland, *Ideen zu einer Geographie der Pflanzen nebst einem Naturgemälde der Tropenländer* (Tübingen: F.G. Cotta, 1807), 168 (original in German); the names "Anahuac" and "Cundinamarca" refer to the regions of Mexico and of Santa Fé de Bogotá.
- 15 An authoritative summary by Heraclio Bonilla, "Las civilizaciones precolombinas," in idem, *El Futuro del Pasado. Las coordenadas de la configuración de los Andes*, vol. 1 (Lima: Fondo Editorial del Pedagógico San Marcos, 2005), 45–86.
- 16 Carlos Sempat Assadourian, "Agriculture and Land Tenurek," in *The Cambridge Economic History of Latin America*, vol. 1 (Cambridge: Cambridge University Press, 2006), 275–314, quote on 276; Linda Newson, "The Demographic Impact of Colonization," in *The Cambridge Economic History of Latin America* (Cambridge: Cambridge University Press, vol. 1 (2006), 143–84; Noble David Cook, *Demographic Collapse. Indian Peru, 1520–1620* (Cambridge: Cambridge University Press, 1981), 253; Juan and Judith Villamarín, "Native Colombia: Contact, Conquest and Colonial Populations," *Revista de Indias* 63, no. 227 (2003): 105–34.
- 17 Heraclio Bonilla, "El rol histórico de Potosí en los sistemas de intercambio," in *El Futuro del Pasado. Las coordenadas de la configuración de los Andes*, vol. 1 (Lima: Fondo Editorial del Pedagógico San Marcos, 2005), 503–14.
- 18 Path dependence theory is not attached to a single author but rather collectively used and (re)formulated by various groups in different fields of economic and social sciences; an often quoted work is Douglass C. North, *Institutions, Institutional Change, and Economic Performance* (Cambridge: Cambridge University Press, 1990); an introduction to the discussion is provided, for example, by Laurent Tissot and Béatrice Veyrassat, eds., *Technological Trajectories, Markets, Institutions. Industrialized Countries, 19th–20th Centuries; from Context Dependency to Path Dependency* (Bern: Peter Lang, 2002).
- 19 Charles C. Mann, *1491. New Revelations of the Americas before Columbus* (New York: Alfred A. Knopf, 2009), 227.
- 20 William M. Denevan, ed., *The Native Population of the Americas in 1492* (Madison: University of Wisconsin Press, 1992), xxviii; Heraclio Bonilla et al., "Los Andes y la Amazonía: La metamorfosis y los particularismos de una región" (Maestría internacional de estudios andinos y amazónicos; unpublished paper, Bogotá 2004), 15.
- 21 For example, see the research projects described in the special issue of *Geographica Helvetica* 3 (2011); a survey on the history of research is provided by Mann, *New Revelations*, 280–311.
- 22 For 1950–2001: *Instituto Nacional de Estadística*, Bolivia (www.ine.gov.bo); the lowland provinces are Santa Cruz, Beni, Pando; for 1847: José María Dalence, *Bosquejo estadístico de Bolivia* (1851; repr., La Paz: Universidad Boliviana, 1975), 182; in that period the scarcely populated province of Cobija on the Pacific Ocean still belonged to the lowlands.
- 23 See Ester Boserup, *Population and Technology* (Oxford: Basil Blackwell, 1981), 63–75.
- 24 United Nations, *Urban Agglomerations 2001* (New York: UN Population Division, 2003); there are, of course, many problems of measurement concerning both the urban areas and their altitude; an extreme case is exactly La Paz, where the difference between the highest and the lowest city quarters is about 1,000 meters.

- 25 Jon Mathieu, "The Mountains in Urban Development: Lessons from a Comparative View," *Histoire des Alpes* 8 (2003): 22.
- 26 United Nations, *Urban Agglomerations 2001*.
- 27 For the Alps and their surroundings, this uneven urbanization process is described in a circumstantial manner in Jon Mathieu, *History of the Alps 1500–1900. Environment, Development, and Society* (Morgantown: West Virginia University Press, 2009; first German edition 1998), 83–134, 222–28.
- 28 Disparate data for population trends in the six countries mentioned (Bolivia, Colombia, Ecuador, Ethiopia, Mexico, Yemen) for the second part of the twentieth century (Mathieu, *Third Dimension*, 82).
- 29 Scott, *Art*, 64.
- 30 Humboldt, *Ideen*, 169 (original in German).
- 31 See note 18.
- 32 Mathieu, *Third Dimension*, 86–108.