Observing Nature – Representing Experience
The Osmotic Dynamics of Romanticism 1800–1850

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BEYOND EXPERIENCE? THE VALUE OF THE SENSES VS. NATURE'S CONSTRUCTION

Charlotte Bigg[1]

The Panorama, or La Nature A Coup d'Œil

Coup d'œil:
A glance taking in a general view;
concr.
A view or scene
as it strikes the eye at a glance.[2]

First patented in the UK by the Irish painter Robert Barker in 1787, the panorama is a large circular painting offering the spectator a 360 degree view of a landscape, but the term also describes the purpose-built structure in which it is housed. The word is a neologism from the Greek meaning "an all-embracing view," or as Barker first described his set-up, "la nature a coup d'œil." To give viewers the impression they were surrounded by an actual landscape, Barker conceived a circular room whose walls are entirely covered by a continuous, painted canvas lit from above. The spectators entered the room using an underground passage suitably darkened to enhance the effect when they emerged onto a central island from which they could view the scene. A number of contrivances are listed in the patent, all intended to enhance the illusion. Important was to suppress any external referent against which the panorama could be compared, to meticulously render adequate proportions and perspective on the curved surface, to convey realistic illumination and shadows, to compensate for the sagging of the painting under its weight and to hide the canvas' junction lines.

1 For comments and suggestions I am grateful to Annik Pietsch, as well as to the organisers and audiences of the following meetings, where this work was presented: colloquia at the Centre François Viète (University of Nantes) and the Zentrum Geschichte des Wissens (ETH Zurich); workshop "Observing Nature–Representing Experience" and the Summer Academy "Science on Screen", both at the Max Planck Institute for the History of Science (Berlin); the workshop *Les Représentations scientifiques de l'Environnement Terrestre: Des Images, des Nombres et des Cartes*, Centre Alexandre Koyré (Paris).

2 Article "coup d'œil", Oxford English Dictionary, 2nd Edition.

Barker first exhibited his panorama in Edinburgh, before launching ventures in London and abroad. With success came emulation, and panoramas sprouted throughout the cities of Europe in the following years. They were extremely popular throughout the nineteenth century: Stefan Oettermann estimates that between 1870 and 1900 at least one hundred million visits were made to panoramas. The first panoramas represented the city of Edinburgh, the British Navy ankered at Portsmouth, the city of Rome, the Brightholmstone Baths, and mountain landscapes. These became the standard stock-in-trade themes of panoramas throughout the century: alpine views, picturesque landscapes, cultural highlights of the Grand Tour, and battles.

The panorama was from the start a commercial venture: the panoramic experience was purchased for a fee by each visitor. It compares with the higher end of travelling natural philosophy and magic lantern shows of the time. In Paris the first panorama was erected in 1799 opposite a fireworks shop and close to the venue where Robertson's magic lantern *fantasmagories* were performed. The panorama business was a capital-intensive activity that was managed by entrepreneurs. Producing a panorama could take up to two years: first artists were sent to the chosen location to select a suitable viewpoint and make painfully accurate sketches of the landscape. In a special panorama-painting building, a team of drawers, painters, faux terrain builders then reproduced the view by laying paint on huge canvasses up to 2000 square meters large for dioramas up to 50 metres in diameter.

To amortize these production costs, networks of circulation were rapidly organised to rotate standard-sized paintings from city to city through Europe and the United States. The panoramas were rolled and unrolled until the damage to the paint was so great they had to be discarded (which is why so few have survived). By the end of the century, the panorama industry had well polished its routines and was increasingly sponsored by private companies as a means of publicity.[3] Thus the 1900 exhibition featured no less than seven panoramas, including a sponsored *Panorama du Pétrole*, reflecting the increasing gigantism and the sensorial and technological one-upmanship of universal exhibitions. These later panoramas were especially subjected to the commercial pressure of providing novelty to jaded visitors, and display increasing sophistication, with the introduction of additional, often mechanical contrivances such as mobile platforms.

Historians have linked the invention of the panorama to the late eighteenth century's first hot air balloon rides and new fashion for travelling. Contemporary accounts of first encounters with the panorama mention amazement and wonder but also dizziness and sea sickness, precisely the sensations felt by those first travellers of sublime landscapes, high in the alps, at sea or atop church towers. The panorama also drew upon the romantic movement's focus on and pictorial rendering of accidental landscapes, dramatic atmospheres, and to new viewpoints and light effects, as exemplified by Phillipp

3 Bernard Comment, *Le XIXème siecle des panoramas* (Paris: Adam Biro, 1993), 43.

Hackert's transparent paintings, Caspar David Friedrich's paintings or Karl Friedrich Schinkel's theatre sets. The growing production and circulation of paintings and watercolours by amateur travellers and the increasing use of the camera obscura moreover helped to formulate more "realistic" alternatives to the aesthetic standards of the ideal landscape. In this the panoramic painting, whose selling point was its absolutely faithful reproduction of an actual landscape, was eminently successful, and it announced and prepared in virtual form the mass tourism that developed with railways and steamships from the 1850s, when increasing proportions of the bourgeoisie were able to make these experiences for themselves on site.[4]

The popular success of the first panoramas undoubtedly contributed to discredit this form of representation in the eyes of many artists, who disparaged "ce barbouillage dispendieux pour amuser les grands et les petits enfants".[5] Many dismissed it as cheap thrills, condemning the showmen who did not shrink from placing stuffed animals in the foreground and simulating the sea breeze using ventilators. The success and subsequent dismissal of the panorama as a debased form of art should not however conceal the real interest expressed both by scientists and artists as the first panoramas were built in European cities.[6] It is perhaps worth insisting that for contemporaries the novelty of the panorama lay not so much in the technical challenge of faithfully reproducing a landscape on the surface of the panorama canvas – curved perspectives on ceilings and theatre sets no longer presented major theoretical or practical challenges. The novelty lay rather in the type of representation, attention to the horizon, to light, to the exact rendering of a given view as well as the emotions it stimulated.

A related context for the emergence of the panoramic form of representation is arguably the development of systematic methods of viewing, assessing and representing landscape, which, it has been suggested, constituted powerful new ways of seeing and representing the world rooting the panoramic vision.[7] Taking the examples of physical geography and military topography, I pursue this suggestion by examining the practices of observation and representation involved in the scientific coup d'œil in the late

4 This overview is based on: Stephan Oettermann, *Das Panorama, die Geschichte eines Massenmediums* (Frankfurt am Main: Syndicat Autoren- und Verlagsgesellschaft, 1980); Comment 1993 (as in note 3); *Sehsucht, Das Panorama als Massenunterhaltung des 19. Jahrhunderts* (Frankfurt am Main: Stroemfeld/Roter Stern, 1993); Ralph Hyde, *Panoramania! The Art and Entertainment of the 'all-embracing view'* (London: Trefoil Publications, 1988).

5 Millin, *Dictionnaire des Beaux Arts* (1806) quoted in Comment 1993 (as in note 3), 59.

6 E.g. the report established by a special commission of the Institut de France on the merits of the panorama, in *Magasin Encyclopédique* 8 (1800), quoted in: Vanessa Schwartz, *Spectacular Realities, Early Mass Culture in Fin-de-Siècle Paris* (Berkeley: University of California Press, 1998), 152-153.

7 E.g. Oettermann 1980 (as in note 4); Daniel Speich, "Wissenschaftlicher und touristischer Blick: zur Geschichte der 'Aussicht' im 19. Jahrhundert," *Traverse 3* (1999), 83-99.

eighteenth and early nineteenth century and how they were incorporated into early commercial panoramas.

Observation

In the second half of the eighteenth century, observation became an explicit topic of reflection for naturalists. They increasingly referred to this notion in their writings, and sought to provide suitable definitions for it. This is particularly true of the Genevan group of naturalists that gathered around and were inspired by Charles Bonnet, that included Jean Senebier, Horace-Bénédict de Saussure, and Benjamin Carrard.[8] Jean Senebier's *L'Art d'Observer* (1775) provides perhaps the most detailed discussion of this new ethos of scientific practice.[9] Senebier, like many of his contemporaries, dismissed the a priori systems and speculations of ancient science in favour of the results obtained thanks to observation, in such sciences as astronomy, natural history, experimental physics, botany and the arts. He proposed to establish the rules of the art of observing, which "au lieu d'être l'Art de penser seroit l'Art d'apercevoir; elle seroit une Logique pour les sens, elle apprendroit leur usage & leurs opérations, elle enseigneroit les moyens de saisir tout ce qui les ébranle & de profiter des sensations qu'ils excitent, comme des idées qu'elles font naître."[10] In contrast to experimentation, likened in one place to wresting out nature's secrets under torture, Senebier defined observation as "ce regard attentif et réfléchi que l'âme porte par le moyen des sens sur les objets de la Nature, tels qu'ils sont dans l'univers, afin d'acquérir une connoissance exacte de leurs qualités, de leurs causes ou de leurs effets."[11] Only by this means will the observer be able to perceive invariable phenomena, "parce que la nature est constante dans ses productions."[12]

The growing emphasis placed on observation is clearly part of the transformation of investigative practices in the eighteenth century, which saw attention replace wonder as the prime motor of research.[13] These discussions also draw, albeit implicitly, on the on-going philosophical preoccupation with the role of sensory evidence in the constitution of knowledge. But most important for the purposes at hand is the practice of observation itself, as it was performed in the decades around 1800.

8 See Fernando Vidal, "Psychologie empirique et méthodologie des sciences au siècle des Lumiüres. L'exemple de Jean Trembley," *Archive des Sciences* 57 (2004), 15-37.

9 Jean Senebier, *L'Art d'Observer* (Geneva: Cl. Philibert et Bart. Chirol, 1775). Similar statements are made in, e.g. : "Observation", *Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers*; Claude Roucher-Deratte, *Leçons sur l'art d'observer relativement aux sciences physiques et médicales* (Montpellier: Fontenay-Picot, 1807); Benjamin Carrard, *Essai qui a remporté le prix de la société hollandaise des sciences de Harlem en 1770 sur cette question: Qu'est ce qui est requis dans l'art d'observer et jusqu'ou cet art contribue-t-il à perfectionner l'entendement* (Amsterdam, 1777).

10 Senebier 1775 (as in note 9), vol. 1, xvi.

11 Ibid., 2.

12 Ibid., 6.

13 See Lorraine Daston, *Eine kurze Geschichte der wissenschaftlichen Aufmerksamkeit* (Munich: Carl Friedrich von Siemens Stiftung, 2001).

Exploration

In terms of exploration, one of the eighteenth century's major feats was the completion of the maritime exploration of the world. But European exploration of land also proceeded at an increasing pace, carried out for geodetic, commercial and political purposes: Bouguer and La Condamine explored the Andes in 1736, the German naturalist Pallas crossed the Ural and Siberia in 1768-1774, the Frenchman Volney travelled to the Lebanon mountain chain in 1783, to name only a few.[14] Within Europe also, expeditions were launched to explore and chart the remaining blank spaces on existing maps: the mountains, in particular the Alps. A few distinguished naturalists, many of them Swiss, ventured into the highest altitudes in the late eighteenth century, including Johann Jacob Scheuchzer and Albrecht von Haller, Hans Conrad Escher von der Linth, Jean Louis Giraud Soulavie, Jean-Baptiste Micheli du Crest, Louis-François Ramond de Carbonnières, or Horace-Bénédict de Saussure. They crisscrossed the alps, climbed glaciers, named summits, measured their altitude and sketched their profile, recorded the weather conditions, the cultures of the inhabitants and the geological make-up of the Alpine range. Confronted with entirely new vistas and experiences, these naturalists produced writings that are particularly rich sources for understanding the new observation ethos as it was practised in the field.

Elevation, the view from above, is a fundamental feature of this experience, which granted them a privileged access to knowledge. For Ramond "les idées [...] gagnent en généralité ce que l'horizon gagne en étendue."[15] As far as geological investigation went, de Saussure argued, plains were uniform and provided little information. Only the physical geography of mountains, infinitely varied in their shapes and in their constitution, could advance the theory of the earth. From their summits, "l'on embrasse d'un coup-d'œil l'ordre, la situation, la direction, l'épaisseur et même la nature des assises dont elles sont composées, et des fissures qui les traversent".[16] But for this, "il faut quitter les routes battues et gravir sur des sommités élevées d'ou l'œil puisse embrasser à la fois une multitude d'objets."[17] When he finally reached the summit of Mont Blanc in 1878 after years of failed attempts, and contemplated the whole *Massif* before him, de Saussure believed he had at once understood the structure of the whole range.

But one needed to know how to look at mountains. "L'unique but de la plupart des voyageurs qui se disent naturalistes, c'est de recueillir des curiosités; ils marchent ou

14 See Numa Broc, „Les Montagnes vues par les Géographes et les Naturalistes de langue française au XVIIIe. siècle," *Mémoires de la Section de Géographie 4* (1969); Gilles Bertrand (ed.), Discours sur la montagne (XVIIIe - XIXe siècles): rhétorique, science, estétique (Bern, Berlin, Frankfurt/M.: P. Lang, 2001).

15 Louis-François Ramond de Carbonnières, *Observations faites dans les Pyrénées, pour servir de suite à des observations faites sur les Alpes, insérées dans une traduction des Lettres de W. Coxe sur la Suisse* (Paris: Belin, 1789), 27. Cited in Broc 1969 (as in note 14), 27.

16 Horace-Bénédict de Saussure, *Voyages dans les Alpes* (Neufchatel: Chez Samuel Fauche, 1779), vol. I, II.

17 Ibid., III.

plutot ils rampent; les yeux fixés sur la terre, ramassant ça et là de petits morceaux, sans viser à des observations générales. Ils ressemblent à un antiquaire qui grateroit la terre à Rome, au milieu du panthéon ou du colisée, pour y chercher des fragments de verre coloré, sans jetter les yeux sur l'architecture de ces superbes édifices." The proper approach, de Saussure countered was another: exactitude in the observation of details was to be cultivated ("ce sont ces détails, qui seuls peuvent former la base d'une connaissance profonde & solide"[18]), but should not be carried out at the expense of the whole picture : "je voudrois [...] que la connaissance des grands objets et de leurs rapports fût toujours le but que l'on se proposât en étudiant leurs petites parties."[19]

Instruments played an important role on these expeditions. Triangulations, barometric, hygrometric and thermometric readings, sketches carried out with the help of the telescope were an integral part of these investigations. But while some naturalists swore by measurement, most, though they brought instruments with them, also insisted on the importance of the trained eye. In his treaty on observation Benjamin Carrard insisted that "Ce n'est pas assez d'être fourni d'instrumens, il faut acquerir, s'il est possible, par un long exercice, le coup d'œil, l'habileté & l'expérience nécessaire pour s'en servir convenablement."[20] In his explorations of the Pyrenees from the 1780s, Ramond relied on his "œil exercé", his "coup d'œil," that enabled him to measure distances using his pace, to measure depths and proportions using trees growing on slopes.[21] The Alp explorers prefigured Alexander von Humboldt's understanding of precision as described by Michael Dettelbach, considering instruments as "extension of the senses," and their senses as delicate instruments.[22] Senebier wrote that instruments "représentent communément les objets avec plus de précision [...] ils deviennent ainsi une partie essentielle de nos sens qu'ils perfectionnent & les suppléments de leur faiblesse qu'ils diminuent."[23]

That Humboldt and the late eighteenth century naturalists shared similar views was no coincidence, for the programme of the new discipline of geography in the early nineteenth century was rooted in the mountain naturalists' study of landscape. Alexander von Humboldt thus attempted in his *Ansichten der Natur* (1807) to set up a Physiog-

18 Ibid., XV.

19 Ibid., II-III.

20 Carrard 1777 (as in note 9), 240.

21 See Marie-Noëlle Bourguet, "Landscape with numbers: natural history, travel and instruments in the late eighteenth and early nineteenth centuries," in *Instruments, Travel and Science. Itineraries of Precision from the seventeenth to the twentieth century*, ed. Marie-Noëlle Bourguet, Christian Licoppe, and H. Otto Sibum (London: Routledge, 2002), 96-125; Marie-Noëlle Bourguet and Christian Licoppe, "Voyages, Mesures et Instruments: une nouvelle expérience du monde au Siècle des Lumières," *Annales Histoire, Sciences Sociales* 5 (1997): 1115-1151.

22 Michael Dettelbach, "The Face of Nature: Precise Measurement, Mapping, Sensibility in the Work of Alexander von Humboldt," *Studies in the History and Philosophy of the Biological and Biomedical Sciences* 30 (1999): 473-504.

23 Senebier 1775 (as in note 9), 4.

nomy of Nature, the "Verklammerung von Anschauen und Messen, Erleben und Experimentieren, Natur geniessen und Natur beherrschbar machen."[24] Humboldt's physiognomy aimed at grasping the "Totaleindruck einer Gegend," that is, "Luftbläue, Beleuchtung, Duft, der auf der Ferne ruht, Gestalt der Thiere, Saftfülle der Kräuter, Glanz des Laubes, Umriß der Berge."[25] Thus the coup d'œil (whether "armed" – helped by instruments – or not) found its way into the Humboldtian project, "die Natur mit einem Blicke zu erfassen."[26]

Representation

This approach to landscape required new forms of representation. For the naturalists, communicating perception, in narrative, diagrammatic or pictorial form essentially belonged to the practice of observation. As Senebier wrote, "l'art d'observer est l'art de se former des idées claires & exactes de tous les objets qui agissent sur les sens, & de les communiquer comme on les a reçues."[27] Micheli du Crest's "Prospect Geometrique" (1754), de Saussure's "Vûe circulaire" (1776), Franz Ludwig Pfyffer von Wyher's "Plan perspectif" (1777), Giraud-Soulavie's "coupe verticale" (1883) or Escher's "Circularaussicht" (1792) are some of the most striking attempts by the naturalists to develop a visual language for representing mountains. The essential features of the Alpine naturalists' art of observing are to be found in these images: the choice of an elevated standpoint reflects their equation between all-encompassing view and understanding; the precise and exhaustive rendering of individual features expresses their attention to detail and variations but also to general features, the necessity of proceeding methodically, but also of recording as many observations as possible, whether meteorological, botanical, anthropological, geological, or geodetic; finally the presence of names and measurements in these pictures testifies to their emphasis on method as well as their use of instruments and of a trained sight to perceive, record and convey the appearance of territories with the utmost accuracy.

The aesthetic dimension of experience was not neglected. The naturalists saw it to be part and parcel of the scientific undertaking: not only were physical sensations

24 Michael Hagner, "Zur Physiognomik bei Alexander von Humboldt" in *Geschichten der Physiognomik*, ed. Rüdiger Campe and Manfred Schneider (Freiburg i. B.: Rombach, 1996), 449.

25 Alexander von Humboldt, "Ideen zu einer Physiognomik der Gewächse" in idem, *Ansichten der Natur* (Nördlingen: Greno, 1986), 245. Humboldt physiognomy also drew on Lavater's adaptation of the observation ethos to the study of character through the analysis of facial expressions. Lavater wrote that "Beobachten ist die Seele der Physiognomik" and conceived *Totaleindruck* to be the result of a quick glance of an eye that ought to be "vorzüglich fein, hell, scharf, schnell, und fest". Johann Caspar Lavater, Von der *Physiognomik*, ed. Karl Riha and Carsten Zelle (Frankfurt am Main: Insel Verlag, 1991), 58 (originally published 1772).

26 Alexander von Humboldt, *Kosmos, Entwurf einer physischen Weltbeschreibung* (Stuttgart et al.: Cotta, 1845-1858), 90.

27 Senebier 1775 (as in note 9), 5.

and emotions often difficult to separate, but they partook in a wider conception of the unity of nature and of science and the interconnectedness of phenomena. These images accordingly combine measurement and sensibility, science and art. They may be seen as the counterpart to the scientization of the artistic gaze in the pre-romantic period, witness Jean Hoüel's drawings of Sicilian basalt formations of 1782-7;[28] and especially Caspar Wolf's *Merkwürdigen Prospekte aus den Schweizer-Gebürgen* (1777), the product of years of mountain exploration together with the naturalist Samuel Wyttenbach.[29]

An exemplary, if somewhat later expression of this approach seeking to combine aesthetics and science, to convey the harmony of nature accurately is to be found in Carl Gustav Carus' *Briefe über Landschaftsmalerei* (1827). The doctor, naturalist and artist Carus called for the "Bildung des Auges zur Wahrnehmung der Natur,"[30] in order for landscape art no longer to consist of pictures, "die immer nur wieder an Bilder und niemals an die eigentliche Natur erinnern."[31] Mineralogical and geological knowledge was as important to landscape art as anatomy to the representation of human bodies. He insisted on the importance of using the senses for exactly observing all the details of individual forms, and to aim for truthful rendering: "ich fand mich überall zu einem Bestreben nach strenger Wahrheit hingeleitet, weil an einem Gebirge mir keine Linie und an einem nicht künstlich verunstalteten Baume keine Modifikation seines Umfanges zufällig und genauer Nachbildung unwert erscheinen konnte."[32] Not only altitude, situation and shapes should be represented, but also the character of the whole scene should be conveyed: "Etwas [...], was durch Beschreibung gar nicht wiedergegeben werden kann: es ist der Gesamteindruck, welchen die Form eines Gebirges macht, die eigene Art der Linien, welche seine Umrisse bilden, das Verschmelzende oder Rauhe seiner Erhebungen usw."[33] This programme he implemented notably by drawing the geological formations of the Riesengebirge in the 1820s.[34]

28 Susanne Keller, "Der mineralogische Blick des Künstlers Jean Hoüel. Perzeption und Präsentation von Basaltformationen in der *Voyage pittoresque des Isles de Sicile* (1782-1787)," in *Wahrnehmung der Natur, Natur der Wahrnemung*, ed. Gabriele Dürbeck et al., (Dresden: Verlag der Kunst, 2001), 117-134.

29 See Stephan Kunz et al. (eds.), *Caspar Wolf, Ein Panorama der Schweizer Alpen* (Aarau: Aargauer Kunsthaus Aarau, 2001).

30 Carl Gustav Carus, *Briefe und Aufsätze über Landschaftsmalerei* (Leipzig: Kiepenheuer, 1982), 79.

31 Ibid., 77.

32 Ibid., 96.

33 Ibid., 97-98.

34 Jenns E. Howoldt, "Von Caspar David Friedrich zu Carl Gustav Carus, Landschaftsmalerei zwischen ästhetischer Autonomie und wissenschaftlichem Anspruch," in *Expedition Kunst, Die Entdeckung der Natur von C.D. Friedrich bis Humboldt*, ed. Jenns E. Howoldt and Uwe M. Schneede (Hamburger Kunsthalle: Dölling und Galitz Verlag, 2003), 9-16.

Education

According to Jutta-Müller Tamm, geography in the nineteenth century was the "bevorzugten Disziplin, in der ästhetische Auffassung und wissenschaftliche Erkenntnis der Natur einander durchdringen und auch programmatisch zusammengeführt werden".[35] In this context it is hardly surprising that landscape painting took on a special role as a didactic resource to popularize the geographical conception of nature. For Humboldt as for Carus, landscape painting ought to embody the synthesis of art and science, as well as stimulate "die Belebung des Naturstudiums." For Humboldt, "in der Ausbildung unserer Sprache, in der glühenden Phantasie des Dichters, in der darstellenden Kunst der Maler ist eine reiche Quelle des Ersatzes geöffnet,"[36] while for Carus "reine Naturerkenntniß, kunstgemäß gestaltet, von selbst zur edelsten Poesie wird."[37]

Humboldt's *Kosmos*, written in the mid-nineteenth century when panoramas had become widespread, advocated the use of such illusionist devices for didactic purposes to convey his physiognomic method and simulate the experience of distant landscapes.

> *Die Vervollkommnung der Landschaftsmalerei in großen Dimensionen (als Decorationsmalerei, als Panorama, Diorama und Neorama) hat in neueren Zeiten zugleich die Allgemeinheit und die Stärke des Eindrucks vermehrt. Was [...] in der Mitte des sechzehnten Jahrhunderts, durch Serlio's Coulissen-Einrichtungen, die Sinnestäuschung vermehrte, kann jetzt, seit Prevost's und Daguerre's Meisterwerken, in Barker'schen Rundgemälden, die Wanderung durch verschiedendartige Klimate fast ersetzen. Die Rundgemälde leisten mehr als die Bühnentechnik, weil der Beschauer, wie in einen magischen Kreis gebannt und aller störenden Realität entzogen, sich von der fremden Natur selbst umgeben wähnt. Sie lassen Erinnerungen zurück, die nach Jahren sich vor der Seele mit den wirklich gesehenen Naturscenen wundersam täuschend vermengen. [...]*
>
> *Alle diese Mittel [...] sind vorzüglich geeignet die Liebe zum Naturstudium zu erhöhen; ja die Kenntniß und das Gefühl von der erhabenen Größe der Schöpfung würden kräftig vermehrt werden, wenn man in grossen Städten neben den Museen, und wie diese dem Volke frei geöffnet, eine Zahl von Rundgebäuden aufführte, welche wechselnd Landschaften aus verschiedenen geographischen Breiten und aus verschiedenen Höhezonen darstellten. Der Begriff eines Naturganzen, das Gefühl der Einheit und des harmonischen Einklanges im Kosmos werden um so lebendiger unter den Menschen, als sich die Mittel vervielfältigen, die Gesammtheit der Naturerscheinungen zu anschaulichen Bildern zu gestalten.*[38]

35 Jutta Müller-Tamm, *Kunst als Gipfel der Wissenschaft. Ästhetische und wissenschaftliche Weltaneignung bei Carl Gustav Carus* (Berlin et al: de Gruyter, 1995), 39. See also Howoldt/Schneede 2003 (as in note 34); Claude Reichler, *La Découverte des Alpes et la Question du Paysage* (Chêne-Bourg: Georg, 2002).

36 Humboldt, *Ansichten* (as in note 25), 260.

37 Carus in Müller-Tamm 1995 (as in note 35), 167.

38 Humboldt, *Kosmos* (as in note 26), 93-94.

As Annik Pietsch shows in this volume, the concern for a simultaneously accurate but also vivid representation of natural landscapes led artists like Carl Blechen to develop new techniques that even took into account the sensory apparatus of the spectator. For proponents of the new geography such as Humboldt, the illusionist virtues of such devices as the panorama was germane to and could be enrolled for introducing the public in the geographical way of seeing.

The Alpine Panorama

The only existing examples of the type of landscape art that Carus advocated were according to him the "Zeichnungen von Gebirgen [...] gezeichnet von Geognosten, welche, ohne irgend Künstler zu sein, die Notwendigkeit der Nachbildung einer gewissen merkwürdigen Gebirgsform empfanden, und diese Zeichnungen hatten so viel inneres Leben, so viel Charakteristisches, daß man einige technische Unbehilflichkeit gar nicht achtete und sie bei weitem vorziehen mußte andern ähnlichen Zeichnungen, von sehr routinierten Künstlern gegeben, aber ohne Ahnung von der eigentlichen Natur des dargestellten Gegenstandes."[39]

If the images produced by the Alpine naturalists were seen to stand for the new geography, they have also often been interpreted as forerunners of the commercial panorama.[40] The paintings and sketches of Micheli du Crest, Escher von der Linth or de Saussure certainly constitute some of the first attempts at circular views and all-encompassing horizontal or vertical projections. But they announce the panorama not only in formal terms, i.e. the type of projection adopted, but also in other respects, especially the emphasis on geological-topographical accuracy and on sensory immersion. Could not then the panoramic type of representation already constitute precisely one such "Quelle des Ersatzes" of the geographical coup d'œil, prefiguring and announcing Humboldt's project?

An appropriate example might be the *Panorama von Thun und seiner Umgebung* (Figures 1 and 1a). This panorama, the first produced in Switzerland and the oldest still extant, was painted in 1808-1814 by Marquard Wocher in the context of the mountain naturalists' investigations. It is reminiscent of their undertakings especially in the choice of landscape, as well as in the accuracy and precision of its rendering, topographical as well as perspectival.[41]

39 Carus 1982 (as in note 30), 81.

40 See *Augenreisen. Das Panorama in der Schweiz*, ed. Schweizerisches Alpines Museum/Schweizer Alpen-Club SAC (Bern: Schweizerisches Alpines Museum, 2001); Gustav Solar, *Das Panorama und seine Vorentwicklung bis zu Hans Conrad Escher von der Linth* (Zurich: Orell Füssli, 1979); Hans Conrad Escher von der Linth, *Die ersten Panoramen der Alpen, Zeichnungen, Ansichten, und Karten*, ed. René Brandenberger (Mollis: Linth-Escher Stiftung, 2002).

41 Solar 1979 (as in note 40), 11; H. Albert Steiger-Bay, "Marquard Wocher und sein Panorama von Thun," *Zeitschrift für Schweizerische Archaeologie und Kunstgeschichte* 11 (1959): 43-53.

Fig. 1 / Colour Fig. IX Marquard Wocher (1760 – 1830), Panorama of Thun and its Surroundings, 1809 – 1814 oil on canvas, 7.5 x 38.3 m. Depositum Gottfried Keller-Stiftung, Kunstmuseum Thun. Photo: Christian Helmle.
Fig. 1a / Colour Fig. X Detail of Fig. 1

In the realisation of this as of other panoramas, techniques were employed and aims pursued which conformed to the naturalists' practices and values. The emphasis on overview and especially the accuracy of rendering in panoramas, as in the new landscape painting testify to a common concern for describing and measuring nature.[42]

Though little is known concerning the making of this particular panorama, an extensive account of the techniques and procedures involved in the realisation of panoramas generally was published by German Bapst in 1891. He explains how teams of artists were sent in the field to choose a suitable viewpoint of the scene to be represented, devoid of obstacles and from which the scene could be easily grasped. The artists then produced connecting sketches covering the whole horizon. To ensure a faithful rendering, according to Bapst, the earliest panorama makers used a camera obscura (sometimes on a pivot), or the traditional Alberti window, a grid of threads to separate the whole view

42 See Yvonne Boerlin-Brodbeck, "Vermessene Landschaft? Zur Landschaft in Zeichnung und Malerei um 1800," in *Vermessene Landschaften, Kulturgeschichte und technische Praxis im 19. und 20. Jahrhundert*, ed. David Gugerli (Zürich: Chronos, 1999): 113-123.

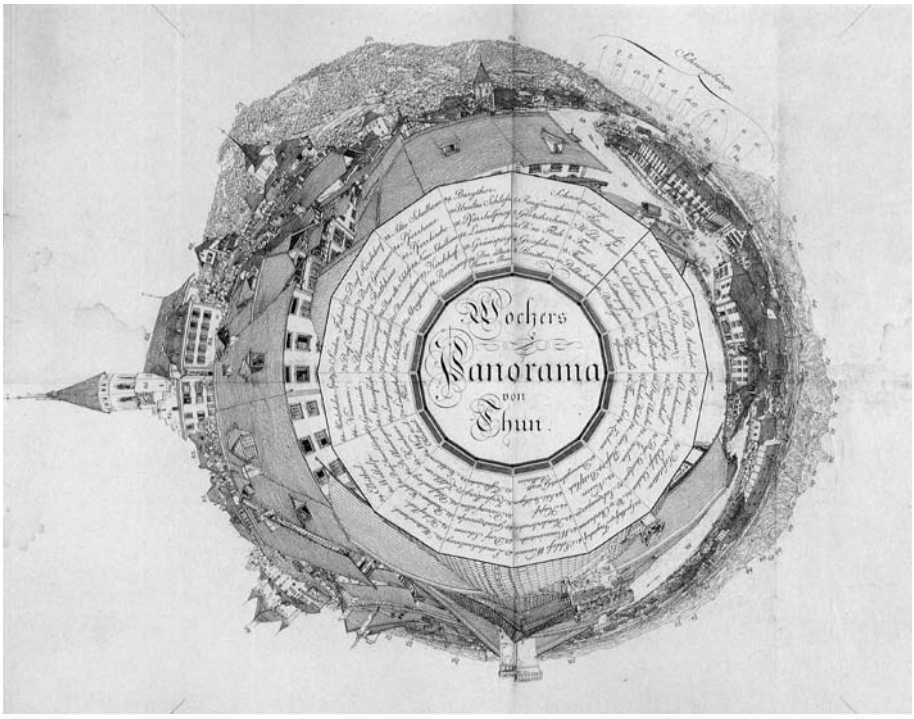

Fig.2 Marquard Wocher (1760-1830), Panorama Orientation Map, 1811 copper engraving, 32.5 x 40.4 cm, Kunstmuseum Thun, Photo: Christian Helmle.

into distinct frames. To these were added in the nineteenth century optical devices such as the camera lucida and telescopes, and from 1855 photography: photographs were then projected on the panorama canvas to assist in the painting process. But the best artists, Bapst maintained, relied on their eye alone: accurate rendering by inspiration and intuition had a way of grasping the spectator which mechanical devices could not achieve. Again we find talent emphasised here, which, with or without the help of instrumentation, is able to convey a true picture of the scene, topographically exact but also faithful in rendering the impressions experienced on-site. The preparatory fieldwork for the panorama further involved an in-depth study of all individual details, including the typical vegetation of the chosen location, as well as its buildings, weather and light conditions. Samples were collected, to serve as models for the final painting or as authenticity-enhancing devices when set up in the faux-terrain. Witnesses' accounts were solicited to ensure in every way that the scene was exactly rendered.[43] It is known for instance in the case of the Thun panorama that Wocher asked relatives in Thun to inform him of any changes being made to the city during the months it took to prepare the panorama in Ba-

43 Germain Bapst, *Essai sur l'Histoire des Panoramas et des Dioramas, Extrait des Rapports du Jury International de l'Exposition Universelle de 1889* (Paris: Imprimerie Nationale, 1891), 9-11.

Fig. 3 Horace-Bénédict de Saussure, Vûe circulaire des Montagnes qu'on découvre du sommet du Glacier de Buet. Voyage dans les Alpes (Neufchatel: Chez Samuel Fauche, 1779), Vol. 1, plate 8 (opposite p. 512).

sel.[44] All in all, as critics always insisted, the panorama painter should observe "die Natur auf's Genaueste" in order to produce a "harmonische und naturgetreue Wirkung im Ganzen und genaue Ausführung im Einzelnen".[45]

How exactly the panoramic representation is constructed and how it expresses the naturalist coup d'œil is however best shown through a study of the horizontal projections of panoramic paintings that were usually distributed to panorama visitors (Figure 2). De Saussure claimed to have invented this form of representation. Describing the dangerous and tiring ascent of the Buet summit, he wrote that he was stimulated by "l'espérance du grand spectacle dont il va jouir, & des vérités nouvelles qui en seront les fruits." But he was overcome with perplexity as he sought to draw the landscape before his eyes in its totality and in detail and to render his exact impression. "Lorsque j'eus achevé la description des objets infiniment variés que j'avois sous les yeux, je vis clairement qu'il me seroit impossible d'en donner à mes Lecteurs une idée un peu nette sans y

44 P. L. Ganz, *Das Rundbild der Stadt Thun* (Basel: Gesellschaft für schweizerische Kunstgeschichte, 1975), 6.

45 Anon., "Panorama von Salzburg," *Kunstblatt* 61 (30. July 1829): 243-44.

joindre des dessins. Mais en employant des vues ordinaires, il en auroit fallu un grand nombre; & plus elles auroient été nombreuses, moins elles auroient rendu l'ensemble & l'enchaînement de toutes ces montagnes, comme on les voit dans la Nature."[46]

This led de Saussure to imagine a novel form of representation, the horizontal projection, which he argued was closer to real perception (Figure 3). He developed a method with the aim of "assujettir cette espèce de dessin, à une exactitude presque géométrique,"[47] whereby the drawer traced a circle figuring his eye level, placing each object at a proportional distance, measured using a graphometer, above or below (i.e. outside or inside of) this horizon.[48] The anamorphic projection technique of the horizontal panorama remains unfamiliar to us and conveys perhaps better than the vertical panorama the novelty of the perspective on landscape developed by the naturalists. It embodies the *Gesamteindruck* nature of the coup d'œil while emphasising the central position of the observer, figured by the blank space in the middle of the horizontal panorama. The observer is the central referent and determines the appearance of the representation, since the image is constructed on the basis of the circular horizon line at the height of the observer's eye. Dispensing with the conventional rules of perspective, dismissed as being artificial, de Saussure wished to convey on paper the exact and immediate impression he experiences at the summit of the Buet. The reader of his image is invited to reproduce his experience by turning the horizontal panorama to examine its different sights, just like de Saussure turned on his feet as he drew the outline of the landscape before him. The small-scale horizontal panoramas distributed to panorama visitors fulfilled exactly this function: in the rotunda, spectators experienced the vertical panorama using the flyer as a guide indicating the names of places and peoples to be seen – just like de Saussure's book and images served as guides to the first Alp tourists. Daniel Speich has pointed to the important objectifying function of the naturalists' Alpine images, and by extension of alpine panoramas. Long before maps of the region became available, these attempts to name, measure and give precise representations made it possible for the Alps to become touristic landscapes.[49]

Thus while the subjects chosen for representation in panoramas were not usually or purely geographical in nature, the techniques employed and the impressions they were meant to give rise to were germane to the observation ethos and techniques of representation developed by the late eighteenth-century naturalists and early nineteenth-century geographers. As devices primarily made for popular consumption by commercial entrepreneurs, panoramas only rarely fulfilled the didactic ambitions dreamt by Humboldt. Yet they partook in the transformation of ways of seeing landscape in this period, together and in accordance with naturalists' representation of nature. In this light, the pano-

46 de Saussure 1779 (as in note 16), 496.
47 Ibid., 497.
48 de Saussure 1779 (as in note 16), vol. 2, 326-330.
49 Speich 1999 (as in note 7).

rama's material reconstruction of real landscapes offered its visitors the immediate experience of the coup d'œil, purified of preliminary training or tiring ascensions; and thereby helped popularize the naturalist -geographical gaze.

Topography

"La guerre est déclarée; et déjà l'officier [...] pénètre sur le territoire ennemi, l'épée et le crayon à la main, observant et prêt à combattre."[50] Another, related modality of observing landscape informing the panoramic vision is the distinctly more utilitarian military topography. Like Humboldtian geography, military topography is rooted in the late eighteenth century observation of landscape, though it takes it in a very different direction.

The notion of coup d'œil is used in military jargon to this day. Carl von Clausewitz in his theoretical treaty *Vom Kriege* (1832) arguably gave it its modern meaning. Clausewitz believed that, together with resolution, the coup d'œil is the most important quality for the pursuit of war. It is the general's ability for immediate and all-encompassing perception of a scene enabling the right decision to be made:

> *Weil [...] in den Gefechten Zeit und Raum wichtige Elemente sind, [...] so ist der Begriff eines schnellen und treffenden Entschlusses zuerst aus der Schätzung jener beiden Dinge hervorgetreten und hat daher einen Ausdruck zur Bezeichnung bekommen, der nur auf richtiges Augenmaß geht. [...] Aber es ist nicht zu verkennen, daß bald alle im Augenblick der Ausführung gefaßten treffenden Entschlüsse darunter verstanden worden sind, z. B. das Erkennen des wahren Angriffspunktes usw. Es ist also nicht bloß das körperliche, sondern häufiger das geistige Auge, welches in dem coup d'œil gemeint ist. [...] so ist er nichts als das schnelle Treffen einer Wahrheit, die einem gewöhnlichen Blick des Geistes gar nicht sichtbar ist oder es erst nach langem Betrachten und Überlegen wird.*[51]

The military coup d'œil, then, differs from the naturalists' in being an accurate survey of landscape absolutely situated in time and for immediate purposes of action.

Clausewitz' treaty has been seen as an attempt to make sense of Napoleon's innovative strategy and tactics of war and his emphasis on the coup d'œil is an accurate reflection of the importance of topography in the post revolutionary French military ventures. The *ingénieur-géographe* corps had been created in France in 1777 as an answer to the growing need for topographical information for the purposes of modern warfare: smaller, more mobile troop units, their joining forces for large-scale battles, better and lighter artillery enhanced the need for infrastructure on the ground and for maps. The ingénieurs géographes were in charge of *reconnaissance* (exploring territory in small units ahead of the army) in times of war, and of collecting and producing information on territories in times of peace. This included geodetic surveying but also the assessment of the resources of the

50 *Mémorial Topographique et Militaire, rédigé au Dépôt Général de la Guerre; par Ordre du Ministre* 4 (an X-XI): 31.

51 Carl Clausewitz, *Vom Kriege* (Berlin: Dümmlers Verlag, 1832), 59-60.

land, including population and agricultural production. The civilian purposes of topography were inseparable from their military uses, as the information produced could just as easily serve for the distribution of land, taxation, and administration. The exponential growth of military topographical production in the late eighteenth and early nineteenth centuries evidently served the increasing rationalisation, centralisation and control exercised by the French State in this period inside its borders but also in its newly acquired territories. In the first half of the nineteenth century, French topography was influential in other nations, and its methods widely adopted.[52]

In her fine analysis of French topographical visual practices in this period, Valeria Pansini has shown that the coup d'œil first makes its appearance in treatises from the 1760s, becoming a central feature of military topographical practice in the early nineteenth century, as displayed by the *Mémorial Topographique et Militaire*, a series of volumes published from 1802 compiling and systematising the *ingénieurs-géographes*' practices. It is identified as the ability to make measurements without instruments, a skill typically associated with *reconnaissance à vue*. This rapid survey of enemy territory cannot involve cumbersome or visible instrumentation which would make the officer's presence conspicuous to enemy populations and put him at risk. He must therefore undergo an in-depth training of the sight in order to use his body and his senses for measurement: the pace of his horse and its variations at different slope angles, the height of his eyes must be known quantities which serve as measuring units in the field. The officer must be aware of visual deformations due to distance or illumination and be able to use these for his purposes; he must be able to transform viewed landscapes into precise geometrical relations.[53] Proficiency can only be gained through experience and practice: "ce coup d'œil pratique, ce tact, pour ainsi dire, involontaire, que donne seule l'habitude de voir et d'observer: c'est celui du chasseur des Alpes et des Pyrénées, errant dans les montagnes et ne s'égarant jamais."[54] As for the naturalists, the coup d'œil is intimately related to the view from above: "cet instinct, si l'officier le possède, le dirigera sans effort et ne le trompera jamais. Il ne s'agit, pour l'avoir, ni de science ni d'étude. Qu'il observe souvent, du haut des montagnes et des points élevés, la direction des hauteurs, des eaux et des routes, la position

52 Anne Godlewska, "Napoleon's Geographers (1797-1815): Imperialists and Soldiers of Modernity," in *Geography and Empire*, ed. Anne Godlewska and Neil Smith (Oxford: Blackwell, 1991), 31-54; Patrice Bret, "Le Dépôt général de la Guerre et la formation scientifique des ingénieurs-géographes militaires en France (1789-1830)," *Annals of Science* 41 (1991): 113–57. On the propagation of the French culture of surveying and geodesy abroad see, e.g. on Sweden, Sven Widmalm, *Mellan kartan och verkligheten: Geodesi och kartläggning, 1695–1860* (Uppsala: Inst. för idé- och lärdomshistoria, 1990).

53 *Mémorial* (as in note 50), 4, 95-154; Valeria Pansini, *L'Œil du Topographe et la Science de la Guerre (1760-1820)*, Thèse de Doctorat EHESS (Paris 2002), esp. 292-303 and 239-248. On the coup d'œil in German topography of the time see Zeno G. Swijtink, "Coup d'œil and proprio marte: Bodily aspects of reasoning in Johann Lambert's Graphical Representations" (unpublished manuscript). I am grateful to Lorraine Daston and Simon Werrett for bringing this text to my attention.

54 *Mémorial* (as in note 50), 4, 43.

des villes, des villages, des hameaux et de tous les objets que le terrain offre à sa surface [...] bientôt son œil démêlera, dans cette confusion apparente, un ordre général [...] il sera frappé [...] de sa physiognomie"[55]

The coup d'œil goes beyond observation, Pansini argues, for the topographer must be able not only to see and record all relevant details, but also for instance to infer from the steepness of slopes the time it will take for particular army corps to walk across them. In the specialised army, the topographer is the trained eye of the general and is in charge of producing the general's coup d'œil, the instant, synthetic yet detailed vision of the whole situation that will enable decision-making, "l'art d'embrasser à la fois tous les rapports du terrain et les opérations, de combiner mille données, et d'en tirer à l'instant même des moyens de victoire."[56] It is the formalisation of the particular genius of war into a practice of seeing fostered and kept in a particular corps, the ingénieurs géographes.[57]

This knowledge was safeguarded in the bodies of the geographers but also in maps, *mémoires descriptifs* and paintings, as the *Mémorial* demonstrates. Taken together, they constitute "le tableau raccourci de chaque contrée."[58] The topographer's task was an historical as much as a cartographic one: through narratives, maps and paintings, an accurate rendering of past battle situations was to be reconstructed. Already on the battlefield, "l'ingénieur géographe [...] recueille des matériaux précieux pour les marches rétrogrades, les retours offensifs, l'histoire de la guerre présente, et les combinaisons des guerres à venir."[59] Pansini has shown how the paintings representing past battles were considered scientific sources of information and were commissioned and kept in the Dépôt de la Guerre. Their production followed strict procedures. The topographers wrote protocols for the artists, spelling out the official interpretation of the events, choosing the moment and the point of view to be represented, and the details to be shown. Artists had to ask for authorisation to introduce or modify details of the painting. Veridical representation was the central criterion though aesthetic considerations were taken into account: exact rendering involved not only representing the right uniforms but also the "character" of the battle.[60]

55 Ibid.
56 Ibid. 3.
57 Pansini 2002 (as in note 53), 311-315.
58 *Mémorial* (as in note 50), 3, xix.
59 Ibid., 4, 32.
60 Pansini 2002 (as in note 53), 323-348. See also Xavier Salmon, *Napoleone in Italia: negli acquarelli di Giuseppe Pietro Bagetti e nelle cronache di Stendhal e di Adolphe Thiers* (Milan: F. M. Ricci, 2001).

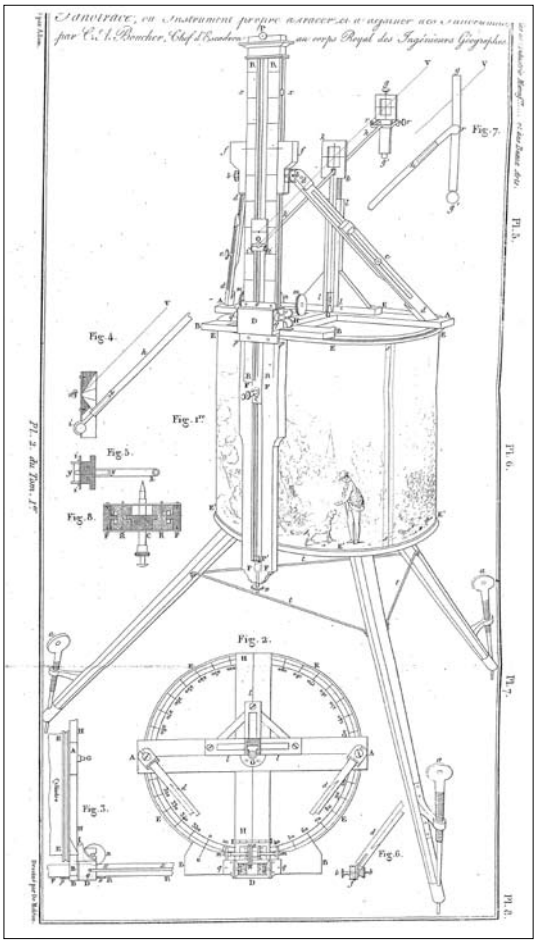

Fig. 4 "Panotrace, ou Instrument propre à tracer et à dessiner des Panoramas, par C.A. Boucher, Chef d'Escadron au corps Royal des Ingénieurs Géographes" Drawn by De Moléon. Annales de l'Industrie Manufacturière, Agricole et Commerciale de la salubrité publique et des Beaux-Arts 1 (1827), second plate.

The battle panorama

Panorama painting was a natural continuation of the topographer's activity. To begin with, the techniques of panorama painting share many similarities with those of topography. Renzo Dubbini has even argued that prior to 1787 circular views are mainly to be found in military topography and constitute precursors of the survey.[61] This connection becomes all the more apparent in the nineteenth century with the growing number of panoramas representing battles. Topographical officers were not only often solicited as witnesses and advisors guaranteeing the authenticity of details, they were often involved in the business of panorama painting itself. The ingénieur-géographe C. A. Boucher for instance published in 1827 an article detailing the advantages of the "Panotrace, ou instrument propre à dessiner les panoramas". This device based on the topographical men-

61 Renzo Dubbini, *Geography of the Gaze* (Chicago: University of Chicago Press, 2002), 73-82.

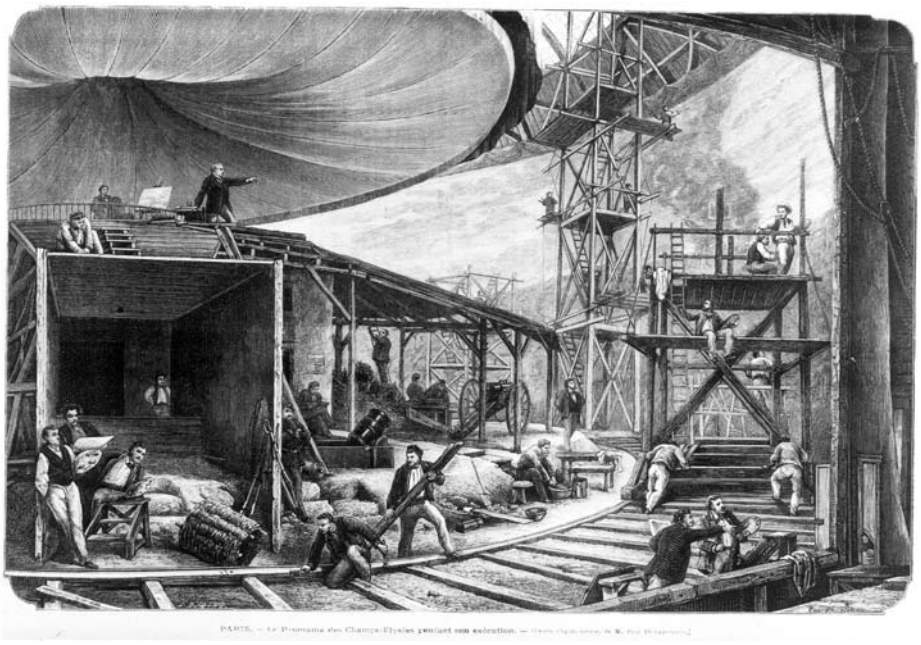

Fig. 5 Jean-Charles Langlois directing the operations in his panorama. Paris. – Le Panorama des Champs-Elysées pendant son exécution – dessin d'après nature. de M. Paul Philippoteaux Le Monde Illustré: Journal Hebdomadaire, 2. November 1872. Staatsbibliothek zu Berlin – Preußischer Kulturbesitz, Abteilung Historische Drucke.

sula consists of a cylinder equipped with a prism facilitating the transport of actual views on a curved surface giving realistic perspective (Figure 4).[62] Later in the century and with the multiplication of panoramas, professional "perspecteurs" were employed, who were trained in topography and geometry, as Bapst recalled: "Ces hommes de métier, par une méthode scientifique, projettent des courbes passant par des points déterminés, rabattent des plans, calculent l'éloignement, étudient les dimensions et, au moyen de la géométrie descriptive, résolvent les problèmes qui leur sont posés en mettant au point l'objet en lui donnant les dimensions et les formes qu'il doit avoir sur la toile pour le faire paraître, à nos yeux, tel que la réalité".[63]

The most striking examples of this connection between topography and panoramas are Colonel Langlois' battle panoramas. After studying descriptive geometry, topographical and landscape drawing at the new Ecole Polytechnique, Jean-Charles Langlois took part from 1807 in the Napoleonic campaigns as a topographer. After his early retire-

62 C.A. Boucher, "Panotrace," *Annales de l'Industrie Manufacturière, Agricole et Commerciale de la salubrité publique e des Beaux-Arts* 1 (1827), 104-116. I am grateful to Annik Pietsch for bringing this text to my attention. On the mensula see Swijtink (as in note 53), 10-15.

63 Bapst 1891 (as in note 43), 10.

Indicateur des Alpes près d'Aarau, en Argovie (Suisse);
appareil destiné à indiquer au touriste le nom des montagnes vues d'un lieu élevé.
(Dessin d'après nature, par l'auteur.)

Fig. 6 The outdoor panoramic experience is closely patterned on its indoor original, with the provision of a special, elevated viewing platform and of guides for reading the landscape. On site, tables were built, sometimes as here equipped with a viewfinder, that reproduced the sights with indications of names and altitudes. The author's description of the device recalls de Saussure's horizontal panorama: "the space between the viewfinder and the table's circumference has been divided in regularly spaced, concentric half-circles centered on the viewfinder, whose intervals represent 5 km in the line of sight;" while the device itself recalls military surveying techniques. René Lacker, «L'Indicateur des Alpes,» La Nature 23/1 (1895), 101.

ment, he learned painting in Parisian ateliers before launching his own panorama business in 1830.[64]

Langlois is best known for the numerous innovations he contributed to the commercial panorama, from the introduction of frosted glass in the windows lighting the panorama from above, to the improvement of faux terrain props. Some of these innovations were directly inspired by topographical practice, for instance his habit of drawing landscapes not only from one, but from six different standpoints, which implied his use of precise topographical maps.[65] His choice of the perspective and the moment to be represented in the panorama fully accords with the military-topographical coup d'œil and its rendering in paintings (Figure 5).

The booklet accompanying the *Panorama de la Bataille de la Moskowa* indicates that "Le spectateur est placé dans la seule cabane qui ait échappé à l'incendie du village de Séménowskoïe. [...] Pour rendre l'explication du tableau plus facile et plus claire, nous supposons que le spectateur fait face à la cavalerie russe, qui exécute une charge sur le régiment d'infanterie, formé en carré."[66] A particularity of several of his panoramas, likely related to his multiple standpoint method, is the doubling of the privileged perspective. After a long description of the panorama painting, the booklet advises the spectator to examine the emperor's figure: "l'empereur, qui seul, au bord du ravin, observe de son œil d'aigle la marche de cette action terrible, appelée avec raison par lui une bataille de géants, et qui dirige, de ce point central, tout l'ensemble de cette scène immense."[67] The spectators, themselves in the middle of the panorama, can observe the emperor overseeing the battle and deploying his coup d'œil.

In the booklet, Langlois has further replaced the horizontal panorama of the naturalists on the one hand by a topographical map, and on the other by a detailed, written description of his own researches: "Pendant près d'un mois je parcourus cette plaine dans tous les sens, observant et dessinant tous ses détails pour les reproduire ensuite avec une exactitude religieuse; presque rien n'était changé."[68] Finally, the battle itself is described, accompanied by reports of witnesses and actors, which all contribute to establish the authenticity of the representation. Painting, narrative, map: Langlois was closely following the Dépôt de la Guerre's procedures.

If topographical painting recorded information on past battles for purposes of future study and archiving, they could also clearly be used for nationalist propaganda; and the increasing exchanges between topography and panorama painting in the nine-

64 François Robichon, "Langlois, photographe et panoramiste" in *Jean-Charles Langlois, la photographie, la peinture, la guerre, correspondance inédite de Crimée (1855-1856)*, ed. François Robichon and André Rouillé (Nîmes: Editions Jacqueline Chambon, 1992), 9-44.

65 Ibid., 19.

66 Charles Langlois, *Explication du panorama représentant la bataille de la Moskowa* (Paris: Ducessois, 1835), 9.

67 Ibid., 13.

68 Ibid., 4.

teenth century only served to make this dimension more explicit. In 1808 at the latest, when he visited a panorama showing the Tilsitt Interview of 1807, Napoleon recognised the potential of the device for such purposes. He ordered the construction of seven rotundae on the Champs Elysées, each showing a great battle of the Revolution and the Empire. The emperor offered to buy the paintings for 45 thousand francs each; the paintings were then to be rotated around the cities of the Empire. The débâcle of 1812 put an end to this project.[69] Notwithstanding, in the course of the nineteenth century the glorification of nation and battle became one of the most common themes of panoramas; and Langlois could count on the support of Napoleon's successors. Before the emergence of illustrated journalism, panoramas shaped the representation of events of national importance and conquered territories in powerful ways.[70]

The panoramic illusion

> *Locality is the faculty which conduces to the desire for travelling, and constitutes a chief element in the talent for topography, geography, astronomy and landscape painting. It gives what is called 'coup d'œil'. It is necessary to the military draughtsman, and is of great importance to a general in war. The organ is large in the head of astronomers, as Kepler, Galileo, Newton, Tycho Brahe, Descartes; and also of landscape painters and travellers as Captain Cook.*[71]

The coup d'œil ideal of observation shared by naturalists and topographers of the late eighteenth century, though they operate in different registers, emphasise the overview in a literal as well as an epistemological sense: vision from above yields an understanding of the landscape below which is both comprehensive and absolutely exact in all its details. They both insist on the combined scientific and aesthetic components of the observation of landscape as well as on the personal nature of perception. The eye must be trained, sometimes helped by instruments, to measure all dimensions and to identify the relevant relations between the component elements of the landscape. As a highly personal, situated perception of landscape, the panorama experience is fully in line with the understanding of the coup d'œil as a talent, and in which instruments play an epistemologically subordinate role. The spectator is literally put in the eye of the observer. The techniques of the panorama, the way sights are shown therein, the accuracy in the reproduction of landscapes make it in a literal sense a reconstruction of "la Nature a Coup d'œil."

69 Bapst 1891 (as in note 43), 18; François Robuchon, "Langlois et les panoramas Napoléoniens" in *Un peintre de l'épopée napoléonienne, Le Colonel Langlois, 1789-1870* (Paris: P. Giovanangeli, 2000), 16-23.

70 e.g. of Algeria or Egypt. See John Zarobell, "Jean-Charles Langlois' *Panorama of Algiers* (1833) and the Prospective Colonial Landscape," *Art History* 26/5 (2003): 638-668; Anne Godlewska, "Map, Text and Image: the Mentality of enlightened Conquerors: a new look at the Description de l'Egypte," *Transactions of the Institute of British Geographers* NS 20/1 (1995): 5-28; Denise Oleksijczuk, *The First Panoramas: Vision, the Body and British Imperialism, 1787-1820*, forthcoming with the University of Minnesota Press.

71 George Combe, *Elements of Phrenology* (Boston: Marsh, Capen and Lyon, 1834).

But the choice of scene for representation in the panorama rotunda, the ton-heavy materiality of the device and of the reconstructed landscapes, the confinement of the spectators in the central island undermine the transparency and naturalness of the panoramic representation. Instead it might be seen as an engineered simulation of the coup d'œil, stimulating and teaching observers to see an environment in a controlled way. The reproduction of a frozen moment in time enables the spectators to take their own time to form this immediate vision, to note all its features and recover its narratives, whether the geological history of mountain formation or the unfolding of a battle. The illusionist character of the panorama painting, the deliberate dissimulation of the technologies of representation made all the more effective this training of the spectators' eyes in the "utopia of universal and exact visibility";[72] whether for the perception of geographical landscapes as Humboldt conceived it, or for the perception of national landscape as Napoleon imagined it. The ultimate success of the device in shaping vision lies in its material disintegration: it has been forgotten. By the end of the nineteenth century, the outdoor panorama had largely replaced the wood and canvas original. Practices of scientific and military observation that had been built in the entertainment device were in turn transferred to the viewing of touristic landscapes. The panorama has been naturalised.

72 Pansini 2002 (as in note 53), 302.

Fig. IX Marquard Wocher (1760 – 1830), Panorama of Thun and its Surroundings, 1809 – 1814 oil on canvas, 7.5 x 38.3 m. Depositum Gottfried Keller-Stiftung, Kunstmuseum Thun. Photo: Christian Helmle. (see Fig. 1, p. 83)
Fig. X Detail of Fig. IX (see Fig. 1a, p. 83)