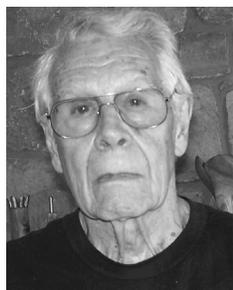


Alexander von Humboldt

By Fred Oppenheimer



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In 1953-54 he had served in the US Air Force in Korea as a navigator flying aerial reconnaissance, night photography, and ECM missions. After his discharge, he continued to serve in the US Air Force Reserve, attaining the rank of Lieutenant Colonel.

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He has been a member of Torch since December 2001. His talk on Humboldt was presented in December 2015.

Few Americans today have heard of Alexander von Humboldt, but 200 years ago he was one of the two most famous men in the world, along with Napoleon. When he visited President Jefferson in 1804, he and his companion Aimé Bonpland had just completed a 6000-mile, five-year expedition of discovery of Latin and South America that would redraw the map of the Americas. He conducted the first scientific exploration of the Andes mountains and the Orinoco river, collected more than 60,000 plant and animal specimens, set an altitude record climbing the highest known mountain in the world at that time, gathered information about the indigenous tribes of South America, including the grammar and vocabulary of their languages, and inspired scientists like Charles Darwin.

Humboldt was born in Berlin in 1769. His father had been an officer in the army of Frederick the Great, his mother a wealthy heiress of French background. His brother Wilhelm, two years older, would also become famous as a philosopher and linguist and would found the University of Berlin. In return for his service to Frederick the Great, Humboldt's father was made a royal chamberlain, giving him unlimited access to the palace. Once when young Alexander was along, Frederick asked him, "Well, young man, are you going

to be like your namesake, the great Alexander and conquer worlds?" He reportedly answered, "Yes, Sire, but with my head" (Helferich 5).

While Humboldt was studying at the University of Göttingen, a friendship with Georg Forster, who had been with Captain James Cook on Cook's second voyage, awakened in Humboldt the desire to be a scientific explorer. His mother's wishes redirected him to civil service, and by age 24 he was Director in the Prussian Ministry of Mines. During his spare time, with his insatiable thirst for knowledge, he studied mathematics, foreign languages and chemistry. In 1794, while visiting Wilhelm, he was introduced to his brother's circle of friends, which included the two foremost German poets, Goethe and Schiller. Goethe said of him, "In eight days of reading books, one couldn't learn as much as what he gives you in an hour" (qtd in Wulf 28).

The death of his mother in 1796 left him a wealthy man, free to fulfill his dream of travel. In Paris he met a young botanist, Aimé Bonpland, who was also interested in scientific travel. In Madrid, a minister at the Spanish court convinced the two young naturalists to explore South America. Humboldt made a favorable impression on the King, who hoped Humboldt's knowledge

of minerals might enable him to discover new sources of wealth for Spain, and he and Bonpland departed June 4, 1799 on the *Pizarro*. They had with them, in 42 velvet-lined boxes, the most advanced and accurate instruments in the world at that time: telescopes, chronometers, sextants, an artificial horizon, a barometer/altimeter to determine altitude, thermometers, and more.

* * *

They landed first on the island of Tenerife, stopping long enough to climb the 12,200-foot volcano Pico el Teyde. As they were sailing from from Teneriffe to the coast of South America, typhoid fever broke out on board and spread so rapidly that they decided to leave the ship at Cumaná, Venezuela, and await the arrival of another ship to continue their course to Cuba and Mexico. This bad luck became a fortuitous blessing: “Instead of a few weeks, we remained a whole year in this part of the continent; had not the fever raged on the *Pizarro*, we should never have reached the Orinoco, the Cassiquiare, and the Rio Negro” (*Personal Narrative* II, 35). José, the first native he met on their arrival, would remain with him as his guide for the next two years and give him much valuable information about the country, the plants and the animals.

What did Humboldt do during his unplanned visit to Venezuela? He observed with his instruments that the marine charts were in error both as to longitude and latitude by as much as 15-20 miles. On observing the slave market in

Cumaná, he became a lifelong opponent of slavery. He made detailed measurements during an earthquake. In Caracas, he climbed Mt Avila with the Venezuelan poet and statesman, Andrés Bello, who would later be the teacher of Simón Bolívar. They then headed south across the Llanos, the vast grasslands of Venezuela, home to deer, crocodiles, jaguars, and capybara. On José's advice they lined their hats with leaves to protect themselves from the extreme heat of the sun, which would regularly reach 104 degrees or above.

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From José, he had heard of the electric eels that inhabit some of the streams. Having conducted many experiments with electricity, he was interested. In Calobozo he found some natives to take him to a river containing eels. Driving horses into the water to stir up the fish that habitually buried themselves in the mud, he learned not only that the charge could go through several

men holding hands, but also that the fish could aim the charge and control the strength as needed to stun various prey without touching it.

On the Orinoco they traveled in dugout canoes, 40-50 ft. in length, some with a sail. One day they were hit by a violent gust of wind that broke the mast and swamped the boat, endangering the instruments. Another gust righted the boat again, and they were able to save their notes and specimens. The natives shook their heads in amusement at the “blancos” who were more worried about their books than about saving their own lives. It was Humboldt and Bonpland who found the link between the two largest river systems in South America, the Orinoco and the Amazon—a link that had been reported but not previously confirmed.

Humboldt observed and described vegetation and animals on the banks: birds small and large, monkeys, crocodiles (some up to 24 feet long), fresh water dolphins, manatees, and capybaras, favorite prey of the jaguars. A talented artist, he could sketch anything they could not transport. They also encountered caribes (pirhana), which, although only five inches long or so, could tear chunks of flesh from waders' legs with their powerful jaws and sharp teeth.

Humboldt was fascinated with the jaguars as he observed them coming to the water's edge to drink. The natives told him jaguars would not enter the water to attack men in a boat, but they would enter the water to take the smaller crocodiles, the

jacare cayman. To keep the jaguars away, they always made fires at night. The sounds in the night were loud and terrifying—jaguars would roar, howler monkeys would join in, birds would shriek. He loved it. It was like a rain forest symphony.

One day as he was walking along the riverbank collecting plants, he suddenly came upon a large jaguar, crouched over an animal it had just killed. Remembering the natives' warning against making eye contact, he kept his eyes straight ahead and nervously backed away. One night a guide unwittingly threw his bedding on the back of a crocodile that had buried itself in the sand and suddenly sprang into action. Mosquitoes were a constant plague, so bad the party had to wear masks to keep them from flying into their mouths and nostrils. Nonetheless, although he had been rather frail during his youth, Humboldt writes, he had never felt better in his entire life than during this journey.

They frequently encountered cataracts; Humboldt would measure the speed of the current, the depth of the water, the length and height of the rapids, and the degree of fall of the river. They often stayed at missions along the river, where they were treated hospitably and generously, but where they sometimes observed mistreatment of natives by missionaries who used them as slaves. After what he had observed in Cumaná, he detested slavery. He was told of raiders conducting illegal incursions into native territory, destroying their crops, burning their huts, killing those who resisted, and carrying

off women and children to work as slaves in the missions. One missionary explained, “the voice of the gospel is heard only where Indians have also heard the sound of gunfire” (*Personal Narrative* IV, 542).

The two-volume work he later published was banned in Cuba because of his criticism of the slavery there.

In Esmerelda on the upper Orinoco, he studied curare upon observing the natives making poison for their blowgun darts from the plant. He learned it can be ingested and is only lethal if it enters the blood stream, causing paralysis and then death by asphyxiation. As he was transporting a vial to take back, some leaked onto his stockings. Had he not discovered it in time, it could have been lethal, since he had some cuts on his legs.

* * *

Humboldt and Bonpland did eventually get to Cuba, where they divided their specimens into three parts to increase the chances of their survival, storing one part in Cuba and shipping the rest back to Europe in two separate ships (unfortunately, one of the ships wrecked off the coast of

Africa). Measuring the latitude and longitude, Humboldt corrected the maps of Havana. He also examined the island's population, its commerce and its finances. The two-volume work he later published, *Political Essay on the Island of Cuba*, was banned in Cuba because of his criticism of the slavery there.

Learning that Captain Nicholas Baudin's postponed expedition, which he had originally hoped to join, had finally been financed and would now sail, Humboldt set his sights for Lima, hoping to catch Baudin there. In 1801 he and Bonpland journeyed overland from Cartagena to Bogotá, again in canoes, again plagued by mosquitoes. After crossing the Andes at twelve thousand feet and arriving at Quito, Humboldt learned that Baudin had sailed by way of the Cape of Good Hope rather than by that of Cape Horn, giving him half a year to spend climbing and examining the major volcanoes near Quito, including Antisana, Cotopaxi and Pichincha—all active. On Pichincha he lay on a shelf inside the crater observing the flames within while the volcano rumbled and trembled every few minutes.

At this time Humboldt, probably the most experienced mountain climber in the world, earned universal fame by climbing Mt. Chimborazo, considered the highest mountain in the world at the time. Without oxygen, leaving their mules and porters at 15,000 feet, sometimes unable to see their own feet because of the clouds, and crawling on all fours across narrow

ledges, Humboldt and companions set up his altimeter every few hundred feet and determined that they had reached an altitude of 19,286 ft, a world record at the time. An impassable ravine forced them to turn back.

They traveled 1000 miles across the Andes to Lima, discovering the magnetic equator on the way. In Lima he studied the Incas, observed the transit of Mercury, and studied the properties of guano, which the natives had been using as a fertilizer for centuries.¹

Measuring the water temperature while sailing north along the coast of Peru, he discovered a cold current rich in plankton; the most productive marine ecosystem in the world, yielding about 20% of the world's fish catch, it was named the "Humboldt Current" despite his objections.

As he was preparing to sail to Mexico, he learned Cotopaxi was starting to erupt 200 miles away. He desperately wanted to go there to observe the eruption, but there was not enough time; they had booked passage and wanted to avoid the hurricane season. In agony he chose to sail, hearing the volcanic explosions as they sailed up the coast.

He spent a year in Mexico traveling to the major cities, visiting libraries and studying historical documents as well as climbing the newly formed volcano, Jorullo. His two-volume work *Political Essay on the Kingdom of New Spain* contains a wealth of material on the

geography and geology of Mexico, descriptions of its political, social, and economic conditions, and extensive population statistics. In addition to studying the Aztec civilization, he studied the customs of the native population, including mortality rates based on occupation, effectiveness of inoculation, longevity as a result of agricultural practices, birth control of some native groups, treatment of women, and reasons for converting to Christianity. He also studied the feasibility of a canal connecting the Atlantic and the Pacific, something he later discussed with Thomas Jefferson. (The Panama Canal would be built 100 years later.) The book was so well received that President Benito Juarez would bestow honorary Mexican citizenship on Humboldt.

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From Mexico they sailed to Havana, where he retrieved the materials he had stored there before sailing to Philadelphia to address the American Philosophical

Society. Here he received an invitation from Thomas Jefferson to be his guest at the White House for several weeks. On the 4th of June 1804, Jefferson hosted a dinner for Humboldt and his travel companions, including the artist Charles Willson Peale, founder of the Philadelphia Museum, who would paint Humboldt's portrait. Jefferson's *Notes on Virginia* was well known to Humboldt, and Jefferson, who had just completed the Louisiana purchase and sent Lewis and Clark on their voyage of exploration, had reason to meet the 34-year old Prussian "baron" who according to the American Consul in Havana possessed much valuable information about Mexico, especially concerning the borders between Mexico and the newly acquired lands. Humboldt gladly let them copy his charts, which were of great interest to Jefferson and Madison. His friendship with Jefferson would last until Jefferson's death.

When Humboldt returned to Paris, at that time the scientific and cultural capital of the world, he was greeted like a conquering hero. His brother had kept the press informed with regular reports of his journey, and everyone wanted to see this man who had travelled through jungles and on wild raging rivers, had climbed the highest mountains and peered down into volcanoes. Shortly after his return, he started presenting lectures of his journey to the National Institute of Science and Art. His plant collection was exhibited at the Jardin des Plantes while the Bureau of Longitude reviewed his astronomical and barometric measurements. One

French scientist remarked, “this man combines an entire academy in himself.”

In Paris, Humboldt met Simón Bolívar, who told him he had made him proud of his continent and considered him the true discoverer of South America. They discussed the likelihood of the colonies being liberated from Spain.

One man who was not enthusiastic about his presence in Paris was Napoleon, who was about to be crowned emperor. He disliked Humboldt for stealing the spotlight from him. Because of Humboldt’s Prussian nationality, Napoleon thought he was a spy and had him followed by his secret police, even ordered him to be evicted from France. A friend of Humboldt’s was able to persuade him that he was not a spy, so the order was rescinded.

* * *

Humboldt’s *Personal Narrative of Travels to the Equinoctial Regions of the New Continent*, which he wrote in French, was translated into English in seven volumes in 1829. A student at Cambridge, Charles Darwin, read it on the recommendation of John Stevens Henslow, a Professor of Botany and Geology, and the book changed Darwin’s life completely, inspiring in him a desire to go on a scientific journey of his own. When Henslow was asked to join Capt. Fitzroy’s expedition to South America on the HMS *Beagle*, he recommended that Darwin go in his place. Darwin later said that had it not been for Humboldt, he

would never have boarded the *Beagle*. Henslow’s parting gift to Darwin was a set of Humboldt’s *Narrative*, which he took with him on the voyage.

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Eventually Humboldt had to return to Berlin. He regarded it as an intellectual backwater, but King Frederick William III wanted him there, and as he was running low on funds, he decided to accept the stipend the king offered. The king gave him quite a bit of freedom for research and periodic travel to Paris, but required a daily audience with him, taking advantage of his widespread knowledge by using him as his personal encyclopedia. Humboldt had a prodigious memory and seemed to know everything. In 1826, Goethe, himself a polymath, said of Humboldt, “I have known him for years, yet I continue to be amazed. He has no equal in knowledge and lively interests. No matter the subject, he is at home in all. He is like a fountain with many spouts, you need only hold a pitcher to any of them and it will pour forth inexhaustibly.”² His curiosity was insatiable; he wanted to know everything.

In 1829, invited by Czar Nicholas I to undertake a journey of exploration through Russia, he travelled 12,000 miles by coach, sometimes 100 miles in a day. His escorts were amazed at the fitness and endurance of this 59 year old, who could walk for hours without showing signs of fatigue. He celebrated his 60th birthday drinking tea with a man who would become the grandfather of Vladimir Lenin. Alexander Pushkin, greatest of Russian poets, was enthusiastic about Humboldt’s visit. Upon reaching the border with China, he departed from the prescribed itinerary by crossing the border and exchanging gifts with the Chinese officials, drinking fermented mare’s milk with the Kyrgyz in their yurts.

* * *

Having become aware how many sciences were linked to one another, how botany and zoology were dependant on climate and geography as well as geology, he wanted to write a book on the interconnectedness of all fields of knowledge with the world’s environment. He chose the title *Kosmos*; it was he who revived this ancient Greek word.

For the book, which was loosely based on the lectures he had given previously at the University, he enlisted experts in various fields from history, literature, philosophy and the sciences, usually several in each field, to contribute data. Most of them were happy to contribute and read proofs while he put it all together. Indeed, his reputation was so great at this time that a recommendation from him could

assure an aspiring scientist's future. Volume I was published in German in 1845 with 20,000 copies and was an instant best seller. Reprints were required immediately, with translations into eleven languages. Volume II followed in 1847. By 1849, 40,000 copies had been sold in England as well as many thousands in the U.S. (Wulf 245-48). People fought over copies, and soon a number of unauthorized translations appeared. Darwin was pleased to find himself and *Voyage of the Beagle* mentioned very favorably.

In 1859, at the age of 89, Humboldt suffered a stroke and died a few days later. He was given a state funeral that surpassed any given to the greatest military heroes. In 1869, on the centennial of his birth, thousands of people the world over celebrated his memory, 25,000 assembling in Central Park for the unveiling of his bust, 80,000 in Berlin, thousands more in Paris and London.

Humboldt coined words like Jurassic, developed the concept of isotherms (now a regular feature of weather maps), and was the first to study systematically temperature lapse rate, noting the decrease in temperature with the increase in altitude. He believed that Africa and South America were once joined, a supposition later confirmed by plate tectonics. Humboldt inspired not only scientists (Darwin, Charles Lyell, Louis Agassiz) but also artists (Frederick Church) and writers (Ralph Waldo Emerson, Walt Whitman, Henry David Thoreau, Edgar Allen Poe). Environmentalist John Muir

made a pilgrimage to Humboldt's gravesite in Berlin; because of his warnings regarding deforestation and its effect on climate change, Humboldt has been called the first environmentalist.

Cities the world over, including in eight U.S. states, are named after him, as well as streets, parks, rivers, mountains, schools, 300 plant and 100 animal species, and even a surface on the moon.

Ironically, he had spent the remainder of his fortune on the publication of his books, which were now so expensive, he could not afford to buy them himself. He died penniless and in debt, leaving all his belongings to his servant who by then had been working for him without pay.

NOTES

¹ Subsequent to his introduction of guano as a fertilizer in Europe, it is estimated 20 million tons were shipped from Peru to Europe and the U.S.

² Goethe made this remark to his secretary, Johann Peter Eckermann, who quoted it in the edition of Goethe's correspondence with the Humboldt Brothers, *Briefwechsel mit den Gebrüdern von Humboldt* (Leipzig, 1876). The translation is by the author.

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