Biogenesis

The term *biogenesis*, coined in 1870 by Thomas Henry Huxley, refers to the emergence of life from existing life, whereas *abiogenesis* refers to the emergence of life from nonliving matter. The study of the origin of life involves both the physics of the possible (what *can* happen) and the history of the actual (what *did* happen). As will be discussed in a subsequent essay, when studying the past, which is inaccessible to direct observation, logical parsimony is the only available resource for evaluating explanatory utility.

Given hydrogen and helium, stellar nucleosynthesis supplies the cosmos with the heavier chemical elements. Underlying atomic structure places constraints on atomic interactions, such that chemical bonds occur with a certain geometry, allowing, for example, crystals to self-assemble nonmiraculously. Just as molecular potential resides in the structure of atoms, macromolecular potential resides in the structure of molecules. Organic compounds are observed within interstellar clouds and comets (Turner, B.E., 1980. *Interstellar Molecules*. J. Mol. Evol. 15:79). Planets form by the accretion of planetesimals within a protoplanetary disk.

Even if there is no single best, universal biology, the options are restricted. It is thought that life could only originate at the molecular scale and be based on carbon due to the variety, reactivity and adequately huge possibility space to be found in organic chemistry. Chemical complexification is an unavoidable consequence of ineluctable diffusion through that possibility space.

As with the old notion (popular before the artificial synthesis of urea) that organic chemistry could occur only *in vivo*, some seem to deny the possibility of prebiotic chemical systems. Even if prebiotic systems are not alive, biochemistry happens. Creationists seem to be asking the oxymoronic compound question, "How were prebiotic systems kept alive until they became alive?" The point is that they were not alive. They did not possess all the requisite functions to qualify as living, but nor would they have been simply inert. Hurricanes do not reproduce genetically but they nevertheless not only exist but spontaneously and repeatedly self-organize and dissipate energy without violating any laws of logic, mechanics or thermodynamics. Being nonliving does not stop hurricanes from being natural, dynamic, self-organizing, dissipative systems because life is not a prerequisite for these properties. Some "biological" phenomena, such as the sphericity of cell membranes, may occur without having to wait for genetic commands.

In accord with the Bible, Epictetus asserts that the body is "only clay cunningly compounded." Science confirms that life is based on common, ordinary materials. (Logically, explanatory dependence on the unlikely and special is to be minimized.) According to Ken Ham (answersingenesis.com), "The Bible says from dust we come and to dust we return. We don't return to an ape-man when we die." Who, exactly, is the straw man holding the opposing view? Neither will we "return to" our cousins when we die. But just as this fact is genealogically irrelevant, so too is it phylogenetically irrelevant.

Catalysis is the acceleration of chemical reactions, not the invention of them. Catalysts, including enzymes, can facilitate only preexisting reactions, as zero multiplied by any number remains zero.

Aqueous ferric ions catalyze the dismutation of hydrogen peroxide. When iron is organicized in the form of heme, the reaction occurs with 3 orders of magnitude greater

efficiently. When heme functions as a part of the enzyme catalase, the reaction occurs with 7 orders of magnitude times greater efficiently than with heme alone. Thus the history of catalase can be viewed as the progressive organic refinement of preexisting inorganic activity. Similarly, histidyl-histidine has rudimentary catalytic activity in the formation of peptide bonds, and may thus be a precursor to the ribosome (David White, 1980. J. Mol. Evol. 16:279).

In nucleotide condensation experiments catalyzed by lead, 2'-5' phosphodiester bonds predominate. When catalyzed by zinc, 3'-5' bonds predominate. Extant organisms have RNA polymerases that make 3'-5' bonds using zinc as a cofactor (Lohrmann, R., P.K. Bridson and L.E. Orgel, 1980. Science 208:1464). Thus may zinc be an evolutionary precursor to RNA polymerase. (As Harold Morowitz proposes, "Metabolism recapitulates biogenesis.") Let it also be noted in passing that the biological purines and pyrimidines are the most stable subset.

Given their particular molecular functionalities, amino acids abiotically polymerize nonrandomly in response to electrostatic, hydrophobic and steric factors. A miracle (or extreme conditions) would be required to force them to behave otherwise. These same forces nonrandomly, nonmagically, nonmiraculously direct metabolism today. If all molecules interacted randomly, then DNA could not replicate, tRNAs could not be charged with specific amino acids, restriction endonucleases could not exist, and so forth. (This issue will be discussed further a subsequent essay.)

In addition to catalytic and even autocatalytic peptides, enzymatic RNA (Cech, Thomas R., 1986. *RNA as an Enzyme*. Scientific American. 11/86) relieves proteins from some of the burden of catalysis. Self-splicing RNA (Kruger et al, 1982. Cell 31:147) avoids chicken-and-egg paradox. RNA oligomers are more stable when circular, and could prebiotically function as genome and mRNA. Partial copies of varying length of such molecules could be made, and circular permutations of this generator could function as tRNA with unique anticodons for every discriminator region, which could select amino acids by chemical affinity. Specific interactions between amino acids and oligonucleotides, such as those exhibited by restriction endonucleases, allow proteins to recognize specific short nucleotide sequences.

Much of the elaboration of the abstract dynamics of self-organization and autocatalysis has been done by Manfred Eigen (Eigen, M. and P. Schuster, 1979. *The Hypercycle: A Principle of Natural Self-Organization*. Springer-Verlag). (Eigen also explains that the size of a genome is limited by its mutation rate. As the rate diminishes, progressively more information can be accommodated.) A derivative of Eigen's hypercycle is the autogen model of David White (J. Mol. Evol. 16:121, 16:279, 17:19, 18:207). Theoretical contributions made by Stuart A. Kauffman will be discussed in a subsequent essay.

Among those dealing with concrete scenarios, A.G. Cairns-Smith has proposed a role for clay surfaces more significant than that of the fluctuating clay environment of David White's autogen. The Cairns-Smith model proposes that in the formation of mineral structures, scaffolding is relied upon until the tale can begin wagging the dog. Specifically, organic catalysis of the replication of inorganic structures gave way to inorganic catalysis of the replication of organic structures. Also, certain clays selectively bind only the biological amino acids. (The work of A.G. Cairns-Smith may be found in the following: *Genetic Takeover and the Mineral Origins of Life*, Cambridge University Press, 1984; *The First Organisms*, in Scientific American, 6/85; *Seven Clues to the Origins of Life: A Scientific Detective Story*, Cambridge University Press, 1985.)

A membrane-bound cell isolates an aqueous environment within a phase boundary. Partial sequestration of resources allows for internal divergence from ambient conditions and the

formation of exploitable gradients, such as of electrical charge, pH and redox potential. Bilayer lipid membranes form spontaneously from abiotic precursors, and so need not be genetically specified. Sidney W. Fox discovered many cellular properties in proteinoid microspheres (*Molecular Evolution and the Origin of Life*. Sidney W. Fox and Klaus Dose. W.H. Freeman & Co., 1977). This represents explorations into the realm of protobionts, which are hypothesized intermediates between the chemical and the biological.

Energy capture and transduction could begin with porphyrin, a simple assemblage of pyrroles and methylenic bridges, as a solar UV receptor. Light would be absorbed, producing valence changes in a metal ion and generating reduction potential. This could give rise to a charge gradient that could be harnessed to do chemical work, such as activating and polymerizing monomers, more of which would then diffuse osmoticaly down their concentration gradient into the encapsulating protocell. A switch to visible light as the power source would later be necessary to compensate for the atmospheric blocking of UV.

Phosphate drives condensation reactions in aqueous solutions today, and the prebiotic condensation of phophate-activated intermediates could be powered by the charge-gradient driven formation of pyrophosphate from phosphate. Even today, oxidadtive phosphorylation yields water in an aqueous environment.

Norman Horowitz explained how metabolic pathways could evolve backwards in response to selective pressure when precursors become scarce. Herbert (survival-of-the-fittest) Spencer held that everything progresses from an indefinite incoherent homogeneity to a definite coherent heterogeneity. Accordingly, an ensemble of a few indiscriminate, inefficient, unregulated enzymes can, in principle, naturally self-organize into a system of many specific, efficient, regulated enzymes (Kacser and Beedy, 1984. J. Mol. Evol. 20:38).

As to the matter of biochirality (stereoisomerism/stereochemistry/homochirality), and the particular system in use (L amino acids, D sugars), either engineering criteria make one way better, in which case God is unnecessary and nature can decide for itself, or both are equal, in which case God, faced with a tossup, had no option but to play dice and so deserves no credit for making what can be none other than an accidental, arbitrary choice. The supernatural explanation of this aspect of the issue is thus no less capricious and happenstantial than the one ascribed to scientists by creationists, with the pot calling the kettle black.

The situation may be analogous to the cosmic matter/antimatter imbalance, and may ultimately be less mysterious. In principle, enantiomers can differ in their physical properties, such as solubility and melting point, and differential binding affinity would allow stereospecific interaction with mineral surfaces. The possible "sympatric" crystallization of metabolism will be discussed in subsequent essays, and stereospecificity could be one criterion by which only proper components would interact successfully. Asymmetries could also arise by chaotic bifurcation. (see Kondepudi, Dilip, 1988. *Parity Violation and the Origin of Biomolecular Chirality*. in *Entropy, Information, and Evolution: New Perspectives on Physical and Biological Evolution*. ed. by B.H. Weber, D.J. Depew, and J.D. Smith. The MIT Press.)

Many recent developments in this field have been outlined by Richard Robinson in a paper titled *Jump-Starting a Cellular World: Investigating the Origin of Life, from Soup to Networks* (www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0030396). Topics include RNA polymerization, inorganic catalysis in early metabolism, the possible role of hydrothermal vents, the mimicry of minerals by enzymes, the catalysis of sugar synthesis by amino acids, the development of metabolic feedback loops via reciprocal regulation by molecules of each other's synthesis, and the divergence of the Eubacteria and Archaebacteria.

Scientists have been accused of persisting in a dogmatic assertion that life can only be the result of natural processes. Science makes no such assertion that life can *only* arise naturally. It does, however, recognize that life can only be *presumed* thus to arise. Creationists claim, "There is no credible naturalistic explanation for the existence of life." There may be none known *to them*, but this slothful induction would merely be another example of The Philosophers' Syndrome. And even if the statement is literally true today, it may not be tomorrow. The current absence of an explanation does not in itself preclude its future invention. For a time, there was "no credible naturalistic explanation for" the precession of the orbit of Mercury, the exposure of photographic plates by radium, and many other phenomena that were discovered prior to being explained. By contrast, the cosmic microwave background radiation was explained years before it was discovered, allowing it to be predicted. With respect to the future, as nature constitutes the correct logical presumption, the burden of falsifying it lies with those seeking a credible *super*naturalistic explanation. They are more than welcome to get on with it. Those who can, do. Until they do, those who need not, win by default, just as no proof of criminal innocence is necessary for acquittal.

Here again, creationists are driven to illegitimate philosophical stances. The following quotes are from Mike Gene:

"Science is more interested in coming up with this particular type of explanation than in trying to determine what actually happened." The past ("what actually happened") being unavailable for direct observation, this type is the only one possible, such that science has no choice but to be interested more in that type than in the impossible.

"[W]e will not find powerful arguments establishing that abiogenesis did indeed happen, even in a scientific sense." The most parsimonious propositions, like criminal innocence, are not to be argued but presumed. Argument is necessary only for less parsimonious ones.

"As a consequence of methodological naturalism, one begins with the belief that abiogenesis did happen and then looks for evidence to outline how it could have happened. There is nothing inherently wrong with this approach. It is just that it is not very helpful to one who doesn't already possess the belief that abiogenesis did happen." One is not to have such a belief. It is to be presumed. Those who cannot presume it due to cowardice or stupidity are not to be socially promoted. In court, the presumption of criminal innocence is assigned to jurors, and properly, with tie-breakers always favoring the defendant. Jurors who are not prepared to presume innocence, regardless of whether they "already possess the belief" in it, show themselves to be unfit for jury duty. In science, all relevant evidence is collected and then the theory that best explains it is determined.

"Science can only offer explanations that do not invoke intelligent intervention and is thus unable to determine if those explanations are true." Logic is unable to determine truth for any explanation because theories are neither true nor false; they are better or worse. Science freely invokes any explanation that is necessary and rejects only the unnecessary in accordance with Ockham's Razor.

"But unless we can entertain and test this notion of design, we have no way of eliminating it as a valid explanation." Science indeed tests it and eliminates it as less parsimonious than natural alternatives. Also, creationists do not require valid explanations, as they are satisfied with using faith, which is not truth-preserving.

"If we were to restrict our inquiry to the purely scientific perspective, ..." The basis of conjecture is irrelevant and need not be thus restricted, though "scientific perspective" is unavoidable for the proper achievement of refutation. Therefore, restricting inquiry to this

perspective is almost tautological, as other perspectives lack truth preservation. Ultimately, all alternatives to "the purely scientific perspective" are worse.

"[S]cience is useful in that it does offer the best possible explanations for abiogenesis that do not invoke intelligent intervention." Logic determines the best possible explanations for everything. Science offers explanations that are logically best, regardless of what lesser explanation do or do not invoke, while creationism offers the best explanations consistent with comfort.

"[I]f these best possible explanations are deemed insufficient in light of all the evidence, design begins to emerge as a more plausible alternative explanation that can fill this void." Whatever its plausibility, it is the wrong presumption while waiting for explanatory improvement. It is another example of the Philosophers' Syndrome instead of positive evidence.

"Sherwood Chang opened the program with the cautious reminder that any canonical scenario for the stepwise progression toward the origin of life is still a 'convenient fiction.'" This is the nature of all theory, making the statement tautological. Creationism offers a fiction that is logically worse, whatever its degree of convenience.

"Thus, in the end, I would say I am on pretty firm ground in suspecting that metaphysics do indeed play a significant role in acceptance of abiogenesis. For the fact remains that there is an almost universal consensus that this happened that reaches far, far beyond the actual evidence." Evidence is irrelevant to presumption. Evidence of criminal innocence is unnecessary for acquittal. That this happened is not to be believed. Rather, its presumption is to be recognized as proper, just as it is to be recognized that 2 is less than 3. Natural abiogenesis is not as "far beyond the actual evidence" as is creationism, given that the supernatural is tautologically unexplorable.

Judge Ed Carnes of the U.S. 11th Circuit Court of Appeals says, "From nonlife to life is the greatest gap in scientific theory." In truth, it cannot compare with the gaps in the understanding of consciousness. He also says, "There is less evidence supporting it than there is for other theories." Actually, all alternatives make supernatural speculations that make them necessarily less parsimonious and therefore worse. Natural abiogenesis *per se* is the null hypothesis and so bears no burden of proof.

Subsequent essays will explore some of these issues in greater depth.

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A disappointing question that is frequently asked in the abortion debate is "When does life begin?" The validity of this question lapsed in the nineteenth century when the theory of spontaneous generation, which it presupposes, was falsified. It is thus now a compound question that deserves to be as infamous as "Have you stopped beating your wife?"

If life begins at fertilization, as some claim, then it must *stop and start* between each generation. At what time prior to fertilization does life stop, such that the lives of the parents or their gametes end? A finite segment of time cannot be defined by a single boundary. It must have a beginning and an end, or else be as paradoxical as the sound of one hand clapping. Being unbounded in one direction would make it infinite in extent. Extending a zygote's abiotic past infinitely would deny the life of all its ancestors. If an organism is alive, then so were its ancestors.

The theory of biogenesis holds that all extant terrestrial life is derived from preexisting life. This supersedes the theory of spontaneous generation, which holds that organisms belonging

to extant species can arise *de novo* via abiogenesis and without organismal ancestry. Creationists wrongly suppose that natural theories of abiogenesis were invalidated when the theory of spontaneous generation was falsified. Actually, modern theories of the origin of life are concerned with the emergence of life *per se*, not of organisms belonging to extant, derived species, such organisms being stipulated as issuing from parents. In extant, terrestrial species, reproduction does not occur by abiogenesis. And yet, absurd compound questions continue to be asked (*pro confesso*) as if an abiotic interim between generations were not purely imaginary.

Death is, by definition, irreversible. (For more on the issue of irreversibility, see *Evolution as Entropy: Toward a Unified Theory of Biology* by Brooks and Wiley, and *Entropy, Information, and Evolution: New Perspectives on Physical and Biological Evolution* edited by Weber, Depew and Smith. Full references are given in a subsequent essay.) Thus, a living zygote can only result from the fusion of gametes that are and always were alive. A gamete that gives rise to a living embryo may have once been dormant or quiescent, but it could never have been dead. Many things begin at human fertilization, including diploidy, but life is not and cannot be one of them.

That life either begins or ends during the course of reproduction is a misconception of which many people have yet to disabuse themselves. It rests on the unwarranted assumption of the discredited and defunct abiogenetic theory of spontaneous generation to which some people nevertheless continue to help themselves. Their distorted vision has created a mistaken view of the matter, and only with tortured caricature can this be made to look like a scientific dilemma when in fact it has long ceased to be a dispute within science (*res judicata*). In the course of reproduction, there is no need for life to begin unless it previously ends, which it does not. As it does not end, neither does it begin. Therefore, within the context of reproduction, no such issue arises.

The characterization of fertilization as the beginning of life is simply an artifact of the arbitrary and opportunistically chosen termination at conception of the retrospective search for death. (Baltasar Gracián observes that "for a thing to remain undone nothing more is needed than to think it done.") When the search is not arbitrarily halted at fertilization, death continues not to be found. During reproduction, life can be said to begin only by arbitrary stipulation. In fact, it does not (and cannot) begin, but instead proceeds through the threshold of fertilization, as biogenesis specifies.

There being no fact of the matter regarding the beginning of life during reproduction (any more than there is a fact of the matter as to whether or not the universe is right-side-up), life begins at the same point that a circle begins. The forlorn search for a counterfactual nonliving intermediate entity in the process of reproduction is as incoherent as the search for married bachelors, and belongs in the same class of confusion of dimensions of language as found in religion. The joke is on those who think that the statement "Life begins at conception" has more significance than the statement "Life begins at forty." Both statements are literal falsehoods.

On the pro-life Children of God for Life website, "well-educated scientists" are accused of being "fully aware that life begins at the moment of fertilization." Better-educated scientists know better. The site goes on to quote embryology texts that acknowledge the beginning at fertilization of development, but not of life. Another entry contends, "The lie that 'life begins at implantation' is an old one." That it begins at fertilization is equally spurious.

Some rationalize their ignorance by assigning questions about the beginning of life to the category of imponderabilia, beyond the limits of science. In fact, August Weismann's assertion of the continuity of the germ plasm was first published in 1886, showing that this particular

question was not even beyond the limits of the science of the nineteenth century (*jucundi acti labores*), even if it is beyond the idiots of any and all centuries.

In the *Los Angeles Times*, 6/17/05, David Gelernter writes, "Ignorance of history destroys our judgment." The military knowledge of Major-General Stanley in *The Pirate of Penzance* has at least "been brought down to the beginning of [his] century," while many still have yet to catch up with Weismann's work of the 1880s, not to mention that of Louis Pasteur, John Tyndall, Lazzaro Spallanzani and Francesco Redi. But it is a bit too late to plead ignorance of losses of currency that occurred in the nineteenth century (*elapso tempore*), though some continue to try. After more than a century, the dust that they would have been eating has settled (*sero venientibus ossa*). Scientists have a duty to know science. Among nonscientists, ignorance may be forgivable, but not complacent stupidity.

As with creationism, modern assertions of abiogenetic reproduction are not so much at odds with the history of science as unconcerned with it. Multitudes continue to rise to the bait and vex themselves needlessly by wrestling with a phalanx of straw men, compound questions, pseudoquestions, false dichotomies and phantom problems (*et sic de similibus*)(*toujours perdrix*). Many an obsolete notion is cleaved to and trotted out by those slow to abandon inferior ideas or whose taste tends toward nostalgia for retro claptrap. The endearing naiveté of such people incline one to be charitable and tolerant (*joci causa*) of their corrigenda (*ride si sapis*) (*plus on est de fous, plus on rit*), for such intellectual Pratt falls (the sad legacy of social promotion) are an inexhaustible source of amusement, while the bogus problems themselves dissolve upon closer examination. Even if opposition to abortion is right, rarely if ever is its propriety supported by reasoned, systematic and valid argument. Most of the rhetoric offered constitutes a rogue's gallery of serial and sustained fallacies built upon misnomers. Consequently, the discovery of an abortion opponent with a simultaneous knowledge of biology, logic and English will be cause to through a party. Again, this essay is meant not to endorse abortion but to denounce stupidity. If there exists a good reason to oppose abortion, then let it be opposed for that reason and not because the moon is made of green cheese.

In a letter to the *Los Angeles Times*, 12/02/04, Thomas E. Brandlin mentions people who "hold belief in the sacredness of life from conception to natural death." Why the restriction? What is so unholy about the lives of gametes prior to conception? Motility alone should be enough to convince Sean Hannity that sperm are alive, given his conviction regarding the consciousness of the vegetative Terri Schiavo.

In a letter to the *Los Angeles Times*, 1/22/05, Richard Morse claims that "there is no scientific or religious consensus on when life begins." There could be no such consensus about what does not occur. He asserts that to him, abortion would be acceptable only if "before the moment of delivery a fetus is nothing but an undifferentiated blob of protoplasm." On the ultrastructural, cytoskeletal level, no such condition ever exists, even among zygotes and gametes. This leaves such writers to struggle with the moral dilemma posed by menstruation, which is itself a denial of the opportunity for development. Menstruation results in the ovum being just as dead as an aborted fetus, so the outcome is the same from the point of view of the gamete.

In a letter to the *Los Angeles Times*, 8/2/05, Steve Boulanger writes, "Genesis 2:7 clearly defines the moment when God causes the spirit to enter the body and life to begin: the first breath. Before then the body is as inanimate as the 'dust of the ground.'" Such an "inanimate" human fetus is actually every bit as alive as any living plant or microbe. Birth may be the time of the entry of "spirit" in the physical sense of breath, but life itself can be anaerobic.

In the *Los Angeles Times*, 10/16/07, Johah Goldberg, in a piece titled "When in doubt — pro-life," claims that "no one knows when life begins," but is unable to guess why. Some claim abortion to be a "morally ambiguous" issue, though, unbeknownst to Goldberg, it is not *scientifically* ambiguous, for science is not "in doubt.".

In the *Los Angeles Times*, 11/23/07, Nicholas Riccardi reports, "Antiabortion activists in several states are promoting constitutional amendments that would define life as beginning at conception." The report continues, "'We're trying to establish some bioethical standards to move us into the 21st century,' said Dan Becker, president of Georgia Right to Life." However, Kristi Burton is quoted as saying, "We're not banning abortion. We're defining life." They are doing so in pre-20th century terms, again allowing this writer to enjoy the thrill of victory. It is further reported that Cal Zastrow, head of Michigan Citizens for Life, said, "There are a lot of moms and pops that are pro-life." With supposed respect for humanity but with ignorance extending beyond biology to grammar, people are disrespectfully represented by the word *that* rather than *who*.

On Michael Medved's radio show 9/12/08, Stephen Baldwin said that one is not an authentic Christian if answering the question of when life begins is above one's pay grade. Answering it incorrectly puts one below the pay grade of this writer.

The assertion that abortion is the killing of innocent human life is true *pro tanto*, but is also an accent fallacy that fails to make a distinction adequate for the task demanded of it, such as a distinction between abortion from tonsillectomy. Tonsils are no less impotent than a zygote and so are equally incapable of guilt. Both cannot be other than innocent. Any part of a human body is as human as any other part and could be biochemically and immunologically identified as such in the laboratory. If tonsils are exhibiting metabolism and are undergoing neither necrosis nor putrefaction, then they are alive. If mere life were the paramount salient value and if literally all human life were sacred, then tonsillectomy would be as wrong as abortion and would deserve the same degree of opposition.

Abortion is described as the "wanton destruction of the most innocent among us." It certainly can be wanton, but is not necessarily so. Occasionally, it is simply self-defense against a fetus destined to kill its mother in spite of the absence of malice. And cognitively, normal adult dogs are more "among us" than a human fetus.

In a letter to the *Los Angeles Times*, 12/1/05, Frank Pray accurately notes, "The scientific fact is that the DNA of a fetus is a complete and unique blueprint of human life." This, however, is also true of tonsils. Even if life did not begin until fertilization, tonsils develop subsequent to fertilization and enjoy the property of life regardless of when it supposedly began. Any special value possessed by a human fetus cannot logically derive from any property that it shares with entities that lack that value. Human tonsils are not valued as highly as a human fetus, yet share with it properties including innocence, humanity, life and more.

What about the zygote's "potential" to develop into an adult human? Here the meaning of the word *potential* is being underestimated. Dolly the sheep and other clones have demonstrated mammalian somatic totipotency (nuclei from cells other than gametes are competent to support development). Tonsils, therefore, share the potential of a zygote. But a zygote undergoes development spontaneously, whereas tonsils require artificial intervention in order to realize that potential. Therefore, the one relevant and significant distinguishing characteristic of the zygote is not "potential" but developmental commitment, such that the threshold beyond which the unborn deserve the protection that is not deserved by the unconceived or the uncommitted is ultimately one of probability. The probability of tonsils developing into an independent adult organism

without artificial intervention is infinitesimal, while the odds of a human zygote doing so are about one in four. Specifically, one-third of human embryos die of natural causes during their first week of development, while two-thirds die in the first ten weeks.

In a letter to the *Los Angeles Times*, 3/13/05, Michael Parente writes about "the 'choice' about life in the womb. We can't ask the unborn, but I think God is clear on that issue too." The implication seems to be that God chooses life, though this is not statistically supported by the facts. It is amusing that God gets an extraordinary free ride by being declared pro-life while allowing (some might say causing) three-fourths of human embryos to die *in utero*. Conversely, America's so-called "culture of death" cannot even muster enough death to halt population growth. In other words, it is experiencing no *net* death. (Japan, by contrast, is.) Borrowing an image from Samuel Hoffenstein, the cradle continues to outwit the hearse. Ironically, this culture-of-death rhetoric comes primarily from Republicans, who denounce Democrats for calling a reduced increase a "cut," and should thus know better. And since when did Christians consider death such a bad thing anyway? Why would they regret someone going to "a better place," unless they simply do not know what *better* means?

Not all organisms enjoy autotrophism. Animal life cannot be sustained without killing, as most organisms do not survive being eaten. The maintenance of animal life in general entails the death of particular organisms. Because some killing reflects this biological imperative, killing *per se* is seldom the issue even for those who claim to be "pro-life." In fact, it is perhaps only within Jainism that so sweeping a phrase as "pro-life" is appropriate because the indiscriminate, categorical conviction that all life is sacred is seldom expressed elsewhere. The sanctity of all human life is often proclaimed, but seldom is mere human life valued. In practice, the "pro-life" stance usually values only human consciousness because it excludes nonhuman organisms and human cells that are unconscious but totipotent. Most who call themselves pro-life do not oppose tonsillectomy and are probably not even vegetarians, much less Jains.

Anti-abortionists often characterize a human zygote as a person. The essential quality of a person is personality, and personality is as personality does. A person is a sentient being capable of recognizing itself as a person. Such capacities of conscious self-recognition are lacking prior to the development of consciousness. Even if zygotes are persons in some sense, they themselves do not know it, at least not yet. It is personality, not life, that is merely potential in the zygote.

In a letter to the *Los Angeles Times*, 11/29/07, Brian Bennett asks how monozygotic twins can be explained if personhood is established at fertilization. This poses no dilemma for standard, orthodox biology.

The issue of personhood arises mainly in the discussion of fetal rights. Rights are provisional and depend on the capacity to be wronged. They are contingent upon a being's worth *to itself*. Accordingly, William Bennett asserts that, ethically, one is free to do whatever one likes to a tree because it can feel neither pain, grief, shame nor boredom. But neither can a human zygote. A tree is no less alive than a human, but it has fewer rights because it lacks consciousness. (And, as discussed in a subsequent essay, a flag is not alive at all.) The consciousness of a human zygote is at best pending, a fact that escapes zygotes themselves. Even if a human zygote can in some sense be considered a human being, it is inchoate, unconscious and insensate. Its rights hierarchically emerge as its consciousness emerges, for human is as human does. The aesthetic dimension is relevant only in proportion to subjectivity.

A report published in August, 2005, in the Journal of the American Medical Association states that it is unlikely that human fetuses feel pain during the first 29 weeks of development.

Abortion opponents have been known to invoke fetal pain, as if fetal anesthesia would quell their opposition to abortion. If pain is an issue, then bone marrow biopsy should be investigated. Within the first 29 weeks of human development, the issue of pain can only arise via the pathetic fallacy.

There is a bumper sticker that reads, "Abortion stops a beating heart." This is untrue if performed sufficiently early in development, but is also true of the slaughter of cattle. If a sloganeering abortion opponent were to ask, "Are you equating humans and cow?" the answer would be, "No. *You* are failing to differentiate them."

Rights based on properties that an embryo lacks can be justified only by the plausible *expectation* of the acquisition of those properties. A human embryo may be expected to acquire an entitling consciousness via the process of development, which generates the history of organisms. It may also be allowed that nonhuman lineages could in principle acquire properties such as consciousness by means of evolution, which generates the history of species. Both cases involve the issue of rights earned not by characteristics that are present but by those that may be pending. This notion is expressed in Jim Inger's *Herman* cartoon of 6/26/05, in which a man reads in his newspaper, "Scientists have predicted that in 387 million years the anchovy will have the same intelligence as a present-day human." His wife responds, "I never eat them anyway."

It is said that foreign detainees who are alleged to be terrorists lack the rights of American citizens. Law professor Jonathan Turley writes in the *Los Angeles Times*, 5/2/03, "The Bush administration has argued that these detainees are not 'people' under the Constitution but, rather, legal nonentities it may hold, release or even execute at its sole discretion." Even if a fetus is a person, it is no more than a *candidate* for citizenship in any country, which is earned by being born there. So President George W. Bush is premature when he describes frozen embryos as the youngest and most vulnerable Americans. Though not all rights are limited to citizens, it is nonetheless amusing to see unborn noncitizens promoted by affirmative action to a status above that of adult noncitizens who are (logically, if not legally) presumed innocent, not yet proven guilty and not an immediate threat. If the detention of alleged terrorists serves national security, then the termination of a pregnancy destined to kill the mother serves maternal organismal security and is supported by the legal concept of self-defense, which allows the use of deadly force to save one's life. Nonlethal abortion, in which a fetus is delivered and allowed to live, would not be unwelcome, but the point is that a mother would seem to be absolutely entitled to survive pregnancy. If, as President George W. Bush says, "The Constitution is not a suicide pact," then neither is pregnancy. Besides, a society that accepts the death penalty believes that it is wrong only to kill a person *gratuitously*.

Douglas W. Kmiec, rebutting the equal-protection defense of gay marriage in the *Los Angeles Times*, 11/19/03, writes that "accepted principles of equality have long taught that only those similarly situated must be treated similarly." This position places the burden of proof on those who would assert that fetal and adult humans are "similarly situated."

Vitalism holds that some "ineffable quintessence" is a distinguishing feature of organisms. Plato's sin of explanatory prodigality is committed by postulating ensoulment at fertilization or indeed at any other time. And given an immortal soul, abortion would seem to involve no interesting loss. Therefore, nothing important turns on this objection, as it lapses once Ockham's Razor is applied.

As to exactly when ensoulment supposedly occurs, Sheldon Welles, in a letter to the *Los Angeles Times*, 7/23/05, writes, "We most likely never will know." He seems unable to guess why. Such things can be known with certainty, but only by arbitrary designation, as when the birthday of a fictional character is specified in a novel. Commenting on an earlier writer's piece on the difficulty in recognizing an exact moment of conception, Welles continues, "I suspect that Barash believes souls do not exist, and he seeks scientific arguments that help him cope with his bleak view of the universe." Welles has it backwards, as if bleakness were the goal of science, which it is not. The goal of science is to be right, not bleak. Science indulges in facts *instead of* coping. It is the bleakness of some of these facts that scares away cowards who find bleakness too high a price to pay for being right. It is they who demonstrate an overwhelming need for coping, even at the expense of reason.

On his radio program 5/24/07, Michael Medved asserted that the fetal right to life derived from the belief that a human fetus has an immortal soul. The presence of an immortal soul actually devalues biological life because the soul in question has "a better place" to which to go. It is the absence of an immortal soul that amplifies the right to life. The absence of an afterlife leaves nothing but this biological one, making the latter more valuable in consequence. The presence of an immortal soul keeps biological death from being a problem. Thus does Medved conveniently undermine his own argument, saving others the trouble.

Shakespeare expresses this situation well in *Twelfth Night* (I.v.,) wherein occurs the following exchange: Clown: "Good, madonna, give me leave to prove you a fool." Olivia: "Can you do it?" Clown: "Dexterously, good madonna." Olivia: "Make your proof. . . ." Clown: "Good madonna, why mourn'st thou?" Olivia: "Good fool, for my brother's death." Clown: "I think his soul is in hell, madonna." Olivia: "I know his soul is in heaven, fool." Clown: "The more fool, madonna, to mourn for your brother's soul being in heaven."

Jesus is said to have had a biological mother but a nonbiological, divine father. For many, a biological mother and father are still insufficient, with personhood viewed as being divinity-dependent and not a natural biological phenomenon, though timing can still be a contentious issue. In the *Los Angeles Times*, 11/4/07, Garry Wills writes, "Lacking scriptural guidance, St. Thomas Aquinas worked from Aristotle's view of the different kinds of animation – the nutritive (vegetable) soul, the sensing (animal) soul and the intellectual soul. Some people used Aristotle to say that humans therefore have three souls. Others said that the intellectual soul is created by human semen. Aquinas denied both positions. He said that a material cause (semen) cannot cause a spiritual product. The intellectual soul (personhood) is directly created by God 'at the end of human generation.' This intellectual soul supplants what had preceded it (nutritive and sensory animation). So Aquinas denied that personhood arose at fertilization by the semen. God directly infuses the soul at the completion of human formation." It takes a very liberal Catholic to contradict a saint.

In a letter to the *Los Angeles Times*, 11/10/07, responding to the above piece, James Graham writes, "Garry Wills asks us to overlook 2,000 years of clear, unambiguous tradition that abortion is a particularly grave moral disorder punishable by excommunication." Wills is merely a messenger, it being logic that calls for recognizing the fallacy of the *argumentum ad populum* and the *argumentum ad antiquitatem*. The traditions of the flat earth and geocentric universe existed far longer. Graham continues, "Wills claims that doubt exists as to when a human being comes to exist. The leading texts in human embryology don't share that doubt because they clearly state that human development begins at fertilization." The texts themselves begin with meiosis, given that life and humanity antecede fertilization.

Then there is the question, "What if your mother had had an abortion while carrying you?" The answer, again, is that if aborted at a sufficiently early stage, one would never have developed into an organism capable of caring (*amissum quod nescitur non amittitur*). Similarly, people who lived centuries ago but did not reproduce can be thought of as having virtual descendants who would be alive today if it were not that their parents and grandparents never existed. However, such nonexistent people can feel neither regret nor anything else without being. Asking that the issue be considered "from the perspective of the unborn child," one writer asks which point of view (liberal or conservative) an embryo would "find arrogant and elitist." Interrogated sufficiently early, an embryo would be incapable of "finding." David Gelernter writes in the *Los Angeles Times*, 9/23/05, that "abortion is a strictly private act only if you believe that the fetus is not a person." What does the fetus believe? There comes to mind the Monty Python sketch in which dead people are asked about the afterlife. Terri Schiavo's death was called by some "barbaric," though it could not have been so from her own point of view. Any tragedy in that case was unknowable to the victim.

In a letter to the *Los Angeles Times*, 11/16/06, Darrin Mariott writes, "Let there be no doubt that if a human fetus could speak, it would express a desire to live rather than face a gruesome death." So would a cow, though Mariott does not take the opportunity to espouse vegetarianism. A human embryo lacks not only speech but the cognitive competence to hold, much less express, the concepts under discussion. As Ludwig Wittgenstein observed, if a lion could talk, we could not understand it. (And if a frog had wings, ...) An adult cow is at least as capable of the subjective experience of "a gruesome death" as is a human fetus.

Many abortion opponents enthusiastically showcase "ugly details" (Dr. Laura is much given to speaking of material being "sucked into a sink") but ironically ridicule animal rights advocates as suffering from the Bambi Syndrome, which is the irrational assignment of disproportionate value to cuteness. Even if cuteness can be attributed to fetuses, it can hardly be attributed to zygotes and thus cannot be used as an argument against the morning after pill.

In a letter to the *Los Angeles Times*, 4/20/07, Mary Curtius writes, "'Dilation and extraction' is a euphemism for a barbaric procedure," which she calls "inhumane cruelty." Actually, alternative names for "intact dilation and extraction" (such as "partial-birth abortion") are vulgar, colloquial, dysphemistic neologisms of the uneducated, anti-intellectual and unusually sensitive, as the standard phrase is not even Latin. Calling the procedure cruel (or"brutal" or "disgusting") is an accent fallacy because the alternative procedure (dilatation and evacuation) results in the fetus being no less dead and even more extensively dismembered. It also puts the mother at greater risk of hemorrhage. (Such a deal!)

In a letter to the same publication on the same day, Paul Kokoski asserts that "the person who opts for abortion is neglecting to consider the fundamental right to life of the mother's unborn fetus." This is purely a guess on his part, as consideration does not entail any one particular decision. The "fundamental right to life" of attempted murderers may also be considered, but they may also be killed in self-defense with impunity. If murder is actually achieved, the perpetrator may be subject to the death penalty. Whatever right to life a person may enjoy, it may be forfeited when another's life is threatened.

Randall Terry of Operation Rescue once cagily boasted that although women have been known to die as a result of abortions, no one ever died in one of his counseling centers. This is because pregnant women deliver their children not there but in hospitals. It may also be that no

one ever died in a military recruitment office, yet many have died on the battle field. Abortion opponents assert that there are no safe abortions, which is true in the same sense that there are no safe vaccinations or cars or airliners.

In a letter to the *Los Angeles Times*, 10/21/06, Linda Zelik writes, "Abortion is a surgical procedure that can have serious complications, such as hemorrhage or infection, both of which can be fatal." Cesarean Section is at least as surgical as abortion. Childbirth is even worse in terms of fatality, according to the Abortion Surveillance Branch of the Centers for Disease Control, and as reported by D. Grimes (*Estimation of pregnancy-related mortality risk by pregnancy outcome, United States, 1991 to 1999*. American Journal of Obstetrics and Gynecology. volume 194, issue 1). This makes Zelik's statement more than an accent fallacy and obliges her (*a fortiori*) to warn against childbirth even more strenuously. Abortion opponents point to the possibility of bias in the above statistics. However, the same ambiguity that allows for the possibility of bias also frustrates the determination of its actuality.

In the cartoon of 11/5/06, a caption refers to a column at townhall.com about "women who've foiled violent predators because those women were armed, . . . because you won't hear about 'em from the mainstream media." Nor might you hear from conservatives about the death rate associated with childbirth, except in skewed terms. For example, David C. Reardon (on afterabortion.org) cites a Finnish study (Gissler, M., et. al.. 1997. *Pregnancy-associated deaths in Finland 1987-1994 – definition problems and benefits of record linkage*. Acta Obsetricia et Gynecolgica Scandinavica. 76:651.) that found that during the final year of women's lives, abortions are twice as likely to have occurred than births. Proper experimental design would make death the dependent variable. Given births and abortions, it is the number of deaths that succeed each that is to be determined. Of interest is the rate at which given events result in death, that is, deaths per abortion and per birth. Making death the independent variable allows misunderstandings and accent fallacies. Even if abortion is a prominent cause of death among decedents, what about survivors? What if abortions also exceed birth among the living? Women who use abortion for routine birth control *intend* to have many more abortions than births, and so will, on average, have more abortions than births in any particular year, including their last, regardless of the cause of their death, be it plane crash, lightning strike or whatever. By contrast, conservative women intend to have more births than abortions during their lives, and religious ones would be expected to attend church more often they they give birth or have abortions, even in their final year, demonstrating that church attendance is deadlier than either births or abortions, according to this way of thinking. Sneezing is also likely to be found to have occurred in women's final year, as would be haircuts and blinking. This methodology must hold these activities to be terribly risky if they are so much more frequent in women's final year than even abortion. Actually, sneezing would be found so frequently precisely because it is *not* deadly. Abortions occurring frequently in women's final year could be because they are so nonlethal that they, like sneezes, can occur throughout their adult lives. By contrast, among decedents, none had probably experienced decapitation during the previous year, even though it is 100% fatal when it does occur. If twice as many abortions occur in the final year of women's lives, it could mean that twice as many are required to result in maternal death because they are only half as deadly. At their death, women would be twice as likely to have an abortion than a birth in their recent past if abortion is half as risky but occurs four times as often, which would not change the fact that abortion is half as risky. Women who had had no abortion during their final year of life could have had many in previous years, surviving them all only to be felled by childbirth.

Another common slogan is: "It's not a fetus. It's a baby." For vulgarians in the agora, where disambiguation is not valued, this may be true in the same sense that "It's not a patella. It's a kneecap." This may also be related to the Aristotelian mode of thinking in which there is some nonmetaphorical sense in which one can "know in one's heart." Unlike the rabble, scholars are concerned with proper meaning. The disadvantage of the plainspeak/hickspeak alternative was expressed by James Burke when he defended the use of precise, unambiguous proprietary jargon in communications between physicians and pharmacist by saying, "Or would you rather be dead?"

Apparently, some would. In a letter to the *Los Angeles Times* 4/10/04, The Rev. Thomas Welbers writes, "Fetus? A generation or so ago that word resided comfortably as arcane jargon in scientific textbooks and medical journals. It was then yanked out into the arena of political correctness to dehumanize what for centuries the English language correctly called an 'unborn baby.'"

Such contemptuous rationalization is at least an accent fallacy because the technical term would not exist unless it were at least as "correct" as the common one. Yanking such terms into the public arena also serves to civilize "what for centuries the English language correctly called" savage idiots. It is also common parlance in English to say that a pregnant woman does not already have a baby but is *going to* have one. As Lewis Carroll knew, a word means what Humpty Dumpty chooses it to mean. And, ironically, the very people who think nothing of redefining *baby* are those most likely to rail against the redefinition of *marriage*.

Civilized coinage and uncivilized colloquialism may share referential transparency. The synonymous expressions "2+2" and "the number of Brahms symphonies" are different modes of representational intension with the same referential extension. Nevertheless, Welbers continues, "In more than 35 years as a Catholic priest serving in half a dozen parishes ranging from the suburbs to the inner city, I have never heard an expectant mother speak of 'her fetus.'" The fact that the reverend does not get around much intellectually is hardly relevant. By contrast, this writer is acquainted with no one who speaks of their anatomy in terms of "sinew" and "gristle." Education conditions vocabulary, as exemplified in Jim Unger's *Herman* cartoon of 12/17/04: In the aftermath of a boating accident, a woman complains to her companion, "Port?! Starboard?! Can't you speak English?" The revealing use of the term *conception* rather than *fertilization* by abortion opponents is similarly indicative of amateurism, and parallels the tardy leave-taking of obsolete science.

Welbers concludes, "Common sense knows the humanity and individuality of the life developing in the womb – and knows what to call it." Yet the supposed panacea of common sense is unable to deal with many things, including quantum mechanics. Neither does common sense always know when to apply itself. One commentator claims that "now with modern technology, we know what was not known when Roe vs Wade happened." What was not known? The anatomical drawings of Leonardo Da Vinci have existed for centuries. Science (and this writer) knew human fetal morphology long before Roe vs Wade, even if idiots did not. All other relevant facts had already been known for decades, making "modern technology" ethically and legally unnecessary, except perhaps with respect to such issues as viability.

In July, 2005, Senator Bill Frist approvingly referred to removing the heart "from someone who is brain-dead." A zygote is less than brain-dead because it is brain*less*. The mentalities of the two organisms differ only with respect to their expected futures. Even as a medical doctor, Frist says, "I believe human life begins at conception." He says of an embryo, "It's biologically human. It's living." As the same is true of the gametes that formed it, these are

accent fallacies. Frist contends that a human embryo "has moral significance and moral worth." These are extrinsic subjective properties, as a zygote is incapable of having significance and worth *to itself*. Frist asserts that a human embryo "deserves to be treated with the utmost dignity and the utmost respect." (Similarly, the Vatican has issued a document titled *Dignitas Personae*, and statements have been issued by the U.S. Conference of Catholics Bishops regarding "threats to the sanctity and dignity of human life," such as human cloning, embryonic stem cell research, racism, torture and genocide.) The concept of dignity can apply only to conscious beings capable of feeling indignity. Also, even if minors deserve "utmost respect," they are still not permitted to vote, drive or drink alcohol. In a piece in the *Los Angeles Times*, 8/4/05, Margaret Carlson reports that "House Majority Leader Tom DeLay accuses Frist of creating 'commodities out of embryos.'" Employers do this to adults every time they hire or fire someone.

In a tribute to Dr. George Tiller in the *Los Angeles Times*, 6/6/09, Suzanne Poppema writes, "He helped thousands of women in the most horrifying circumstances: Some women . . . had cancers that would have killed them unless they ended their pregnancies." Again, let not pregnancy be any more of a suicide pact than the Constitution. This is not to deny the right to life of a fetus. Let it indeed live. But a mother has the right, in order to save her own life, to have her offspring live somewhere other than in her body. On the other hand, if conservative mothers *are* willing to accept pregnancy as a suicide pact, it is for the reader to decide whether they should be saved against their will.

Additional examples of the conservative perspective may be gleaned from several of Bruce Tinsley's *Mallard Fillmore* cartoons.

In the cartoon of 4/21/05, a character says, "Look, we progressives have just as much respect for 'life' as you do! We just *define* life differently! Having some human qualities doesn't mean you're *alive*! Even fetuses have those!" In fact, conservatives define life *more* narrowly than "progressives." They exclude gametes and have no respect for excized and discarded tonsils, seldom being smart enough to realize the breadth of the term *life*.

In the cartoon of 4/17/05, a character notes that "we've abolished the death penalty for everyone under 18!" A thought balloon emerging from the belly of a pregnant woman reads, "Well . . . not *exactly* everybody." Abortion is not a penalty, and here there is attributed to human fetuses a fictitious level of cognition and linguistic understanding.

In the cartoon of 4/23/05, Mallard refers to "a culture that starves its weakest members to death." The Schiavo case seems to be implied. Culture is something of which one suffering PVS is incapable of being a member. As culture entails cognition, a human in PVS is a member of the human species, but not of any culture.

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George W. Bush says that stem cell research involves creating life only to end life. As already explained, such research would not and could not involve the creation of life. Further, therapies employing dead stem cells are not foreseen, and would make as much sense as the adoption of dead children. Rather, the therapeutic value of stem cells would derive from their proliferation and differentiation, which would not occur *post mortem*. These cells would thus be kept alive and would be used clinically to postpone the cessation of the existing (and conscious) life of a patient. Like tonsils, stem cells would not achieve independent consciousness themselves but would support it in the patient as a whole.

Opponents of human stem cell research are said to "value" surplus human embryos, but more as landfill than as potential therapy, as the routine alternative to the proposed research is disposal. Morality is as morality does. When embryos are scheduled for destruction, those who seek a third option had better start offering their uteri in order to avoid a false dichotomy. Between 2002 and the middle of 2006, this amounted to only 138 people, according to Senator Arlen Specter.

Conservatives says that if liberals had had their way, then Saddam Hussein would still be in power (as of 2008), his rape rooms would still be operating and mass graves would still be getting filled. Achieving the converse, which may indeed constitute a net saving of lives, has cost thousands of U.S. military lives, there being no free lunch. Conservatives prefer it this way, For example, Sean Hannity does not celebrate U.S. military deaths *per se*. All other things being equal, he would rather have U.S. soldiers live than die. However, he denounces those who feel that 2,500 U.S. military deaths is too high a price to pay in the war in Iraq. Considering overall, net outcomes, Hannity would rather have 2,500 U.S. soldiers dead *and* Saddam out of power, his rape rooms closed and mass graves no longer being filled than to have no U.S. military deaths and these other objectives not achieved. If these objectives are worth sacrificing human lives, how is the objective of relieving the suffering of millions not equally worthy? Hannity advocates a policy of no *net* grief concerning Iraq. Let there similarly be gross but no net grief for those who die in equally worthy causes.

There is no conservative opposition to government-sponsored death *per se*. The deaths of thousands of U.S. soldiers is considered a reasonable price to pay for liberating people from a dictator, but not for liberating them from disease, as they would regret having millions of people cured if any embryos are to be denied the opportunity to develop consciousness. American war deaths are financed by the government and involve adults who are aware of the life they are losing, but conservatives resist financing research that would involve a lesser perceived loss from the point of view of the embryo and for a cause at least as noble. Conservatives reject the notion of peace at any price, though the preservation of embryos at any price is equally dubious. Conservatives thus demonstrate the peacenik mentality every bit as much as liberals, though in different circumstances. For conservatives, the use of atomic bombs to kill hundreds of thousands of Japanese, including children, is justified by the number of American (and Japanese) lives supposedly saved. Stem cell therapy could potentially save even more lives, American and otherwise.

President George W. Bush (7/19/06) said of children derived from adopted embryos, "These boys and girls are not spare parts. They remind us what is lost when embryos are destroyed in the name of research." Said embryos are no less destroyed when used as landfill or when they die on the battlefield after maturing into adults. In these latter cases, conservatives do not miss them enough to spare them. That same day, House Majority Leader John A. Boehner noted, "Every man and woman in this chamber began life as an embryo identical to those destroyed through the process known as embryonic stem cell research." Let him also complain about those destroyed through the process of being discarded. At least those destroyed through research yield medical knowledge, just as adult soldiers killed in war contribute to military objectives. It could be argued that these war deaths occurred within a volunteer army, but conservatives are not above instituting military drafts. It could be argued that an embryo cannot give informed consent, but then neither can cows slaughtered for their meat. And most embryos of the sort referred to by Boehner die of natural causes *in utero*.

In a letter to the *Los Angeles Times* of 5/12/04, Barbara and Thomas Schenach amusingly get themselves all tangled up in a Catch-22. Not wanting human stem cell research to start until they have the knowledge that only such research can provide, they misdirect to scientists questions better asked of psychics. They ask if stem cell therapy has already proven itself, not realizing that people cannot be cured by remedies that have not yet been developed. They ask if we can be sure stem cell treatment will work, unaware that only research can determine this. Clearly, the first order of business would seem to be to develop a cure for not knowing what research is. Where it is not understood why things like drugs and the Joint Strike Fighter are tested before they are put on the market, civilization is simply not occurring. Similarly, the pro-life Children of God for Life website states, "To date there has not been one single cure using embryonic stem cells." The same may be said of nanotechnology. At the start of the twentieth century, the same could be said of antibiotics.

Writing about stem cell research in the *Los Angeles Times* of 7/31/04, Noel D'Angelo objects to "research conducted at the expense of the lives of others." The charge that such research would end one life in order to save another is an accent fallacy because the alternative would be to allow the end of the life of the patient in order to save that of the embryo. Thus, this same research is also *avoided* "at the expense of the lives of others." Actually, such research would occur at the expense of lives three-fourths of which would be *expected* under natural circumstances to be lost prior to their developing much beyond the type of unconscious, vegetative life that even vegetarians do not mind ending in order to obtain their dinner. D'Angelo also says of research on *adult* stem cells, "Although this field may offer challenges, these should not be insurmountable to a nation that put a man on the moon 35 years ago." This is the same nation that was to have achieved the conquest of cancer seven years following that moon landing. In truth, few scientific projects could be as formidable as the education of a scientifically illiterate public.

In a letter to the *Los Angeles Times*, 7/21/06, opposing stem cell research involving embryos destined for disposal, Noel D'Angelo writes, "There is a big difference between someone dying of natural causes (even a days-old embryo) and someone being killed for scientific gain." The difference is "gain," after eliminating the false dichotomy arising from disposal being misconstrued as "dying of natural causes." The distinction is between useful and useless death. And again, this distinction is lost on the "days-old embryo" itself, which (or whom) conservatives would rather see dead in a landfill rather than have it be of any benefit to those who are sentient and ailing.

As to the related issue of cloning, it is curious that identical human twins are tolerated unless they are guilty of the sin of asynchrony. In a piece in the *Los Angeles Times*, 8/5/05, Wayne Pacelle calls the cloning of pets "a little frivolous," as are many other things that go unopposed, even by conservatives who routinely complain about the absence of liberal outrage. A cloned embryo is a demonstration of the potential latent in the somatic cell from which it was cloned. Yet, tonsillectomy remains unopposed.

Given that vertebrate embryos are more regulative than mosaic, embryonic stem cells can be harvested nonlethally, with respect to the embryo as a whole. For example, in January 2008, Advanced Cell Technology reported the derivation of stem cells as a byproduct of pre-implantation genetic diagnosis (PGD), of which about 5,000 couples in the U.S. avail themselves annually as patients in fertility clinics. Also, once carcinogenesis is thoroughly understood, it may be possible to dedifferentiate somatic cells to a state of pluripotency without forming either cancer or zygotes. This would yield the desired stem cells without depriving any embryos of

anything. The possibility of cloning using ova rather than zygotes has also been suggested. Additionally, transgenic xenografts could circumvent the issue of humanity.

When, in August 2006, it was reported that stem cells could be derived from individual blastomeres that are harvested nonlethally from embryos, the objection arose that those individual blastomeres could themselves develop into embryos, though one person per zygote may be all that critics deserve, given that they oppose reproductive cloning and many of them believe that individual personhood is established at conception.

It was announced in the *Los Angeles Times*, 11/21/07, that reprogrammed human skin cells, functioning as induced pluripotent stem cells, "behave almost exactly like embryonic stem cells." Previous research on embryonic stem cell remains retrospectively necessary to establish basic biological facts. Given the impossibility of comparing one thing, it could not be known that one type of cell behaved like another unless both had been studied.

In an article about stem cells in the *Los Angeles Times*, 10/17/05, Karen Kaplan writes, "But given the intractable debate about when life begins, there are lingering ethical concerns." Given that the issue was resolved a century ago, concerns based on this confusion can linger only among the catastrophically uninformed. Kaplan reports that a single blastomere can be removed from an embryo such that the latter can still develop normally and the former can give rise to stem cells. Dr. George Q. Daley, noting the possible ability of a single blastomere to develop into an embryo, says, "A process that dooms an otherwise normal embryo to later demise" may not satisfy everyone. But such is the case every time only one baby develops per zygote. It is also not clear that a blastomere deserves to be considered a "normal embryo." If not, then its failure to develop into an embryo is no greater tragedy than that occurring whenever a somatic nucleus goes uncloned, which is exactly the way that those who oppose cloning say they like it. And yet, not only do they grieve when stem cells are harvested in a way that yields zero babies per embryo, they now complain about getting *only one* baby per embryo, even though cloning is required to yield more. Conservatives are expected to denounce as "playing God" the artificial derivation of more than one baby per embryo, as the normal situation in nature is for the blastomeres of a human embryo collectively to produce a single fetus. As much as they may want to have their cake and eat it too, they simply cannot.

It was reported 9/7/04, "Catholic bishops branded the destruction of human embryos for research as 'playing God with the mystery of life.'" Playing God should be worrisome only if it is believed that someone is *being* God. And in practical terms, somebody must at least *play* God, as God Himself, at least statistically, does not. The Pope's 1995 *Evangelium Vitae* states, "Life, especially human life, belongs to God: For this reason whoever attacks human life in some way attacks God." This is no problem for an omnipotent being who is perfectly capable of defending Himself and is in no need of protection or rescue (Acts 17:25).

In a letter to the *Los Angeles Times*, 12/13/04, Andrew Decker writes, "Let us not forget the crux of this research lies in creating human life only to destroy it for very questionable gain." What he wants not to be forgotten is what should not be known in the first place. Cloning does not involve abiogenesis. The harvesting of stem cells is meant to preserve their life. The process may collaterally entail ending the embryo's opportunity to develop an independent consciousness, an attribute not yet possessed by the embryo. Even if the ending of life is a consequence, which it would not be for all of the embryonic cells, it is not the intent, much less the "only" one. The goal is not to end any life, but to save that of patients via therapy. The gain is questionable because the research that would make it answerable lies in the future at the time of

Decker's letter. Also, setting aside the issue of humanity, "creating" (actually reproducing and perpetuating) life only to destroy it is the very nature of most ranching.

In a letter to the *Los Angeles Times*, 5/28/05, Robert Rakauskas rebuts Michael Kinsley's characterization of an early embryo as a "tiny clump of cells," saying, "Under a microscope, Michael Kinsley himself might appear to be nothing more than a big clump of cells." True, but macroscopically, Kinsley exhibits certain properties such as cognition, which the embryo cannot regardless of the frame of reference. Rakauskas continues by asserting that "the clump of cells" in question "would develop into a human being." Not if it were discarded, and only one-fourth of the time under normal circumstances.

Mel Gibson is similarly quoted in the *Los Angeles Times*, 10/29/04, as saying, "I was never in a petri dish, but at one stage I was that little cluster of cells myself, as were you, as was the doctor, as is everybody. Tell me anybody who wasn't that at some point in their development, and I'll give you a cigar." Gibson was also a pair of gametes at one point. Gametes, however, appear unworthy of his respect and protection. Also, most such clusters of cells never develop to a point where they can consider such issues and know what they would be missing. Conservatives say that embryos produced in fertility clinics need to be given a chance at life. But adults would seem to be at least as deserving of such a chance.

In a piece in the *Los Angeles Times*, 8/5/05, David Galernter notes that the results of stem cell research "might help alleviate horrific human suffering." Early embryos themselves are not capable of any such suffering. Galernter notes that zygotes do not elicit "squeamishness" in adults. Nor can they experience it themselves. Though he acknowledges that consciousness (what he calls "actual life") "ranks higher," he claims that "we can never permit the creation of human life with the intent of using and then killing it." He may rest assured that human life cannot (currently) be created, regardless of intent. He observes that some people "campaign for unrestricted stem cell research." Regardless of the merits of that stance, campaigning should certainly be done for unrestricted biology education.

Senator Jim Bunning says, "Just because the budding life will not survive does not mean that we should ghoulishly conduct experiments on them." It is not clear who is to set the standard for ghoulishness, but whoever it is should investigate bone marrow aspiration. In both cases, even if ghoulishness occurs, it is not the goal. And again, ghoulishness is a concept applicable only to beings capable of a subjectivity far beyond that of an early embryo.

President George W. Bush vetoed a bill (7/19/06) that would expand federal funding of stem cell research, though his veto saved no lives. He claimed that such research "crosses a moral boundary that our society needs to respect." If such is the case, then all societies need to respect it and the practice should be criminalized.

In a letter to the *Los Angeles Times*, 6/11/07, Robert Rakauskas writes, "Now that we may have an unquestionably ethical alternative to cell reprogramming, is there any justification for continuing to support embryonic stem cell research?" First, the alternative to which he refers is that *of* cell reprogramming, not *to* it. Also, embryonic stem cell research is only a concern to conservatives when it involves humans. Given the necessary assumptions, the answer for Rakauskas resides within his own question. That we *may* have such an alternative means that we also may not.

In Garry Trudeau's *Doonesbury* cartoon of 7/22/07, it is asked, "How can destroying [human blastocysts] be more ethical than using them to save lives?" Conservatives apparently calculate that more lives are saved when said embryos are flushed down the sink.

In the *Los Angeles Times*, 1/11/08, Karen Kaplan reports, "The Rev. Tadeusz Pacholczyk, an ethicist at the National Catholic Bioethics Center in Philadelphia, said that removing a single cell from an embryo turns it into 'a starting source for harvestable raw materials, in a gesture that reduces young humans to commodities.'" This would be true even of people who survive kidney donation.

In a letter to the *Los Angeles Times*, 10/10/08, Kathy Harty writes, "A person, any person, does not have the right to life if it depends on using another's body without permission. We do not force others to donate bone marrow, blood or even postmortem organs to save a life, none of which risks the life of the donor. The embryo or fetus cannot survive without the huge and risky sacrifice of the mother, and therefore has no right to life without her permission." Permission may be inferred if responsibility for her pregnancy is placed on the mother, which it would not be in the case of rape. When future advances allow a fetus to survive without a mother, Harty's argument will have lapsed.

In a letter to the *Los Angeles Times*, 3/12/09, Gary Curtis writes, "Human embryonic stem cell research has not yet cured anything. Yet Obama has fulfilled his campaign promise to lift the ban on federally funded embryonic stem cell research." This is yet another example of someone who fails to realize that cures do not antecede research, but can only result from it. Curtis continues, "Meanwhile, adult stem cell research has generated cures and treatments for many diseases." This writer is unaware of any FDA-approved treatments based on adult stem cell are available at the time of this writing. Curtis reasons, "Considering this, sound science would seem to dictate that embryonic stem cells not be used." Sound science reveals that the plasticity of embryonic stem cells in unparalleled, making them the most effective type. It also reveals that knowledge results from performing and completing research, not from clairvoyance. The results of unperformed research remain to be seen, except perhaps by fortune tellers. Curtis concludes, "Moral values would furthermore dictate that no good can come out of the destruction of humans in an early stage of their development." It is possible to derive net good from death, at least according to conservatives, who support the death penalty and regard as traitors those who express opposition to humans dying in war a mere two decades further in their development.