# “The International Historiography of Early Color Photography”

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"Color photography is vulgar" (Walker Evans, 1969).

I am very thankful to Michelle Delaney and the NMAH for inviting me to this symposium — and I am very honored — but also very embarrassed to be present among such a distinguished panel. I am by no means an expert of early color experiments, but a cultural historian of American photography and visual culture, and my only title to participate in this symposium is the work I have done on the French reception of the hillotype controversy, which will be an important part of my talk today. The very ambitious title given to this talk should really be rephrased as something like "Some critical notes on the historiography of early color photography and the Hill affair" — indeed very awkward — and still it would have to specify that my point of view is primarily social or ideological, rather than technological. Thus I will begin with some remarks on the treatment, or lack thereof, of color photography and especially early color photography in the general historiography of photography. Then I will concentrate particularly on the common claim that from 1839 on the inability of early processes to record natural colors was unanimously deplored as a "problem", demanding an urgent solution — and yet to remain a problem for quite a long time. I will suggest here that much of the early commentary does NOT lament the lack of color, and that this relative indifference is consistent with a practice and a theory of photography that — except in scientific circles — effectively marginalized color. Finally, I will come back to the Hill affair as a crucial episode in the history of color photography.

## 1. Color in the historiography of photography: a supplemental chapter

As we all know, and as the work of Nathalie Boulouch[1] has demonstrated in detail, color has long been considered a secondary or vulgar province of photography and for that reason has remained a supplemental chapter in the history of photography — whether we are talking of "technical", "artistic", "cultural", "ideological", or other histories. Insofar as color photography has indeed become a historical subject, this has been the result of its emergence as a significant practice either in the industry and the market or in artistic circles. This has happened, on the whole, rather late in the formation of historiography, and therefore it has not significantly altered the structure of historical narratives that were informed by black-and-white or monochrome photography and therefore by a certain conception of photography — as a form of drawing rather than true "sun painting". This structure has continually treated color as a marginal, late-come and supplemental chapter of the history of photography. Let me briefly illustrate this point with a (partial) summary of 20th-century historiography, leaving the 19th-century texts in the subject for the second part of my paper[2].

[1] Nathalie Boulouch, « Peindre avec le soleil ? », *Études photographiques*, 10 | Novembre 2001 ; « Couleur versus noir et blanc », *Etudes photographiques*, 16, 2005.

[2] The critical study of the historiography of color photography has not been much attempted beyond the work of Boulouch and that, in a cultural, American studies perspective, of Jean Kempf. For instance, Liz Wells in her otherwise commendable study of the historiography of photography nowhere addresses the treatment of color (Wells, *Photography: a Critical Introduction*, p. 48-60). I am basing my treatment of the *historiography* on an understanding of the *history* of color experiments based on Nathalie Boulouch's articles and William R. Alschhuler's excellent entries on "color theory and practice" in the recent Routledge Encyclopedia.

The first third of the 20th century, which witnessed the first emergence of practicable color processes — Autochrome plates, various color printing methods such as Viachrome, but not yet the Kodachrome, Kodacolor, Ektachrome which truly popularized color photography after 1940 —, was also the formative moment of an academic historiography of photography. In this period, early color experiments were a small concern of the nascent historiography, and such treatment as there existed was marked by persisting patriotic or chauvinistic biases.

The first sentence of Georges Potonniée's *History of the Discovery of Photography* (Fr. publ. 1925, English transl. by E. Epstean 1936, Engl. repr. 1973) is that "photography is the art of making permanent, by means other than those of manual drawing, the images perceived in the camera obscura" (p. 7). Such images, needless to say, are in natural colors, but for Potonniée as for a long tradition before and after him the analogy of the camera obscura pertained to the photographic rendering of form or line, not of color or light. Potonniée does have a chapter on "The photography of colors" (chap. 42), but it is not longer than 2 pages and it appears as one of the last, between "Photomechanical processes" and "Projections and enlargements", followed by "stereoscopy" and "moving images". The chapter briefly lists a series of French experiments down to 1890 (a series that is classic for us: Becquerel with silver subchloride, Niepce de St-Victor's heliochromy, Ducos du Hauron's and Cros's 1869 concurrent publications on synthetic production of color images, Lippmann's interferential method; Hill, of course, is not mentioned), stopping short of narrating later experiments. Potonniée, indeed, was writing the history of what he called the "discovery" of photography, and not of its whole development; conveniently, this history allowed him to uphold to the doctrine, first established by Arago in his memoirs, that photography was throughout a French invention. In his other publications, more attuned to recent and especially visual developments of photography, Potonniée did not improve much on this peripheral vision of color[3].

A contrasting view, in several respects, is presented in the work of the great Austrian historian Josef-Maria Eder, who in the last edition of his *History* (1932, Engl. transl. 1945, Engl. repr. 1978), devoted two long chapters to "Three-Color Photography" and "Photochromy" (chap. 94 and 95) — discussing many recent experiments and processes as well as the large prehistory of color photography (Scheele, Seebeck, etc.), and incorporating several important secondary sources from the 1920s and 1930s (see p. 664 "the field has grown enormously"). Eder made no mystery, in his postface, of the fact that he sought to redress the nationalist bias and what he saw as the amateurish style of Potonniée and others by giving their due to Austrian and German-language researchers (Becquerel's color experiments are hardly mentioned) and insisting on the *chemical* nature of photography, which particularly explained his interest in color. Still, it remains significant that his two chapters are almost the last of the book (before the final chapter on institutions and journals), and that earlier in the book color experiments are only mentioned in passing, especially within discussions of spectral sensitivity and Vogel's discovery of "optical sensitizers" (see chap. 64), or, even earlier, of coloring daguerreotypes (in this brief chapter Eder dismissed the hillotypes as "nothing but painted daguerreotypes"). From Eder's narrative one gathers a sense of the modern prominence of color processes, especially in cinema and printing — but also of the complex and primarily scientific nature of the subject, which is consistently approached by Eder, according to his general method, from the viewpoint of chemistry rather than that of

[3] Similarly, Gisèle Freund in her 1936 dissertation on photography in 19th century France does not mention color; more significantly, in the later versions of her book (*Photography and Society*, 1974 in Fr.), and especially in her exciting chapter on photography as a means of reproduction of art and as a source for postcards, color is nowhere mentioned either as an achievement or as an important desideratum.

photographic practice[4]. Eder's was perhaps the last "general" history of photography, indeed, written from this scientific and chemical viewpoint; in later "general" histories, primarily written in English, the so-called "technical" history of photography tends to drop from view and this especially affects the treatment of the notoriously complex color experiments.

As for Beaumont Newhall's famous *Photography 1839-1937*, the MOMA catalogue that became the first version of his later, immensely influential *History of Photography*, it does not fundamentally depart from the trend I have just outlined — photography in color remains a marginal subject — and yet it innovates in including a significant number of early color photographs in the exhibition and in attempting to extend to color photography the same esthetic approach that characterizes the text as a whole. Newhall is the first to publicize widely both the new emergence of color processes (Kodachrome) and the fact that they have a history (p. 85: "color photography is not new, but it has not been practiced to any great extent until the present decade"), clearly showing the link between historiography and contemporary practice — as well as industrial strategies, since Newhall relies heavily on Eastman Kodak for both his examples and his literature. His chapter on "Color photography" (p. 81- 85) is one of the last and placed between "News photography" and "Scientific photography". Yet it claims that "the demand for [color] is as old as photography itself" (85) and, citing early criticisms of the daguerreotype as lacking "life and color" (p. 25), highlights Niépce's exchanges with Daguerre on the latter's claims of registering colors in 1827. Newhall's narrative contrasts with Eder's by presenting a clear, pedagogical summary of 19th century researches, distinguishing first between "direct" processes (Lippmann's) and indirect ones, and then further differentiating, among the latter, between "additive" processes (Maxwell, Ives, Joly, Lumière, Dufaycolor) and "substractive" ones (where Newhall traces a direct lineage between Ducos du Hauron and the Kodachrome— not mentioning Charles Cros, nor, indeed, Levi Hill). This narrative will become more or less standard. It places the history of early experiments in a non-scientific light (notably it says nothing of the connections of color experiments on discussions of the theory of light, the Brewster-Helmholtz controversy, etc.). It relates these experiments to a history of photographic practice, even acknowledging that the practice of color is recent and that therefore "it is too early to form any esthetic opinions" (85). Earlier in the book, Newhall has spent much time on the esthetics of black-and-white, particularly paying attention to the esthetic significance of orthochromatic and panchromatic plates, and the issue of the correct recording of colors in a monochrome perspective (p. 67). This esthetic viewpoint, which Newhall prophesized in 1937 would gain "more and more attention" in the future, would indeed be developed in the later editions of his book, where "In color" became the one-but-last chapter. By the last edition in 1982, this chapter was amply developed and included a number of excellent reproductions from various periods, yet the fact that it remained as a separate chapter and one clearly dominated by a broad technological chronology and a relatively technical discourse — compared to other chapters — betrayed the older novelty and alienness of color to the history of photography[5].

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[4] 1) in chap. 64 (p. 457 ff), a chapter dominated by H. Vogel's 1873 discovery of "optical sensitizers" and where the major pioneer of color photography is Charles Ducos du Hauron (465). Becquerel's early attempts at color daguerreotypy are hardly mentioned. More striking even is the fact that this discussion of color photography is only a section in the course of a chapter that is devoted to the larger question of sensitizing emulsions and the "correct" rendition of colors in B&W. It would be helfpful, however, to consider more in detail the evolution of Eder's treatment of the subject between 1895 and 1932, as well as Erich Stenger's and other German-language historians, which I have not yet done but will do if there is to be a publication of our proceedings.
2) in chap. 94 (p. 639 ff), Eder gives credit to Maxwell's 1861 "theory of the three primary colors" and their production (by additive synthesis)in photographs and then to Ducos du Hauron.

[5] It is intriguing, in view of Newhall's strong admiration for the Stieglitz group and the "secessionist" tradition of photography, that Stieglitz's and his circle's own strong interest in photochromy (the first Stieglitz

Histories written after 1940 and especially after 1960 have generally given more consideration to color photography, without really seriously revising the basic paradox contained in Potonnniée's definition of photography as the art of making permanent images from the camera obscura — yet implicitly without color. Helmut Gernsheim, for instance, in his biography of Daguerre and the daguerreotype (1956, repr. 1968) and in the first version of his *History*, did not, unlike Newhall, count the lack of colors among the six initial drawbacks of the daguerreotype (111-112), and more generally did not mention more than passingly color experiments or even the coloring of daguerreotypes. The later editions of his larger *History of Photography* (1955), however, followed Newhall in paying increasing attention to color, and the 3rd and last ed. of his *Concise History* (1986) took up color photography in earnest, first early on in its progression as part of the intrinsic evolution of early photography (3rd rev. ed. 1986, chap. 4, p. 26-40, below, giving a lead role to Maxwell's 1861 lecture), and, then in its last, short chapter on color as an art medium (135-140). In this text, moreover, Gernhseim adopted Newhall's claim that in 1839 "a certain disappointment was felt at [the daguerreotype's] inability to record colors" (p. 26). (Still, in contrast, in his *Origins of Photography* 1986 Gernsheim hardly mentions color.). Gernsheim's and Newhall's late revisions set the stage for later surveys, notably Naomi Rosenblum's *World History*. Finally, the already-mentioned Routledge Encyclopedia, recently published, as well as many other publications I cannot list here, also testify to the general improvement of knowledge and narration of early color experiments — though not on Hill.

Yet there are several counter-examples to this recent recognition of color, especially in France. Indeed recent French surveys tend to show that color remains largely outside the pale of photohistory. Jean-Claude Lemagny and André Rouillé's *Histoire*, in its last ed. in 1998, still does not have a chapter in colour. Michel Frizot's *New History* (1994), does have a chapter on color, written by J.C. Gautrand — but it is oddly entitled « Une étrangeté naturelle, l'hypothèse de la couleur » (chap 25, p. 411-430) and it, too, tends to confirm the extraneous nature of color. The Orsay catalogue on *Le daguerréotype français* (2003) does not mention color experiments. The most recent large French survey of the history of photography, directed by Gunthert and Poivert, and to which I contributed, does not treat color or the history of its apparition in photography as a specific subject — although it includes and reproduces color photographs and thus could perhaps be seen as a tentative integration of color into the core narrative of photography's history. It may be added here that the current, predominantly social-political outlook of studies in the history of photography and visual culture, whether in French or in English, does not favor color as a worthy *cultural* or *ideological* topic (*contra* see Kempf[6]).

The conclusion of this fragmentary survey is fairly straightforward. Until the 1930s, color experiments were largely outside the scope of the history of photography, except in scientific contexts, because they were not a common part of photographic practice. After 1940 and much more so after 1970 or 1980 color became a subject for histories of photography as image, in direct relation to its artistic exploitation, secondarily to its popular uses — but, even considering Newhall's remarkable talents at pedagogy, the *technical* history of color photography (as well as of photography in general) became increasingly an obscure or parochial subject. Today, the dominant framework of photo-history continues, for the most part, either to ignore color or treat it as a supplemental subject. There is something odd about

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photogravure firm's name), photogravure, the various nuances made possible by the bichromate and other pictorialist processes, as well as the autochrome, did not leave more of a mark on Newhall's narrative.

[6] Jean Kempf, « La couleur du réel. La photographie couleur(s) a-t-elle un sens ? (Etats-unis 1960-1990) », *Revue Française d'Etudes Américaines*, n° 105, 2005 (see also the whole issue on « Couleurs d'Amérique »).

this state of affairs in the digital age, where B&W has become a mere "artsy" setting on camera and image enhancement softwares. I would suggest that at bottom of this narrative structure, looms a primarily *optical* and *formal* definition of photography — as primarily an art of *drawing*. This definition inherits and transmits, down to the present day, the primeval idea of photography as it took shape before 1860 — an idea that was forcibly shaped by the daguerreotype and that especially defined photographs as "drawings and not pictures in color" (Arago in Gernsheim, *LJM Daguerre*, 82), or, as Samuel Morse put it in his 1839 letter, a kind of aquatint engravings. And at the core of this narrative lies an interesting paradox, which I will now explore in my second part.

## 2. Was color really a "problem" in the daguerreotype era? A paradox of photo-history

The paradox is the following. Modern histories of photography, whether or not they give much space to the history of color experimentation, generally share a common assumption, according to which the absence of natural colors in early processes was initially and durably perceived as a "lack" and a great defect, thus constituting a "problem", and that the quest for a solution to this problem was one of the most obvious and urgent avenues for research. Yet, the implicit story goes, because this "problem" was not solved until the Lumière's Autochrome process or even Eastman Kodak's processes around 1940, it somehow fell to the background — except in specialized scientific circles — and left monochrome photography free to develop itself both as a practice and as an idea. Thus is created or reported the notion of a formidable gap of about a century between the emergence of a problem or expectation and the advent of a real solution, a gap that recalls Helmut Gernsheim's sensational statement that "the greatest mystery in the history of photography is that it was not invented earlier" (as early as the 17th or early 18th c., according to Gernsheim and before him to Eder).

In the already quoted passage of Gernsheim's history, we read this formulation of the problem, where I notice a certain awkwardness, a certain tortuousness of the phrasing:

"From the first announcement of the daguerreotype … a certain disappointment was felt at is inability to record colours, which were instead translated into varying shades of monochrome. Yet, having achieved the exact representation if Nature with all its details, it was realized that the attainment of colour was only a matter of time—though its advent came much later than expected."

The same unease with phrasing this "problem" is found in Beaumont Newhall's writings. As we have seen, Newhall had, as early as 1937, placed the lack of color among the "faults of the daguerreotype", quoting the misgivings of Marc-Antoine Gaudin ("in a word, color and life, the two parents of all poetry, were lacking"[7]), and insisting that "the demand for color is as old as photography itself". In his *The Daguerreotype in America*, Newhall insisted, at the outset of chap 12 (A Quest for Color), where incidentally he was the first modern historian to recount in detail the hillotype affair: "when Daguerre showed his daguerreotypes in 1839, the public regretted that the colors of nature were not recorded in the wonderfully autographic manner that light and shade was reproduced" (p. 96). And in the "In Color" chapter of his *History*, he quoted once again Niepce's interest in Daguerre's experiments with color, following with the ambiguous statement that "the immediate acceptance of daguerreotypes in

[7] As Newhall's quote itself shows, however, the meaning of « color and life » in the sentence is debatable; Gaudin laments "harsh tone", "masses of greenery" depicted as mere "silhouettes", "and nowhere … any people to be seen". Newhall (1937), p. 25.

monochrome outweighed the fact that the colors were not recorded", and adding, as if ill-at-ease with his own statement, that "it was not long, however, before the lack was sensed, and daguerreotypists began to color their plates by hand" (269). American historians of the daguerreotype from Robert Taft to Bill Becker have consistently upheld this claim, citing especially the fact that three of the first five US patents in photography dealt with processes of coloring (Taft 44-45, Becker 1981 28). In his important 1981 article on the hillotype controversy, Bill Becker wrote, in a manner of background justification for Hill's experiments, that the 19th c public was "unaccustomed to the black-and-white image", that "a common theme of the earliest descriptions of daguerreotypes was that these first photographs … needed only color to be perfect", and that "daguerreian galleries soon began to paint their products by hand" (Becker 1981, 28).

Similarly, for France and the French daguerreotype era, Quentin Bajac writes in the Orsay catalogue that "black and white was very early on perceived as a very regrettable loss in terms of verismilitude, which had to be remedied as early as possible" (175), and cites the "many patents" taken out in the 1840s [several in 1842 and 1843] on methods of coloring, although he also quotes the criticisms of several more high-minded writers against the practice of coloring[8]. (In this connection, the virtual absence of colored portraits in the Orsay exhibition demonstrates that the view of the purist critics of the 1840s and 50s has won durable acceptance in France, unlike in the US where recent exhibitions of daguerreotypes have prominently featured colored specimens.) Some commentators have given the impatience of the public for color much more formidable dimensions. Thus in the important collection *Pioneers of Photography*, edited by Eugene Ostroff in 1986, one finds another specialist, Wesley T. Hanson (then VP Research at Eastman Kodak), ridiculing the claim that society had been "ready for color photography in the early twentieth century", a claim advanced by cultural historians in reference to the fashions of Autochromes and postcards. According to Hanson, "The society that existed 10,000 years ago, he insisted, was ready for color photography", citing a Lascaux cave painting as evidence, and suggesting, as Eastman Kodak – linked historians have often done, that the world had been awaiting the genius of George Eastman to solve its ancient problems[9].

Now to what extent does the historical record indeed confirm the thesis of a grave and durable "problem", arising from the "lack" of colors in photographs? This is a difficult question, to which some of you will perhaps bring more decisive answers, and I don't claim to have fully formed my own opinion. Yet I am puzzled by the affirmation that the "lack" of color was everywhere and durably perceived as a great defect awaiting a rapid solution. The scientific community, in a broad sense, clearly described a limit and a problem in the absence of colors: there are many well-known statements to that effect by Arago, Gay-Lussac ("Nature herself has set the limits" to what photography can do), Morse, Brewster (explaining to the public in an 1862 article that the "one step" needed to secure photography a place among the fine arts was the fixing of the "colors of nature"[10]), and others. In fact it should be noted that later in the century, many if not all of the significant color experiments — in spite of the major exception of Hill — were conducted either by professional and academic

[8] One of these critics, in echo to Arago (and Daguerre himself), descried coloring as equally as vain as the retouching of "a butterfly's wings" by "a sign painter".

[9] This article suggests that only German and American researchers connected with the big firms (Ansco, Agfa, Eastman Kodak) successfully overcame the problem of color photography in the early 20th century. Yet the role of Eastman Kodak in the history of color photography is a complex one, since, in particular, George Eatsman was long in recognizing the importance of the subject and really turned his attention to it only in the wake of the Autochrome process's success. See Jenkins 304.

[10] " (quote Root p. 428).

scientists (Herschel, Hunt, Brewster, Maxwell, Lippmann) or in relatively close collaboration with them (Cros, Ducos, Vogel, Ives). In the realm of popular culture and practical photography, a strong piece of evidence is the popular fashion of colored portraits[11].

Yet in most if not all of the accounts from the first years, especially perhaps the popular accounts, the emphasis is clearly, in my view, on the miraculous *success* of photographic representation, not on its defects; while in the scientific accounts, I find an evident awareness of the problem, but also a clear warning that it will be long in solving[12]. In the later literature on photography, say after 1855 and the advent of negative-positive processes, the notion of the "problem" clearly persisted in the research of inventors. In 1869, both Cros and Ducos du Hauron titled their publications with the expression "solution du problème" of color photography. Popular and professional historians of photography of the 19th century, insofar as they treated the question of color, often placed among the "problems to be solved", as was still the case in Gaston Tissandier's *Merveilles de la photographie* (3rd ed., 1882). In this book Tissandier noted, with some effect, that photography reproduced "nature" as a "mirror image", but "an image without color", and spent a few pages listing early experiments (starting with a dramatic presentation of the hillotype to which I will come back, moving on to Cros and Carpentier), yet without properly explaining the specificities of the processes involved, and stressing instead the difficulty of the problem and the hopeful, if not utopian, character of a solution to it (Tissandier 183-190). This treatment, quite common, betrays indeed the persistence of a "problem", but tends to present its solution as a utopia and altogether a scientific task, by now external to the *social reality* of photography. By the same token it tends to question the notion that the absence of color was still perceived as a lack.

At this point it becomes necessary to take into account the development, in the 1840s and especially 1850s, of a lay discourse on photography, and on photography's connections to art; a discourse that more often than not completely did away with the "problem" or the "lack" of color to concentrate on other "problems". A good example is the famous 1857 article of Elizabeth Eastlake. The writer mentions "the coveted attainment of colour" as the one "great improvement" yet to be expected in photography — but at the same time she comments at length on coloured portraits as "a most satisfactory coalition between the artist and the machine", and discusses in much more detail the false transcription of the various colours in the monochrome range. The idea of photography that established itself in the mid-19th century, and I would argue possibly as early as 1839, and which certainly lasted into the 20th, was clearly a monochrome idea. A champion of this monochrome idea of photography, in the US, is Marcus Root in his *The Camera and the Pencil* (1864), a book that is important both as a professional handbook (including as was usually the case a history of the invention) and as perhaps the most elaborate defense of photography as art, in the US, before Peter Henry Emerson and Stieglitz. This, you will recall, is also the book where Root pronounces against Hill was has often been seen as a decisively negative verdict. In his chap 26, "On coloring photographs", Root conceded — against other, more "purist" American authorities

[11] It is true that the prevalence of hand coloring in portraiture — especially perhaps in the US, where Bill Becker reckons that 90% of dag portraits were colored at least in the form of tinted cheeks and gold jewels — is a strong argument for the claim of a popular expectation of color photography. (Conversely, in the US the few studios that did not color or that only did little coloring, such as Southworth & Hawes, clearly labelled themselves as more advanced artistically.) Another supporting argument is the cultural link between dag portraits and painted miniatures — cases for which were readily adapted to dags (Becker). This, however, is another small enigma since miniatures were more expensive than dags and also were much larger than the usual 1/6 plate dag. At the same time dags were also compared to black-and-white pictures (mezzotints), line engravings, silhouette profiles, all of which were more common, and much cheaper, than painted miniatures. See also Heinsich & Heinsich, *The Painted Photograph.*

[12] Cf. Boulouch).

— that "the effect of color may, in many instances, be absolutely essential to anything like a faithful reproduction of the original" (p. 264-265). But in his chap 31, "History of the art", Root went at great lengths to advance his chief thesis — the desirable union of "sun painting" and "pencil painting", or camera and pencil — and recognized, as a principal shortcoming of the camera, the limited time of the sitting necessary to a portrait and the risk of thereby missing "individuality of expression". Nowhere did Root mention the lack of color as a defect of the heliograph — logically so since the adjunction of coloring by hand was for him a prime example of the successful union of photography with art. Thus in his chap. 32 (on the "artistic relations" of heliography, p. 435), Root went so far as to distinguish photography from painting precisely on the basis of the absence of colors in the former, thus better compared to drawing. In so doing Root was at unison with the dominant (idealist) esthetics of the 19th century, for which the main artistic quality of photography was in its reproduction of form, and its main drawback in the lack of *esprit*, *soul,* or *feeling* — not the lack of color.

Hence a tentative conclusion. While the "problem" of color progressively specialized itself as a scientific one, the "lack" or the "demand" for color so often cited by histories — especially, perhaps, American ones — was primarily linked to the business of portraiture and thus to the more popular / commercial uses of photography. In the practice of 19th c photographers, in contemporary accounts, and in much of the ensuing historiography, the sense of this "demand" or "lack" coexists with not only great eulogies of the invention's miraculous accuracy but also more or less sophisticated definitions and dissertations that characterize it as an art of drawing, of the "line", and entirely do away with the presumed lack of color. Even though the practice of portraiture may have constantly reminded both the photographers and their customers of a "lack" of color, the *theories* of photography that flourished then and that capitalized on this very business of portraiture clearly did not take this lack into account — even the critical, negative theories, for which photography's main defect was in spirit, soul, or imagination (idealism) rather than in color. This consensus, which obviously originated in Neo-classical esthetics, has, in my view, durably affected the later historiography of the medium. It remains to be seen now that it also affected directly the reception of Reverend Hill's experiments, both in the 1850s and later.

## 3) The hillotype and its reception as a critical moment of the history of color photography

I don't have the time today to propose a full account of the proliferating and fascinating historiographical enigma of the hillotype — and I don't want to simply repeat my earlier work on the French side of its reception. I will content myself with, first, some observations about the American historiography of the hillotype, second a brief summary of my earlier work on the French side, and finally a tentative formulation of the significance of the episode as a critical moment in the history we are looking at today.

First of all, while it is perhaps not surprising that the hillotype has been forgotten by international historiography, I am very struck by the fact that Hill and his invention have remained for so long such a sensitive subject in American historiography, and that in spite of the abundant research of the past 30 years at least, the historical status of the hillotype remains undecipherable at best, or dubious at worst. The most recent evidence of the reluctance of historians, not just American, to change this view is given by the Levi Hill entry in the recent Routledge *Encyclopedia of Nineteenth Century* (another project I have contributed to), which (written by British Ron Callender) is disappointing, mostly in that it is so short (about 20 lines), when I personally think this is a very large subject; but also because

it describes the rediscovery of hillotypes in the SI as "recent" and repeats tired judgements about Hill's 1856 treatise[13]. Since this is a sensitive subject, let me state my point of view. I am perfectly incompetent to judge either the feasibility of the process as described by Hill in his 1856 treatise or the chemical congruence of the actual hillotype plates preserved at the Smithsonian with this description of the process; I also have little or no opinion on matters of Hill's personality, which have played an important role in the discussion. But I will say candidly that I have been convinced of *some achievement by Hill, not merely accidental, in the way of color daguerreotypy* by observation of the plates residing since the 1930s in the SI's collection, the several historical studies conducted since 1960 about either the historical record or the plates themselves (notably by Newhall in his 1961 book on the daguerreotype, Floyd and Marion Rinhart, in 1967 and 1981, Bill Becker, 1980 and 1981, Michael Jacob 1992, Heinz and Bridget Heinisch 1996), as well as the detailed recreations of the process first described by Joseph Boudreau in 1987 and then repeated by David Burder and others.

What strikes me, then, is the persistence, in the proliferating American literature on 19th-century American photography, of a rather dim view, to say the least, of the Reverend and his professed invention. Indeed, Marcus Root's verdict in 1864 that Hills's results were either accidental or forged and that those examples he had personally seen had been painted dags has not, to this day, been decisively overturned, even if all or nearly commentators have professed caution and doubt. Robert Taft, of course, deserves credit for reviving the affair and unearthing a number of relevant textual sources. His verdict, however, was anything but clear, since he both admitted Eder's theory that Hill had "worked his hoax by cleverly coloring his dags" and yet conceded that he "may have stumbled on a process of color photography" (91-92). Beaumont Newhall, although in his book on the daguerreotype he vastly expanded the scope of textual research, did not change in the last edition of his *History* the verdict according to which Hill's *Treatise* of 1856 (which had been reprinted in 1972 by the Carnation Press, and had therefore become accessible), was "a confused and complicated piece of writing, which contained, in place of specific workable directions, an autobiography and an account of endless experiments" (p. 272); as for Hill's results, he agreed with Root and Towler that they must have been accidental. Naomi Rosenblum called the process "ineffectual" and the results "accidental" (p. 448 Fr. ed.). Even Floyd Rinhart, after concluding from a detailed study of the plates that this could have been neither accident nor camouflage, contended himself with calling the affair "tragic". It is perhaps John Wood who, at the end of a very balanced account of the hillotype's uncertainties, gave the most lucid, as well as the most perplexing, statement of the case that I have read: "I have no doubt, wote Wood in *Secrets of the Dark Chamber*, that Hill did produce some plates in natural colors, but his reluctance to exhibit his work, his Barnumized circulars, appeals, products, and processes for sale at inflated prices, and a less than straightforward approach even to his advocates cast suspicion on whatever he might actually have accomplished" (p. 215).

Thus, I commented in my 2005 article, "even allowing that Hill might have been a great inventor, he would still and above all remain a charlatan" (Brunet 126). This continued perplexity, as well as this continuing willingness to accuse Hill, or at any rate to judge him on moral grounds, strikes me for a number of reasons, including the ever-increasing detail and sophistication of American scholarship on the "American daguerreotype" era, and also its general patriotic bend, which has led authors from Taft and Newhall to Richard Rudisill, Alan Trachtenberg, and John Wood not only to reconstruct in great detail but to celebrate — rightly

[13] Fortunately the entry "Color theory and practice 1800-1860" (by William R Alschhuler) is more encouraging and mentions the publications of Becker 1981 and Boudreau 1987 as well as the recent recreations of this and other early processes.

in my opinion — the great and often unique achievements of American daguerreotypists. Levi Hill is clearly a major exception to this celebratory climate. Now I suggest that a detour by France might perhaps help this situation improve.

Without going into the detail of my 2005 paper on the French reception of the hillotype affair, I will summarize some of its findings.

- In France (and to some extent in England), the controversy of the hillotype was followed very closely and for several years, doubtless for the same reasons as in the US — i.e. the impatient expectation of the public for color portraits, and, like in the US, the fact that Hill's revelations appeared exactly in time to feed copy to the first professional magazines, namely *La Lumière.* This magazine, the organ of the SFP, ran a veritable *feuilleton* on Hill from 1851 to 1856, like *Humphrey's Journal* and the *SA* did in the US, and followed the mood swings of the latter especially, as it turned in favor of Niepce de St Victor and his American disciple Jason Campbell. What is strikingly different about the French reception, however, is that memories of the "Hill affair" were perpetuated in the French photographic literature quite durably — into the 1880s if not the 1890s, in the texts of Ernest Lacan, Gaston Tissandier, and Louis Figuier, especially, where they were condensed into mini-chapters entitled "A famous impostor" or "A great American 'puff'". As such they served the function of mini-histories of American photography (this was basically the only historical "fact" coming from America in these books) — as well as, I would stress today, mini-histories of color photography. In the Tissandier chapter of 1882 alluded to earlier in my talk, the Hill affair took up a good two pages, and was the first "historical" fact served in the account of color experiments. In this and several other texts, the narrative of Hill's failure or hoax regularly served (until at least 1888 in the case of Figuier) as a foil, not only for more serious (French) researches such as those of Niepce de Saint-Victor, but for the exposition of the seriousness of the "problem" of color photography — a problem, it was intimated, better left in the hands of serious and disinterested scientists — while at the same time suggesting a cultural link between color photography and charlatanism.
- There is some evidence that the serial in *La Lumière* impacted the proceedings in the US. Hill himself, and his one-time sponsor and advisor Samuel Morse, were aware of the antipathy that, from 1852 on, filled the columns not only of the *Scientific American* but of *La Lumière*. In April of 1852, Hill wrote to Morse about his fear of "French savans" whom he suspected of trying to "jump on his treasure". In October of the same year he wrote an open letter, published in the *New York Daily Times* of Oct. 26 and translated thereafter in *La Lumière*, to castigate those of his fellow Americans who disdained "the honors that grow in our mountains" in favor of those of "la belle France", i.e. the merits of Niepce de Saint Victor, and to announce his intention of raising his invention "in the peace of my mountains". Claiming to protect his invention for the benefit of his native country, he attacked "a foreign publication" without naming it (obviously, *La Lumière*). This outburst of patriotic feelings on Hill's part must be seen in the context of 1852, both global and photographic, where in particular the nascent American corporation and its mouthpieces lamented the lack of serious innovation by American experimenters. Be that as it may, the negative judgement on the hillotype that became, after 1852, the norm in France and in England was clearly no help to Hill's efforts — whereas there is also some evidence to suggest that the inventor may have, at one point, considered appealing to French authorities to guarantee his claim, particularly his use of several French prints as matrices for some of his plates, and the fact that Morse himself had followed this path with his invention of the telegraph.
- Finally, and most importantly, what the detour by France highlights is the regrettable absence of both an international and an institutional perspective in the historiography of the Hill affair. There is, to start with, a striking and yet generally unobserved similarity between

the hillotype episode and the sequence of divulgation of the daguerreotype (a similarity that the term *hillotype*, apparently coined by his first patron Samuel Humphrey, only begins to suggest); in some respects Levi Hill could be viewed, historically, as an American Daguerre, or rather as a failed American Daguerre. This is not only because his invention, if completed and validated, might have produced as memorable a "revolution" as that of Daguerre. But rather, what has been missing in most historical appraisals of Hill's tortuous if not devious attempts at publishing his work is a clear institutional perspective, rather than in a psychological or commercial one. From such a perspective, the difference between Hill and Daguerre or other French inventors was not so much the degree of completion of their inventions, the veracity of their discourses, let alone their personal characters (Daguerre was not liked by all and his subsequent fate in French memory closely resembles that of Hill in America). The difference was also, and perhaps rather, in Daguerre's ability to marshal a powerful political or institutional apparatus in favor of his invention, and of course, in that apparatus's own power in effectively promoting an invention and turning it, almost overnight, into a national treasure — not forgetting also that Daguerre benefited from his exchanges with Arago and other scientists in technical aspects as well, which accelerated in 1838-39 the finalization of his process. What would have become of the hillotype if Hill had somehow been able (and willing) to communicate with, say, Becquerel, or even John Draper? Meanwhile, not only was there no comparable institutional apparatus in the US (Morse, by himself, could not possibly pretend to that kind of aura, be it only because he had been rather poorly rewarded in his appeals to the European academies), but Hill seems also to have been ambivalent about such a procedure, possibly at the advice of the conservative Morse himself. The bizarre sequence of events that led him to testify in 1853 before a Congressional committee, and that committee to issue a favorable report only to decide to shelve it for lack of a better option was, in this perspective, a failed repetition of the 1839 sequence of publication of the daguerreotype (which, like the hillotype, had been claimed to be "unpatentable" on account of its immaterial, chemical, or non-mechanical nature). Let us note finally that Daguerre himself became in France, in the wake of the revelations of Isidore Niepce, Victor Fouque, and others, a kind of French Hill — an impostor, a dishonest businessman, a "puffer", a charlatan. Hill, and even Daguerre, in this sense, both came to embody the "popular" and ultimately uncouth side of photography — Hill especially, because he failed to decisively produce anything truly public, because, perhaps, he temporarily ruined the daguerreotype market, but also, I will now suggest in concluding, because his amateurish search for a color process ran up against both the professional-cultural mindset and its idea of photography as drawing and the scientific conception of the "problem" of color.

Here, then, is my conclusion. Color photography, in a sense, has played in the history of photography a similar role to that which was long attributed to photography itself in the history of art and culture — that of a secondary, "technical", or "popular", illusionistic, potentially despicable and largely irrelevant chapter. This is due in part to the intrinsici complexities of the "problem" of color, but also to the early consolidation, aided by the average practice of the mid-century, of an idea of photography as primarily an art of drawing, a monochrome visual form, indeed an art of "pure form" — an idea that formed itself early on, became a matter of cultural discourse and remained affixed for the longest time to the cultural definition of photography. This may explain at least in part how such a fascinating enigma as the hillotype has remained, almost to this day, a largely unexamined chapter of that history. In addition, the fact that the surviving hillotypes remained unidentified until about 1980 and then appeared as very elusive and rather unspectacular images deterred later

mainstream histories, bound up in the appreciation and interpretation of images rather than historical facts, from including them in their purview.

And yet I would concur with John Wood that the hillotype affair is a crucial moment in the cultural history of American photography and of photography in general. On the one hand, I continue to believe that the social framework of Hill's researches, i.e. his isolation and the absence of powerful scientific institutions in the US of the time, was a significant component of his failure, and one which reflects (like Daguerre's success) on the importance of scientific channels of communication and recognition in the development of inventions in the 19th century. It seems not improper to me to suggest that, had Hill been surrounded by better scientific and even *historical* knowledge, the fate of the hillotype might have been different. On the other hand, the fact that Hill and the hillotype became a proverbial name, so to speak, for charlatanism must not prevent us from observing that his endeavor, like many other ones before and after him, perpetuated the profoundly anti-conformist drive of inventors, illustrated in France by the popular figures of Niépce and even Daguerre. Given the formidable media exposure of the affair in the 1850s and even later, the almost "vulgar" character of Reverend Hill durably reflected negatively on American photography and on color photography. It can explain in part the durable indifference or super-caution of many American historians, recurrently concerned, until Newhall at least, with the prospect of establishing photography as a distinctly legitimate (and American) art, and in addition driven by a Stieglitzian credo of "straight photography". Yet back in the 1850s and 1860s the hillotype fiasco might well have served as a background in the subsequent, successful experiments in color photography, especially by Cros and Ducos, be it only by rekindling an interest in the "problem" of color, and reminding experimenters of the usefuless of establishing proper communications with scientists and institutions. But this is sheer speculation and I must stop here.

# The Evolution of Colour Photography

From the first announcement of the daguerreotype on 7th January 1839 a certain disappointment was felt at its inability to record colours, which were instead translated into varying shades of monochrome. Yet, having achieved the exact representation of Nature with all its details, it was realized that the attainment of colour was only a matter of time—though its advent came much later than expected.

Lack of colour was at first particularly felt in portraiture, for the public, accustomed to miniatures, preferred 'twopence coloured' to 'penny plain'. Miniature painters, finding themselves out of work through the popularity of the daguerreotype, soon fulfilled the demand by tinting daguerreotypes and occasionally painting over paper photographs.

(Sir) James Clerk Maxwell in a lecture on the Young/Helmholtz theory of colour vision at the Royal Institution, London, in May 1861 demonstrated that every possible shade of colour could be made up from the three colours, red, blue, and green. Thomas Sutton took for him three photographs of striped coloured ribbon through glass cells containing red, blue, and green solutions of metallic salts (acting as filters). Diapositives of these were projected from three optical lanterns behind three identical coloured filters, and when superimposed on the screen, combined into a colour photograph. Though the result was far from perfect, Clerk Maxwell indicated the correct primary colours for three-colour photography by the additive process, whereas the suggestions put forward by Henry Collen in 1865 were not only impracticable but were moreover based on Sir David Brewster's theory of red, blue, and *yellow* as primary colours, which is erroneous for light, though valid for pigments.

Louis Ducos du Hauron made the greatest contribution to the evolution of colour photography in the nineteenth century. He proposed the subtractive method of colour photography in his book *Les Couleurs en Photographie, Solution du Problème* (1869), i.e. the pigments absorb or subtract from light all colours except their own, which they reflect. Ducos du Hauron took three separation negatives behind green, orange, and violet filters, and made positives on thin sheets of bichromated gelatine incorporating carbon pig-