

The word "exaptation" has been and still is a criticized notion in the field of evolutionary biology. In 1982, the paleobiologists Stephen Jay Gould and Elisabeth Vrba introduced the term in order to describe a trait that had been co-opted for a use other than the one for which natural selection had built it (1). Therefore, exaptation describes features evolving to serve other functions, or even none at all. The most common example used to illustrate this term are bird's feathers, which would initially keep dinosaurs warm, as they were not able to fly in prehistoric times. This original function of thermoregulation evolved and became a flight functionality (2).

However, the word exaptation seems to be used more and more frequently in the branch of technology, proving to be the best way to describe new mechanisms of technological evolution.

As technological evolution is intimately linked to photographic practice and has a particular impact on its climate and environment, I wanted to explore the idea of exaptation within the photographic medium, and in this way further study the perpetual change in the nature and functions of technology, as well as photography.

What does technology look like nowadays? Is there a recognizable global aesthetic? Do functions have their own visual aspect? Equating the development of technology to an evolutionary process allows us to consider technologies and their artifacts as species. For Koert Van Menswoort, technospecies create new functionalities and new markets, where our society acts like a catalyst of this technodiversity (3). Therefore, are we also the design decision maker of the face of technology? Menswoort asserts that we have a "symbiotic relationship with technology", but technology also tends to be shaped by the economy itself, like an independent factor. Hence consumer demand applies its contingent aura on the aesthetic of technology.

Determining a visual aesthetic for technology is certainly something interesting to categorize in terms of evolution, but does this aesthetic have a meaning or a role in the new functions that technologies bring? It is clear that some of these aesthetics are functionless, for example the plastic tongue brushes that appear behind toothbrushes heads: they add a new characteristic to the artifact, yet this exaptation doesn't provide a major functionality to this commodity. "Hence artifacts emerge from a social process" (4) as Giovanni Bonifati says, which is based on the economic forces that fill the hunger for innovation rather than the act of improving people's lives. Thus, this contemporary evolution has changed the nature of technology.

Nevertheless, Bonifati gives various examples of exaptations with the Edison's phonograph as a starting point: it brought talking books to the blinds. It could also teach languages, reproduce music, create musical toys, help with the pronunciation of foreign languages and record phone calls, amongst many other things. In a way, this helped widely with the evolution of life's comfort. But if we now take the example of the mobile phone: it can show a lot of functionless innovations, and an obvious exaptation of its original uses, frenetically creating new artifacts and technospecies. These accelerating technologies illustrate the "technological convergence" (5) (Nathan Rosenberg, 1963) which create knowledge and skills that are different from the original ones. Automated tools like robotics are representative of this convergence. For instance, an automated robot can now build a car, as well as surgically operate on a patient. While this is obviously not happening at the same time, the automated structure can specialize in different sectors of the economy, allowing an infinite range of function possibilities. This decomposability of functions also builds a certain number of economical structures, which in some cases have the same function. Bonifati uses the biology term "degeneracy" (6) in order to explain this hyper-economic process. We can thus see that technology undergoes countless variations of its functions, as the economic system also experiences exaptations.

This is why we cannot predict the future of technology. It has an undetermined evolution, which depends on several contingent factors like hyper-commercialization. For Susan Blackmore, this continual hybridization is an evolutionary algorithm held by replications of functionalities and social process (as well as markets), which further adds to the ways and the capacity technology has to replicate itself. She calls it "Temes" (7), as a technological mimetic which sees itself as having its own variation, selection and heredity different from economic forces. Along with this process in which we see technology as becoming almost singular, we are led to believe that technological evolution is unpredictable in its design, as well as in its functionalities and its nature. Is photography as unpredictable as technological evolution? Do these technological exaptations have an impact on the nature of the photographic medium?

The mechanism of photography sustains a wide range of variations. It is undeniable that the etymology of the word "photography" is nowadays an anachronism. In his book "Photography in the age of electronic imaging", Todd Stewart emphasizes the fact that the digital medium is not a transcription anymore but rather a conversion of information, logged as numbers in electronic circuits (8). Hence, photography does not record light but simulates it with algorithms. With the emergence of softwares, augmented tools and virtual displays of images, photography has been extended, shifting from the analogue representation to the digital simulation. It creates a "Hyperspace" as illustrated in the Jameson quote in Stewart's book, "because our perceptual habits were formed in that older kind of space (...), the space of high modernism" (9). There is also a rise in the production of computer generated images, which leads us to wonder what the limits between CGI and digital photography actually are. Both are made of algorithms and are reminiscent of the degeneracy in technology, as structures like digital cameras and computers have the same image making functionality. This "Hyperspace" is further emphasized by the proliferation and the pervasive amount of digital images on the internet. The hyper connected environment of this network is responsible for this digitized ubiquity which was formerly referred to as "mechanical reproduction" by Walter Benjamin (10), and is nowadays seen as digital imaging: an infinite reproduction of images available online and altered by the viewer's gaze and the different contexts in which they are replicated.

In addition to this digital dematerialization, economic and social conventions have changed the outlook of the photographic medium, as we previously discussed in the case of technology. Hyper-commercialization and trends are prominent examples of factors of this photographic evolution. In one of her talks (11), Katja Novitskova explains what the current successful images online (trends) are and the effect of viewer attention on new media, which we will call "indirect alterations". Internet is fueled by attentions of millions and almost billions of human beings. Our attention is a scarce resource that everybody is competing for. In a way, it is an economy, but our attention is an evolutionary mechanism that develops throughout the human evolution. Hence, photography is also closely connected to commodification, as we have seen happening with various stock image websites that are blossoming on the internet, satisfying the visual communication of a number of corporations. This has drawn a lot of questions on the role of photography and its goal to "appeal to the broadest consumer base" (12). Timur Si-Qin designates appealing (thus economically effective) images as "attractors" that can give a somewhat common feeling to the largest cultural community they are aimed at. However, our society can't decide and design the evolution of attractors, as well as technology. These conventions and factors have totally changed the ontology of photography.

It is for this reason that I decided to analyze photographic evolution as an exaptation, as its characteristic has now evolved towards other uses. The photographic medium is on its way to change (if it hasn't done already) its uncertain nature and function. Loosing its indexicality, the medium releases itself from the classical research of literal representation (trace or index), to adopt an expressional and a plastic functionality. This can be translated into the rise of dematerialization and virtualization, which highlights and tends to the importance of the concept behind the photographic artwork. Like Stewart said, "It has emphasized the reception rather than the production" (13), although it is obvious that its production has also evolved from representation to simulation (softwares, new media and algorithms), as we previously noted in this part of the discussion. The classical time and space representational functionality of photography is therefore giving way to expression functionality.

We can thus state that photography has completely altered its etymology, as a result of technological evolution and the contingency of external forces (such as economy and social process), but it has surprisingly kept its practice and its appellation, exapting to new functions while preserving its unstinting structure.

Sources:

(1) : Stephen Jay Gould and Elisabeth S. Vrba, "Exaptation: A Missing Term in the Science of Form", 1982

(2) : Wynne Parry, "Exaptation: How evolution uses what's available", 2013, <http://www.livescience.com/39688-exaptation.html>

(3) : Koert Van Menswoort, "Razorius Gilletus: On the origin of next species", 2010, <http://www.nextnature.net/2010/03/razorius-gilletus/>

(4) : Giovanni Bonifati, "Exaptation and emerging degeneracy in innovation processes", 2012, page 6.

(5) : N. Rosenberg, "Technological change in the machine tool industry", 1963.

(6) : Giovanni Bonifati, "Exaptation and emerging degeneracy in innovation processes", 2012, page 8-9.

(7) : Susan Blackmore, "Memes and Temes", TED Talks, 2008, https://www.youtube.com/watch?v=fQ_9-Qx5Hz4

(8) : Todd Stewart, "Photography in the Age of Electronic Imaging", 1997, page 303.

(9) : Idem, page 310 (Frederic Jameson citation, 1993)

(10) : Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction", 1936.

(11) : Katja Novitskova, "Attention, Economies and Art", Ted Talk, 2014.

(12) : Timur Si-Qin, "Stock Photography as evolutionary attractor", Dismagazine, <http://dismagazine.com/issues/42017/stock-photography-as-evolutionary-attractor/>

(13) : Todd Stewart, "Photography in the Age of Electronic Imaging", 1997, page 328.