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The End of Photography?
An Indexical Crisis at the
Dawn of the AI Age.

Master's Thesis

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Table des matières

Introduction.....	2
I. Photography as an <i>indice</i>	4
1.1 Directionality of the sign.....	11
II. 19th Century: The Dogma of Indexicality and <i>the Ontology of Photography</i>	14
2.1. Before the digital turn, the autonomy of photography.	35
2.1.1. The spectrograph, a non-figurative photographic <i>indice</i>	41
III. End of 20 th Century: Digital Photography, a Reverse Weathercock?.....	42
3.1. The digital turn, already the end of photography?	44
3.2. The problematic of the <i>index</i>	53
IV. 21st Century: The Dogma of Fictionality, and the Rise of AI.....	64
4.1. <i>Indexical AI?</i>	68
4.2. The blockchain, the virtual indice?	71
Conclusion	76
Bibliography	78
Summary	83

Introduction

"The End of Photography? An Indexical Crisis at the Dawn of the AI Age." behind this title lies a tradition of works that prophesied the end of cinema and photography, announcing an entirely new era in our relationship with this medium. It is worth noting that the title is borrowed from André Gaudreault and Philippe Marion's book, "The End of Cinema? A Medium Crisis in the Digital Age." However, instead of focusing solely on the analogy, let us explore the differences. Firstly, the current work is situated in a new era and responds to a new 'technological turbulence'. The rapid emergence of AI in various aspects of our lives can already be seen as the transition to a new age – the AI Age. What better moment to prophesy than when we stand at the dawn of a new age? Additionally, there is no mention of a medium crisis but rather an indexical crisis. This choice emphasises the orientation of the current thesis on general semiotics - to understand and explain the actual and future problems AI generative images represent for our relation to the photographic medium - by analysing how the nature, or perceived nature of a sign condition its cultural and cognitive significance. The main statement argued in this paper is that photography can only be considered as such if we believe in its indexicality. Last, but not least difference is the choice of subject: photography, not cinema. This decision stems from the fact this paper is solely about the indexicality of photography as a "print from light" and a representation of the real.

To resume, if the form of the title is inspired of Gaudreault and Marion's book, the similitude stops here, and the comparison was just an occasion to introduce to the reader what it could expect to be found along the pages. The mains authors that influence this work are indeed Peirce and Van Lier that have extendedly use photography as example to explore the nature of the indexical sign. The corpus will not be limited to those authors, the figure of Barthes, for example, would be hard to neglect in a semiotic essay about photography, or Sonesson that give an interesting overlook about the relation between photography and semiotics. Others like Ball for his work on realism, or Bazin as a pioneer on photographic theory would be solicited.

The first chapter would propose a definition of index, focused on the distinction Van Lier does between *indice* and *index*, a nominalist approach that he opposes to the realism of

Peirce's index – it will be the backbone of the study. Once this technical aspect of the index introduced, the thesis will follow a chronological structure from the 19th century to nowadays.

The purpose is not to retrace the history of photography as such, the history is instead used as a framework to enlighten some specific questions on the indexicality of photography. Three main periods would be treated, the 19th century and the birth of the photography, in the chapter 2; the end of the 20th century and the digital turn of photography, in the chapter 3; and the 21st century with the rise of the AI technology and its implication in our perception of photography, in the chapter 4.

This chronological framework is convenient in terms of narration and allows to focus on different moments of the index in photography. However, the problematic of the index is transversal to all those periods and the aim of the thesis is not to crystallise a state of photography's indexicality corresponding to each period, but to use history to exemplify the specificity of index in photography. In this aspect, the present work has been inspired and reply to a claim of Baetens (2008) about the relation between semiotics and photography:

Semiotics, even image semiotics, is far from privileging the photographic object. In fact, semiotic reflection on the image 'in general', which is real and alive, does not always attach much importance to the distinction between 'specific' types of images, so that there is little room, at least for some, for the semiotic study of the photographic image *as in itself*. (Baetens 2008: 15)¹

The aims being to understand the epistemological nature of the photographic sign to be able to catch its specificity, its impact on our pragmatic relation to it and to differentiate it from the AI generated images.

However, the proposition that the specificity of photography is to be found in its index does not mean the icon and the symbol are not part of the photographic sign. Like it has been reminded numerous times by semioticians as Jakobson (1976), Peirce's system implies the coexistence of the index-icon-symbol in the triadic sign. In other words, the claim is not that the photography is only an index, but the way index works in photography is what separate it from other visual signs.

¹ « [...] la sémiotique, même celle de l'image, est loin de privilégier l'objet photographique. En fait, la réflexion sémiotique sur l'image 'en général', qui est réelle et vivante, n'accorde pas toujours énormément d'importance à la distinction entre types d'images 'spécifiques', de sorte qu'il ne demeure que peu de place, du moins chez certains, pour l'étude sémiotique de l'image photographique *telle qu'en elle-même*. »

I. Photography as an *indice*

The notion of index in semiotics is not as clear-cut as we might think at first glance. When we speak of index in semiotics, we generally refer to Peircean semiotics - where it is one of the three types of signs, along with iconic and symbolic - but the notion of index is also used in Saussurian semiotics, especially in Bally's work. It is important to note that "index" in Saussure's and Bally's work is the English translation of the French word 'indice'.

Bally's work having never been translated in English, quotes from his publications and from his manuscripts are my translations with the original given in footnotes. Quotes from Saussure's CLG are given in English, using exclusively, unless specified otherwise, Wade Baskin's translation. Finally, the French word *indice* is translated as 'index'. (Forel, 2023: 1)

The Saussurian notion of index will not be developed to any great extent in our study, but it will be used mainly to underline the importance of the difference between French and English regarding "*indice*" and "*index*", which will be a fundamental point of our demonstration. For now, however, let us have a look at how Peirce defined index.

Peirce develops his notion of index throughout his writings, bringing different elements to it, but a good starting point is given by Sonesson (1994: 285), who synthesises the Peircean index as "a sign in which *the 'thing which serves as its expression is, in one or other way, connected with another 'thing', which serves as its content.*". Using this definition, we have, for example, the footprint of a fox in the snow, which would serve as an expression of the fox that is the content. From this idea, we can wonder why semioticians who have searched for the specificity of photography have considered this medium as primarily indexical rather than iconic. Iconicity, for Peirce, can be defined as (Sonesson 1994: 285) "a sign in which the 'thing which serves as its expression in one or other respect is similar to, or shares properties with, another 'thing', which serves as its content.". Iconicity and indexicality, defined in this way, are not antagonistic. This relation between the iconic and indexical value of photography has also been an important theme in the work of authors such as Philippe Dubois and Jean-Marie Schaeffer, who, along with Van Lier, are considered the main authors of the 'indexical school'. Gorän Sonesson, who was greatly influenced by their work, also pushes this relation, criticising the primacy of the index over the icon. However, if the description of this relation varies from author to author, none of them rejects the notion of the icon in photography, of photography visually resembling its object, if there is much to be said about iconicity in photography, it is not the subject of our work, which focuses on

indexicality for the same reason as Van Lier and others, indexicality is the nature of photography, of which iconicity is a consequence. Sonesson would somewhat disagree with this assertion, as he points out:

there is really no intrinsic reason for considering the cause producing a trace to be a more important type of cause than the others; and even so, we have seen that many more causes than the motif may be held responsible for the trace. Indeed, we can only explain the importance of the motif when we realize that a trace, in the most central sense of the term, contains not only indexical but also iconic aspects, and if we begin by admitting that a photograph is a kind of pictorial sign, and that all such signs are first and foremost grounded in the illusion of similarity. (Sonesson, 1994: 321)

It is somehow true that the separation of the indexical and iconic aspects of photography is superficial as they come together, but photography as a medium has a privileged status in our relationship to the world. The reason why a photograph can be used as evidence in a court of law and a hyper-realistic painting cannot is that photography is the index of its object, whereas painting, even ultra-realistic, is not. When we appreciate a photograph, we are confronted with the existence of an object, an event, as Barthes (1961: 137) said, "the photographer had to be there!"; all objects and events ever photographed have existed. They may have been staged or manipulated, taken out of context, but the index does not lie, the objects were in front of the camera's lens. The indexicality of photography is inherent in its genesis.

Photography is a graphie by light, not a graphie by man by means of light. It is *a graphie of and by light itself*, which man can only collect and provoke. But then it is not a graphie at all. It is an act, the act of writing and drawing, which was for the Greeks a unique act, the human act by excellence; graph is deliberate, intentional. Light, on the other hand, does not deliberate anything. It is capable of action, and therefore of reaction, in the sense of physicists, but not of act. Photography is a *physico-chemical action*, around which a human act can only more or less efficiently be carried out. (Van Lier, 1982: 2)²

Surprisingly, in her article "Drawn by light versus drawn by hand" Krista Simson (2016) concludes the opposite, painting would carry more indexicality than "simple photography", the latter tends to be more iconic.

The artist, however, creates his/her work of art over a period of time through a continuous process that leads to the embedding of diverse indexical and symbolic signs in the work. It is the time factor, and the inclusion of indexical and symbolic, signs that excludes the possibility of seeing iconicity as a dominating value in pictorial art. In simple photographs, which are above all drawn by light and where the artist's own presence is not stressed, iconicity is the main feature of the image. This would not be the case if a photographer as an artist were to intervene in the process of creating the photograph. (Simson, 2016: 58)

² « La photographie est une graphie par la lumière, n'est pas une graphie par l'homme au moyen de la lumière. C'est une *graphie de et par la lumière même*, que l'homme peut seulement recueillir et provoquer. Mais alors ce n'est pas une *graphie du tout*. Celle-ci est un acte, l'acte d'écrire et de dessiner, qui fut pour les Grecs un acte unique, l'acte humain par excellence ; la graphie est délibérée, intentionnelle. La lumière, elle, ne délibère rien. Elle est capable d'action, et donc de réaction, au sens des physiciens, mais non d'acte. La photographie est une *action physico-chimique*, autour de laquelle peut seulement s'affairer plus ou moins efficacement un acte humain. »

This observation can be surprising for those familiar with the works on index from authors as Van Lier, Philippe Dubois, or - in a certain instance - Peirce himself who argue photography is the indexical sign by excellence. Who is wrong, who is right? Of course, it is not so simple; and the conclusion of Simson is particularly interesting for us as it enlightens an ambiguity in Peirce's definition of index at the origins of this problem. In his different attempts to define index, Peirce seems to give him two distinctive meaning.

Meaning 1:

The index assert nothing; it only says "There!" it takes hold of our eyes, as it were, and forcibly direct them to a particular object, and there it stop. (C.P ".361)

Meaning 2:

An index is a sign which refers to the Object that it denotes by virtues of being really affected by that Object. [...]. It does, therefore, involve a sort of Icon, although an icon of a peculiar kind; and it is not the mere resemblance of its Object, even in these respects which makes it a sign, but it is the actual modification of it by the Object. (PWP 102 + emphasis)

In M.1 the index is not a sign in itself, "assert nothing", but a mere indication to the object. At the opposite, in M.2 the index is a sign in itself, it has a form "sort of icon", and is somehow an imprint of "its object". However, those two meanings are different, Peirce does not distinguish them, and they are combined, in its works as well as in the works of other authors following Peircean's tradition. It is on this point that Van Lier developed is most famous critics of Peirces by pointing out the difference between *indice* and *index*.

As you can see, French is a great help here. It allows us to express firmly what the structure of the photograph is. We have two very different words, *indice* and *index*, from Latin. The *index* is a sign, it points with the (index) finger, intentionally and conventionally (depending on the culture), it designates in the strict sense, and indicates in the strong sense. [...]. On the other hand, *indices*, which may (but need not) be light imprints, are not *signs*; they are physical effects perceived as such, and therefore point to their cause. The empreinte-indice does not designate in the strict sense, it *signals*, as any other physical effect does, it indicates in the weak sense. (Van Liers, 1982: 2)³

From this quote we could propose this equivalence:

M.1 = *Index* → Designate

M.2 = *Indice* → Imprint

³ « On le voit, le français nous est ici d'un grand secours. Il nous permet d'exprimer fermement quelle est la structure de la photographie. Nous disposons en effet de deux mots, *indice et index*, très différents, et cela dès le latin. *L'index* est un signe, il montre du doigt, de l'index, intentionnellement et conventionnellement (selon les cultures), il *désigne* au sens strict, et indique au sens fort. [...]. Par contre, les *indices*, que peuvent être éventuellement (non obligatoirement) les empreintes lumineuses, ne sont pas des *signes*, ce sont des effets physiques perçus comme tels, et pour autant renvoyant à leur cause. L'empreinte-indice ne désigne pas au sens strict, elle *signale*, comme le fait tout autre effet physique, elle indique au sens faible. »

However, there is a fundamental problem in this equivalence, for Peirce we have:

M.1 → ?

M.2 → A sign

Where for Van Liers, we have:

Index → A sign

Indice → Not a sign

As previously mentioned, Peirce does not make the distinction between M.1 and M.2 himself, it is so more ease to analyse the arguments of Van Liers for this attribution. If the index is a sign because it is intentional (and conventional), at the opposite the *indice* is not a sign because he is just a “physical effect”. It can be find an echo of the distinction between *indice* and *index* in Bally.

The index was a means of knowing, the sign a means of making known. The sign is a means of (indirect) ACTION. The new element here is the WILL (whereas the intellectual character of the sign is a gift from the index which is at its origin). Moreover, a sign implies FREEDOM; for, as we have seen, it can be used without the presence of the objective process which constitutes the index, and which is given objectively, independently of our will. The mechanism of the sign rarely appears in this clear form, for the production of signs is based on a hereditary disposition, applied most often in an unconscious manner. We see that the sign is the voluntary use of an intellectual and logical operation, the relation of the index to the “indicates [= indicated?]”. (Bally cited in Forel, 2023: 7)

Let us not forget that Forel translate ‘indice’ by index, if the translation can be justified by the lack of the distinction between *indice* and *index* in English, Bally for his part has conscientiously chosen to use the word *indice* and not index in French. For Bally, the *indice* is not a sign, the sign only becomes a sign after “the voluntary use of an intellectual and logical operation, the relation of the index to the “indicates [= indicated?]””. This proximity between Van Lier’s and Bally’s definition of the *indice* is reinforced by this necessity of an intentionality in order to be considered as a sign, and we could even find a resonance between Van Lier’s index and “the relation of the index to the “indicates [= indicated?]””.

An indice without index has no referent, it is not "what a (linguistic) sign refers to in reality" (Larousse), nor "a thing that a symbol (a sign) stands for" (Webster). The sign has a referent, it refers or is referred beforehand, from within. An indice can only be referred to (and never refers by itself) after hand, from the outside. (Van Lier, 1982: 2)⁴

However, as Bally did not choose to call this relation index, and because the relation is not a sign itself, where for Van Lier *index* is a sign, it will be prudent to do not push this similitude further. The importance is to show that the distinction between *indice/index* and index is not

⁴ « Un indice sans index n'a pas de référent, il n'est pas « ce à quoi renvoie un signe (linguistique) dans la réalité » (Larousse), ni « a thing that a symbole (a sign) stands for » (Webster). Le signe a un référent, il se réfère ou est référé avant coup, du dedans. Un indice ne peut être référé (et jamais se référer) qu'après coup, du dehors. »

just a mere problem of translation but is an ontological difference that has important implications in semiotics. It is a constation than Van Liers made himself about Peirce's work.

Peirce did not make these distinctions. We might say that the English language, which has only the word "index", did not favour his attention on this point. But the reason, for a mind like his, is obviously more fundamental. He didn't need the distinction, however striking, because his medieval realism made him see the universe as a reservoir of divine intentions, in which indices were originally signs. (Van Lier, 1982: 2)

The distinction between *indice* and *index* is specific to Van Lier and its use is not widely used in semiotics, its untranslatability being an obstacle, as Sonesson (2015: 453) point out. Nevertheless, what has been presented so far as a translation problem, is actually the hallmark of two different ontologies of semiotics; one in which objects would always carry signs in themselves and, another one in which signs would always be the result of a cognitive operation directed at an object. For this reason, the distinction between *index* and *indice* is fundamental and can solve many ambiguities and problematic encountered about the index in semiotics.

Now that Van Lier's distinction has been established and justified, let us look back at Simson's conclusion to analyse it from this new perspective, and see if her observation is contradicting authors who consider photography – especially “simple photography”, rather than art photography – as the perfect example of indexical signs. Simson's “index” focuses on the *index* and not the *indice*. The *indice* of a painting for example, would be the physical traces of the technique and tools used by the artist. The *indice* in classical painting – there are painters who have deliberately placed more emphasis on the materiality and technique than on the representation of their painting, but let us consider painting and pictorial art in its most general expression - plays a minimal role in the appreciation of the work of art. One group of people who might be interested in the *indicial* value of painting would be art historians and other artists who want to understand the process used to achieve a particular result. When Simson (2016) says artists' works consist of “a continuous process that leads to the embedding of various indexical and symbolic signs in the work.”, she is referring to the *index*. The painter and the art photographer embedded *index* into their works, those *index* translate their intention, and act as propositions. It can be found in those *index* the two characteristics mentioned by Van Lier, an intentionality and a certain conventionality. Simson would be right to say painting and art photography are more indexical than “simple” photography, but

only if indexes are considered as *index*, and not *indice*. On the contrary, “simple photography” is undeniably a more indexical sign than painting and purer than art photography if index is taken the as *indice*. In this light, the result of Simson's paper can be seen as the direct result of Peirce's index ambiguity revealed by Van Lier.

Now, the problem is not so much that the English speaker Peirce would cover the two divergent meanings (indice/index) with the same word - the logician that he is would not have made such a confusion - but that, in the end, he only recognises indices (in the French sense), and brings back index (in the French sense) when he encounters them. As a result, the Peircean INDEX (= INDICE) covers: 1) (French) indices, such as thunder or footprints, including those in photography; 2) French index, such as possessive pronouns ("a possessive pronoun is two ways an index", 110), relative pronouns, demonstrative pronouns, and quantifiers ("quilibet, quisquam, quidam"); 3) propositions: "a Dicisign necessarily represents itself to be a genuine Index, and to be nothing more", since "every kind of proposition is either meaningless or has a real Secondness as their object"; 4) the names of existing things once spoken or written: "A Replica of the word "camel" is likewise a Rhematic Indexical Sinsing, being really affected, through the knowledge of camels, common to the speaker and auditor, by the real camel it denotes; 5) the spoken or written names of imaginary things: The same thing is true of the word "phœnix". For although no phœnix really exists, real descriptions of the phœnix are well known to the speaker and his auditor; and thus the word is really affected by the Object denoted. (Van Lier 1983: 2)⁵

The *indice* is of primary interest to semioticians searching for the specificity of photography as a semiotic object, from Barthes to the present day. To make an analogy using Barthesian vocabulary, one could say that the *indices* are the denotative message, where *index* are the connotative elements (Barthes 1961).

INDICES (French) are the effects of a cause, signalling or betraying that cause; being unintentional, they go mainly from the object to the subject. INDEX (French) are pointers which, being intentional, go mainly from the subject to the object. Thus, in our *Philosophy of Photography*, photos can be rigorously defined as *indices possibly indexed*: *indices* for the natural and technical sides of photonic imprints; *index* for the subject side (the photographer) choosing his frame, his film, his developers, his proof paper. (Van Lier 1983: 3)⁶

⁵« Or, ce qui gêne ce n'est pas tellement que le locuteur anglais Peirce couvrirait les deux acceptions divergentes (indice/index) par un même mot, -le logicien qu'il est n'eût pas fait pareille confusion, - mais qu'en fin de compte il ne reconnaît que les indices (au sens français), et y ramène les index (au sens français) quand il en rencontre. Ce qui fait que l'INDEX (= INDICE) peircéen couvre à la fois : 1) les indices (français), comme le tonnerre ou les empreintes, dont celles de la photographie ; 2) les index français que sont les pronoms possessifs (« a possessive pronoun is two ways an index », 110), relatifs, démonstratifs, ainsi que les Quantificateurs (« quilibet, quisquam, quidam ») ; 3) les propositions : « a Dicisign necessarily represents itself to be a genuine Index, and to be nothing more », étant donné que « every kind of proposition is either meaningless or has a real Secondness as its object » ; 4) les noms de choses existantes une fois prononcés ou écrits : « A Replica of the word "camel" is likewise a Rhematic Indexical Sinsing, being really affected, through the knowledge of camels, common to the speaker and auditor, by the real camel it denotes ; 5) les noms prononcés ou écrits de choses imaginaires : « The same thing is true of the word "phœnix". For although no phœnix really exists, real descriptions of the phœnix are well known to the speaker and his auditor ; and thus the word is really affected by the Object denoted. ».”

⁶ « Les INDICES (français) sont des effets d'une cause signalant, trahissant cette cause ; étant non intentionnels, ils vont surtout de l'objet vers le sujet. Les INDEX (français) sont des pointements qui, étant intentionnels, vont surtout du sujet vers l'objet. Ainsi, dans notre *Philosophie de la photographie*, les photos peuvent se définir en toute rigueur comme des *indices éventuellement indexés* : *indices* pour le côté nature et le côté technique des empreintes photoniques ; *index* pour le côté sujet (le photographe) choisissant son cadre, sa pellicule, ses révélateurs, son papier d'épreuve. »

Anyone familiar with Barthes (1961) *Photographic Message* could see the similarity between *indice*/denoted and *index*/connoted. Moreover, this analogy is perhaps one of the motivations for Sonesson (1994/2015) to see Van Lier's system as more grounded in Barthes's theory than in Peirce's.⁷ Having said that, an important distinction that Van Lier makes is the difference in the movement in the *indice* and the *index*.

We must see that index and indicia work in the opposite direction. Indicia go from things to the one considering them; this is what the Latin objectal termination "-icium" in *indicium*, where **indice** comes from. Conversely, index go from the pointing, tracing or collecting specimen to things; what the "-ex" Latin subjectal termination in *index*, where comes from our **index**. (Van Lier 1982-2002: 2)⁸

Why is it so important to emphasise that the *indice* goes from the object to the subject and the *index* from the subject to the object? Because it is the basis of Van Lier's critique of Peirce's "medieval realism" that leads him to regard indexes as originally signs. To use his own words, for Peirce the universe "is perfused of signs" (CP 5.448, footnote), what apply a pre-existence of the sign to the subject, or a dominance of the "representamen" on the "interpretant". This may be one of the reasons why Peirce's work has had such a resonance in the field of religious semiotics, or theosemiotics - a neologism itself taken from Peirce - because of his way of seeing the world as charged with meanings that correspond to the religious vision of a world incrustated with meaning during God's creation of all things.

Peirce's concept of signification is triadic. Interpretation occurs when an agent makes a purposeful response to something, a sign, the latter standing *in lieu* of something else, the object. Object, sign and interpretative response are the three elements of any event of representation and interpretation. However, the triadicity of sign processes would be of little interest for trinitarian theology if it were not for striking parallels between the specific pattern of this triadicity and the main tenets of the Christian way of speaking about the triune being of God [3,4]. (Robinson, 2015: 1017-1018)

This implies an epistemological view of the sign in Peirce's system, where the movement is mainly from the object to the sign, its nature is given by the object it stands for and not

⁷ Van Lier seems equally critical to those two authors:

"At the same time, we might wonder why some of our contemporaries are so infatuated with the 'Peirce's index'. Here again, Peirce's semio-sociologist, sheds light when he stresses at length that, for academic conviviality, a vague and slightly false idea is more profitable than a clear one. It is the same vagueness that, from various sources around Roland Barthes, has undoubtedly made the fortune of the "message without code", which is a *contradictio in terminis*; of a "ça a été" in which it is hardly specified which "ça" or which compound past tense is meant; a "punctum/studium", from which most exemplary photographers have distanced themselves; the emphatic "Reference is the founding order of Photography", whereas (French) indices do "fèrent" but do not "réfèrent", carry but do not point, signal but do not designate." (Van Lier 1983: 3)

⁸ « On doit voir que les index et les indices fonctionnent en sens opposé. Les indices vont des choses à celui qui les considère ; c'est ce que signale la terminaison objectale latine "-icium" dans *indicium*, dont vient **indice**. Au contraire, les index vont du spécimen pointeur, traceur ou collecteur aux choses ; ce que signale la terminaison subjectale latine "-ex", dans *index*, dont vient notre **index**. »

attributed by the agent. If this statement can be discussed for symbolic signs, it is certainly the case for index signs. But, because Peirce index is actually composed of *indices* and sometime *indexs*, it may include a double movement, object to sign and subject to sign in same time, opening the door to the possibility for the index to be true or false by becoming a proposition.

It is remarkable that while neither a pure icon or a pure index can assert anything, an index which forces something to be an icon, as a weathercock does, or which forces us to regard it as an icon, as the legend under the portrait does, does make an assertion, and forms a proposition. This suggests a true definition of a proposition, which is a question in much dispute at the moment. A proposition is a sign which separately, or independently, indicates its object.” (EPII, 307)

The “pure index” would correspond to the *indice* and “a proposition” could be an *indexed-indice*, showing that Peirce was indeed able to do the difference *indice/index*, but did not find the necessity to stress it. Furthermore, a fundamental difference between an *indice* and a proposition is, an *indice* cannot be true or false, because “it asserts nothing”, considering a photography as solely an *indice* is take the part of the idiom “a photo can’t lie”. If I have insisted on Van Lier’s separation between *indice* and *index*, it’s to clarify the position in the upcoming chapters when indexicality will be used to separate photography from AI generated image that ‘looks like photography’. When opposing those two medias on there indexiality, I would not extend the index as a proposition but solely as an *indice*, a physical cause. Of course, a photography can lie – even more, its privileged indexical statue compared to others visual media makes it a very powerful vehicle of manipulation – but it is necessary to consider the existence of an ideal *indice-photography* for our upcoming argumentation.

1.1 Directionality of the sign

Once this conception of photography as an *indice* is accepted, it is possible to focus on another problematic; The difference between the *representamen* and the *interpretant* nature of the sign, and the consequences this gap can creates. The gap between the *representamen* and the *interpretant* is a point rise by the previous quotation; “an index which forces something to be an icon, as a weathercock, or which forces us to regard it as an icon”, from the object-sign (*representamen*/epistemological) direction, the weathercock is an index, and to a subject-sign (*interpretant* /subjective) direction he is – or, is seen as - an icon. It is

problematic that Peirce did not choose between “being” and “perceive as”, keeping this ambiguity on the nature of the sign, not giving us the answer if the *representamen* and *interpretant* are two elements of a same sign or two distinguished signs. This ambiguity is consequential to the definition of sign in Peirce, as Jappy (2013) explains it well.

The following three definitions are the variant descriptions of the nature of the action of a sign:

- (1) [A sign] is a vehicle conveying into the mind something from without. (CP 1.339)
- (2) A sign is something by knowing which we know something more. (SS 31-2)
- (3) A sign, or *representamen*, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign. That sign which it creates I call the *interpretant* of the first sign. The sign stands for something, its *object*. (PWP 99)

Like that of Kant, Peirce’s major philosophical concern was with the explanation of how we acquire scientific knowledge, [...].

The relatively informal definitions given in (1) and (2) suggest how signs contribute to the acquisition of knowledge [...]. Definition (3), on the other hand, introduces [...] the ‘human element’ in semiosis by stipulating that the sign creates an equivalent or more developed sign in a person’s mind [...]. (Jappy, 2013: 3)

If the definition (1) and (2) only take on account the direction object-sign, and are the epistemological pendant of Peirce’s semiotics, the definition (3) opens up with the double direction discussed later. The coexistence of those two directions toward the object (*representamen/ interpretant*), and the way to consider and hierarchies their relation will define your global understanding and view on semiotics. Semiotic is neither a science based on the object as natural science nor on the subject as psychology, but it is “the cenoscopic science of signs” (CP 8.343, 1908). Signs, the object of semiotics, are neither the object nor the subject, it is the intermediary between the subject and the object:

I define a Sign as anything which on the one hand is so determined by an Object and on the other hand so determines an idea in a person’s mind, that this latter determination, which I term the *Interpretant* of the sign, is thereby mediately determined by that Object. (CP 8.343, 1908)

The sign mediates the correspondence between the object and the idea through the relation between the *representamen* and the *interpretant*. It is this relation that avoids semiotics to consider the world as solipsism while still taking in account the pragmatic in its analysis. Semiotic is a science of mediation between the object and the subject by the signs, and this mediation is itself determined by the relation between the *representamen* and the *interpretant*. The purpose of this thesis is to understand, via the example of photography, what are the consequences of a disturbance in the relation *representamen/ interpretant* on our mediation of the world. Photography is a great subject for analysing this disruption, since its technological evolutions and transformations have challenged our ability to re-actualise our concept of it.

To understand this, let us retrace the history of photography, not from the point of view of an art historian, but with a focus on its function as a mediator of the real and the legitimacy of its value as an *indice*.

II. 19th Century: The Dogma of Indexicality and *the Ontology of Photography*



Fig. 1. Niépce 1827. *Point de vue du Gras*.

Some would date the birth of photography to 1827, when the French inventor Nicéphore Niépce realised what is considered to be the first photography, *Point de vue du Gras* (fig 1). If I were to accept Niépce's 16.2 x 20.2 cm bitumen-coated pewter plate of Judea as the first artefact considered to be a photograph - although there is always an element of arbitrariness in this kind of attribution - another millstone in the genesis of this medium could be attributed to the work of a man who died exactly one hundred years earlier (1727), Isaac Newton. This attribution is not because of his work on the physics of light, which may or may not have been used in the conception of photography, but because he symbolises a new era in human history, the era of science. Of course, the choice of Newton here is also partly arbitrary, if it were not for the exact gap of one hundred years between his death (1727) and the birth of photography (1827) - the human mind appreciates such round figures - it could perhaps have been the authors of the Enlightenment or Hegel and his vision of progress, because what is

being pointed out here is the relation between the creation of photography and the gradual transformation of human society into a science-centred society. What needs to be understood is that the invention of photography may be a specific event - the creation of a French aristocrat in a villa in the south - but it is also the inevitable result of a causal chain that has led our society to reclaim this singular medium, which makes it reasonable to claim that if Niépce had not invented photography, someone else would have.

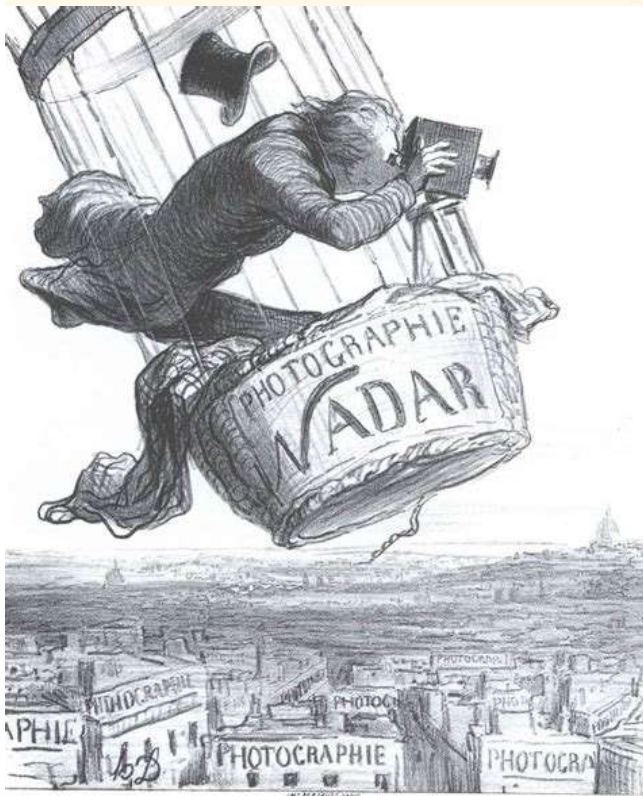
What is the basis of this claim? Other justifications could be put on the table, such as the Hegelian progress mentioned above, which would postulate the necessary development of such a technology. It is on this idea that Levenson (1988) justifies the appearance of photography as the last step in a linear research of a technology - from antiquity to modernity - capable of 'automating' drawing and printing on a large scale in order to respond to the increasing demand for images by the 'market'. If Levenson (1988: 26) is probably right when he says, "Important innovations come in their due time when there is a fertile combination of perceived need and technical feasibility", it is important to precisely define the need. Is photography just an image? As seen in the previous chapter, this medium has a specificity from its *indice* genesis and thus from its relation to the 'real'. Photography as definitely popularise the commercialisation and distribution of visual artefact in the population. Pioneer like Niépce and Daguerre were indeed considered as entrepreneur and photography like a business (Fig. 2), and many have critics Nadar and his artistic ambition toward photography (Fig. 3).⁹ Nevertheless, all this is well known and documented by the work of art historians, from the historical point of view like Gernsheim (1955) to more meta approaches like Marien (1997; 2002), passing by a multitude of other angles from different fields.

The need at the birth of photography was not only a response to society's increasing demand for images, but also a desire for an image that man had never before achieved, a 'true image' or 'image of the real'. Just as the ancient Greeks and Romans looked for symbols in the flight of birds or in the entrails of animals in order to achieve their knowledge of the world, the European of the nineteenth century looked for another type of sign in which to place his trust in found knowledge, the index.

⁹ "[...] following the French government announcement of the daguerreotype in August 1839, a song circulated in London which began with the following verse:

O Mister Daguerre! Sure you're not aware
Of half the impressions you're making,
By the sun's potent rays you'll set Thames in a blaze
While the National Galler's breaking

Initially, photography threatens to overwhelm the citadels of high culture" (Sekula 1986: 4)



NADAR. élevant la Photographie à la hauteur de l'Art

Fig. 2 Maurisset 1839, La Daguerriotypomanie.

Fig. 3 Caricature of Nadar.

Like the anecdote we like to tell around the table to those few who have never heard it, "the lighter was invented before matches", the chronology between the invention of the fingerprint and photography would surprise most people who discover it for the first time. The fingerprint - at least its use or institutionalisation - could be considered to have been invented in 1877-1888 from the ideas of William James Herschel (1877), Henry Faulds (1880) and Francis Galton (1888). Galton's work is itself directly related to the work of Alphonse Bertillon and his *Bértillonnage* system developed in 1879. *Bértillonnage* is one of the many attempts to "archive the body" that were developed in the 19th century and is often considered to be "the first effective modern system of criminal identification"; his system worked with anthropometric fiches, where an image of the criminal was linked to his biometric description; the model would later evolve to include fingerprints (Fig. 4). *Bértillonnage* is a great transcription of this new way of mediating the real, what I have decided to call here the 'dogma of indexicality'.



Fig. 4 Henri-léon Scheffer's anthropometric fiche, *Bértillonnage* (1902)

To continue our development on the increasing importance of the index and the role of photography in the realisation of this new dogma, I would like to invite you to explore the insidious path that the *Bértillonnage* has paved for criminal science and phrenology. In the hope that an excursion into the ideologies built around the index might clarify our precedent position on the need to distinguish the *indice* from the *index*.

In the frenzy of indexing that engulfed the 19th century, it was not long before new projects were launched to indexicalise the *indices* produced and archived by photography and other processes. In this way, the biometric measures and photographic portrait of the *Bértillonnage* were soon transformed into indexes (in the broad sense that Peirce gave them), and became the material basis of a science of criminology, carried by names such as Lombroso and Lacassagne, although both were very different. It should be pointed out here that the chronological impression of a transformation of the *indice* into an index (or indexed-*indice*) does not reflect a historical or social reality, but an epistemological one. In this respect, it can be certain that Bértillon did not originally had a vision similar to the one we are going to explore now - on the contrary, the accumulation of biometric data in his records tends to prove that he was keen to find a measurable 'something' about human nature (Fig. 5, Fi. 6).¹⁰

¹⁰ The *bértillonnage* files contain a multitude of body measurements that seem to go beyond the simple need for 'recognition' that is their purpose. It's hard to see how forearm or ear measurements can be of any help to police officers in identifying a repeat offender.

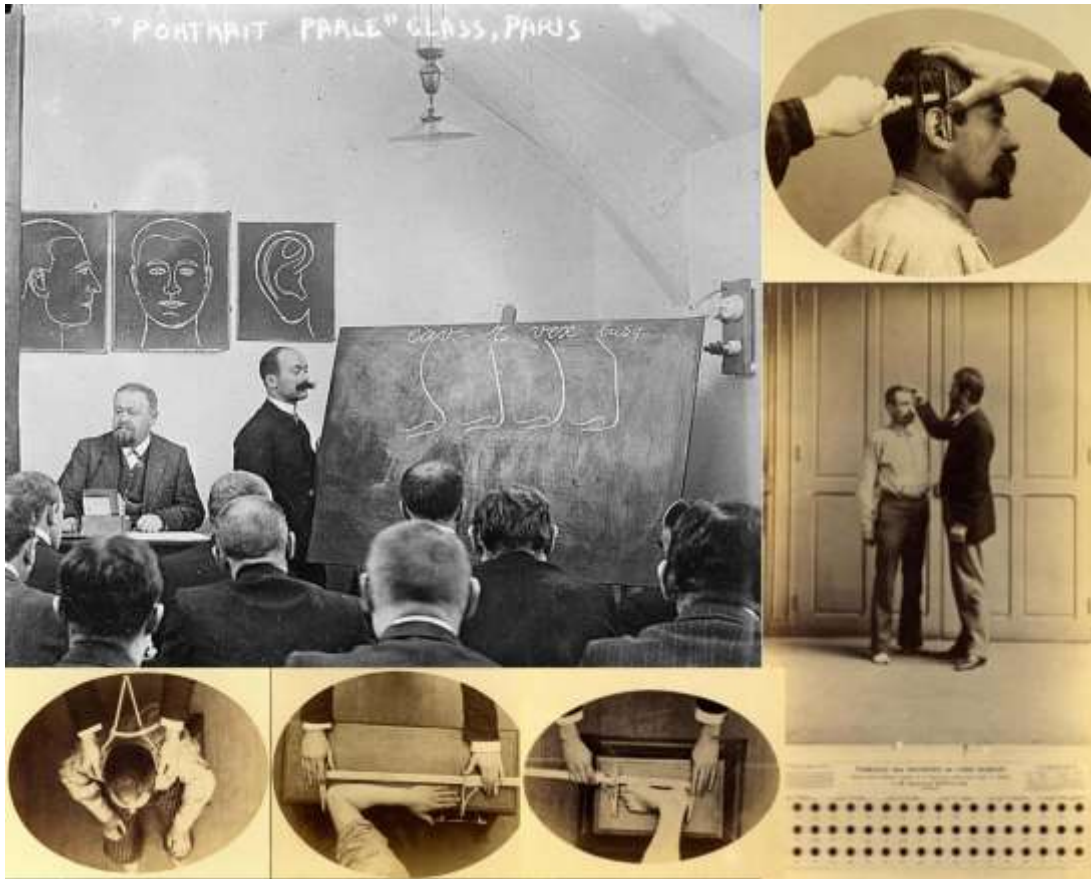


Fig. 5 Bertillon recording his measurement session and class on human facial traits.



Fig. 6 Juxtaposition of criminals ears. Bertillon.

However, whatever his inspiration and conviction, his process remains a series of individual cards grouping together the *indices* of a criminal, rather than a proposition (index) of what a criminal is. This distinction is also made by Sekula (1986: 18), who contrasts Bérillon's approach with that of Galton in order to explore a more profound difference between 'two models of photographic meaning':

[...] one way of "taming" photography is by means of this transformation of the circumstantial and idiosyncratic into the typical and emblematic. This is usually achieved by stylistic or interpretive fiat, or by a sampling of the archive's offerings for a "representative" instance. Another way is to invent a machine, or rather a clerical apparatus, a filing system, which allows the operator/researcher/editor to retrieve the individual instance from the huge quantity of images contained within the archives. Here the photograph is not regarded as necessarily typical or emblematic of anything, but only as a particular image which has been isolated for purposes of inspection. These two semantic paths are so fundamental to the culture of photographic realism that their very existence is usually ignored.

The difference between these two models of photographic meaning are played out in two different approaches to the photographic representation of the criminal body: the "realist" approach, and by realism here I mean that venerable (medieval) philosophical realism that insists upon the truth of general propositions, on the reality of species and types, and the equally venerable "nominalist" approach, which denies the reality of generic categories as anything other than mental constructs. The first approach can be seen as overtly theoretical and "scientific" in its aims, if more covertly practical. The other can be seen as overtly practical and "technical" in its aims, if only covertly theoretical. Thus the would-be scientists of crime sought a knowledge and mastery of an elusive "criminal type." And the "technicians" of crime sought knowledge and mastery of individual criminals. Herein lies a terminological distinction, and a division of labor, between "criminology" and "criminalistics." "Criminology hunted "the" criminal body. Criminalistics hunted "this" or "that" criminal body. (Sekula 1986: 17-18)

Galton belongs to the first group and Bertillon to the second; it would also be tempting to say that Peirce belongs to the first group and Van Lier to the second. Of course, knowing Peirce's position on nominalism, such a statement, which would in fact anchor our present work in that school of thought, might invite some criticism, but it is partly true. The distinction made by Sekula (1986) accurately reflects part of Van Lier's desire to distinguish the *indice* from the *index*, as he himself concludes.

Thus, if "indices" are opposed to "signs" in my *Philosophy of Photography*, it is only because of a nominal definition that is capable of emphasizing the sharp contrast between *non-intentional* photonic imprints, pictorial *intentional* touches and their own equally *intentional* indexes. This is important when keeping in mind the differentiation between 'signaling' and 'designating', as indices signal and all other signs designate. [...]. The well-trained scientist that he was, Peirce was too confident to be capable of believing that nominal definitions are always legitimate, and also occasionally economical. (Van Lier 1983: 4)¹¹

¹¹ « Ainsi, dans la présente *Philosophie de la photographie*, si les « indices » ont été opposés aux « signes », c'est uniquement en raison d'une définition nominale qui paraissait commode pour souligner le vif contraste des empreintes photoniques, *non intentionnelles*, avec les touches picturales, *intentionnelles*, et avec leurs propres index, également *intentionnels*. D'autant que le français a la distinction signaler/désigner, l'indice signale, les autres signes désignent. [...]. Peirce était trop confiant de croire, en bon scientifique, que les définitions nominales sont toujours licites et parfois économiques. »

However, this distinction between *realism* and *nominalism* needs to be qualified. As we said earlier, even if the *Bértillonage* can be seen, as Sekula (1986) does, as a *nominalistic* approach, Bertillon's obsession with measuring every part of the body, and his juxtaposition of ears, irises and other limbs of criminals perhaps suggests a mind just as *realistic* as that of Galton or Lombroso. What about the work of the latter two?

Galton is known as the founder of eugenics, while Lombroso developed the idea of the 'born criminal', which had a profound influence on modern criminology (until now?). It would be an understatement to say that their racist and eugenicist ideals are, in the overwhelming majority of cases, highly contested today, but they both enjoyed great success (and criticism) in their day. This success is partly due because their works were based - or wanted to be based - on index, but which could be called 'scientific facts', 'measurable data', or why not 'indexical propositions' in a more Peircean turn of phrase. Galton and Lombroso shared a common belief or ontological view - which could be described as essentialist - that men are born with the predisposition of their class, characters, and all the attributes that in short indicate their purpose and role in society. A Calvinist vision in itself (although Lombroso was an Italian Jew), and a scientific and technological opportunity provided by the 19th century to move from the belief to the proof, and from the proof built the categorisation that enable the anticipation of any criminals' acts.¹² One of this 'opportunity' being the photography. Galton is certainly the most intriguing in his use of photography, with his famous 'composite photography' "that he felt the method ought to be developed, not as a newspaper curiosity, but as a serious aid to sociology, and especially to the study of heredity." (Welby 1911). What is exactly this 'composite photography' method he developed (Fig. 7)?

¹² Sounds very actual.



Fig. 7 Galton's composite photographs and associated labels

As the name suggests, this involves creating a composite image by superimposing different portraits of people, which Galton has previously categorised (syphilitics, criminals, officers, etc.), with the intention of using this image to obtain a 'type' of person corresponding to each of these categories. The idea of creating a perfect representative from a composite amalgam of different agents of a type is not new in itself. Botticelli's Venus is often cited as an ideal type of beauty, and some consider that the painter formulates this ideal type by choosing different elements from the women (real and artistic) he has encountered, "She is a chimera, taking the best bits from many sources" (Haughton 2004: 231). What is new is the scientific argument linked to such a project, and the hope of reducing a "symbolic truth" to an indexical truth. Let us see how Galton presents his concept to:

[...], I have caused trials to be made, and have found, as a matter of fact, that the photographic process of which I there spoke enables us to obtain with mechanical precision a generalised picture; one that represents no man in particular, but portrays an imaginary figure possessing the average feature of any given group of men. These ideal faces have a surprising air of reality. Nobody who glanced at one of them for the first time, would doubt its being the likeness of a living person, yet, as I have said, it is no such thing; it is the portrait of a type and not of an individual. (Galton 1879: 132-133)

Speaking of a representation “with mechanical precision” for a general idea, shows very well that ambition and believe he – and many others of his time – has. He finds in photography the tool to indexicalise his ideas, to decipherer the truth. Of course, Galton work is not to be reduce to the ‘composite picture’ and the analyse of such images needs to go with other process of the phrenology, divers measurement that becomes by the power of the propositions proves of certain qualities.

Lombroso's photographic work is more classical. It must be admitted that Galton's 'composite picture' is the very paragon of what I want to examine here, and it is no surprise that Sekula (1986) focuses his attention on it. Nevertheless, a diversion to Lombroso not only shows, if proof were needed, that the logic underlying Galton's work is not an exception, but also that this logic can be expressed through photography without the need to retouch it. If Galton's image obtained by superposition is 'not of an individual', which leads Sekula (1986) to conclude that Galton had a symbolic aim, Lombroso's work of juxtaposing photographs follows the same logic and aims at the same result of being able to indexicalise 'types' (Fig. 8).

PORTRAITS DE CRIMINELS ALLEMANDS,



Fig. 8 Portraits of German Criminals. Lombroso (1876).

These plates of images are taken from his Atlas, which goes hand in hand with his famous work *L'uomo delinquente* (1876). It is interesting to look at the introductory page of the *Atlas*:¹³

The main aim of this Atlas has been to offer the reader a means of grasping and checking, for himself, the truth of our assertions, without detracting from the economy of space and time that is required in a book.

This Atlas is therefore an integral part of the book, and perhaps the most important; [...].

[...]

The plates in this new edition illustrate a little-studied side of the criminal world: what ethnologists call the pietography of savages; other plates illustrate the type of the criminally insane and show their analogy with the born criminal. Another shows, using the Galtonian photographic method, the synthesis of 18 criminal skulls: in this way we respond, with types fixed by the sun, to certain more or less serious anthropologists who denied the existence of type in the skulls of criminals. (Lombroso 1888[1876]: 1)

Where Galton spoke of 'generalised images' made with 'mechanical precision', Lombroso brings an even more interesting turn of phrases: 'types fixed by the sun'.¹⁴ This formulation synthesises in itself all the critic developed in this chapter. Indeed, if photography can be seen as the 'imprint of the sun' it cannot 'fix' a type, it 'fix' the light reflected by objects through the lens to the photosensitive film. A type cannot be photographed, certainly Lombroso knows it, but for him as for Galton or Peirce, the photography has the power of proposition in itself, and there is no mean to differentiate the *indice* from the *index*. It was not long before other criminologists - mainly in France - criticised Lombroso's work, refuting the alleged links between skull morphology and predisposition to crime, and opting instead for a social explanation of criminality.

What is interesting about their work, is that they express the danger of failing to distinguish between *indice* and *index*, and of accepting every index as a proposition. I, in this aspect following the work of Sekula (1986), but I am also trying to reply to one of the critics addressed by Ball (2017: 161) on his encounter; "Sekula's conclusions suffer from at least two problems. The first limitation is strictly semiotic. When he directly cites Peirce, he contrasts index and symbol in relation to nominalism and realism, respectively." Ball finds in the opposition between symbol and index a clumsiness on Sekula's part from a purely

¹³ The following extract is my translation from the French edition of 1888. Despite my effort I could not find the *Atlas* in Italian nor in English.

¹⁴ It is interesting that Lombroso use 'sun' and not 'light'. If at that time the sun was the main source of light for photography - due to the poor sensibility of the photographic film - Nadar has already make use of artificial light for his series of photos in the catacombs of Paris (1861). We can suppose there is in his choice of words an almost religious reference.

semiotic point of view. Indeed, he considers that Peirce's index offers far more depth than Sekula exploits, in his appeal to the symbol to categorise the realist view on photography.

The symbol is not necessarily the best way to characterize how photos or other signs partake of generality. For example, concepts such as metapragmatics, dicentization, and qualia offer ways to think about patterned and/or generalized (legisign) types of indexicality without appeal to the symbol(ic). (Ball 2017: 160).

I completely agree on this point - without denying the triad of the Peircean sign (index-icon-symbol) – I also think that the difference of those 'two models of photographic meaning', that Sekula (1986) attributes to the realist and the nominalist, lies at the very heart of their own definition of the index. Nevertheless, more than in the exact attribution of the type of indexicality that would suit one or the other by delving into the micro-elements that make up the index (such as qualia), I propose on the basis of the work of Van Lier (1983) to situate this ontological difference in the will or not to separate the *indice* (non-proposition) from the *index* (proposition) as two natures of the index..¹⁵

Before closing this chapter on the 19th century and its development of the 'dogma of indexicality', I cannot resist one last example to illustrate the problem of considering *indices* as propositions and might also highlight how the *index/indice* distinction is not to be done only for photography. The antagonist in this story is none other than Charles Peirce (1834-1914) himself, who, it should be remembered, however much of a genius he may have been, was nonetheless a man of his time and thus shared some of its shortcomings. This anecdote is reported by Sebeok in a 1979 article entitled “‘You Know my Method’: A Juxtaposition of Charles S. Peirce and Sherlock Holmes”.

On Friday, June 20, 1879, Charles S. Peirce boarded the Fall River boat in Boston, bound for New York, where he was to attend a conference at the Brevoort House the next day. Upon his arrival in New York, the following morning, he experienced what he describes as a "strange fuzzy sensation" in his head, which he attributed to the stale air of his stateroom. He hurriedly dressed and left the ship. In his haste to get some fresh air, he inadvertently left behind his overcoat and an expensive Tiffany lever watch which had been purchased for him by the U.S. government for his work with the Coast Survey. Soon realizing his oversight, Peirce rushed back to the boat only to find his things gone, at which point, faced with what he felt would be a "life-long professional disgrace" were he not able to restore the watch in as perfect condition as he had received it in, he tells us that, having "then made all the colored waiters, no matter on what deck they belonged, come and stand up in a row ..." (Sebeok 1979: 203)

I invite the lecture curious to know how ‘detective Peirce’ resolve this enigma to consult

¹⁵ It is interesting to note that this index/index separation shares strong similarities with Barthes's 'denotative' or 'connotative' message, an influence that is also strongly reflected in Ball's semiotic definition of photography.« This involves a semiotic account of how photographs as images combine subjects (indexes) and predicates (icons) but without the linear syntax of the linguistic proposition. » (Ball 2017: 157), being one of the most direct translation of Barthes's (1961) photographic message into Peircean terms that I had encounter.

Sebeok paper, on our side all the elements necessary for our critic are already present in this passage. What I can tell, without spoiler, is whenever how hard it was for Peirce to identify the final culprit, it is without hesitation he narrows his belonging to a certain group, 'colored waiters'. From the point of view of Van Lier, the black colour of the skin would be first the *indice* of the melanin pigments, and after this could be *indexed* as divers behavior. For Peirce, the black colour of the skin is an index but also a proposition, and judging his 'method', the proposition should be something like "black skin indicates an highest disposition to stealing". I could eventually not reproach to Peirce some behavior that could be put into perspective with the context of his time,¹⁶ if it was not for him and Sebeok to relate the 'adventure' like the work of a detective. Indeed, the work of a detective is based on the observations of *indices*, not of symbols,¹⁷ it is in this case legitimate to say Peirce logic was concomitant to Galton's or Lombroso's ones for their tendency to not being able to differentiate the 'denoted' message from the 'connoted' one. This treatment of the index has tremendous consequences from the end of the 19th century to the middle of the 20th, and the role photography played in the validation of racist ideas into scientific theories is to underline.¹⁸ Does that mean, photography or Peirce's definitions of the index are racist? Obviously not. But the combinations of both gave a solid epistemological ground for those who wanted to 'fix by the sun' their ideals in the book of science.

While photography may has played an unenviable role in the development of sciences and doctrines now considered obsolete at best and dangerous at worst. It has also played a fundamental role in other fields of science, where its use was often been reduce – or at least try to be contained - to its *indice* quality. Even before Bértillon's anthropomorphic records and Galton's composite images, photography found one of its first scientific applications on the banks of the Nile. Barely two decades after Niépce's first photograph (1827), three photographic expeditions set out for Egypt, mounted in parallel - but in some cases simultaneously.¹⁹ These expeditions, led respectively by Maxim Du Camp (1849-1851), Félix Teynard (1851-1852) and John Beasley Greene (1853-1856), shared this strange mixture between the scientific work of using photography to record - not to say archive - and a degree of artistry in their way to composed the images. Although Maxim Du Camp was the first on the scene, the idea of using photography as an instrument for the study of Egypt seems to

¹⁶ Even if ultimately, racism never been an acceptable ideology.

¹⁷ Expect for the *DaVinci Code* peraphs.

¹⁸ I am not saying that Peirce notion of index conditioned this period, but that the Peirce and his notion of index reflet this mindset of his time.

¹⁹ If it seems to be a curious coincidence the three expeditions took place at almost the same time, it can be explained by the fascination of the occident through the 'mysteries of Egypt' that was still running strong those time. Also, Egypt with his strong sun was certainly considered has the perfect place to take picture at a moment of the technology was still required a large amount of light to get is print on the photosensitive film. The selection of those three expeditions is quite arbitrary. Other antiques sites has been photographed during those decades (Rome, Nubia, Troy,...), and names as Robert Macpherson, William James Stillman and others could have been mentioned instead. However, this selection - even if it does take in account the totality of the similar works produces during this time - has the advantage to be concentrated on a same place and period of time.

have been first formulated some ten years earlier by François Arago, as Howe (1996) reports:

Egypt and photography were paired in the first description of Daguerre's process. When François Arago, Permanent Secretary of the Académie des Sciences, officially announced this new invention, he proposed that photography could be applied to the ongoing study of Egypt. Arago's statement before the Chamber of Deputies on 3 July 1839, subsequently repeated to the combined session of the Académie des Sciences and the Académie des Beaux Art on 19 August 1839, made explicit connection between this new method of recording the physical world of ancient Egypt:

While these pictures are exhibited to you, everyone will imagine the extraordinary advantages which could have been derived from so exact and rapid a means of reproduction during the expedition to Egypt; everybody will realize that had we had photography in 1798 we would possess today faithful pictorial records of that which the learned world is forever deprived of by the greed of the Arabs and the vandalism of certain travelers. (Howes 1996: 5-6)

There are several interesting points in this extract. First, the fact that Arago defended his idea before the Académie des Sciences and the Académie des Beaux Arts, showing that such a project belonged to these two spheres of our society from the outset. Another point is Arago's description of the possible use of photography, which is devoid of the 'romanticism' of Galton or Lombroso; he considers this medium only in its capacity to record faithfully (and quickly) the artefacts of ancient culture. Returning to Du Camp, who of the three expeditions was the only one sponsored by a public institution - perhaps as such, a concretisation of Arago's project ten years after he had formulated it - and who received his directives from the Académie des inscriptions et Belles-Lettres (Howe 1996: 14), what would let us presume that his work was primarily concerned with hieroglyphs. Yet his photographs are oriented towards landscape shots, with a great distance separating him from his subject, and sometimes including Egyptian workers at work or standing atop a monument. These wide shots are not suited to the study of hieroglyphs, which, when they exist, appear tiny and indecipherable; Du Camp's project shows us an Egypt to be explored, with its monuments lost in the desert, half buried in the sand, and the work of some native laborers enabling them to gradually resurface. The inclusion of humans in his photos also seems to reflect a desire to scale up the gigantism of Egyptian monuments, in the same way that modern archaeologists use graduated rules on their photographs as a reference to determine the size of the objects photographed. There is a contemplative, even dreamlike quality to these photos, but it does not resort from strong staging effects. Most of the time, the photos are taken from the front, without plunging or counter-plunging, and the atmosphere is conveyed mainly by the way he composes his frame. Which makes it possible to obtain images that are 'faithful' to their subjects, but also definitely poetic (Fig. 9 ; Fig. 10).

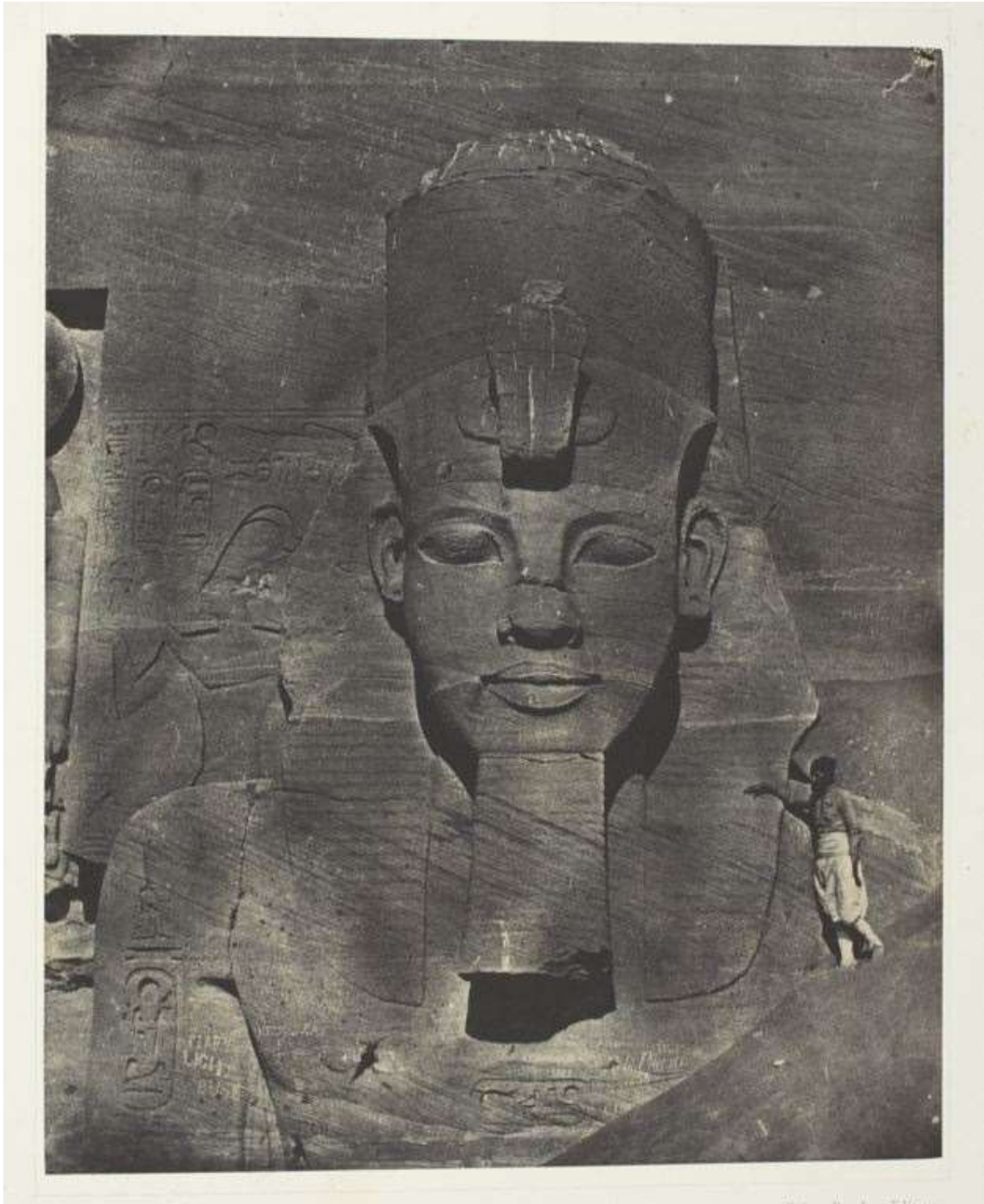


Fig. 9 Du Camps (1849-1851).



Fig. 10 Du Camps (1849-1851).

For the study of hieroglyphs, let us look more closely at the work of Teynard. Teynard's primary motivation was to provide a photographic complement to the *Description de l'Egypte*, a collective reference work that brought together all the research on Egypt carried out since the Napoleonic campaign (Howes 1996: 14). Of the three expeditions, it is the one that offers the most 'scientific' approach. (Fig. 11; Fig. 12; Fig.13).



Source gallica.bnf.fr / Bibliothèque nationale de France, Département des Manuscrits, NAF 20435 (2)

Fig. 11 Fonds Emile Prisse d'Avennes sur l'Egypte : Iconographie. Dessins, estampes, photographies. "Thèbes - Karnac". « Thèbes — Karnac, 4 ». Teynard Félix (1851-1852)



Source gallica.bnf.fr / Bibliothèque nationale de France. Département des Manuscrits. NAF 20435 (2)

Fig. 12 Teynard Félix (1851-1852).



Source gallica.bnf.fr / Bibliothèque nationale de France. Département des Manuscrits. NAF 20435 (2)

Fig. 13 Teynard Félix (1851-1852).

The publication of negatives is an interesting aspect of his methodology. Indeed, Teynard seems to have noticed that certain details, certain lines of hieroglyphs, are more visible on negatives than on positives. The choice to publish them demonstrates an understanding of the photographic index and its relation to its Object that goes beyond mere iconicity. The negative 'resembles' less what we could observe with our own eyes than what the positive offers us. Nevertheless, the truth of photography lies not in its iconicity, but in its indexicality, so that what the negative highlights is validated by the indexical nature of the photographic sign, even if these details escape us when we observe with naked eyes. It was this same logic that made possible the invention and use of the spectrograph, to which we shall return shortly.

Greene, for his part, wanted to make a systematic record of sites and inscriptions (Howes 1996: 14). Of the three, however, he offers the most romantic vision of Egypt, with - as we shall show - an approach rooted in realism (Fig. 14; Fig. 15).



Fig. 14, Medinet-Habu. John Beasley Greene (1854).

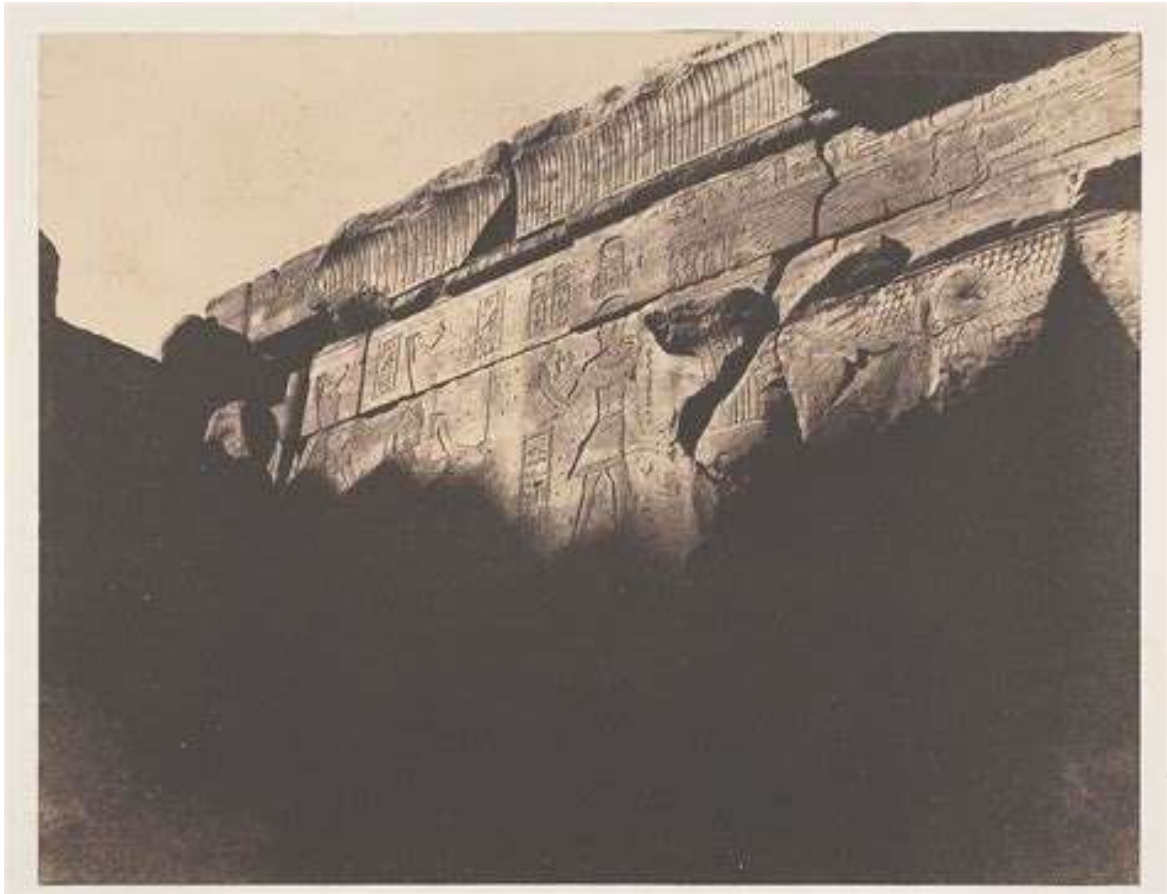


Fig. 15 John Beasley Greene (1854).

The slidings between *indicium* and *index* perhaps explain that English speakers, who are strong logicians, have only kept one word, *index* (pl. *indices*) to designate both; (...).Indeed, according to a certain vision of things, the *world not only "makes sign technically" in technical objects, or "contains signs" in non-intentional *indicium*, but almost "makes a sign semiotically" in the sense that it seems to index certain things. Such was the fundamental destiny-party of Emerson and Walt Whitman's American transcendentalism, followed by Ch. S. Peirce, who wanted nature to be so indicial-indexating that it showed God: "As to God, open your eyes, and you see Him". The United Kingdom is the land of haunted castles *per se*, and what are phantoms if not *indicia* doubled by indexes, and indexes doubled by *indicia*? (Van Lier 1982-2002:17)

Greene with his images gives a voice to the monument he photography. Like 'haunted castles', Greene's Egyptian monuments seem to contain a mystical force in the way he treats them. His play of light and shadow, his low-angle shots and his mid-range framing are all *index* that joined to the *indice*, gives a romantic mystical connotation to Egypt. Greene's American origins been a reason of his way to see and shows us Egypt?²⁰ It would be complicated to prove it, and the opposition 'French nominalist' against 'Anglo-Saxon realism' is certainly too simple. However, Van Lier's 'phantoms' seems to be more present in his work than compared to Du Camp and Teynard, at my opinion.

²⁰ John Beasley Greene grown up in France but his parents was Americans.

2.1. Before the digital turn, the autonomy of photography.

I have included the 20th century in the bigger chapter of the 19th century as there is no fundamental technological turn in photography (until the 90's as we will see later). However, this doesn't mean the century reflections on photography was poor, at the opposite it is a dynamic moment in the exploration of photography. It is the moment where photography became an independent art media and many photographers and art theoreticians delve into reflections on the relation between photography and the 'real'. If many projects could have been selected to illustrate the dynamism of the meta-reflection of photographers on their media all along the century, I have chosen two projects that have almost opposed point of view on the 'objectivity' of photography. The first being Bazin's *L'ontologie de la photographie*, an academic paper that had fundamentally impacted the view on photography and leaved an indelible mark on cinema. Bazin was an art critic and not a photographer, for this reason I will illustrate his view with works of others. The second being Otto Steinert's 'Subjektive Fotografie' movement, an artistic conceptualisation of photography rejecting the 'objectivity' value of the media.

The name of our 19th century chapter is a reference to André Bazin's *L'ontologie de la photographie*. This paper is almost the 'manifest' for those believing in the mechanical objectivity of photography. There is here an anachronism as Bazin's first publication was in 1942, but no ideas are *ex-nihilo* and I consider this paper as the synthesis of the myth of photography's objectivity that has been celebrated since the birth of this media. It is also the occasion to emphasis on a distinction in this myth, two ways photography has been considered as an objective media, its chemical genesis and its mechanical one. 'Fixed by the sun' or 'mechanical precision' to take back the expressions of Lombroso and Galton. If both, as we have seen, have faith on photography to represent on an indexical level their ideas, both expressions refer to different geneses of the photography. Lombroso put his trust in the chemical imprint of the light, Galton put it on the cold mechanical nature of the photography; If Van Lier *indice* emphasise on the chemical genesis of photography, Bazin celebrate mostly the mechanical aspect:

There is room, nevertheless, for a study of the psychology of the lesser plastic arts, the molding of death masks, for example, which likewise involves a certain automatic process. One might consider photography, in this sense as a molding, the taking of an impression, by the manipulation of light. (Bazin 1960 [1942] : 7-footnote)

The aesthetic qualities of photography are to be sought in its power to lay bare the realities. It is not for me to separate off, in the complex fabric of the objective world, here a reflexion on a damp sidewalk, there the gesture of a child. Only the impassive lens, stripping its object of all those ways of seeing it, those piledup preconceptions, that spiritual dust and grime with which my eyes have covered it, are able to present it in all its virginal purity to my attention and consequently to my love. By the power of photography, the natural image of a world that we neither know nor can know, nature at last does more than imitate art: she imitates the artist. (Bazin 1960 [1942]: 8)

The painting, being confronted in the mechanically produced image with a competitor able to reach out beyond baroque resemblance to the very identity of the model, was compelled into the category of object. (Bazin 1960 [1942]: 9)

For Bazin, the objectivity of the photographic medium is justified not so much by its *indice* quality – that he doesn't reject - as by its ability to erase the human factor in the production of images. If Peter Wollen (1969) has found in Bazin's ontology an echo of Peirce's index as Bazin "repeatedly stresses the existential bond between sign and object" (Peter Wollen quoted in Cribb 2021: 916), I would personally think the ontology of Bazin stresses the neutrality of the *interepretant*. Indeed, Bazin's sentence (1960 [1942] : 8) "By the power of photography, the natural image of a world that we neither know nor can know, nature at last does more than imitate art: she imitates the artist." seems to indicate he consider through the photographic process that the nature take the place of the artist, reliving a sign which the *interpretant* would be identical to the *representamen* as the relation between the two would not be 'corrupted' by the human subjectivity giving us a sign 'more natural' than the direct observation: "Only the impassive lens, stripping its object of all those ways of seeing it, those piledup preconceptions, that spiritual dust and grime with which my eyes have covered it, are able to present it in all its virginal purity to my attention" (Bazin 1960 [1942] : 8). For Bazin the photography is somehow more real than the 'directly observable reality', and this attitude might be found in the faith to the machine to overcome our limitations. A famous example would be Muybridge's *The Horse in Motion* (1878), what is considered by some as the first video ever shoot (Fig. 16).²¹

²¹ The real interest of Bazin is cinema, not photography. For that reason, I think this example is particularly pertinent and may have had a real influence on Bazin's views.

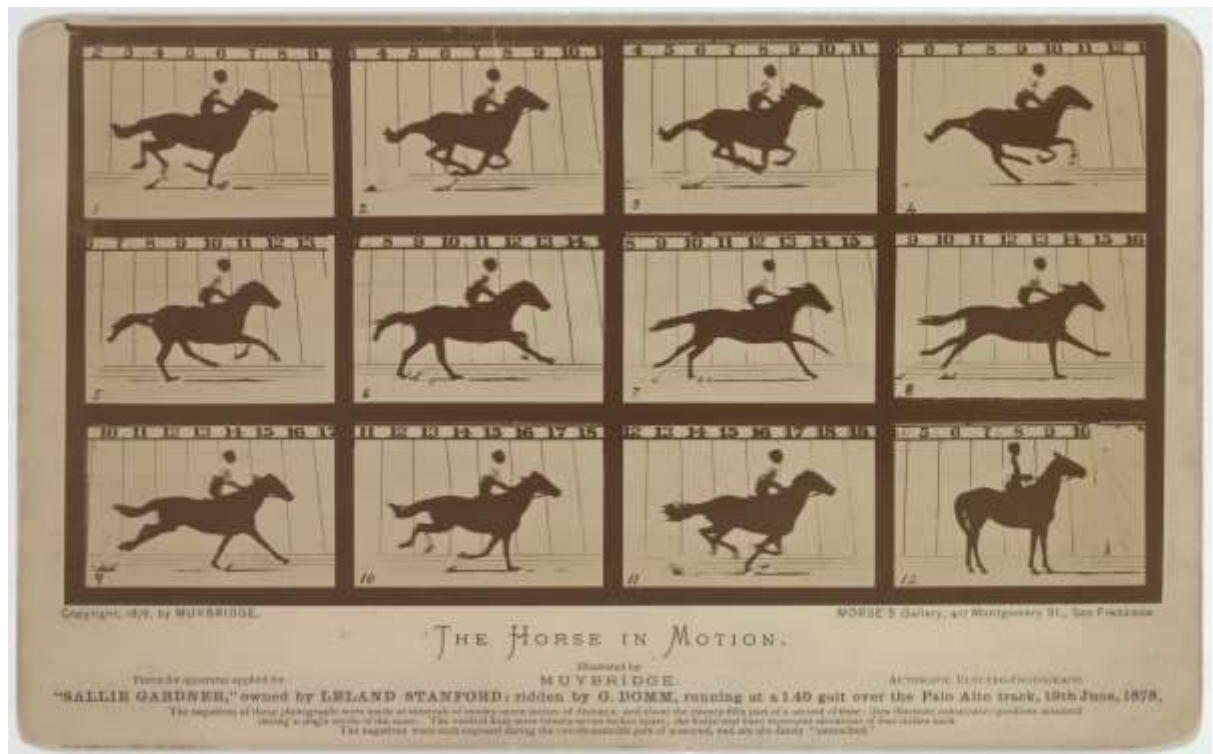


Fig. 16 *The Horse in Motion*. Muybridge 1878.

This series of pictures is not only a technical prowess for its time, it was also the answer of a question long asked ‘does horse touch the ground during gallop?’. The decomposition of the horse galloping motion could show with exactitude what eyes could not before, this decomposition of movement and time became an important topic in Art during the first part of the 20th century, with more photographic series on human and animal, but also in painting with for example Marcel Duchamp’s series *Nu descendant un escalier* and more generally the Futurism movement strongly influenced by the mechanicalistic of the movement. Even Peirce seems to have been influenced by such works:

It is not impossible that in view of his constant appeal to photographs and photography as an example of indexical representation, he had been struck by two of the previous century’s major advances in visual technology: Thomas Edison’s invention of the Kinetoscope leading to the rapid increase in moving pictures – ‘movies’ – and the earlier photographic researches of Eadweard Muybridge and his representations of animal and human locomotion by means of a multiple camera technique. (Jappy 2020 : 490-491)

Certainly, the enthusiasm about mechanical technics and a vision of the role of art as revelation of the nature, similar of the Renaissance spirit, made in Bazin the conviction that cinema was the highest form of art and might be more real than the ‘every day reality’.

In another hand, Otto Steinert from 1951 to 1958 will makes three editions of an exposition named ‘Subjektive Fotografie’ (1951, 1954, 1958). Those exposition are accompanied by books where Otto Steinert and his acolytes express their frustration about the objective myth

of photography and advocate for a relation to photography taking account on the subjectivity of the photographer (Leigthen 1978 : 313).

J. A. Schmoll, called Eisenwerth, in the second essay, "Objective and Subjective Photography," attempts to sweep the critical board clean and redefine the nature of photography, looking at the reasons for the compulsive faith bestowed on photography since its invention in 1839.

In the illusion of the absolute objectivity of photography there are perhaps vestiges of the old view of the image as something real—a view bound up at all times with sacred pictures but also with the classical period of the portrait. For modern man this objectivity is guaranteed by the mechanical process ... On the other hand, it has already become a truism (which people, however, under the direct influence of the "reality" of the photograph seldom admit) that every photograph is an abstraction, genuinely and literally an abstracted reality, a print from plate or film, on which through an optical-chemical process tone-values are transposed in terms of a black-grey-white scale. (Leigthen 1978 : 313).

It is interesting how in this extract the chemical genesis of photography is put in opposition to its mechanical one. Even more interesting that they think the chemical genesis is a counter argument to the 'objectivity' of photography. Where Bazin's ontology was mechanical and finally not much in relation with the notion of *indice*, the 'subjectivity' of Steinert is in direct relation with it. This enlighten us on one point, there is no relation between objectivity/subjectivity and the *indice*. Both of them are already placed in the reception of photography, it is when the photography become proposition that we judge of its objectivity and subjectivity, Bazin's ontology is not an ontology but a pragmatic of the photography, and the abstract-subjective art of Steinert somehow illustrates splendidly the *indice* of photography, with his photos where all is left to see is the trace of the light, *indice* of the presence of an object (Fig. 17; Fig 18). The iconic 'resemblance' to the object is not the grant of the *indice*, as the spectrograph proves it.

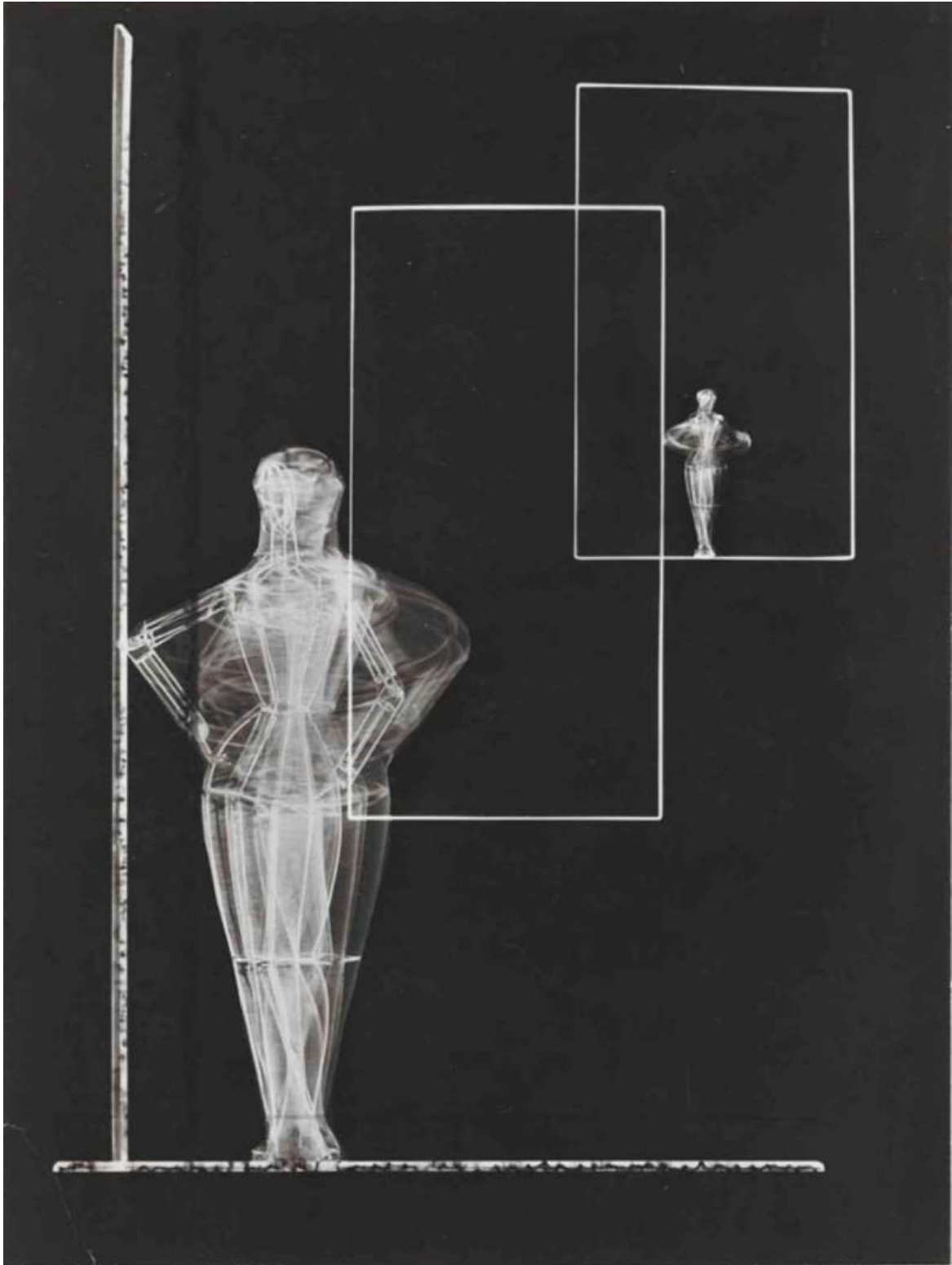


Fig. 17 Otto Steinert, Strenges Ballett, Hommage à Oskar Schlemmer, 1949/1950, Saarlandmuseum Saarbrücken, NI 1607

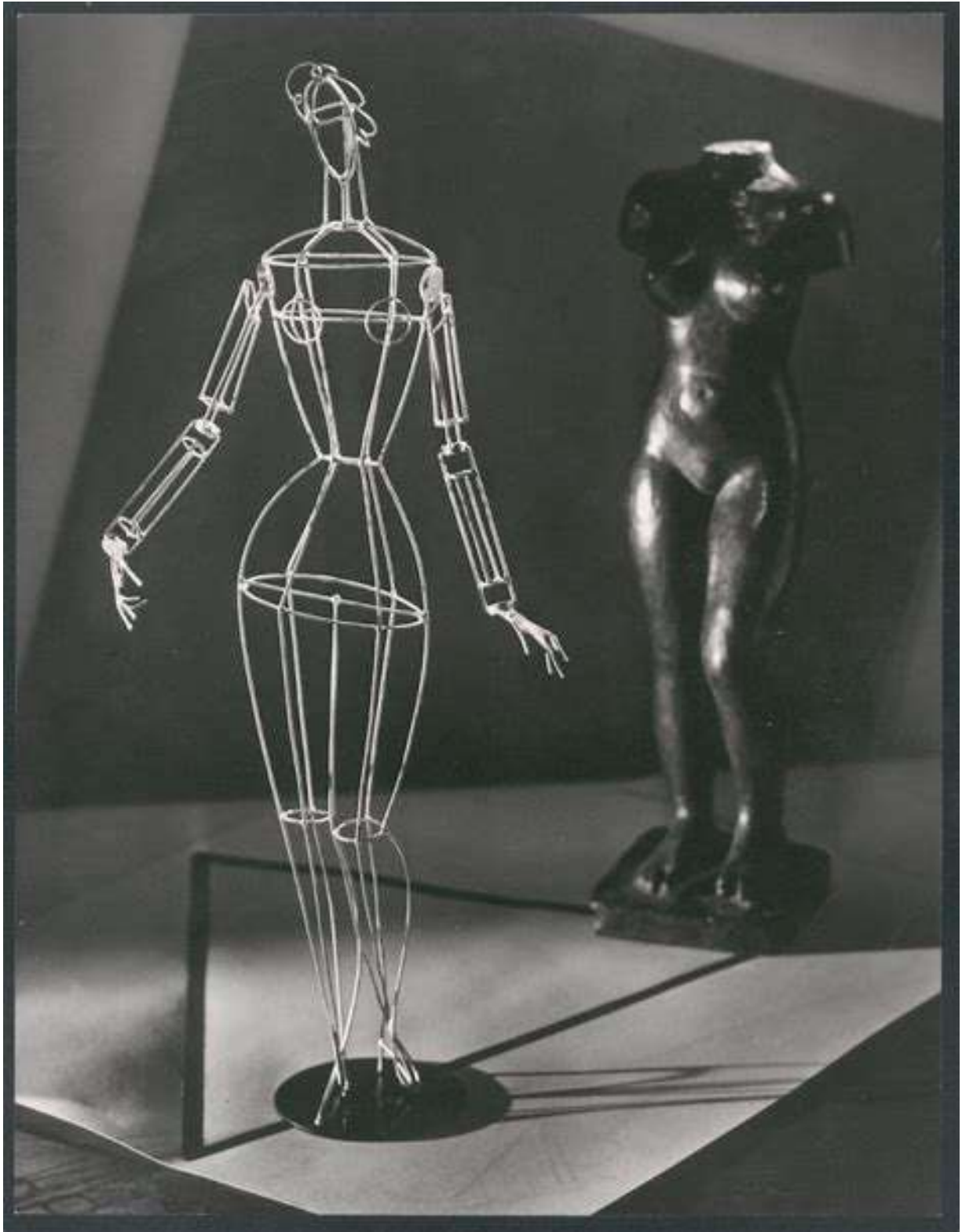


Fig. 18 Set up. Otto Steinert, Strenges Ballett, 1949/1950

2.1.1. The spectrograph, a non-figurative photographic *indice*

As promise earlier, let us have a look to the spectrograph. Invented in 1876 by the American Henry Daper,²² the spectrograph is maybe the missing link to those who studied the indexicality of photography. The spectrography is a photography, however far of the the cultural and artistic consideration that often goes with photographic history studies and relegate to a simple ‘measurement’ from spectroscopist, its photographic ‘nature’ has been somehow ignored.

In the words of one chemical spectroscopist:

“[b]efore your message, I had never articulated for myself the implications of these objects as photographs: they were not images for viewing, they were images for measuring. We never published pictures or prints from the plates themselves – only tables of measured numbers or graphical plots of densitometer scans.”³

[...]

³ Extract of e-mail correspondence with Dr Mike Ware, chemical spectroscopist, photographer, and photographic historian, 22 March 2006. His doctoral studies were conducted using the Raman method of spectroscopy. (Wilder 2007 : 44)

Nevertheless, the spectrograph photography is an interesting artefact for whom want to study the index in photography. By its non-figurative form, it allows us to focus on its relation to its object, its *indice*, without being distracted by its iconicity. But also, the spectrograph does not share the problem of temporality and contextualisation of the photography, he only relates to its immutable object. This last declaration may be a bit bold, and certainly to nuanced, but the observation of the spectrum of stars and other cosmologic objects are less contingent to temporal-context in our human temporality than the terrestrials events the photographer try to capture. For those reasons, it is perhaps the closest photographic form of a ‘pure index’ as it ‘assert nothing’ and ‘only point to its cause’.

²² Here again this attribution is somehow arbitrary, we could also mention Becquerel or Herschel with some similar experiments back to 1839. (Wilder 2007 : 45)

III. End of 20th Century: Digital Photography, a Reverse Weathercock?

The last decade of the 20th century saw a paradigm shift in photography with the mass adoption of digital photography. The 'digital turn' in photography is often dated to the 1990s, but the technology was developed as early as 1957. Russel Krish is credited as the inventor of this new technology, with the development of a rotary scanner for the United States National Bureau of Standards (Galal 2016: 203). From 1957 to 1975, digital imaging technology underwent major technological advances, but remained confined to technology laboratories. In 1975, the first prototype of a digital camera was invented by Kodak. The first commercialisations of digital cameras happened in the 1980s, led by Japanese companies such as Sony, Fujifilm or Canon, but the adoption of the technology was still marginal at that stage; not only because the captors were not yet able to rival the quality of the film camera, but also because the storage solution was still to be developed and cost a lot. However, the main advantage of digital cameras to seduce photographers was already there: the ability to see the image you have taken 'instantly' on the camera's screen. Improvements in technology (sensors, storage, etc.), the creation of an ecosystem (Photoshop 1.0 was released in 1990), cost reductions and the public's attraction to this new technology all led to the adoption of digital cameras in the 1990s, and the early 2000s pushed digital technology into a whole new dimension, with sales surpassing analogue cameras in 2003 (Galal 2016: 207-2011; Henry C., Mein Goh 2009: 50-51). So much for the brief history of digital photography, let us now turn to the semiotic implications of this technological paradigm shift.²³

If the technological evolution of photography has not been emphasised in the previous chapters, it is not because it has not evolved - one only has to compare a camera from the 1830s with its equivalent from the 1980s to be convinced - but because these evolutions have not represented an epistemological change, in other words, the indexicality of photography has not been at stake until now. With the transition from analogue to digital, the whole

²³ The 'digital turn' is not limited to the photography and has affected pretty much all the medias at that time. If here our subject is the photography; It is important to keep it in mind to avoid a monadic vision of the evolution of this media.

indexical relation between photography and its object is called into question, as Van Lier describes it:²⁴

Photographic prints, as we mentioned before, are made up of chemically sensitive grains. The « photographer », to use your own words, is then required to bundle these grains, and is therefore inevitably concerned with the analog rather than writing. But one day, Physics and Chemistry will be able to change all that. And a different type of sensitive grains will be invented, whose reactions to the form, to the colour, to the values, to the saturations etc., will be translatable into a sequence of 0/1 decisions, of bits (BInary digiT). Which is why I refer to it as « digital photography ». Furthermore, it will be possible to handle those grains *one by one*. Or even by *mathematically well-defined groups*, by means of *algorithms*. Which would then allow an endless variety of modifications depending on intensities, curve rates, plans, thousands of other cosmogonic inflections each perfectly determinable. Basically, we are referring to algorithms that would, in “digital photography”, replace the *line of writing*. During the Renaissance, the French did not mind creating new words. Allow me therefor to speak of *textic fabrication*, and of a *textic reading* of the photo. In short, a *textic photography*. (Van Lier 2002: 25)²⁵

Replacing a technology based on the imprint of photons on a sensitive surface with a sensor technology that 'translates' the trace of photons on its surface into a binary digital sequence adds a layer of transformation between the object and its sign. In this way, photography in its digital form loses the 'abrasive imprint' quality - to use Sonesson's term - that it had in its analogue form.

Inspired by the parallel between Peirce's conception of indexicality and abduction and Sherlock Holmes's famous 'method' which has been explored by Sebeok, Eco, and others (Eco and Sebeok 1983), we have suggested elsewhere (Sonesson 1989: 30) the term abrasion for the particular indexical relationship resulting from the fact that the object which is to become the referent has, at some prior moment of time, entered into contact with and then detached itself from what later is to become the expression plane of the sign, leaving on the surface of the latter some visible trace, however inconspicuous, of the event. (Sonesson 1994: 320-321)

It was this same quality of the index that underpinned Van Lier's (1982: 2) idea of differentiating the photograph into an 'imprint-*indice*' and any accompanying *index*. Once deprived of this physical relation to its object, the photograph can no longer be considered an *indice*. Indeed, the photographic theory developed by Van Lier had not anticipated this change in technology, and more generally it was all the theories linked to the indexicality of

²⁴ This citation is extracted from a text of Van Lier written like an imaginary dialogue between François 1er and Leonardo da Vinci, that explain some unusual formulations.

²⁵ « Une photographie ayant recours aux propriétés du *trait*. Somme toute, le principe en est simple. Les empreintes photographiques, disions-nous, sont composées de *grains* chimiquement sensibles. Le « photographe », pour reprendre votre mot, est alors obligé de prendre ces grains par paquets, il est donc fatalement dans l'analogie, pas dans l'écriture. Mais un jour, la Physique et la Chimie pourraient changer cela. Seraient conçus des grains sensibles d'une autre nature, dont les réactions à la forme, à la couleur, aux valeurs, aux saturations, etc. seraient traductibles en une suite de décisions 0/1, de *bits* (BInary digiT). Voilà pourquoi je parle de « photographie digitale ». Alors, il serait loisible de manier ces grains *un à un*. Ou encore selon des *groupes parfaitement définis mathématiquement*, moyennant des *algorithmes*. Ce qui permettrait une infinité de modifications d'après des intensités, des taux de courbures, des plans, mille autres inflexions cosmogoniques chaque fois parfaitement déterminables. Au fond, ce serait ces algorithmes qui, dans la « photographie digitale », joueraient le rôle des *traits de l'écriture*. Dans votre français de la Renaissance, vous n'avez pas peur de créer de nouveaux mots. Laissez-moi alors parler d'une *fabrication textique*, et d'une *lecture textique* de la photo. Bref, d'une *photographie textique*. »

photography that would be put to the test by this technological paradigm shift. Could this new photography, no longer considered as an index, still be considered as photography at all? This is the question that Van Lier must have asked and tried to answer when he proposed the term 'textic photography', or Dubois (2016), who readily spoke of the 'fictional image' to describe the image obtained using digital cameras.

3.1. The digital turn, already the end of photography?

It is indeed easier for those who have elaborated on the indexical nature of photography to divide analogue and digital photography into two quite different media with their own ontologies. But while this academic evasion may be justified at the ontological level, it is far less satisfactory at the semiotic level. Indeed, however different analogue and digital photography may be in their nature and index, the fact remains that the distinction between the two is rarely made, and that the term 'photography' indiscriminately encompasses both processes - unless the need to specify is felt, which is more often the case in art to indicate a process than in science, where the value of the index should be more important. From this observation, it would be just as easy to take the opposite side to 'indexicalist' semioticians such as Van Lier and Dubois (1980) and take advantage of the relative indifference of the general public to claim that the definition of photography is not to be found in its 'genesis' but in its reception and use. This position has been favoured in the Anglo-Saxon world, particularly with the research and publications of Liz Wells (2003). Baetens (2008) attempts to nuance this response to digital photography:

The result is a twofold shift: on one hand, the photographic image is being replaced by the image in general; on the other, the image-object is being replaced by its social uses (for a good overview of these transformations, see Liz Wells's 'reader' on photography (2003), which is currently the leading authority in the English-speaking world).

However, it is worth questioning these interpretations a little, perhaps made too quickly:

- technically: images change less than we might think, given that the vast majority of digital images resemble analogue images to a fault; unbridled manipulation and the loss of indexicality seem to be limited mainly to very 'local' practices (advertising, for example, or artistic expression, in other words two photographic practices whose 'referential' or 'indexical' character has always been open to question);

- hermeneutically, it has to be said that the expectations and practices of users have hardly changed: we still want a photographic image to be 'faithful', otherwise we would understand nothing of the discussions on the ethics of photojournalism, nor of the reactions provoked by

images of testimony, espionage or revelation on the Internet (cf. Mitchell 2006; Gunthert 2004, 2006).

From this perspective, which implies a real continuity of photographic concerns, it is understandable that there should be a return to questions of media specificity: it is true that digitalization has radically changed photography, but not at the level of the image itself. (Baetens 2008 : 24-25)²⁶

This extract from Baetens sums up the state of the photographic question in the first decade of the 2000s. Photography has changed, but its *indiciality* has not disappeared, and the claim that it has become an artefact defined solely by its use and perception needs to be balanced. It seems that the advent of digital technology has once again highlighted the extremes of semiotic trends: European structuralist nominalism struggled to adapt its theory to this new paradigm, and Anglo-Saxon realism thought it had found an argument for relegating epistemology to pragmatics. Peirce himself, in his later writings, was critical of the possible excesses of the realists (Romanini 2014: 569-570); and Van Lier, despite his critics, appreciated Peirce's epistemological approach and his desire to always start 'from the object to the sign' (Van Lier 1983). What we need to understand here is that in order to analyse and define the photographic index in the digital age, a simple opposition between nominalist and realist is not sufficient. If in the 19th century photography highlighted the differences between these two ontologies, at the end of the 20th century it calls for their reconciliation. The increased complexity of the photographic sign brought by digital technology requires us to consider photography not just in terms of the index, but also in terms of the relation between *representament* and *interpretant*.

²⁶ « De là un double glissement: d'une part, l'image photographique s'efface au profit de l'image en général; d'autre part, l'image-objet s'efface au profit de ses usages sociaux (pour une bonne synthèse de ces transformations, on peut se reporter au "reader" de Liz Wells sur la photographie (2003), qui fait actuellement autorité dans le monde anglo-saxon).

Il convient toutefois s'interroger un peu sur ces interprétations peut-être trop vite toutes faites:

- techniquement: les images changent moins qu'on ne le pense vu que la grande majorité des images numériques ressemblent à s'y méprendre aux images analogiques; la manipulation sauvage et la perte de l'indexicalité semblent limitées surtout à des pratiques très 'locales' (la publicité par exemple, ou l'expression artistique, soit deux pratiques photographiques dont le caractère 'référentiel' ou 'indexical' a toujours été sujet à caution);
- herméneutiquement, force est de relever que les attentes et les pratiques des utilisateurs n'ont guère changé: nous voulons toujours qu'une image photographique soit 'fidèle', sans quoi Sémiotique et photographie: 1961-2006 25 on ne comprendrait rien aux discussions sur l'éthique du photojournalisme, ni aux réactions suscitées par des images de témoignage, d'espionnage ou de révélation sur internet (cf. Mitchell 2006; Gunthert 2004, 2006)

Dans cette perspective qui implique une réelle continuité des soucis photographiques, on comprend qu'il puisse y avoir comme un retour aux questions de spécificité médiatique: certes, la numérisation a radicalement changé la photographie, mais pas au niveau de l'image même.

Hence the question “Is the digital photography a revers weathercock?”. We have already seen the double direction of the sign in the Peircian system, with the non-distinction between *indice* and *index* which then included a movement from the object to the sign forming the *representament* and a movement from the sign to the object forming the *interpretant*. We have also seen that on the triadic scale of the sign Peirce evoked the weathercock as an index which 'becomes an icon' or 'forces us to see it' as an icon. In its analogue state, photography could have been cited in this example in place of the weathercock, but for digital photography the situation seems to be reversed. Indeed, could we say that digital photography is an 'icon that forces us to see it as an index'? This is what Dubois leads us to believe in his late work - three decades after his famous work “L'acte photographique” (1980), which opened with Van Lier this movement to think photography firstly as an index - witnessing the technological change of photography, he redefines it in these terms:

How can we think about the image when the supposed reality it represents is no longer necessarily given as a trace of 'what has been'?

[...]

The answer to this question seems to me to be based on the idea that this image (the contemporary digital photographic image, sometimes called the 'post photographic' image) can be thought of as representing a 'possible world' - and not a 'having been there', which is necessarily real. In other words, *theories of possible worlds* seem to me to be the best way to theoretically apprehending the status of the contemporary photographic image: no longer something 'that has been (there)' in the real world, but something 'that is (here)', in front of us, something that we can accept (or reject), not as a trace of something that has been, but for what it is, or more precisely for *what it shows itself to be*: a 'possible world', no more and no less, which exists in *parallel* with the 'present world', an 'a-referential' world to use André Gunthert's expression, a 'plausible' world, which has *its own* logic, *its own* coherence, *its own* rules, and which owes nothing to a beyond of reference, a world 'apart', acceptable as much as it can be rejected, with no fixed criteria and which exists in its very monstration, presentified and present, without necessarily being the trace of a proven, contingent and anterior world. An image conceived as a "universe of fiction" rather than a "universe of reference". (Dubois 2016: 6)²⁷

²⁷ « Comment penser l'image dès lors que le supposé réel qu'elle représente n'est plus donné nécessairement comme une trace de « ce qui a été » ?

[...]

La réponse à cette question me semble pouvoir se construire sur l'idée que cette image- là (l'image photographique numérique contemporaine, dite parfois « post- photographique ») peut être pensée comme représentation d'un « monde possible » – et non d'un avoir-été-là, nécessairement réel. C'est-à-dire que les *théories des mondes possibles* me semblent la meilleure façon d'appréhender théoriquement le statut de l'image photographique contemporaine : non plus quelque chose « qui a été (là) » dans le monde réel mais quelque chose « qui est (ici) », devant nous, quelque chose que l'on peut accepter (ou refuser), non pas comme trace de quelque chose qui a été, mais pour ce qu'il est, ou plus exactement pour ce qu'il montre qu'il est : un « monde possible », ni plus ni moins, qui existe *parallèlement* au « monde actuel », un monde « a-référentiel » pour reprendre une expression d'André Gunthert, un monde « plausible », qui a *sa* logique, *sa* cohérence, *ses* règles, bien à lui, et qui ne doit rien à un au-delà de référence, un monde « à part », acceptable autant que refusable, sans critère de fixation et qui existe dans sa monstration même, présentifié et présent, sans être nécessairement la trace d'un monde avéré, contingent et antérieur. Une image pensée comme un « univers de fiction » et non plus un « univers de référence ».

It could almost be summarised and translated into a Peircean vocabulary as "the digital photograph, from index has become an icon" because of the similarities in his representation of digital photography with Peirce's icon. The similarities are particularly interesting when the temporality of the sign is emphasised. In this excerpt, Dubois (2016) creates a dichotomy between the "trace", which refers to a past event, and the "post-photographic image", which is "no longer something 'that was (there)' in the real world, but something 'that is (here)', in front of us". This dichotomy has found an echo in Peircean theory, where some have pointed out that the index is turned towards the past and the icon is 'presentified' (Stjernfelt 2007; De Tienne 2015).

the icon is, through its timeless similarity, apt to communicate aspects of an experience in the 'present instant', (Stjernfelt 2007: 29).

the index is turned towards the past: the action which has left the index as a mark must be located in time earlier than the sign, (Stjernfelt 2007: 29).

The symbol itself is a [...] general recipe for the production of similar instantiations in the future, (Stjernfelt 2007: 30).

If we cross it with the observation of Sonesson (2015) on Dubois:

Contrary to Vanlier, Dubois is concerned to place himself within the recent history of photographic semiotics, which he differentiates into one iconic phase, a symbolic (in the sense of conventional) one, and then an indexical one, of which his own work is a part. He also is more preoccupied with stating his relationship to the Peircean tradition, (Sonesson 2015: 436)

Perhaps Dubois's (2016) aim is to move from the index to the icon in his semiotics of photography. In this view, digital photography would be what I call - in reference to Peirce's famous example - a 'reverse weathercock', an icon that makes you see it as an index. In this case, the problem of our belief in photography would not be - as with Bazin and Steinert - our belief in its objectivity, it would be a deeper epistemological problem, it would turn the indexical connection that photography has with its object into a myth. With photography's digital turn, the question is no longer whether we should believe in its objectivity, but whether we should believe in its indexicality at all. To illustrate his point, Dubois (2016) uses the work of Walid Raad, The Atlas Group.

What happens if the image 'invents itself as a document', if it becomes a *fabrication of traces*? Can it give rise to 'fabricated archives', and are these necessarily 'false'? What happens to the criterion of *truth of the image* "outside the real" (with its corollaries: facticity or falsity? fictitiousness or feintness? etc.)? A remarkable and deeply interesting case in point (among many others) is that of the Lebanese photographer and artist Walid Raad and his Atlas Group, who 'invent' imaginary archives that are, in his view, 'truer' than the real ones, to give an idea of what the wars represent in Lebanon. (Dubois 2016: 8)²⁸

²⁸ « Que se passe-t-il si l'image « s'invente elle-même comme document », si elle devient une *fabrication de traces* ? Peut-elle donner lieu à la constitution d'« archives fabriquées », et celles-ci sont-elles nécessairement «

Walid Raad's Atlas Group is a fascinating project that plays with the boundaries between reality and fiction, and with the normative codes associated with 'trustworthiness'. More than an artwork, it is a complete transmedia project that took place over almost two decades (1986-2004). The originality of this artistic project lies in the use of transmedia to blur the line between fact and fiction, making its structure - the entity of The Atlas Group - more important than its artistic content. But what is The Atlas Group?

First and foremost, it is about the founding story of the project: by marking a specific starting point, date and place, it is given a certain authenticity. However, there are several versions of this text, and these data may vary depending on the situation in which they appear:

"At different times and places," says Walid Raad in an interview, "I called the Atlas Group an imaginary foundation, a foundation I created in 1976 and a foundation created in 1976 by Maha Traboulsi. In Lebanon in 1999, I said "The Atlas Group is a non-profit foundation established in Beirut in 1967. In New York in 2000 and in Beirut in 2002, I said "The Atlas Group is an imaginary foundation that I created in 1999". I say different things in different places because of personal, historical cultural and political considerations, in terms of geographical location and my personal and professional relationship with the public and their knowledge of the political, economic and cultural histories of Lebanon, the Lebanese wars, the Middle East and contemporary art" (Baumann 2009: 2)²⁹

For Walid there is no 'truth', there is an 'aesthetic of the truth', this is why he uses the aesthetic of archive to anchor his production in the 'idea of reality' and re-enforce the illusion by mediating his own person through an institution – The Atlas Group – symbol of trustworthiness compared to the individual. However, the project is not a simple forgery of archives, to understand the aim of the project it is important to understand Walid's relation to fiction: "I never assume that reality and fiction are opposed". To synthesise, Walid like Steinert does not believe in the objectivity of photography, but he also believes like Bazin that fiction can be more real than the 'reality'.

fausses » ? Que devient le critère de *vérité de l'image* « hors du réel » (avec ses corollaires : facticité ou fausseté ? fictivité ou feintise ? etc.) ? Un cas remarquable de ce point de vue, profondément intéressant (et parmi beaucoup d'autres possibles) est celui du photographe et artiste libanais Walid Raad et son Atlas Group, qui « invente » des archives imaginaires, qui sont, selon lui, plus « vraies » que les vraies, pour donner une idée de ce que représentent les guerres au Liban. »

²⁹« Avant tout, il est question de l'histoire fondatrice du projet : en marquant un point de départ, une date et un lieu spécifiques, une certaine authenticité lui est conférée. Cependant il existe plusieurs versions de ce texte et ces données peuvent varier selon la situation dans laquelle elles apparaissent :

« A des lieux et des temps différents, raconte Walid Raad dans une interview, j'ai appelé l'Atlas Group une fondation imaginaire, une fondation que j'ai créée en 1976 et une fondation créée en 1976 par Maha Traboulsi. Au Liban en 1999, j'ai déclaré « L'Atlas Group est une fondation à but non lucratif créée à Beyrouth en 1967. » A New York en 2000 et à Beyrouth en 2002, j'ai déclaré « L'Atlas Group est une fondation imaginaire que j'ai créée en 1999 ». Je dis des choses différentes dans des lieux différents par rapport à des considérations personnelles, historiques, culturelles et politiques, au vu de la localisation géographique et de ma relation personnelle et professionnelle avec le public et de leurs connaissances des histoires politiques, économiques et culturelles du Liban, des guerres du Liban, du Moyen Orient et de l'art contemporain.» »

Race after race, the historians stood behind the track photographer, whose job was to image the winning horse as it crossed the finish line, to record the photo-finish. It is also said that they convinced (some say bribed) the photographer to snap only one picture as the winning horse arrived.” (The Atlas Group 1989 (?): <https://www.theatlasgroup1989.org/n72>)

The photographic production being curated by the photographer and the institutions who employ him, even if photos are a ‘real’ trace of an event, it is only very partial, and all the story photos do not tell or cannot tell need to be told by the aim of fiction. The idiomatic question “If a tree falls in the forest and no one is here to hear it, did it made noise?” could be changed to “If a tree falls in the forest and no photographer shoot it, did it fell?”. Walid, himself photograph, critics the ‘monopole of truth’ the photographic media has taken in the report of events as ‘proof of existence’, and revers the role using photography as ‘proof of fiction’. In this aspect, it could be considered that Walid does use photography as a reverse-weathercock, using the photographic icon-resemblance to its fictional-object to make us believe in the existence of that fictional-object in the physical causal world by calling to a forged indexicality. The problem is, Walid demarche is based on a interplay between the Barthesian evocation-denotation, his photographic images are as much *indice* that any other photos, only the propositions he attached to them are blurring the lines. This is not the problem of Walid, but of Dubois to be precise. When he speaks of ‘*fabrication of traces*’ he seems to forget those ‘fabrication’ would have their own traces. The trace as the *indice*, as often repeated, does not assert anything. To be forged or fabricated it must be joined to *index* and became a proposition, but this was already the case for analogue photography, so why the digital turn has been translated in Dubois’ theoretical position into an iconic turn? I think there is two reasons for it: an overreaction to a new technology and a maybe a misunderstanding of Peirce’s system, as Fisset (2011) mentions it.

But Philippe Dubois has no more precise knowledge of the foundations of Peirce’s semiotics, and can only situate himself in a Saussurian logic founded on the central notion of difference: from then on, the two notions are thought of as terms belonging to the same paradigm, defined by mutual exclusion.

We can see, then, that while the photographic index, more than any other means of representation, implies a weight, a power, a fullness of the real, it operates only in the order of existence, and in no way in the order of meaning. The index stops with the “ça a été” and does not fill it with a “ça veut dire” (Dubois, 1980, p. 83).

Despite the denials, a dichotomy is established between the icon and the index, which leads us to transfer the same dichotomy to the painting versus photography schema. (Fisset 2011: 5)³⁰

³⁰ « Mais Philippe Dubois ne possède pas de connaissance plus précise des fondements de la sémiotique de Peirce, il ne trouve à se situer que dans une logique saussurienne fondée sur la notion centrale de différence : dès lors, les deux notions sont pensées comme des termes appartenant au même paradigme, se définissant par exclusion mutuelle.

On voit donc que si l’index photographique, plus que tout autre moyen de représentation, implique quelque part un poids, une puissance, une plénitude de réel, celui-ci opère seulement dans l’ordre de

In the present case, the dichotomy being between the analogic photography and the digital photography.

Dubois's approach, while interesting, also seems excessive - at least for the moment. Having worked towards 'photographic specificity' in the 1980s, Dubois makes a 180° turn and considers the 'digital photographic image' to be devoid of any reference. The use of 'image' or 'photographic image' instead of 'photo' or even 'pictures' is relevant to his position. Dubois does not seem to regard digital photography as photography at all. To understand this, let us quote Van Lier (1982):

So it's almost too much to say that a photo, negative or positive, is an image. In the spontaneous sense, image comes from imitation, and refers first and foremost to the act of sculpting (the images of our ancestors) or drawing, which places us in the category of the sign, not the *indice*. The imprint-*indice* that is a photograph cannot be an image in this sense. (Van Lier 1982: 2-3)³¹

It is for the same reason I used 'image' in this current work for speaking about photography, as long I believe in its *indice* quality.

Unlike Dubois, I still see digital photography as an *indice*, not as an image. Firstly, the 'genesis' of a digital photograph needs to be requalified. Admittedly, the 'visible' result is an algorithmic translation of the sensor's binary data, and therefore does not have this index relation with the object. But the binary data are not algorithmic generated by the captor, nor aleatory or 'a-referential' as Dubois would say. The digital camera works in two times. First it records data in binary form created by the contact of photons on its sensor by voltage difference; it asserts nothing (Valley 2007). Only after, the algorithms are used to translate those data in an image. The algorithmic treatment of the data is the problematic part of the technology, but the recording of those data is an object-*indice* relation in. Kang (2014) that shares like me the idea digital photography must be still consider as index also justify this approach on his interpretation of Peirce.

If we don't consider physically causal relation between an index and its object as an integral feature of it, an original file produced by a digital camera may be treated as an index according to Peirce, who said that "photograph, for example, not only excites an images, has an appearance, but, *owing to its optical connexion with the object*, is evidence that that appearance correspond to reality" (CP 4.447; my emphasis). (Kang 2014: 257)

l'existence et en aucun cas l'ordre du sens. L'index s'arrête avec le « ça a été » Il ne remplit pas celui-ci d'un « ça veut dire » (Dubois, 1980, p. 83).

Malgré les dénégations, une dichotomie est instaurée entre l'icône et l'indice qui conduit à reporter la même dichotomie sur le schéma peinture versus photographie. »

³¹ « C'est donc presque trop de dire qu'une photo, négatif ou positif, est une image. Au sens spontané, *image* vient d'imitation, et renvoie d'abord à *l'acte* de sculpter (les imagos des ancêtres) ou dessiner, ce qui nous situe bien dans la catégorie du signe, non de l'indice. L'empreinte-*indice* qu'est la photo ne saurait être une image dans ce sens-là. »

This extract does not specifically go in the sense of the *indice* as an abrasive trace of the object but does remind that the iconicity of a photo is subordinate to its index relation to the object, and those in digital as well as in analogue. If I point the lens of my camera at a cat in the street, the chances of the 'original image file' that appears on my screen being a dog, a fox or a bear are non-existent; all these 'possible worlds' will never come true when I take a photograph. However, I stand by my assertion that digital photography shares a physical cause with its object. Not to see this interaction as indexical is to call into question all the digital sensors ever developed by man, and to conclude that the data they transmit to us are not referential at all, but fictional; it would then be highly inadvisable to take the plane. The epistemological mistrust between analogue and digital photography would be almost comical if it were applied to the thermometer, which has also undergone its 'digital turn'. Digital photography is not a 'reverse weathercock', it is in fact an index.

Nevertheless, it is important to understand what the implications are from the difference between the two types of *indices* produced by analogue and digital technologies. Once again, Van Lier's (2002) definition seems particularly relevant. Not only because he indicates that it is indeed a physico-chemical reaction which is then translated into binary data, but also because his concept of 'textic photography' is accurate and represents real difference between digital and analogue. To make the analogy clearer, I propose to change Van Lier 'textic photography' to 'photo-texty' in mirror to 'photo-graphy'. To take back Simson (2016) expression, analogue photography is 'drawn by light', in another hand, digital photography is 'written by light'. Both technologies are an *indice* of the object, but both are from different nature. The translation of the light into a 'drawing' is done for analogic photography via chemical reaction to photon; The translation of the light into a 'text' (binary data) is done for analogic photography via voltage reaction to photon (Valley 2007). I would like to summarise the two systems using this metaphor of 'drawing' and 'writing' by the present schemas (Fig. 19; Fig. 20):

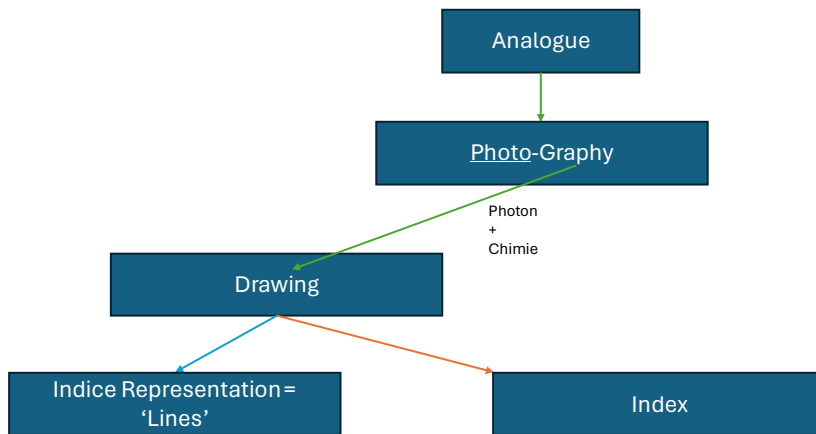


Fig. 19 Photo-graphy.

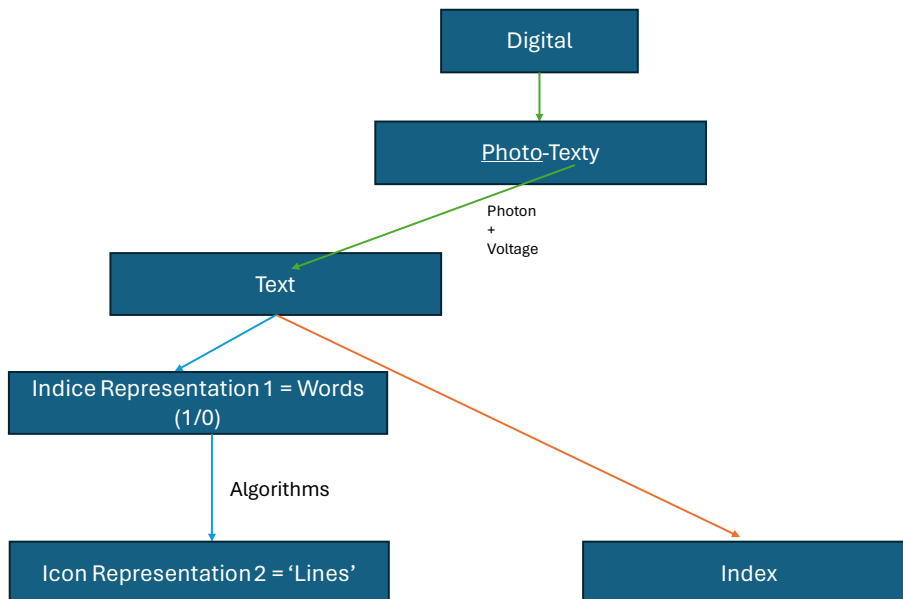


Fig. 20 Photo-texty

In his description of the digital photography as a text Van Lier also mentioned the facility to modify the text and so modify the image. This is maybe the hearth of the problem with digital

photography. It would be wrong to think that analogue photographs were untouched by montages and any other modifications and effects that 'betrayed' their pure *indice* nature. But image modification has taken on a whole new dimension with digital technology, notably with the famous image processing software Photoshop (1990).³² The new 'textic' form of photography, allow an almost infinite scope of modification to the image, as long we use the right tool to re-write the designate part of a photo/image we want to change. Post-treatment is a re-writing of the binary data-blocks given by the captor of the camera. To proceed to the re-writing, we need to use tools using different algorithm to execute the change we want to operate. It might be necessary to distinguish two types of tools used in photographic post-treatment, the ones for 'heavy treatment' as photoshop used for 'montage' operations, and those for 'light treatment' as lightroom used for 'photo-enchantment' similar to the 'black room' operations for the photography analog. To use the vocabulary developed so far, tools like photoshop can potentially change the 'line', so the *indice* itself, where tools like lightroom would only affect the *index*.

3.2. The problematic of the *index*

Up to now, I have mainly relied on the notion of Van Lier's *indice*, leaving his notion of *index* to the side. However, although the separation of the *indice* and the *index* is justified - as I believe to have shown - Van Lier (1983) admits that it is hard to imagine an *indice* without an *index* in photography. The *index* is the which designates; he is the connotation for a Barthesian translation or the *dicisign* for a Peircean translation. The *index* in photography is not directly linked to the *indice* (the trace) but is concomitant with the 'limitations' of the photographic medium.

In the case of photography, as for pictures generally, certain limitations are imposed on the trace not by the object, but by the support on which the trace is inscribed. Some of these are mentioned by Vanlier: the quadrangular shape of the photograph, its digital nature, the information it leaves out, its inability to record the temporal aspects of the process giving rise to the trace, etc. But this may be restated by saying that *the photograph is not only the trace of the objects, or even the photons, but also of the properties of the film, of the lenses, of the photographic device generally, of the space travelled through by the photons, and so on.* (Sonesson 1994: 321)

³² So famous that it is nowadays used as a verb to say an image has been modified on computer.

The *indice* cannot be a force of proposition, be true or false, it is only the abrasive trace of its object. The *index* designates and transforms the *indice* into a proposition, true or false. It is the necessary component for the emergence of the photographic message and forms its syntax. Where Barthes rejects the idea of a photographic language that is not subsidiary to natural language, thereby limiting the mechanisms of connotation internal to the photographic medium; Peirce's *dicisigns* and Van Lier's *index* are not limited to language.

Full-fledged linguistic propositions realize this same structure by grammatical means – but this is no special capacity of language as such. Rather, language is adapted to fit Dicisign structure. Thus, this basic definition makes clear the large extension of Peirce's Dicisign category.

This maybe surprising definition of the Dicisign is closely connected, however, to the basic function of the Dicisign, namely to convey information – to relay claims, true or false. Only by separately indicating an object it becomes possible for a sign to convey information about that object, correctly or not:

“... the essential nature of the Dicisign, in general, that is, the kind of sign that conveys information, in contradistinction to a sign from which information may be derived.

The readiest characteristic test showing whether a sign is a Dicisign or not, is that a Dicisign is either true or false, but does not directly furnish reasons for its being so.”

(*Syllabus*, 1903, EPII, 276)

Dicisigns are thus signs which may be assigned a truth value – without providing, themselves, reasons for that value. (Stjernfelt 2015: 6-7)

(...) indexes do not operate like a real syntax, which applies to signs. Nor do they operate like a true rhetoric, which organises propositions that are already syntactically formed. However, the indexes in the photo do have a certain perceptual and conventional organisation between them. So we would like to have a word to designate them as a whole. Syntax is a rigid practice that applies to elements that are also very well defined, something that does not exist at all in photography. Rhetoric, on the other hand, concerns vast, floating wholes; it varies greatly according to individuals and groups; it always involves a certain amount of noise. For all these reasons, we will keep: *rhetoric of index*. (Van Lier 1992: 3)³³

If it can be found in the two extracts a common difficulty to articulate exactly how the *dicisign* or *index* works. It is therefore possible for a photography to become a proposition through its own *dicisign* or its own *index* without resorting to the externality of language. It is also important to stress that *index*, as *dicisign*, are not part of the sign-object system (index-icon-symbole) but to the sign-interpretant (Fig. 21).

³³« les index n'opèrent pas comme une véritable syntaxe, laquelle s'applique à des signes. Ni non plus comme une vraie rhétorique, qui organise des propositions déjà syntaxiquement formées. Cependant, les index de la photo ont entre eux une certaine organisation perceptive et conventionnelle. On voudrait donc disposer d'un mot pour désigner leur ensemble. La syntaxe est une pratique rigide s'appliquant à des éléments également très définis, ce qui n'existe nullement dans la photo. La rhétorique par contre concerne des ensembles vastes et flottants ; elle varie fortement d'après les individus et les groupes ; elle implique toujours un certain bruit. Pour ces diverses raisons nous garderons : *rhétorique des index*. »

	Division		
	Sign	Sign-Object	Sign-Interpretant
Category			
Thirdness	Legisign	Symbol	Argument
Secondness	Sinsign	Index	Dicisign
Firstness	Qualisign	Icon	Rheme

Fig. 21 Peirce's division of the sign. Jappy (2016: 31)

Van Liers gives some practical examples of what can be *index* in the specific case of photography:

The photographer has various ways of indexing (to index) certain indicia-imprints, and therefore of showing that their presence is the result of an intention. Framing with its so-called strong points: what appears in these is undoubtedly underlined. Depth of field: chances are that anything in the mid-range of the volume of light sources will be particularly targeted. Scale: a close-up of an object is likely to draw our attention. *Burning in*, which over-exposes certain parts of the print, and *dodging*, which underexposes others: the intention in slicing the areas was probably to show that what was important was one of them, or the contrast between the two. Perspective: the arrangement of the vanishing lines normally leads the eye to one point rather than another. Fine or coarse grain: sharpness would indicate the search for a stable overall effect, while coarse grain would mark detail in a more physiological becoming. The distribution of shots: the way in which the Eye is directed can obey a hierarchy of interests. Backlighting, curling light, focused light, ambient light: these are all ways of indexing contours or planes, textures, certain expressive elements, a situation. (Van Lier 1992: 2)³⁴

From those indications, I propose to see together how a software like Lightroom can play with those *indices* and how it influences the meaning of a photo.³⁵

The first photo (Fig. 22) shows a low intentionality in the frame, the focus plane is neither on the first plan nor the back plan, lost somewhere in between. There is no marked vanishing

³⁴ « Le photographe a divers moyens d'indexer (*to index*) certaines empreintes-indices, et donc de montrer que leur présence procède d'une intention. Le cadrage avec ses points dits forts : ce qui apparaît en ceux-ci est sans doute souligné. La profondeur de champ : il y a des chances pour que ce qui se trouve dans les valeurs moyennes du volume des sources lumineuses soit particulièrement visé. L'échelle : un objet pris en gros plan sollicite probablement notre attention. Le *burning in*, qui surexpose certaines parties du tirage, et le *dodging*, qui au contraire en sous-expose d'autres : on a sans doute voulu, en tranchant les plages, manifester que l'important est l'une d'elles, ou bien le contraste des deux. La perspective : la disposition des lignes de fuite conduit normalement l'Œil sur tel point plutôt que sur tel autre. Le grain fin ou gros : le piqué signifierait la recherche d'un effet d'ensemble stable, tandis que le gros grain marquerait le détail dans un devenir plus physiologique. La distribution des plans : la conduite du regard peut obéir à une hiérarchie d'intérêts. Le contre-jour, la lumière frissante, les lumières focalisées, les clartés d'ambiance : autant de façons d'indexer les contours ou les plans, les textures, certains éléments expressifs, une situation. »

³⁵ I personally use Capture One and not Lightroom. Those two software propose the same functions, so I did choose to speak about Lightroom in the text as it is the most famous of both. However, the upcoming examples have been made using Capture One.

line or strong points to guide the eye on the different *indices* of the picture.³⁶ No indications shows that I wanted to capture the presence of *indices* in particular. The treatment of the light also failed to point on specific *indices*, even if the black and white have an interesting contrast, with little grey plages, the distribution does not help to point our intention on certain part of the picture. The existence of this photo proves a certain intentionality from me,³⁷ as I have pointed and click to get a shoot, but it failed to show what was my intention with this photo, if there was one.



Fig. 22 Tartu I. Habran Bruno (2023).

Now, here is another shoot take few instants after (Fig.23).³⁸ Like the first photography, for the moment there is no post-treatment applied,³⁹ but a higher intentionality and a beginning of proposition can already be seen.

³⁶ To be honest, the woman with stripe coat is on a strong point, and I can deduce I might have wanted to make her my main subject. However, the focus plage is not on her, she has a public lamp going up her head, ect. It is hard to know if her placement on the strong point is intentional, a photographer habitus, or a simple coincidence.

³⁷ As Van Lier mentioned it “An intentional photo is already an index simply because it was taken, and also because it contains certain indicia-imprints and not others.”

³⁸ The motivated person who would like to calculate the distance walked by the woman in stripes coat by the speed of walking, could get an estimation of the time laps between the two pictures.



Fig. 23 Tartu 2. Habran Bruno (2023).

Many of the *indices* present are common to the two pictures, however the organisation of those *indices* is different. The eye should be tunneled to the background of the picture help by the vanishing lines, and the focal point. The trees and the city hall are communicating together by juxtaposition, giving the first formulation of my proposition “Tartu has a sinister winter vibe”. This proposition is also reinforced by the first plan branches that are lightly blocking the view, but also gives the perspective as if I was hiding behind them, emphasising a certain anxiety to the whole picture.

The index, partly perceptive and partly established by social conventions, point from the finger to what was intended to be taken from the *spectacle*. In other words, they realise the *denotations* of the photo.

They also have as result to convey its *connotations*. Their use reflects the mentality of the photographer and that of his client. (Van Lier 1992: 2)⁴⁰

³⁹ I have used a special red filter put on my lens. That kind of filter was mostly use in analogue photography to obtain a high contrast black and white. To simplify a little, the black and white of those picture are consecutive of my initial setting and not post treatment choice to go from colours to black and white.

⁴⁰« Les index, partiellement perceptifs et partiellement établis par conventions sociales montrent du doigt ce qu'on a voulu prélever du spectacle. En d'autres mots, ils réalisent les dénnotations de la photo.

Ils ont aussi pour résultat de transmettre ses connotations. Leur usage traduit la mentalité du photographe et celle de son client. »

If the second picture is a better reflect of my mentality, as its intentionality is marked by the *index* bringing a proposition where the first one failed to do so, I still want to reenforce it to make my proposition clearer and more obvious. To do so I will now use post-treatment (Fig. 24).



Fig. 24 Tartu 2.2. Habran Bruno (2023).

What did I do exactly? First, I changed my frame to 16x9, what is a conventional cinematic format. I call here to a social convention to emphasis on the dramatic aspects I want to give to my picture. Also, this frame format allows me to get off of the bottom part of the picture, that was composed of *indices* not necessary to my proposition and was mostly an empty place where the eye would have lost his time, as it was not participating to the syntax/rhetoric of my image. I have also put a vignette effect; the vignette is originally a consequence of the fabrication of the lens - how it brings the light to the film or captor -, it is translated into *dodging* on the edge of the picture. If that ‘mechanical’ effect was strong at the beginning of photography, modern materiel proposes a higher quality and the effect is now added intentionally, not as a ‘postiche’ (it can eventually be), but as it is a good way to focus the attention on the central point of the pictures. It is somehow conventional as it refers to a photographic ‘tradition’ but it is use not as a reference to old pictures but instead as a perceptive element. And to finish I have played with the contrast and exposition. I have pushed the difference between the white and the black, bringing a stronger contrast between

the trees (mostly black) and the city hall (mostly white) to reenforce the juxtaposition. If my modifications have been successful, the use of *index* should have carried my proposition on Tartu as a sinister winter city. The first image was incorporating almost the same *indices* (city hall, trees, snow, etc..) but was not able to formulate such a proposition, because it was lacking *index*. Nevertheless, as Stjernfelt (2015: 6-7) says “Dicisigns are thus signs which may be assigned a truth value – without providing, themselves, reasons for that value.”, those *index* may have formulated the *indices* into a proposition that we can agree or disagree with (true/false), but they do not content the proposition in themselves. The *index* ‘conveys’ information but information is not ‘derived’ from them. The type of modifications Lightroom can do is not a treat to the *indiciality* of digital photography. It does question on the subjectivity of it and can ‘lie’ in the way Eco use the terms. Such post-treatment is giving, reenforcing or changing the propositions in a photography, but it does not betray the *indice* relation of the photography to its object. The second type of modification possible with digital photography via Photoshop for example is different and more problematic as it touches more directly to the *indice*; it acts to the object-sign level.

With Photoshop it is possible to transform the shape of the *indices*, but also to do montage, so take *indices* that was not from a same scene and put them together. Actually, the options offer by such programs are more or less infinite. I would partially agree with Kang (2014: 258) that the montage is not a treat to the indexical value of photography, but I somehow disagree with his conclusion. Kang (2014) take the example of Brian Walsky’s documentary photo took in 2003 in the context of Iraq war, published in *The Los Angeles Times* (Fig. 25). The photo that shows an American military stopping a man, who his carrying a child, from a gest of his hand was soon an object of scandal when it has been revealed that it was a photo-montage, result of the aggregate of two separated pictures.

One might say two different moments have been composited in one picture, but, following Peirce, it could be also said that “single units, single collections of units, or single continua” (CP 2.306) are particulars (CP 2.306). Therefore, Walski’s digital photo can be classified as an elementary index just like the Pole Star and any analogue photos.. Peirce’s pragmatic realism provides a theoretical ground on which we can render Walski’s picture as an index of certain real things. (Kang 2014: 258)

I am not challenging Kang’s interpretation of Peirce, but this extract highlights the need to separate the object-sign level (*indice*) from the *interpretant*-sign one (*index*). In the first part Kang talks about the *indice*, and emphasises that “the index must be individual; otherwise, it cannot be physically connected to its object” (Kang 2014: 254). This idea goes along with the *indice* as ‘proof of existence’ of the object, going beyond Barthes’ (1961: 137) ‘proof of

presence'; "The photographer must have been here",⁴¹ Peirce like Van Lier would have said 'The object must have been here'. In the sense that composite photography is just as *indicial* than 'any analogue' ones, all the *indices* present does share a physical cause to their objects, only they have been juxtaposed in another timeline that does not exist at the holistic level of the photography. I also agree that the composite image's new meaning is not to be found in the *indices* but in the organisation of the *indices* between themselves, so from the *index* ('Peirce's pragmatic realism' level). Surprising as it may seem, photo-montage is more a mater of *index* than *indices*, but I would strongly disagree to the claim "Walski's picture as an index of certain real things.". Walski's picture follows the exact same logic as Galton's composite images, it tries to found a validation of its own views by the juxtaposition of *indices* together, by then the result is an *indexialisation* of those *indices*. Walski's picture does not index 'certain real things', it is the *indices* of 'certain real things' *indexed* into a proposition; "American solders lake of empathy", perhaps.

Manipulations: Iraq War Photo 2003



Brian Walski of the *LA Times* was Fired for submitting a composite of two images



Fig. 25 Brian Walski (2003)

⁴¹ "il fallait que le photographe fût là"

The last type of modification is also the most problematic in our approach.⁴² The photography by “owing to its optical connexion with the object” have an iconicity that correspond to its object, and the *indice* is the grant of this correspondence. Because of the subordination of the icon to the index, the iconic modification on the image would be consequently a rupture in the *indicial* value of photography. This is specific to the photography, for the weathercock for example, whatever the shape of it – its iconicity – its movement would still be the index and *indice* of the wind. If I point my camera to a cat, shoot, and get a dog on the image, there is not only an icon modification, but also the *indice* relation itself that would have to be reconsidered. This modification can be done in post treatment on Photoshop, but also, more insidiously directly in the camera or the telephone, even before to have access to the original file. Those modifications are usually called ‘filters’. To avoid repetition, I will not show how this works on photoshop, who is the post treatment, more powerful version of those algorithmic filters in our phone-cameras. The fundamental work is the same in both cases, an iconic alteration that question the validity of the *indice* as the trace of its object. However, where Photoshop usage presume some skills and intentionality from its user to modify the images, the filters in cameras can be operating without our concern. The most eccentric is the filter, the easier is to spot it on and I would leave the ‘cat face’ filters, and other comical, burlesque filters that are closer of “drawing on a picture” aside. What interest me first is the filters activated by default in our telephone camera application.

The captors on telephone are very small, it is quite surprising they deliver such good images. This is due to the fact, the ‘quality’ of a phone camera is mostly linked to its algorithms better than to its captor. Not being able to catch a lot of light with those small captors, telephone industry has realised they could highly enchant the aspect of the photo by pushing harder the algorithmic translation of the captor’s data into image. This is also made possible by the increase of calculation power given by the recent processors. Nevertheless, the pictures you take on your telephone are ‘post-treated’, more or less heavily, even before you could have your first sight at them. Depending on the brand, model and the place you buy it, the ‘factory setting’ of those filters can be variable. To illustrate it, let us see two selfies; the first taken with the minimal filter setting (Fig. 27) and the second with the maximal setting (Fig. 26).⁴³

⁴² Photo-montage is probably the most problematic practice in the case of photo-documentary as we are supposed to report specific events, moments. However, the *indice* is not really concerned by this question, as we just seen.

⁴³ Frome my native camera application. Also, the factory setting was not 0 but 6 on a 0-10 scale.



Fig. 27 Selfie. Filter min. Bruno Habran 2024



Fig. 26 Selfie. Filter max. Bruno Habran 2024

There is here a different manipulation than the mere change of exposition or contrast. The lines of the face have been slightly changed to make me appear finer, and all the imperfections of my skin have been erased. Some would say I have been ‘photoshoped’, the resemblance to the object is still present but altered and considering that filter is called “beauty filter”, it gives us some information about the beauty standards of those who write the algorithms (white tons, slick skin etc.). This algorithm layer infused with the human’s bias that wrote it, is the main problem of digital photography to claim its epistemological *indice* status. In one way those filters transform the relation between the object to the sign from individual (index) to general (symbol). We do recognise me, it can prove my existence or presence, but what we see is perhaps more an ‘idea’ of me, an *interpretant* of the algorithms, but still ‘the object must have been here’. As demonstrated it, this is finally the definition of index from Peirce, an *indice* already mixed to its *interpretant* going to both object-sign and sign-*interpretant* at the same time. However, the sign-*interpretant* in action here might be no more the *dicisign* but the *rheme*.

A *rheme*, Peirce explains, is what remains when all the elements of a proposition that can play the role of subject have been subtracted. The structure of a *rheme* is made up of the number of subject places it manifests. subject places it manifests: if we subtract the subject Aahmes from the proposition a soldier", what remains ("_ is a soldier") is a *rheme*. (Bellucci 2017: 94)⁴⁴

⁴⁴« Un *rhème*, explique Peirce, est ce qui reste quand tous les éléments d’une proposition qui peuvent jouer le rôle de sujet ont été soustraits. La structure d’un *rhème* est constituée du nombre de places sujets qu’il manifeste : si on soustrait de la proposition « Aahmes est un soldat » le sujet Aahmes, ce qui reste (« _ est un soldat ») est un *rhème*. »

This type of manipulation is the closest of the problematic encounter with AI generated images, at the difference that the image composed here is calqued *on* the photography, where for AI generated images are created *from* photography. However, as we will see, the AI problematic take back numerous commun point than those the digital turn as risen, but bring them futher, and peraphs could be the realisation of the 'a-referentiel' image to soon claimed by Dubois (2016).

IV. 21st Century: The Dogma of Fictionality, and the Rise of AI

Artificial Intelligence is the big new narrative of the 2020's. Like digital technology, the rise of AI and its widespread adoption do not coincide with the date of its creation. In fact, while we've only recently started hearing about and using AI - around 2020 for the most cautious, and 2022-2023 for most of us - with the advent of ChatGPT (Figure 28), the technology has actually been in development since the 50s.

Figure 1: Illustrative visualization of AI periods

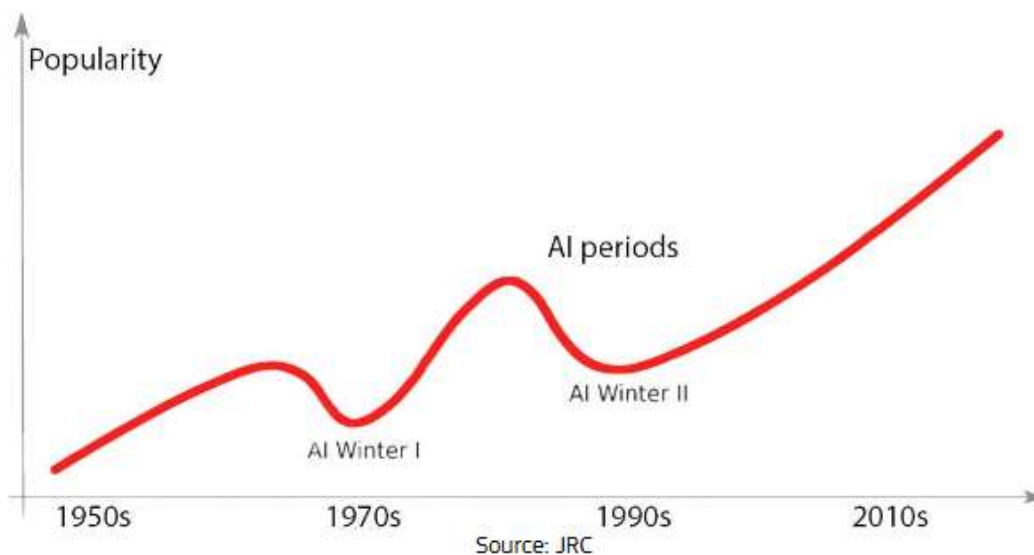


Fig. 28. Illustrative visualisation of AI periods. JRC

History date the beginning of AI with Alan Turin (1950) paper *Computing Machinery and Intelligence*, that for the first time bring the fundamental question 'Can machines think?' (Delipetrev 2020: 7). From this milestone to today, AI technology has undergone numerous developments, and the term 'artificial intelligence' has come to encompass a variety of technologies. Delipetrev and his team (2020) divide the development of AI technologies into three main periods: (1) AI foundations 1950s-1970s; (2) symbolic AI 1970s-1990s; machine learning and deep learning 1990s-2020s. It would not be of much interest to delve into these for our current work, but it is interesting to understand that AI can have very different models

and ways of working. The technologies I will refer to here are Machine Learning (ML), Deep Learning (DL) and Generative Adversarial Nets (GANs). Those models are the basis of all the big generative AIs in use today, such as ChatGPT, DALL-E, Midjourney and many others.

The Generative Adversarial Nets model has been developed in 2014 by Goodfellow and his collaborators, in the *Département d'informatique et de recherche opérationnelle Université de Montréal*.

In the proposed *adversarial nets* framework, the generative model is pitted against an adversary: a discriminative model that learns to determine whether a sample is from the model distribution or the data distribution. The generative model can be thought of as analogous to a team of counterfeiters, trying to produce fake currency and use it without detection, while the discriminative model is analogous to the police, trying to detect the counterfeit currency. Competition in this game drives both teams to improve their methods until the counterfeits are indistinguishable from the genuine articles. (Goodfellow 2014: 1)

It is not my intention to explain in detail how these technologies work, firstly because I would not be able to do so, and secondly because my aim is only to provide the necessary understanding to distinguish the 'genesis' of an AI-generated image from a photograph. To summarise, this model works with two agencies, one that generates new images and one that tries to verify if this image is 'real' or not. The aim of this process is to keep only those images that are convincing enough (Fig. 29). Both the 'counterfeiter' and the 'police' have reference datasets and are able to generate images and verify them by applying deep learning to their datasets.



Fig. 29 Visualisation of samples from the model. GANs 2014

Let us risk an analogy to explain the process of image generation using the ‘infinite monkey theorem’.

The infinite monkey theorem states that a monkey hitting keys at random on a typewriter keyboard for an infinite amount of time will almost surely type any given text, including the complete works of William Shakespeare. In fact, the monkey would almost surely type every possible finite text an infinite number of times. The theorem can be generalized to state that any sequence of events that has a non-zero probability of happening will almost certainly occur an infinite number of times, given an infinite amount of time or a universe that is infinite in size. (Wikipedia)

The monkeys are the AI, we give them both a data set (an alphabet for the monkey and an extremely large number of images for the AI) and we let them combine the different elements of their data set until we get a satisfactory result (Hamlet for the monkeys, an image corresponding to our prompt for the AI). Now let us say that the AI is a little more "intelligent" than the monkey, and that it can narrow down its generative process through the input we gave it and the data set, and it can also generate at a speed close to that of an infinite number of monkeys. We end up with a tool that can generate extremely convincing images in a matter of seconds. (Fig. 30).



Fig. 30 Evolution of AI generative images. Giattoni and Roser.

These people don't exist. All images have been generated by artificial intelligence' can be read as a disclaimer at the top of fig. 30. This information is almost difficult for us to process, not only because they look 'realistic', but because the generated images copy the *indices* of photography: the way the light is captured on the faces or the sky (2021), the difference in focus between the subject and the background (2019), one can even see what looks like bokeh, a light artefact from the camera lens (2017). Using the codes of photography, the AI-generated images give us a familiar and conventional representation of the real, further blurring our ability to distinguish it. Since the 19th century, photography has been the most trustworthy representation of the real for our cultures, and the *indices* related to the photographic support are in a way the guarantee of our trust. We do not see with our eyes in the same way as with a camera, the depth of field, the bokeh, the granulation, all these are indicators that we are facing a photograph and not another type of hyper-realistic representation (3D photorealistic composition, hyper-realistic painting, ...). These *indices* are due to the physical limitation or are conventional to the photographic medium. But they are just postiches used by the machine to make the image look like photography, not that the falsification is intentional, but consequential of the use of data set based on multitude of photography.

There is no *indice* in the AI generated image, it is an 'image fiction' without a reference in the real world, to take in our account what Dubois (2016) was saying of the digital photography. For the first time we are confronted to an images that shares all the iconicity qualities of photography without sharing any of its indexicality. And, even worst, those images can be produced at in incredible speed (not like ultra realistic painting for exemple), shared on the internet and if nothing indicate us this is a generated images and not a photography, we can only believe on our eyes and expertise to makes the difference. To believe specialise press, in 2023 15 billion images where generated by AI (Valyaeva, Everyapixel Journal 2023), less than 10% of the total of images share on the web that year (Fig. ?). The most impressive is that number comes only one and half year after AI generative images opens to the mainstream public. This exponential croissance made other specialise press to predict that '90% of the internet will be AI-generated by 2026' (Wang, Medium 2022). It should never bring too much credit to predictions, and the question is not if it would be indeed 90% or not, but to realise that the majority of the content we found on the web will

certainly be soon AI-generated content. But why do I think this is especially problematic in the case of ‘photographic images’?⁴⁵

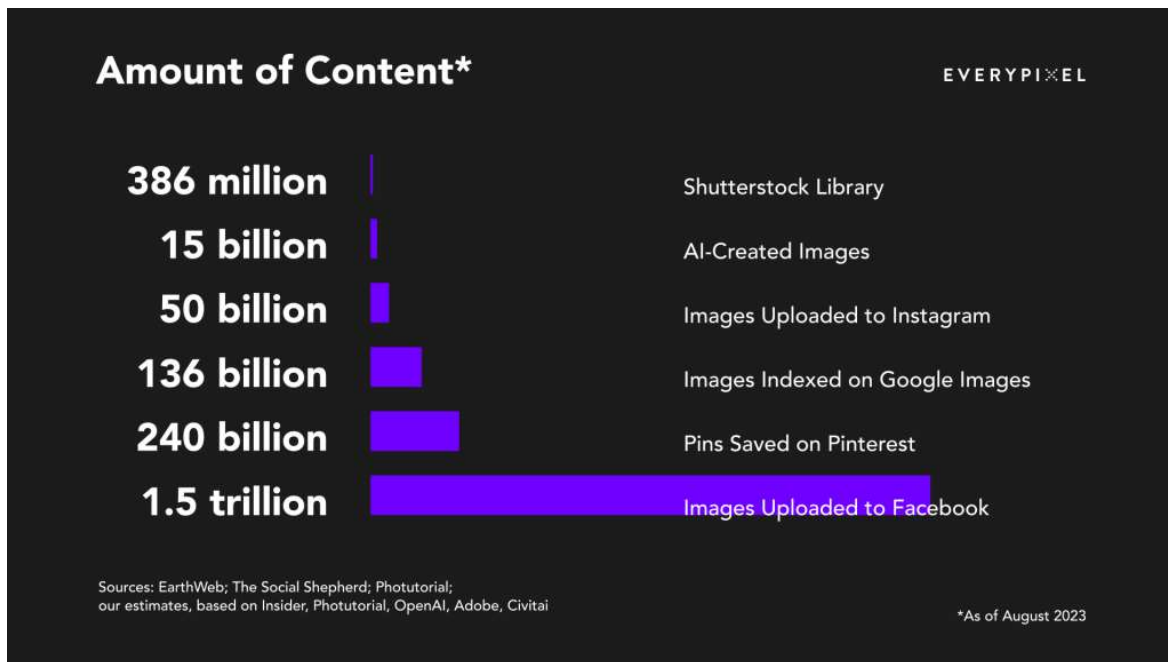


Fig. 31 Amount of content posted in 2023, by types.

The AI generated images is in one way more threatening than the digital turn, but also simpler to analyse. Where one of the problems with the digital was the persistence or not of the photography as an *indice*, for the AI there is no doubt about it, AI generated images are not an *indice* of the object they represent. Those generated images when they take the appearance of a photography are simply a reverse-weathercock. If Dubois (2016) was writing the same text today, just by changing “digital photographic images” to “AI generated images”, I would certainly agree with it. But if they are not *indices*, can they be index, on Peirce sense?

4.1. Indexical AI?

It is at least the point of view defended by Leif Weatherby and Brian Justie in their paper *Indexical AI* (2022).

⁴⁵ As mentioned before, we are opposing ‘image’ to ‘photography’ in this thesis, when we use ‘photographic image’ it is to understand as ‘image that look like photography but that are not’.

Indexical AI contrasts with the symbolic AI that dominated artificial intelligence research before 2000.⁶ And it uses this powerful referential function, the index, to gain the appearance of truth, the force of necessity. In the semiotic terms that we spell out below, nets indexicalize data to produce judgments about the world—judgments we take to be meaningful and to resemble our own judgments at our own risk. Neural nets disassemble images for recognition and production of new images, pointing us to what appear to be resemblances, images *of* something other than the pathways of the net itself. (Weatherby 2022 : 382-383)

This vision of the index highlights the importance of separating *indice* to *index*, and bring us back to our critics of Simson (2016) established in the first chapter. Because of Peirce's index inability to limit itself to the sign-object relation, it would not exclude indexicality in AI's production, and taking Simson (2016) approach, it could be even argued that AI generated images are 'more indexical' than 'simple photography', as long it can be proven "how much the systems *know* about images or language" (Weatherby 2022: 283). In other words, the index would be defined not as a trace of the object, but as a trace of 'intelligence', it is the relegation of the index to the *interpretant*.

Early nets solved logical problems; current nets make judgments about creditworthiness, jail time, and other nondyadic things. The index in the neural net substitutes for and manipulates the other sign functions, heightening the sense that net output is meaningful, trust-worthy, robust. Terrence Deacon argues that "only indexical relationships provide information," while "iconic relationships" can be used to acquire information, and symbols constitute "relationships between forms of information." (Weatherby 2022 : 382-383)

Following Deacon's interpretation, Weatherby concludes that as new AI models can produce judgements, they provide new information about the world, which makes their production indexical. I would call this position an 'excess of realism'. Even if, as Kang (2014 : 258) says, Peirce 'in his scholastic version of realism, the universal is real, while the individual is an instance of reality', this does not change the individuality of the index, but means that it is the particular that points to the universal. Weatherby somehow reversed this relation and found in the interpretant the actualisation of the index, going further than Peircean realism.

As individuals, the indices indicate the universal, embodying the Firstness (or quality) and exemplifying the Thirdness (or concept). With this fact in mind, I have explained how one can regard digital photos as indices. (Kang 2014 : 258)

If I have disagreed that holistically a digital composite photography can indicate the real – but instead formulate a proposition -, I agreed that the composite nature of a photography does not erase the individual relation of each *indices* to their objects, leaving our disagreement not in the interpretation of Peirce but on our appreciation of his system. However, in Weatherby case, I do think there is a miss interpretation of the Peirce's index. The index does have this double direction object-sign/sign-*interpretant*, it can also be only at the object-sign level, as an *indice* for Van Lier or as a pure index for Peirce, but the opposite

is not possible, and represent the difference between Peirce’s pragmatism ‘truth’ and psychological ‘truth’ or “the will to believe” (Romanini 2014 : 569).

Methodologically, one must maintain a clear distinction between the notion of interpretation (1) when applied to the activity of perceptual mechanisms that build syntactic structures of visual representation, and (2) when used to designate processes by which meaning is attributed to segments thus determined. In fact, Prieto (1966) has postulated the firm distinction between the plane of expression and that of content as the very foundation of semiotic enterprise. It is even more crucial in visual language when what is given to sight refers to something not in the realm of the visible. (Saint-Martin 1989: 310)

New AI model might have developed critical judgement, this does not prove that the images they generate are sharing an indexical link to their objects. The data set of the AI can be composed of photographic images, the new image obtained from them is far over a composite photography where the individual *indice* might be preserved. Also, new AI model might eventually start to use generated image data set to generated images, bringing the result even further, entering in a full digital solipsism loop (Fig. 32).

Intuitively, one reason that synthetic data can be better than real data is because we are able to achieve a greater degree of control in the sampling, such as via the guidance scale in Stable Diffusion, or via text prompts and latent noise variables. Furthermore, generative models have the potential to generalize beyond their training data and therefore provide a richer (synthetic) training set than the corresponding real data alone. Our key contributions are:

1. We discover that training modern self-supervised methods on synthetic images from Stable Diffusion can be surprisingly effective. The learned representations are often better than representations learned from real images of the same sample size.
2. We develop StableRep, a novel representation learning approach by capturing invariance between images generated from the same text prompt, and propose a multi-positive contrastive loss. (Tian 2023 : 2)

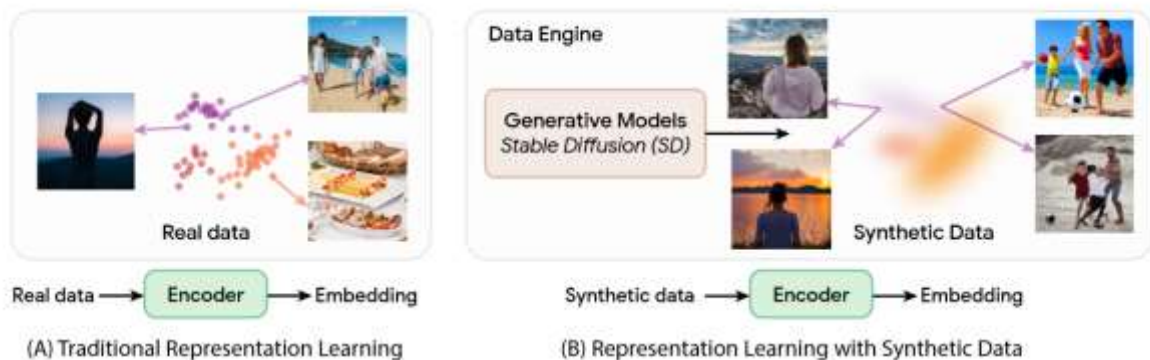


Figure 1: Left: traditional visual representation learning relies on a dataset of real images to train an image embedding function. **Right:** we view generative models as datasets that allow us to sample images from the data distribution. In our study, we leverage text-to-image models (Stable Diffusion [61]) and treat multiple images synthesized from the same prompt as positives for contrastive representation learning.

Fig. 32 Tian (2023)

Once established, on an epistemological level, that AI generated image is not an *indice* neither an index, it can be understand why it is primordial to find a way to distinguish the two medias in the aim to preserve photography indexical specificity in our pragmatism.

Generative imagery that is indistinguishable from photographic data raises questions both ontological, those which concern the nature of being, and epistemological, surrounding the theories of methods, validity, and scope. Ontologically, given that humans cannot tell the difference between images from cameras and those generated by AI models such as an Artificial Neural Network, in terms of digital information, what is real and what is not? The epistemological reality is that there are serious questions surrounding the reliability of human knowledge and the ethical implications that surround the misuse of these types of technology. The implications suggest that we are in growing need of a system that can aid us in the recognition of real images versus those generated by AI. (Bird 2023 : 15642-15643)

Ironic that photography, invented in the 19th century to ‘catch’ and reveal the ‘real’- with the excess we have seen - is now blurring our rapport to reality. With the co-existence of two technologies sharing the same iconicity, visually identic but with one being an *indice* and the other not, it is the *indiciality* that become myth.

If we are not able, at a pragmatic level, to recognise a photography from an image anymore, there is no reason to keep believing in the *indice* value of photography. As seen before, a majority of images found on internet could be AI generated in the future, in those condition, it is likely that we do not speak of photography in the future but of photorealism, relegating the photo to its mere iconicity. Such a future, if no solutions are found, could spell the end of photography. After two centuries of existence, photography has taken a central place in our mediation of the world, and it is hard to imagine a world without this medium, which offers us at least the illusion of 'indexical truth'. However, humanity has long lived without such a medium, and we might, like Walid, accept the idea of finding 'truth' in fiction if we cannot find a way to pragmatically separate photography from the AI-generated image. The use of camera might not disappear – it certainly would still be a practical tool to obtain an image quickly - but a photography without our acceptance of it as an *indice* is just an image. The solution might reside in our capacity to found means to identify the two mediums.

4.2. The blockchain, the virtual indice?

In order to believe in the photography as an *indice* we need to be able to distinguish it from the images generated by the AI, which look similar but are not *indices*. Failure to do so could lead to the end of our faith in photography as an *indicial* representation of the real. But how

can we distinguish the indistinguishable? Various solutions have been proposed, mostly based on the use of watermarks incorporated into the AI-generated images to indicate their "machine-generated origin" (Xian 2024 : 1). There are different models of watermarks that can be used, and they can also be added to digital photographs to attract the AI (Hsu 2024), but watermarks are more or less discreet and imply a modification of the original file. Another solution being explored is the use of blockchain to authenticate content. This solution is the most interesting to explore in the focus of this paper, not because it is more effective than watermarks, I could not judge it, but because the blockchain can possibly be considered as a virtual *indice*.

The history of blockchain is directly linked to the history of bitcoin. In 2008 a paper was published signed by Satoshi Nakamoto (2008) - even today we do not know who he is, if it is a person or a group, Satoshi became a casi-mystical figure with time - called Bitcoin: A Peer-to-Peer Electronic Cash System. This is the first milestone of a movement that will later take on dimensions that nobody could have foreseen at the time. Although I am not going to retrace the history of bitcoin here, I would like to highlight some elements of Satoshi's first publication, which shows his initial objectives with this project.

Commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments. While the system works well enough for most transactions, it still suffers from the inherent weaknesses of the trust based model. (...)

What is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party. (Satoshi 2008: 1)

The objective of Satoshi is to provide a transaction system that is not based on the 'trust' of participating agents but on the 'proof' that the transaction has taken place, making all operations 'irreversible'. This differentiation between *Trust* and *Proof* is what make me think that this system could be analysed through the scope of *indice*. But what is the blockchain? It is interesting that the world 'blockchain' does not appear to this foundational paper, however the concept is already present. The blockchain is the structure that enable the system based on *proof* wished by Satoshi.

We have proposed a system for electronic transactions without relying on trust. We started with the usual framework of coins made from digital signatures, which provides strong control of ownership, but is incomplete without a way to prevent double-spending. To solve this, we proposed a peer-to-peer network using proof-of-work to record a public history of transactions (...). (Satoshi 2008: 8)

This is the blockchain as imagined by Satoshi, a public history of transactions record in blocks certified by the *proof of work* and chained together not allowing any block to be modified – the blockchain (Fig. 33).

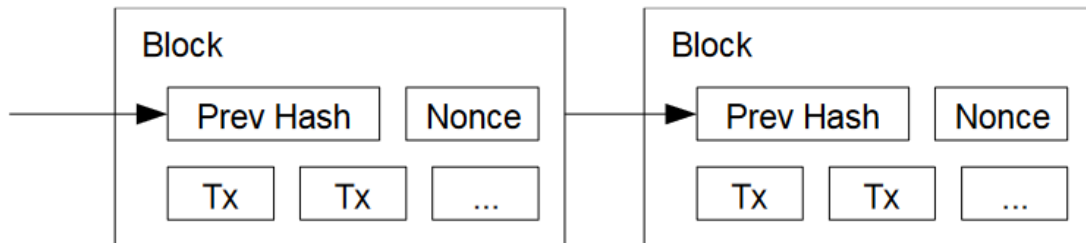


Fig. 33 Blockchain. Satoshi 2008

It is unlikely that the definition of *indice* would fit any virtual object, has virtual world operate on another plan than the material-physic plan of the object it might represent, and the notion of existence is not necessary the same in the virtual world than in the physical one. However, it would be a mistake to not explore the possibility to consider the blockchain as a virtual *indice* -, as the trace of a virtual object inside the ‘virtual world’, and not the representation of a physical object translated in the virtual world.

A consequence of the *indice* specificity as an abrasive trace its object is to not be a proposition. In the virtual world everything is already a binary translation and so it is a system based on symbol and everything should be considered as a proposition. But the objective here is to develop a semiotic of the ‘virtual world’. Perhaps it would be possible to focus on the materiality of the blockchain and any informatic system (Serada 2020), and attribute to every virtual operation its physical origine, but I doubt of the feasibility and interest of such a project. What make me able to say the blockchain could be considered – if we accept the virtual word as a monadic world that has its own rules separated of the physical one – as a *indice*, it is because it overcome the necessity of ‘trust’ to replace it by ‘truth’ (Weichselbraun 2022). The goal of Satoshi was to propose a system that would not depend on a third party to judge an operation, instead it makes all the action automatically recorded and irreversible. By doing so, he created what could be considered as the equivalent of the *indice* in the virtual world, the operation leaving their trace in a chain of causality, like objects would live their traces in the physical world.

Blockchain technologies do not prove that an image is authentic or has not been tampered with, just because it has been minted into the blockchain. In fact, the image could hardly have been altered before it was mint in the blockchain, and minting it in an NFT would not prove its authenticity. The blockchain cannot certify the authenticity of a photo before it has been integrated into the blockchain. However, the blockchain could certify the authenticity if the photo was mint at the moment it was taken, directly in the camera. Such a photo, which would be in the blockchain since the moment of its creation, could be certified because all further operations performed on it would be registered in the blockchain and we could always trace it back to its original form or even prevent it from being modified (Dobre 2018 : 212). It is this idea that motivates companies such as StarlingLab, Numbers Protocol or Truepic (and certainly some others) to propose a product that would mint the photos at the time they are taken, in order to certify their authenticity by including them in the blockchain before any modifications could have been made. It is hard to say which of these projects has more potential or proposes the best system; the exact technical process to stamp and mint photos on the blockchain may differ (Dobre 2018, Dong 2018, Zou 2019, Abrar 2021, Katarzyna 2021), but it is far beyond my understanding and the purpose of this article to discuss these technical elements. However, the interest shown by Reuters in StarlingLab's and Numbers Protocol's projects,⁴⁶ indicates the potential of these projects. Reuters is a well-established media, renowned for its photojournalism, so not only does it tend to prove the seriousness of the projects, also it is easy to understand what the advantages for them to develop and adopt a technology of *proof of authenticity* for their photos. For journalistic companies, it is essential to be able to prove the authenticity of their documents in order to maintain the trust of their viewers.

All those projects are possible if we trust in the *indicial* value of the blockchain. What I mean by this is, the information the blockchain is recording must be seen as the 'abrasive trace' of the operations that happened, and not as a proposition that could be 'true or false'. Of course, the semantic of the physical world hardly fit the virtual world and speak of 'abrasive' trace or imprint for a virtual operation is metaphorical and not epistemological. To be able to propose an epistemology of the blockchain as the virtual *indice* a semantic work would be first necessary. By creating a recording system that is not based on the trust, and

⁴⁶ <https://www.journalism.co.uk/news/reuters-tests-new-blockchain-tool-to-authenticate-images/s2/a1067852/>
<https://the-decoder.com/reuters-tests-blockchain-technology-to-authenticate-photos-in-ukraine-war/>

that is not possible to be rewritten, Satoshi has created what could be considered as the virtual equivalent of the *indice*. However, it is important to remember the blockchain can have value of *indice* only in the virtual world, and the state of an image on the blockchain does not presume of its authenticity as long as we are not able to prove that the image has never been modified before it gets into the blockchain.

The solutions offered by the blockchain and watermarks may have the capacity to solve our faith in photography, not only in the perspective of AI-generated images, but also in the problematic of digital photography, as it gives us the certainty to verify the 'original file'. However, verification still requires a process from the viewer that most would certainly not do, either because of time or ignorance of how to proceed to such verification and find the relevant information. For this reason, it is difficult to measure the real impact on a pragmatic level. It is also possible that the integration of these 'authenticators' has little to do with the preservation of our faith in photography, and if we really want to preserve the specificity of this medium, perhaps we should take stronger measures and forbid the production of images that copy the photographic aesthetic. But do we still want to believe in the index, as we did in the 19th century?

Conclusion

Are we getting the media we deserve? The emergence of AI-generated images also seems to coincide with dogmatic changes in society. I have argued that since the modern era, Western society has become an indexical dogma, with the development and belief in hard sciences. Recently, the table seems to have turned, and more and more people are doubting science and index to represent the truth, or at least their truth. In other words, the realisation that the sciences are not only based on *indice* but on index, with interpretations fused with observations, has led to an awareness of the existence of a gap between the 'real' and its representation (including the sciences). Semiotics as a field is a consequence and an actor of our attitude towards the real. However, it is interesting to see the correlation between this phenomenon and the development of photography: born in the same period, semiotics and photography have both questioned our relationship with the real. As we have seen, the nineteenth century put all its faith in the index as proof of the real; the end of the twentieth century coincided with the emergence of digital photography, but also with a certain defiance of our ability to represent the real with confidence. For AI and the present situation - it is always more complicated to study a moment in which we are still in it - I could argue that there is a strong crisis of the index underway.

The index, by being a proposition, also has the power to deceive, and the deception of not finding in science a truthful representation of their experience has led people to turn to other ways. For example, the indexical relation between sex (male/female) and chromosomes (XX/XY) has been strongly rejected by an important part of society and replaced by a system that does not find its justification in indexical correspondence. This turn in our relation to the real is what I call the 'dogma of fictionality' in contrast to the 'dogma of indexicality' that I developed in Chapter II. Is it a coincidence that at this moment of our history a new technology is being developed that is capable of creating realistic appearance images - at a scale that corresponds to our gigantic demand for visual content - without the indexical limitations of photography? Photography, with its rich history and ongoing transformations, serves as a revealing case study in this complex relationship between man, technology and their ever-changing reality. However, the motivation to preserve photography as our privileged media to catch and represent the real, strong of its *indicial* relation to its object,

could be shredded if we do not believe in its index anymore. In a way the root of the problem is the same as at the 19th with Galton and Lombroso, the confusion between the *indice* and the index may have hurt our faith in both. Considering photography as an *indice*, is before all an act of humilities, is to accept like Barthes and Van Lier that photography asserts nothing, and the truth value of the propositions that can emerge from the connotations added to it does not concerns the *indices* in themselves. Photography certainly does not tell the truth, neither it shows it, instead it captures what is in front the camera. However, the arrival of AI as a treat on our believe in photography is co-occurring to a certain deceptive movement we have toward this medium, already started since the digital turn, represented in this paper by Dubois (2016) and Walid. As them, I do ask the question if we are looking for propositions that are corresponding to our visions of event, and not *indices*? Is it possible that non-indexical medium like AI generated images are able to offer a better correspondence to the wished ‘truth’ than photography nowadays? Barthes (1961) was saying:

In other words, and this is an important historical reversal, the image no longer illustrates the words; it is now the words which, structurally, are parasitic on the image. The reversal is at a cost: in the traditional modes of illustration the image functioned as an episodic return to denotation from a principal message (the text) which was experienced as connoted since, precisely, it needed an illustration; in the relationship that now holds, it is not the image which comes to elucidate or ‘realize’ the text, but the latter which comes to sublimate, patheticize or rationalize the image. As however this operation is carried out accessorially, the new informational totality appears to be chiefly founded on an objective (denoted) message in relation to which the text is only a kind of secondary vibration, almost without consequence. Formerly, the image illustrated the text (made it clearer); today, the text loads the image, burdening it with a culture, a moral, an imagination. Formerly, there was reduction from text to image; today, there is amplification from the one to the other. (Barthes 1961 : 26).

What I am suggesting with this thesis is that without preserving the specificity of photography as an *indice*, we could return to the earlier historical state where images were mere illustrations of text.

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Summary

Fotograafia lõpp? Indeksikriis tehisintellekti ajastu alguses.

Käesolev väitekirj lähtub tähelepanekust, et fotograafia võib sattuda "indeksilisse kriisi", kuna uued ja levinud tehisintellekti abil genereeritud kujutised näevad välja nagu fotograafia. Selleks, et mõista, miks see "indeksiline kriis" võib tähendada fotograafia lõppu, olen püüdnud taaslustada 1980-ndatel populaarset suunda semiootikas, mis pidas fotograafia eripäraks selle indeksilist suhet oma objektiga. Seda liikumist, mida mõnikord nimetatakse "indeksikoolkonnaks", esindasid peamiselt sellised Belgia ja Prantsusmaa autorid nagu Philip Dubois, Henri Van Lier ja Jean-Marie Schaeffer. Nende fotograafia semiootika on mõjutatud Saussure'ist nende teooria ülesehituse osas ja Peirce'ist indeksi mõiste osas. See viis hiljem nende tööde teatud kriitikani, sest nad ei oleks suutnud Peirce'i süsteemi täielikult mõista. Mina aga näen neis töödes, eriti Van Lieri töös, silda Saussure'i ja Peirce'i traditsiooni vahel ning võimalust tuua mõned Peirce'i mõisted tagasi epistemoloogilisele tasandile, kus uuemad semiootilised uurimused on sageli pragmatismile keskendunud. Fotograafia ja AI vastasseisu ei saa uurida ainult kujutiste vastuvõtu seisukohast, sest asi on meie suutmatuses eristada kaht meediumit. Tuleb keskenduda fotograafia epistemoloogilisele analüüsile ja viia see vastavusse meie meediumitajuga, rõhutades kogu suhete ahelat objektist esitise kaudu *tõlgendini*. Selleks kasutan ma Van Lieri eristust *indice* ja *index* vahel, mida pean asjakohaseks ja mis võimaldab paremini mõista piire väljendustasandi ja sisutasandi, märgi ja tõlgendi vahel. Magistritöö jälgib fotograafia indeksilise olemuse arengut kolme olulise perioodi jooksul: fotograafia tekkimine üheksateistkümnendal sajandil, digitaalne transformatsioon kahekümnenda sajandi lõpus ja kahekümne esimese sajandi tehisintellekti revolutsioon. Selline kronoloogiline lähenemine näitab, kuidas iga ajastu on fotograafilise indeksi ja selle kultuurilise tähtsuse määratlust muutnud. Lõpuks esitab magistritöö küsimuse, kas tehisintellekti abil loodud kujutised võiksid paremini teenida kaasaegset subjektiivse tõe otsingut kui traditsioonilise fotograafia objektiivne indeksilisus.

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