

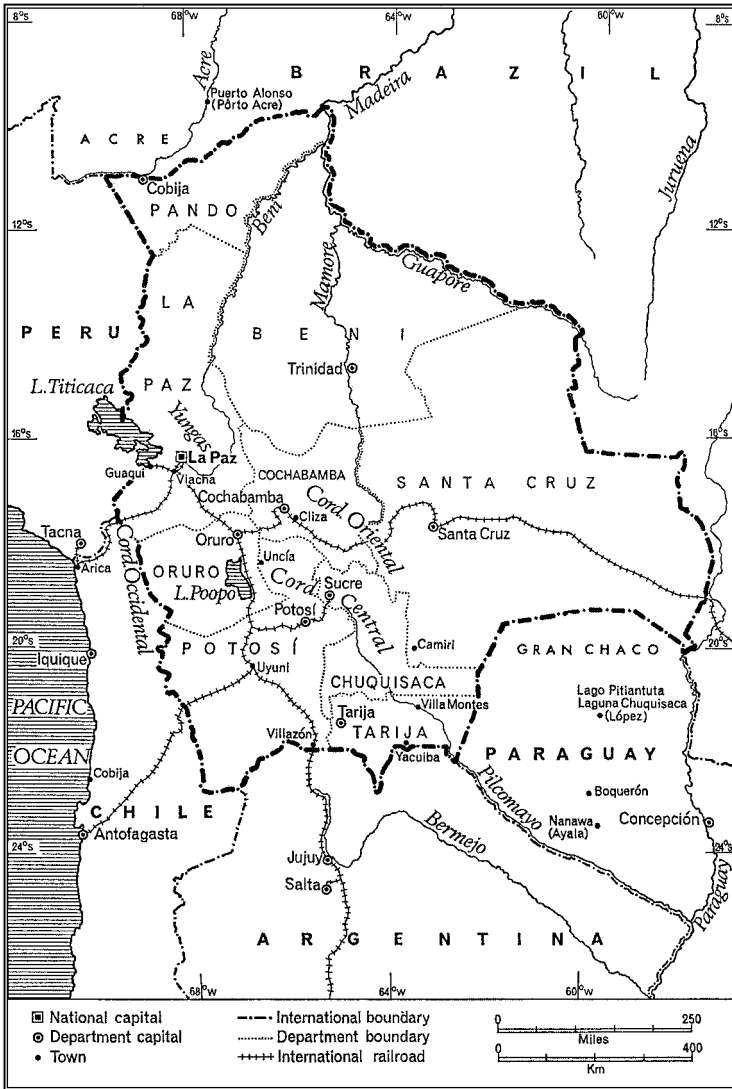
Chapter I

Geography and Pre-Columbian Civilization

Bolivian society evolved in a highly complex and unusual environment. Although situated in tropical latitudes, it was in fact an unusual high altitude society only comparable to those few similar societies found in the Himalayas. From the earliest human settlement to the present day, a good part of its people have lived at altitudes over five thousand feet above sea level, with the majority of the population and its most advanced cultures being found at twelve thousand feet or above. While not a totally prohibitive environment, the highlands have poorer soils and much colder and drier climates, and face constraints that do not hinder the lowlands. This ecology required the domestication of plants and animals unique to the highlands and even had a dramatic impact on human physiology, as highland populations were forced to adapt to the limited supply of oxygen and quite different degrees of air pressure.

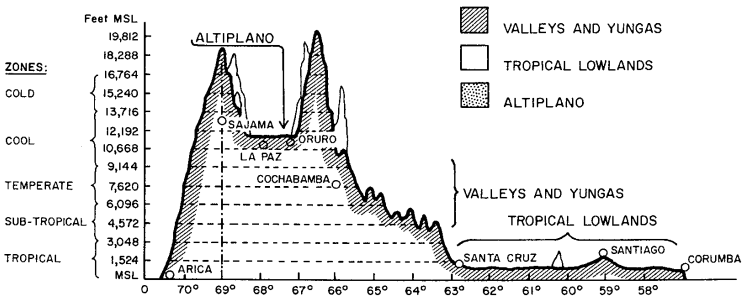
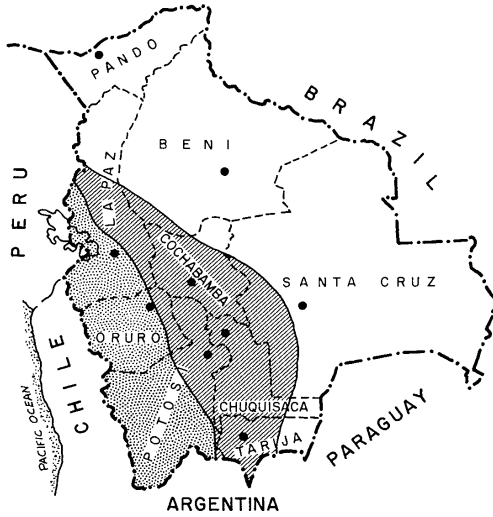
Although some two-thirds of Bolivia's territory consists of tropical and semitropical lowlands, from the Pacific coast deserts of the Atacama region (until this past century) in the west, to the vast stretches of eastern lowlands and flood plains forming parts of the Amazonian and Pilcomayo river basins in the east, humanity has been concentrated in the highlands from remotest times until today. But the highlands and their associated intramountain valleys (see Map 1-1) formed but a small part of the total Bolivian landscape.

While the lowlands may have offered better soils and the potential for a richer life, their inaccessibility until modern times rendered them useless to all but a small number of seminomadic hunters and



1-1 Map of Bolivia

gatherers isolated from significant contact with the major centers of advanced civilization. By contrast, the high plateau was well articulated with the dense populations and advanced culture areas of coastal and central Peru. Thus, despite its limitations in terms



I-2 Topography of Bolivia

of crops and life in general, the broad expanse of its arable lands, its potential as a major grazing zone, and its deposits of accessible minerals made the Bolivian highlands the logical center for human settlement.

The Bolivian highlands, known to the Spaniards as the *altiplano* (or high plateau), consisted of an enormous level tableland at an extremely high altitude (see Map I-2). Beginning just north of Lake Titicaca, these highlands extend some five hundred miles to the south at an average altitude of some thirteen thousand feet. Created by an opening of the Southern Andes into two distinct mountain ranges at around nine degrees south of the Equator, the altiplano grows

from a width of a few miles at its beginning to approximately one hundred miles across in the central areas. A great elliptical sphere with the enormous lake at its top, the altiplano is the largest and most level plateau in the Andes, which in its turn is the most extensive mountain range in the world. Two-thirds of the approximately fifty thousand or so square miles that constitute the altiplano falls within the current borders of Bolivia.

The mountain ranges that define the altiplano contain quite different features. The western branch is known as the *Cordillera Occidental*, and is an extremely narrow and well-defined range averaging some 16,500 feet, rising at its highest point to over 21,000 feet. It contains few river valleys or habitable plateaus and forms a steep barrier blocking the high plateau from easy access to the sea and the desert of the Atacama coast. Although formed from volcanic activity and highly subject to erosion, it contains relatively few minerals worth exploiting. On its eastern slope touching on the altiplano, it has very arid soils and some enormous salt flats, those at Uyuni being greater in size than Lake Titicaca itself. Thus, the western Cordillera stands as a harsh barrier preventing easy access to the coast. At its northern and southern edges, however, the Cordillera breaks up into more accessible routes to the sea, encouraging Bolivia's integration with the coast in a more northern or southwestern direction. This western mountain range offers few attractions for human populations either within or near its borders and so defines the western half of the altiplano as the most sparsely settled area of the region.

Quite different is the eastern range of mountains known variously as the *Cordillera Real*, *Central*, or *Oriental*. Far broader and much more broken than the western Cordillera, the Cordillera Real contains numerous fertile plains and river valleys at altitudes from fourteen thousand feet down to a few hundred feet above sea level. Because of its numerous valleys, it also provides easier access to the eastern foothills (known as the *montaña* region) and the lowland plains to the east.

The valleys and plains of the Cordillera Real are quite complex but can be roughly defined by altitude and extension. The higher altitude plains, defined as subpuna valleys, for the most part have a temperate environment and good ground water, although relatively

dry climate, and average about eighty-two hundred feet above sea level. They are usually long open plains with relatively easy accessibility from the higher altiplano; the most densely inhabited are the valleys of Cochabamba and Chuquisaca, the western part of Potosí, and the region of Tarija. These broad middle altitude valleys were major zones of pre- and post-Conquest production and settlement. Best exemplified by the Cochabamba Valley system, these valleys were the primary producers of maize in the pre-Columbian period and of wheat after the Spanish Conquest. They also were the major manufacturers of *chica*, the alcoholic beverage made from maize. Given the importance of all these crops, these subpuna valleys were in constant contact with the core highland populations. Here, too, would develop cattle production after the Conquest, while the altiplano became the center of Spanish-introduced sheep.

Below the subpuna valleys or just off the altiplano itself were the steep river valleys in the central part of the Cordillera known generally as the *Yungas*. At anywhere from thirty-two hundred to eighty-two hundred feet in altitude, these valleys are characterized by high humidity because of the Amazonian winds and thus have intensive cultivation of tropical and semitropical crops. The most important of these Yungas are those located close to the altiplano city of La Paz and called the *Nor* and *Sud* (or North and South) Yungas, the regions of Larecaja, Muñecas, and Inquisivi. Historically, these valleys were the center of maize and coca production, two fundamental products in high demand on the altiplano and incapable of being cultivated there. They also were the zone of intensive citrus, fruit, and coffee production in the post-Conquest period, and thus were complementary to the highland centers. Another series of semitropical valleys were the more isolated ones to be found in the provinces of Cochabamba and Santa Cruz. Capable of producing the same crops as the Yungas valleys, they remained largely unsettled and inaccessible until the twentieth century.

Before reaching the flat plains of the Amazonian and Chaco lowlands, the eastern Cordillera turns into a series of small hills and mountains called the *montaña* area. Passing these one enters the open sea level plains. These are divided into two quite distinct zones. In the north are the *Llanos de* (or plains of) *Mojos*, sometimes called the Northern Humid *llanos* or those of the Beni. These tropical

savannas are usually heavily flooded in the December–April summer rainy season. In their center is the Rio Mamore, which forms part of the Amazonian basin system. To the south of the Mojos plains are the highlands of the *Macizo Chuquitano*, named after the old province of Chuquitos. At slightly higher elevation, this area shares much of the Mojos environment but is also a center of important hydrocarbon deposits. Then to the south are the dry plains or *llanos del Chaco*. Stretching from Santa Cruz south to the Brazilian, Argentine, and Paraguayan borders and beyond, these sandy dry *chaco* plains, which form the Pilcomayo river basin, are covered with scattered scrub forest and form a large part of the territory of the nation, yet contain only one-fifth of its population.

Because of inaccessibility and harsh seasonal variations, these lowlands were unexplored and unexploited until recent times. While some coca production and cattle-raising were developed in the colonial period along the eastern montana edge of the lowlands in those areas close to the cities of Santa Cruz and La Paz, it was only with the development of commercial production of wild rubber in the late nineteenth century that systematic exploitation began. Only the opening of rail and road transport in the twentieth century finally permitted the development of commercial agricultural production in sugar, cotton, soybeans, and coca and the exploitation of the region's oil and natural gas deposits. In turn, cattle-raising became centered on the northeastern plains regions of Mojos and the Beni. Even with all these recent developments, these lowland regions still only contain a third of the national population.

Throughout the history of human settlement in Bolivia, the altiplano and its associated eastern valleys remained the primary zone of human activity, with the altiplano the core of the system. But, despite its centrality and the density of its population, the altiplano was not uniformly hospitable for human settlement over its entire area. The western half of the altiplano contained few minerals, largely infertile soils, and extraordinarily dry climate; the eastern half, however, had reasonably fertile soils, enormous mineral deposits, and a relatively more humid and warm climate resulting from the presence of Lake Titicaca. With its thirty-five hundred square miles, Lake Titicaca exerts an enormous influence over the local climate and provides humidity and relative warmth unavailable on the rest

of the altiplano. As a result, intensive agriculture and herding became essential occupations of the peoples surrounding the lake and provided the ecological support for the creation of an important food surplus. This in turn provided the incentive for the creation of more complex cultural systems. The settlement around the lake took place in a series of open plains defined by foothills, known as *cuencas*, which stretch south to the great river valley that would become the city of La Paz, some fifty-six miles south of the lake. The cuenca on the shores of the lake and the one of Jesus de Machaca are the most valuable in terms of soils and humidity and are linked by the Desaguadero River. This in turn binds together the two lakes, Titicaca to the north and Poopó to the south, and also passes through the two southern cuencas of Oruro and Uyuni. The Oruro cuenca is moderately populated, while Uyuni – the driest zone in all Bolivia – is the center of salt flats and largely uninhabited.

It was on the altiplano that the domestication of the staple products of Andean civilization took place. In the Lake Titicaca region the potato was domesticated – a development that was to have a profound impact on the populations of Europe – as well as quinoa and a host of nutritional root crops. Frozen and dehydrated, these numerous roots have been fundamental staples in the Bolivian diet.

The altiplano also was the scene of the domestication of the American cameloids: the llama, alpaca, and vicuña. Beasts of burden, producers of wool, and sources of meat, fertilizer, and heat, these cameloids were to play a fundamental role in the Andean ecology and economy. From the remotest times, these animals were found in close contact with human populations on the altiplano, although it was during the epoch of the historic Aymara kingdoms that the domestication and use of these animals reached its fullest development. So important were their herds that in all their fortified settlements the pre-Incan Aymaras provided space for their animals as well as their people.

An excellent grazing zone of natural and artificial pastures, the altiplano also became the home of the European domesticated sheep after the Spanish Conquest. While usually incompatible with other grazing stock, sheep successfully integrated with the American cameloids, and the two today remain integral parts of the Amerindian herding economy. Thus, between the great herds and

the intensive root crop agriculture, the altiplano Indian populations were able to produce both sufficient foodstuffs and woollens for their own survival and replacement, as well as surpluses to exchange for fish, fruits, condiments, maize, and coca, which could not be produced in the highlands.

The altiplano also contains a wealth of mineral deposits that have been exploited from pre-Columbian times to the present and that mark this region as one of the great mineral zones of the world. The distribution of these minerals closely parallels the primary agricultural areas of the altiplano. Just as the best soils were in the eastern side of the altiplano, some 80 percent of Bolivia's vast mineral deposits are to be found in the same area. Concentrated in a zone that has been given the general name of the *faja estanífera* (or tin belt), most of Bolivia's minerals are found in the Cordillera Real and its associated plains and upper valleys, running from just northeast of Lake Titicaca, through the eastern Cordillera range, to the Argentine frontier in southern Bolivia. Going from north to south, the minerals belt is divided into several roughly defined areas. From southern Peru to about the level of Mururata is the oldest geological section, which contains all the gold deposits, taken mostly through placer mining since pre-Columbian times, as well as wolfram and other metals. From Mururata south to Oruro are more deposits of wolfram and the first important deposits of tin. But the major tin districts appear in the third zone heading south, in the region from Oruro through Potosí to the southern frontier. Known as the "poli-metal province" because of its unique association of tin with silver, this region is the heartland of Bolivia's mineral deposits and contains not only tin and silver in extraordinary abundance but also a host of rare metals, many of them unique to Bolivia, and minerals such as lead, bismuth, zinc, and antimony. The only major metal deposits located outside this zone are copper in the eastern altiplano, and the large nitrate and copper concentrations on the other side of the western Cordillera in the Atacama desert. The Cochabamba Valley contained a host of nonferrous metals. In the eastern foothills are large deposits of natural gas and petroleum and the only iron ore in the whole region. Thus, the only minerals or hydrocarbons Bolivia lacks are coal, bauxite, chrome, platinum, and precious stones. This extraordinary mineral heritage, while only

modestly exploited in pre-Columbian times, would become the basis for Bolivia's importance in the world economy once the region was discovered by Europe. Moreover, even during its more modest pre-sixteenth-century beginnings, the metallurgy of the highland populations was an important trade item between themselves and the high civilizations of the Peruvian coast, and it was in metallurgy and in their creation of a unique highland ecology adaptive to man's needs that the early Bolivian populations showed their greatest originality.

Given the extraordinary importance of minerals, root crops, and cameloid products in the Andean economy, the highlands remained the primary zone of exploitation for the peoples of pre-Conquest Bolivia, and thus set the pattern that would predominate down to the present day. But the utility of the altiplano environment, for all the creativity of its human populations, was limited. For this reason, the highland populations have constantly interacted with the valley and lowlands peoples to obtain basic complementary food products that they could not produce. This so-called vertical ecological integration, involving exchanges of products from sharply different ecological zones, has been a common feature of human life in this region from the beginning. From earliest known times, colonists from the altiplano were to be found in all the valleys to the east and also as far away as the Pacific coast on the west. Intense interregional trade became the hallmark for all the advanced cultures on the altiplano. Trading root crops, meat, and wools from their vast cameloid herds of llama, alpaca, and vicuña, the highland peoples obtained coca, maize, fish, fruits, and beans from the lowland areas and maintained a varied subsistence base. Through centuries of expansion, change, and finally European conquest, the highland peoples kept this vertical ecological integration intact, and fought all attempts to isolate the altiplano from its regional sources of trade. To this very day, in fact, vertical ecological integration is a dominant theme of social and economic organization in rural Bolivia.

In this, as in so much else, the area that would eventually make up the Bolivian nation shared much in common with the entire Andean region, of which it formed only the southern sector. In the central and southern highlands of what is today Peru, similar geographic settings created similar patterns of integration, especially in the region

immediately north of Lake Titicaca. Moreover, the entire Andean area would share a common cultural history.

The arrival of early man in the Andean area dates back at least twelve thousand years, although the remnants of their presence in the highlands have been less well preserved than along the Andean Pacific coastline. But both highland and coastal cultural areas in the period prior to 2500 B.C. shared a largely hunting and gathering subsistence with seminomadic settlements. Whereas in the coastal zone, human population concentrated on the resources of the sea, the highland peoples engaged in wild-animal hunting for subsistence. From the end of the last glacial period (c. 8000 B.C.), there began the slow development of domestication of plants and animals. Agriculture and herding finally became the predominant forms of subsistence only after some six thousand years of experimentation. By 4000 B.C., herding of Andean cameloids became a major highland activity; by 3200 B.C., pottery could be found in the region, and spun cotton cloth has been recovered from coastal burials dating from 2500 B.C.

By this latter date, the highlands of Peru were the scene of a major transformation to settled village agriculture. Permanent settlement, increased population density, and more complex social organization in terms of multicommunity governments became the norm. For the next thousand years, both the coast and highlands experienced this increasing tempo of settled agricultural life. More truly urban centers were formed, and the establishment of religious ceremonial centers marked the beginnings of non-food-producing specialists who provided services to the full-time agriculturists.

Although the process that moved village horticulturists to sacrifice some of their surplus to non-food-producing groups is not fully understood, the record from the Andes suggests that it was primarily technical and/or religious motivations that led to the formation of complex intercommunity governments. The existence of unfortified ceremonial centers isolated from agricultural settlements and the creation of complex irrigation systems across several valleys and around the major lakes seem to reinforce this interpretation.

The next major phase of Andean development involved the widespread use of metals, the development of metal technology being an important indication of the creation of increasingly larger