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Immanuel Kant, Alexander von Humboldt and the Tequendama Fall. Two Prussians linked by Geography

ABSTRACT

Immanuel Kant mentions in his Physical Geography the waterfall of the Bogotá River in South America, known today as the Salto de Tequendama, which is located near Bogotá, the capital city of Colombia. Kant claims that this was the highest waterfall in the world, which is not true. Alexander von Humboldt could not know anything about it, but he visited the Salto in 1801, just before the publication of Kant's Physical Geography, and went to personally measure the height of the Salto. In this paper we make a comparison of both personalities who, unknowingly, were united by their interest in the Salto de Tequendama.

RESUMEN

Immanuel Kant menciona en su Geografía Física la cascada del Río Bogotá en América del Sur, conocida hoy como el Salto de Tequendama, que se encuentra cerca de Bogotá, la capital de Colombia. Aquí Kant afirma que esa era la caída de agua más alta del mundo, lo cual no es cierto. Alexander von Humboldt no podía saber nada de eso, pero visitó el Salto en 1801, justo antes de la publicación de la Geografía Física de Kant, y fue a medir personalmente la altura del Salto. En este escrito hacemos una comparación de ambas personalidades que, sin saberlo, estuvieron unidas por su interés por el Salto de Tequendama.

ZUSAMMENFASSUNG

Immanuel Kant erwähnt in seiner Physischen Geographie den Wasserfall vom Rio Bogotá in Südamerika, der als Salto del Tequendama bekannt ist und in der Nähe der Hauptstadt Kolumbiens, in Bogotá, liegt. Dabei behauptet Kant er sei der Höchste Wasserfall der Welt, was nicht stimmt. Alexander von Humboldt dürfte von Kants Behauptung nichts wissen aber besuchte den Salto 1801, kurz bevor Kants Physische Geographie veröffentlicht wurde; er ging hin um die Höhe von Salto zu messen. In diesem Aufsatz werden beide Persönlichkeiten verglichen, da sie durch diesen Wasserfall verbunden wurden ohne es zu wissen.



On February 12, 1804, in Königsberg —former name of today's Kaliningrad in the Russian Federation, and then capital of Eastern Prussia— Immanuel Kant, for many of us the foremost and more influential modern age philosopher, died short of his eightieth birthday. That very same day, another Prussian, this one born in Berlin in 1769, was afar off, in Jalapa, Mexico, Xalapa-Enríquez to be precise, where he had arrived two days earlier. He was getting ready for his return journey. He most probably spent that last day on the back of a mule, binoculars and notepad at hand, whilst scrutinizing birds, insects, and plants, or measuring the atmospheric pressure in the vicinity of the Citlaltepēt̄l volcano, better known as Pico de Orizaba. From here, he traveled overland to Veracruz, where he set sail for Cuba, Philadelphia, and Washington, to be guest to Thomas Jefferson, third president of the United States of America, before returning to Europe, thus ending a five year expedition of intensive scientific research throughout the American continent's wasp waist.

In spite of the fact that both were first rate Prussian intellectuals (Fig. 1 and 2), they never met in person, yet both knew and were interested in each other's work, a fact attested in their respective works¹. Kant, the philosopher of Pure Reason, the philosopher of Categorical Imperative and Perpetual Peace lore, was forty-five years older than Humboldt, nature's examiner and explorer. Both were party to the *Berliner Aufklärung* —Berlin's Enlightenment—, and thus contributed to or profited from Prussia's Emperor Frederick the Great's (1712–1786) efforts to boost arts and sciences, efforts which led to his reputation as a worthy example of enlightened despotism.

Kant and Humboldt were both inquisitive, indeed very inquisitive minds, but each in peculiar ways, thus bringing forth interesting contrasts between them. Kant was a prolific and influential writer, creative in almost all philosophical and scientific areas, but led a sedentary life: his travels never exceeded thirty or so miles. In fact, he never left Königsberg, where he was born, brought up, educated and where he read, thought, wrote, received myriads guests, and finally died, not, however, before changing and enhancing philosophical thought in ways perhaps only comparable with what Aristotle had done 2100 years before. Of all the works of Kant, the one that seems most likely to influence not only Humboldt, but also the most outstanding scientists of his time, was undoubtedly the *Metaphysical Foundations of Natural Science*, published in 1786, a year before the second edition of the *Critique of Pure Reason*.

By contrast, Alexander von Humboldt was an unflagging traveler and hiker who rambled all over the Americas, Europe, and big parts of Asia, and in the meanwhile never lost an opportunity to measure, gauge, take note, inquire, collect and process relevant information regardless of the altitudes and longitudes of his whereabouts. His letters, reports, and travelogues, vouch for all of the above, together with his extraordinary and extensive five volume oeuvre entitled *Kosmos*, published from 1845 to 1862, which can, to all intents and purposes, be called a *summa* —in the proper medieval sense of the word— of all scientific research heretofore done in the known world: that and nothing less than that.

1 Everything seems to indicate that Humboldt knew the modern scientific-philosophical reflection caused by the ambiguity in the expressions "*Naturgeschichte*" (Natural History) and "*Naturbeschreibung*" (Description of Nature), in which both Kant and Voltaire had participated. See Helmreich 2009, p. 56. The modern world is more inclined to speak of a description of nature and tends to reject the very old expression "*historia naturalis*", which goes back to the famous work of Pliny the Elder, in the 1st century.



Fig. 1: Johann Gottlieb Becker (1720–1782). Immanuel Kant, 1768, Oil on canvas, 59 x 46 cm, Schiller-Nationalmuseum, Marbach am Neckar, Germany. Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Kant_gemaelde_3.jpg



Fig. 2: Friedrich Georg Weitsch (1758–1828). Alexander von Humboldt, 1806, Oil on canvas, 126 x 92.5 cm, Alte Nationalgalerie, Berlin, Germany, Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Alexandre_humboldt.jpg

Both men's fascination with geography and their respective contributions to this discipline are again just as interesting.² Let us start by saying that Kant was a genuine *Gelehrter*, a German word usually translated as sage and which, in Kant's case, can perfectly fall short if we really attempt to describe him: his wisdom was such that yes, he knew much about many things, but none superficially or lightheartedly... he examined the very depths of all issues he attended to. Yes, he is a sage among sages, throughout his writings we see what in German is known as *Gründlichkeit*, i. e., soundness, close attention, and assiduousness in thought and knowledge.

Furthermore, he managed to combine —a unique and perhaps unrepeatable task— intense and continuous university teaching with an enormous intellectual output, all of it of outstanding quality and impact. Professor for almost forty years, Kant lectured on many subjects and disciplines: natural sciences, physics, mathematics, logic, metaphysics, encyclopedic philosophy, ethics, natural law, pedagogy, natural theology, physical geography, and anthropology. As usual —and at the time compulsory, meaning, prescribed by Prussian authorities—, he gave his lectures based on extant texts and handbooks but, as many of his disciples later recalled, he easily set them aside to teach from his own material. The posthumous publication of his lessons attest the freedom with which he broadened, criticized, and reframed the theories of authors considered untouchables in Prussia at the time, *id est*, Alexander Gottlieb Baumgarten (1714–1762) and Christian Wolff (1679–1754).

2 See Hartshorne 1991.

The theologian and literary critic, Johann Gottfried von Herder (1744–1803), one of Kant’s disciples later to exert powerful influence on German Romanticism, who in his youth was a great enthusiast of Kant and in his maturity a prominent critic and contradictor of him, especially in relation to the Kantian conception of history, described as follows his by then beloved and admired *Herr Professor*:

In his lectures, the latest works of Rousseau, his *Emile* and his *New Heloise*, were studied with the same enthusiasm with which works by Leibniz, Wolf, Baumgarten, Crusius, and Hume were analyzed or the natural laws of Kepler, Newton, and other physicists examined. He honored any new discovery in natural sciences he got news of, and used it to emphasize nature and human moral standing. His lessons and manners were fueled and informed by his knowledge and interest in both human and natural history, as well as by the pleasure he derived from doctrine on nature, mathematics, and in broader terms, from all knowledge derived from experience. Nothing worth knowing escaped his attention. No superstition, sect, favor, or ambition stopped his search for truth. Think for yourselves, was to be his pupils motto; nothing more alien to him than despotism.³

In Kant’s very interesting biography by Russian writer Arsenij Gulyga, the latter highlights a fact which I think has not been sufficiently stressed: Kant was one —if not the first— academic in Europe to teach geography as a proper autonomous discipline at university level. This explains why he had little or no access to handbooks or textbooks previously approved by Prussian authorities.⁴ Thus, Kant, who gave geography lessons from 1756 to 1796, was forced to impart this discipline based on his own readings, basically travel accounts or descriptions by better skilled geographers. As laid down by Gerd Irrlitz’ study of Kant’s life and oeuvre, the philosopher delivered the physical geography course on 48 occasions, the last one during the summer of 1796.⁵ It was based on the aforesaid lectures that finally, in 1802, Friedrich Theodor Rink edits and publishes, “...upon request by the author... and partly revised by the editor,” i. e. Kant’s *Physical Geography* (Fig. 3). It was one of his last works published in life. It is still to be translated into Spanish, but already included in volume IX of Kant’s oeuvre canon edition, published by the Prussian Academy of Sciences.

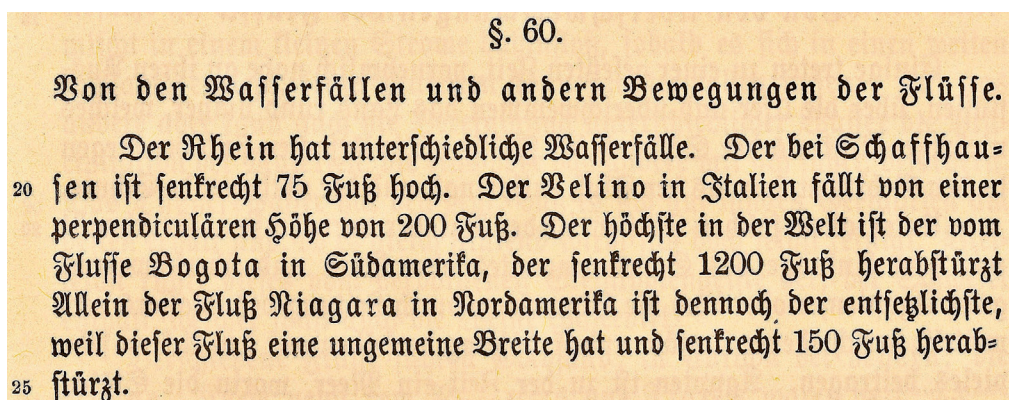


Fig. 3: Immanuel Kant, *Physische Geographie* § 60, 1802 (Kant, Immanuel. *Physische Geographie*. Gesammelte Schriften, Berlin und Leipzig: Walter de Gruyter, 1923). Biblioteca Mario Valenzuela, Pontificia Universidad Javeriana, Bogotá, Colombia.

3 Johann Gottfried von Herder, in Vorländer 1986, pp. 46–47. [Translation by Vicente Durán Casas]

4 Gulyga 1981, p. 39.

5 Irrlitz 2002, p. 92.

A significant historical-scientific query is that which asks for Kant's sources vis-à-vis his *Physical Geography*. Thanks to the *Akademie's* edition we can assert with acceptable accuracy which those sources were:⁶

- *Abhandlungen der Kgl. Schwedischen Akademie in Stockholm*. 1749 ff. 40 Bde.
- *Allgemeines Magazin der Natur, Kunst und Wissenschaften*, Leipzig 1753–67. 12 Bde.
- Buffon: *Allgemeine Historie der Nature*, Hamburg und Leipzig 1750 ff, 11 Teile.
- Gmelin: *Reise durch Sibirien*. Göttingen 1752.
- Halle: *Naturgeschichte der Thiere*. Berlin 1757.
- *Hamburger Magazin, oder gesammelte Schriften zum Unterricht und Vergnügen aus der Naturforschung und den angenehmen Wissenschaften überhaupt*. Leipzig 1748–62.
- Justi, *Grundriss des gesamten Mineralreichs*. Göttingen 1757.
- Keyssler, *Neueste Reise durch Teutschland, Böhmen, Ungarn, etc.* Hannover 1740.
- Kolb, *Beschreibung des Vorgebirges der Guten Hoffnung und derer darauf wohnenden Hottentotten*. Frankfurt und Leipzig 1745.
- Ludolf, *Nouvelle Histoire d'Abissine ou d'Ethiopie*. Paris 1684.
- Lulof, *Einleitung zu der mathematischen und physikalischen Kenntniss der Erdkugel*; aus dem Holländischen übersetzt von Abraham Gotthelf Kästner. Göttingen und Leipzig 1755.
- Newton, *Philosophiae naturalis principia mathematica*. 1723.
- Pontoppidan, *Versuch einer natürlichen Historie von Norwegen*. 1754, 2 Bde.
- *Allgemeine Historie der Reisen zu Wasser und Lande*. Leipzig 1747–74.
- Salmon, *Die heutige Historie oder der gegenwärtige Staat von allen Nationen*. I u. II. Altona 1732.
- Salmon, *Die heutige Historie oder der gegenwärtige Staat des Türkischen Reichs*. Altona und Flensburg 1748.
- Varenius, *Geographia Generalis*. Amstelodami 1671.
- Gehler, *Physikalisches Wörterbuch*, 5 Theile. Leipzig 1787–1796.
- A.Fr. Büsching, *Neue Erdbeschreibung* I u. II. 1754.

When approaching Kant's *Physical Geography*, one finds something perfectly consistent with what at the time was considered any geographer's real task: descriptive geography. In the very introduction to his text, Kant puts forward the term *Erdbeschreibung* —earth's description— as synonymous with *physische Geographie*.⁷ Which says a lot, among other things because it contrasts sharply with what geographers currently do. Nowadays, geographers have more than enough reasons to disagree vis-à-vis the notion of limiting their discipline to a mere description of the natural and physical world, and justifiably focus mainly on the description of a whole set of interactions that take place between human beings, societies, cultures, nature and environments, thus thinning down and fading whichever methodological barriers could arise between geography and history, between ecology and society, to finally flow into the vast and appealing sea of interdisciplinary research.

Which is not precisely what we are to find in Kant's geography textbook, whereby he seems to be utterly convinced that each science differs from all others, even when closely related. History and geography, for example, share the transmission of foreign experiences and knowledge,

6 This bibliographic list has been transcribed without alteration from the primary source.

7 Kant 1923, IX, p. 157.

but differ in how they convey it, *id est*, history, via narrative, and geography, via description. The latter, in turn, divides up into the description of singular loci (topography), of regions (chorography), of mountain ranges (orography), and of lakes and rivers (hydrography).⁸

Still, it is possible to discern in Kant something like the roots of the interdisciplinary work nowadays demanded by the complex horizon envisaged by researchers of both nature and human societies. Thus, time and space, which in the *Critique of Pure Reason* are *a priori* forms of perception (with which we ponder phenomena), in Kant's *Physical Geography* they constitute the very crucial nuance which differentiates history from geography. Both are descriptions, surmises Kant, but in the case of history, the description of time, whereas in the case of geography, the description of space.⁹ Both disciplines broaden our knowledge of both space and time, and in geography's case, pending the subject studied, the discipline takes on different appellations: physical, mathematical, political, moral, theological, literary, or commercial geography.

After conveying these different ways of engaging geography, in compliance with each subject matter, Kant appends an interesting observation with which the philosopher sensed that, all in all, the abovementioned enumeration connoted one and only one reality where all things tend to merge. "The history (*Geschichte*) of what takes place at different times, and which strictly speaking constitutes what we call *Historie*," says Kant, "is essentially nothing but continuous geography (*continuirliche Geographie*)."¹⁰ Thus, history can be considered a continuation of geography; time, a continuation of space; events, a continuation of place; succession, a continuation of extension, and so forth. Interesting indeed, but let's get back to the main point.

After an engaging introduction where proper geographical knowledge is presented within its own particular framework, and after introducing the "mathematical preconceptions" required to study geography, Kant divides his work in three main parts: the first, deals with what we can call Earth's essential elements: water, land, and atmosphere, together with the fluctuations they have undergone and "continue underway." The second, is devoted to what in my youth was referred to as the mineral, plant, animal, and human kingdoms. The third and last part concerns what the author calls a summary account of interesting sites in different countries, ordered by regions, i. e., Asia, Africa, Europe, and the Americas.

Kant's *rendez vous* with Von Humboldt takes place in paragraph 37 of his *Physical Geography*. Regarding the philosopher's observations of the extant knowledge of the world's diverse countries and regions, when addressing the nations of southern America Kant seems to underscore how little is known about them:¹¹ "We can only hope that, thanks to Von Humboldt, we get to know more about an important part of South America."¹² Now, considering that Von Humboldt set sail for America on June 5, 1799, from the port of La Coruña, and that Kant's assertion was most probably written by mid-1801, we cannot but endorse the fascinating interest with which Kant gathered information coming from travelers and travel journals, from anything that would

8 Kant 1923, IX, p. 159.

9 Kant 1923, IX, p. 160.

10 Kant 1923, IX, p. 161.

11 Kant in note five to § 37: "Hoffentlich werden wir einen beträchtlichen Theil von Südamerika durch v. Humboldt näher kennen lernen."

12 Kant 1923, IX, p. 233.

broaden the knowledge of the world as was then known. Thus, the famed Kantian cosmopolitanism can't be reduced to political cosmopolitanism or international law's cosmopolitanism, in short, to a mere "epistemic cosmopolitanism"¹³ because we should rather talk, straddling one of his most original assertions, of the *idea of general geography in a cosmopolitan sense*.

Yet, this *rendez vous*, which was in fact no more than Kant's imprecise reference to Humboldt's voyage (at the time underway) to South America, heralds further encounters when we get to what Kant had to say on waterfalls in paragraph 60 of his *Physical Geography*: "The (River) Rhine," he writes, "has several (water)falls. The one near Schaffhausen (Switzerland) has a vertical height of 75 feet. The one in El Velino, Italy, drops 200 precipitous feet." Then, he adds: "The world's highest [fall] stands in the Bogotá River, South America, at a vertical drop of 1200 feet."¹⁴



Fig. 4: Frederick Edwin Church (1826–1900). Tequendama Falls near Bogotá, New Granada, 1854, Oil on canvas, 59 x 46 cm, Cincinnati Art Museum, Cincinnati, USA. Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Frederic_Edwin_Church_-_Tequendama_Falls,_Near_Bogota,_New_Granada.jpg



Fig. 5: Alexander von Humboldt (1769–1859) / Wilhelm Friedrich Gmelin (1745–1821). Chute du Tequendama, 1810, Engraving and etching on paper, 56.5 x 39.7 cm (Humboldt, Alexander von. *Vues des cordillères et monumens des peuples indigènes de l'Amérique*. Paris: F. Schoell, 1810, planche VI, opposite p. 19). Biblioteca General, Pontificia Universidad Javeriana, Bogotá, Colombia.

13 Höffe 2003, pp. 18 ff.

14 "Der Rhein hat unterschiedliche Wasserfälle. Der bei Schaffhausen ist senkrecht 75 Fuß hoch. Der Velino in Italien fällt von einer perpendiculären Höhe von 200 Fuß. Der höchste in der Welt ist der vom Flusse Bogota in Südamerika, der senkrecht 1200 Fuß herabstürzt." Kant 1923, IX, p. 279.

Kant was obviously wrong, or rather, wrongly informed. The Tequendama Falls, then a popular natural attraction for Nueva Granada's inhabitants, in fact is far from the world's highest cascade (Fig. 4 and 5). Where did he get that piece of information from? As the authorized publisher/editor of his work asserts, the philosopher picked it up from the work of the Dutch scientist Johann Lulof (1711–1768), *Einleitung zu der mathematischen und physikalischen Kenntnis der Erdkugel* ("Introduction to the Mathematical and Physical knowledge of the globe"), translated into German by mathematician Abraham Gotthelf Kästner (1719–1800) and published in Göttingen and Leipzig in 1755. We in fact accessed the digital version of the abovementioned work and endorsed Kant's editor's assertion that the philosopher gets wrong the famous Tequendama Falls' vertical height at 1200 feet. Furthermore, if we abide by the foot's length used in the Prussian Empire (*Reichsfuss*) in Kant's time, i. e. 313 millimeters¹⁵, the Bogotá river's waters, at the Tequendama spot, would fall from a height of 375.6 meters, figure by all means wrong.

Be it as it may, what neither Kant or his editor said —and we are entitled to guess that both did know—, is that Lulof did declare the source of his information, i. e., the *Relation abrégée du Voyage fait au Pérou par Messieurs de L'Académie Royale des Sciences, pour mesurer les Degrés du Méridien aux environs de l'Équateur, & en conclure la Figure de la Terre*, quoted by Lulof thus: "nach Herr Bouguer Berichte ... Voy[age]. au Pérou p.91." Let's have a look at the quote's inaccuracies and mistakes: "In South America," says Lulof, "the most outstanding of all known cascades, according to Bouguer's report, is the Bogotá river fall (15 or 16 miles from Santa Fe) which then flows into the Magdalena river; it [the fall] stands about 8 miles distant from the Magdalena [river], at a place called Tequendama; the water falls from a height of 200 to 300 *toisen*, and this scary fall is perpendicular."¹⁶ Kant's editor in fact specifies that Lulof notes "a height of 200 to 300 *toisen*,"¹⁷ not 1200 feet. Now, if we acknowledge that one *toise* amounts to 1.9 meters, Lulof would have established the Tequendama's height at something between 389 and 584 meters, figure still quite removed from the Tequendama Falls' real height.

We have not been able to access Bouguer's text proper, but we did find out that, even though he never visited either Bogotá or the Tequendama site, he did know the Magdalena River quite well, so much so that he carried out some of the river's first topographical surveys.¹⁸ What we can gather from this quick inquiry is that, in Kant and Von Humboldt's time, there was no precise measurement (at least not one within reach of European readers interested in geography) of the Tequendama Falls' height, that once striking natural sight of the Bogotá river that today, two hundred years later, has been sadly turned into a dismal spectacle due to the river's pollution, in turn converted into the sewer of a city oblivious to the river's and the relevant communities' welfare.

Nevertheless, not many know that, a few days before the publication of Kant's *Physical Geography* (1802), on July 7 of 1801, Alexander von Humboldt reached Bogotá, the capital city of the Viceroyalty of Nueva Granada, then called Santa Fe for short, a quiet town of about 30,000 inhabitants. One of Humboldt's reasons to visit Bogotá was no other than to make the acquaintance of José Celestino Mutis (1732–1808), the eminent sage, physician, and scientist from Cadiz

15 See the useful and complete "German obsolete units of measurement" at http://en.wikipedia.org/wiki/German_obsolete_units_of_measurement#Fu.C3.9F_.28foot.29 (checked on 05/02/2018).

16 Lulofs 1775, p. 351.

17 Kant 1923, IX, p. 557.

18 See Espinosa 1989.

who, in 1760, arrived from Spain as Viceroy's Pedro Messía de la Cerda's personal physician. In Bogotá Mutis was ordained priest in 1772 and in the meanwhile strengthened his knowledge and enthusiasm for natural sciences, botany in particular. When Humboldt arrived, Mutis was 69 years old and the old man held the esteem and admiration of worldwide renowned scientists such as the famous Swede botanist Carl Linnaeus (1707–1778), with whom he kept a fruitful and prolific correspondence.¹⁹

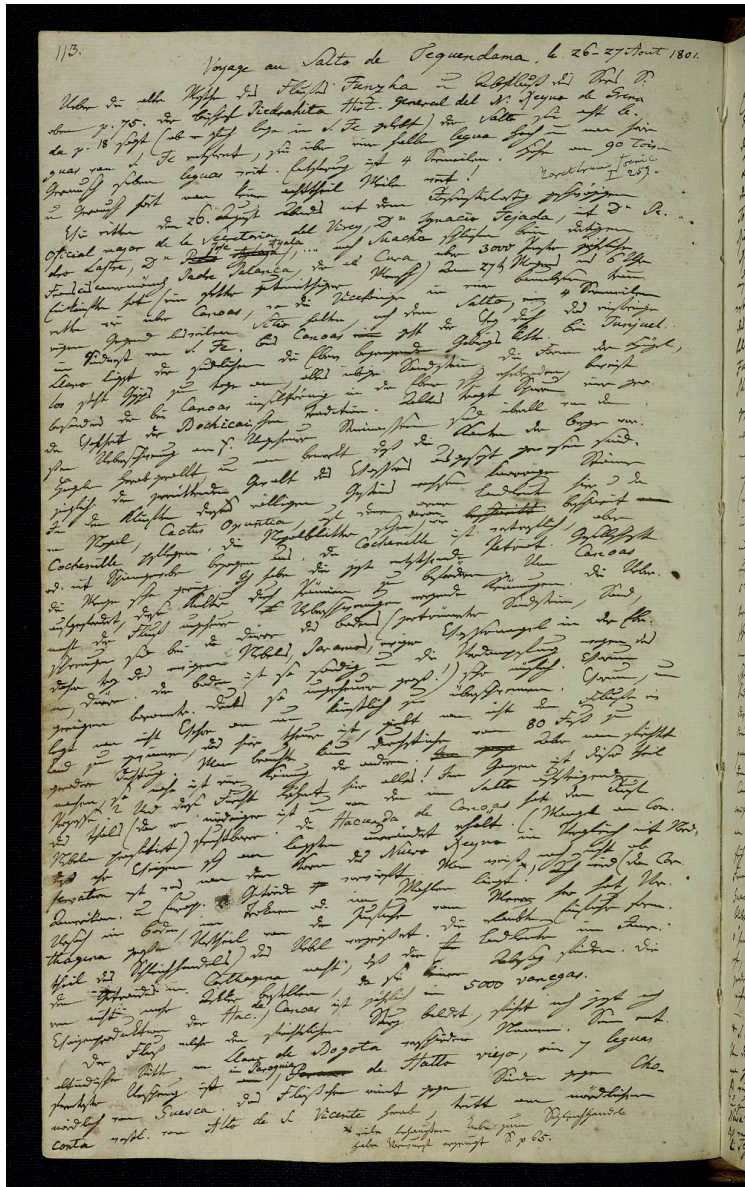


Fig. 6: Humboldt, Alexander von. Tagebücher der Amerikanischen Reise VIIa/b: Rio de la Magdalena – Bogota – [Quindiu] – Popayan – Quito [...], 1801–1802, Staatsbibliothek zu Berlin, Germany, Nachl. Alexander von Humboldt (Tagebücher), VIIa/b, fol. 69v. (CC BY-NC-SA 3.0, <http://resolver.staatsbibliothek-berlin.de/SBB0001527A00000108>)

Humboldt was busy during his Bogotá sojourn. We know that on the 27th of August 1801, he visited the Salto de Tequendama (Fig. 6). Next, some paragraphs from his *Diary* on the adventure:

19 At least five letters were written by Carl Linnaeus to José Celestino Mutis, and seven letters were received by Carl Linnaeus from José Celestino Mutis between 1761 and 1777. See: <http://linnaeus.c18.net/Letters/index.php> (checked on 05/02/2018).

I have seen faster-flowing cascades, yet none exhibiting such a permanent and thick cloud hanging over as the one that hangs over the Tequendama (...). The fact long time repeated that the Tequendama is the world's highest water fall (see Bouguer) is completely unfounded, nevertheless I still believe that there is no other waterfall of the same height whereby such amount of water is plunged and evaporated. In fact, the sight is dazzling rather than terrifying (...). The amount of water plunged at mid height offers a profile of about 758 feet measured from where I stood, in Canoas. The fall has an approximate height of 90 *toesas*, but when the [water] level is high, the splash bounces only once, well away from the wall. When the river runs shallow (as was the case when I went), the spectacle is more sumptuous. The rock's wall over which the waters fall has two protrusions, a first outcrop 5 *toesas* deep and a second at 30. When the water level is at its lowest, the liquid drops vertically close to the wall and the step-like fall likens a proper cascade. In the upper part of the drop we can see the water parted in pearl-like silver threads, but 50 *toesas* down the spray's evaporation offers a spectacle of such stunning beauty as I have not yet seen anywhere (...). The sheer volume of the evaporation is so outrageously huge that, seen face-on, the waterfall resembles a silver antimacassar whose tassels barely touch the floor here and there.

The river below, which carries a third of the upper flow (most probably due to chemical break down of water and wind gusts) is mainly comprised by evaporation. When I first said that the Tequendama Fall was an amusing, dazzling, and amiable sight rather than one conducive to fright and awe, I make exception of the bottom part of the fall. Looking down from the narrow abyss (hardly 30 feet wide), the fog, like ripped clouds, fills up and darkens the massive expanses of rock that have witnessed earth tremors and quakes and molds the lower river's bed, bringing to one's mind something akin to the terrible river Acheron (...). Once I had seen the Fall from the top, I decided to visit a coal mine nearby (...) next, quite exhausted, went down the long Culebra path towards the Povasa brook and from there, clinging to tree branches like spiders, we climbed down to the lower river's proper riverbed. The last bit of the way is quite perilous, so much so that at times I feared for the barometer and the thought of having to return without further news on the question. But everything turned out just fine. We walked from 7 to 2, that is, 7 straight hours with no break (only D. Josef Ayala came with me). The humidity in the ravine made my whole body ache, thus making the expedition so wearing. Downwards the river is known as Río de la Mesa, del Colegio, or de Tocaima.²⁰

As proper modern scientists would, Humboldt made much of the methods by means of which their findings turned out. Thus, the not few pages devoted in his diaries to account for the difficulties he went through in order to measure the Tequendama Falls' height. That said, his own measurement was imprecise.

In a letter from Ibagué to his brother Wilhelm, dated September 21, 1801, the Prussian scientist ratifies the Tequendama's height against his own measurements: "At the same time, I estimated the mountains around [Santa Fe], some of which I gathered at 2.000 to 2.500 *toesas* high; I

20 This is a rather brief summary of Humboldt's visit to the Tequendama. The complete text can be found in Humboldt's diaries digital edition by Banco de la República, Colombia, based on the corresponding publication by the Academia Colombiana de Ciencias Exactas, Físicas y Naturales and the German Democratic Republic's Academy of Sciences in 1982. See <http://babel.banrepcultural.org/cdm/ref/collection/p17054coll20/id/33> (checked on 05/02/2018).

visited the Lago de Guatavita, the Tequendama cataract, of extreme beauty due to the volume of water, though it only reaches a height of 91 *toesas*.”²¹ The Spanish Language Academy defines *toesa* thus: “old French measure of length equivalent to 1.946 meters”, fact which agrees with Lulof’s *Toisen* (Kant’s source, thus the Tequendama Fall would have a height of somewhere between 200 to 300 *Toisen*, *id est*, between 389 and 584 meters. Hence, the 91 *toesas* assigned by Humboldt to the Tequendama Fall, would amount to 177 meters but, as we now know, the Bogotá river waters at that point fall 157 meters, therefore Humboldt got it wrong for only next to 20 meters.²²

Once back in Europe, Humboldt settled in Paris to work at organizing all the material he had gathered during his American expedition which, from 1799 to 1804, and along with Aimé Bonpland, took him to territories that today make part of Venezuela, Cuba, Colombia, Ecuador, Peru, Mexico, Cuba, and the United States. The outcome of this effort was the editing of *Voyage aux régions équinoxiales du Nouveau Continent*, a monumental piece of work finally published in French, in thirty volumes, between 1807 and 1834. Thus, it is fair to say that Kant’s expectations (expressed five years earlier in his *Physical Geography*) regarding his trust in that with Von Humboldt’s voyage “we will get to know better an important part of South America,”²³ were fully met.

But Kant and Humboldt’s exchanges did not end here. First, in 1827, when the Prussian naturalist gets back to Berlin, and two years later, after a few diplomatic errands and, at Tsar’s Nicholas I explicit request, a geographic expedition over the vast eastern Russian territories, Humboldt came back and spent the rest of his life teaching at the university and laboring on what would become his main work, *Kosmos*, five volumes published between 1845 and 1862 (the last one, posthumously, since he died on May 6, 1859). And it is precisely in *Kosmos*, his better known work, where Humboldt quotes and further underscores the scientific importance of the philosopher of pure reason: he quotes him fifty-one times, and that most of those quotes refer not to the *Physical Geography* nor his *Critique of Pure Reason* or any of his other most famous works, but to the *General History of Nature and Theory of the Heavens*, one of his earlier pieces, published in 1755, whereby he interprets and comments the use of Newton’s physics to better understand the heavens, that very same starry heaven which, in conjunction with moral law, would later move his spirit to further awe and respect²⁴.

To conclude, and based on Eberhard Knobloch’s *Gedanken zu Humboldts Kosmos*, we can say that although Pliny the Elder could have been the one who directed the sight of Humboldt to see *the things of nature* as something that can simultaneously be known and enjoyed, and while the scientific method that served him as a model was that of Pierre-Simon Marquis de Laplace, it is Immanuel Kant who occupies a special and indisputable place in the Humboldtian conceptual map: he was the *Grosse Geist* (Great Spirit) that illuminated him in order to arrange the laws of nature in a complete system of laws, made possible by the *a priori* knowledge contained in mathematics. The image of nature that Humboldt communicates in *Kosmos* can be expressed by the conjunction of two concepts: force (*Kraft*) and freedom (*Freiheit*),

21 Minguet 1989, p. 74.

22 To better understand the history and difficulties of the measurements of the Fall Tequendama see Mantilla, Ochoa & Martínez 2016.

23 Kant 1923, IX, p. 233.

24 See Lind 1897.

both truly central in Kantian philosophy. This could not Humboldt have guessed as he visited the Tequendama Waterfall in 1801 when was moved by its sublime beauty and measured the height from which the water fall. But the coincidence that both Prussians were linked by this prodigious waterfall in the Tequendama canyon turned out to be the prelude to a concurrence that would modify our understanding of the world in which we live: a beautiful and sublime world governed by natural laws whose knowledge is possible thanks to the cognitive *a prioris* of human nature.

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