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Justin Winkler

Abstract

In the 1780s, de Saussure invented the cyanometer that was subsequently used by Humboldt on his research travels. It served to determine the blueness of the sky at various altitudes. This article examines the research context in which this device was used and seeks to trace an underlying *aisthesis materialis* (Barck). I raise the question whether this recourse to a supposed pre-art theory and aesthetic practice can help establish a better concept of the everyday aesthetics to come.

Key Words

air; color; high altitude; material aesthetics; scientific aesthetics; realism

1. Motivation

My investigation started with plain curiosity. I was interested in the making of a seemingly odd instrument built in the late eighteenth century, the cyanometer, designed to determine the blueness of the sky. It appeared in the context of an era when scientific scrutiny of the natural world started off along the path that led to today's natural sciences. The World Wide Web abounds with standard information, mythologies, and creative artistic reuses of the cyanometer. These show that it is a technical fossil but fail to explain its epistemological location in the history of the natural sciences or aesthetics.^[1]

When I followed the thematic path taken by the inventor of the cyanometer, Horace Bénédict de Saussure (1740–1799), and by the most prominent user of the instrument, Alexander von Humboldt (1769–1859), I encountered the term *aisthesis materialis*, introduced by Karlheinz Barck.^[2] It expresses the German concern with an idea of *aisthesis* that does not necessarily overlap with the parallel and subsequent academic traditions of aesthetics in other places, from the early nineteenth century onward.^[3] *Aisthesis materialis* was part of the title of a publication by Dotzler and Müller in which the editors only used it as a search term serving to discover traces, not as an established notion.^[4] The term has not been discussed during the twenty years since that publication.^[5] In the wake of Welsch's impulse for an *aesthetic* turn, the authors chose *aisthesis*, in lieu of the common *aesthetics*, in reference to Baumgarten's sensuous cognition and on the basis of their diagnosis of an eighteenth-century concept of pre-art theory aesthetics, "the apocryphal continued existence of an aesthetics that is not limited to the system of the arts."^{[6],[7]} They underscored their postulate for a grounded approach to aesthetics with an excerpt from a project application by Foucault in which he stressed that, in elaborating theoretical issues, the reference to a concrete case should never be given up.^[8] My interest has been to understand de Saussure's and Humboldt's theoretical curiosity and concrete *aesthetic* procedures in their observation of the blue of the sky, a phenomenon that is clearly not man-made and thus does not fit into the category of artwork.

Thus, my task is twofold: to establish a hermeneutical account for the historical context of the cyanometer as an instrument related to an *aesthetic* natural science, and to discuss the potential application of *aisthesis materialis* to this historical case and to contemporary usage.

2. De Saussure: the cyanometer

What was the concept of the instrument called the cyanometer that aimed to determine the blue of the sky? It draws all of its meaning and functionality from the context of scientific endeavors of the late eighteenth century, from attention to the hues of the atmosphere that Humboldt traces back to 1765, and from the person of its inventor, Horace-Bénédict de Saussure of Geneva.^[9] A figure of the Enlightenment, he is known as an indefatigable inventor of instruments and procedures, pioneering the ascent of Mont Blanc, the highest peak of the Alps. After botanical and zoological investigations of the mountains, climbing extreme altitudes becomes, beyond the aesthetics of aristocratic tourists, a scientific endeavor.^[10] In descriptions of the expeditions that became exponentially more frequent from the 1780s onward, picturesque aesthetic categories are mixed with novel scientific phenomenologies.



Figure 1: One of de Saussure's cyanometers, with a fifty-two-shade scale, dated January 1788. Collection Musée d'histoire des sciences, Geneva, Wikimedia Commons.^[11]

The cyanometer is only one of many inventions by de Saussure. It is a seemingly simple device, a circle made of cardboard, as shown in Figure 1. Its sophistication lies in its calibration and use. It serves to link the colors as an outcome of the presence of the hypothesized opaque turbidity of the atmosphere. What one takes for granted now, the black sky of outer space, was at that time only a hypothesis. It was deduced that at high altitudes the decreasing presence of these turbidities would allow the sky to appear black, even under the sun, as at night. The aesthetic proof, as it were, was difficult to obtain and required an elevated position of the observer.

De Saussure introduced this tool in his first *Mémoires de l'Académie Royale de Turin* (Account for the Royal Academy of Turin, 1788) and in the last volume of his *Voyages dans les Alpes* (*Travels in the Alps*). "In a nutshell, we had to find a cyanometer or a measure of the blue color," he writes in this report, equating in this phrase the tool with the measure.^[12] Thus, the cyanometer is an instrument of

which the observer's vision and the observed phenomenon are part. Technically, the cyanometer is based on a series of cardboard sheets with shades of blue that have to be matched with the apparent color of the sky (Figure 1). A sixteen-element, circular cyanometer was used by de Saussure on his Mont Blanc expeditions in order to measure the blueness of the sky at high altitudes and compare it with the hues experienced in the lower atmosphere. More elaborate models have forty to fifty-three degrees. An experimental reconstruction by Breidbach and Karliczek offers an excellent extended discussion of the procedural nature of the tool.^[13]

The Claude glass, in use in the same century, was a device for picturesque contemplation of the environment, that was sight formatted using pictorial rules. The scrutiny using the cyanometer has a different systematic because, in Humboldt's words, "serious knowledge and more delicate incentives of imagination tend to pervade each other."^[14] Likewise, towards the end of the eighteenth century, the amateurs using the Claude glass were replaced by the newly constituted scientists of the environment, the lonely explorer as opposed to the convivial tourist or the exploring painter. The cyanometer was the companion of a novel conquest of the physical world, and so the physical locations and their imaginaries were also different. It aimed at high altitudes, first with mountaineers and later with balloonists, and the search for explanations of atmospheric processes replaced the search for enchantment. The cyanometer represents a natural scientific *aisthesis* within the realm of the aesthetic.

In de Saussure's Turin reports, the cyanometer was present along with the diaphanometer, and a kind of photometer using hydrochloric acid for light intensity measurement. All three devices were only steps of experimental instrumentation and were abandoned either by de Saussure himself or by his son Nicolas Théodore, who became a natural scientist and assumed a role in reviewing Humboldt's eudiometer project, where the latter aimed to improve the measurement of aerial oxygen. Whereas the cyanometer is based on a series of shades of blue, decreasing from the theoretical darkest blue-black of outer space to a turbid whitish blue, the diaphanometer models states of air transparency, also in a function of turbidity. Both acts of measurement involve the observer to an extent that de Saussure was led to take into account the fatigue of the eye by recommending moments of rest. The hydrochloric acid light intensity measurements were reported as not being thoroughly satisfying, but their extension by the systematic exposure of differently colored ribbons, in order to observe their specific fading, were carried on in the spirit of the first two procedures and led to relative numerical results. A footnote gives evidence that de Saussure's involvement with sense data made him aware of his proximity to current aesthetics practice:

This phenomenon and several others that I have been developing in this account explain different practices of which the painters do not know the motives, but are guided by a kind of instinct or assiduous study of nature that leads them to sense its suitability.^[15]

De Saussure's recognition of the painters' skills is without consequences for his own work, which is based on a material interest, framed by a realistic ontology, and carried out by means of sensory cognition. However, his travelogues mirror a plain pictorial aesthetics of the beautiful. In his review of de Saussure's volcano research, Alcantara concludes, from de Saussure's report from the exploration of Mount Vesuvius, that "the landscape aesthetics remains confined to the register of the 'beautiful effect' and of the 'charming sight', and in this respect de Saussure never bargains over superlatives."^[16] Hence the conclusion that, "in the times of de Saussure, traveling seemed to respond to a complex of therapeutic, cultural, and glamorous motives apart from scientific ones. Would a solely aesthetic motivation have justified a tour? Nothing is less evident."^[17]

3. Humboldt: toward infographics

Thanks to a plethora of sources, Alexander von Humboldt's approach appears more tangible and more complex than de Saussure's. His journey to and through Central and South America from 1799 to 1804 is well known, not least from his own very active dissemination of the narratives in several languages. Humboldt consulted de Saussure in 1795 and applied cyanometric measurement not only to the colors of high altitudes but to the sky over the sea and the sea itself, and he sorted the data by altitude and latitude.^[18]

The ascent of Mount Chimborazo in 1802 that took Humboldt and his companion Bonpland almost to the top can be read as the follow-up to de Saussure's Mont Blanc project ambitions and functions. Like de Saussure, Humboldt was neither a painter nor a geographer. Chemistry was paradigmatic for his approach to natural phenomena, including reactions of living bodies to external effects and probably the role of color as indicators of these processes. In his work, an explicit notion of precision is known by his reference to Lavoisian chemistry and experimental devices. According to Dettelbach, "Humboldt set off around the world to measure every possible quantity, 'armed' with every conceivable precise instrument from cyanometers to barometers, because of the meaning of precision, not a tacit vitalism."^[19] For Humboldt, the instruments were some sort of precise organs, enhancing the capacity of the human organs, in order to achieve the analysis of the *Totaleindruck*, an aesthetic notion backed by a Pythagorean idea of an objective whole, of the interaction of animate with inanimate matter. This idea of organic precision in the perception of the environment now appears as a realistic concept based on a still-lacking critical epistemology of the senses. *Aisthesis materialis* in the Humboldtian spirit is grounded, as the term indicates, in a material vision of the external world and the project of its thorough quantification. The artwork aspect, if this analogy is permitted, is the scientific product computed from the collected data.

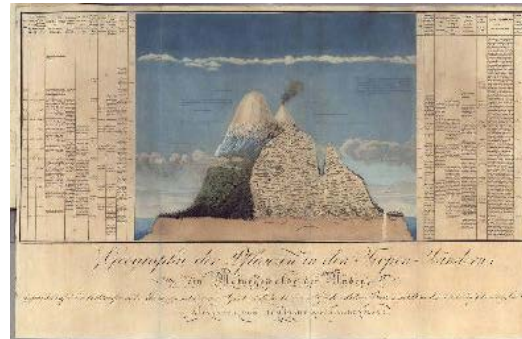


Figure 2: Lithograph *Geographie der Pflanzen in den Tropen-Ländern* (Plant Geography in the Tropics; Humboldt & Bonpland 1807^[20]), source: Humboldt University of Berlin, University Library^[21]

The lithograph from *Geographie der Pflanzen* in Figure 2 opens the path to grasping the importance of change and the assessment of the divide between art-bound aesthetics and *aisthesis materialis*. One might call this illustration of the outline of the climax of the Andes from Humboldt's plant geography an ancestor of scientific infodesign: a colored schematic cross-section of the main ridge, as if cut through in the manner of mining prospection, showing the plants and their names in a life-like weather ambience. Here, not only the mountains are vertically structured, the sky, too, is layered in shades of blue, from clear at the bottom to dark at the top. Upon closer inspection, one notices the spreadsheet-like information laid out to the left and the right in accordance with the altitudes represented that is not given in most reproductions. In the sky to the right of the mountain range, above the cloud line, is written (in German) "Height of Mont Blanc, which de Saussure reached in 1787."^[22] The entire picture relates strongly to the plain barometric, thermometric, and cyanometric figures contained in the *Notes* of Humboldt's travel accounts.^[23] Humboldt notes that it is construed from observations between latitudes 10° N to 10° S, on both sides of the equator.

Thus, one has to read the skyscape in a similar way as the mountain cross section, in a non-perspectival way, with the shades of blue acting as codes for the atmospheric layers. Even though the landscape represented is analytic and highly virtual, seven to eight generations later one is still caught by its seeming perspectival pictorial appeal. Beholding one of the few color items that have survived in the archives, one is struck by the differentiated shades and hues of blue of the sky. Not without cause, they tempt one to assume an art historian's approach, not least given the involvement of the two landscape painters Louis Schönberger and Lancelot-Théodore Turpin, who devised the picture, and the calligraphic engraver Louis Aubert, who made it fit for mass reproduction.^[24] Does this allusion to conventional artwork make it relevant for an aesthetic approach, or do the descriptors on both sides of the image indicate that it is already beyond aesthetics, materially grounded in the realm of science? It initiates a more fundamental aesthetic query, questioning the role of images and colors in Baroque science passing into secular worldviews based on empirical surveys.

To today's eye the picture appears like an executive summary, a recapitulation of Humboldt's written opus. It is part of the project of the great picture of nature that was the aim of his investigations. It can easily be mistaken for a specialized pictorial aesthetics, since his descriptions are often taken for depictions. Humboldt was aware that the achievement of a description of exotic places depended on the readers' imagination, which the author and researcher cannot enforce through eloquent verbal depictions. He struggled with the task of describing extraordinary places and situations with ordinary language. This is quite counter to the pictorial exaggeration of familiar and appreciated sceneries. Humboldt realized the risk of boredom, sharing the concern of his editors and translators that the reader would become fatigued, and that also led to translating his travelogues to be equivalent with abridging them:

When a traveler attempts to furnish descriptions of the loftiest summits of the globe, the cataracts of the great rivers, the tortuous valleys of the Andes, he is exposed to the danger of fatiguing his readers by the monotonous expression of his admiration. It appears to me more conformable to the plan, which I have proposed to myself in this narrative, to indicate the peculiar character that distinguishes each zone; we exhibit with more clearness the physiognomy of the landscape.[25]

The infographic representation is, in the words of Godlewska, "moving beyond geographic space to assume the spaces of scientific theory." [26] Paradoxically, it could also be read as the product of a pre-art theory aesthetics. At the end of the eighteenth century, this kind of "visual thinking" brought the landscape into appearance and relegated abstracting mapping to a second tier. [27]

4. Assessing blueness

Blue appears in the context at hand as blueness, pointing to the material world and carrying its semantics. It is difficult to center on blue when it is mere, seamless blueness, if an aesthetics of environment should be more than an aesthetics of the forms of flora and fauna and not of seemingly simple issues such as colors or matter. [28]

I want to hint at two discussions. Bachelard, the philosopher of the new scientific spirit and of the psychoanalysis of imagination, addresses the blue of the sky but deals with it as a motif for poetic analysis. [29] For him, the descriptive task has been done by the poet, and the phenomenon becomes observable through this work. In her recent analysis of "fine weather," Diaconu introduces arguments for transcending a habitual aesthetics of the beautiful and for assuming a reflective aesthetic attitude. [30] This would counter what she labels "the poor blue-sky thinking" underlying everyday activities. Neither author is thinking of an *aisthesis materialis* but remains in the realm of appreciation in categories of the beautiful. However, both hint at the capacity of this complex phenomenon to explain the world outside artworks. Now, de Saussure's original use tends toward the abstract reductionism so tightly associated with today's natural sciences: the use of the blue of the sky as an indicator in the spirit of reductionism. The success of his project would abolish the need to scrutinize or contemplate the blue of the sky any longer.

It is clear that neither de Saussure nor Humboldt wants to conceptualize his interest in the blue of the sky with Barck's term of *aisthesis materialis*. They combine sensuous engagement (scrutiny of the actual blue), quantitative abstraction (collecting numbers), verbal and numerical reproduction, and the hope of reaching precision. At the same time, a pictorial aesthetics is present, although not used in the core of the investigation but in, as it were, a secondary, popular layer.

Both researchers worked and lived in a period of fast-paced change in the rapid evolution of environmental knowledge. One should not forget that, in de Saussure's and Humboldt's time, research on nature was directed forward, whereas today's aesthetic awareness, pointing backward, is based on the historicity of sights and approaches. The problem is not the co-presence and partial co-occurrence of a pictorial and material aesthetics, but the difficulty today of acquiring a clear notion of what else a scientific aesthetics actually has been or could have become.

The change in the concept of the physical atmosphere, as expressed in Humboldt's table (Figure 2), is monumental. Its character of a tilted image that exhibits the blue sky between a scientific concept and a pictorial convention can still be understood by today's onlookers. In de Saussure and Humboldt, a theory of the senses is still absent or only emerging, whereas the aesthetics of taste appears as kind of mainstream. Because of its capacity for transformation, an aesthetics of the picturesque, as a kind of mass aesthetics, conventional and conservative by nature, was never in danger of losing momentum. In contrast, a grounded aesthetic, an aesthetics connected with environment and at the same time grounded in the senses, that serves the progress of scientific reification would disappear through its own progress, and ultimately because of its success. Dettelbach rejects the standard *ex post* identification of Humboldt "as 'the last of universal geniuses', as struggling to hold together a (pre-modern and illegitimate) appeal to aesthetics what must inevitably fly apart as science professionalized." [31] We don't think that an aesthetics of environment has actually evaporated, as this historical concept suggests. In *aisthesis materialis*, the work of the senses is fundamental, while the process of description, depiction, and representation remains decisive. As powerful as this had been in its beginnings, it has become equally impoverished within the scientific community, despite the overabundance of visual material.

Aisthesis materialis includes sensing and also representing. In sensing, instruments such as the cyanometer were not devices that worked autonomously, independent of the observer, nor were they considered new organs, but as leverage to amplify and standardize sensitivity. [32] Their place was in a natural science based on observation as much as on measurement, and therefore necessitating the task of computation and description. With the multiplication of parameters that can be determined by measurement, this task has become impossible to fulfill, and sensitivity has, despite many attempts to restore it, disappeared from many scientific procedures. Regarding descriptive representation, Humboldt is exemplary in demonstrating the dependence on conventional formats and media, writing, and painting. Both work in linguistic and rhetoric frames that continue to use categories of art-related aesthetics, such as the traveler's literary account or pictorial reconstruction. Both, then, depend on specific crafts that are embedded in tradition.

What can we learn from the historical setting? The idea of *aisthesis materialis* opens an approach to environment as both object and subject. We don't talk of the physical setting alone but of environment in a broad sense. The everyday is environment for contemporary man. [33] Despite the many cultural products with the character of work, it is a massive and unending presence, like the natural environment explored by de Saussure and Humboldt. Its inescapable dominant sensuous elements are, similar to the blue of the sky, keys to insights. It would be desirable to determine whether *aisthesis materialis* has the capacity to deliver everyday aesthetics from the bonds of an aesthetics of the beautiful and of the artwork. It would make it possible to include, without circumstantial justification, the functional, the bland, or the awkward.

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Endnotes

[1] In 1834, the original sense of the cyanometer was obviously no longer understood, as Durant's balloon experience indicates: Charles F. Durant, "Improvement of the Barometer," *Mechanic's Magazine* 4(4), (October 1834), 210–214. A few online examples illustrate the breadth of present-time adaptations: Barbara Schaefer, "Die Vermessung der Himmelsbläue," in *My Kind of Blue. The Cyanometer-Blog*, <<https://mykindofblue.wordpress.com/page/2/>> (accessed September 5, 2016); A smartphone application: Csibi Balasz, "Cyanometer 2.0," <<https://www.behance.net/gallery/29132257/CYANOMETER-20>> (accessed September 6, 2016); a monument that measures air quality: Martin Bricelj Baraga, "Cyanometer monument," ARTECITYA network (Ljubljana: MoTA – Museum of Transitory Art, 2016) <<http://cyanometer.net>> (accessed September 6, 2016); a design project: Tim Maly, "Recording America's Landscape with Some Very Strange Devices" (Béhance, 2012) <<http://www.wired.com/2012/06/venue-expedition>> (accessed September 6, 2016).

[2] Karlheinz Barck, "'Umwandlung des Ohrs zum Auge': Telescopisches Sehen und ästhetische Beschreibung bei Alexander von Humboldt," in *Wahrnehmung und Geschichte: Markierungen zur Aisthesis*

materialis, edited by Bernhard J. Dotzler and Ernst Müller (Berlin: Akademie Verlag, 1995), pp. 27–42. I tried here to resist the temptation to use the translation *material aesthetics* in order to respect Barck's allusion to Baumgarten's seminal Latin work.

[3] Cf. Karlheinz Barck, Lemma "Ästhetik. Der europäische Kontext einer deutschen Gründung," in *Ästhetische Grundbegriffe*, vol. 1 (Wiesbaden: Metzler, 2000), pp. 317–321.

[4] Bernhard J. Dotzler and Ernst Müller (eds.), *Wahrnehmung und Geschichte : Markierungen zur Aisthesis materialis* (Berlin: Akademie Verlag, 1995).

[5] Private communication from Bernhard Dotzler to the author, December 22, 2016.

[6] Wolfgang Welsch, *Aisthesis. Grundzüge und Perspektiven der Aristotelischen Sinneslehre* (Stuttgart: Klett-Cotta, 1987).

[7] Dotzler & Müller 1995, p. x (translated by the author); Barck (2000), Lemma "Ästhetik. Zur Aktualität des Ästhetischen," p. 309.

[8] Gaston Bachelard's priority of the material over the formal aspects in his aesthetic works hints at the same issue. Quotes are found in *Le Nouvel esprit scientifique* (1934) and in his aesthetic works like *L'eau et les rêves* (1942).

[9] Alexander von Humboldt and Aimé Bonpland, *Voyage aux régions équinoxiales du Nouveau Continent*, vol. 1 (Paris: Schoell, 1814), p. 248.

[10] Such tourists have been described as being "often Englishmen who tried to scare themselves." Philippe Joutard (ed.), *L'invention du Mont Blanc* (Paris: Gallimard/Juillard, 1986), p. 105 (translated by the author).

[11] Source: https://upload.wikimedia.org/wikipedia/commons/3/36/Mat%C3%A9riel_de_recherche%2C_Horace-B%C3%A9n%C3%A9dict_de_Saussure_deuxi%C3%A8me_sch%C3%A9ma_du_cyanom%C3%A8tre%2C_1788_%C2%A9_Collection_Mus%C3%A9e_d%E2%80%99histoire_des_sciences%2C_Geneva.jpg (accessed November 1, 2017).

[12] Horace-Bénédict de Saussure, "Description d'un cyanomètre ou d'un appareil destiné à mesurer l'intensité de la couleur bleue du ciel," Premier mémoire, *Mémoires de l'Académie Royale des Sciences de Turin* (1788–89(a)), pp. 409–424, ref. on p. 410, translated by the author.

[13] Olaf Breidbach and André Karliczek, "Himmelblau—das Cyanometer des Horace-Bénédict de Saussure (1740–1799)," *Sudhoffs Archiv* 95(1), (2011), 3–28, ref. on 16ff.

[14] Alexander von Humboldt, *Kosmos. Entwurf einer physischen Weltbeschreibung*, vol. 2 (Tübingen: Cotta, 1847), p. 4, translated by the author; cf. Barck (1995), note 2, p. 28.

[15] De Saussure (1788–98(b)), *Description d'un cyanometer*, p. 450, translated by the author.

[16] Jean-Pascal Alcantara, "De neige et de lave mêlée: le paysage volcanique d'après Horace-Bénédict de Saussure," in *L'invention du paysage volcanique*, ed. Dominique Bertrand (Clermont-Ferrand: Presses universitaires Blaise Pascal, 2004), pp. 83–102, here p. 90, translated by the author.

[17] Alcantara, *ibid.*, p. 93, translated by the author.

[18] Humboldt, *Voyage aux régions équinoxiales* (1814), p. 248.

[19] Michael Dettelbach, "The Face of Nature: Precise Measurement, Mapping, and Sensibility in the Work of Alexander von Humboldt," in *Studies in the History of Philosophy & Biomedical Sciences* 30(4) (1999), 473–504, here p. 480.

[20] Alexander von Humboldt and André Bonpland, *Essai sur la géographie des plantes, accompagné d'un tableau physique des régions équinoxiales, fondé sur des mesures exécutées, depuis le dixième degré de latitude boréale jusqu'au dixième degré de latitude australe pendant les années 1799, 1800, 1801, 1802 et 1803* (Paris: Levrault & Schoell, 1807).

[21] Source: <http://www.sammlungen.hu-berlin.de/dokumente/16284/#> (accessed November 1, 2017).

[22] The comparison of mountain altitudes and the shift of vegetation zones has been novel and attractive for readers of Humboldt's works. Goethe comments in a letter of April 3, 1807 to Alexander von Humboldt (WA IV, vol. 19, pp. 296ff., no. 5340, see <http://www.avhumboldt.de/?p=4223>) on his particular interest in the comparative cross sections of mountains attached to the first volume of *Essai sur la géographie des plantes*, perhaps the one in Figure 2, that had obviously been lacking. It led him to draw a sketch of his imagination that he sent along with the letter to Humboldt.

[23] Alexander von Humboldt and Aimé Bonpland, *Voyage aux régions équinoxiales du Nouveau Continent*, vol. 3 (Paris: Schoell, 1825), pp. 314–321.

[24] François Brulliot, *Dictionnaire des monogrammes, marques figurées, lettres initiales ...*, vol. 2 (Stuttgart: Cotta, 1833), pp. 250f.; Patrick Le Nouène and Caroline Chaine, *Lancelot-Théodore Turpin de Crissé: peintre et collectionneur, Paris, 1782–1859*. Catalogue Musée des beaux-arts et Bibliothèque Marmottan, Angers (Paris: Somogy, 2006).

[25] Humboldt & Bonpland, *Voyages* (1814), p. 178.

[26] Anne Marie Claire Godlewska, "From Enlightenment Vision to Modern Science? Humboldt's Visual Thinking," in *Geography and Enlightenment*, edited by David N. Livingstone and Charles W. J. Withers (Chicago: University of Chicago Press, 1999), pp. 236–275, here p. 267.

[27] Godlewska, *ibid.*, pp. 250f.

[28] My own tentative survey of color terms in the main works of de Saussure <S> and Humboldt <H> shows that the group of blues makes up only 5% <S> and 8% <H>, respectively, of all color mentions. The group of white, black, and grays constitute the mass of color terms (57% <S> and 48% <H>); the greens, reds, yellows, browns, blues, and metals cover the rest, with shares from 13% <S> to 4% <H>, a distribution obviously marked by the description of petrographic and plant colors. In de Saussure, the frequent dynamic circumscription of colors, such as *gris tirant sur le jaune verdâtre* (gray with a hue of greenish yellow; *Voyages* IV, 424, §2255), would be of particular interest for the history of color semantics in the early natural sciences. For the linguistic codes of colors, see Toni Bernhart, "Die Farbe als sprachliche Größe," in *Erkenntniswert Farbe*, edited by Margrit Vogt and André Karliczek (Jena: Ernst-Haeckel-Haus), pp. 137–150.

[29] Gaston Bachelard, "Le ciel bleu et l'imagination aérienne," in *Confluences, revue de la renaissance française* 25, (September 1943), pp. 447–460; chapter "Le ciel bleu," in *L'air et les songes* (Paris: Corti, 1943), pp. 209–226.

[30] Mădălina Diaconu, "Longing for Clouds—Does Beautiful Weather Have to Be Fine?," in *Contemporary Aesthetics*, Volume 13, (2015), <<http://www.contempaesthetics.org/newvolume/pages/article.php?articleID=719>>.

[31] Dettelbach, "The Face of Nature," p. 475, note 4.

[32] Humboldt's concept as identified by Barck (cf. note 2) is well covered by Berleant's definition of sensitivity, "perceptual awareness that is developed, guided, and focused." Despite Humboldt's contact

with Goethe, I do not believe that it has to be expanded to comprehend Goethe's transcending *Anschauung*. Cf. Arnold Berleant, "Aesthetic Sensibility," in *Ambiances. Environnement sensible, architecture et espace urbain*, (March 2015), 1–9; ref. on p. 4, <<http://ambiances.revues.org/526>>.

[33] I understand here "environment" in Berleant's definition, without definite or indefinite article, as a generic term without plural, that does not refer to finished and conceptually framed environments. Cf. Arnold Berleant, *The aesthetics of environment* (Philadelphia: Temple University Press, 1992).