Anniversaries

Humboldt in Mexico 220 years ago

THE 1803 EXPEDITION OF ALEXANDER VON HUMBOLDT IN MEXICO

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Fig. 1. Alexander von Humboldt portrait by Rafael Ximeno y Planes, 1804.
Manuel Tolsá Museum.
Courtesy of the General Directorate of University Heritage UNAM.
Photography: Javier Otaola Montage.

The Prussian explorer and humanist, Alexander von Humboldt (Fig. 1) was a pioneer of modern geological studies on Mexico. Born in Berlin on September 14, 1769, into a wealthy and noble family, he and his brother Wilhelm received a meticulous early education in their hometown, before going on to study at the University of Frankfurt.

He made further studies at the Freiberg Mining Academy in Saxony from 1790 to 1791 with one of the founders of modern geology, Abraham Gottlob Werner (1749–1817). Some of Werner's students travelled to New Spain in the Americas. These included Friedrich Traugott Sonneschmid (1763–1824), Fausto de Elhuyar (1775–1833), Andrés Manuel del Río (1764–1849), among others (Stevens-Middleton 1956; Beck 1966).

Between 1792 and 1796 Humboldt served as a mining official, made trips to Italy and Switzerland, arriving in early May 1799 together with Aimé Bonpland (1773–1858) in La Coruña, Spain. On June 15, 1799, he departed to begin his great project: The American journey (1799–1804), which he self-financed with his inheritance. He set out to investigate the nature of the New World travelling through the present-day territories of Venezuela, Cuba, Colombia, Ecuador, Peru, Mexico and United States of America (Echenberg, 2017; Rubinovich 1997).

On March 22, 1803, Humboldt and Bonpland landed in Acapulco to start their journey through the present-day states of Mexico, Guerrero, Morelos, Michoacán, Guanajuato, and

Mexico City, where he spent eleven months gathering information from local intellectuals, libraries and archives. In fact, Humboldt was the first foreigner to consult the archives with permission from the Spanish Crown.

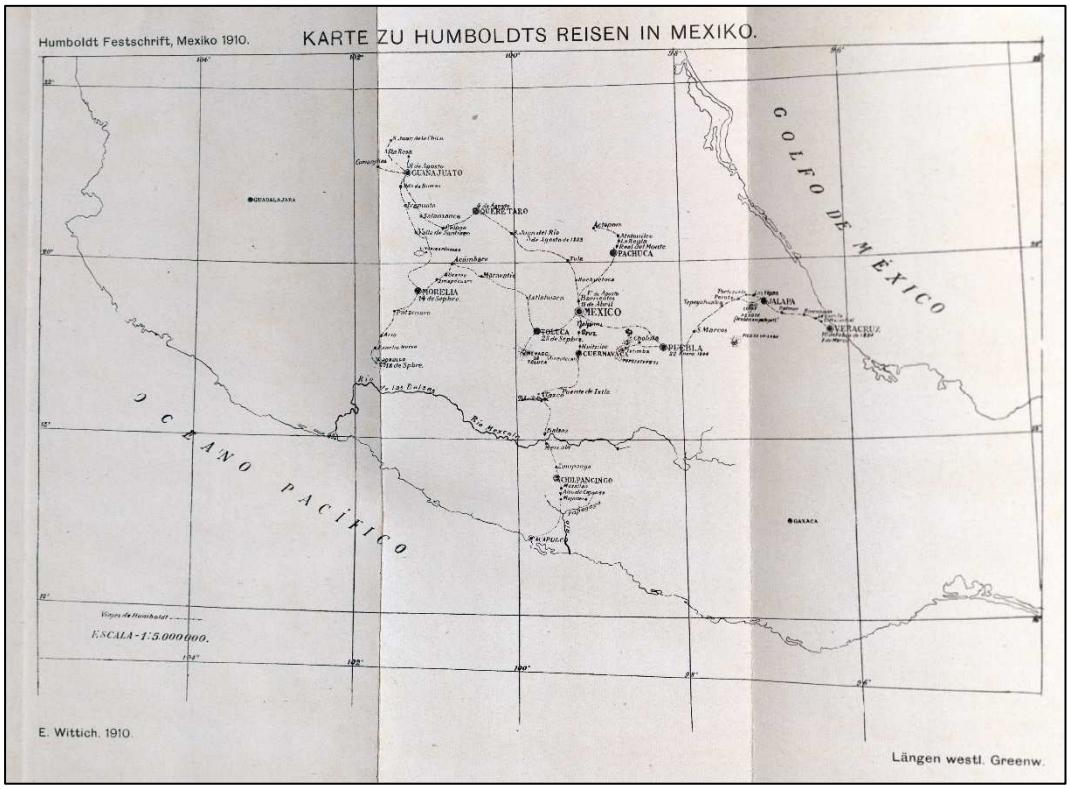
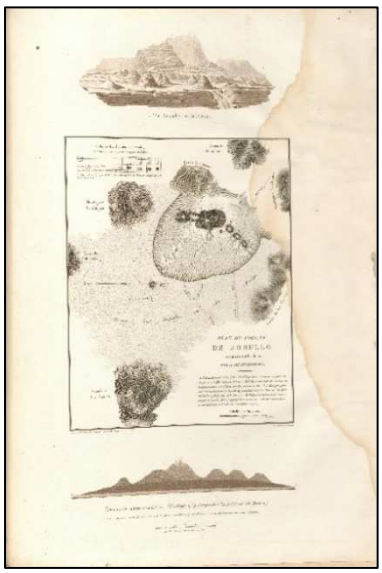


Figure 2. Map of Humboldt's travels in Mexico. Source: Wittich et. al. 1910.

Humboldt made Mexico City his temporary home and starting point for his excursions throughout New Spain. During his stay in the city, he took the opportunity to visit the surroundings, the hill of Chapultepec, the Sierra de Guadalupe [Guadalupe Range], the Peñón de los Baños and the Pedregal of the Xitle volcano. He visited, depicted and studied the central part of Mexico, between the Pacific and Atlantic oceans, paying special attention to volcanoes, mines and geological phenomena (Wittich et al. 1910) (Fig. 2).



He observed, studied, and analyzed geological features such as the Jorullo volcano in Michoacán and the volcanoes of Puebla (Fig. 3); the Basaltic Prisms [columnar basalt] made of igneous rock of the area of Santa María Regla, a Historical Marker now forming part of Comarca Minera, Hidalgo UNESCO Global Geopark.

Figure 3. Plan of Jorullo volcano, outlined in place by Alexander von Humboldt. Source: *Voyage de Humboldt et Bonpland. Première partie, relation historique. Atlas géographique et physique,* 1814. Courtesy of Acervo Histórico del Palacio de Minería, Facultad de Ingeniería, UNAM.

He also prepared the first two geological profiles of America, which showed the arrangement and height of the 'primitive' rocks in Europe and America. The first represented the strata of primitive rocks in Europe and America, the second contained the distribution of secondary rocks on both continents (Wittich et al. 1910). (Stevens-Middleton,1956) (see Fig. 4).

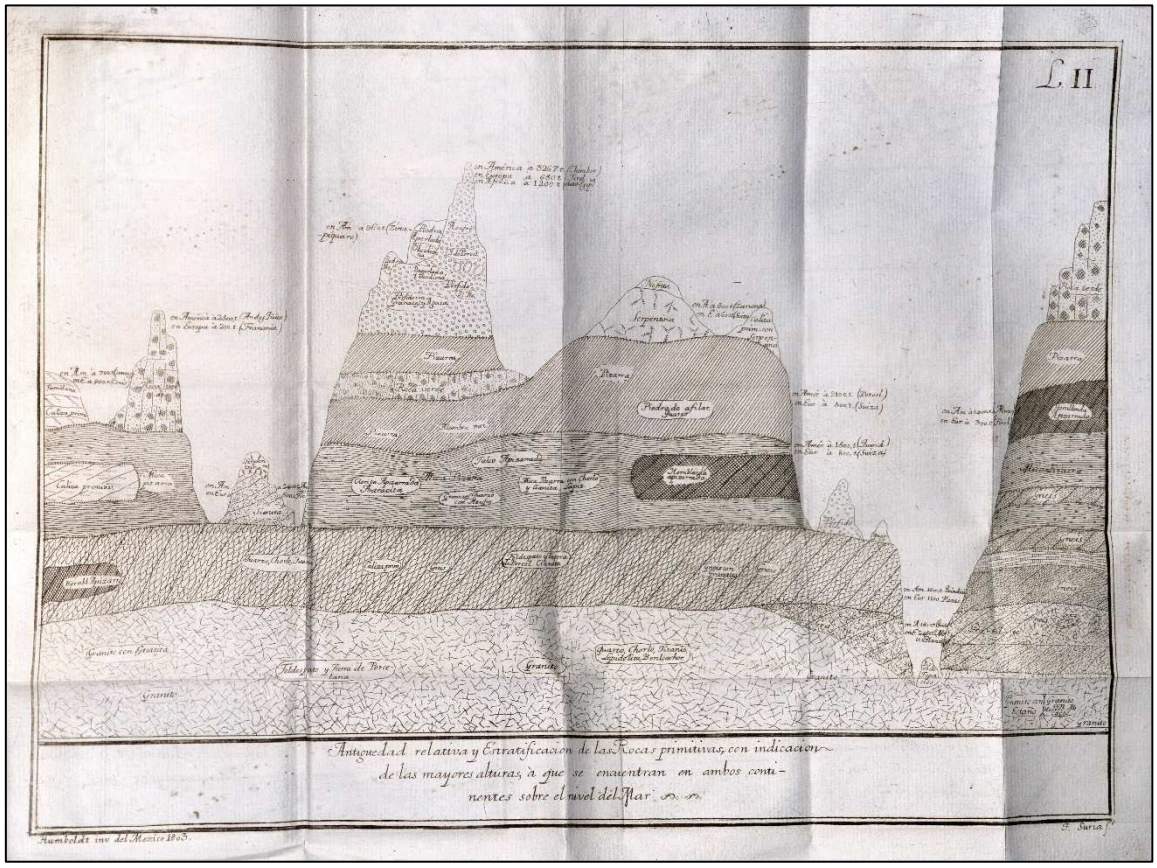


Figure 4. Geological section showing the layers of the earth's crust.
Engraving by F. Suria, after the drawing by Alexander von Humboldt, 1803. Source: Andrés Manuel del Río, *Elements of Orictognosia*, 1805. Courtesy of Acervo Histórico del Palacio de Minería, Facultad de Ingeniería, UNAM.

In 1803 Humboldt also encountered his classmate from Freiberg, Andrés Manuel del Río, who was professor of Mineralogy at the Royal Seminary of Mines in Mexico and had become famous by discovering Vanadium in 1802. Del Río and many others were interested in science and provided Humboldt with valuable collaboration and guidance for his travels and research in Mexico. Later, in 1805, within the second volume of *Elementos de Orictognosia* by Del Río, a short treatise by Humboldt entitled *Introducción a la Pasigrafía geológica* [*Introduction to Geological Pasigraphy,* originally written in French] was included, where he developed a method of geological description using a universal graphic language of lines, points, arrows and other symbols to represent rocks and strata that formed Earth´s crust. Humboldt departed New Spain on March 7, 1804 (Wittich et al. 1910).

Humboldt made great discoveries regarding American geology from a global perspective, a consequence of his training with Werner, at the time he embraced the Neptunist theory to explain the phenomena of Earth´s history. Yet, after his travels around the world, the systematization of knowledge, and the development of new scientific hypotheses, the Prussian scholar came out in favor of the volcanic origin of basalt and other terrestrial products (Leitner 2002). He expressed his global vision of the natural world in his work *Cosmos: A Sketch of a Physical Description of the Universe* (translated into Spanish between 1851 and 1852).

His main contributions to geology include the formulation of theories about the unity of geological processes that he maintained in his *Essai Géognostique Sur les Gisements des Roches dans les deux Hémisphéres*; he hypothesized a volcanic rift along the 19th parallel in Mexico; additionally he was one of the first to distinguish between volcanic and plutonic tremors; he drew the mountain ranges on the map of New Spain; he started using vertical projections, with which he represented the "mass" of the mountain ranges; carried out applied geology work, highlighting the studies on the problem of the drainage of the Valley of Mexico and wrote the most complete and precise Mexican mining studies made at the time, which later served as a guide to foreign investment after Mexico´s Independence from Spain in 1821 (Aguilera, 1905).

He wrote thousands of letters and various scientific texts during his lifetime; he established a model of “research voyage” that would have a strong influence on later scientists and travelers. An example is his *Political Essay on the Kingdom of New Spain* (1811), these writings inspired several explorers, painters and entrepreneurs that came to study and work Mexican mineral resources. As a part of the First Centenary of Independence of Mexico celebrations in 1910, the German Colony erected a statue in his honor. He passed away at age 90, on May 6, 1859, in Berlin.

Further Reading

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