NBAC and Embryo Ethics

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Unless renewed by presidential order, the National Bioethics Advisory Commission (NBAC) will expire on October 3, 2001. President George W. Bush must decide whether he will renew this board, allow it to lapse, or reconstitute it in some other form. It was President Clinton who established the present Commission, appointed its members from the disciplines of science, medicine, law, and ethics, and designated a chairperson. The Commission has served several important functions, from advising and making recommendations to the National Science and Technology Council, to formulating broad principles to guide the ethics of research. In November of 1998, President Clinton wrote to chairperson Harold T. Shapiro requesting that the Commission turn its attention to human stem cell research, taking into consideration "all medical and ethical considerations." The question that assumed center stage in its considerations of embryonic stem (ES) cell research was: Should there be a repeal of the ban on federal funding for research in which a human embryo is destroyed?[1]

The Commission deliberated for ten months, giving careful attention to extensive public and expert testimony on the legal, ethical, and scientific aspects of stem cell research. In September of 1999, the NBAC presented President Clinton with its response, *Ethical Issues in Human Stem Cell Research*, Volumes I & II.[2] In that

[1] The ban on federal support of any research "in which a human embryo. . . [is] destroyed, discarded, or knowingly subjected to risk of injury greater than that allowed for research on fetuses in utero . . . ." was originally enacted as Public Law No. 104-99 on January 26, 1996. It was adopted in 1997 as part of the Omnibus Consolidated Fiscal Year 1997 Appropriations Act. It is currently in section 511 of the Conference Report on H.R. 4328, The Omnibus Consolidated and Emergency Supplemental Appropriations Act for Fiscal Year 1999, and it is predicted to come up for a vote again in September of 2000.

[2] Volume I is entitled *Report and Recommendations of the National Bioethics Advisory Commission* and Volume II, *Commissioned Papers*. A third volume has been published in June, 2000, under the title *Religious Perspectives*.

report, the Commission argued that ES cell research deserves federal financial support because the benefit to society—healing, prevention, and research—outweighs the deficit that results from the destruction[3] of early human embryonic life.[4]

The Ethics of ES Cell Research

The NBAC's report makes it clear from the outset that the answer to the appropriateness of federal funding for ES cell research turns on the moral status of the human embryo. What we think the human embryo is determines what we may do to it in terms of research and whether federal funding is appropriate. The question, then, is this: Do human embryos possess the same personhood as children and adults and the concomitant right to life that cannot be sacrificed even for the greatest good of society, such as that embodied in the most promising of clinical therapies and cures? [5]

Answering in the negative, the NBAC determined that the human embryo is not a person but a "form of human life" that deserves a respect commensurate with

[3] Although it may sound inflammatory, the NBAC insists that characterizing ES cell research as destructive is accurate. Integral to ES cell research is the derivation process which destroys the embryo. As my paper points out, the NBAC justifies such destruction of embryos, forms of human life, based on a consequentialist calculus. The greater good of diagnostic and therapeutic advances and the total benefit that that represents to society in general, and millions of individuals in particular, outweighs the evil of destroying embryos that, although human, are not members of the moral community of persons.

[4] John C. Fletcher, in his NBAC commissioned paper does us a service by demonstrating why a ban on fetal research is entirely out-of-sync with the dominant philosophical matrix of the existing research community: "The ethical framework of the NC's report (The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research) was a three-sided compromise between liberal and conservative views on fetal research, with an added feature (to facilitate the compromise) for a national Ethics Advisory Board to review and resolve problems in future protocols on fetal research. First, guided by the principle of beneficence, the NC encouraged fetal research because of its benefits. Any reasonable liberal view on fetal research could support the first point. Second, the NC sharply restricted fetal research under an equality-of-protection principle, especially to protect fetuses to be aborted from exploitation. *The second point was a bold specification of a conservative viewpoint that was incompatible with a utilitarian ethos previously dominating U.S. research practices* which had guided investigative research with living fetuses *ex utero*. The NC, even in the face of *Roe* v. *Wade*, specified that societal protection of human subjects of research ought to be extended to fetuses, including fetuses in the context of abortion" (italics mine). (See "Deliberating Incrementally on Human Pluripotential Stem Cell Research," Vol. II, NBAC report, E-10.) Later in this same paper, Fletcher admits that his preference for utilitarian ethics is the variant found in American pragmatism. He is committed to bringing "the resources of American pragmatism to bear upon the tasks of bioethics . . . . At this point, it is worth marking a difference between a vulgar view of pragmatism (i.e., pragmatism concerned only with what works) and a view that embraces ethical principles but not does not treat them as fixed or timeless categories." (Ibid., E-34).

[5] Or, as Robert P. George contends, "Isn't excluding the unborn from the legal protections against arbitrary killing that the rest of us enjoy a sin against the principle of equality?" *First Things*, 105 (Aug/Sept, 2000): 18.

its progressive developmental maturation.[6] Its answer, the Commission suggested, is one that is both moderate and dominant. Moderate because it avoids "extreme positions;" dominant because it is a view shared by many.[7] What the Commission means by being non-extremist is that its position avoids the Scylla of describing the human embryo as a mere cluster of cells and the Charybdis of awarding personhood to the embryo with the same Fourteenth Amendment rights and protection due children and adults.[8]

The NBAC outlines the specific character of its special-respect-but-no-rights-for-human-embryos approach by demanding that the research community: 1) conduct ES cell research for only the highest scientific ends; 2) obtain informed and free consent from the embryo's progenitors; 3) refuse donors of ES cells the opportunity to name recipients for subsequent therapies; 4) prohibit payment for or sale of embryos and monetary inducements for donation of spare embryos; 5) limit ES cell research, at least for now, to "spare" or "extra" in vitro fertilization (IVF) embryos;[9] 6) use embryos only when it is necessary—when it is the only possible source, and

[6] In his the NBAC-commissioned paper, John Robertson opines that special respect is due to a human embryo, not based on any kind of inherent characteristic, but because it is "a potentially developing form of human life." Thus, if a preimplantation embryo were the subject of research and then transferred to a woman's uterus, such research activities would be prohibited since they "could harm the resulting child." However, even in cases where no transfer is intended, a special respect for the human embryo should be maintained if for no other reason than that the human embryo is a symbol of or denotes human life or is a form of human life. In the end, the phrase, form of human life, made its way into the NBAC report as a description, ambiguous as it is, of the moral status of the human embryo, placing it somewhere between a mere cluster of cells and personhood.

[7] Of course, the word "many" is a relative one. Certainly, if we would conduct a survey of the public and expert testimonies and poll the articles and books referenced in Volume I of the NBAC report, it is true to say that the majority of these hold, as the NBAC does, that the embryo is a non-, pre-, or potential person. Given the pervasiveness of an emotivist-based system of ethical decision making in the U.S., I would not doubt that public opinion polls might yield the same view. I am convinced, however, that if the public would be exposed to a solid, coherent and comprehensively reasoned discussion, they would be able to make a better decision, one not based on how one feels or on utilitarian gains but on reason and on what we can know, universally, about human nature. But, since this sort of presentation does not lend itself to thirty second soundbites, the prospects of a genuinely informed public are not encouraging.

[8] In a paper referenced by the NBAC, J. F. Childress explains that the human fetus (or embryo) can be placed in one of three categories: 1) mere tissue, 2) potential human life, or 3) full human life. Lori Knowles, in her expert testimony, cites the European Group on Ethics in Science and New Technologies and suggests two possible positions on the moral status question: 1) human embryos have the same moral status as human persons and consequently are worthy of equal protection, or 2) human embryos do not have the same moral status as human persons and consequently have a relative worth as far as protection is concerned. In the end, Childress argues that human embryos and fetuses are potential human life; Knowles asserts that these be accorded a relative sort of protection.

[9] In his NBAC-commissioned paper, Dr. Erik Parens, a member of the Hastings Center, reflects that the NBAC and other public policy groups have conducted their public

resort to alternatives (for example, umbilical cord stem cells, adult stem [AS] cells) when they would realize the respective research goal equally well; 7) refuse federal monetary support for research using embryos produced by somatic cell nuclear transfer (cloning);[10] 8) establish a National Stem Cell Oversight and Review Panel to uniformly exact conformity to ethical guidelines from any federally funded researcher and to encourage researchers in the private sector to conform to the same ethical criteria.

The respect or even "profound respect" that the NBAC believes ought to be given to the human embryo does not extend to protecting the human embryo from destructive research. That kind of protective respect is only accorded to persons who, in the context of non-therapeutic research, would be classified as human subjects whose constitutional right to life would award them protection from undue harm. As John Robertson noted to the NBAC members, respect for human embryos is not for the sake of the embryo itself because there is no ontological basis for such respect. It is principally for the sake of the "adult human persons of the scientific community and of the greater society" and their degree of "commitment to giving life."[11]

Approach to the Subject

This article will review and critique the central arguments put forward by the NBAC to justify its conclusions, with special attention to the philosophic arguments that support its conclusion that the human embryo is not a person. The views of the NBAC, though grounded in science, are essentially philosophical arguments and therefore deserve to be evaluated from this same point of view. My contention is that the NBAC has failed to provide a persuasive moral argument for federal funding for ES cell research precisely *because* it has failed to argue convincingly for the non-

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policy conversations about ES cell research much too gingerly and much less candidly than they ought. Perhaps, out of fear of negative press and a drop in public support, the concentration of the discussion of ES cell research has been on their pluirpotentiality while ignoring the immortality or the "prolonged undifferentiated proliferation" of ES cells. Focus on the latter is important for its implication for human genetic engineering particularly, as Parens admits, for our desire to design our children by means of genetically altered human embryos. "Because it is easier to make precise gene insertion in ES cells than it is to make such insertions in other kind of cells, ES cells are potentially a powerful tool with which to produce germline interventions ...." ("What Has the President Asked of NBAC? On the Ethics and Politics of Embryonic Stem Cell Research," Vol. II, NBAC report, I-4.)

[10] This "temporary" U.S. stay of ES cell research is contrasted by the recent UK decision to permit the production of SCNT-produced embryos to be used solely for their stem cells. The move is designed to avoid rejection of ES cells by using the recipient's own DNA in their production. Richard Doerflinger underscores the irony of the British decision. "These embryos will be created only for destruction—in fact, it will be illegal to try to bring such an embryo to live birth. Government will thus effectively define a class of human beings that it is illegal not to kill." ("Stemming Life," *National Review* online [August 24, 2000]: http://www.nationalreview.com/comment)

[11] Expert testimony before the NBAC meeting, January 19, 1999, Washington, DC, transcript, 128 at http://bioethics.gov/transcripts/jan99.

personhood status of the human embryo. First, I will a) reconstruct the arguments that support the nonpersonhood theory from the NBAC report itself, from its commissioned papers, from its public and expert testimony, and from sources referenced in the report; and b) develop the thinking that grounds these arguments. Second, I will critique these positions by appealing to a) common experience and human reason and what they can tell us about human nature; and b) science and what it has discovered about early embryogenesis. Third, I will summarize the main lines of the personhood theory that emerge from my critique. In evaluating the question of the moral status of the human embryo from the viewpoint of philosophy rather than theology, I hope to jettison the common charge that the position I defend is based essentially on religious bias. Hopefully my analysis will provide the reader with an idea of the main objections advanced against the NBAC thesis that the human embryo is not a human person.

Stem Cells and Stem Cell Research

Some general remarks are in order here concerning stem cells and their derivation and use.[12] Stem cells have two principal characteristics: the ability to divide indefinitely in culture and the capacity to give rise to specialized cells. Stem cells are totipotent, pluripotent, or multipotent. Totipotent stem cells are found exclusively in the cells comprising the one to three day-old embryo and possess a potential for differentiation that is total. They have the capacity to specialize into extraembryonic membranes and tissues, the cells and tissues of the embryo, and all post-embryonic tissues and organs. Therefore, if twinning occurs after the single cell zygote divides, the two resultant totipotent cells separate and two individual human organisms—two genetically identical human beings (except for differences in their mitochondrial genes)—begin their individual developmental journeys.[13] After several cycles of cell division and probably no later than the eight or sixteen-cell stage (circa day three of embryogenesis), the totipotent cells begin to specialize. Now pluripotent in nature, these begin to form a hollow sphere of cells called a blastocyst. The blastocyst consists of an outer layer of cells, the trophoblast, that will eventually form the placenta and other supporting tissues needed for fetal development *in utero*, and an

[12] See The National Institutes of Health web page, esp. http://www.nih.gov/stemcell/primer.htm for "Stem Cells: A Primer" May 2000, and http://bioethics.gov/transcripts/jan99 for expert testimony of Dr. James Thomson, University of Wisconsin-Madison, before the NBAC, Jan. 19, 1999, Washington, DC.

[13] Dr. James Thomson, in his expert testimony before the NBAC, advised against defining human totipotential cells as having the capacity to develop into individuated organisms or distinct human beings. While the latter capacity to develop into an entire human organism is true of the single cell zygote and each of the cells of the two and four-cell zygote, it is no longer true of the blastomeres of the eight-cell morula, for example. Although totipotent, the blastomeres at this stage lack sufficient mass to be able to develop into an embryo if transferred to a woman's uterus. The stem cells that comprise the inner cell mass of the blastocyst stage embryo (those harvested for ES cell research) are pluripotent and lack the ability to specialize into extraembryonic cells and tissues. One of these or a group of these cells would not, as a result, develop as a normal human embryo if placed into a woman's uterus or into culture *in vitro* (transcript, 42–3, 58–9).

inner cell mass, the embryoblast, that consists of a cluster of cells (approximately 100 in the late blastocyst) each of which are pluripotent.

While pluripotent, or second generation, stem cells lack the capacity to specialize into extraembryonic tissues and cells and, therefore, lack the capacity to develop into an entire individuated organism, they do have the ability to specialize into any of the 210 types of cells in the mature human body. After pluripotent cells undergo further specialization and become more committed to certain cell types, they give rise to a third generation of stem cells that are multipotent. Thus, for example, pluripotent blood stem cells specialize into multipotent or progenitor stem cells for red blood cells, white blood cells, and platelets, respectively.[14]

The isolation or derivation of pluripotent stem cells is the first stage of ES cell research. Human pluripotent cell lines have been harvested from two sources, the inner cell mass of the blastocyst (the embryoblast) and from fetal tissue from induced abortions. Dr. James Thomson of the University of Wisconsin-Madison produced a pluripotent stem cell line from the first source by isolating the inner cell mass of the blastocyst (thereby destroying the embryo) and then culturing these harvested cells to proliferate continuously while maintaining their undifferentiated state and normal karyotype. Dr. John Gearhart of Johns Hopkins University isolated stem cells for his pluripotent cell line from embryonic germ (EG) cells of cadaveric fetal tissue and then cultured these. Blastocyst-stage embryos produced as a result of the fusion of the nuclear material of a human somatic cell with an enucleated ovum (somatic cell nuclear transfer) are a third source of ES cells.

ES cell research that both derives and uses stem cells has three goals: first, the identification of the mechanisms that trigger cell specialization that could lead to a better understanding of diseases involving abnormal cell specialization and division such as cancer and birth defects; second, the streamlining of drug development through the use of pluripotent cell lines to test drug safety and efficacy; third, the development of "cell therapies," a renewable source for debilitating diseases such as Parkinson's, Alzheimer's, arthritis, and spinal cord injury.

The production of adult stem (AS) cell lines, or multipotent stem cells, is yet another source for the development of therapies just described. The National Institutes of Health argues that ES cell research and AS cell research need to be pur-

[14] One of the exciting discoveries with adult stem (AS) cell research is to disprove the long-held belief that multipotent stem cells could only become those cells to which they were committed. For example, scientists have induced human marrow stromal cells to overcome their mesenchymal commitment by converting them into neural cells. In other words, they have de-differentiated and then re-differentiated them. See http://www.usatoday.com/news/nndsmon08.htm for a populist account of the very promising findings regarding a possible abundant source—permanent neural stem cell lines—for treatment of a variety of neurologic diseases. See the *Journal of Neuroscience Research* 61 (2000): 364–70 for a detailed scientific account. More recently, researcher Paul Sandberg reported to an American Association for the Advancement of Science meeting (Feb. 2001) that when rats affected by strokes were injected with cultured stem cells from umbilical cord blood they exhibited normal muscle control and movement. In other words, the blood stem cells went beyond their normal multipotent character and developed into working brain cells (http://www.independent.co.uk/news/UK/Health/2001–02/brain200201.sthml).

sued concurrently before researchers can determine the very best source for the necessary specialized cells and tissues.

Personhood as Function

In his expert testimony before the NBAC, John Robertson accurately identified the principal sides of the debate on the personhood of the early embryo. For one group, those who argue for delayed hominization (delayed personhood) until some designated post-fertilization event, ES cell research is generally non-problematic. For those who argue for immediate hominization, however, ES cell research is immoral because it is the destruction of a new human being who is a person. The principal arguments against immediate hominization are that the early human embryo is not a person because: 1) it does not function or behave like a person; 2) it lacks developmental individuation; 3) it is not independent in its developmental process; 4) it lacks a future and, therefore, lacks interests; 5) it is too nascent a form of life; and 6) it does not meet the construct of personhood defined by social convention.

The principal point behind the first of these arguments, the personhood-as-function argument,[15] is that the human embryo does not function or behave like a human person because it lacks the human spiritual powers and their activities which are essential to personhood. The significant physiological datum that bolsters this position is that the human embryo lacks a neocortex, the organ of central control (OCC), which makes person-defining behavior possible.

Only if the human embryo were capable of representative, brain-dependent personal activities[16] such as consciousness, reasoning, self-motivated activity, capacity to communicate, and self-consciousness would the embryo enjoy the constitutional right to life, liberty and the pursuit of happiness.[17] Since human embryos are not self-conscious, do not communicate, and so on, their membership in the species *homo sapiens* is not enough to also earn them a place in the moral community of persons.

[15] The functional definition of human personhood has several variations. I present that of Mary Anne Warren ("On the Moral and Legal Status of Abortion," *The Monist* 57 (1973): 55),N but Tristam Engelhardt proffers a different set of characteristics and ups the ante of the discussion by advancing the notion that members of animal species who are capable of sentience and have consciousness are closer to the moral status of persons than, say, the unconscious embryo and early fetus.

[16] In *Humanhood: Essays in Biomedical Ethics* (Buffalo: Prometheus Press, 1979):12–16, ethicist Joseph Fletcher presents his original list of person-defining behavior that originates from a 1972 *Hastings Center Report* article: minimum intelligence, self-awareness, self-control, a sense of time, a sense of futurity, a sense of the past, the capability to relate to others, concern for others, communication, control of existence, curiosity, change and changeability, balance of rationality and feeling, idiosyncrasy, neocortical function. Subsequently, he narrowed humanhood indicators to four traits with neocortical function the cardinal criterion: neocortical function, self-awareness, interrelationships, euphoria (which he explains as that of a retarded but happy child). "Four Indicators of Humanhood-The Enquiry Matures," *Hastings Center Report* 4 (December, 1974), 4–7.

[17] "On the Moral and Legal Status of Abortion," *The Monist,* 43–61.

The guiding principle for this position is that any being who lacks the enumerated capacities lacks personhood.[18] Accordingly, human beings whose consciousness is permanently non-functional, those with no appreciable mental capacity, or human embryos incapable of sentience and registering no brain waves possess genetic humanity but not personhood. Stating the principle positively: any being who possesses the enumerated powers enjoys personhood. Thus, if self-conscious robots or computers are developed or rationally intelligent extraterrestial beings discovered, such entities would be persons, no matter their lack of human genomic material.

A secondary argument in the personhood-as-function theory dictates that only powers determinative of a person that are capable of functioning in the here and now are real, and only here and now functional human beings are persons. Function proponents object to any use of the word potential—as in "the embryo has the potential for human development," or "the embryo has the natural capacity or potency for personal behavior"—that implies that such powers are really present in the embryonic human being here and now. Proponents of this position insist that what follows from potential qualification for human behavior and their concomitant human rights is potential, not real, capacities and rights. Potential activities become real and ground moral rights for the human only in the future when they are actualized.[19]

[18] In earlier discussions of the personhood-as-function theory, proponents cited only one or two person-defining characteristics (e.g., self-consciousness, rational thought) rather than the panoply of activities enumerated by Warren et al. George J. Annas, Arthur Caplan, Sherman Elias criticized the latter, which they called a pluralistic framework, in their evaluation of the ethical perspective of the 1994 Human Embryo Research Panel report. Their principal objection applies equally well to the NBAC's position: " ... the pluralistic framework ... is not convincing. This is so primarily because that framework requires a detailed analysis that explains why the particular properties cited confers moral worth, or to what degree each property cited is necessary and sufficient. Without such an underlying rationale, the framework looks like an attempt to rationalize a desired conclusion, namely that some research on embryos ought to be permitted—rather than to derive a conclusion from an ethical analysis." Sounding Board, *NEJM*, 334 (May 11, 1996): 1330.

[19] Joel Feinberg (whose work is cited in the NBAC report) not only uses the same reductionistic definition of potential, but also misrepresents the meaning intended by persons who defend the embryo's personhood based on its radical genetic potentiality for human development and for human activities. He claims that the logical error in their thinking is based on deducing "actual rights from merely potential (but not yet actual) qualification for those rights." He concludes that "[w]hat follows from potential qualification, ... is potential not actual, rights; what entails actual rights is actual, not potential, qualifications." But using potential in its comprehensive Aristotelian sense, I am arguing that one can base the rights of human embryos on real or actual qualifications, powers that, although they have not been actualized, are in active potentiality to be perfected. The potential of a human embryo's natural capacity to think is as real and personally significant as that same capacity in its actualized state. The embryo's potential or radical capacity, when potential and radical are understood adequately, does not show that the embryo has the potential for *becoming* a person, but demonstrates that the embryo *is* a human person who has the potential to develop into an adult human person. ("Abortion" in *Matters of Life and Death*, ed. Tom Regan, [Philadelphia: Temple University Press, 1980], 201.)

Critique: The NBAC report concurs with personhood-as-function theorists that human embryos are not persons, but admits several difficulties[20] with the theory itself whether its proponents identify personhood with one or two activities or with a cadre of functions.[21] Either way, the NBAC recognizes that the hypothesis is either under- or over-inclusive. Ultimately, it excludes all but adult human beings from personhood status or awards moral status to nonhuman creatures that otherwise fail to meet even a generally-accepted, commonsense notion of human personhood. On its face, the theory is counterintuitive. You and I spend a great deal of our lives eating, sleeping, relaxing, all the while engaged only minimally or not at all in the person-defining activities of thinking, planning, and self-reflective interaction with the world. Yet few of us would concede that we lose our personhood while asleep or daydreaming, while anesthetized or in a temporary coma. In fact, it would be homicide to deliberately kill any one of us who is anesthetized, since the latter continues to enjoy his or her right to life even though, under anesthesia, he or she does not manifest person-defining activities.

Beyond the obvious shortfall of identifying personhood with function, the theory has other serious flaws that the NBAC failed to distinguish. First, the person-as-function theory dichotomizes humanhood and personhood and then trivializes the former, humanhood, and reduces the latter, personhood, to what John R. G. Turner designates as "some phenomenon within the developing mind."[22]

With its roots in Cartesian thought, this theory mistakenly identifies personhood with thinking. Descartes' famous dictum, "Cogito ergo sum" (I think, therefore I am) highlights the problem. But this is a reductionistic concept of personhood that loses sight of the forest (whole person) for the trees (its component parts). It falls prey to the spurious Platonist and idealist conception, a kind of neo-angelism, that represents the human person as a pure intelligence or as a self-conscious being who only has or uses its body. A minimum of self-reflection disproves this conclusion and confirms that we humans are bodily persons whose body reveals the person; the body is an essential component of who we are. herefore, a person is a living body—not a disembodied capacity to think, to choose, or to be self-aware. Everyday human experience teaches us that, as thinking bodies, each of us is rooted in the natural world from which he or she has evolved. A person's intellection and freedom emerge as culminations of complex processes all of which depend on a bodily substrate and its ongoing physiological development over an extended period

[20] The NBAC admits that those who argue for delayed hominization do not convincingly establish at which point or why a particular juncture of fetal or embryonic development is person-defining. But the Commission does not fault or dismiss their conclusions regarding the moral status of the human embryo since, in their experience, those who argue for immediate hominization and who oppose the destruction of embryos "likewise fail to establish, in a convincing manner, why society should ascribe the status of persons to human embryos." NBAC report, Vol. I, 51.

[21] The 1994 Human Embryo Research Panel referred to the more-than-two personhood criteria as the pluralistic requirement. Their intent in endorsing this position was to avoid a definition of personhood that was simplistic. (See footnote 18.)

[22] *New York Times Online*, review of Lori Andrew's book, *The Clone Age*, September 19, 1999.

of time. Human personhood, then, is coextensive with all of the physical-metaphysical composite that we call a human individual. More than just an intellect or pure consciousness, the human being is, by nature, a thinking organism or embodied intelligent freedom.[23]

A telling inconsistency of the functional theory reveals the incoherency of its dualistic conception. Proponents of this position marginalize the body and bodily matter while underlining the intellectual powers and personal behavior as the sole qualifier for personhood. But the theory also insists that personhood is possible only when functional capacities are manifest. With this last move, however, the theory inadvertently accentuates (and implicitly admits) the necessity of the body since functional behavior is only possible in the presence of a sufficiently developed body, the essential substratum for person-defining activities.

Second, the functional theory of personhood fails to recognize that the powers that define personhood, both natural and functional, are present in the organic structure of every human being and are essential to its nature. Person-defining powers are present in their developed or functional state in adult human beings, but they are also present in their undeveloped state, simply as capacities to develop mature and effective human behavior, in embryonic, fetal, and neonatal human beings. Both phases of human powers, the natural and the functional, are real, and both define the same human being in which they reside, whether at its embryonic or adult phase, as a human person. Thus, the embryonic human being, though lacking the functional capacity of the adult state, has the natural, real capacity or potential[24] to be a free, self-aware moral agent, and is, therefore, naturally and really, a human person. In short, the human embryo is a real person with substantive potential for development and self-expression.[25]

Contrast the previous statement with the understanding of functional theorists. For the latter, an embryonic or fetal human being's potential qualification for person-

[23] Benedict M. Ashley and Kevin D. O'Rourke have crafted their definition of person—"embodied intelligent freedom"—carefully. "The static view that humanhood is separate from personhood fails to recognize that a human person is not a pure intelligence as is an angel—as Plato and philosophical idealism have always contended—but a *bodily being*, evolving out of the natural world yet never separated from it. Consequently, human self-awareness and freedom emerge only at high points of a very complex process, much of which is subconscious and dependent upon bodily development and function.... The whole life process involves a development of this unique body-mind in constant interaction with its environment." *Health Care Ethics: A Theological Analysis,* 4th edition (Washington, DC: Georgetown University, 1996), 6.

[24] In human embryos who are actually persons, the potentialities associated with humans are real but must be actualized over time. Those potentialities are rooted in the real and actual person of the human embryo. The spiritual soul or life principle of the human embryo is the source of life (it is a living being), unity (it is an organism and not merely a collection of individual cells) and specificity (namely, it is a member of *homo sapiens*). The person, then, results from the fusion of matter and spirit.

[25] The potentiality of an embryo is passive in character to the extent that it is something that is acted upon by outside agents. But, like all material, changing things, the potentiality of the human embryo also has an active character. All living substances or

hood is merely a logical possibility—a not-yet-actual qualification, signifying only that the embryo or fetus or neonate has the potential of *becoming* a human person at some later point, the potential of manifesting personal behavior later along in its developmental continuum. But, as Robert E. Joyce points out, "[e]very potentiality is an actuality. A person's potential to walk across the street is an actuality that the tree beside him does not have. A woman's potential to give birth to a baby is an actuality that a man does not have. The potential of a human *conceptus* to think and talk is an actuality."[26] Thus what is potential in the human embryo is not its personhood or its natural capacity for person-defining activities, but its functional capacity or exercise of person-defining behavior.

If the active potentialities of the embryonic human being should fail to develop to their functional state due to illness or injury, the individual concerned does not lose his or her human and/or personal status. Take the case of a severely autistic child. Although we consider the state of being autistic an abnormal one because the individual's natural capacity to communicate with the world in a self-reflective way, a potentiality common to all persons, has never adequately developed, the personhood of the autistic child is intact. A human person does not cease being a person just because he lacks the functional capacity of interrelating with others using an abstract, syntactical language. An autistic child retains the natural capacity to do so and that natural capacity exemplifies his personal status. It is also true that, if the active potentialities of the embryonic human being for person-defining activities do develop to their functional state, the resulting behavioral activities of writing, thinking, willing freely, etc., do not signify the beginning of that individual's humanhood or personhood. Their manifestation merely represents stages in a lifelong developmental continuum during which the developing human being becomes ever more fully what it already is. The perfection of natural human capacities to the here-and-now expression of person-defining activities represents high points of human functioning, not the first time human powers, and the human rights associated with them, exist.

Third, the personhood-as-function theory fails to recognize that human powers are not some sort of free-floating characteristics but inborn capacities that are natural to an individual organism of human genomic material. Every living creature has its own distinct nature. The human genome underscores this reality. In contrast to artifacts like computers and cars that come to be part by part, every living organism—turnip, chimp, human—comes to be all at once, though its development to maturity may be extended over a span of time. And, at its genesis, each possesses its genome-specific plant, animal, or human nature with its inherent powers or potencies for activity characteristic of turnips, chimps, and humans respectively. If the zygote chimp is not a chimp at fertilization, it will never be one. And, if the human zygote is

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organisms are 'potential' in both the active and passive senses. The cells and organs of the human embryo have the passive capacity to be organized and developed, but the embryonic human being also possesses the active potentiality to develop, differentiate, and regulate itself. (See Ashley and O'Rourke*, Health Care Ethics*, 231–32)

[26] "The Human Zygote Is a Person," in *Abortion: A New Generation of Catholic Responses*, ed. Stephen J. Heaney (Braintree, MA: The Pope John Center, 1992): 32.

not a person at the completion of its fertilization process, it will never be one. What post-fertilization growth and development signifies is that the organism—turnip, chimp, human—manifests what it is by nature and what it was from the beginning in a manner proportionate to its developmental stage.[27]

It is true to say, then, that these inborn powers of essential personal characteristics are as real at the first phase of a developing human organism as they are at later stages when they appear in their developed or functional state. When I was a single cell zygote, I had the same potencies or powers of rational thought and self-awareness as really as I do now as an adult human being, except in a less developed state.

Someone may question the realness of these person-defining powers in the embryo by objecting that we cannot empirically observe them. But neither can we observe them in a sleeping or comatose adult. The functional capacities of an entity are only known after its behavior is observed over an appropriate time span. We do not know the properties of water, for instance, simply by looking at a glass of water; we must observe its effects in different solutions over a protracted period of time. So with living organisms. We come to know their powers by watching their self-development and interaction with other things over time. The embryologist observes the embryo's maturation and interaction with the environment over several months. In this way, he comes to know the powers that the embryo possesses and that these originate as natural capacities at the completion of fertilization, not before and not after. That these powers are real accounts for the fact that a human embryo does not develop into something other than what it is programmed to be by its human nature and its natural capacities.

Finally, the functional theory of personhood is faulty in its reduction of person status to appearance and to something that can be empirically demonstrated. It concludes that human embryos could not possibly be persons capable of person-defining acts because they do not resemble or look anything at all, or very little like, a human child or adult. As Mary Anne Warren argues, the human fetus "whatever its stage of development, satisfies none of the basic criteria for personhood, and is not even enough *like* a person to be accorded even some of the same rights on the basis of this resemblance."[28] Perhaps, if embryos were capable of functional behavior such as talking or interrelating, the argument continues, they might arouse emotions of compassion or attachment.[29] Human embryos, it is said, simply fail to elicit feelings of fellowship when we look at them in a petri dish or under the microscope. But, one wonders, would we be rid of slavery or the systematic annihilation of Jews today if we were to persist in awarding or denying personhood and its concomitant basic human rights on the basis of sight and feeling?

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[27] Robert E. Joyce, "James Q. Wilson, 'On Abortion': A Reply," *The NaProEthics Forum*, Vol. 3, No. 1 (1998): 3.

[28] Warren, "On the Moral and Legal Status of Abortion," 47.

[29] From a similar emotivist base, James Q. Wilson proposes that abortions would be chosen much less frequently if the women involved would base their decision on their emotional and intuitive responses to pictures and videos of what they might abort. The pregnant woman should be told, "You are X weeks pregnant, as near as we can tell. The embryo now looks about like this (pointing). In another week it will look like this (point-

Human personhood is a moral characteristic, that is, immaterial and, *in se*, invisible. But just because the characteristic of personhood, whether in the embryonic or adult human being, is not self-evident or palpable does not mean that it is not real.[30] The theory of quantum mechanics is also beyond our direct experience, yet physicists assure us that it is real and, in fact, describes reality in its most basic, subatomic level. We can neither see personhood nor can we necessarily respond emotionally to it even in a fully functioning adult. Discerning personhood, then, must be seen not as a matter of a visceral affective response, or of *prima facie* empirical observation, or of direct experience. All living things come to be all at once and then develop over time. We cannot describe the nature of an oak tree by observing only its dormant stage in the acorn or the nature of a butterfly in its larval stage. *A fortiori*, we discern personhood of the human embryo by inferring the existence of its person-defining powers through observation of its behavior, not only at the embryonic stage, but also from fertilization to maturity.

Lack of Developmental Individuation

Margaret Farley, professor of Christian ethics at Yale University, in her expert testimony before the NBAC, identified another delayed hominization theory, one held by certain Catholic theologians who "do not consider the human embryo in its

ing). You should know this before you make a final decision." Wilson predicts that the woman's visceral responses would lead her to declare "it's a baby" to visuals of the developing embryo and fetus anywhere from the fifth to tenth week of gestation, much sooner than she would without the pictures. The reason is simple. At this gestational phase, the developing baby begins to look or to take on the appearance of a human being and it is this resemblance, Wilson predicts, that will and should arouse moral sentiments in the mother. But the arbitrary nature of Wilson's experiment becomes apparent when, let's say, the father of the child is shown the same visuals as the mother, and declares "that's a baby" at the fourteen week fetus stage rather than the ten week fetal stage of the mother's choice. So, is the fetus a person at ten weeks or at fourteen weeks?

[30] Leah Wild, weighing in on the debate that surrounded the UK decision (August, 2000) to clone embryos for research purposes, provides a clear example of the role emotions and the naked eye play in what could be called "progenitor positivism" (i.e., maternal and paternal fiat determines the moral status and the fate of conceived embryos): "There were eight fertilized embryos sitting in eight little dishes. The cytogeneticist showed us their photographs—enough for any family album, except these black and grey forms had nothing discernibly human about them. An amoeba would have looked more engaging. One was clearly oblong. This was alarming. I envisaged a child with a long rectangular head, square eyes, diamond-shaped nostrils and a mouth with a little pointy, cornered smile, like a pixie. But then it was rather early to be envisaging any child at all. These embryos were the size of a pinprick, just eight cells—seven now that one had been removed to test for my genetic condition." Her decision regarding the potential personhood of her embryos, however, is as clearly contradictory as that of the NBAC's report when it approvingly quoted those who insisted that, since preimplantation embryos will die anyway, it's better to put them to some good use. Wild refers to the transferred embryos at one point as her "six spares" and as "the unwanted byproducts of infertility treatment." But almost in the same breath she refers to the two implanted embryos as the "biological brothers and sisters of the unimplanted embryos." While she regards the latter only in utilitarian, objectivized terms, she looks forward to the former bringing "joy" to her and her boy-

earliest stages ... to constitute an individualized human entity."[31] Although Farley does not develop the position, she is referencing the well-published opinion of several Catholic theologians[32] who argue that personhood begins at or around day fourteen at the appearance of the primitive streak, a point after which twinning is no longer possible. Pre-primitive streak, the embryo may be genetically unique but not developmentally individuated.

The kind of twinning that is at issue in this discussion is monozygotic twinning.[33] The latter can occur when the embryo splits at one of several stages. At the earliest, monozygotic twinning is thought to occur at the two-cell stage and results in two separate zygotes each of which usually has its own placenta, chorion, and amnion. A later kind of twinning occurs at the early blastocyst stage during which the cell mass or embryoblast splits into two groups of cells within the same blastocyst producing twin embryos that share a common placenta and chorionic cavity but that have separate amniotic cavities. And the third form of monozygotic twinning occurs at the bilaminar germ disc stage, just before the appearance of the primitive streak, with the two resultant twin embryos sharing the same placenta, chorion, and amnion. The rarest kind of twinning, conjoined twins, form at an even later stage of development resulting in a partial splitting of the primitive node and streak.

Those who propose twinning as proof of delayed hominization argue that if an embryo splits into two you cannot claim that the original embryo is an individuated or single organism, that is, a person. A single person cannot divide into two persons because neither of the two resulting organisms would be identical to the first.

Critique: Understanding the biology behind twinning is the best rebuttal for the delayed hominization claim of developmental theorists.[34] The multi-celled organism of the early embryo is programmed to function as a complex unit and to move as a whole toward a myriad of developmental goals. Twinning does not normally occur in human reproduction because in humans it is disadvantageous both to the mother and to the normal development of the offspring. As an exception to normal development, monozygotic twinning appears to be a developmental accident that results 1) from an internal cause that is either a genetic defect (such twinning seems sometimes to run in families) or some mishap in the functioning of the normal mechanism that maintains the organic integrity of the embryo; or 2) from some external interference that causes the separation of one or more cells from the original embryo as happens in experimental manipulation. In early-stage monozygotic twinning that

friend. ("The fate of six flawed embryos," http://www.guardianunlimited.co.uk/Archive/Article/0,4273,4051885,00.html).

[31] Expert testimony at the NBAC meeting, May 7, 1999, Washington, DC, NBAC report, Vol. I, 50.

[32] These theologians include, but are not limited to, Richard McCormick, John Mahoney, John F. Dedek, Charles E. Curran, and Bernard Haring.

[33] T. W. Sadler, ed., *Langman's Medical Embryology*, 8th ed. (Philadelphia: Lippincott Williams & Wilkins): 150–155.

[34] Benedict Ashley, O.P., and Albert S. Moraczewski, O.P., "Is the Biological Subject of Human Rights Present from Conception?" in *The Fetal Tissue Issue*, eds. Peter J. Cataldo and Albert S. Moraczewski (Braintree, MA: Pope John Center, 1994), 43.

takes place at the two-cell stage, one of the totipotent cells breaks away from the original embryo or two-cell zygote. Through the power of regulation,[35] the second embryo begins to divide and to develop as a single organism making up for the cell it lost through normal cell cleavage. The original organism, also through its power of regulation, restores the cell lost to it and then continues with the normal process of embryonic and fetal maturation. Understood thus, the formation and development of the second embryo does not take away from the developmental individuation of the first, nor does it compromise its own singleness or unity.

In second-stage twinning that occurs in the early blastocyst, the cells that break away from the original inner cell mass or embryoblast are pluripotent. Since the trophoblastic tissue (precursor to the placenta) is already formed, the break-away cells that make up the second embryo are not totipotent. They are not capable of producing the trophoblast as were each of the cells in the two-cell stage zygote. However, the pluripotent cells that separate from the early embryoblast do have the potency or capacity to develop into all of the embryonic and post-embryonic cells, tissues, and organs necessary to the normal development of the twin embryo.

The two-cell zygote and the early blastocyst that preceded the twinning are individuated organisms. The capacity of each of the second of the twin embryos to develop into an entire human organism is actualized. The example of embryos produced by SCNT helps us understand this kind of asexual reproduction: the cloned embryonic organism is produced from the somatic cell of the original individuated human organism. Similarly, in the way that one amoeba can split into two with the original amoeba intact and the second a new organism, the first embryo (twin #1) remains an individuated human organism as before and the second organism (twin #2) begins its individuated human life after its separation from the first embryo.

Understood thus, twinning proves rather than disproves the developmental individuation of the original human embryonic organism. Twinning would never occur unless an original embryo began to develop normally up to the point of twinning. The normal development of the first embryo is possible only because it is guided by its genome, proving that it is already a fully individuated organism. Experimental cloning of a second individual animal from cells taken from a first individual animal does not imply that the first animal was not already a complete individual organism. Similarly, in twinning, the detachment of some cell or cells from the original conceptus that by reason of their totipotentiality or at least pluripotentiality can develop into a second, genomically identical individual does not disprove but confirms that the first individual existed in organic integrity.

Finally, the concept of cordoning off a human embryo's genetic individuation from its developmental singleness is an artificial one, since it flies in the face of what we know about the whole of human development. What guides all of the developmental process of the human individual from its single cell stage into that of adult-

[35] Regulation is "the power of the embryo to continue normal or approximately normal development or regeneration in spite of experimental interference by ablation, implantation, transplantation, etc." Robert C. King and William D. Stansfield, eds., *A Dictionary of Genetics*, 5th ed. (Oxford University Press, 1997): 293.

hood is its genome, together with, of course, the initial and ancillary role of maternal and other factors. Rather than separating genetic individuality and developmental singleness, both ought to be included in the definition of human personhood. That the essence of development or process is the emergence of new realities is an important insight for our discussion of twinning. Benedict Ashley, O.P., and Kevin O'Rourke, O.P., point out that discerning when personhood begins from the perspective of development requires that we determine the critical juncture in the process of reproduction at which a new second organism exists (twin embryo) where there was only one before (original embryo) or where there were two incomplete organisms before (sperm and ovum) there is now a unique third complete human organism (human zygote) with the capacity for full human development.[36]

The NBAC report subscribes to the position that gastrulation and the appearance of the primitive streak *in vivo* is the earliest point to which one could attach significance in respect to the moral status of the gestating human embryo. Although it does not admit that human personhood begins at this point, it does describe this juncture as critical since it marks the beginning of "organized development" in the human embryo and the onset of sentience.[37] The findings of a study reported in the journal *Cell*[38] have important implications for the developmental significance of what was previously thought to take place in mammals at gastrulation and the appearance of the node and the primitive streak. The findings suggest that the definitive axes of the mammalian embryo (anterior-posterior, left-right, dorsal-ventral) that are morphologically associated with the emergence of the primitive streak are set much earlier in embryonic development and may perhaps be laid down as early as the first cell stage, or zygote. If this is so, and if it is as equally characteristic of human embryos, it represents one more reason to argue that the cellular entity of the human embryo that precedes the appearance of the primitive streak can hardly be categorized as an unorganized mass of cells, as the NBAC implies, or that the development from days one through thirteen ought to be bracketed from "organized" embryogenesis. But even if the developmental significance previously attributed to the appearance of the primitive streak stands, it does not constitute a radical (substantial) change that would herald the ontological beginning of a human being who is somehow discontinuous from the precursor embryonic entity formed at fertilization.

The new field of proteomics helps us appreciate the complexity of one facet of embryonic development, the production of proteins, a process that occurs as early as the zygote stage of the human embryo. IBM has designed a computer, dubbed the Blue Gene, to advance the field of protein structural genomics (proteomics). A machine five hundred times faster than any before it, Blue Gene operators will have to expend an entire year's worth of number crunching in order to calculate how a single protein folds into its proper shape.[39] The complexity of protein production—

[36] *Health Care Ethics*, 230.

[37] NBAC Report, Vol. I, 6, 10.

[38] Rosa S. P. Beddington and Elizabeth J. Robertson, "Axis Development and Early Asymmetry in Mammals," *Cell*, 96 (January 22, 1999): 195–209.

[39] Andrew Pollack, "The Next Chapter in the Book of Life: Structural Genomics," *The New York Times on the Web*, Science/Health, July 4 (2000).

and the fact that it is programmed to occur in the early human embryo—helps us appreciate, in turn, that from fertilization onward the developmental process of embryogenesis is programmed to proceed as a consistent whole in which any missed step, including production of even a single protein, could spell disaster for the developing (or mature) human being.

Lack of Independent Development

According to Conservative Judaism, the fetus until the fortieth day after conception is "like water." And then, as Rabbi Elliot N. Dorff [40] explained to the Commission, from the fortieth day until birth, the fetus, although entitled to a certain amount of respect and protection, "remains primarily a part of the pregnant woman's body." Although this conviction is based on outdated biology, the seminal concept of the embryo or fetus as a being indistinct from or essentially dependent on its mother is alive and well, even among contemporary bioethicists. In the discussion that followed Margaret Farley's expert testimony before the NBAC, a discussant went so far as to say that an IVF-produced embryo that is not transferred "cannot be alive without the uterus in which it is implanted ...."[41] Carlos Bedate, S.J., and Robert Cefalo,[42] hold that the complex organization of the embryo from fertilization forward does not, by itself, qualify the embryonic human being for personhood.The early human embryo requires from its mother, especially during its first fourteen days, "additional information necessary for its normal development," and for that reason does not have the requisite independence, particularly developmental independence, characteristic of persons. These authors use the formation of hydatidiform moles to underscore their point that "an individual zygote, even when biologically perfect, does not possess in itself all the necessary, and surely not sufficient, information to become a human person."[43] That human persons are complex organisms that do not depend on others for their essential development is the primary presupposition in this theory of personhood.

Critique: The person-as-independent theory fails to recognize that no human being, including the adult human, is completely independent. A human baby, prepartum and postpartum, depends on its mother for the same things: nutrition, protection, and a healthy environment. For that matter, adult humans depend on the work and investments, creativity and inventions of others to provide food, shelter, education, and a healthy ecosystem. With our current focus on a global mentality, we see clearly that no single human individual is a completely autonomous being, and all living substances are connected and interdependent. An accurate picture of the way human developmental biology works is summed up in the universal law of epistasis:

[40] Expert testimony at the NBAC meeting, May 7, 1999, Georgetown University, Washington, D.C. (http://bioethics.gov/transcripts/may99), 64.

[41] Ibid., 38.

[42] "The Zygote: To Be or Not To Be a Person," *Journal of Medicine and Philosophy*, 14 (1989): 641–645.

[43] Ibid. A member of the Nebraska Bioethics Advisory Commission argues in a similar fashion: "Embryos resulting from IVF cannot fully develop without implantation to a completely developed female human. This process requires human intervention. Thus, the embryo itself can only be viewed as a potential independently surviving human being."

"Nothing is simple, and everything depends on everything else."[44]

In the case of the human embryo, then, while it is true to say that it is not an absolutely closed system depending as it does on its mother's body for nutrition, the disposal of human waste, a temperature compatible with health and growth, and protection, it is not true to say that that sort of relative dependence counts against its personhood. The human organism comes into existence at the point when it is organized enough to be a functioning biological unit that is *relatively* independent of other substances and that carries on at least some of the processes such as homeostasis and development to maturity characteristic of living beings. As an organism, then, the human embryo is a complex unity with a relatively independent existence.

It is also important to note that the human embryo with its unique genome is a distinct being from that of the mother, even though dependent on her for certain things. That *ex vivo* embryos develop anywhere from five to fourteen days *in vitro*, as they would in the womb, without help of their maternal host, demonstrates that embryos are self-constructing and self-preserving beings. As argued earlier, the active potentialities of the human embryonic organism to develop and regulate itself produce the necessary changes in the embryo so it can progress from its embryonic to its fetal and eventually to its adult stage. The embryo's capacity for self-construction proves that early developmental and homeostatic events—regularly-timed mitosis and the formation of blastomeres, formation of the *zona pellucida*, differentiation into trophoblast and embryoblast, processes like methylation that silence some genes and turn on others, the production of protein and enzymes to facilitate molecular construction culminating in the production of DNA—are in an integral way initiated and controlled by the epigenetic OCC, the nuclear DNA of the one-cell human zygote.[45] Although it appears that, *in vivo*, early mitotic events up to the eight or sixteen-cell stage embryo are controlled largely by maternal cytoplasm, the mitotic divisions would never take place if the embryo's nuclear DNA had not been active to a significant degree.

In reference to the connection that Bedate and Cefalo draw between moral status and the formation of hydatidiform moles, it is inaccurate to argue that, since these prove that a normal human zygote can give rise to a nonhuman entity, no human zygote can be classified as a person. Research shows that hydatidiform moles develop from a pseudo-zygote (lacking maternal chromosomes) rather than from a normal zygote[46] (possessing half of its chromosomes from the male pronucleus and half from the female pronucleus). Therefore, rather than arguing that the formation of a hydatidiform mole proves that human zygotes before day fourteen need additional information from their mother for their self-development, research

[44] Natalie Angier, "The Human Genome Abounds in Complex Contradictions," *The New York Times on the Web*, National Science/Health, June 26 (2000).

[45] Ashley and O'Rourke, *Health Care Ethics*, 229; Ashley, *Theologies of the Body*, 30.

[46] Geneticist Jerome Lejeune speculated that the presence of two sets of male chromosomes and the death of the female pronuclei in hydatidiform moles results from the presence, in the female gamete, of a methyl group attached to the base nucleotide, cytosine, which suppresses the expression of the respective genetic information which is

confirms what common sense would dictate. When you start with human tissue that lacks the maternal genetic contribution necessary for the proper development of a human organism (that is, a pseudo-zygote) you necessarily end up with a product that is also not a human organism (hydatidiform mole).

No Future Means No Interests

The no-future-no-personhood position argues against the personhood of a specific category of embryos: 1) those that are leftover or "spares" from an IVF procedure that are subsequently donated by their progenitors for research; or 2) those that are produced exclusively for research through IVF or SCNT. Since the use of IVF spare embryos is one category that the NBAC approves for federally funded ES cell research, this argument is an attempt to apply situation-specific criteria to some embryos, creating, thereby, an embryonic hierarchy. *Ex utero* embryos rank below those *in utero*; fresh *ex utero* embryos rank above those that are cryopreserved, and abnormal *ex utero* embryos (triploidy, for example) are inferior to normal fresh or frozen preimplantation embryos.

The argument for the no-future position is straightforward. Whether cryopreserved or "fresh," *ex utero* embryos intended for ES cell research will never be transferred to a woman's body and in that sense have no further possibility for development beyond the five or fourteen day stage. As John Fletcher points out in his expert testimony before the NBAC, " ... without implantation and gestation to fetal viability and beyond an embryo can have no interests that society ought to protect."[47] Furthermore, Fletcher insists, one cannot harm an unimplanted embryo through research because it is non-sentient (pre-primitive streak) and has no interests for us to protect as would an implanted embryo after manifestation of its rudimentary sentience. The principal assumption of this argument is that the potential of an embryo for development to term and beyond is morally determinative and should be applied to both *in utero* and *ex utero* embryos.

Critique: The no-future-no-personhood view fails to recognize that personhood is not some extraneous characteristic of the human individual. Human beings are human beings naturally, that is, in light of their intrinsic human nature. Part and parcel of having a human nature is having the corresponding human powers or potentialities for person-defining behavior. Consequently, a human embryo is not a person because you or I plan to give it the opportunity of transfer and gestation; a human embryo is a person based on his or her own inborn essential makeup. Personhood, then, is something I discover or recognize in a fellow human being; not something I first concoct and then award to another human.

Likewise, just because other persons have an extrinsic end for which they wish to use the human embryo, research for example, this end does not eradicate the essential nature of the embryo and, as I have argued thus far, the necessary personhood

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vital for normal zygote formation. In order for a true human zygote to form, the complementary presence and absence of the methyl group in sperm and ovum is necessary. (See p. 47–48 of Lejeune's testimony before the Circuit Court for Blount County, Tennessee at Maryville, Equity Division, custody dispute over seven human embryos, *Davis* v. *Davis*.)

[47] Vol. II, NBAC report, E-26.

of the embryo. An embryo is an embryo is an embryo, no matter what any external human agent intends to do with or to it.[48] The potency (natural or active capacity) for human development is actually present in both *ex utero* or *in utero* embryos, and no amount of extraneous uses is able to eradicate this natural capacity. The duty of researchers is to judge all embryos against the rule of the normal situation of *in utero* embryos who as individuated, human organisms will progress gradually along the continuum of human development that comprises their entire lives. What researchers or progenitors might willfully do to change that normal course of events by their respective "plans" or uses for the embryo does not in any way eradicate the essential humanhood and, therefore, the personhood of those embryos.

Too Nascent a Form of Life

Many times, the argument that denies personhood to the embryo because of its inchoate development presupposes the Aristotelian/Thomistic theory of delayed hominization. As Farley attests, the movement among some Catholic theologians to argue for delayed hominization is "a return to the centuries-old Catholic position that a certain amount of development is necessary in order for a conceptus to warrant personal status."[49]

Contemporary variations of the traditional theory of delayed hominization identify personhood with the presence of the brain, the OCC, or a precursor to the brain. Hence, the early human embryo is not a person until it has progressed to the point of sentience with gastrulation and the appearance of the primitive streak. Or the developing fetus is not a person until the detection of brain waves at the second month of gestation. Or the developing human is not a person until the presence of the cerebral cortex (at approximately six months gestation with final differentiation not completed until middle childhood).[50]

The idea behind these various demarcation lines is that the body of the embryo/fetus must go through progressive stages of organization and formation until truly human activity—intelligent activity—is possible. The NBAC approves of this progressive personhood theory and grants that just as the embryo/fetus develops gradually toward greater psycho-physical maturity, "the respect others pay the embryo/fetus must also grow ever greater in a commensurate manner."[51]

[48] Gilbert Meilander, in his expert testimony urged "that we speak simply of embryos, not of the preembryo or the preimplantation embryo, which is really the unimplanted embryo." (http://bioethics.gov/transcripts/may99) 153.

[49] Farley, expert testimony at the NBAC meeting, May 7, 1999, Washington, DC, ibid., website address, 26.

[50] Accordingly, Ashley and O'Rourke explain that the reason Donceel, Pastrana, et al., conclude that before three months the embryo or fetus is not even an animal organism and *a fortiori* not human is because the cerebrum, essential organ to the CNS and to a truly human organism, is first observable in the fetus at three months gestation. This appropriation of Aristotle's theory of delayed hominization fails to appreciate its primary principle—hominization is possible when the matter of the developing creature is appropriately prepared or organized—and how that principle is fulfilled by what science tells us about the human embryo at its single cell stage. (*Health Care Ethics*, 236) (Cf. footnote 52 below).

[51] NBAC report, Vol. I, 50.

Critique: To appreciate the misappropriation and misinterpretation of those who subscribe to the Aristotelian delayed hominization theory, we need to explore the argument in more detail.[52] Aristotle rejected the Pythagorean and Platonist notion that the body is the tomb or prison of the soul and that the soul is infused into a body that is alien to it. The soul, according to Aristotle, is the natural form of the body: it informs or organizes, unifies, and specifies the matter of a human body. Thus, the soul is never viewed as something opposed or foreign to the body.

However, Aristotle did not think that the human soul with its complex spiritual powers could be present at fertilization because he also believed that the "matter" of the pregnancy was not proportionate to the "substantial form" of the human soul. An important point to keep in mind is how Aristotle (and Aquinas after him) understood the "matter" or the material principle of a pregnancy. At the conception of a human being, both philosophers held that the only available material substance was the woman's menstrual blood, a homogenous mass without any form or structure of its own. The matter of the menstrual blood had to be informed or given a form by the external agent of the semen that remained in the womb post-conception and formed the menses in a series of progressively perfecting phases. The process required some time (about forty days for males and eighty days for females)[53] before the semen formed the menses first to the level of physiological (vegetative) life and then to the level of sentient (animal) life. Aristotle emphasized that only when the fetal body reached this higher state of formation could it receive its final organization which required, in light of our human spiritual intelligence, "the direct action of the First Cause of the universe, the divine 'Thought Thinking Itself.'" Only after the successive lower order organisms received a rational soul, did the original matter of the menses become a human body, that is matter that is proportionate to a human soul.[54] The salient point here is that attaining humanhood and attaining personhood, according to Aristotle and Aquinas, are synchronous events. The individual human being and the human person come to be at the same time and the individual ceases

[52] Ashley and O'Rourke, *Health Care Ethics*, 228–229.

[53] Aristotle was a biologist and the son of a physician. He based his human ensoulment theory on the conviction that the heart was the organ of central control for the human being. He calculated the appearance of the heart in a human being based on data he gathered from an experiment with fertilized chicken eggs. Using eggs fertilized on the same day, he examined a different egg on successive days until he saw a red beating blob in the egg, indicating the presence of the primitive heart.

[54] Ockham's razor, or the principle of economy, holds that one must not multiply entities or explanations needlessly. Its practice is seen in the drive of physicists to formulate one grand unifying principle that would include and reconcile other principles such as gravity or quantum mechanics. So, too, in the field of embryology, the principle of economy dictates that one should not propose the existence of a new organism at each of the various junctures of embryological and fetal development. It is much closer to reality to propose that from fertilization onward, the developing human being is a single organism that undergoes multiple phases of development—embryonic, fetal, neonatal, child, adolescent, adult. See John Gallagher, C.S.B., *Is the Human Embryo a Person*? (Toronto: Human Life Research Institute, 1985) for a critique of the primary theories of delayed hominization with focus on the application of Ockham's razor.

to be a person when he or she dies, that is, ceases to be an individuated human organism.

Once we understand the ancient theory of hominization, the significance of four facets of the contemporary appropriation of that theory surfaces. First, the Aristotelian-Thomistic theory was based on faulty biology. However, if we look to the principle invoked in the theory and apply it to contemporary embryological science, we can conclude that the being or the matter of the zygote and early embryo is human because its body is human. That is, a greater portion of the information needed to construct the zygote's embryonic, fetal, and adult human body, including the human brain, is contained in its nuclear DNA. It is a human body because it is brought to life—informed, organized, unified—by the life principle of a human intellectual soul. In sum, the human zygote who is a human body informed by a human soul *is* a human person, i.e., an individuated organism.[55] Second, the fetal events of the appearance of the primitive streak and the developed brain indicate important stages in the maturation of the individuated human organism that began at fertilization, not the emergence of a new organism where there was previously none. Third, contemporary theologians, bioethicists, and persons of science and medicine that invoke the Aristotelian/Thomistic delayed hominization theory to defend personhood at some point post-conception fail to grasp the theory's primary principles: a particular body is human when it is animated or informed by a human soul. And, germane to our discussion, a particular human body that is alive by means of its life principle, the soul and all of its person-defining powers, is a living, human person.[56] Fourth, it is a paradox wrapped in an enigma that some Catholic theologians continue to cite, without proper appropriation, this obsolete controversy for delayed hominization and even to revive a competing theory of another medievalist, Duns Scotus, who was also misinformed. As I made clear initially, the discussion of personhood in the public forum ought to be conducted on a philosophical level, appealing to the common language of reason. Therefore, theories based on outmoded biology and of interest to a particular religious tradition are out of place.

[55] A common misconception is that the Roman Catholic Church condemns abortion because it is the destruction of an ensouled human being. In 1974, the *Declaration on Procured Abortion*, made it clear that, from its beginning, the Church's opposition to abortion followed from the nature of the action, a very grave evil approximating murder. In an important footnote (#19), the *Declaration* stated that it was prescinding from the discussion of the personhood of the developing human being in the womb because there was disagreement in the Catholic tradition about when ensoulment takes place: at fertilization or post-fertilization. But thirteen years after the *Declaration*, armed with the advances of embryological science, the Congregation for the Doctrine of Faith (CDF) in its *Instruction on Respect for Human Life*, concluded that the Aristotelian/Thomistic theory of delayed hominization as it stands is anachronistic because it is based on faulty biology. The CDF affirms that while biological data cannot in itself be "sufficient to bring us to the recognition of a spiritual soul; nevertheless, the conclusions of science regarding the human embryo prove a valuable indication for discerning by the use of reason a personal presence at the moment of this first appearance of a human life: How could a human individual not be a human person?" (*Instruction*, I, 1).

[56] William E. May, "Zygotes, Embryos, and Persons," Part II, *Ethics & Medics,* 17.1 (January, 1992): 1.

Personhood as a Social Construct

Baroness Mary Warnock (first Chair of the Warnock committee of Britain) deserves credit for publicizing and perhaps even popularizing the Lockean notion of personhood: an accidental rather than essential characteristic that one person—a mother or father, or a group of persons: the Supreme Court, a body of legislators, society—bestows on another. She also upholds an important assumption to John Locke's view of personhood, viz., that there is a distinction between being a human, a biological term, and being a person, a forensic term. In Warnock's words, "... [W]hether or not someone, or some corporate body, is to be deemed a person is something that must be *decided*. To settle it, we need to know the criteria that have been established for settling such cases, or else we must establish new criteria for ourselves."[57]

Critique: The personhood-as-function theory discussed above is a good example of Warnock's forensic concept. It sets down what kinds of behavior (criteria) the human embryo would need to manifest before it would qualify as a person. Whether someone concludes that the embryo fulfills the criteria is a matter of how well that individual understands person-defining capacities and how much his perception of the embryo is colored by an emotional response or lack thereof. Thus, the social construct theory of personhood is closely related to another idea already discussed: an embryo or fetus is only a person when it resembles a human being since only then is it capable of eliciting from another a feeling of being related, of being a mutual member of the moral community of persons. My criticism of the inherent weakness of visceral and affective-based decisions about the personhood of the unborn, elucidated earlier, applies here. Human personhood inheres in the human being naturally. Therefore, the role of an extraneous moral agent is to discover human personhood in someone based on the individual's humanhood, not to arbitrarily construct and award it to another; to follow right reason in the formulation of an adequate concept of personhood, not to entrust someone else's moral status to visceral reactions.

An indisputable conclusion of a critique of the social construction theory of human personhood is this: If all human beings, no matter their stage of development, are not persons before the adult human community and before the law, then the question of who is included and who is excluded from that community is forever condemned to the arbitrary and utilitarian will of the power-brokers that be. And let us not underestimate the ascendancy of scientists, whose power, at least in part, is driven by their bias for maximum freedom in research. Nonetheless, their argument that their investigation will bring great human benefits must not be allowed to override the rights of human beings, the human subjects of research, even if their personhood is perceived to be potential.

There is a much more reasonable, humane, and objective conclusion for the NBAC. Because we cannot decide at what point human life begins, we should not decide at what point abortion ought to be legalized. Since we cannot agree at what point in human development personhood begins, we also should not decide that

[57] "Do Human Cells Have Rights?" *Bioethics* 1(1987): 10–12.

destructive ES cell research deserves federal subsidy and/or legalization. What we *can* do is to honestly confront and objectively evaluate our decision-making in the area of ES cell research. Even if we concede to the NBAC report's definition of the human embryo for argument's sake, to be willing to destroy a form of human life that is substantially changing into a person is to be willing to destroy a person. What former Senator Bill Bradley said about racial discrimination applies equally to discrimination against the unborn: "We're truly at a time when we'll all advance together or each of us will be diminished."[58] For the sake of those of us whose personhood is uncontested, who were zygotes once ourselves, who reflexively understand that the development of our own personhood is a continuous process, we adults must responsibly exercise our moral agency by recognizing that to permit the destruction of even potential human persons is to grossly offend against the dignity and right to life of every person, developmentally mature or immature.

Immediate Hominization

Human beings become persons at the same time they begin their biographical, relatively independent, developmental, organismic journey called existence or human life. At the completion of the process of fertilization when the male and female pronuclei of the human progenitors' sperm and ovum are indistinguishable and lose their nuclear envelopes, the human creature emerges as a whole, genetically distinct, individuated zygotic human organism. This individuated human organism actually has the natural capacity for the person-defining activities of reasoning, willing, desiring, and relating to others. The human individual also possesses the actual, natural capacity to develop continuously into the mature (maximally differentiated) organism of a functional adult human being, the organic structural development of which is under the control of a sequence of primordial centers which begin with nuclear DNA or the genome, and eventually develops into the central nervous system, especially the fully developed brain with its cerebral cortex. (As pointed out above, monozygotic twins, triplets, etc., begin their single cell, zygotic stage not through the normal reproductive process of syngamy but through the asexual process of twinning.) The new zygote, a member of the species *homo sapiens*, with its particular (that is, genome-specific) bodily "matter" unified and organized,that is, formed or enlivened by means of its life principle—the soul and all of its person-defining natural powers—is a whole, living, human person. The difference between the individual in her adult stage and in her zygotic stage is not one of personhood but of development.

The Future of the NBAC

I began by saying that the NBAC had failed to provide persuasive moral argument for the federal funding of ES cell research *because* it had failed to argue convincingly for the non-personhood status of the human embryo. While I stand by that conclusion, and while I think a philosophical discussion of personhood is perfectly acceptable and even necessary, I believe that an even more basic error plagues the NBAC report. When all is said and done, and despite the fact that a tight, well-reasoned argument for the personhood of the embryo can be made, it does not have a place of primacy in a scientific discussion like that of the NBAC report. The term

[58] *The Journey from Here* (New York: Artisan, 2000), 60.

"person," after all, is not a biological concept, but a philosophical term, and a highly controverted one at that. Language that is apposite for a scientific forum that probes the status of the early human embryo ought to refer to the embryo in scientific, objective terms: as an organism and as a member of the human species. Embryological science teaches us that the embryo is a member of a species because, when developed to maturity, it will be capable of inter-breeding and producing fertile offspring. Science also demonstrates that the human embryo from its zygotic stage, or from the subsequent spontaneous production of a monozygotic twin, is a relatively independent organism that is a member of the human species. This, too, has been established objectively by embryological science beyond reasonable doubt, since the zygote, given the necessary input of nutrition and energy, is capable of self-development guided by a genetic code that can be objectively determined to be 99.9% identical to that of all recognizable human adults of the species.

It is with this basic scientific data that all discussion of ethical questions must begin. Ethical theories that ignore, distort, or contradict this data must be suspected of bias. Specifically, ethical discussions that introduce philosophical terms such as "potentiality" or "personhood" into what is, at base, a scientific matter defeat the main consideration: the defense of the human rights of individuals against, among other things, the undue eagerness of scientists for freedom of research under the guise that this will ultimately be to the advantage, not indeed of the human organism that is destroyed in research, but of others. Such dangerous ambiguities would never be tolerated in discussion of the human rights of women, children, Jews, Afro-Americans, Native American Indians, or the disabled.If President George Bush decides to appoint new members to the NBAC, it is of paramount importance that he seat professionals who believe that such equivocation should not be tolerated in discussion of the human rights of the unborn. For any ethics commission whose responsibility it is to advise a sitting president, to yield to these vagaries is to undermine the entire rationale for the defense of human rights and the legitimization of scientific investigation.