Ectogenic Desire: Stories of Placentas, Mothers and Machines from the Past, Present and Future

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Abstract

A handful of scientists around the world are experimenting with animals in artificial wombs. In each study, the technological system is constructed slightly differently with the aim to provide an ex-vivo surrogate environment for infants born 22 to 28 weeks premature – a healthy gestation is 40 weeks. In September 2023 the US Food and Drug Administration met for two days to discuss the regulations, ethics and possibilities of creating an artificial womb for this purpose. To date, this is the most novel example of huMans' endeavor to mimic, control, and "improve" on nature, continuing our aspiration to mechanize and automate the mysteries of "creation." "Ectogenic Desire: Stories of Placentas, Mothers and Machines from the Past, Present, and Future" explores stories, biologies, and technologies of reproduction in humans and beyond. The presentations will consider placenta rituals practiced in different cultures over time; stories about biological and artificial wombs; the history of the Artificial Mothers and other ectogenic desires.

Keywords

placenta; reproduction; artificial womb; incubator; ectogenesis; reproductive rights; ex-vivo; biopolitics; trans-species; eugenics

Introduction

A handful of scientists around the world are experimenting with animals in artificial wombs. In each study, the technological system is constructed slightly differently, with the aim to provide an ex-vivo surrogate environment for infants born before 28 weeks of pregnancy. In September 2023 the US Food and Drug Administration met for two days to discuss the regulations, ethics, and possibilities of creating an artificial womb.

Throughout the huMan experience, wonder, envy and desire to understand and control a woman's sexual biology has driven the science around reproduction. Currently, medical technologies are using systems to mimic, improve and perfect the female reproductive system, challenging our comfort, ethical compass, and concept of sexual reproduction and the process of evolution. This panel looks to identify and elaborate on aspects of this radical embrace of reproductive biotechnologies and how they influence our connection to ancestry, place, and identity.

The first speaker will explore the placenta; the temporary organ which connects the mother to the fetus and supplies it with nutrients and oxygen. With the developments in artificial placentas, there is a vital need to revisit and possibly reinvent placenta rituals. (Figure 1) This will be followed by a talk looking at the womb and how EXTEND (extra-uterine environment for neonatal development) therapy, which is poised for human trials to begin in 2024, redefines both the place of gestation as well as the language around a fetus and/or a newborn. The third speaker will discuss the strange history of the Incubator Baby Shows, issues of eugenics and the need for cultural articulations of new innovations. Lastly, the final presentation will look at the relations between huMans' endeavor to mimic, control and "improve" on nature and the ongoing aspiration to mechanize and automate the mysteries of "creation."

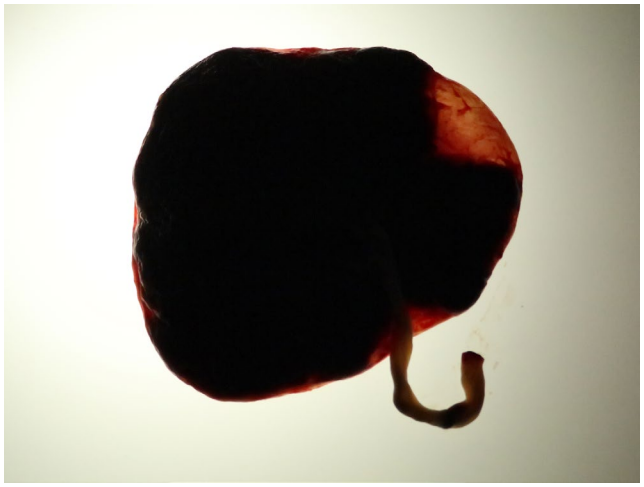

Figure 1. "Placenta." Photograph. ©2022. Author 1/Author 2.

Revisiting and Reinventing Placenta Ritual

For all humans, our biological origin story begins in the womb, tethered to a temporary organ - the placenta - via the umbilical cord. Stories about the human placenta have been conveyed, depicted, and enacted through ceremony for thousands of years. Some of the earliest records of placental ceremony date back to Egyptian times, circa 3,400 BCE. Today, cultural practices around the placenta share interesting similarities, as well as unique differences, but a common thread throughout is the significant role the placenta holds as the guardian of the child's spiritual and physical health. It is customary in many cultures to bury the placenta at, under, or near the home, which is believed to connect the child to place or ensure the fertility of the land for a future of bounty for the child; everywhen. Some maritime cultures cast the placenta to sea: in Bali, the placenta is placed in coconuts and in Costa Rica it is thrown into the waves to protect the child from death by drowning. In ancient Peru, an ill child was given dried umbilical cord to chew as a remedy. (Figure 2)

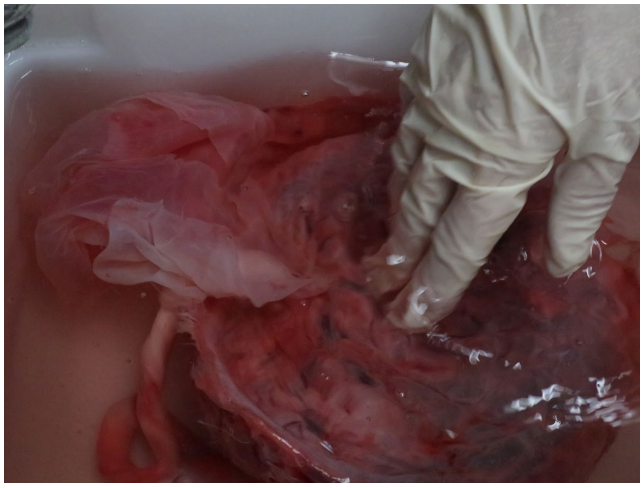

Figure 2. "Washing the Placenta." Photograph. ©2022. Author 1/Author 2.

Western culture does not, however, elevate the placenta to the same degree of importance. In fact, ceremony around placentas has long been abandoned in Western culture, particularly in the US, where we have witnessed the disappearance of midwifery practices and a sharp rise in obstetric violence, of which a classification is forced or coercive cesareans. Actually, in the North American medical context, the placenta is viewed as an extension of the "mess" or "dirt" of childbirth and labeled medical "waste." Not until more recently has the placenta become sought after by both clinical researchers and unregulated third-party industries, who use cord blood for stem cell therapies or advertise placental therapies as curing a myriad of ailments. In Western countries, a recent interest in placentophagy, placenta consumption, popularized by celebrities on social media, is sparking new fascination in the placenta. As placenta consumption practices grow, other questions come into play. What policies oversee the circulation of bio-commodities and what are the legal boundaries around retrieving and repurposing the placenta? How are perceptions of the placenta shifting in Western cultures, where personal interests are potentially influencing biomedical reliance on this organ for research and third-party commodification? What stories are emerging from these experiences? How do they connect us to place and time? Will these new rituals around the placenta endure?

Speculation on the Time and Place of the Womb

With the exception of the platypus and echidna, both endemic to Australia, all female mammals have a uterus. Western understanding of the uterus has unfolded over time. The ancient Greeks believed in the "wandering womb," a shifting entity aimlessly floating within the confines of the host. Plato described the womb as a "wild beast" that freely roamed a woman's body causing destruction, disease, even death. In the Middle Ages, the doctrine of the seven chambered uterus prevailed, with specific compartments assigned to male, female and intersex embryos. The 17th century Preformationist theory argued that the male sperm contained a completely preformed miniature individual - "animalcules." The female reproductive system seemed to be mysterious and problematic; the womb was blamed for hysteria and linked to inappropriate, overly emotional, and erratic behavior.

Efforts to improve on and even replace the womb should come as no surprise. The term "ectogenesis," the extracorporeal development of an embryo in a human constructed artificial environment, was coined one hundred years ago by geneticist J.B.S. Haldane and popularized in *Brave New World* by Aldous Huxley. Once seen as farfetched, mechanization of the birthing process has moved into mainstream science. In 2017, two independent research groups successfully extended the gestation of premature lambs in an entirely manmade, extracorporeal system. EXTEND (extrauterine environment for neonatal development) therapy is poised for human trials to begin in 2024. With a shift to an artificial, external womb, where is the place of gestation? How does the introduction of EXTEND challenge our understanding of the gestational timeline? And what new stories of creation will we share? This presentation examines the uterus through time, as the place of creation, from wild beast to ectogenic machine. (Figure 3)

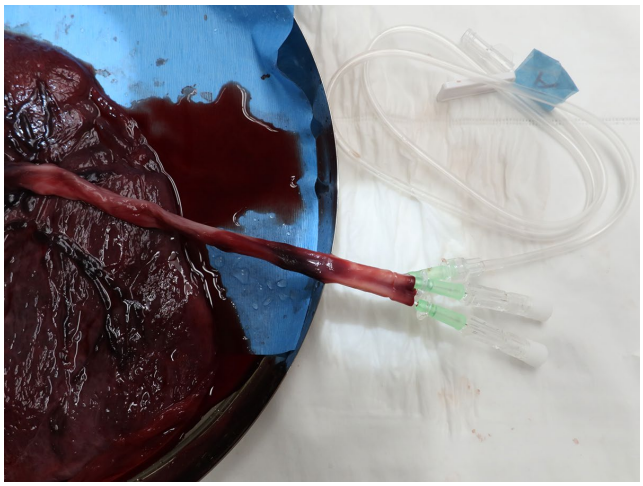

Figure 3. “Cannulation of the Placenta.” Photograph. ©2023. Author 1/Author 2/Author 4.

Figure 4. “Umbilical Cord.” Photograph. ©2023. Author 1/Author 2/Author 4.

“Artificial Mothers” and the Strange History of Incubator Baby Shows

When neo-natal incubators were first developed at the end of the 1800s, they were widely referred to as “artificial mothers” or “automatic nurses" in both the medical and popular press. The first incubators were promoted by being put on public display at World’s Fairs and other large industrial exhibitions, where they were demonstrated with living premature babies inside. At a time when mortality rates for premature babies were as high as 80 or 90%, early incubators used in exhibitory contexts reported survival rates of nearly 80%. They were amongst the most celebrated and popular exhibitions at the turn of the last century.

This presentation traces the history of public exhibitions of baby incubators, focusing on its most long-running example, staged at the Coney Island Amusement Park between 1904 and 1943. For the first half of the twentieth century, this sideshow at Coney Island was one of the only places in the USA that provided access to neo-natal incubators, and it did so free of charge. It also reported a survival rate exponentially higher than that of any hospital at the time. While incubator baby shows may now occupy a marginal position in the histories of science, medicine and technology, then, they also have much to tell us about the intersections between science, sentiment and spectacle as an under-recognised driver of these histories. (Figure 4)

Who Cares?

Human desire to control, replicate, and improve on the “natural world” was always entangled with unraveling the mysteries of “creation” or reproduction – from science fiction stories such as Golem and Frankenstein; to science experimentation and technological innovation – i.e Venter’s *Cynthia* in which its parent is a computer; to controlled environments of reproduction such as incubators, bioreactors and more recently the artificial womb. What Aristarkhova refers to as ‘ectogenic desire’ and the ‘anxiety with/of the maternal; an anxiety that usually manifests itself in philosophical, literary and scientific aspirations towards ‘self-creation’ (Aristarkhova 2005). Here I will explore some Humans’ stories about, and trials of, reproductive systems, whether born, grown, or constructed, human and non-human – in the past, presently and into a speculative future.

Figure 5. “Corrosion Casting of the Placenta Vasculature.” Photograph. ©2023. Author 1/Author 2/Author 4.

Author(s) Biography(ies)

Cynthia N. White Cynthia N. White is a filmmaker and multimedia artist whose work has been screened, broadcast and presented at conferences and festivals in the US, Australia, Europe, and Latin America. In addition to festival awards, White has received funding and artist residencies through government and academic agencies both in Australia and the US. White is currently an Adjunct Research Associate at the Pennsylvania State University. Through visual narratives, she strives to elevate the collaborative work between arts researchers and the medical and biological sciences. She serves on the Pennsylvania State University Microbiome Executive Committee as an arts-based research advocate and teaches in documentary film and social practice.

Cristin Millett Straddling traditional disciplinary boundaries, Millett's investigations of medicine and its history are integral to her artistic process. As a transdisciplinary artist, her work examines the intersection of art and science, specifically sculptural processes and reproductive futures. Her sculptural objects and installations prompt a contemporary cultural critique of societal issues surrounding reproduction and gender identity. Her artwork has been widely exhibited, including at the Villa Strozzi, Florence; the International Museum of Surgical Science, Chicago; the Exploratorium, San Francisco; and the Mütter Museum, Philadelphia. She is an Embedded Faculty Researcher in the Arts + Design Research Incubator and a Professor of Art in the School of Visual Arts at the Pennsylvania State University. In 2020, Millett was a Fulbright Senior Scholar and Resident at SymbioticA at the University of Western Australia.

Elizabeth Stephens Elizabeth Stephens is an Associate Professor in Cultural Studies at the University of Queensland. She was previously an Australian Research Council Future Fellow in the Institute for Advanced Studies in the Humanities at UQ (2017-2021), Associate Dean Research at Southern Cross University (2014-2017), and an ARC Australian Research Fellow in the Centre for the History of European Discourses (UQ, 2010-2014). She is author of over 100 publications, including three monographs: *A Critical Genealogy of Normality* (University of Chicago Press, 2017), co-authored with Peter Cryle; *Anatomy as Spectacle: Public Exhibitions of the Body from 1700 to the Present* (Liverpool University Press, 2011), and *Queer Writing: Homoeroticism in Jean Genet's Fiction* (Palgrave 2009). She is the founder and convenor of the Australasian Health and Medical Humanities Network, and the Immediate Past President of the Cultural Studies Association of Australasia.

Ionat Zurr Ionat Zurr is the Chair of the Fine Arts Discipline at the School of Design at the University of Western Australia and SymbioticA's academic coordinator. She was a Visiting Professor at Biofilia – Based for Biological Arts, Aalto University, Finland (2015-2020); a visiting scholar at The Center of Arts and Art History, Stanford University (2007); and a Research Fellow at Harvard Medical School (2000-2001).

She is considered a pioneer in the field of Biological Arts and publishes and exhibits nationally and internationally. Her work was exhibited and collected by museums such as Pompidou Centre in Paris, MoMA NY, Mori Art Museum, NGV, GoMA, Yerba Buena Center for the Arts, San Francisco, Ars Electronica, National Art Museum of China and more.

Zurr's ideas and projects, together with Oron Catts, reach beyond the confines of art; their work is often cited as inspiration to diverse areas such as bio-fabrication, cellular agriculture, new materials, textiles, design, architecture, ethics, fiction, and food.