until about fourteen days after syngamy. Ford thus refers to a preimplantation human embryo as a "proembryo," i.e., something that is developing into, but is not quite yet, a human embryo informed by a rational soul. Nevertheless, without directly engaging his critics, Ford acknowledges that there are good arguments on both sides of the debate concerning whether a rational soul informs a human embryo from either syngamy or implantation. Therefore, he concludes that, for *prudential* reasons, one should treat all embryos, proembryos, and zygotes as persons, given the lack of conclusive evidence or arguments to the contrary. Hence, Ford holds that any research or medical use involving human embryos at any stage of development ought to include respect for them as persons and ought not utilize or destroy embryos purely in the name of research that has no benefit for the embryo itself.

The remainder of Ford's book consists of highly detailed analyses, from medical and moral viewpoints, of various issues related to developing and newborn human beings. Here, one encounters the great value of Ford's book: he is as highly informed of the scientific understanding of the various medical procedures discussed as he is of the philosophical principles applied in evaluating their moral nature. Ford's intricate understanding of these issues is necessary, since many participants in bioethical debates, particularly political pundits, do not fully understand the clinical, physiological, or pharmacological facts regarding the subjects under discussion. Ford also provides an unbiased review of relevant statistics related to each issue, e.g., the chance of an oral contraceptive acting as an abortifacient versus preventing conception, the success rate of various IVF procedures in producing full-term pregnancies, and the physical and psychological sequelae of procured abortion. Ford's presentation of the statistical data is exhaustive and dispassionate; no conclusions are fallaciously drawn on the basis of the statistical data. After presenting the relevant data, Ford embarks on his moral analysis, which gives voice to the utilitarian perspective as well as Ford's own Catholic viewpoint. The issues Ford discusses include the use of contraceptives, procured abortion, the metaphysical and moral disposition of anencephalic fetuses, treatment for infertility, the use of artificial reproductive technology, surrogate motherhood, reproductive cloning, prenatal genetic screening, prenatal care following diagnosis of some abnormality, and the care of low-birthweight newborn infants.

Ford's book is greatly important for bioethicists and health care professionals from both Judeo-Christian and secular backgrounds. The care with which Ford argues to his conclusions requires that they be seriously considered by any who would argue to the contrary. Furthermore, Ford's own arguments offer strong reasons supporting why the Catholic Church teaches what it does concerning the moral status of developing and newborn human beings. Despite Ford's position regarding the nonpersonal nature of a preimplantation human embryo, it is nevertheless as true for Ford as it is for the Holy Father that a human being—person or not—merits fundamental respect from the first moment of its genetically unique existence.

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Herzfeld, Norma L. *In Our Image: Artificial Intelligence and the Human Spirit.* Minneapolis: Augsburg Fortress, 2002. xii + 136 pp. Bibliography. Index.

This is an important work. Norma L. Herzfeld holds a doctorate in theology as well as graduate degrees in computer science and mathematics, and has been teaching artificial intelligence (AI) for some sixteen years at St. John's University in Col-

legeville, Minnesota. She is well qualified to write a book that spans several disciplines: theology, philosophy, computer science, among others.

The author initiates her reflection with a twofold question: "Why create an artificial intelligence, and what is it in ourselves that we wish to image in such an intelligence?" (9).

Then in three chapters she provides background for responding to the two-part question. Chapter 5 directly addresses the first part of the question, while the next (final) chapter undertakes to give a Christian response to both parts.

Does she accomplish her formidable task? This reviewer thinks that she does. In the first chapter she rightly notes that as we are created in God's image, so we too have a perennial desire to create in our image. In chapter 2, the author discusses various interpretations of *imago Dei.* What in us images God? She focuses on three answers suggested by scholars: reason, regency (dominion), and relationship.

The author's analysis uses primarily the thought of three theologians: Reinhold Niebuhr, Gerhard von Rad, and Karl Barth, whose respective interpretations of the *imago Dei* she terms substantive, functional, and relational (31). The substantive approach sees the image of God in man as reason (16). In the functional approach the image is dominion (delegated, to be sure), which the author terms "regency" (20). The relational interpretation is grounded in man's being a "counterpart of the (triune) God"; it consists in our relationship to God (25).

Regarding the image of God, the reader would do well to consult the *Catechism of the Catholic Church* (1994), nn. 356–361: "In reality it is only in the mystery of the Word made flesh that the mystery of man truly becomes clear" (n. 359). One would wish, too, that the author had included a consideration of St. Thomas's treatment of the image of God (see *Summa theologiae,* I, Q. 93), which focuses on the mind as bearing the image of God (article 6).

Next the author seeks to describe three approaches to artificial intelligence which are parallel to the three interpretations of the image of God. These are based on three versions of *imago hominis,* which she denominates simply as "copy, tool, or friend" (33). To begin her analysis Herzfeld cites how each of several AI researchers describe their project goals and summarizes their endeavors. Thus, for the author AI can be viewed as an "attempt to create an *imago hominis,* a machine that is in some way created in the image of the human person, an image loosely defined using the term *intelligence*" (33, original emphasis).

She then poses two main questions which she states "stand at the heart of the AI endeavor. What is intelligence? And second, how would we know if a computer possessed intelligence?" (33).

After examining *imago hominis* as reason (35), as regency [dominion] (41), and as relationship (45), the author concludes the chapter with these words: "Rationality or Intelligence, by itself, is not the defining characteristic of being human. It cannot, in fact, be captured as an isolated quality. We are relational beings; we give expression to our recognition of that fact in our search for AI" (52). What has happened to "rational animal" as definition of humanness? Or, has she also rejected the oft-repeated assertion that "dominion" (delegation by God) is that by which humans are characterized? Not fully.

The next step in her analysis is to ask, and answer: "from where has the public received its conception of artificial intelligence?" (53). Where else but the science fiction films (and, I might add, sci-fi books and articles)? She names several well-known films: *2001: A Space Odyssey*; *Colossus: The Forbin Project*; *Forbidden Planet*; *Star Wars*; and *AI* (54). She notes that they can be classified in two general categories, namely, as cautionary tales or as tales of wish fulfillment (55). "HAL [*2001*] and Colossus are representative of a genre of sinister supercomputers common in science fiction film" (59). In contrast, Robby the Robot (in *Forbidden Planet),* R2-D2, and C-3PO (both from *Star Wars*) are user-friendly (60–61). They "represent AI at its most benign, as lovable, though somewhat ineffectual com-

panions to and servants of the human characters" (61).

Overall, Herzfeld has done an excellent, albeit brief, analysis of science fiction AI characters. These science fiction robots flesh out for the reader/viewer the more arid scientific descriptions often provided in academic publications.

The author then engages in a Christian critique and response to the questions "why … creat[e] an artificial intelligence ... and what is it we wish to create?" (68). She wisely notes that "we cannot assume that all technological innovations result in an overall betterment of the human condition" (68).

Examining a rather extreme position, she names three authors, Ray Kurzweil, Tom Stonier, and Hank Moravec, who "hope to find in the computer a means of escape from messiness of human physicality" (69). They look forward to the possibility of downloading the mental contents of the brain into a computer which presumably would then be the bearer of the human psyche (69–72). She notes that this sort of option has been called "cybernetic immortality" (69).

This aspiration reminds one of C.S. Lewis's *That Hideous Strength,* which describes a similar attempt and its consequences. For Christians and many others, such a demeaning of the human body is entirely repugnant. A central tenet of the Christian faith is not only the bodily resurrection of Jesus but also of all human beings who die as friends of God. It should be noted that resurrection in the Christian faith is not simply the reanimation of a corpse, but the transformation of the body into one which can no longer experience suffering, corruption, and death (see *Catechism of the Catholic Church,* nn. 997–1000). That body is then completely responsive to the soul and is therefore no longer a "messy physicality."

Are we alone in the universe? Herzfeld notes another theme in the AI endeavor, namely, the wish to build robots as "alien companions," that is, intelligent nonhumans. Richard Forsyth, Chris Naylor, and Jacques Monod suggest that we pursue AI to obtain some nonhuman intellectual beings with whom we can relate/communicate (83). Clearly this is a factor in the radio telescope project SETI (Search for Extraterrestrial Intelligence) and is also reflected in our space programs. Herzfeld reminds the reader that "We must never lose sight of that relationship with God [i.e., that which in our nature we share with God], even as we attempt to share aspects of our nature, our work, and our very selves with computers" (84).

In this critical and theological review of the AI enterprise, Noreen Herzfeld has in *In Our Image* sought to clarify what and who we are. There is plentiful documentation and a comprehensive bibliography. She has admirably initiated the task of reviewing the field of artificial intelligence from a theological perspective.

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Kippley, Sheila Matgen. *Breastfeeding and Natural Child Spacing.* 4th ed. Cincinnati: The Couple to Couple League International, Inc., 1999. xii + 212 pp. Index.

This is the fourth edition of an international classic written by Sheila Matgen Kippley about child spacing and breastfeeding. The first edition was published in 1969. Ongoing study of the subject since that time has continued to confirm the science and dependability of this method of child spacing. Ms. Kippley has called this method *ecological* breastfeeding (1–2) to distinguish it from Westernized scheduled breastfeeding, which does not offer the same natural fertility suppression. This method of feeding the infant is termed "ecological" also because it maximizes the use of the natural sources of both food and comfort for the baby.