The Inka Empire—*Tawantinsuyu*

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In less than one hundred years, from 1438 to 1533, the Inka built *Tawantinsuyu*[1], one of the most sophisticated empires in the world. Today, more than seven million Quechua and Aymara people are the direct descendants of the Inka Empire, which grew from a small kingdom in the Andes in the early thirteenth century to become a thriving civilization. Through peaceful assimilation and warfare, the Inka expanded their empire to include large territories in present-day Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina. A system of government based on the redistribution of resources and the Andean principle of *Ayni*[2], or reciprocity, allowed the Inka Empire to flourish until the Spanish conquest in the middle of the sixteenth century. The city of Cusco was the administrative and religious center of the Inka world. The Inka built a system of roads that stretched from Cusco's main plaza to the four regions of Tawantinsuyu. The *Qhapaq Ñan*[3], or the Great Inka Road system, was the largest construction project in the Western Hemisphere at the height of Inka power.

The Qhapaq Ñan spanned 25,000 miles (almost 40,000 kilometers) throughout Tawantinsuyu and was built without the use of metal or iron, the wheel, or stock animals to pull heavy loads. While llamas can carry up to 60 pounds, they were not used by the Inka in the road construction process as load-carrying animals. The road was built for llamas and foot traffic, not by llamas. The road system allowed the Inka to oversee and manage a territory equivalent to the size of

[1] Tawantinsuyu means "four parts together" in the Quechua language.
[2] The meaning of Ayni in Andean cultures is akin to "reciprocity."
[3] Qhapaq Ñan means "the Great Inka Road" in the Quechua language.

California, Nevada, Arizona, New Mexico, and Texas combined. This extraordinary network of roads meanders down the Pacific coast of South America, from Quito, Ecuador, to Santiago, Chile, traversing one of the most extreme physical geographies on the planet, from snowcapped 16,000-foot (4,900-meter) peaks to the coast, passing through rain forests, grasslands, and deserts. Parts of the road system were built by cultures that preceded the Inka Empire, but the Inka perfected the road network into an engineering marvel that supported transportation, communication, and trade. Inka engineers understood water flow, gravity, and wind erosion, and optimized the road design for human and animal foot traffic. It is estimated that six percent of the Inka road system is still visible, and the existing roads, which continue to be used and maintained by indigenous Andean communities today, are being studied to understand Inka engineering techniques and their application to contemporary projects.

Spanish explorers admired the variety of bridges along the Qhapaq Ñan. In particular, Europeans had never seen a suspension bridge and were amazed to find hundreds of them along the Inka Road system. *Q'eswachaka*[4], the last Inka grass suspension bridge, stretches across a gorge high above the Apurímac River in Peru and has been in continuous use for 500 years. The bridge is 100 feet (30 meters) long and is suspended 50 feet (15 meters) above the river. It is made of grass fibers, vines, and other organic materials. Every year, 1,000 villagers from four neighboring Quechua communities gather, twist, and braid by hand a native grass to make 10 miles (16 kilometers) of rope and then work communally over four days to rebuild the bridge. Asking permission of the *Apus*[5]or sacred mountains and making offerings to *Pachamama*[6]or Mother Earth are important activities that take place in concert with the rebuilding of the bridge. The community also holds a feast to celebrate the new bridge. Q'eswachaka is a key component of the Qhapaq Ñan and a masterpiece of Inka engineering. It also serves as an important example of sustainable engineering—a living expression of the knowledge, practice, and traditions that have been transmitted through generations of Quechua people in the Andes for the benefit of the community.

In addition to a complex road system, monumental architecture, and suspended grass bridges, the Inka applied innovations to terraced agriculture, sophisticated water management and food storage infrastructures, and the domestication of thousands of varieties of potatoes and hundreds of varieties of quinoa and corn. Entire cities were dedicated to developing and experimenting with innovations in water management for drinking and crop irrigation. Crop diversification was essential to ensure plenty of food for millions of people throughout the geographically diverse Inka Empire. Inka innovations were also applied to food preservation, storage, and distribution. Today, indigenous Andean communities are proud of their heritage and still live sustainably and in balance with the natural environment, utilizing many of the great accomplishments of their ancestors.

[4] Q'eswachaka means "braided grass bridge" in the Quechua language.
[5] Apu is a "mountain god or powerful mountain spirit" for the Andean people.
[6] Pachamama is "the earth-mother goddess" of the Andean people.