4.1  Introduction

“Time, space, are thus annihilated, and we identify the resemblance with the reality”

_Walt Whitman_ [1]

It all happened 200 years ago; 194, to be exact. This is the time that separates the first know photograph, taken in 1825 by Joseph Nicéphore Niépce and the 2019 picture of the black hole, taken by 29-year-old Katie Bouman (Fig. 4.1).

We have come a long way since Niepce’s times. Many photographic processes (Table 4.1) [2] have been developed before we arrived at our present digital era. Almost two centuries of vertiginous advances that make photography still today a unique manner to register the world that surrounds us.
Photography has been a disruptive innovation right from the beginning. For authors AP Molella and J Beidi [3], photography reframed how we look at the world and ourselves. Although it was invented in Europe, it achieved such a degree of sophistication in America to be referred to as “the American process.” Photography stood as the new way to see the world; furthermore, it was believed by many to be the new and objective way to represent reality, away from the subjectivity of art. It created images and copied reality in a manner not found before it. But not only scientists were amazed: artists, technology, and science were joined in amazement to reproduce the world around them, taking concepts one from another. Some artists became inventors; some scientists borrowed conventions from the fine arts and applied them to the new medium. From the etymological point of view, the word “image” should be linked to the root *imitari* [4]. In fact, some used photographs as a control for their painted subjects.

Fig. 4.1 The first known picture taken by Joseph Nicéphore Niépce, 1825 (Left) and the 2019 picture of the black hole, taken by 29-year-old Katie Bouman and her team (on the right). (Figures under Public Domain, Wikipedia Commons CCBY)

Table 4.1 History of photographic processes

| Date   | Photographic process                                      |
|--------|----------------------------------------------------------|
| 1839–1860 | Daguerreotypes                                           |
| 1839–1860 | Salted paper prints                                      |
| 1851–1925 | Glass plate negatives (general)                          |
| 1851–1885 | Collodion wet plate glass negatives                      |
| 1878–1925 | Gelatin dry plate glass negatives                        |
| 1889–1951 | Nitrate negatives (introduced by Kodak)                  |
| 1880    | Albumen prints                                            |
| 1885–1905 | Gelatin and collodion printed-out photographic prints    |
| 1880    | Black-and-white gelatin developed-out photographic prints |
| 1934    | Acetate negatives introduced for sheet film              |
| 1935    | Chromogenic color film and transparencies (introduced by Kodak; Kodachrome was the first process) |
| 1948    | Instant black-and-white process (introduced by Polaroid; sepia first, then black-and-white in 1950) |
| 1960    | Polyester film introduced                                |
| 1963    | Instant color print process (introduced by Polaroid; Polacolor was the first process; SX 70 was introduced in 1972 and Polacolor 2 in 1975) |
| 1975    | First digital photography                               |
| 1985    | Electrostatic, inkjet, and dye sublimation prints become increasingly used for printing photographic images |

Photography has been a disruptive innovation right from the beginning. For authors AP Molella and J Beidi [3], photography reframed how we look at the world and ourselves. Although it was invented in Europe, it achieved such a degree of sophistication in America to be referred to as “the American process.” Photography stood as the new way to see the world; furthermore, it was believed by many to be the new and objective way to represent reality, away from the subjectivity of art. It created images and copied reality in a manner not found before it. But not only scientists were amazed: artists, technology, and science were joined in amazement to reproduce the world around them, taking concepts one from another. Some artist became inventors; some scientists borrowed conventions from the fine arts and applied them to the new medium. From the etymological point of view, the word “image” should be linked to the root *imitari* [4]. In fact, some used photographs as a control for their painted subjects.

As a substitute of art, it was seen as a labor saver. The automatism of the process was interpreted as a warranty of impartiality. It was used by scientist to make the invisible visible and also to reproduce nature with extraordinary detail. Machine-regulated image making was a powerful symbol to the goal of abiding objectivity [5]: if it was photographed, it had to be real. By coming from a machine, it had three main characteristics: (1) it could be made to reproduce thousands of copies; (2) it was unbeatable; and (3) it offered images uncontaminated by interpretation [5].
Photographs created images in a new way. But it was not any image: it was an accurate representation; that is, it stood to be “the truth”; however, when exploring on the history of disease representation, including medical photography, one can find that regardless of the reproduction media used, each representation had “embedded cultural and moral understandings of the meaning of illness” [6]. In fact, photography is just another way of representing; it is the vision for a moment captured through the lens [7].

In the field of medicine, this “objectivity” favored a somatic understanding of disease, reducing its complexity to a localized affection visible to the lens of the camera [8], a criticism still made today toward teledermatology.

Even when the first’s photographs were seen as the reflection of reality, they were also seen as supernatural. In fact, the first camera well called “the magic box.” This aura of verisimilitude was exploited by charlatans like William H. Mumler who in the early 1860s used the double exposure and set a business as “spirit photography.” His most famous photography showed Mary Todd Lincoln with the “ghost” of her husband, Abraham Lincoln (Fig. 4.2) [9]. Done the law, done the snare!

This new technology was a democratizer bridging science and art with the lay person: the firsts daguerreotypes represented as a truly democratic form of imaginary [3].

Photography appeared in a period of great changes to society. Science saw the opportunity to go beyond the visible. Physicians either took the pictures themselves or brought their patients to the local portrait photographer [10]. The first medical photographic prints made between 1840 and 1890 could be classified into the following four types: (1) The “grotesque”; (2) classical presentations of medical conditions; (3), war surgical cases; and (4) the mentally ill [10]. In the latter, and just as the Renaissance sought to categorize emotions, doctors used the camera to take photographs that could put emotions and character into evidence. Its use expanded as a means of recording and a source of “creating evidence” in fields like psychiatry, physiology of movement, and the political and police apparatus among others. Generating an image of a human being following “scientific conventions” was and is still being used in a spectrum that spans from medical education, support the theory of eugenics [11] and for surveillance, law enforcement, and control [12]. The power of imaging was soon evidenced.

Fig. 4.2 “Spirit photography” by William H Mumler (1860) showing Mary Todd Lincoln with the “ghost” of her husband, Abraham Lincoln. (William H. Mumler, Mary Todd Lincoln, 1872. Courtesy of Allen County Public Library, Fort Wayne, Allen County, Indiana)
4.2 Time Table

The illiterate of the future will not be the man who cannot read the alphabet, but the one who cannot take a photograph.

Walter Benjamin, 1931 [13]

Medical photography started almost in parallel to general photography: physicians and scientists were among those who first took photographs. The ever-constant stream of new technologies and applications left an imprint on the medical world.

The timeline (Figs. 4.3a, b [14], 4.3c [15], Figs. 4.3; 4.4a, b, c, d; 4.6a, b, c, d; 4.7a, b, c; 4.8a, b, c, d; 4.9a, b, c, d; 4.10; 4.11a, b, c; 4.12a, b, c; and 4.13a, b, c, and d) shows the major development, photographic processes and figures of this exciting period of invention and change [16]. Some highlights were the cyanotype Impressions (1843) by Anna Atkins (Fig. 4.5) or the newly introduced portable camera by Eastman Kodak (1888).

As for skin, its exposed condition made it the leading organ to be systematically photographed.
John Frederick William Herschel (1792–1871)
Astronomer and physicist, credited with coining the terms ‘negative’, ‘positive’, and ‘photograph’. He was the inventor of cyanotype which he used to make blueprint.

Anna Atkins (b. 1799–1871)
Considered the first woman photographer (some claim it was Constance Fox, born Mundy, wife of William Henry Fox Talbot). Anna Atkins was the first person to publish a book with photographic images (Photographs of British Algae: Cyanotype Impressions, 1843).

Alfred Donné (1801–1878)
Leon Foucault (1819–1868)
Medical publication with illustrations from daguerrotypes, Cours de Microscopie Complementaire des Etudes Medicales came to be known as “the Foucault pendulum”.

Simon Peter Hullihen (1810–1857)
Earliest known daguerreotype in the dermatological literature (Medical examiner).

**Daguerrotype (1839–1860)**

**Salted Paper Prints (1839–1860)**

**Fig. 4.4** (a) Photograph of John Frederick William Herschel, taken in 1867 by Julia Margaret Cameron. She is considered one of the “giants” of Victorian photography (the other “giants”: Lewis Carroll, Lady Clementina Hawarden and Oscar Rejlander). Herschel introduced her to photography in 1839 and shared the results of his early experiments with her. (Figure under Public Domain, Wikipedia Commons CCBY); (b) Picture of Anna Atkins, a botanist considered by some the first woman photographer. (Portrait of Anna Atkins, albumen print, 1861, figure under Public Domain, Wikipedia Commons CCBY); (c) Image of blood globules from Cours de Microscopie Complementaire des Etudes Medicales by Donné and Foucault. (Figure under Public Domain, Wikipedia Commons CCBY). (d) Dr. Simon Hullihen (Courtesy of the Wheeling Hospital Collection at the Diocese of Wheeling-Charleston archives).

**Fig. 4.5** Cyanotype image from the book British Algae: Cyanotype Impressions, 1843 by Anna Atkins. (Figure under Public Domain, The New York Public Library, Spencer Collection)
Dermatological photographs were among the first medical images to be reproduced in series for atlases which were used to spread medical knowledge. In this sense, photography can be considered an instrumental part of the emergence of dermatology as a discipline. Over 150 photographs were made public in dermatological photographic atlases published between 1865 and 1900 [10]. The first pictures were black and white and later hand-colored to imitate the naturally occurring condition. Many artistic conventions were borrowed to generate medical portraits. Patients posed as if they were going to be painted for a family portrayal [17]. Gradually, it began a process of standardization, and new pictorial conventions were included to separate medical from popular photographs, a subtle transition from artistic illustration to this new scientific way of imaging.
Glass plate negatives (1851–1925)

Collodion wet plate glass negatives (1851–1885)

Albumen prints (1850–1880)

**Fig. 4.7** (a) Photograph from the book *Clinique photographique de l'hôpital Saint-Louis* by Louis Philippe Hardy and Pierre Michel Arthur de Montméja (*Clinique photographique de l'hôpital Saint-Louis / par M. A. Hardy et A. de Montméja, Chamerot et Lauwereyns, Paris 1868*, figure under Public Domain) (b) Picture of Christian Albrecht Theodor Billroth (Figure under Public Domain, Wikipedia Commons CCBY). (c) Picture from the cover of *Revue photographique des hôpitaux de Paris. Bulletin Médical* by Montmeja, Pierre Michel Arthur de; Rengade, P. Jules; Bourneville, Désiré Magloire. (Digital image courtesy of the Getty’s Open Content Program)
## Fig. 4.8 (a) First page of *Photographic Review of Medicine and Surgery* by Maury F F and Duhring L A (1870–1871). (From *Photographic review of medicine and surgery*), a bi-monthly illustration of interesting cases, accompanied by notes. Philadelphia: J.B. Lippincott & Co., figure under Public Domain; (b) Cover from *Iconographie Photographique de la Salpêtrière* edited by Desiré Magloire-Bourneville and Paul Marie-Leon Regnard (Digitalized from the library of Oxford University, figure under Public Domain). (c) First page of *An Elementary Treatise on Diseases of the skin for the Use of Students and Practitioners* by Henry Granger Piffard (1842–1910). Second American text book of dermatology, *An Elementary Treatise on Diseases of the skin for the Use of Students and Practitioners* Founder of Journal of Cutaneous and Venereal Diseases (Today’s JAMA’s Dermatology) Pioneer the use of flash photography in medicine; (d) Image from the book *Photographic Illustrations of Skin Diseases* by George Henry Fox (1846–1937). First book with heliogravure.

| Year | Author(s) | Description |
|------|-----------|-------------|
| 1870 | Maury F F and Louis A Duhring | *Photographic Review of Medicine and Surgery* 1870-1872 |
| 1876 | Desiré Magloire-Bourneville and Paul Marie-Leon Regnard | Editors of *Iconographie Photographique de la Salpêtrière* |
| 1876 | Henry Granger Piffard | Second American text book of dermatology, *An Elementary Treatise on Diseases of the skin for the Use of Students and Practitioners* |
| 1880 | George Henry Fox | *Photographic Illustrations of Skin Diseases* |

**Photographic Illustrations of Skin Diseases**

- **Glass plate negatives (1851–1925)**
- **Collodion wet plate glass negatives (1851–1885)**
- **Albumen prints (1850–1880)**
Fig. 4.9 (a) Michel Bur was the second case used by Friedrich Daniel von Recklinghausen to describe neurofibromatoses in 1882. The photograph was taken by H. Winter. Credit: Wellcome Library Collection, Attribution 4.0 International (CC BY 4.0); (b) Image of child with impetigo in Edmund Lesser’s Lehrbuch der Haut- und Geschlechtskrankheiten für Studierende und Ärzte which included photographs taken with different techniques. Credit: Wellcome Library Collection, Attribution 4.0 International (CC BY 4.0); (c) Hysterical sleep attack (normal state). Credit: Wellcome Collection. Attribution 4.0 International (CC BY 4.0); (d) George Eastman (1854–1932), founder of Eastman Kodak Company, inventor of the photographic film. Credit: Wellcome Library Collection, Attribution 4.0 International (CC BY 4.0).

Glass plate negatives (1851–1925)

Collodion wet plate glass negatives (1851–1885)

Gelatin and collodion printed-out photographic prints

Black-and-white gelatin developed-out photographic prints (1880)

Gelatin dry plate glass negatives (1878–1925)

Fig. 4.10 First advertisement for the newly introduced portable camera from George Eastman: New Kodak Cameras. “You press the button, we do the rest.” (Ellis Collection of Kodakiana 1886–1923, David M. Rubenstein Rare Book & Manuscript Library, Duke University, figure under Public Domain)
Fig. 4.11 (a) Dutch dermatologist Dirk van Haren Noman that published *Casuistique et Diagnostique Photographique de Maladies de la Peau* (10 volumes) in 1889. (Figure under Public Domain, Wikipedia Commons CCBY). (b) The French pioneer in medical photography, Albert Londe. (Figure under Public Domain). (c) Albert Ludwig Sigesmund Neisser. He published *Stereoskopischer Medizinischer Atlas*, a collection of stereoscopic medical images of a wide range of medical conditions. It included a collection of stereoscopic medical images of a wide range of medical conditions. Neisser is better known for discovering the pathogen that causes gonorrhea. (Figure under Public Domain, Wikipedia Commons CCBY)
Fig. 4.12 (a) Archibald Reiss, better known for founding the first academic forensic science programme and the Institute of Forensic Science (Rodolphe Archibald Reiss, by Bertillon, 1925) (Figure under Public Domain, Wikipedia Commons) CCBY). (b) Cover of Farbenphotographie in der Medizin by Adolf Jaiser (Figure under Public Domain). (c) Austrian dermatologist Gustav Riehl who published in 1925, together with von Zumbusch Lep Titter, the first color atlas in Europe (Gustav Riehl, 1855–1943, Nr. 92 basrelief in bronze, Arkadenhof of the University of Vienna, Photo credits: Hubertl, figure under Public Domain)
Willard Boyle George Smith invented the CCD (Charge-Coupled Device), a device which transforms light into electrical signals. The CCD is the electronic eye of digital cameras, a tool that revolutionized photography by allowing light to be captured electronically rather than on a film.

Eastman-Kodak (USA) Agfa (Germany) started production of color film, Kodachrome and Agfacolor.

Lajos Nékám 1868–1957 Published proceedings of the Ninth International Congress of Dermatology.

First know digital images know. They were sent to Earth by Mariner IV spaceship. They showed the surface of Mars.

Willard Boyley George Smith invented the CCD (Charge-Coupled Device), a device which transforms light into electrical signals. The CCD is the electronic eye of digital cameras, a tool that revolutionized photography by allowing light to be captured electronically rather than on a film.

| Year | Event |
|------|-------|
| 1935-1936 | Eastman-Kodak (USA) started production of color film, Kodachrome and Agfacolor |
| 1938 | Lajos Nékám 1868–1957 Published proceedings of the Ninth International Congress of Dermatology |
| 1964 | First known digital images know. They were sent to Earth by Mariner IV spaceship. They showed the surface of Mars |
| 1969 | Willard Boyle George Smith invented the CCD (Charge-Coupled Device), a device which transforms light into electrical signals. The CCD is the electronic eye of digital cameras, a tool that revolutionized photography by allowing light to be captured electronically rather than on a film. |

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**Chromogenic color film and transparencies (1935)**

- Nitrate negatives (Introduced by Kodak) (1889–1951)
- Chromogenic color film and transparencies (1935)
- Polyester film (1960)

**Acetate negatives introduced for sheet film (1934)**

- First Digital Photography (1964)
- Instant Black and White process (1948)

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**Fig. 4.13**

(a) First color film by Kodak (1935) and Agfa (1936) (Courtesy of Kodak, Copyright © 2020 Eastman Kodak Company. All Rights Reserved, and Thomas Neumann’s Trip to Berlin, 1937, Riksarkivet, National Archives of Norway, figures under public domain).

(b) Painting of Prof. Lajos Nékám. His most important work is his 3 volume dermatovenereological atlas (1938) which contains 4566 Figures. (Painted by Karoly Karlovszky, courtesy of owner and grand child of Prof. Lajos, Dr. Nékám Kristóf).

(c) First known image of the surface of Mars (NASA, 1976, figure under Public Domain).

(d) Steven Sasson and the first known commercial digital camera (Courtesy of Kodak, Copyright © 2020 Eastman Kodak Company. All Rights Reserved)
4.3 Photographing the Grotesque

_Tis true my form is something odd,/But blaming me is blaming God;/Could I create myself anew/I would not fail in pleasing you./If I could reach from pole to pole/Or grasp the ocean with a span,/I would be measured by the soul;/The mind’s the standard of the man._

—Poem used by Joseph Merrick to end his letters, adapted from “False Greatness” by Isaac Watts

_Grotesque_ is a word used to define the “repulsive, ugly or distorted.” It originated from the Italian word _grotteschi_, which referred to the decorations found in the grottoe (Grotta, Italian for cave) like the ones from the Golden House of Nero and that represent a mix of human and plant forms [18]. Such hybrids gave rise to a name later used to define the freaks.

Humans seem to be drawn to the abject as a mean to reaffirm their own well-being. We seem compelled to stare at the aftermath. The initial “trauma” of staring at the deformed or their images is followed by the reassurance that “it is not me.” It gives the opportunity to confront our own fears, while we recognize that image as a subject leaving us in at safe. The large number of images taken of humans with deformities seems to point more to satisfy the appetite for the deviant than a representation of a natural occurring event for academic or documentary purposes.

The history of professional photographs of diseases cannot be disconnected from the representation of monstrous and spectacular cases. These cases were present not only in Atlases but also on personal albums and street exhibitions. Joseph Merrick [19] (Fig. 4.14), the “Elephant man,” was just one such case of shared imaging between the medical world and the circus. Contemporary artist and photographer María-María Acha-Kutscher (Lima, 1968) serie _Les Spectaculaires_ exposes “freak-women” in all their beauty, re-dignifying them against the violent use of their medical condition for the amusement of others [20] (Fig. 4.15).

*Fig. 4.14* Photograph of Joseph Merrick. (Unknown source, no photographer credited in the British Medical Journal article of 1890, figure under Public domain)

*Fig. 4.15* Photographic collage by María-María Acha-Kutscher (Lima, 1968): “Alice E.Doherty” ‘Alice La Maravilla’. (From her series _Les Spectaculaires_, 2011) (With permission of María Acha Rodríguez. Artist name: María-María Acha-Kutscher. All rights reserved)
4.4 Photography in the Psychiatric Ward

Photography makes aware for the first time the optical unconscious, just as psychoanalysis discloses the instinctual unconscious [13].

Walter Benjamin, 1931

The search for the “physiognomy” of the mentally “insane” goes back in medical history. With the advent of photography, cameras found a fast way into the psychiatric wards trying to “catch” outer manifestations of inner disturbances [21, 22]. Certain mental conditions were thought to be identifiable by the looks. Photographs were tools to communicate information about mental health: some psychiatric wards did it in a regular, standardized manner, while others did it erratically and unmethodically. It was a common practice to be photographed when entering an asylum. The justification included the possibility to identify a patient in case of escaping. Interestingly, some individuals refused to be photographed and some doctors supported their decision [23]. Early photography of patients was used to present emotions. Darwin’s book *The Expression of the Emotions in Man and Animals* (1872) is a proof of this approach [24]. Before him, Hugh Welch Diamond (1809–1886) was one of the first to photograph the mentally ill patient, and mentally ill patients, and his enthusiasm with photography marks the appropriation of its use in this specific field of medicine [21, 25]. Today, these pictures can be a resource to understand the methodology with which Victorian doctors pretended to put a face to mental illness, how were psychiatric wards in that period, and who were the afflicted people.

4.5 Face and Law: Bertillon and the First Mugshots

Faces have always been of interest to science because of the possible hints into a person’s character, for identification and in search of signs of expression. Some believe that expressions are a sign of emotions. Therefore, the face could be a mirror to the mind and soul. Photography in psychiatric wards and by police apparatus was a way of instrumentalizing the technique as part of the surveillance apparatus.

In 1890, Alphonse Bertillon (1853–1914) – a French police officer – applied anthropometry to improve the French police identification system. He proposed to complete the police record by including a mug-shot (“Mug” is an English slang term for face), a photographic portrait of the arrested person, from waist up which includes a front view and a side view (Fig. 4.16).

![Fig. 4.16 Mugshot of Bertillon M. (Figure under Public Domain, Wikipedia Commons CCBY)](image-url)
In 1883, his system was adopted by the police in Paris and later became internationally popular [27]. Before him, Francis Galton (1822–1911), a half-cousin of Charles Darwin, had described this technique of generating multiple portraits in a rapidly and inexpensively way. His method was later published by Bertillon as “the English method” [11, 27] (Fig. 4.17).

Merging portraits taken of both sides of the face was possible thanks to an earlier invention from 1832 known as the stereoscope. Images like the one taken by Albert Neisser of a patient with syphilis are just one example of stereoscopic photography. [28]. This “fusion” of optical images was the embryo of depth perception, the beginning of today’s 3D photography.

4.6 Post-Mortem: A Living Testimony of the Dead

By 1939, life expectancy was 35 years. Living and memorial (post-mortem) photography soon became desirable and an affordable way to keep the memories of the deceased person alive: it was like keeping alive not only the memory but the person itself. It was another embrace between science and magic, a mechanical mean of representation at the service of nostalgia.

As Barthes would state, it gave the opportunity to maintain a representation of a reality that once existed though “one can no longer touch” [29]. Past medical images are also the representation of somebody that was, and it is now gone. In the foreword of Roland Barthes’s Camera Lucida, English writer Geoff Dyer says that probably the fascination of Barthes for photography had to do with death. An interest tinged with necrophilia, a “fascination with what has died but is represented as wanting to be alive” [29]. Cameras are, in Barthes words, clocks for seeing. Every photograph is a certificate of presence.

This concept was probably shared by people at the beginning of the era of photography when they took pictures of their deceased. Culturally, Victorians were closer to death than we are today; they honored their deceased and kept images around them; they did not plunge into denial [30]. For those that could not afford a painted portrait, a photograph represented the less expensive and almost providential opportunity to keep the loved one “at home” (Fig. 4.18). With very high mortality rates, it is no surprise that many of these photographs were of children. Bereavement photography of neonates, stillbirths, and children is still done to help in the grieving process (see Annex IMI Guidelines on Bereavement Photography (neonates, stillbirths and children) [31].
4.7 Medical Photography During War Time

Depiction of military medicine was another common use of the first years of medical photography. From 1861 to 1865, American Civil War [32] and later World War I (1914–1918) veterans were photographed in all the crudeness of their facial disfigurement and amputations. These pictures transformed patients into cases by objectifying their bodies [33]. They are living testimonies of the absurdity of war and the power of institutions on the bodies of soldiers. The use of photographs to register “medical conditions” used by the Nazis during WWII is another example of cruelty beyond description that left a testimony for trials and has become part of our collective memory.

Facial disfigurement occurring during War World I was very common. In Britain, the medical photographs from these patients were almost never shown outside the professional context of clinical medicine. Birnoff’s believes it to be the result of British aversion to disfigurement. The worst loss was the loss of one’s face as it was perceived as a loss of humanity [35].

4.8 Photobook and the Media

Roland Barthes, the French philosopher, believed that a photograph implied meanings and had the unique potential for presenting a complete and real representation of the world. He believed a photograph was a message [4] and not simply a “product or a channel but also an object endowed with structural autonomy” [4].

Medical photographs have been tightly intertwined in generating scientific, social, and cultural changes. An example can be found in the AIDS epidemic. The changes brought by HIV included the reshaping of conventional wisdoms in public health, research practice, cultural attitudes, and social behaviors [36]. The rapid development of effective treatments could not have occurred without activists and participation of patients. Photography was able to put “a face” to a disease, making affected people visible not only to the scientific world but also to the general public [37]. This was the case of the renowned images taken by photographer Therese Frare and her moving work with David Kirby and Peta (Fig. 4.19).

Some of the first dermatological atlases stigmatized the disease: AIDS-related photographs included in their legend information on sexual identity and age of the patient stating the relevance of these two pieces of information. This
addendum of information which was otherwise not present in the image generated a classification of the disease into “the narrative of a highly problematic re-medicalization of homosexuality in the course of the early years of the AIDS epidemic” [38]. Photographs were almost always of white young homosexual men. They generated a connection even when the causes of the disease were not still completely understood. This “inherent” relation of AIDS-male homosexuality was later removed from captures presented in atlases. If, as Dalton and Galison point out, atlases “set the standards of a science in word, image, and deed” [5], it is also true that reconstituting histories from archives that were produced to do instrumental jobs becomes a risk [39].

Another interesting case of photobook which had an important social impact was Morire di classe (In English, To die because of your class) authored by Franco and Franca Basaglia with photographs by Carla Cerati and Gianni Berengo Gardin (Fig. 4.20). The pictures of institutionalized patients in psychiatric hospitals in several cities in Italy were able to show the pain, poverty, the suffering, and the imposition. They showed the violence on psychiatric patients as objects forcefully isolated into an asylum but also the violence of a society that does not want to see mental health and secludes individuals particularly those belonging to the poorest social class [40]. This book is part of the history of medical photography as it flattened the way for future photographers [41] and social denouncing of unacceptable medical situations.
4.9 Women and Photography

Throughout history, women have been made invisible. The photography profession is no exception. From the very beginning, orthodox medicine used photography to represent itself creating a stereotyped medical image [42]. In this realm, there was no place for women doctors as doctors were always white men; women were always nurses or psychiatric patients.

The first portrait photography took conventions from art and domestic scenes. Nurses were frequently depicted working alone, “much as housewives did,” or holding children. In the “family” pictures, they stood around male doctors. Depending on the period, they were placed standing behind or sitting on the sides.

If this was the imaginary for photographs of women in medicine, their recognition as photographers was not much more flattering. Names like Anna Atkins or Julia Margaret Cameron rarely appear in histories of medical photography. Another example is Lady Elizabeth Eastlake (1809–1893), an art historian, critic, writer, and pioneer of female journalism, who wrote in 1857 an essay under the title “Photography,” for The London Quarterly Review (No. 101, April 1857, pp. 442–468) where she summarizes the scientific beginnings of photography [43].

Marginalized was also X-ray crystallographer Rosalind Franklin (1920–1958) who in 1951 was responsible for the image nicknamed “Photo 51” that was shot by her PhD Student Raymond Gosling. This photo allowed her to deduce the basic dimensions of DNA strands to demonstrate that phosphates were on the outside of what was probably a helical structure. The image was shown to Watson J without her consent. He found in this image the missing piece of the puzzle to formulate the hypothesis on the nature of DNA, which later gave him and others the Nobel Prize in Medicine [44, 45].

In 2019, 29-year-old computer science doctor Katherine Louise Bouman contributed in the development and application of the algorithm called Continuous High-Resolution Image Reconstruction using Patch priors (CHIRP) which allowed to photograph for the first time a black hole (Fig. 4.21), a halo of dust, and gas found 500 million trillion km from Earth [46]. This image has revolutionized our understanding of one of the great mysteries of the universe [47].

As a curious note, 55 years before Bouman’s achievement, the first digital camera was taking pictures from Mariner IV (1964), 5 years before Neil Armstrong stepped on the Moon. Those pictures were first taken by an analogical camera and converted into digital by a technology that does not exist anymore, the Vidicon tube (later substituted by the CCD sensor). The spaceship took 9 days to transmit the images. Decoding was so slow that the NASA team decided to hand-paint the first photo as they received the information! [48, 49]. A story worthy of an episode in the 1966 TV series Time Tunnel: “Travelling to the time of the first hand paint Atlases”! Again, science and art shaking hands (Fig. 4.22).

Fig. 4.21 Left: Rosalind Franklin (Reproduced with permission from Encyclopedia Britannica, Jewish Chronicle Archive/Heritage-Images) and right: Katie Bouman (Courtesy of National Science Foundation Multimedia gallery, All rights reserved)
4.10 The Undefined Limits Between Science and Art

The confluence of science and art has left us with uncertain boundaries where we can find “artistic” scientific images and “scientific” artistic images.

Standardization of medical photography pretends, among other, to define such limits; however, the use of black backdrops, the light concentrated on the subject, and the sharp contrasts seemed borrowed from chiaroscuro Caravaggio techniques of art. Using elements from scientific standardization, artists have produced extreme artistic images from nature. One such example is French photographer Pascal Goet (Fig. 4.23) and his photographs of bugs for his collection “Mask & Totem,” where he found human symbolism represented in the colored patterns of insects. Each bug represents an imaginary mask, “a cultural bridge between our world and the world of insects” [50]. Photographs by plastic surgeon and photographer David Teplica [51] are another example of a confluence of art and science.
In the mid-twentieth century, photographer Lejaren Hiller Sr (1880–1969) was commissioned by the surgical/medical device company Davis and Geck to produce prints for a series called “Surgery through the Ages.” These were pictorialist style of art photography that recreated medical scenes from posed photographs. Some of these scenes were also recreated by photographer Valentino Serra (1903–1982). These images were used to illustrate journals and became very popular, to the point of requiring reprinting of some journals to sell to those who wanted an extra copy. A possible explanation for these popularities was the fact that humanism was interpreted as the mark of a good physician [52].

In a publication in 2016, Aberer E et al. [53] used photography to document expression of human emotions. They photographed six individuals with different skin conditions: ichthyosis, psoriasis, exanthema, and skin cancer. The patients were asked to express their current emotions on a picture. They aimed at “objectivizing” patient’s emotions by re-labeling the photographs as “discouraged,” “mourning,” “the scream” [53]. It could be argued that patients are asked to pose; however, these photographs are “capturing” their expectations which could or could not correspond to their real feelings. A further bias is the third-person interpretation of such information. It is still an interesting XXI century attempt to register mental conditions using photography as a technical instrument. It reopens the debate of “objectivizing subjectivity” and the continuous merge of science and art.

Anthea Gordon in her paper on Marlene Dumas, states that “medical photography, and in particular dermatological imagery, is often assumed to provide an objective, and functional, representation of disease and that it can act as a diagnostic aid. By contrast, artistic conceptions of the images of the body tend to focus on interpretative heterogeneity and ambiguity, aiming to create or explore meaning rather than enact a particular function” [6].

She brings this point to introduce us into the work of South-African artist Marlene Dumas (based in Amsterdam) that created some of her artwork from medical photographs. Gordon questions the assumption of photographic objectivity to “suggest that there is greater complexity and interpretative scope in dermatological images than might initially be assumed” [6].

Dumas’s paints from photographs bring together the scientific attitude of a visual representation with the artistic one. The painting Dead Marilyn (2008) is based on an autopsy photograph of Marilyn Monroe which serves as a death certificate and objectivizes this moment. This portrait is “evidence”: it is provoking way to confront us (the observers) with our mental image of Marilyn. “Secondhand image generating a first-hand emotion” [54]. By confronting us with a represented photograph of a patient with a skin condition, Dumas reverse our expectations and shows how a skin disease has a psychological burden and how an image of a physical illness represents a psychological condition [6] (Fig. 4.24).

Dr. Hector Padula, a Venezuelan photographer and anesthesiologist, is the author of IPA WAYUMI, a photobook that delves into the life of the Yanomami people, in the Upper Orinoco. He went to work with this group, in the Venezuelan Amazon, 30 years ago, over a period of 2 years. He started taking photographs of his work with the only intention of “stopping time,” the preservation of the instant. His photographs transcend mere medical documentation and still illustrate medical conditions. Through his art, it delivers a powerful message of awareness filled with empathy (Fig. 4.25) [55].
Photography, archive, and memory are intimately
tied. Memory and photography both
involve the process of recording images that may
be used to recall the past [56].

There are numerous medical archives world-
wide, and they have been presented in different
formats: paintings, photographs, wax molds,
sculptures, audio recordings, films, text-based
archives, and manuscripts. Some are available
online, others are digitalized but not available on
the website, and some are still visible in their
original formats. They can be found in specialized
museum or libraries as well as in public and pri-
vate collections; access is sometimes allowed to
the general audiences; in others, only physicians/
historians/curators are permitted to access them.
Medical imaging archives have always been a
precious source of learning, from the first atlases
by Vesalius to the modern photographic digital
anatomy found in the “Visible Human Project”
which contains hundreds of cross-sectional pho-
tographs of the human body, taken to facilitate
anatomy visualization applications (Fig. 4.26).

Medical photographic iconography is to be
found as daguerreotypes, painted photographs,
or wood engravings done after a photograph,
just to mention a few. One such collection is
the Wellcome Collection [57] in London,
which is one of the world’s major resources for the study of medical history and the medical humanities.

Photographs can be used as a historical record of the “how it was” giving us a new understanding of the past [42]. But looking at these photographic collections from the past is also prying into someone’s intimate moments. That picture was most surely taken without the consent of the person involved, of a person that is now probably deceased. Even if the consent was actively sought, it was usually not specified the use, and it was obtained mostly for upper-class patients. Probably, low social status background, minorities, mentally impaired, and many women were not even asked. Protecting the patient’s privacy followed historical, social, and cultural conventions including issues of which anatomical area could be exposed. In clinical photography, power has always played an important role [58]. In fact, it was not until 1957 that the term “informed consent” was first used but needed 10 more years to become established as a standard of care [59].

Did we have the right to take those pictures in the first place? Do we have the right to expose those pictures to the general public? These photographs give information on the physical and mental state of a human being, and since many pictures were taken of the rarity—the freaks—they end up exposed in a circus-like fashion. This is the reason why these collections have been labeled by historians and curators as “sensitive” collections [58, 60].

In the case of the Wellcome Library, they have engaged with this problem by developing a practical policy on research access to personal data present in their collection [61]; approximately 50% can only be viewed by application as images taken in the late nineteenth century and the person in the photograph certainly deceased, fall outside the scope of the Data Protection Act (DPA). The Wellcome Trust policy commits to assessing the data for sensitivity from an ethical perspective: unrecognizable images are made openly accessible (within the library), and the recognizable images available have restricted access. They are conscious of the possible risk of “censorship.” Others, like Michael Sappol, from the US National Library of Medicine believes instead in free access to all medical photographs [62]. Facilitating non-medical audiences to view the medical past iconography as mere source of curios objects and give free entrance into peoples’ privacy does has its consequences. The suffering of some becomes the entertainment of others. The audience is a “voyeurs.” Exposing others afflictions can be a form of visual violence. The appropriation of such images to be used to create monsters for the entertainment of gamers shows lack of empathy and the exploitation of the shock value of a disfigured face or body [62]. As Susan Sontag would say: “Our failure is one of imagination, of empathy:
we have failed to hold this reality in mind” [63]. In the video game BioShock (2007), part of its disturbing artwork was based on digitalized disfigured World War I veterans. Biernoff S states in her paper on Medical Archives and Digital Culture that moral choices and consequences are built into the game and the use of recognizable suffering individuals for the sake of entertainment can only be a perverse transgression of the pledge not to forget [64].

For Tagg J, the camera is never neutral: photographing “abnormal” physiognomies of patients becomes a burden of subjection. The archive of repetitive images is an accumulation in which “the smallest deviations may be noted, classified and filed” [12].

And still, museum exhibitions of clinical photographs can be the opportunity to bear witness of difficult experiences and help in the understanding of human suffering [58].

Can we as medical photographers of the present guarantee that our patient’s images will not be part of a BioShock videogame of the future?

4.12 The Coronavirus Pandemic

In 1963, a young and bright Scottish woman by the name of June Dalziel Almeida (Fig. 4.27) pioneered a technique to better visualize viruses. She used antibodies to aggregate the virus in a technique called immune electron microscopy (IEM) [65]. By 1966, June Almeida and David Tyrell identified a group of viruses that were causing respiratory conditions. Together with Tony Waterson named the newly discovered creatures, coronavirus [66]. Prof. Hugh Pennington declared to the Herald (March 2020) that “without her pioneering work things would be slower in dealing with the current coronavirus outbreak. Her work has speeded up our understanding of the virus” [67]. Her immune electron microscopy (IEM) innovations and insights contributed not only in the coronavirus research but also in diagnosing diseases like hepatitis B, HIV, and rubella. Her electron micrographs and her technique were and still are used. Time has shown how much we owe to her work (Figs. 4.28 and 4.29).


4.13 Conclusions

Photography has changed the way we see the world. It generated a complete change in paradigms, transforming information, democratizing knowledge, changing the perceptive toward patients and their health, and empowering those who posses the images over the subjects. This brief history is just a few brush strokes of a complex relationship whose impact we are still witnessing. We hope this introduction has drawn the path to the amazing world of medical photography.

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