

Chapter 1

A Land of Illusions and Thin Air



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In 1901, John Van Dyke, a New Jersey professor of art history, following his doctor's advice, traveled west seeking a cure for his chronic respiratory ailments. He moved from the civilized, temperate world of the east coast to the wildest of places in the southwestern deserts. At the time, the dry, desert air and the abundance of sunshine were the only cure for lung disorders. He became smitten by the desert landscapes and the astonishing atmospheric effects. He wrote: *The deserts should never be reclaimed. They are the breathing space of the west and should be preserved forever.* In his famous essay, *The Desert* (Van Dyke 1901), he later added: *To speak about sparing anything because it is beautiful is to waste one's breath and incur ridicule in the bargain. [However,] The aesthetic sense, the power to enjoy through the eye, the ear, and the imagination—is just as important a factor in the scheme of human happiness as the corporeal sense of eating and drinking; but there has never been a time when the world would admit it.* Van Dyke's message is as valid today as it was in the days when he was traversing the drylands of the southwestern USA and northwestern Mexico. At the time, the world had five times fewer people, and Mexico had only one-tenth of its present population. The deserts were almost pristine, and Van Dyke's claim to protect them was fulfilled more by their remoteness than by any human effort.

The desert, with deceiving horizons and mountains that seem closer than they are, is not an easy place for living or working. In the summertime, the weather is almost always too hot. Later in the year, winter days bring that cold that goes through your bones, and on days when the temperature is bearable, it turns too dry. Once rainfall arrives, it comes as a deluge with roaring arroyos and flooded plains.

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At the start of the summer rains, it turns into a sultry, humid, and oppressive sauna. For the discerning newcomer, the desert induces an unavoidable state of trance, where perception is defeated by the sparkling blue skies and the spotless landscapes, sometimes colored by gaudy ochre and red and sometimes by subduing pastel hues. Desert daily rhythms start with the sunrise, fresh and promising at dawn, dilutes into *fata morgana* mirages as the day progresses, and ends in a violent display at sunset. Then, twilight comes while deceptively peaceful night falls. At night, everything seems quiet, but plants and animals keep busy. Some desert plants silently transform carbon dioxide into chemical 4-carbon molecules inside their cells. The next day, these will be transformed into sugars by the process of photosynthesis, miraculously fixing light into organic matter. Some animals will harvest seeds or run after small prey while scurrying under a starry sky. Time is the main ingredient to get an understanding of the desert. As time passes, we better appreciate its aesthetics and richness and forget about the discomfort.

What we call Mexico today is mainly a territory of deserts and mountains in the north and tropical forests in the south. A jigsaw puzzle of different biological, geological, climatic, and cultural landscapes, a set of environments moving to new positions throughout its evolutionary history. In deep time, these blocks—which were in other places assembling other continents—came together in a tectonic dance to build southern North America. By the Cretaceous, North America was relatively simple, Laramidia to the west and Appalachia to the east. A shallow seaway separated both subcontinents. The south, called by some Deep Mexico, is much more complex. It is formed by terranes—blocks—with names like Chortis, Maya, Guerrero, and Oaxaquia. Some of these are in turn the result of even older accretion of blocks.

Earth, ironically, is mainly sea. The continental terranes made of lighter elements are prehistoric Noah's arks carrying their biota, sometimes isolated, across the marine realm. The case of the Baja California Peninsula illustrates well how pieces of the continent split and drift. The peninsula started a slow divorce from the continent millions of years ago. It has been carrying a biological treasure of unique, sequestered species. Geologists indicate that the small seaport of San Felipe, near the Colorado River delta, will be near the Golden Gate in a few million years. On their pilgrimage, reassembling fragments of the light continental crust, sometimes end capturing pieces of ancient seas. For example, during the Ediacaran and Early Cambrian, about 600 million years ago, evaporites of the Salt Range Formation in the Pothohar Plateau produced the coveted Himalayan pink salt derived from old shrinking seas.

In what is now North America, the fragments of the Western Interior Seaway ended trapped in northern Mexico by the accretion of terranes during the Late Cretaceous. The convergence center of these wandering terranes (Guerrero, Oaxaquia, Central, and others) happens somewhere in the Northern Mexican Plateau, not far from the area some people call The Lost Paradise. A place of stark mountains, desolate desert, and crystal-clear blue lagoons. In a sense, John Milton's remark about nature gifts is highly appropriate for the region: *Wherefore did Nature pour her bounties forth, With such a full and unwithdrawing hand, Covering the*

earth with odours, fruits, flocks, Thronging the seas with spawn innumerable, But all to please and sate the curious taste? The whole region, seemingly arid and dry, on second thoughts, has an amazing richness of environments, flora, and fauna as well as varied mineral deposits.

In addition to the deserts of northern Mexico, whose niche partitioning—as ecologists call the apportioning of the available resources among species—happens mainly across horizontal gradients of temperature and water availability, there are two other prominent terrestrial regions of Mexico: tropical forests where niche partitioning primarily occurs along vertical light gradients and temperate forests distributed across the extensive mountain ranges typified by extremely low temperatures during winter and a diverse Nearctic tree flora. Given the broken topography across the country, these three broad units are geographically related and share three biogeographic origins. The very old North American elements (Paleoamerican), the more recent Northern Hemisphere properly (Nearctic), and those of tropical origin, including the remains of the tropical flora which flourished in North America during the Tertiary. All these are present in varying proportions across the country and produce the richest biodiversity hotspot of the continent.

Mexico, with its southern powerful rivers and prominent mountain ranges flanking both coasts, is the Sweet Land (*La Suave Patria*) where the *sky is filled with heron's flight and the green lightning of parrots' wings*. However, the poet López Velarde, who speaks of a land of mountains, mines, green jungles, and maize fields forgot to mention that more than half of the country comprises drylands where few dared to go, even with the promise of Cibola and the Golden cities. A place where herons journey among distant, isolated oases, and parrots live in deep Sierran canyons.

On the environmental background of ancient, vanished seas and wandering geological blocks that shaped the Sweet Land, a few human bands arrived into a pristine territory only 20 to 30 thousand years ago. Some say that across the frozen Bering Sea, others now claim that sailing along the western North American coast, and some invoke perplexing migrations paths after finding Aboriginal Australian genetic signatures in South American native people. As happens with the dispersal of plants and animals, at first these early migrants, being few, left little remnants. Some include the mammoth that Emil Haury excavated in the border between Arizona and Sonora in 1952 (Haury 1953) and the gomphothere remains at *El Fin del Mundo*, an ancient locality in the Sonoran Desert (Sánchez et al. 2014), both associated with Clovis spear points. About 60 years ago, in the Cuatro Ciénegas region of the state of Coahuila, in northern Mexico, two well-preserved human footprints more than 10,000 years old were found in tuff deposits near the Sierra San Marcos y Pinos, and recently more footprints have been recorded near the lagoons (Felstead et al. 2014).

It is not difficult to imagine these early humans finding the lagoons in the middle of the desert while chasing ancient bison, gomphotheres, mammoths, and other large mammals. They were inadvertently witnessing the end of an era. At the end of the last glacial—known in North America as the Wisconsin glaciation—after a long summer day, they might have jumped into the balmy thermal waters of the lagoon. A big relief following a strenuous walk stalking prey. Unknowingly, they disturbed

the rich bacterial communities that thrived in the translucent waters. The hunter-gatherers of the end of the last glaciation traversed across conifer forests in the high sierras, and mesquite, oaks, junipers, and pinyon pines in the lowlands (Van Devender and Burgess 1985). These assemblages were plant and animal communities of which we have no contemporary analogs. Biomes where desert and temperate species freely mixed (Minckley et al. 2019). Today, plant communities are markedly drier. Creosote bush (gobernadora, *Larrea tridentata*) is now dominant, especially in the extensive old alluvial valleys. Yuccas and prickly pears, along with a seemingly infinite number of lechuguilla agave, form extensive succulent and rosette desert scrub communities. Even in the high ranges, most of the temperate species have disappeared, and the ones left behind are fast climbing the highest mountains to escape the accelerated warming of climate change.

Since the conquest of Tenochtitlan, the endless deserts of the arid north were the challenging frontier to dominate. Soon after the conquest, Europeans started traveling along already ancient roads. The *Camino Real de Tierra Adentro*—the Inland Road to the North—was the main artery communicating Mexico City with San Juan Pueblo, north of Santa Fe. It traversed the Chihuahuan Desert, and its trace can still be followed along the highways linking the major cities of northern Mexico and New Mexico. These pathways were well trodden by Native Americans carrying much commerce and goods exchange across long distances. For example, the Sonoran Desert toad has been associated with Mayan rituals in the Peten and Yucatán peninsula (Davis and Weil 1992), and the tropical scarlet macaws were traded and bred in the North American Southwest (Minnis et al. 1993).

These old paths were once traveled by Alvar Núñez Cabeza de Vaca and three companions in an epic saga of discovery and survival (Núñez Cabeza de Vaca 1555). Cabeza de Vaca was part of the ill-fated Pánfilo de Narváez expedition. A storm destroyed their ships and drowned most of the expeditionary force near Galveston Island. Narváez set sail in a makeshift raft never to be seen again, and about 80 survivors were marooned ashore. Between 1528 and 1538, Cabeza de Vaca, trying to find a way back to Mexico, walked south, crossed the Rio Grande, and found a native settlement he called *San Luis* or *San Luisito* (present-day Monterrey). The Sierra Madre Oriental, part of the extensive American Cordillera, was a formidable barrier that shifted Cabeza de Vaca path toward the endless plains of Baján, south of Monclova. Most likely, he followed the busy indigenous roads leading to the Cuatro Ciénegas region. As happened with the first Native American settlers, we can think of him taking a respite of the hardships of travel in the warm, blue mirrors of the desert. After resting, he and his companions traveled through present-day Coahuila, Chihuahua, and New Mexico, probably crossing again the Río Bravo (known by many different native Prehispanic names and also known as Río Bravo del Norte and Río Grande del Norte. After the separation of Texas it was officially named Río Grande in the USA; Carroll 1995). He traveled westward, across the continental divide, entering the Pacific watershed and slowly moving into the margins of the much warmer Sonoran Desert. Finally, he was able to travel south following the ranges and rich valleys west of the Sierra Madre Occidental. Southward, into the tropics, he reached the city of Culiacán, by then ruled by the tyrant Nuño Beltrán de

Guzmán. Captured among hundreds of indigenous people in slave raids, Cabeza de Vaca and his three companions, wiry and sunburnt, marveled the Spanish soldiers when they started speaking Castilian.

In the northern deserts, the low desert productivity kept population density relatively low. Settlements were limited to the riverbanks, or the well-irrigated plains, just as the Hohokham of the Sonoran Desert, the Pueblo of the Northern Plateau, and many other now-vanished cultures did long ago. Desert villages comprised small communities, like the Hopi and O'odham in the northwest, or southern desert dwellers like the *Coahuiltecos*, *Guachichiles*, *Zacatecos*, and *Tobosos*. All are descendants of the original immigrants of the end of the Pleistocene whose environmental footprint led to or speeded up the great megafaunal extinction of the last glacial period (Martin 1973; Surovell et al. 2016). The powerful depiction of a mammoth hunting party, guessed from remains found in Santa Isabel Ixtapan, is exhibited in one of the halls of the Museo Nacional de Antropología.¹ At the time, biological desert communities changed by the gradual temperature increase and retreat of glacial ice and by the disappearance of the large herbivores—landscape architects modeling the composition and structure of plant communities. With the megafaunal extinction and increasing population density, a new equilibrium on the biological communities was reached. It was a short-lived, precarious equilibrium that modern native indigenous desert people lived at the time of Cabeza de Vaca pilgrimage.

The transition from the period of conquest to the colony happened through royal land grants, sometimes coming along with a nobility title. Being a landlord, the owner of a hacienda with a few hundred or thousands of acres and the peasants to work that land, was the sign of high social rank and influence. The first to receive such a grant was Hernán Cortés in 1529, when he was appointed Marquis of the Valley of Oaxaca by the Emperor Charles V. In comparison with the lands of the Central Plateau, by its remoteness and isolation, the *Lost Paradise* remained almost unchanged. The next remarkable change in ecological and cultural landscapes of the northern deserts happened during the times of Porfirio Díaz, a dictator that modernized Mexico at the end of the nineteenth century. Don Porfirio, as he was called, with the help of new technology, modernized colonial practices and supported the *Sistema de Haciendas* through the appropriation of vast tracts of land by the Mexican elite and the injection of foreign capital to transform and control land. Less than 1000 families controlled political power. They had millions of acres of cultivated land as well as extensive forests and cattle range and a monopoly on finances, telephony, railroads, goods and services, and food production. The state of Coahuila, home of the Cuatro Ciénegas region, was not the exception. With the arrival of the railroad in 1880, the whole region turned from being one of the poorest, less populated, and most isolated into a strategic raw materials supplier. Its plentiful coal mines propelled the nascent Mexican industrial revolution, and new markets for extensive agriculture and livestock quickly developed (González Galindo 2016).

¹ Some anthropologists suggest that the mammoth was already dead when butchered.

The last chapter on the history of change and development of the spectacular ecosystems of the Mexican arid north has been written by land developers pushing the agricultural-livestock dryland frontiers. The plains and rivers of Sonora and Sinaloa were channeled by elite capitalists, the so-called agrotitanes, for irrigation. The cotton and later the dairy farming industry of the *La Laguna* region rapidly increased at the expense of drying aquifers. The farmers of the northeast cleared the rich and unique Tamaulipan thornscrub. Throughout the drylands, livestock growers with extensive cattle and goat herds repopulated the desert with the newly imported European megaherbivores. Landowners, and later agro-industries, saw the environment as the frontier to conquer, depleting biotic resources and using technology and the great energetic value of cheap oil—López-Velarde's "springs deeded by the devil"—to dam rivers, to search for deep-well fossil water, and to open the fertile river deltas and valleys for agriculture. This is the dilemma that the fragile desert ecosystems face. All these actions, along with the higher-order factors of transformation due to global climate change, are rapidly shifting the unstable equilibrium of the desert. Unless we find a way to change consumption and production patterns, the recovery and better use of drylands, the replenishment of the ancient sea, remains of the blue lagoons, will be a consequence of the ever-closer human society collapse. Time ticks fast. Perhaps is time to heed the words of Van Dyke (1901) about the desert: "*a land of illusions and thin air. [Where] The vision is so cleared at times that the truth itself is deceptive.*"

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