

Literature Review:

Future Directions in Assisted Reproductive Technology

Henry T. Greely, *The End of Sex and the Future of Human Reproduction* (Cambridge, Mass.: Harvard University Press, 2016).

Greely's book made something of a splash a few years ago, yet the issues it raises have hardly faded from view—hence this review, followed by a brief glance at two articles dealing with a specific topic of interest for Catholic reproductive ethics.

Greely is a bioethicist and law professor at Stanford University, who predicts that within twenty to forty years, sex will cease to be the way in which a majority of prospective parents (with decent health insurance) choose to conceive their children. Instead, more and more children will be conceived through what he calls “Easy PGD,” a combination of IVF techniques using eggs and sperm derived from induced pluripotent stem cells (iPSCs) and genetic sequencing tools that are rapidly improving while also getting cheaper. These changes will make pre-implantation genetic diagnosis of embryos (PGD) more accessible and more desirable for parents wanting the best for their child (or perhaps just the best child?). Greely acknowledges the consonance between his prognostications and the sci-fi visions of *Brave New World* and *Gattaca*; nevertheless, he contends that broader transitions already

underway in medicine, economics, law, and politics will render *ex vivo*, laboratory modes of conception increasingly palatable to the American public.

The book is comprised of three parts of six chapters each, punctuated by two “interludes.” Part One describes the state of our science regarding cellular biology, species reproduction, and the therapeutic interventions currently practiced and proposed in human reproductive medicine. Greely interprets procreation through a naturalistic lens that invites speculation about “the possibilities” for alternative modes of reproduction, which is the topic of the book's first interlude. Here, Greely opines that our technical ability to manipulate cellular differentiation will sunder the longstanding connection between parenthood and innate biological fecundity. He writes, “Infertile people who do not have their own eggs or sperm will have, for the first time, a chance to have a ‘child of their own.’ And, in the not unlikely event that iPSCs can make not only eggs from women and sperm from men, but sperm from women and eggs from men, gay and lesbian couples will, for the first time, have a chance to have ‘a child of their own’” (pp. 102-3).

In Part Two, Greely complements his scientific and theoretical account with some reality

testing, discussing a range of cultural developments that he thinks are clearing the way for the widespread adoption of Easy PGD. For one example here, consider the rapid decline in costs for genome sequencing: from the Human Genome Project's 13-year, \$2.7 billion venture to Greely's now-dated prediction of a \$1,000 genome by 2016. (Such a prediction in fact proved conservative. More recently, consumer-friendly companies like Veritas Genetics have announced plans for a \$99 genome in the next three to five years.) The book's third part goes on to acknowledge, and then respond to, some critical concerns about risks and benefits that will undoubtedly be raised in the course of public discussion about these new procedures. Considering his audience, Greely devotes more attention to addressing the risks, and admits flatly that we have no way of telling in advance what the consequences of these interventions will be. However, as a self-described consequentialist (p. 273), he concludes that such ignorance is hardly cause for delaying our adoption and exploration of such tools, and that, in any case, the momentum of similar ventures willingly engaged in the name of "progress" will carry these prospects forward simply as a matter of course.

It intrigues this reader at least, that, as he anticipates criticisms, Greely accords Catholic reproductive ethics with some measure of credibility, based on the Church's rejection of earlier forms of assisted technologies and its broader sexual ethic. More specifically, Greely observes an impasse between his consequentialist leanings and the deontological foundations of most religious perspectives. But when he mentions Catholicism in particular, he admits a certain consistency of thought that, apparently, can evade his more fundamental

(and rather compelling) argument about why society should not be expected to reject this tool, namely, because to do so would be to assert an arbitrary division between "natural" and "unnatural," which history and experience have already shown to be facile in advanced technological societies. As he puts it, "Unless one takes a very broad view of 'nature,' civilization is not natural. . . . If you accept the convenient unnatural parts of our civilization but not Easy PGD, you have to provide a line that distinguishes between the 'unnatural' you accept and the 'unnatural' you abhor—and provide a convincing justification for the line" (p. 279). Despite Greely's marked disagreement with Catholic conclusions about sex and reproduction in this regard—and indeed, despite the Church's own, ongoing disputations about such matters on the inside—it is at least refreshing that Catholic teaching is perceived as robust and consistent from the outside.

Renée Mirkes, OSF, "The Ethics of Ovarian Tissue Transplantation: A Teleological Perspective," *Ethics and Medicine* 27 (2011): 109-23.

The rates of survival for cancer patients of reproductive age is increasing, such that "life after cancer" is part and parcel of treatment discussions at the time of diagnosis. "Oncofertility" has come to refer to the conjunction of oncology and fertility science, aimed at preserving or restoring reproductive capacities for patients after recovery. For some time now, professional societies have defined the standard of care for any cancer patient of reproductive age as including physician recommendation for fertility preservation—i.e., egg freezing or sperm banking—for the sake of subsequent use in IVF. In this article, however, Mirkes (director of ethics at the Pope Paul VI

institute) explores the ethics of another treatment option that has been increasingly successful, namely: ovarian tissue cryopreservation and transplantation (OTT). In this procedure, “surgeons remove the millimeter-thick outer shell of the ovary, cut the cortex into strips around 1-3 mm in thickness and up to 1 cm² in total area, and allow the cryoprotectants to thoroughly penetrate the tissue. Each of these strips potentially contains thousands of primordial follicles capable of developing into mature oocytes or egg cells when thawed and transplanted” (p. 110). After describing the range of graft techniques and other applications involving harvested ovarian tissue, Mirkes concludes the first part of her article with a discussion of outcomes.

The second part presents an ethical analysis of OTT from the perspective of what she calls “teleological prudential personalism,” which “represents a middle course between a pragmatic and deontological ethics” (p. 111). This perspective espouses a need for ordering the practical attainment of human goods in accord with “a personal and communitarian ethics of authentic love” (p. 113). After describing such an ethic more clearly, the analysis unfolds by way of four case studies of various scenarios, reflecting a range of human intentions and technical applications involving OTT, including IVF opportunities as well as the restoration of the body’s natural fertility processes, leading to routine conception and birth. Mirkes concludes that of the possible futures here, only “spontaneous conception and live birth following ovarian autotransplantation” is morally acceptable (p. 119).

Paul Lauritzen and Andrea Vicini, “Oncofertility and the Boundaries of Moral Reflection,” *Theological Studies* 72 (2011): 116-30.

Lauritzen and Vicini also analyze OTT through the lens of Catholic moral theology, but their discussion looks towards the “boundaries” of doctrinal guidance thus far supplied by the Magisterium. The authors first take note of how the two most relevant documents, *Dignitas personae* and *Donum vitae*, distinguish between “authentic” treatments for infertility and treatments that are more objectionable. For example, hormonal treatments and surgical interventions for endometriosis are held to be “authentic” because “once the problem causing the infertility has been resolved, the married couple is able to engage in conjugal acts resulting in procreation, without the physician’s action directly interfering in that act itself” (p. 122; citing *DP* #13).

This being the case, Lauritzen and Vicini acknowledge the ethical permissibility of *autologous* ovarian tissue transplantation (as in Mirkes’s discussion above); but they then go one step further, exploring what would be the doctrinal grounds for accepting or rejecting *non-autologous* OTT. “[T]ill now,” they write, “the teaching on reproductive technology has been framed by focusing on procreation that results in the birth of a child who is not the genetic offspring of one of the spouses in a marriage, and that was conceived either artificially or gestated by someone who is not one’s spouse. Nonautologous OTT followed by natural conception demonstrates that this is no longer the case” (p. 125). That is to say, while it is true that some of the Church’s opposition to heterologous artificial fertilization can be reasonably extended to nonautologous OTT—

in particular, it (1) deprives a child of his “filial relationship with his parental origins. . .” and (2) breaks the links “between genetic parenthood, gestational parenthood, and responsibility for upbringing” (cf. *Donum vitae* II, no. 2)—Lauritzen and Vicini suggest that an adequate assessment of nonautologous OTT must necessarily attend to additional factors, since in this case the unitive and procreative dimensions of sex are preserved in ways that complicate a straightforward application of points (1) and (2). The authors warn the Church not to seek refuge in “a kind of genetic essentialism” in its analysis of parenthood vis-à-vis new fertility therapies (p. 127), for as they point out, the conflation of genetic transmission and “family” has been rightly rejected in other contexts (i.e., adoption), which leaves doors open for further considerations about how we are to perceive the relation between “genomes” and “persons.”

CONCLUDING OBSERVATIONS

Although the topics discussed above are certainly not new in terms of the publication record, the Church continues to wrestle with the myriad ways technology is influencing the scope of medical intervention in the course of sex and reproduction. Catholic health care ethics is challenged to respond to new questions in this area, for which ecclesial guidance often requires creative and faithful interpretation so as to become applicable. Greely’s vision of reproductive technology’s possible future is worthy of consideration, not only for its illumination of potential challenges here, but also for its unintended provocation to the missional Church (and by extension, religiously-based health care institutions), to continue working on a robust and coherent response to questions at the intersection of

technology and embodiment. The two articles on ovarian tissue transplantation are good exemplars of what such a project entails, focused on a topic of immediate interest to health care practitioners. Yet as Lauritzen and Vicini suggest, developing a response to things like OTT is also an invitation to examine our own theological presuppositions more carefully.



Alec Arnold is a Ph.D. student in Theology and Health Care Ethics at the Albert Gnaegi Center for Health Care Ethics at Saint Louis University.

alec.arnold@slu.edu