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Revelations of science: discussing images of prenatal development by Ernst Haeckel and Lennart Nilsson

"This is like the first look at the back side of the moon" – exclaimed a leading Swedish gynecologist upon first seeing Lennart Nilsson's photo series representing the development of a human fetus from the moment of fertilization up to birth: "a strangely beautiful and scientifically unique color essay", reported the editor-in-chief of *Life* magazine, George P. Hunt, in his editorial to the issue of 30 April 1965, memorable precisely for Nilsson's photographs (Hunt, 1965, p. 3). Almost exactly a century before, in his bestselling book *Natürliche Schöpfungsgeschichte* published for the first time in 1868, its author, Ernst Haeckel, wrote: "The facts of embryology alone would be sufficient to solve the question of man's position in nature, which is the highest of all problems" (Haeckel, 1876, p. 294). We would acquire knowledge of those facts to a large extent by virtue of "visual" knowledge: by viewing Haeckel's illustrations of the consecutive stages of human and animal embryogenesis, which the contemporary researcher Nick Hopwood described as the "first public embryo spectacle" (Hopwood, 2015, p. 5).

It may seem far-fetched to bring together images representing prenatal development of man created by a 19th-century biologist and philosopher of nature on the one hand and by a 20th-century photographer on the other. They differ in profession, in the applied media, as well as in the context in which their images appeared. The century of development of science which separates them seems to have been very significant for the practices of scientific imaging. In my article, I do not intend to undermine those differences nor call them into doubt. On the contrary, emphasizing the difference between Haeckel's and Nilsson's images,

even just in terms of the media they used, will be of important interpretative value. At the same time, it is impossible to overlook certain fundamental and, from the viewpoint of the history of culture, extremely significant similarities. Both visual series situate the human embryo at the center of the reflection on reality, which reaches far beyond biological or medical knowledge on embryo- and organogenesis. In both cases, the images gain popularity among a mass audience, though at the same time that popularity is directly related to the much underscored knowledge of their scientific origin. Both series are closely related to the modern cult of scientific visibility and they are created by men personifying scientific or technological authority. Finally, both Haeckel's drawings and Nilsson's photographs faced serious accusations about the process of their production as well as about the information which they conveyed, and those accusations constitute a sort of additional background to their past and present reception.

In this article, I will compare the nature and the mode of functioning of Ernst Haeckel's and Lennart Nilsson's images of embryos and fetuses from the perspective of the similarities and differences mentioned above. It should be underscored that both Haeckel and Nilsson created a substantial number of different embryo and fetal images that were subsequently published in books, the press or online (Nilsson is also author of pregnancy photographs and co-author of educational movies). To narrow the broad and differentiated material, I will concentrate on original images in Haeckel's books (especially different editions of *Natürliche Schöpfungsgeschichte*), published within the verbal discourse forged by Haeckel himself, and on early (and most influential) publications of Nilsson's photographs – in *Life* magazine (1965 and 1966, commented on respectively by A. Rosenfeld and E. Graves) and in the book *A Child is Born* with a verbal description by Axel Ingelman-Sundberg and Claes Wirsén (many editions beginning in 1965; for more specific quotations I consult the Polish edition, see Nilsson et al. 1985).

The first part of the text will be dedicated to the concrete actions which make it possible to render the embryo visible through media: in this respect, both Haeckel and Nilsson find themselves on the verge of science and art (understood very traditionally as creating beautiful objects), forming a visually attractive object out of amorphous material, at times imperceptible to the naked eye. In the second part, the mediatic and interpretative frame within which the images of fetuses are produced and function will be of key importance. It is that frame of interpretation which provides the new "living environment" of imagined embryos and fetuses, and although the frame is different in both of the studied cases, the fact of its creation is very much comparable. Finally, the third part of

the article will be dedicated to the identities of the embryos of Haeckel and Nilsson, which became heroes of culture; it will also trigger the notion of the identity of a pregnant woman. Through this analysis of the mechanism of production and the functioning of the images, I will be able to reconstruct the metaphysical ambitions of both narrations and the relationship between them and the cultural frame of their respective times.

Masters of representation or else how to see an embryo

Both Ernst Haeckel, born in 1834 in Potsdam, and Lennart Nilsson, born in 1922 in Strängnäs in Sweden, were true children of their respective times; however they were both also true sons of the sight-centered Western culture and of Renaissance, with its important relationship between art and science (see for example Panofsky, 1991, p. 66). On the other hand, 19th and 20th century interest in real anatomy and physiology of sight and on new technologies of seeing through the mediation of machines (see Crary, 1990) also remained an important background for their work.

In her book on the cultural changes in perception of pregnancy and the fetus, Barbara Duden states that it was Leonardo da Vinci who "introduced the notion that the skin can be rendered transparent": "In one of his commentaries he notes that he draws to discover with his eyes, because otherwise he cannot see what his handiwork later reveals to him" (1993, p. 44). However, according to Nick Hopwood it was only by the end of the 18th century, when German universities welcomed a more visual and practical approach, allowing their students to draw from nature rather than to learn from lectures (Hopwood, 2015, p. 32). In Haeckel's biography, contrived by Hopwood, two junctions are distinctly present: the necessity to combine the ideal of the empirical visibility with the existence of a theory or knowledge which only makes it possible to perceive the reality as meaningful (2015, p. 87) and the intertwining of science and art (2015, p. 53). This artistic vocation was obvious for his contemporaries. "Haeckel is a learned naturalist and a painter-esthete" – wrote the Polish translator of Haeckel, Maks Rosenfeld (Haeckel, 1906, pp. 12-13). This complexity renders Haeckel's view of the world of nature somewhat absolute and supports his metaphysical ambitions.

As rich as Haeckel's legacy in the area of nature drawings might be, the most famous of those drawings form together a grid representing embryos of various animals and human embryos in different stages of embryogenesis. These famous grids appeared in the early editions of *Natürliche Schopfüngsgechichte* in a less expanded form, featuring turtle, chick, dog and human embryos in two stages of development (Hopwood 2015, p. 83). With time, they became more

and more elaborate, in *Anthropogenie* (many editions from 1874 onwards) and *Natürliche Schopfüngsgechichte* (see Hopwood 2015, pp. 145–170); for example, in the eleventh edition of *Natürliche Schopfüngsgechichte* from 1909, the animals are an echidna, marsupial, red deer, cat and monkey shown in three stages of development (Haeckel, 1909). Such a layout of drawings was supposed to make visible to the readers the extraordinary similarity between embryos of various species in the early stage of their development, and their slow differentiation as they grow, which gradually indicates their identity as a species. While it indeed requires no effort to notice the similarity between the images of a human embryo and an embryo of echidna or dog in the mentioned grids, in relation to the even earlier stages of development (also graphically represented) Haeckel speaks overtly of embryos as identical or indistinguishable. This indistinguishability rendered thus visible aimed to convince the readers, scientists as well as laypeople, that man is an inseparable part of the realm of nature; and also, that in a female womb the same process takes place as that in the history of the origin of species. A single embryo in its development exhibits certain characteristics that are proper to adult stages of its ancestors. This hypothesis, already present in scientific circles, was summarized in Haeckel's phrase: "ontogeny repeats phylogeny", or, in other words, the process of development of a single creature follows the stages of development of the entire species.

In Haeckel's times, embryologists obtained the study material from natural and induced miscarriages, thanks to cooperation with doctors and midwives (see Hopwood, 2012). The smallest specimens were of no more than four millimeters in length – Hopwood describes the fascinating method of dissecting embryos created by Wilhelm His, an embryologist contemporary to Haeckel and at the same time his rival and ardent critic: It was "a long sequence of intellectual and physical transformations that turned nondescript material into a set of vivid images" – states Hopwood (2012, p. 15). As for Haeckel, he drew "the specimens in the Jena collections and synthesized his views of pictures in the literature to represent types" (Hopwood, 2015, p. 73). Upon publication of his drawings, the naturalist worked in close co-operation with lithographers, providing them with detailed guidelines to each illustration, to achieve a particularly appealing visual form.

It was the conjunction of empirical visibility and audacious research, together with the evolutionist theoretical frame that rendered the professor from Jena genuinely famous. I shall comment on this fame later on within this text, as well as on the indeed astounding popularity of the photographic images of Lennart Nilsson. The issue of *Life* magazine, featuring the images of the Swedish pioneer

of macrophotography, sold eight million copies and the book *A Child Is Born* (first published in Sweden in October 1965 with the title *Ett barn blir till*, later on translated and published throughout the world in tens of millions of copies), which benefited from the success of the magazine, became the best-selling photo album ever in history[1].

Lennart Nilsson was employed by the Swedish publishing house Bonnier and worked in Sabbatsberg hospital belonging to the Stockholm polyclinic Karolinska Institutet (see Jülich, 2015). Just like embryologists in the times of Ernst Haeckel, he was also imaging embryos and fetuses coming from miscarriages and abortions: in the famous photographical essay in *Life* magazine only one photograph was executed indeed within a woman's body by use of endoscopic techniques; no such photograph was included in the first edition of *A Child Is Born*. And in this case it was also necessary to perform a radical visual transformation of the original material. Bo Tolander, a co-producer of Nilsson's album delegated from Bonnier publishing house, said that the embryos on which Nilsson worked "were not really beautiful; there was «a little bit of gray, a little bit of blood»" (Jülich, 2015, p. 509). In order to achieve the intended aesthetic effect, the photographer cooperated with a famous retoucher to modify colors or to remove "reflections from flashes and other light sources" (p. 509). Nilsson arranged the bodily positions of embryos and fetuses and added the famous nebular stylistic which made them seem as if they were floating in cosmic space.

George P. Hunt, *Life*'s editor-in-chief, wrote in the editorial to the issue that Nilsson's work was "not only photographically exciting but scientifically valid" (1965, p. 3). "Being able to view the fetus inside the uterus, and being able to note its circulatory details, is rather sensational from our point of view" – another doctor, also cited by Hunt without credit, was reported to have said (1965, p. 3). Nilsson himself was presented by the editor, on the one hand, as a versatile photographer, in constant cooperation with, for instance, Ingmar Bergman; while on the other, in relation to the presented series perhaps above all – as a tenacious and talented researcher of natural science. "His two books on ants and on *Life in the Sea* are classic examples of patience, photographic skill and a dogged determination to record living cells and animals in their natural surroundings" – wrote Hunt.

Historically, the most famous visualizations of prenatal development – the one authored by Ernst Haeckel and the one photographed by Lennart Nilsson – are connected by an atmosphere of scandal related both to the very use of media

[1] Or so claims Wikipedia, following an article in *The Times* magazine, see https://en.wikipedia.org/wiki/A_Child_Is_Born_(book), (accessed October 30, 2019). For more information on the popularity of Nilsson's photographs, see among others Stormer, 2008, p. 647.

(drawing and photography, respectively) and to the relationship of the image and the word constituting its interpretation. In both cases, the manipulation was clear and manifest, while at the same time – paradoxically – bashfully concealed.

Haeckel's presentation of the theory of recapitulation was based precisely on visual evidence: on establishing and analyzing the appearance of embryos of various animal species and of man. Haeckel emphasized their extraordinary resemblance, yet the methods he used to picture them raised doubts. The purpose of his drawings was to create a representation that would stay in harmony with the verbal discourse of his theory; in Hopwood's reconstruction of Haeckel's practice, he "silently downplayed or even removed esoteric structures that distracted from his point" and simultaneously "worked hard for vivid effect" (2015, p. 76). But the most glaring example of doubtful (if not simply fraudulent) procedure was the use in the first edition of *Natürliche Schöpfungsgeschichte* of the same woodblock to illustrate the very early stages of development of a dog, chicken and turtle (see Hopwood, 2015, p. 80-81). In a peculiar gesture of both confirmation and negation, Haeckel at the same time admitted to having applied the procedure and rebutted the charges of manipulation – for the embryos were indeed, in his opinion, identical (see Richards, 2009, p. 153). Although he did not repeat this procedure in subsequent editions of the book, the dispute whether his general drawing practices meant an intentional breach of the accepted scientific practices of the day was never quite resolved (see Richards, 2009), which also seems to indicate how the naïve and idealistic view of "scientific" representation was never functional within the actual practices of science.

The "scandal" connected with Lennart Nilsson's photographs has a different turn, for their scientific aura, though underscored, remains purely declaratory: it is hard to say what "scientific" questions Nilsson's photographs could offer an answer for. Descriptions of the photographer's work and of the motivations behind it indicate, on the one hand, a desire to show the processes of embryo- and ontogenesis in a better – more colorful, more spectacular and technologically advanced – way. The scientific precision of the process as a whole was less important, since, as Solveig Jülich reconstructs it, Claes Wirsén, who provided descriptions of the development of the photographs, had to define by himself the age of the embryos – Nilsson did not conduct a diary of his works (Jülich, 2015, p. 508). On the other hand, those descriptions suggest the photographer's guiding need to illuminate the mass public in the domain of embryology. In order to do it, Nilsson had to – once again in the history of science and visual culture – define a fetus and create its identity. And this procedure has an unequivocal ideological leaning.

In an article commemorating Nilsson, published recently in *The Guardian*, the late photographer (Lennart Nilsson died in 2017) is remembered as working in Sweden and in isolation from the moral and ideological debates of his time and thus unaware that his images were broadly used in anti-abortion movements throughout Europe and the USA. This fact left him "deeply shocked" only years later (Jansen, 2019). But, quite in contrast to that opinion, Solveig Jülich quotes Nilsson's interview for the Swedish press (from before the publication of *A Child is Born*), where the photographer openly admits that "he was hoping his images of embryos would «prevent many unnecessary abortions»" (Jülich, 2015, p. 506). To achieve that effect, he presented dead embryos and fetuses so as to make them seem alive and visually attractive and in the book *A Child is Born* the fact that the fetuses and embryos were removed from the womb was not mentioned. This agenda seemed to be clear for the first readers of Nilsson's book. Lars Engström, Wirsén and Ingelman-Sundberg's colleague from Karolinska Institutet, called the book "anti-abortion propaganda, lightly disguised" (Jülich, 2015, p. 519). Engström criticized the way the embryos were portrayed, as well as the fact that the origins of Nilsson's models were concealed, and even the sole fact of visualization of the embryos for the benefit of the future mothers, whose original "relation to the expected children had an emotional and physical basis – not a visual one" (p. 519). These charges anticipate the body of later feminist critique of Nilsson's photographs (see e.g. Duden, 1993, Franklin et al. 2000).

The slightly old-fashioned model of artist-scientist, who uncovers the truth of nature before the very eyes of an astonished public, also fits neatly in discourses around Nilsson's photographs. This cult of visibility, so crucial a part of our heritage, seems to be of a special significance for the question of cultural understanding of pregnancy and fetal life (see Petchesky, 1987), because it was responsible for turning a scientifically and technologically constructed embryo into an important figure of public discourse. Both Haeckel and Nilsson created – in their respective times and using different mediatic means – the new embryo identities. In what follows, I shall examine both these means and the identities.

The Medium/The Frame

When I write "medium" and "frame", I am thinking of a couple of different issues. The first one is the media specificity of the images themselves: Haeckel's drawings and Nilsson's photographs. The second one is the metaphorically understood frame, constituted for Nilsson's and Haeckel's images by their media environment; including, obviously, the verbal discourse in which they are inscribed. The final issue is the half-metaphorical, half-concrete space

within which those images situate their heroes, the embryos and fetuses. Nathan Stormer, who analyzed images by Lennart Nilsson and Alexander Tsiaras (the author of photographs and visualizations published in 2002 in the album *From Conception to Birth*, modelled on Nilsson's photo series, with a verbal description by Barry Werth[2]), writes about a "prenatal space" which they create and which "functions as a visual in-between, a heterotopic commonplace for discourses on life's order" (Stormer, 2008, p. 650). Although Stormer does not mention Ernst Haeckel in his article, he does refer to the earlier tradition of a fetus's visualization and treats Nilsson as a proponent of (albeit very roughly understood) theory of recapitulation[3], which places the human embryo at the very center of discussion on the natural and metaphysical order of reality.

The direct environment within which Haeckel's drawings function would today be described as a popular science environment. Printed in tens of editions of Haeckel's books, reprinted and caricatured in daily newspapers, they reached perhaps not as much a mass audience (for it is hard to speak of a mass audience at that time), as educated, aspiring circles. Maks Rosenfeld wrote about Haeckel in 1906 that he belongs "to those rare German scientists who are proudly perceived as heroes by the whole of Germany, and who have managed to gain the highest popularity throughout the world" (Haeckel, 1906, p. 9). The subtitle to *Natürliche Schöpfungsgeschichte* presents the book as "gemeinverständliche wissenschaftliche Vorträge", which should be translated as "commonly understandable scientific lectures." Those lectures, as their author emphasized time and again (see Haeckel, 1876), were supposed to dissipate the ignorance of the sensible readers who were but lacking in knowledge. It was in such publications that Haeckel explained to laymen the meaning of his drawings, in which he would compare the external appearance of human embryos and of various animal embryos, as well as trace the initial stages of their development. As was written by one of the witnesses of the age, "*Natürliche Schöpfungsgeschichte* is read in thousands of copies by the widest circles. Every educated man who progresses with the spirit of his century is today expected to know what a four-week dog embryo looks like" (Hopwood, 2015, p. 129).

[2] Stormer decides to consider in his paper the whole body of works by Nilsson and Tsiaras and also to treat the photographers as the sole (or at least the most important) authors of their work, not mentioning the authors of the verbal discourse. These decisions renders his reflection at times less precise: for example when he writes about the absence of abnormalities within Nilsson's narration (p. 667) he forgets the 1990 edition of *A Child Is Born* with the verbal commentary by Lars Hamberger, where these issues (such as fetal abnormalities, abortion or infertility) are also addressed, albeit very gently (see Nilsson et. al., 1995).

[3] Especially in the book editions the literal understanding of Haeckelian theory is turned down by the verbal commentary of Axel Ingelman-Sundberg and Lars Hamberger, see Nilsson et al., 1985, p. 50-51, 1990, p. 74; but the visual similarities between embryos of humans and other vertebrates are commented on. They are also very important within the movies featuring Nilsson's photographs, however, within this article I shall not discuss them.

As for *Life* magazine, in which Nilsson's photographs first appeared, in the mid-1960s it would offer his readers colorful photos of political councils, wars, sport events, catastrophes and natural curiosities. Richly illustrated texts are placed side by side with a huge number of visually attractive advertisements. Such an environment seems to be an embodiment of Susan Sontag's reflection included in *On Photography* (Sontag, 1977): in line with that reflection, we could treat the female womb, in which the process of embryo- and organogenesis is enacted, as yet another place which the reporters managed to reach with their cameras in their endeavor to catalog the entire visible world. However, if Nilsson's photo essay (announced in the editorial as the main attraction of the issue), along with the accompanying description by *Life*'s science editor, Albert Rosenfeld, can be read as a journalistic photo report, it is only one possible interpretation. The photo series also constitutes a snap from the world of science presented to the laymen ("By studying pictures like these, embryologists get a deeper and more detailed understanding of life before birth", Rosenfeld, 1965), and also aesthetic pleasure, announced both by the title ("an unprecedented photographic feat") and the language of the description, according to which the photographs are "strikingly complete in their clinical detail, but at the same time strangely beautiful" (Rosenfeld, 1965). Indeed, the reader is encouraged, as I see it, to navigate between these two orders: while satisfying their curiosity, they experience at the same time an aesthetic emotion, perhaps with a feeling of ennoblement by being granted access to the narrow circle of embryology specialists. It is even clearer in the book, where Axel Ingelman-Sundberg underlines the need to dissipate widespread and erroneous opinions about prenatal life (Nilsson et. al., 1985, p. 5). By the same token the readers of Haeckel, who deplored the fact that the "most important biological facts" are not known to "so-called «educated circles»" (Haeckel, 1876, p. 294), may have experienced the same feeling of being included in the circles of the scientific community.

However, to situate Haeckel's and Nilsson's images within the narrations they were immersed in, one needs to invoke their respective media specificity. I have already mentioned Susan Sontag, for, indeed, Nilsson's photographs belong to the cultural period very well encompassed by her analysis. The same might be said about Roland Barthes' classical text *Photographic Message*[4]. According to Barthes, the difference between the contemporary (to Lennart Nilsson, for Barthes' text comes from 1961) relationship of image and text and their earlier, historical relationship, is the role reversal; text is no more primary, but secondary

[4] The usefulness of Barthes' reflection for the analysis of cultural functioning of fetal photographs (including those by Nilsson) was already proven by Rosalind Pollack Petchesky (see Petchesky 1987) and Sarah S. Lochlann Jain (see Lochlann Jain 1998).

to an image, which it parasitizes, taking advantage of its denotation (see Barthes, 1982, p. 204). "Formerly, the image illustrated the text (made it clearer); today, the text loads the image, burdening it with a culture, a moral, an imagination […]"; and concurrently, for the photographic message "the text is only a kind of secondary vibration, almost without consequence" (p. 205). This is why, as the readers of *Life* and *A Child Is Born* feel it, Nilsson's images speak for themselves, conveying the truth about prenatal life, while everything else is merely a commentary. Haeckel, indeed, also made use of visual evidence, yet his understanding of visibility was still at least as close to actual seeing, as to the metaphorical mind's eye; which would make the illustrations in his books, however important and audacious, secondary to the verbal narration.

In Haeckel's times, embryology, which up till then had enjoyed little prestige, had grown into a science of such importance that, as Nick Hopwood wrote, during lectures in that field students either confirmed or doubted their religious beliefs (see Hopwood, 2015, p. 40). The actual, physical space where the embryogenesis takes place – the uterus – acquires important symbolical connotations. "As a static, mechanical universe gave way to a huge, organismic cosmos, adult anatomy seemed dead and artificial. The origin and development of embryos – embryogenesis – became the model for a nature pregnant with series on series of forms" – wrote Hopwood (2015, p. 12). This transformation was of course directly connected with the publication in 1859 of *On the Origin of Species*. Haeckel, as one of the main propagators of Darwinism[5], was at the same time the author of its metaphysical interpretation, according to which a personal Creator is to be substituted by deified Nature.

> Haeckelian monism is meant to be the missing-link between religion and knowledge, it is to content the reason, to satisfy the heart, it is to be a true, ethical and aesthetical principle. Goodness, truth, beauty – this is the monistic trinity. All three can be attributed to God-Nature. Thus, Haeckel's religion is the religion of Bruno, Spinoza and Goethe, stated Maks Rosenfeld (Haeckel, 1906, p. 12).

This particular romantic and enlightened paradigm leads the German natural scientist to describe embryogenesis as "wonderful" and "astonishing" (Haeckel, 1876, p. 308-309), precisely because of the fact that within the scope of a few months it repeats that which evolution required millions of years to accomplish.

The assertion of wonderfulness of individual ontogenesis in its early, embryonic stage, emerges in full strength on the pages of *Natürliche Schöpfungsgeschichte*. It is

[5] See M. Rosenfeld in: Haeckel 1906, p. 10.

also brought up by Nathan Stormer, who speaking about Nilsson and about Tsiaras' book, points to the category of "wonder" that may be deduced from the romantic reading of the sublime (p. 653). According to Stormer, the aesthetic impact of the images of Nilsson and Tsiaras is characterized by its specific variant – a "prenatal sublimity" – since that which is small and fragile collides there with that which is infinitely great. In Nilsson's photographs this colliding is rendered visible by, on the one hand, their cosmic staffage. Floating in the cosmic blackness, the delicate, radiant silhouettes of fetuses are encompassed with nebular structures described by Stormer as a "star field" (p. 654). In the same manner – as stars – Claes Wirsén describes a "mother's blood cells and crystals of salt in the amniotic fluid" in the album *A Child Is Born*, comparing also the fetus to an astronaut (Nilsson et al., 1985, p. 87). This association, similarly to the comparison of viewing fetuses and embryos as looking at "the back side of the moon", is deeply ingrained in the sensitivity of the public of those days, who only six years beforehand had had a chance to see the first true photographs of that area, thanks to the Soviet space probe Luna 3. That Lennart Nilsson's fetal images should be viewed precisely in the context of the images of cosmic explorations has already been discussed by, among others, Barbara Duden and Sarah Franklin[6].

On the other hand, the "prenatal sublime" is made possible by means of inscribing the individual present moment of the embryonal body in the infinity of time. Stormer underscores evolutionist references in the works of Nilsson and Tsiaras:

> the whole of life is hinted at by a black vortex, a galaxy, a human embryo not unlike a fish embryo, and… Infinity and eternity lie just beyond a perfect blastocyst floating down to the surface of the uterus. The cobbled-together singularity of the unborn stands at the cusp of unimaginable multiplicity: life from its first moment, in every being ever on this planet and throughout all the cosmos (Stormer 2008, p. 663).

According to the definition, the pleasure accompanying the experience of the sublime has a "negative" nature: it results from contact with something that arouses anxiety, threatening – be it only in our imagination – with the destruction of individual identity, its disintegration within the infinite and surpassing human comprehension reality (see Kant, 2004). It is possible, as Stormer recapitulates it, to overcome this feeling "by the superiority of reason. What is overwhelming in its own right is contained, thus elevating the self" (Stormer 2008, p. 657). But Stormer refers further to the romantic understanding of the sublime,

[6] See Duden, 1993, Franklin et. al. 2000.

associated with Coleridge, who endows it with a dimension of "the wonderful" (Stormer, 2008, p. 661). This dimension, as I have indicated above, is strongly present in Nilsson's and Ernst Haeckel's narrations. Aside from signaling the sublime, the wonderful might also function as a way to find in Nature a God-like Reason; and thus to protect the individual from moral and physical panic related to the view opening up ahead – of the immensity of ages past and ages to come and the infinite cosmic space, filled with an unceasing fight for survival and the randomness of natural selection[7]. As Stormer puts it, "Looking in wonder on the unborn establishes gendered boundaries and causeways between the human and the greater than human; it locates and helps produce a memory of the order of life, cosmic and microscopic, that is accessible only through the womb" (Stormer 2008, p. 668).

At this point, though, it is worthwhile noting that these modes of thinking are not associated exclusively with prenatal representations. The year 1966 saw the tremendous success of Richard Fleischer's movie *Fantastic Voyage*, in which scientists miniaturized by means of futuristic technology navigate in a nuclear submarine inside a human organism. Researchers tend to see the movie as an element of settling political and military scores in the Cold War, however, for the audiences of the day, fascinated with new visual techniques (such as endoscopy), it was attractive primarily as a spectacular view from within the body (see Stachowicz, 2018). Kim Sawchuk analyzes the movie precisely by applying the category of sublimity, recognizing that quality in the fantasies of journeys through corporeal landscapes, denoted as biotourism (see Sawchuk, 2000). As Marcin Stachowicz puts it, in turn, there are in *Fantastic Voyage* two conflicting modes of representing the corporeality: as something uncontrollable, arousing awe; and as something supervised, subject to control (see Stachowicz, 2018). Supervision and control are indispensable, but in their exertion the narration of wonder must be, at least rhetorically, taken into account, for it gives them a metaphysical legitimization.

A side effect of such treatment of the inside of the human body is, however, a kind of depersonalization or even – dehumanization. This is what happens to the hero of the *Fantastic Voyage* lying on the operating table. His body loses human scale and becomes a cosmic-underwater environment, in which the quasi-metaphysical drama takes place in the passage "from darkness to light – to the brain understood not only as the command center, but also as the «Creator's dwelling place», a corporeal Mecca" (Stachowicz, 2018, p. 46). On the one hand

[7] The cultural shock, experienced by the public confronted with endless, cosmic space in the 17th century and with the enormity of geological time in the 19th century, is addressed by F. Haber (1972).

wonderful, on the other incapacitated and supervised, seemingly omnipresent and yet vanishing – such is the body in Richard Fleischer's movie as well as in Lennart Nilsson's photographs. But this is, of course, not the body of the embryo, but its "natural frame" – the organism of a pregnant woman. I will analyze its identity – and the identity of the embryo/fetus – in the following part of my reflections.

The Identity

The fact that visualizing an embryo extracted from its physiological context – the female body – (or omitting this context, as in the endoscopic photographs or, later on, by means of tomographic techniques) will make it into an independent cultural hero, while the context (the mother) will become unnoticeable in its human aspect, together with the social, political and cultural consequences of this practice, have been dealt with so often that it is virtually impossible to recall all the pertaining publications[8]. In this respect, Barbara Duden points to the long history of scientific visualization of the fetus (see Duden, 1999, p. 23); Nick Hopwood does the same, also situating the beginning of this history already in the innovative drawings of von Söemmering, who, in his fetal images "at most hints at the umbilical cord" (2015, p. 15). However, if it is self-evident that the space of an anatomical drawing remains conventional, a photograph, especially when its denotation (see Barthes, 1982, p. 196–199, Petchesky 1987, p. 269) is accompanied by a scientific aura, has in the public reception the quality of a literal message. What such a photograph does not show, *truly* does not exist. What it metaphorically connotes, becomes real.

Thus, it has become a custom to say that Nilsson's photographs extract pregnancy from a woman's body, making it vanish or else – where it can return as a metaphor – turning it into a mythologized body, the cosmic nature: "feminized body of nature" (Stormer 2008, p. 661). In neither of these options is the woman a social subject with its own rights, but also with plans and obligations of a very common, human scale. In the second case, inscribing the pregnancy within the sphere of the sacred rather than the profane, means that a woman who above motherhood (not the motherhood in its real aspect, but in the mystic and cosmic dimensions) gives priority to other projects in her life, betrays her cosmic role.

But Nilsson's photographs, just like Haeckel's drawings, function within multiple contexts and against various points of reference. If the series printed

[8] Works by Rosalind Pollack Petchesky and Barbara Duden remain canonical texts on the subject (see Petchesky, 1987, Duden, 1993).

in *Life* magazine did not in fact contain any photographs of women, the album *A Child Is Born* was different in character. The narration of prenatal development is accompanied by the parallel story of a young couple, Margareta and Willy Falk, who agreed to perform in front of Nilsson's camera as they were awaiting their child and at delivery, which was also presented in the photographs. While the photographs of embryos and fetuses demonstrate the cosmic mystery (and many of them in color), the black and white series of Falks' photographs shows everyday life – though it is worth mentioning that it was also criticized for its overly idealized presentation of the details of pregnancy (see Jülich 2015, p. 520).

In 1966, Margaret Falk's pregnancy series was published in *Life* magazine and the accompanying text by Eleanor Graves tried to combine both perspectives – the cosmic, and the everyday.

> Whatever feelings pregnancy may arouse – writes Graves – delight, indifference, resignation or horror – the very idea of creating a new human being is awesome. Pregnancy is surely the most creative thing you will ever do – even if you have done it inadvertently. And the process itself is miraculous – so hard to believe that at an already appointed hour you will divide like some ancient cell, and suddenly it won't be you any longer, but you and some other being, to whom you will be tied, by nerves and tissues and chemistry, all your life. This being is already within you, shouting in a sometimes deafening voice, look out, stand back, here comes a whole new person. And you are the lifeline, its substance, its nourishment (Graves, 1966, p. 48).

This text, with a clear reference to evolutionist narration, apart from uniting the miraculous with the accidental of everyday life – which, by the way, is not so unusual with regard to pregnancy even within overtly feminist discourses[9] – performs yet another significant discursive operation: presenting a woman who has just learned she is pregnant as the environment of a fetus's life, it defines its identity as "a whole new person", and hers – as a mother. In Haeckel's drawings and in his narration the woman was absent. With Nilsson and his

[9] It would be worthwhile quoting here Simone de Beauvoir, since her seminal chapter *Mother* in *Second Sex* features a description of motherhood that seems to be in many ways related (as we will also see further in my article) to my reconstruction of Nilsson's narration. "[A woman] experiences it [her pregnancy] both as enrichment and a mutilation; the fetus is part of her body, and it is a parasite exploiting her; she possesses it and she is possessed by it; it encapsulates the whole future and, in carrying it, she feels as vast as the world; but this very richness annihilates her, she has the impression of not being anything else" (see de Beauvoir, p. 612). This closeness to women's experience deeply rooted in the history of culture seems to explain at least part of Nilsson's popularity with female readers.

commentators, the woman returns; but this re-embodiment has its price. The Bonnier publishing house addresses its album to "a large target group of future mothers" (Jülich 2015, p. 509). The woman, who is now entering the stage, is only (and as much as) a mother, with all the social consequences of the fact.

While the pregnant woman, if she is present at all, may assume in the verbal-visual prenatal narrations I analyze the role of a mother, a life-sustaining environment or a hybrid of both those identities, the identity of the fetus – their main hero – is subject to even more complex transformations. It won't be a surprise to acknowledge that the album *A Child Is Born* while introducing a woman and giving her social identification as a mother, simultaneously introduces a fetus as her child – especially by the practice of juxtaposing fetal images with photographs of newborns and babies. This, along with the critique by the above-quoted Lars Engström, who stated that "enlarged emphasis […] on the human elements of the very small fetus" will force women "to believe that an embryo not quite one millimeter in size was a «child»" (Jülich, p. 519) would place the identity of Nilsson's embryo in clear opposition to the one of Haeckel's. In one of the most frequently quoted passages from *Natürliche Schöpfungsgeschichte*, the latter points to the social consequences of his ideas:

> What are these nobles to think of the noble blood which flows in their privileged veins, when they learn that all human embryos, those of nobles as well as commoners, during the first two months of development, are scarcely distinguishable from the tailed embryos of dogs and other mammals? (Haeckel, 1876, p. 295).

While Nilsson's embryo was constituted as a human being, Haeckel's embryo is an animal: the social resonance of the visual resemblance of human and animal embryogenesis indicated by Haeckel (and many of his contemporaries) was very powerful. Barbara Duden notes: "My great-aunt once told me that in the fourth month of her pregnancy she was sure she was carrying a little fish in her womb" (Duden, 1993, p. 48).

But, while indicating the quasi-evolutionary process taking place during embryogenesis, Haeckel was well aware that even if, morphologically, dog and human embryos are identical, this does not mean the same identity: although the oocytes of a human and of other mammals look the same, they are chemically different (Haeckel, 1876, pp. 296-297). Even if, at certain stage of development, a human embryo has, according to Haeckel, certain characteristics of a fish, it is still just one part of a dynamic process: only a human embryo is potentially a human being, and only a human being (and particularly an Englishman or

a German[10]) is the crowning of the work of evolution to this day. For Haeckel, the resemblance of human and animal embryos served less to denigrate the first ones and more to underscore the miraculous features of God-like Nature.

This heritage was certainly strongly present in Nilsson's times. His fetus is simultaneously a child, in need of protection, an astronaut (tiny in face of the endless cosmic space, but nevertheless fearless in its exploration[11]) and finally a part of a wonderful process of evolution – Nathan Stormer calls this unstable identity "the persistent sloppiness of reference" (Stormer 2008, p. 664). However, in my opinion this "sloppiness" is of great significance, given the fact, that Nilsson's photographs (just as Haeckel's grids) show a process, not a single event. At the same time Stormer underscores the observer's identification with the fetus. Precisely this identification makes it possible, as it seems, to experience the prenatal sublime. "The specific function of a sublime vision of prenatal space is to stage the self's emergence from the dark side of eternal and infinite life to the bright side of a finite human life" – wrote the researcher (Stormer, 2008, p. 666). The identity of the fetus becomes thus Adamic; it is the identity of the first man. At the same time each of us may recognize in it our own mythical origin.

Both in the images of Ernst Haeckel and Lennart Nilsson there seems to be a complicated interplay between what can and what cannot be seen (and thus has to be explained in the verbal description); and neither of the narrations is unambiguous. Let us note again the narration in the original publication of Nilsson's photographs in *Life* magazine. Here, the total absence of a pregnant woman (treated in *A Child is Born* as a mother to be – or even already a mother), and a popular science frame, seems to be opening the way for a less sentimental treatment of the topic in the verbal discourse. Although in the introduction the author of this commentary, science writer Albert Rosenfeld, included typical expressions of admiration over the beauty of Nilsson's fetuses, the language of his further descriptions uncovers what, according to other commentators, the images of the Swedish photographer were supposed to conceal (see also Newman, 1996, pp. 10-17). Not only does Rosenfeld speak openly about the origin of the photographs, which show embryos that were "surgically removed" from the womb, but upon reading his article, one is made aware that anyone who thinks

[10] See, for example, Haeckel, 1876, p. 281. The emergence of the problem of racist consequences of Haeckel's theories is quite expected within social Darwinism of the time.

[11] This particular identity was probably most underscored upon the publications in *Life* and *A Child is Born*. The relation between a fetal and cosmic space also appeared before Nilsson (see Jülich, p. 502), and after him it was omnipresent: we may trace it in such seemingly distant areas as the introduction to Gene Youngblood's famous book *Expanded Cinema* (Youngblood, 1970) by the visionary architect and philosopher Buckminster Fuller.

about what they are actually looking at will notice the fact that the organisms presented in the photographs are already dead: Rosenfeld draws the reader's attention to the placenta or amniotic sac removed "for better visibility", to the cut umbilical cord or the torn tissue of the preparation (Rosenfeld, 1965, pp. 54-72A, no indicated page numbers).

This unmasking (or rather simply factual) straightforwardness of language does not create a new identity of the fetus – it rather uncovers the mechanism of creation of such an identity. And yet, in his text, Rosenfeld does construct some sort of fetal identity. "The baby is a parasite" – he says (Rosenfeld, 1965). It is only thanks to the functioning of the placenta that the woman "tolerates this entire foreign body in her system for nine whole months" (Rosenfeld, 1965). *Life*'s science editor does not describe "a whole new person", but a parasite, whose predatory inclinations are emphasized by the description of the "aggressive" trophoblast cells, against which only a uterus can defend itself: "A trophoblast implanted anywhere else in the body will eat away whatever tissue it comes in contact with" (Rosenfeld, 1965, see also Stabile, 1998, p. 179).

This new, parasite identification is not detached from Nilsson's images, which present above all the early stages of pregnancy. Interpreted by the critics as overly humanized, they simultaneously seem to be visually mediating between the human and the inhuman. Apart from the theory of recapitulation, such identification also brings to mind the particular closeness of the categories of the sublime and the abject (see Kowalczyk, 2014). The already mentioned passage from the "dark side" to "the bright side of a finite human life" (Stormer, 2008, p. 666) will always make one confront the possibility of redirecting the course the opposite way. So as much as Nilsson's fetus may turn out to be a child or a universal model of humanity, it may also be a visualization of a monster. A recurring image of reference in the context of Nilsson's photographs is the fetus from *2001: A Space Odyssey* by Stanley Kubrick (1968); the "star child" floating in cosmos is a symbol of a new stage in the history of humanity (See, among others, Franklin et al., p. 35). Even if Kubrick's *Space Odyssey* or even such movies as Amy Heckerling's *Look Who's Talking* (1989) or the Polish *Hello, here I am* by Zofia Ołdak (1991, based on Willy Breinholst's best-selling book *Hello, here I am*[12]), presenting the fetus both as a child and a small adult, belong to the heritage of Nilsson – who in turn would be as much a child of his era, as an undeniable heir of Ernst Haeckel and other authors of fetal images – nevertheless, they have a reverse face in Roman Polański's *Rosemary's Child* (1969) and, above all, in the Alien series, its basic tetralogy com-

[12] For Polish discussion of Breinholst's book, see Radkowska-Walkowicz, 2013, p. 148–149.

mencing with Ridley Scott's *Alien* (1979) and finishing with Jean-Pierre Jeunet's *Alien: Resurrection* (1997)[13]. In these movies, we watch a parody of the act of birth: the coming to the world of a parasite which emerges from the chest of its host. The alien, able to survive in any conditions, even the most hostile, is undoubtedly an embodiment of evolutionary success and, at the same time, a nightmare reversal of positive fetal history.

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In *The Draughtsman Contract* (1982), the work of the British director Peter Greenaway, the question appears: whether an artist – a painter, a draftsman – draws that which he sees or that which he knows? The question itself, recurrent also in Hopwood's analysis of Ernst Haeckel's drawing practice (Hopwood 2015), is a clear indication that perception is entangled in epistemological issues. With the work of Ernst Haeckel and Lennart Nilsson, scientifically understood human embryos and fetuses not only became visible (for indeed neither Haeckel nor Nilsson, in their respective times, were unique in their effort to adequately show human embryogenesis) but also extremely popular, and the images, vested with scientific and technological authority, served as revelations.

What exactly was the character of these revelations? They reflect cultural changes and recurring themes. Haeckel's embryo, not any more a creation of God, but of (God-like) Nature, while at the same time a successful and versatile player in the risky game of survival, turns into an innocent child (within a culture that highly values and romanticizes childhood) and a brave conqueror of infinite space. As with every revelation, their role is to give meaning to the reality that otherwise may become frightfully meaningless. By answering (or pretending to answer) some scientific questions, they also answer metaphysical ones, and this contributes to their popularity.

But this practice has obviously a variety of different consequences. The sole work of producing images and complementing them with verbal commentary raised doubts. In the case of Ernst Haeckel, the intentions were clear – the images should prove a clearly articulated thesis – but the execution was protested. With Nilsson, neither intention nor execution was clear. What did he want to show and with what agenda? How did he achieve it? No matter how we answer these questions, the popularity of the images caused the imagined fetuses to merge with the real ones, and this changed the cultural perception of pregnancy. And finally, since the images have a life of their own and do not fully subjugate to the intentions of

[13] For a discussion of monstrous fetuses see Hoffman, 2011.

their makers or users, the positive identity they transmit may as well turn into its opposite. Quite contrary to its assumed character, the revelation never seems to be final, and just as the authority of the image is constantly undermined, the same happens to its interpretation.

Translated by Blanka Domachowska

Abstract

The paper discusses images of prenatal development created by Ernst Haeckel and Lennart Nilsson. Despite the obvious differences between a 19th-century biologist and philosopher of nature and a 20th-century photographer, substantial similarities exist in the way their respective narrations situate embryos and fetuses within the cultural realm. The paper traces the processes of creating the representations of stages of embryogenesis and the controversies surrounding them, analyzes the discursive frame within which the images are produced and function, and discusses their media specificity. It also examines the metaphysical ambitions surrounding the process of producing embryo- and fetal identities and the relation of these identities to the important cultural characteristics of their historical epochs.

Keywords: Ernst Haeckel, Lennart Nilsson, fetal images, embryo images, pregnancy

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