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Photography and its Preservation: Continuity and Changes in the Digital Era

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The emergence of digital photography and digital technology, in general, illustrate the principle of "creative destruction", coined by the economist Joseph Schumpeter (1883-1950)[1]. During the 20th century, the photography industry regularly introduced innovations that have contributed to its growth. Improvements in appearance combined with lower costs for consumers increased the availability of photographs to the general public. Photographs are now a popular commodity. However, at the end of the twentieth century, the introduction of digital photography provoked a discontinuity and historic structural transformations. The market moved from the chemical to the electronic sector. This major shift initiated the progressive destruction of the traditional photographic market. The leaders in this former field, including Kodak, Agfa, and Fuji are weakening. As well as economic challenges, this has impacted the photographic artwork and photograph's materiality. We press a button, an image is captured and subsequently presented to us. In contrast to the processes of the past which include a chemical process, the development of the image is replaced by an electronic process that we do not need to be involved in. However, is a photo still a photo? More so than any other visual art, digital technology has induced a paradigmatic historical shift. While the public appreciates the ease and quickly adapts to this new digital media, the field of photography has been subjected to a profound disruption and our photographic heritage is facing an important change. This paper will review some of these changes in order to demonstrate how we moved from a culture of photographic prints to an imaging culture; we have shifted from memorial photography to fast consumption photography. The transformation has impacted cultural institutions in what they must preserve and how they preserve it.

Towards an image society

Nowadays, the number of photographs produced is growing in an exponential way: every two minutes we are generating more photographs than were produced during the whole of the nineteenth century[2]. More than one trillion photographs are made in 2017[3]. This growth is the result of the technological evolution that has occurred within the field of photography since 1839. There have been a series of technological steps that enabled images to be produced in a more efficient and cost effective way. This technological advancement has not only had an impact on the quantity of photographs produced but also on the aesthetics. The daguerreotype (1839-1850's) was a unique and costly image with a long exposure time. The lengthy exposure time resulted in archetype poses very similar to the miniatures of the period: mainly a bust portrait from the front or three quarters. It was a once in a lifetime experience. Collodion negatives and albumen prints (1851-1890) were probably used as the first social media, particularly with the famous carte de visite format introduced by A. Disderi in 1854 and produced in many samples[4]. It became a way for the wealthy social class to picture themselves elegantly dressed and to represent this image to the world. The prints began to circulate; they were exchanged, sold, and exhibited. The Gelatin silver process (1880-2000) was the start of photography as a mass product, as the photographic industry developed at speed. It allowed anyone the possibility to produce photographs in a cheap and easy way. "You press the button, we do the rest" was the Kodak

advertising[5]. Photography became a profitable, industrial business. This was the beginning of famous companies such as Kodak, Agfa, Ilford, and Lumière. If we examine the profits of Lumière from 1884 to 1896, which mainly correspond to the sale of glass plate negatives, the growth of the photographic market during this period is evident. Within twelve years, the sale of photographic plates reached eight million French francs, which corresponds to approximately twenty-five million US dollars. Clearly, photography is a large consumption market that reaches all the social classes. Snapshots, images of daily life, and important life events can be recorded using this new popular medium. Photography is now used for its memory values by families, storing tangible memories for the future: I was there, I was like this, and I made this. Photographs are placed in albums and boxes, to be "store and forget" after a while.

Photographs: from tangible to intangible

At the end of the twentieth century, an even more powerful mass product appeared, which greatly impacted the practice of photography: digital photography. Digital photography is an instant media: it is no longer "I was", but "I am". I am here, I am like this and I am doing this. As André Gunther[6] stated, this is "conversational photography", which has an instant value and likely no remembrance significance. This "fast-food photography" is made to be shared immediately on social media. Its shelf life is very short and its life expectancy, from the point of view of preservation, is unfortunately also brief. Aligning the photographs from past and the ones produced today creates an illusion of linearity, a continuous evolution derived by technological improvement. In this vein, Henri Cartier-Bresson commented that "photography has not changed since its origin except in its technical aspects"[7]. However, this linear representation is hiding a paradigm shift: an important discontinuity. There is a change in the nature of the photograph itself. Twenty years ago, when someone said they were going to send you a photograph, what were we expecting? Certainly to receive by postal mail, in an envelope containing a print! Today, if someone suggests the same thing, we are not expecting to receive a print by postal mail but to get an email with a digital file of the photograph attached to it. The fact is, today we are using the same term "photograph" to name a fundamentally different artefact and this new meaning has somehow erased the older one. This is a common situation. When a new product – one that has no equivalent - is introduced on the market, a new name is created for it, for example, computer, phone, walkman. However, if a similar product already exists, we simply recycle the previous vocabulary. Until the end of the eighteenth century, a print was an engraving. At the end of nineteenth century it became known as a photographic print, and today it is a digital print. A camera (obscura) was a dark room with a small aperture and then it becomes a photographic camera and today a digital camera. We use the same word to designate technologically different artefacts. It also happens for photographs, and the difference is greater than for a camera or for a print. In today's society, it is an object of a different nature. A photograph was a permanent image created by the action of the light on a support. The photograph has moved from being a tangible object to an intangible artefact, like music. Photographs are now files, streams of bits that we can play on a computer or smart phone, or we can print to make them tangible. We are producing images and no longer photographs and this fundamental change has occasionally been acknowledged in the scientific journals: the title has been changed and the word "photography" has been replaced by "imaging", the "Journal of Photographic Science" is now the "Imaging Science Journal"[8]. More recently, the "Lens Media Lab" was created at Yale University[9], and was devoted to the study of the characterisation and conservation of photographs. Ten years ago it would have been named "Imaging Media Lab", and thirty years ago it would have been named "Photo Media Lab". It seems that not only "photography" but also the word "imaging" has now been abandoned. However, museums, libraries, archives, and the public continue to use the word

“photograph” because it corresponds to a previous way of categorising objects, despite the ambiguity created by its polysemy. More than any other visual art, photography is subjected to a profound mutation that impacts the practice of art, the nature of artefacts and, at the end, the kind of objects we preserve in the collections. Consequently, within a museum, photography departments are probably the departments which are facing the most important changes as they must keep tangible and intangible artefacts, 2D, 2.5D[10] or 3D prints, true photographs and digital prints as well, etc. For this reason, it is important to gather as much information as possible about artefacts that enter collections, including the way they were produced and the artist's intentions. The Photograph Information Record (PIR) represents the effort by Nora Kennedy and other colleagues to create an “international standard” for an artist’s questionnaire. It exists in 14 languages, including Japanese[11].

What will be Photograph collections?

We are still in a period of growth and already have ideas about what the future holds. For instance, we were referring to a photograph as a still image; however this is no longer true: photographs are no longer still images! The border between photographs and video is blurred. The “Live photo” concept[12], introduced on Iphone 6S, is a photo that records what happens 1.5 seconds before and after the picture is taken, which obscures the line between photo and video. The pinhole camera model is disappearing. The classic principle of the camera, a box with a lens, has been replaced by a light field camera containing hundreds of micro lenses. In the new type of images produced by a so called “plenoptic camera”[13], it is possible to change the focus explore the image’s depth inch by inch[14]. It is also possible to have a panoramic view and alter the point of view. This medium becomes a fully immersive experience that allows us to experience a virtual reality, augmented reality, or mixed reality. It will cover not only the visible range using blue-red-green selection but also the ultraviolet and the infrared ranges, and thus makes it possible to have images where we cannot see them. Our camera will turn into hyperspectral camera. Some researchers are looking to recreate the fragrance of an environment by using a camera that smells[15].

Returning to the question of what kind of artefacts will be collected in museums, it is challenging to predict what our future collection may contain. As Nora Kennedy quoted in her 2016 paper: “The future is not what it used to be”[16]. Making predictions is always a risky challenge, particularly if you check some the predictions today! In 1977, Ken Olson, CEO of Digital Equipment Corp., stated that “there is no reason anyone would want a computer in their home”[17]. Actually, based on the huge size of the computer that was predicted, there is no doubt that no-one would have wanted it in their living room. Furthermore, today we do not want a computer in our home, but we want it in our pocket, in our phone, or in our watch. The difficulty in predicting relies on two unknown parameters, which are hard to assess: the technology factor and the human factor. Looking first at technology, there are disruptive technologies[18] that create discontinuity and a shift in concepts that cause predictions to be incorrect. Digital technology is one example of disruptive technology. Secondly, the human factor is a kind of cultural resilience. Not everyone accepts the changes and some want to go in an unexpected direction. This is particularly noticeable in the field of photography. It is fascinating that while digital photography is spreading, many artists are enthusiastic about alternative photographic processes. In many countries, amateurs and artists are rediscovering the complexity of nineteenth century processes, from the daguerreotype to the collodion process and colour pigment prints[19]. These, among many others, are contributing to the persistence of analog photographic processes. As such, we cannot pretend that “analog photography is dead”, as claimed by Paul Delaroche in 1839 regarding painting when photography appeared[20]. It is all about materiality, matter matters! Artists will still produce it, and this is due to

the human physiology. We have five senses, and materiality triggers most of them, not only the visual information, but the gloss, the texture, the touch, the smell, the noise that makes any object when you manipulate it. Museums will probably still acquire analog photographs in addition to an increasingly significant number of digital based media. Nonetheless, if we know how to preserve analog photographs, the preservation of digital artefacts raises concerns.

Preservation of digital photographs

The preservation of digital photographs is not a new issue. In archives, we have been facing the challenge of the preservation of "non-human readable" artefacts such as analog disc, video, recording, and we have been regularly hoping for a long lasting preservation solution. Thirty years ago, Klaus Hendriks, head of the Conservation Research division of the National Archives of Canada, highlighted this as a priority. The first hope came with optical memories and compact discs. In the 1990s, when the CD and DVD market was growing, they were announced to be the storage of the future for digital data, a standard format that will last and be accessible for more a century. Where are we now? Since the quantity of images and the size of the files are increasing, the storage capacity of CDs is too limited. Furthermore, the ability to access the data is questionable as after just a few years some data are no longer readable. Additionally, this format may soon be obsolete as new computers no longer have CD players. Nowadays, common practice for preserving digital data includes redundancy, making regular copies, migration, and continuous checks of data. Indeed, digital photographic heritage is no longer stored in archives or family albums but spread in data centres: 99.99% of our photographic heritage is in the cloud. Facebook holds 10,000 times more images than the library of congress that was believed to store the largest collection of photographs in the world at the end of the twentieth century[21]. The images are stored on servers, which carries a risk of data corruption, loss, or illegal use. The images are an incredible resource for our history, as well as studies in social science, both present and future, providing we can preserve them and avoid any loss and corruption. Manipulating images is fast and easy with digital technology, either on purpose to modify content or by accident through a migration-reformatting process or an image compression.

The preservation techniques ensure the authenticity of the information, in other words, the integrity of the data. We need trusted digital repositories. To ensure the authenticity and long term access, micro-etching the data on a solid substrate either in a shape of holes, dots, or spots is a promising approach. Metal plate (High-Density Rosetta)[22] or glass plate (260 TB)[23] have been introduced as long lasting digital information carriers. However, it is interesting to consider that analog photograph has been proposed as a possibility for safely preserving digital information over long period of time. The Monolith™ archiving system (Bitsaveag)[24] records the digital information as a 2D bar code in colour on ilfochrome colour microfilm[25]. As anyone can read the stream of bits recorded in the substrate by using a microscope, prevents any obsolescence of the reading machine. Furthermore, there is a human readable finding aid - a photo that shows as a visual image about the content recorded - and information such as metadata needed to access the digital information. Moreover, the binary information is recorded as black or white squares. Such a passive archiving system guaranties long term accessibility and authenticity because the data are unchangeable, unlike on a magnetic storage. The cost after twenty years is much lower and that makes a very robust and durable system for archiving data in a safe way, as long as a photographic film is available on the market. Another example in order to illustrate that trends: in France, the National Centre for Cinema (CNC), the body in charge of the French film archives, is now required to archive digital movies by printing them on a film base in order to store a traditional movie film (Article 13 of the Decree of 19 December 2011)[26]. In court, film producers' unions unsuccessfully

challenged this requirement for cinematographic documents, that two copies be deposited at the CNC: a digital copy and a photochemical copy (that is to say on film 35 mm)[27].

Conclusion

After having adopted the technological changes we are stepping into the past by using the true photograph and its tangible value for preserving digital data. Unfortunately, the few examples will not keep the photographic printing alive: it is no longer the ultimate step in the art of photography. It is disappearing as we are visualising and sharing images through screens. It is the nature of photographs today to be ubiquitous, and only a small share of our photographic heritage is printed, mainly for collections or to be hung on walls. Some artists, collectors, and amateurs will always appreciate the physical form and materiality of prints because it links them to a period, and time gives them a specific value. Prints are like a chazutsu tea box. When a tin, cupper or brass chazutsu tea box is produced, a normal yet subtle change in the colour tone appears after a while: its beauty increases over time. A new chazutsu is imperfect, impermanent, and incomplete. It will change and gain more value and aesthetic charm over time. Possibly, the manufacturer is exhibiting some old models for you to figure out how it may look in the future, in one to fifteen years from now. Such an example reminds us that any material object embodies, through its physical ageing, the value of the time, which will be absent from digital photographs. As the French poet Alphonse de Lamartine said, “Objets inanimés, avez-vous donc une âme qui s’attache à notre âme et la force d’aimer? (“Inanimate objects, do you have a soul which clings to our soul and force it to love?”)[28].

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