

Starting Point

Scientific and Legal Definitions of Unborn Human Life: 1965-1995

All ignorance toboggans into know
and trudges up to ignorance again:
but winter's not forever, even snow
melts; and if spring should spoil the game, what then?

e.e. cummings

History 101; History of Life Sciences
Professor J.E. Lesch
December 6, 1995

I want to find out what this medical procedure is all about. And I don't want to have to decide on a poster with three sentences from two doctors.

Senator Arlen Specter
November 8, 1995
As quoted in New York Times'
"Abortion Foes Are Dealt Setback..."
By Jerry Gray

The Abortion Debate and What is Life?

In the current political maelstrom over a specialized abortion procedure termed "intact dilation" the Republican Senate has turned tail on the Republican House of Representatives in a 90 to 7 resolution. The Senate voted to send the House-approved bill, prohibiting the intact dilation procedure, to committee for further discussion, effectively stalling its passage. It is interesting that in Jerry Gray's description of the procedure in the above-quoted article, he refers to the anatomical site of intact dilation as the "birthing canal" rather than using one of the more precise anatomical terms such as uterus, uterine neck, cervix and/or upper vagina.¹ Gray's choice of term plays into the rhetoric of those that would appropriate a public canal, for the public well being of a public birth. A uterus, cervix or vagina on the other hand, are private, even hidden within the body of a woman. The rhetoric of the anti-abortionists goes further with its own inflammatory term for intact dilation, naming it instead "partial-birth abortion." Again, the use of the word "birth" by focusing on the fetus/baby, implies a public duty to protect life, rather than any duty toward the woman and her body, to whom that fetal life belongs and depends.

The question of "life" and who is best suited to protect it, regulate it, and make decisions about it is intrinsic to the abortion debate. It rests on the harder question of "What is life?" which comes with its own set of filial responsibilities. Who defines life? Is it the courts, the legislatures, the clerics, philosophers, or the scientific practitioners and researchers on whom we

¹ Gray writes, "The procedure involves partially extracting a fetus [after ~20 weeks gestational age] feet first, and collapsing the skull in the *birth canal* by suctioning out the brain." (emphasis added) Jerry Gray, *New York Times*, November 9, 1995, Vol. CXXLV, No. 50, 240. p. A-1.

rely for so much of our knowledge? Ultimately, it may be a subjective, personal, and private decision, differing with each individual set of circumstances which may arise. It is no accident that the page editors of the *New York Times* placed the above-referenced article by Jerry Gray exactly above a story about Dr. Kevorkian's 26th assisted suicide. The undertow of the euthanasia question and the abortion question is identical: What is life and who gets to decide about it?

Positions Within the Abortion Debate

Within the abortion debate, the most extreme anti-abortionist stance posits that life begins at conception. This sort of life holds full moral status, possesses natural rights, possesses a unique soul, and should be protected by society as needed. These positions are represented in one form or another by groups as diverse as the fundamentalist Operation Rescue to the conservative Catholic Church. The other extreme stance, held by pro-abortionists, posits that life begins at birth not at conception. Prior to that point, potential life exists, but by virtue of its dependence on the maternal body, such potential life is subject to the choices of its mother. Her physical health, and readiness to carry a child to full term influence the choice she makes concerning the potential life which she carries and nourishes. In consultation with clerics, physicians, and family, or by herself, the mother holds a 100% option to foster the potential life within her or to terminate it. Groups as diverse as Planned Parenthood or the liberal sects of the Protestant Church hold such views. The middle ground between these extremes is vast. It is where the Supreme Court's 1973 decision, Roe v. Wade lies and it is the field upon which most of the abortion debate has unfurled for the last 22 years.

While highly relevant to questions of "Who defines life?" and "How do 'they' define life?" the range of positions summarized above will not be analyzed in detail here. Scholars in science, theology, law, bioethics, and other disciplines have struggled to arrive at the

ultimate, correct conclusion in the abortion debate and all have fallen short as the debate rages on. The question that this paper addresses is not the ultimate definition of life. Steering clear of the abortion debate (except when a certain position is directly relevant for explanatory purposes), this paper will describe the scientific and legal opinions and facts concerning *in utero* human life from 1965 - 1995. The paper will use the 1973 Roe v. Wade case as its most prominent chronological marker looking at the issues from a pre and post 1973 perspective.

Terminology: Life

A human embryo at 5 weeks and an amoeba are both alive. Both ingest nourishment, produce waste, and retract from the stimulus of a probe. Both live in highly specialized environments and would die if deprived of their special environments. Both possess “life” in the most limited scientific sense. Because one is human life, the term “life” takes on multiple meanings when transferred to the social, philosophical and legal realms. Certain theorists² believe that the term “life” is so all-encompassing that the study of “life” is an inappropriate subject for science alone, which can never do the subject justice within the limits of its method. Because of the fine gradations of “life” to be described and analyzed, this paper will use the word as sparingly as possible, opting instead for the phrase “unborn life” or just “unborn.” to refer to *in utero* life. Generally, the most limited, scientific definition of life: “the state of an organism characterized by certain processes or abilities that include metabolism, growth, reproduction, and response.”³ will be the implied definition when no other is given.

Conflicting Terminology for Stages of Unborn Life

² Duden, Barbara. *Disembodying Women* (London: Harvard University Press, 1993), pp. 107 - 110.

³ *New Lexicon Webster's Dictionary* (New York: Lexicon Publications, Inc., 1987), p. 572.

Just as “life” changes meaning between the realms of science, philosophy and law, so do the terms for stages of unborn human life change between fields and practices within the scientific community. In general, the union of male and female gametes results in a fertilized ovum which is termed a zygote. The zygote grows to about 100 cells with an eccentric inner cavity filled with fluid to become the blastocyst. The blastocyst has two separate cell populations, inner and outer. The outer layer, called the trophoblast will form the structural matrix to house and nourish the unborn life. The inner cell mass which eventually displays the “primitive streak”⁴ can be termed the “pre-embryo,” then later the embryo. Prior to these primary organizational events (10-14 days) the blastocyst is an undifferentiated two layer disc of cells.

The term “pre-embryo” has not yet made it into popular or general scientific usage. The term was coined in the mid 80’s especially to differentiate the fact that at the earliest stages of mammalian development, embryo formation played a subsidiary role to matrix formation, i.e. the establishment of the non-embryonic trophoblast. Anne McLaren, Director of the British Medical Research Council’s Mammalian Development Unit recounted, “. . . it first began to dawn on me that the ‘embryo’ as a continuous entity could be traced back from birth only as far as the primitive streak stage. . . . It has taken a further ten years and some pressure from outside the scientific community for this distinction to result in a suggested change of terminology to eliminate the ambiguity of the term ‘embryo.’”⁵ At a meeting of the Ethics Committee of the American Fertility Society, a suggestion that the term “pre-embryo” was a cosmetic trick (to avoid constraints placed on embryo research)⁶ was made to McLaren who responded that “There is

⁴ Paired cell masses, called somites, form along the sides of the eccentric fluid-filled cavity, the precursor to the spinal cord, brain stem and brain.

⁵ The Ciba Foundation, *Human Embryo Research: Yes or No?* (London and New York: Tavistock Publications, 1986), pp. 149 - 50.

⁶ Grobstein, Clifford. *Science and the Unborn* (New York: Basic Books, 1988), p. 62.

ambiguity in the way scientists use the term 'embryo' -- and we are not justified in continuing to use the term embryo in both senses. We are not talking about cosmetics but about clarity."⁷

There appears to be even less agreement within the scientific community on the terminology for the embryo to fetus transition. The gestational age⁸ either changes from 7 to 8 to 10 weeks or is found to be irrelevant. In other disciplines such as philosophy and the law, and in the popular media and the political realm, the term fetus is used as a catch-all for any unborn human life, at any stage. Within this paper the terms will be used as follows unless specific, definitions are given relevant to the discipline and practice area being discussed:

Gamete	separate male/female egg and sperm
Zygote	fertilized ovum, 0 hours to 24 hours gestational age
Blastocyst	cell mass of 100, 10-14 days gestational age
Trophoblast	cells of blastocyst that will form structural matrix (e.g., the placenta and amniotic sac), 12-15 days gestational age
Pre-embryo	stage prior to formation of primitive streak, strong trophoblast development, 0 - 15 days gestational age
Embryo	widely varying definitions: 0 - 8 weeks, 2 - 8 weeks, 2 - 10 weeks, or anything prior to the "fetus"; for this paper 2 - 8 weeks gestational age

⁷ The Ciba Foundation, *Human Embryo Research: Yes or No?* p. 150.

⁸ Gestational age is used primarily by embryologists and researchers whereas menstrual age is used by practicing obstetricians. There can be as much as a two week difference between the two terms. Gestational age is computed from the time of syngamy onward. Menstrual age, the more popular, lay term is computed from the end of the woman's last menstrual cycle preceding the pregnancy. Because menstrual age is the more commonly used term, it will be the implied term in this paper. Gestational age will always be specified, and will, of course, be an age 2 weeks younger than the comparable menstrual age.

Fetus	again, widely varying definitions; for this paper, greater than 8 weeks
Neonate	1 - 30 days outside of the womb
Newborn	1 month - 12 months

Conflicting Terminology's Epistemological Indications

This brief overview of life stage definitions foreshadows the disagreements between and within scientific communities on the best labeling system for unborn life. Such disagreement is common between scientific schools according to a description by Thomas S. Kuhn in the *Structure of Scientific Revolutions*.⁹ Arriving at scientific certainty via transmission to the level of popular knowledge (which allows for glossing over of debatable details) is an epistemological strategy that eliminates the braking effect that internal disagreements have on the progress of the scientific project at hand, according to Ludwick Fleck in his *Genesis and Development of a Scientific Fact*.

The conclusion that the rods found in the microscopic specimen of the swab are identical with those in the [diphtheria] culture is actually a complicated, specialist thought construction, although it is presented here as simple fact. Furthermore the case is extremely elementary. It is not very often that everything works in such perfect agreement. Frequently the arrangement of the bacilli is not quite so typical. Staining is not always so unambiguous, for it can be positive, negative, or indeterminate. Finally, the culture may contradict the microscope specimen. . . . *Certainty, simplicity, vividness originate in popular knowledge. That is where the expert obtains his faith in this triad as the ideal of knowledge. Therein lies the general epistemological significance of popular science . . .* The mother of the child whose throat swab has been examined is simply informed: 'Your child has diphtheria.'¹⁰

(emphasis added)

⁹ "To the extent. . . that two scientific schools disagree about what is a problem and what is a solution, they will inevitably *talk through each other* when debating the relative merits of their respective paradigms." (emphasis added) Kuhn, Thomas, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962), p. 109.

¹⁰ Fleck, Ludwick, *Genesis and Development of a Scientific Fact* (Basel, Switzerland: Benno Schwabe and Co., 1935), pp. 114 - 115.

The terminology described earlier owes much to the development of experimentalism within embryology's domain of physiology. Physiological experimentalism has permitted the observation of certain structural and behavioral characteristics upon which the terminology relies. Claude Bernard (the founder of modern physiology) believed

that many of the attempts to apply mathematics to physiological problems were faulty because the empirical data were insufficient [His rejection of statistics was] closely linked with [his] endeavor to transform physiology into an exact science. Determinism is, in fact, the guiding principle in the thought of Claude Bernard, as it was for his teacher Magendie. It derived from the conviction *accepted as a truism today*, but still in question a century ago, that biological phenomena are as regular as chemical and physical phenomena, and subject to the same type of experimental laws.¹¹ (emphasis added)

Part of the disagreement surrounding consistent terminology for stages of unborn life is connected to a lack of a measuring standard, be it quantitative or qualitative. Some prefer to define stages structurally, some behaviorally, some at the macro or microscopic level, some by cell/organ differentiation, or some by an histology of those differentiations. Until there can be agreement on the yardstick, there will never be agreement on the measurements taken.

History of Fetus and Pregnancy Prior to 1965

It was simpler in antiquity when there was little visual evidence to analyze. The life of the unborn was described primarily through metaphor. For instance, Aristotle (c. 350 B.C.) saw the womb as a cheese making vessel writing that "The action of the semen of the male in 'setting' the female's secretion in the uterus is similar to that of rennet upon milk. Rennet is milk which contains vital heat, as semen does."¹² The Bible makes similar references, for example in the book of Job, "Thy hands fashioned and made me . . . Remember Lord...hast thou not poured

¹¹ Cohen, I. Bernard, Foreword to *An Introduction to the Study of Experimental Medicine* by Claude Bernard. (New York: Dover Publications, Inc., 1957 [first English transl. originally published by Macmillan in 1927]).

¹² Aristotle, *Generation of Animals*, II. IV, Trans. A.L. Peck (Cambridge, Mass.: Harvard University Press, 1942), 739b, pp. 21 - 25.

me out like milk and curdled me like cheese?”¹³ Later, Roman law (c. 100) would conceive of the unborn life as a legal fiction, recognizing it only if it was in its interest to do so, i.e. if it was recognized by the father. If not, “the fiction was retroactively extinguished.”¹⁴

Canonical law gathered cases supporting the Christian opinion of abortion as homicide during the time of Pope Gregory IX (c. 1200) when a watershed case arose. In it, abortion legally moved from being a sin against marriage to the crime of killing a child. A Carthusian monk, in banter with his mistress caused her to spontaneously abort. Could he still celebrate mass? No. He was judged to have incurred “irregularity” which was unlawful if “the fetus had been quickened at the time, (*si erat vivificatus conceptus*),” which it had.¹⁵

Early microscopist Jan Swammerdam (c. 1660) revealed the extent of these prevailing metaphorical conceptions when he wrote begrudgingly of his observations which contradicted Aristotelian (as well as Galenic and Vesalian) views, “. . . as offensive as it sounds to the ear and as much as it troubles the eye, we cannot help but say that women do have ovaries and like certain animals do lay eggs.”¹⁶ Thus a human woman producing an egg like a hen constituted an offensive piece of knowledge in the 17th century.

The post-Enlightenment period marked the first laws to reach inside the womb. English jurist William Blackstone was the earliest to try to extend the protection of “personal law beyond the entrance to the vagina” and to the fetus. This was, however, a far, far cry from the

¹³ The Holy Bible, Book of Job, Chapter 10, verses 8 - 10 (Nashville, Tennessee: Hollman Bible Publishers, 1982), p. 454.

¹⁴ Noonan, John T. Jr. ed., *The Morality of Abortion: Legal and Historical Perspectives*, “An Almost Absolute Value in History” (Cambridge, Mass.: Harvard University Press, 1970), pp. 26 - 28.

¹⁵ Noonan, John T. Jr. ed., *Morality of Abortion*, pp. 154 - 60.

¹⁵ Noonan, John T. Jr. ed., *Morality of Abortion*, p. 20.

¹⁶ Swammerdam, Jan, *Miraculum naturae sive uteri muliebris fabrica* (Leiden, 1672), p. 19.

“medieval law that exacts compensation for damages caused to a man’s household by injury to his pregnant wife.”¹⁷

The criminalization of feticide occurred concurrent to the rise of physician conducted therapeutic abortion in Victorian England and Germany. It was technically discussed as “elimination of fetus” or “elimination of tissue.” While physicians were construed as protecting mothers’ health, if a woman aborted a child alone the woman was construed as a criminal. “Doctors had accomplished the remarkable feat of creating a taboo which they alone could freely violate.”¹⁸ Finally, Catholic theology, from the end of W.W. II well into the 60’s, called on Catholic nurses to “sprinkle water on anything she expected might be a spontaneous abortion [e.g. a heavy menstrual flow or a miscarriage] saying ‘If you are human, I baptize you. . . .’”¹⁹

Commenting on the overall history of the fetus, Barbara Duden in *Disembodying Women* states that

“medicine over long periods knew the embryo and speculated about it in the guise of cheese and bread. Customary law recognized the value added to a woman to whom pregnancy was imputed. Christian law pioneered rules against infanticide at the orifice of the vagina and even within the womb. Theologians speculated about the ensoulment and the moment God’s mercy and full redemption could be extended to the child through baptism. Historically then, anything resembling the biological fetus of our time is absent.”²⁰

Yet today the biological fetus which has been viewed so extensively *in utero* and outside the womb, is a real object in mass consciousness. Its appearance in newspapers, magazines, film, the

¹⁷ Noonan, John T. Jr. ed., *Morality of Abortion*, pp. 154 - 60.

¹⁸ McLaren, Angus, *Reproductive Rituals: The Perception of Fertility in England from the Sixteenth to the Nineteenth Century*, Chap. 5 “Converting this Measure of Security into a Crime” (London: Methuen, 1984), p. 143.

¹⁹ Noonan, John T. Jr. ed., *Morality of Abortion*, pp. 185 - 186..

²⁰ Duden, Barbara, *Disembodying Women* (London: Harvard University Press, 1993), pp. 63 - 65.

most elementary science textbooks, even on MTV (and of course in the literature of anti-abortionist activists) provides an object upon which personhood can be conferred, in direct contrast to the hidden, historical examples. By virtue of observational ability alone, the unborn life has moved from the abstract to the concrete in the last century, especially the last 35 years. With that shift, a certain status has been accorded this most human emblem of life. Some award it full personhood and some are apathetic, undecided or confused about its status. But even the undecided have a physical image of a functioning fetus which intuitively disposes one to confer a sort of personhood status in the same way that many pet owners intuitively anthropomorphize their dogs or cats.

Personhood Can Be Conferred at Near Death as at Near Birth

The tendency to confer a vague life status to an image such as the functioning fetus is very different however from the difficult ethical questions posed when deciding the exact life status of those objects, bodies or persons who tenuously exist, such as the near dying, and the early, non-viable fetus (usually before 24 weeks gestational age). Paul Ramsey in his 1978 book *Ethics at the Edges of Life* discusses euthanasia candidates saying that death can be seen to occur if either the lung, heart or brain cease functioning.²¹ Losing the functionality of one of these organs constitutes death just as developing the functionality of one of these organs constitutes life (and concomitant rights) within Ramsey's schema. Thus, between two weeks (heart) and three months (nervous system, spontaneous motion) is when life would begin for Ramsey.

Daniel Callahan, President of the Hastings Center (a nonprofit organization that attempts to resolve the moral problems brought on by advances in the biomedical sciences) and author of the seminal 1970 *Law, Choice and Public Morality* calls a schema like Ramsey's the "developmental school" in that the fetus suddenly becomes a living human at some arbitrary

²¹ Ramsey, Paul, *Ethics at the Edges of Life* (New Haven, Connecticut: Yale University Press, 1978), pp. 187 - 188.

stage of development. Callahan rejects the developmental school as he questions the legitimacy of selecting the brain, heart and lung organs. Just as significant, for fetal development, Callahan asserts, might be developmental milestones such as quickening, viability, implantation, gastrulation, etc. Further, for Callahan, the mere possession of potential does not make a fetus human.²²

Philosophical Fuzziness

It is not surprising that perhaps more questions are raised, than are solved by the above philosophical debate. While Ramsey, a Christian ethicist appears to designate firm signposts for the assessment of life against death in euthanasia patients, they do not hold up for the case of the unborn. Ramsey discusses this philosophical fuzziness in the context of F. Raymond Marks' (former attorney for the Childhood and Government Project at the University of California, Berkeley) position set forth in his 1974 conference paper "The Defective Newborn: An Analytic Framework for Policy Dialogue."

The danger of being imprecise can too easily lead to "redefining human life to exclude the defective child"; with particularity and consensus we would define the "type of infant who upon birth would fit into the category of 'subhuman nonpersonhood' (infants with spina bifida, i.e. divided spine; or extensive brain damage)". . . One reason he (Marks) offers for rejecting the possibility that we simply glide into infant euthanasia is, in fact, a reason Marks believes we should not take that route . . . "These distinctions are meaningless" and moreover drawing them "has a damaging effect because it hides the real issue."²³

The distinctions that we can arrive at through particularity and consensus in deciding on infant euthanasia will always be meaningless distinctions to someone. Thus they are damaging because they hide the real issue which is the all-or-nothing award of personhood status to the unborn life. Against this backdrop of philosophical fuzziness, American law has attempted to establish its own

²² Callahan, Daniel, *Abortion: Law, Choice and Morality* (London: Collier-MacMillan Co., 1970), pp. 50 - 61, 67.

²³ Ramsey, Paul, *Ethics at the Edges of Life*, pp. 247 - 249.

standards. After incorporating philosophy and social history the law has turned to science for a firmer foothold, as it wrestles with the question of “life.” There has been no Supreme Court decision in the history of the United States as striking as the Roe v. Wade case in its dependence on the state-of-the-art medical knowledge of the day.

Roe v. Wade on Maternal Privacy and on Unborn Personhood

In the famous Roe v. Wade decision of January 22, 1973 a right to privacy was established which provided the foundation for unrestricted maternal choice on abortion in the first trimester. This right to privacy was based on:

1. The-repeal of Comstock Law of 1876 (which forbade contraceptives’ distribution and distribution of other “obscene” material),²⁴
2. Griswold v. Connecticut (which guaranteed married couples’ right to privacy and guaranteed against government intrusion on such matters as contraception and whether or not to have a child,²⁵ and
3. Eisenstadt v. Baird (which extended this right to privacy to single persons in 1972).²⁶

Justice Harry A. Blackmun wrote in Roe that 1) the right to privacy includes a woman’s decision to have an abortion; 2) the right is not absolute, the state may regulate it based on the medical standards for the woman’s safety, and that the state may also have an interest in protecting the fetus’s life; 3) that “unborn” is not in the definition of “person” as defined in the 14th Amendment, thus the unborn possess no constitutional rights; 4) in the first trimester (0 - 13 weeks) the individual woman has the right to terminate pregnancy, 5) in the

²⁴ Act of Congress, 1873; Sponsored by Anthony Comstock, barring from U.S. mails “all matter deemed obscene, lewd, lascivious, indecent, filthy or vile.”

²⁵ Griswold v. Connecticut, 381 U.S. 479 (1965).

²⁶ Eisenstadt v. Baird, 405 U.S. 438 (1972).

second trimester (13 - 26 weeks) at viability (perhaps 24 weeks), the state has rights and may only regulate abortion to protect maternal health; 6) at the third trimester (26 - 40 weeks), when the fetus is indeed viable, the state may go so far as to prohibit abortion except when necessary to preserve maternal health; and 7) the state may insist that only licensed doctors perform abortions.²⁷

Justice White joined by Justice Rehnquist dissented. Justice White wrote the dissenting opinion saying the right to privacy was fabricated and not spelled out in the Constitution.²⁸ But many legal scholars find this “fabricated” right to privacy in the “penumbra” of the Bill of Rights in that it is present by virtue of being “alluded” to in the 1st, 5th and 9th amendments which support the right to “personal privacy.” Nonetheless, in Roe v. Wade the (mother’s) right to privacy, no matter how unstable, was clearly distinguished from the act of conferring personhood upon the unborn.²⁹

Collision Course of Roe

Although the Supreme Court separated the right to privacy from the award of personhood status to the fetus, they “failed to address the [more subtle] distinction between terminating a pregnancy and terminating the life of a fetus.”³⁰ A viable fetus, (often called a “preemie” when outside of the womb) is capable of survival at earlier and earlier developmental stages, because of technological advances in medicine. For instance, there is a synthetic surfactant for the lungs, that enhances earlier viability which researchers continue improving. (Lung lining is one of last organ parts to mature.) “What all this means for Roe v. Wade is that through medical technology, the basis for the decision [regarding the privacy to make the choice

²⁷ Roe v. Wade, 410 U.S. 113 (1973), 35 L Ed 2d 147, 93 S Ct 705, p. 148.

²⁸ Ibid., p. 148 - 9.

²⁹ Terkel, Susan Neiburg, *Abortion* (New York: Franklin Watts, Impact Books, 1988), pp. 123 - 126.

³⁰ Ibid., p. 125.

of abortion stipulated by trimesters and viability] could be invalid and the decision would have to be reversed, or else, a new decision based on new legal criteria would have to be written.”³¹ These legal criteria would, of course have to incorporate the current but ever changing medical state-of-the-art. For these technological reasons, Justice Sandra Day O’Connor wrote in dissent of one of the subsequent abortion cases that “Roe v. Wade was on a ‘collision course with itself.’”³²

This “collision course” is concerned with the fact that as neonatologists continue to enhance their ability to rescue prematurely born infants (now as early as 24 weeks in some cases), and as abortions are able to be conducted later and later without jeopardizing maternal life (intact dilation abortion procedure occurs generally between 18 and 26 weeks), the question of “life” takes on a different hue. Rather than centering on the simplistic life versus death polarity, the question of “life” will soon center on the polarity of abandonment (instead of death) versus fiscal responsibility for exorbitant neonatology costs (instead of life). Because the scientific vocabulary has yet to catch up to recent research developments in fields such as embryology (see “pre-embryo” discussion, p. 6) science is hobbled in its ability to inform other academic and political disciplines. Thus the vocabulary, arguments and decisions of lawyers, social workers, philosophers, clergy and those policy makers concerned with orphans, community healthcare costs, and the extent of hospital responsibility toward the unborn, must look away from science as they attempt to parse the multi-disciplinary question of “When does life begin?”

³¹ Ibid., p. 126

³² Ibid., p. 126.

Bioethicist and lawyer George J. Annas, author of the first bioethics brief ever filed with the Supreme Court³³ finds it perfectly natural that the field of law informs the bioethical debate concerning human life's exact start and end points:

Law sides with patients to oppose the arbitrary use of power whether by physicians or the government; the rubric is patient rights. This is why American law, not philosophy or medicine, is primarily responsible for the agenda, development and current state of American bioethics. It seems natural to Americans, for example, that the morality of medical treatment has been recast as the 'right to abortion' and that the morality of medical treatment near the end of life is now simply called the 'right to die.'"³⁴

This is indeed an accurate description of the modern debate's shape. However, placing the debate within the domain of law eliminates fewer problems than it creates. True, such placement provides a certain operational ability for a conflicted society. Yet, it only offers the populace and its leadership an arena for continued contentiousness, rather than an arena for the identification of common ground.

Modernism's Effects on View of Pregnancy and Unborn

The complexity of this "life" debate and its proper domain, be it law, medicine, theology, etc., is unique to modernity. Historically, there was a time when we knew less and the debate was simpler. The modernism of the twentieth century brings with it a view of the unborn as a discrete object rather than unified with its environment of the womb and maternal body. Further, modernism sees pregnancy as an illness or a 9-month condition rather than as a natural, oft occurring biological state. Barbara Duden finds that the human fetus, as conceptualized today, is not a creature of God or a natural fact, but an engineered construct of modern society. She explains that the "modern skinning of women and the modern public concern for her innards"

³³ An amicus brief on behalf of Planned Parenthood when Roe v. Wade was seriously threatened in Reproductive Health Services v. Webster, 662 F. Supp. 407 (W.D. Mo. 1987).

³⁴ Annas, George J., *Standard of Care* (New York: Oxford University Press, 1993), p. 3.

fosters an interdisciplinary scientific communication on the subject of fetal life that borders on the pop-scientific. Modern media and public relations machinery carry such dialogue to the lowest levels and “generate a morass of confusion between ordinary speech and scientific communication. . . . what is really being discussed is the public fetus and an abstraction [of its mother] as a threatening environment.”³⁵ (See “braking effect” of internal disagreements within scientific discipline and popular culture, p. 8.) For Duden the appropriation of the fetus by the public is due to the growth of scientific knowledge and vocabulary in fields like embryology and physiology. Further, the very nature of this scientific vocabulary is culturally influenced.³⁶

Thomas Laqueur reaches a similar conclusion using different evidence in *Making Sex*. After discussing the Renaissance propensity for drawing female genitalia as an interior version of the male’s external genitalia, despite contradictory anatomical evidence which was available to such anatomists and their artists, Laqueur concludes that

the history of the representation of the anatomical differences between man and woman is thus extraordinarily independent of the actual structures of these organs or of what was known about them. Ideology, not accuracy of observation, determined how they were seen and which differences would matter.³⁷

For Laqueur the empirical facts underdetermined the scientific theory and conclusions which they were said to support in full (the Quine-Duhem thesis). Laqueur also states that “no [anatomical] image, verbal or visual, existed independently of prior claims about the meaning of such distinctions. Thus anatomical representation of male and female was dependent on the cultural

³⁵ Duden, Barbara, *Disembodying Women* (London: Harvard University Press, 1993), pp. 4, 61 - 72.

³⁶ Ibid. p. 71-72.

³⁷ Laqueur, Thomas, *Making Sex: Body and Gender from the Greeks to Freud* (Cambridge: Harvard University Press, 1990), p. 88.

politics of representation and illusion, not on evidence about organs, ducts or blood vessels.”³⁸
(emphasis added)

Thus, turning back the clock to historically simpler times and pursuing Duden’s implication that the fetus be re-appropriated by women to the privacy of the womb, would accomplish little in the today’s complex “life” debate. The proverbial cat is already out of the bag. What must be examined and acknowledged, as Laqueur indicates are the ideologies affecting the observations, or on a broader scale the cultural milieu of scientists closest to this question. Subsequently, the proximity of scientists, in their various roles, to the policy debates must be accounted for as well.

Medical Definitions of the Unborn

Specifically addressing the policy debate about the life status of the unborn is Clifford Grobstein’s 1988 work, *Science and the Unborn: Choosing Human Futures*. Grobstein believes science has a special role to play in making available to other disciplines the most reliable knowledge. “Even though such knowledge alone is not sufficient to resolve heavily value-laden issues, it can at least provide a commonly shared foundation.” Toward that end Grobstein, Professor Emeritus of Biological Science and Public Policy at the University of California, San Diego who has a background in mammalian embryology and heavy exposure to medical affairs, maps out 4 major stages of human development: the preembryo, embryo, fetus and neonate. Within those stages he culls 6 separable aspects of individuality that are age related and bear on the question of life status and personhood: genetic, developmental, functional, behavioral, psychic and social. These terms are intentionally as value-neutral as possible for Grobstein’s purpose is to address the policy dichotomy between “. . . absolute criteria based on traditional

³⁸ Ibid.

concepts and relative criteria appropriate to the current state of knowledge . . .”³⁹ Grobstein initially qualifies conception as a starting point for potential life by noting that there is no instant of conception, i.e. that syngamy extends over several hours. He then begins his description of the first criteria in the developmental status of the unborn, genetic individuality.

1. **Grobstein’s Genetic Aspect of Individuality**

Syngamy (a.k.a. fertilization or conception; the union of male and female gametes) accomplishes two things for Grobstein: 1) “It activates what has been a dormant state of the egg in the ovary, so that it completes it’s maturation and continues development; and 2) it combines hereditary contributions from both parents into a new and unique hereditary constitution (genotype or genome).”⁴⁰ Grobstein, a scientist writing in 1988 for public policy purposes, after the 1973 Roe v. Wade case, differs significantly from the 1968 words of a standard, clinically oriented medical text on the same subject, *Intrauterine Development* by Allan C. Barnes. Barnes says that the “final two divisions” [i.e. the meiosis of syngamy]

accomplish two special purposes---(1) the mixture of maternal and paternal genetic material to compose a truly new and unique genetic message which will create the next generation, and (2) the reduction of the number of chromosomes from the diploid 46 to the haploid 23 so that the union of a male with a female gamete will result in a zygote with the **normal** diploid chromosome complement of the next generation.⁴¹ (emphasis added)

The mixture of genes for the creation of the unique next generation, and the achievement of the normal quantity of chromosomes for normal development, are the notable facets of this stage of development in the 1968 scientific text. In Grobstein’s 1988 scientific and public policy treatise, the continued development of **already existing potential** (in the egg’s continued maturation) and the combined genetic message of father and mother to produce a unique next generation are the

³⁹ Grobstein, Clifford, *Science and the Unborn*, p. 16.

⁴⁰ Grobstein, Clifford, *Science and the Unborn*, p. 24.

⁴¹ Barnes, Allan C. and Jones, Howard W., Jr., *Intra-Uterine Development* (Philadelphia: Lee and Febiger, 1968), p. 148.

salient points. Barnes in '68 is not concerned with already existing potential of the ovum, whereas Grobstein in '88 is not concerned (at this stage of definition) with the proper number of chromosomes to permit normal development. For Grobstein "potential" exists even prior to syngamy. Barnes is unconcerned with dodging the implicit assumption that syngamy is the inaugural event in creating potential life. These differences in definitions certainly reflect the differing purposes of these two scientists (policy prescription v. clinical care) and they also reflect the times in which the authors write, pre and post Roe v. Wade. The matter of deciding life's exact starting point in utero was scarcely an issue before Roe v. Wade.

2. Grobstein's Developmental Aspect of Individuality

Primary embryonic organization occurs in this initial stage of differentiation of cells. Cell division has produced ~100 cells and there is an eccentric inner cavity filled with fluid. The inner cell mass of the blastocyst will form the human. The external cells, called the trophoblast, will form the placenta and membranes. The early trophoblast functions as a pump to transport fluid to the inner cavity and as an ingester of maternal tissue as it invades the uterine wall preparing it for reception of the chorionic villi which are the placenta's precursor. The occurrence of the primitive streak marks a linear thickening along the head to toe axis. Prior to this, the pre-embryo is just a two layered disc of cells. With the primary organizational differentiation achieved between blastocyst and trophoblast the embryonic period begins, at least for some scientists. The primitive streak which is first apparent at 2 weeks gestational age becomes the embryonic axis flanked by two bulges which will become the brain at 3 1/2 weeks gestational age.

This cellular differentiation is highly relevant for an embryologist such as Anne McLaren (see p. 6) who regarded it as a watershed event. In 1986 she urged a change in terminology based on the significance of this differentiation ("pre-embryo") which was adopted

by some, such as Grobstein. McLaren's earlier work in this area substantiated her introduction of the new term on purely scientific grounds rather than on self interest or cultural grounds in order to foster availability of research tissue. Prior to Roe v. Wade, in 1972, she contributed to *Embryonic and Fetal Development* and wrote, "The most striking feature of the blastocyst is its differentiation into trophoblast and inner cell mass. Differentiation is the central unsolved mystery of development . . ."42

Despite the 1986 objection that the introduction of such a term was a strategic maneuver to foster continued availability of human embryos for research at a time of political retrenchment, Grobstein still chose to use the term in his policy oriented *Science and the Unborn* (1988) wherein he strives to use value neutral language. Nevertheless, today, 10 years later, the term "pre-embryo" does not seem to have caught on at the popular or scientific level as evidenced by a report of a recent meeting of Nobel laureate scientists and embryologists in New York.

The meeting "Patterns of Life: The Nature of Biological Development" sponsored by the journal *Nature* sought to report on recent progress in the understanding of "the most embryonic stage of embryonic growth." The scientists were "sorting out the molecular and cellular signals that help set up early polarity in a number of different organisms."⁴³ Throughout Natalie Angier's coverage of this meeting and within every quoted scientist's comments, the term "pre-embryo" is not once used, when they are specifically discussing the unborn life at its very earliest stages. All refer to it simply as "embryo."

⁴² Austin, C.R. and Short, R.V., eds., *Embryonic and Fetal Development*, Chapter 1, "The Embryo" by Anne McLaren (Cambridge: Cambridge University Press, 1972) p. 4.

⁴³ Angier, Natalie, *New York Times*, November 21, 1995, Vol. CXXLV, No. 50, 251. p. B-7.

3. **Grobstein's Functional Aspect of Individuality**

Organogenesis begins at 2 - 5 weeks gestational age. For Grobstein, functional individuality is what keeps the pre-embryo whole and separate from surrounding tissues. The heart is the earliest organ to become functionally active, beating during the fourth week (at first only a rudimentary tube moving blood back and forth rather than in a continuous circuit). The neural pathways and the skeletal axis make their appearance, as do the limb buds at 5 weeks. Grobstein warns his readers however, not to judge inner states by outside appearance. This caveat aligns with Daniel Callahan objections against the developmental school (see p. 15) which proposes that life status can be determined by certain vital organs such as the lung, heart and/or brain. The developmental school developed prior to Roe v. Wade. Modern bioethicists would probably find it to be overly simplistic. Grobstein merely warns that the presence of a bud, so to speak, is not the presence of a flower and that we would be wise to remember that the possession of a bud, does not, therefore, confer the same sort of inner state as would the possession of a flower. It is tempting to interpret early neural responses in this way, i.e. in modes normally assigned to fully functioning, verbal adults.

The most noteworthy comparison with Grobstein's functional stage which is marked by organogenesis, is the shifting definition and gestational age associated with the embryo and fetus. found in medical texts in the years before and after Roe v. Wade. Generally, the more recent the medical text, the softer the assertion of gestational age associated with size and organ development. That is to say, the more that is learned about unborn life, the more careful are the researchers and scientists in making broad claims about it. Varying claims about fetal and embryonic ages are reflected during the period 1972 - 1990 in three major medical dictionaries: Stedman's, Dorland's and Black's. Appendix A compares in detail the differences to be found within various editions of these dictionaries in their definitions for "embryo" and "fetus."

According to the prefacing remarks, Black's dictionary is written primarily for the average citizen, to promote health; Stedman's especially strives to meet the needs of students although it is written with comprehensiveness in mind more than any other goal; and Dorland's is geared for students, practitioners and related fields. Black's 1976 definition of "embryo" simplistically equates it with a fetus⁴⁴. Stedman's 1972 definition dates an embryo from conception to the end of the second month.⁴⁵ Dorland's 1974 definition dates an embryo from the second week to the seventh or eighth week.⁴⁶ Each of these dictionaries maintains these embryo timeframes throughout subsequent editions.

Dorland's and Stedman's reverse the order of their primary and secondary definitions for "embryo." Dorland's places plant embryos in the first position, animal/human embryos in the second. Stedman's does the opposite. Neither dictionary refers to the term "pre-embryo" although Dorland's does date the embryo as beginning *after* the 2 week pre-embryonic period has passed. Both Dorland's and Stedman's show associated definitions for a "pre-somite embryo" which is the embryo prior to the arrival of somites (cell clusters indicative of the primitive streak which precedes the neural groove, which becomes the brain and spinal cord). Stedman's dates the pre-somite embryo at gestational age 20-21 days whereas Dorland's avoids the exact age and defines the pre-somite embryo functionally. Somite formation is not as significant an event in embryology that trophoblast differentiation is. Nonetheless its inclusion in these dictionaries indicates the currency of the term and a willingness to more discretely segment the earlier unborn life.

⁴⁴ Black's Medical Dictionary, 31st ed. (Devon, U.K.: Wheaton & Co. Ltd., 1976), p. 296.

⁴⁵ Stedman's Medical Dictionary, 22nd ed. (Baltimore, Maryland: William Wood and Co., 1972), p. 404.

⁴⁶ Dorland's Illustrated Medical Dictionary, 25th ed. (Philadelphia: W.B. Saunders Co., 1974), p. 507.

The definitions of “fetus” are as inconsistent, over time and between dictionaries, as those of the “embryo”. Black’s (written for lay people, and laden with opinion) equates the fetus to a “child while in the womb”, cites “legal viability [in the U.K.] at 28 weeks” and even asserts that “the property of ‘life’ is present from the very beginning.”⁴⁷ Dorland’s dates the fetus at 7-8 weeks gestational age until birth⁴⁸ and Stedman’s from 8-9 weeks gestational age until birth.⁴⁹ Notably, Dorland’s illustration of fetal stages becomes more nuanced with their 1981 (26th) edition. The fetal age accompanying various illustrations is no longer exact. It is qualified as “22 plus or minus 1 day, 24 plus or minus 1 day, etc.” It is also worth noting that Stedman’s, in its 1976 (23rd) edition, the first published after the Roe v. Wade decision qualifies its definition of fetus as “representing” the product of conception. Prior editions implied that the fetus “was” the product of conception. In Stedman’s 1990 (25th) edition, the definition reverts back to the earlier format, implying that the fetus “is” the product of conception, etc.

Subtle as these differences appear, they have an authoritative influence on those students and scientists most often faced with the “life” question; the medical practitioners. The outlines of rudimentary organs mark the beginning of the fetal stage in Dorland’s dictionary. So too do they mark the beginning of Grobstein’s 3rd aspect of individuality, the functional aspect. If scientific consensus about precise life stage definitions for unborn life already existed, would Grobstein have an issue to write about? No. And while Stedman’s and Dorland’s use value neutral language, like Grobstein, their lack of methodological agreement (functional, quantitative, histological) in proffering their definitions inhibit the utility of their lexicography. As Kuhn suggests, competing scientific schools of thought can still talk *through* one another, depending on which dictionary they adhere to. Overall, Dorland’s is more functionally oriented, shying from exact ages whereas Stedman’s is more autocratic in assigning ages and is functionally vaguer.

⁴⁷ Black’s Medical Dictionary, pp. 349 - 351.

⁴⁸ Dorland’s Illustrated Medical Dictionary, p. 493.

⁴⁹ Stedman’s Medical Dictionary, p. 461.

Black's is too unabashedly opinionated to carry weight in an analysis of value-neutral terms and definitions.

4. Grobstein's Behavioral Aspect of Individuality

Behavioral individuality is what keeps the embryo or fetus responding in germane way to its environment. "If function is activity essential to maintain the integrity of the organism, behavior is function that relates the organism to its environment."⁵⁰ Aversion response to stimulus around the mouth at this time (6 - 10 weeks) shows behavior that is responsive to its environment. Citing studies from 50 years ago, Grobstein states that embryos (delivered in the course of therapeutic abortion) placed in a warm physiologically balanced solution, were found to respond weakly to gentle stimulation around the mouth. This movement was then interpreted as an aversive (avoiding) response to stimulation. The interpretation was carried forward, unchallenged, through 50 years. Detailed anatomical studies showed the neck muscles to be innervated with extensions of neurons whose cell bodies were in the central nervous system (located in the ventral horn, the area in adults where motor neurons lie). In addition, these neurons had processes that extended to sensory endings around the mouth, which verified that "at the stages when early behavior of neck turning appeared, there was a structural and functional neurological substrate in place."⁵¹ However the interpretation of an aversive response, and the cognition that such an interpretation implies is far different from the conclusion that a neural substrate is indeed in place.

Grobstein continues his description of behavioral individuality, noting that fetuses at 6-10 weeks generally show increased coordinated motion whether aborted or observed *in utero* via ultra sound. Specifically, there is scientific agreement

⁵⁰ Grobstein, *Science and the Unborn*, p. 30

⁵¹ *Ibid.*, pp. 29-31.

but not incontrovertible proof that at the 7th week there is a more complex startle response, at the 8th week hiccups and isolated limb movements, 9th week, hand movements to face and breathing movements, and at the 10th week, yawning and swallowing. Spontaneous movement at the 11th week raises the question of inner volition and even possible sentience. These are assumptions treated as certainties in the much publicized descriptions and interpretations highlighted in the videotape *The Silent Scream* which films a fetus (via ultrasound) subjected to an abortion procedure. Saying such interpretations are problematic, Grobstein cites this earliest fetal movement only for its purpose as “representing the onset of behavioral individuality.”⁵²

At 26 - 29 weeks the central nervous system (CNS) affects fetal viability outside the womb because it can regulate breathing and control body temperature. This is the essence of Grobstein’s behavioral aspect of individuality. A fetus can respond in a germane way to its environment, even outside the womb. Those concerned with CNS development prior to that time tend to look for more than a “germane response to environment.” Rather they seek evidence of personhood based on neural response which can be interpreted as cognition. Scientists fitting this description testified in 1986 before the Senate Subcommittee on the Constitution of the Committee on the Judiciary. Their testimony is fascinating for its display of the intersection between politics and science.

Intersection of Medical Definitions of Unborn Life with Political

Senator Orrin Hatch (R-Utah) chaired both the Hearing on Fetal Pain in 1986 and the Senate Judiciary Committee’s Subcommittee on the Constitution who conducted the hearing. Why the Senate Subcommittee on the Constitution believed the subject of fetal pain to be within

⁵² Ibid. p. 33

their scope is a mystery. The Subcommittee's main agenda in '86 and '87 was to sponsor and guide various official celebrations commemorating the 1987 bicentennial of the Constitution. Other committee members were Strom Thurmond, South Carolina; Charles E. Grassley, Iowa; Dennis DeConcini, Arizona; and Paul Simon, Illinois. Hatch opened the floor by quoting President Reagan's 1/30/84 speech, "Medical science and doctors confirm that when the lives of the unborn are snuffed out, they often feel pain, pain that is long and agonizing." and Reagan's 3/6/84 speech, "As abortions are performed, the unborn children being killed often feel excruciating pain." These statements, according to Hatch had catapulted the matter of fetal pain to the forefront of national consciousness. However, his introductory comments ignored the timely release of the film *Silent Scream* which comprised the centerpiece of the Hearing on Fetal Pain.⁵³

Dr. Bernard Nathanson, former abortionist and former chair of National Assoc. for Repeal of Abortion Laws began his testimony by narrating *Silent Scream* wherein he said that the fetus was "stalked" by the dilator "prod" and that the face of the "child grimaces" in response to the "prod."⁵⁴ Nathanson, an enthusiastic convert to the pro-life position quoted what he called a "standard" textbook, *Care of the Fetus* by Robert Goodlin who wrote, "But my basic concept is that the fetus is a person and has a psyche, and that it often responds as in pain. Based on ultrasound that is extraordinarily discerning the evidence is irrefutable that we have fetal pain in these procedures."⁵⁵ Sen. Grassley read his statement, ". . . the basic function of government is to protect those individual human beings who are incapable of protecting themselves. No one fits that definition better than the innocent human fetus..." Dr. Kathryn L. Mosely, Assistant Professor

⁵³ Hatch, Orrin, Chairman. Hearing before the Subcommittee on the Constitution of the Committee on the Judiciary, United States Senate, Ninety Ninth Congress, First Session on the Medical Evidence Concerning Fetal Pain, May 21, 1995, Serial J-99-28 (Washington D.S.: U.S. Govt. Printing Office, 1986).

⁵⁴ Ibid.

⁵⁵ Goodlin, Robert C. *Care of Fetus* (New York: Masson Publishing USA, Inc., 1979), p. 192. (N.B. *Care of the Fetus* features a cartoon illustration of a fetus/baby on its cover, who sports a tee shirt bearing the word "PERSON." The motif is carried throughout every chapter of the book.

of Pediatrics at the University of Missouri then testified that pain is based on 1) the existence of afferent and efferent nerve fibers; 2) that cortex development was not mandatory for the experience of pain, [in adults, the cortex enables us to identify, recognize and report the experience of pain] just the thalamus [which serves as a relay station for transmitting the pain signal]. She concluded that it was inconclusive, yet “overwhelmingly probable that the fetus does experience pain.”⁵⁶

Dr. Richard Berkowitz, a former abortion clinic colleague of Nathanson’s and Director of the Division of Maternal and Natal Medicine at Mt. Sinai Medical Center countered Nathanson’s interpretation of filmed ultrasound fetal images saying that they were open to a variety of “fanciful interpretations.” Berkowitz noted the difference between a reaction to stimulus and the sensation of pain. He said, “I implore you not to try to settle this issue with pseudo scientific claims that an early developing fetus is indistinguishable from a newborn baby.” Dr. Daniel Robinson, unidentified in his affiliations (he merely identified himself as “not even a book of the month club member”) testified that *Silent Scream* adds nothing new to the issue. Robinson felt the issue was “. . . the same: What sort of beings qualify for the protections of law? Given that the being in question is human, which is to say that its genetic make-up is drawn from that pool of genes comprising homo-sapiens - what else must it possess to find Sanctuary in our Constitution?” Moseley then continued in honing the matter of pain perception, saying, “. . . all that we have studied in medical school tells us that the fetus does have neurological connections, if you will, to experience pain. What we are debating is whether or not that **pain is perceived** (emphasis added) and we have all defined pain as subjective. There is no way of ultimately defining that.”⁵⁷

⁵⁶ Hearing on Fetal Pain before the Subcommittee on the Constitution, p. 40-41

⁵⁷ Ibid. p. 50.

Hatch then asked her and the other physicians, “When both the thalamus and the cortex are developed and functioning in a late term child . . . when you have both the thalamus and the cortex, they are both developed, they are functioning, in a third trimester child, do any of you have any question that that child would perceive pain?” And Moseley responded, “. . . in the last stages of pregnancy, the cerebral cortex is not fully populated with cells I prefer to act as if the fetus may perceive pain. . . .but I don’t believe that there is any agreement as to what the fetus does perceive. . . .in the fourth and fifth months, when I touch fetuses, when I do things that to you or me would be painful, the fetus does not indicate any response that looks like a perception of pain.”⁵⁸

Conclusion

The physicians at this hearing do not differ in their allegiance to scientific method. They each base their conclusions on observations, experience, and the soundest scientific facts they can grasp in relation to the changing state-of-the-art. However, what one doctor calls “fanciful interpretation” and another doctor calls “lack of agreement about what the fetus perceives” is to another doctor “irrefutable evidence that we have fetal pain.” If biological phenomena were indeed as regular as chemical and physical phenomena, scientists might form consensus about the unborn more easily. However, such disagreement is actually positive in that it is characteristic of the advance of knowledge within science. No one can deny the rapidly changing state-of-the-art of knowledge concerning unborn life and concomitant technologies associated with it. Our legislative and policy making bodies do not look to science to make their difficult determinations about unborn life for them. They, like many others, often look to science for an epistemological trump card to fuel their position -- usually a position that they have already chosen based on personal, rather than scientific, criteria. When they involve scientists in their decision making process, part of the certainty that is science’s popular hallmark begins to fade, as the scientific

⁵⁸ Ibid., p.. 52

project is revealed for the dynamic, exploratory, fluctuating process that it is; one that is subject to many failures. Within the scientific community, failures are viewed as necessary steps within the hypothesis-test-theorizing process, but at the popular level they shake credibility. Further, scientists are revealed to be just as culturally influenced as the lay people they attempt to advise.

The failure of science to adequately and consistently separate and analyze unborn life in a way that illuminates socio-political decisions is not really a failure at all. It is not the job of science to guide society in this way. We forget who is the master of scientific discovery and technology when we allow ourselves to expect this of science. Questions as large, ancient and universal as “What is life?” and “When does life start?” are diminished when we expect any definitive answer from any single source. Perhaps that is why politicians are having such trouble with the abortion debate. It simply refuses to be reduced to a list of simple pros and cons applicable to targeted constituencies. Not only is “life” a technically and scientifically unwieldy question; it is morally, philosophically, legally, socially and economically contentious. It will become more contentious in the future as two trends continue.

First the continued advances of technology (*in utero* testing, late abortion, earlier neonatology success rates) will exacerbate the fetal viability overlap problem, leaving Roe v. Wade without a foundation, and our Courts without a rudder on this issue. Second, the continued politicking, polling and lobbying by abortion partisans will continue the pressure to reduce the complex question of life status to the levels of the ridiculous. The framing of minute but visceral aspects of the debate will ensure successful sound bite coverage which will help polls, which will fuel fund raising, which will catalyzes the issue reduction cycle all over again, leaving us less informed and no closer to a public policy answer.

The question of life status does not require scientific consensus. It requires continued exploration by scientists and by everyone else. Perhaps the confusion and complexity of the modern debate does not rest so heavily on the rapidly changing state-of-the-art of scientific knowledge. Perhaps it rests on the shift of the issue from the personal to the public. It is one thing to control public goods (such as airwaves, rivers, etc.) through our elected leadership. However the individual unborn life fits the description of public good only in a Brave New World. The sooner we evacuate public policy and their institutions from their attempts to forge alliances and consensus on the life status of unborn individuals, the sooner will the debate allow for a plurality of positions and actions.

Historically there was a simpler time when we knew less about unborn life and had no physical or observational access to it. At the same time, however, we had no public interest in public offspring. The individual commitment that is the *sine qua non* of the choice to propagate was never before so publicly mitigated by legislation, doctor's offices, hospitals, insurance companies, government aid, etc. In part we have science to thank for the logistical intrusion of various institutions into the family planning process. Public hygiene, health education, expensive procedures and health care's economies of scale all owe a debt to scientific and technological advances. However, we need not thank science for the modern complexity of the "life" question. We have run astray by asking the wrong institutions for easy answers to age old mysteries. The church, our political leadership, and the nightly news can guide us only so far. Nor will science offer a trump card on the question of life's exact starting point. Like our ancestors, we must find our answers individually.

The easy, reduced, political prescriptions are tempting for many. The more subtle scientific advances and concomitant fluctuations in definitions are far less appealing to the masses. However, the challenge to claim an individual position on the "life" question and to think it all the

way through, be it a scientifically based position, theologically based position or a bioethically based position, compels us to go beyond propaganda and bumper sticker analysis. To decide for ourselves about life; not as a public good but as a precious personal gift which we each possess, not en masse but individually; is our modern task. To do it, we are privy to a modern advantage or handicap; a plethora of information. Amidst the cacophony of the multi-disciplinary voices hailing our attention we can indeed decide for ourselves and our families. "What is life, when does it start and when does it end." The authority to decide just for ourselves, not the entire nation, already belongs to each of us.

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Human Development, if not engendered, is endangered. That is the simple but far-reaching message of Human Development Report 1995. The Report analyses the progress made in reducing gender disparities in the past few decades, highlighting the wide and persistent gap between women's expanding capabilities and limited opportunities. It introduces two new measures for ranking countries on a global scale by their performance in gender equality (GEM) and (GDI), and analyses the under-valuation and non-recognition of women's work. It offers a five-point strategy for equalizing gender opport

Science and advances in technology have been able to prove repeatedly that a fetus is in fact a separate life and a separate human being from his or her mother. A common pro-choice argument in response to this fact is that while the fetus is a human being, he or she is not legally a person and therefore is not entitled to the same rights that you and I enjoy – mainly the right to life. This is an argument we've heard before. Walter B. Hoye writes the following: Sound familiar? Pro-choicers hurl similar statements about unborn human beings every day. Despite knowing that fetuses are human beings, pro-choicers simply don't believe they are human beings who are persons deserving of rights under our laws. They say that deaths of fetuses don't matter and are therefore not murder. Several definitions of life can be found in the law. Blackstone called life "the immediate gift of God and a right inherited by nature in every individual," and more specifically, "a state in which energy of function is ever resisting decay and dissolution. . . .",²For some purposes, the law recognizes the physiological "fact" that life commences at the moment of conception, ³ but more often, the legal state of life is measured. from quickening in the womb,⁴ or from birth.⁵Â consin

Supreme Court realized that "the medical or scientific recognition of the separate entity of an unborn child [does not] aid in determining its legal rights."⁷ But for the most part, the infanticide 'doctrine has evolved as a confused mixture of medical knowledge and legal judgment.