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# In Defense of Human Development

by

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Efforts to influence policy decisions relative to abortion, whether on the federal or state level, have inevitably included statements about human development invoked especially to support a particular political point of view.

The cumulative effect of the many statements has given rise to an ugly spectre of human development, which is being reinvented as a derivative of the socio-legal aspect of the abortion issue.

Since *Roe vs. Wade*, in 1973, more public statements have been made concerning human development than perhaps in all of our previous recorded history. Many of those statements have been misguided, if not outright inaccurate. The abortion issue has crystallized the public's need to know the truth about our own development. Yet, the significance of this truth goes far beyond the abortion issue.

Elective abortion is intervention. But, in a similar sense, so are *in-vitro* fertilization, *in-utero* fetal surgery, fetal tissue research, drug addicted newborns, smoking pregnant women (and proximal consorters) and pregnant women who drink and produce fetal alcohol syndrome babies.

Because of the consequences to human development by the above-mentioned procedures and conditions, and with the advent of such technology as gene synthesis, selection, modification and repair, it is high time we take a closer look at our developmental history.

Four major concepts have fallen prey to contemporary socio-legal issues: The Beginning of Life, The Quality of Being Human, Viability, and Sentience.

## The Concept of the Beginning of Life

Ernest Van Den Haag writing in *The National Review*<sup>1</sup> states that prochoice advocates argue "the infant is unquestionably alive, unquestionably human and

viable outside the mother, whereas the fetus may not be." We know fetuses can be dead, and anything dead had to have been, at some previous time, alive. But the possibility of the existence of a *dead* fetus is not mentioned by Van Den Haag.

The fetus *is* unquestionably alive and is evidence of the continuum of the phenomenon called "life." Fetal cells and components within those cells are metabolizing, but more importantly, reproducing, which is the essence of life.<sup>2</sup> The progressive increase in size of the embryo and fetus is due to an increase in the number of cells, which are reproducing faster than others which are dying, and an increase in cell proteins.

Van Den Haag repeats the prolife claim that "life begins at conception." He states: "this makes sense." It makes even more sense that life does not really *begin* at conception because it was already present in the sperm and the egg prior to their union. Life as a phenomenon was, in fact, a singular event, which occurred approximately 4.5 billion years ago when an instant of replication became sustained and eventually gave rise to all further consequences of that one fortuitous moment through reproduction. *That* was life. What happens at the union of a sperm and an egg is a new expression of the continuum of that life process. Bradley Patten, an embryologist now deceased, wrote in his textbook: "Although in a sense, an embryo preexists in the gametes from which it arises, its life *as a new individual* must be regarded as commencing at the moment of fertilization."<sup>3</sup>

Among the many errors in the Roe vs. Wade decision was the Court's view as to when life began. Indeed, the Court stated "We need not resolve the difficult question of when life begins." They then stated that those trained in medicine, philosophy and religion could not arrive at a consensus.<sup>4</sup> *Indeed!* Although medical practice often relies on empirical procedures, it should be, and mostly is, based on scientific fact, and science has never relied on philosophy or religion for a definition of biological life, nor should it.

By accepting the concept that life begins at conception, the previous biological history of life is abrogated and is rendered relatively insignificant. Therefore, the greater biological significance is that from the instantaneous moment of life (which can never recur) a system of reproduction has been designed, engineered, evolved and entrusted within the female of our species for the care and perpetuation of humankind.

### The Quality of Being Human

Another supposed vagary produced by the abortion issue is the question as to when the embryo or fetus becomes *human*. Rivers Singleton, Jr. states in his article in *Perspectives in Biology and Medicine*, that, for some, conception defines the point of being human, whereas, for others, various periods of development suffice to "distinguish human from non-humans."<sup>5</sup> Such statements promote the legal dilemma as expressed during the arguments of the Webster case before the Supreme Court. Justice Scalia described the fetus to Attorney Sussman as, "This thing that we don't know what it is."<sup>6</sup>

Singleton and Van Den Haag call into question whether the fetus is human or prehuman. Carl Sagan and his wife, Ann Druyan<sup>7</sup> wrote a layman's article in the nationally distributed *Sunday Parade* magazine and questioned when human qualities emerge. The fetus, and all preceding stages, can only be human for the reason that cross-specie fertilization is not known to occur in the human. That is, only a human can mate with a human and produce offspring. Special exceptions, however, are known among mammals in which cross specie fertilization may occur. For example, a Jackass can mate with a Mare (different species) and produce a Mule, which, however, is always sterile. The biological quality of being human arose somewhere back in time when, most probably, the first hominids were developed on earth. However, an equal case could be made for the quality of being human being embodied within the chromosomes derived from certain genomic mutative events which locked in the human quality and locked out all other species. Hominids were the evidence for that. Therefore, we could reasonably say that our chromosomes embody our *human* quality. The apparent basis for questioning being human is that early developmental stages do not *look like* the newborn.

Van Den Haag claims the embryo is "prehuman." In support of this he relates the embryo to a human baby as a larva relates to a butterfly.<sup>1</sup> This comparison may satisfy contemporary social engineers but it is biologically absurd. Even an entomologist would be grievously offended by such a notion.

Van Den Haag further states that as development proceeds, the embryo acquires "human characteristics." He actually means the change from an embryo to a fetus, occurring at about 9 weeks post-fertilization age, which is the time when *facial* characteristics accelerate their development. Sagan and Druyan refer to different developmental stages as resembling a worm, reptile and a pig. In 1866 the axiom was promoted in zoology that *Ontogeny Recapitulates Phylogeny* (The Basic Biogenetic Law).<sup>8</sup> This meant that during development, as it would relate in the case of the human, stages of lesser vertebrate organisms were reflected, morphologically. It was believed that developmental archives contained a telescoped evolutionary history. From this statement a frivolous notion was generated that in actuality a fish, lizard or perhaps a rabbit (or as Sagan and Druyan would have it, a worm, reptile and pig) was somehow enjoined in the early developmental stages of what later became human. This is an example of the reinvention of human development, for, 38 years earlier (1828) the published laws of von Baer precluded the Basic Biogenetic Law.<sup>9</sup>

Van Den Haag states the embryo lacks distinctly human characteristics that might entitle it to a social protection and follows by asking: "when does intrauterine life become human life?"<sup>1</sup> To the embryologist (who knows the subject best) no such quandary exists. The dilemma is wrought by his confusing "human" characteristics with "facial" characteristics. The period of transition between an embryo and a fetus is approximately 9 weeks post-fertilization. This is a time at which facial characteristics become "human" in terms of their positions or proportionate size so that the structures of the face begin to resemble those with which we are born. Prior to this, development of the face has been

rather slow because the presumptive face is impacted against the primitive heart bulge due to a flexure in the neck area. Upon relief of that flexure, due to differential growth rates, development of the face may proceed more rapidly.

When the eye fields migrate from the lateral to more medial positions the interposition of a head structure called the *frontonasal prominence*, which includes the presumptive nasal structure, impedes their further movements. However, in rare instances this does not happen. The eye fields merge, become one, and give rise to a condition known as *cyclopia*. A few of these individuals are born alive. By the reasoning of Van Den Haag, a cyclops individual would certainly lack "human" characteristics and would not be entitled to "social protection." It is interesting to note that in true cyclopia the nose structure (not a true nose) would always appear above the eye. In contrast, the typical Hollywood cyclops shows the nose below the eye.

Singleton describes an embryo as a "poorly differentiated aggregation of cells" and that "early human fetuses [sic] with their primitive gill slits and tails more often than not resemble some primeval sea creature than a cuddly human baby."<sup>5</sup> (It is worthwhile to note that the only opportunity for a gill to form in human development would be during the stage of the *embryo*, not that of the fetus.) Sagan and Druyan describe the four week embryo with "something like the gill arches of a fish or an amphibian" and also say it has a "pronounced tail." No gills *ever* occur in development of the human.<sup>10</sup> Embryologists and embryology texts continue to this day to use the term "tail process" or "tail bud". This is most unfortunate and begs an inaccurate use of the term "tail". The real truth is that a tail *never* occurs in normal development. What occasionally occurs in the case of the human is a caudal appendage, which is an anomaly and cannot reasonably be called a "tail." It has no intrinsic movement and most are composed solely of subcutaneous tissue.

Sagan and Druyan compound their errors by stating that "300 million also-rans of sperm have not yet arrived" at the site of fertilization of the egg.<sup>7</sup> The fact is they never do. Only about 100 or less sperm out of about 200 million in a given ejaculate ever arrive at the usual site of fertilization. They also state a "hollow sphere" as an embryo (meaning the blastocyst) "sucks blood" from maternal capillaries!<sup>7</sup> Wrong, again. A sucking process never occurs, and the "sphere" has considerable more structure to it than simply being hollow.

Today we recognize that the Biogenetic Law, at least, was an overstatement. Thus, with advancing knowledge we have been able to satisfactorily dismiss the false conclusions generated from Ontogeny Recapitulates Phylogeny and, instead, come to the correct conclusion that developmental processes among vertebrates (including man) are simply similar in the embryo stage and exhibit aspects of the same kind of developmental plan. This makes much more sense. As such, each organism retains its own special identity from fertilization to death.

Charles A. Gardner, while a graduate student in anatomy at the University of Michigan, wrote an article for *The Nation* entitled, "Is an Embryo a Person?"<sup>11</sup> He stated the embryo is not a person and not a "human being." His reasoning: "the fertilized egg knows nothing about how to make a finger, a nose or eyes."

He then contradicts himself by admitting that the fertilized egg contains all the DNA necessary for development of all the body parts; but, then he states that the egg does not contain all of the information to put those parts together.

Of course it does not, not at any given moment in time. But, if this disqualifies the embryo as being human, how come in every case the end result is human? The sequencing of events is predetermined and takes place over time according to cues given to the genome.

Wrongfully, embryonic and fetal characteristics have been evaluated against adult characteristics.

Keith Moore, in his textbook *Before We Are Born* responds to the question "When does the embryo become human?," as follows:<sup>12</sup>

This is a difficult question to answer because one's views are affected by one's religion and the views of one's peers. The *scientific* answer is that the embryo *always* had human potential, and no other, from the time of fertilization because of its human chromosome constitution. Two things are definite: (1) human development begins at fertilization and (2) the zygote and early embryo are living organisms. My personal view is that the embryo becomes a human being during the eighth week when it acquires distinctive human characteristics, but you will have to decide for yourself after wide consultation.

Moore has provided two answers: the biological one and the socio-legal one. It is little wonder humankind has difficulty living compatibly with the laws of nature when we keep redefining those laws to justify socio-legal proclivities.

### Viability

In *Roe vs. Wade*, the court defined a "person" (ergo-the fetus) as one being "capable of an independent existence," and independent existence as the point of viability.<sup>13</sup>

The question of a fetus being viable outside the mother, of course, has biological and medical significance, but its relevancy to the abortion issue is highly questionable. Van Den Haag states: "Infanticide kills a human being that is independently alive." But, this seems to beg the question as to whether or not a fetus which cannot live "independently" may be disposed of with impunity. True, newborns and infants are "independently alive," but only temporarily so. Although physically independent from the mother, in that they are no longer connected via umbilical cords, they cannot feed, bathe, or adequately protect themselves from the hostilities of their environment or other equivalent threats. Even though they breathe "on their own" (actually independent respiratory actions occur in the fetus) this continues only as long as other needs are met. They require as much total care as they were receiving *in-utero*, in fact, more so.

Insofar as the abortion issue is concerned, of what particular significance is it that a 24 week old fetus (or a fetus of any age) could survive outside of the womb? It is important to prolife advocates because it drives back the time of "independent existence." Thus, they may claim abortion would be illegal after the time of "independent existence" (personhood). Improved technology may sustain prematurely delivered fetuses, but would include those who may not overcome a severely reduced quality of life. Thus, the socio-legal term of

"personhood" has reduced the *biological* quality of a newborn in terms of its ability to use its lungs to aerate blood with the aid of an incubator, respirator, chemical additives and round-the-clock nursing attendants. "Personhood" has thus become a captive issue and is entirely socio-legal in content. From the biological point of view, it is irrelevant.

### Sentience

Singleton differs from Roe vs. Wade and cites the beginning of personhood as when the fetus is capable of having an interest in its own existence and, further, when awareness of the existence occurs. Van Den Haag concurs and uses the term *sentience*. He states the embryo has neither a brain nor the neural system which makes *sentience* possible.

In terms of survival value for subsequent developmental stages of the human embryo and fetus, no better mechanism (in a teleological sense one could say "interest") can be demonstrated than the very aggressive special tissue surrounding the embryo proper differentiated within the first 12 days post-fertilization called *syncytiotrophoblast*. It is a premier invasive tissue and may assist in preventing rejection of this "foreign tissue" by the mother.<sup>14,15</sup> No neural pathway is necessary for this activity to occur.

Clifford Grobstein, a Ph.D. and developmental biologist, interviewed in *Psychology Today*, maintains there are six essential aspects of individuality.<sup>16</sup> He relates them to specific stages or times of development. Psychic individuality, he states, occurs at 26 weeks, but admits this is arbitrary. He couples this with *sentience*, or thought.

But, thought is a concept and needs an historical component. Those interpreting EEGs on premature infants, or fetuses from elective abortions are normally *very* cautious concerning their interpretation. Grobstein's stages are arbitrary and are not scientifically founded.

Sentience is not a topic which is taught in basic embryology courses by embryologists. The concept of *sentience* has undoubtedly arisen from psychologists who have tried to relate muscular movements to *willful* and *protective* behavior in the fetus. The newborn does not respond to vocal commands. Thus, its movements are the result of virtually the same kind of stimuli that prompt movements at 5 to 6 weeks of embryonic age, such as chemical (change in oxygen supply) or mechanical (stretch of a muscle cell).<sup>17</sup> The surgeon's probe, or an environmental change, can essentially provoke the same kind of movement in the embryo as well as in the newborn. In this sense there is no difference between the two stages. At about 17 weeks of development, enough of a communication system has developed so that as more muscle cells have been produced more will respond to the same magnitude of stimulus and, thus, be felt by the mother as "quickenings." If movements are manifestations of "awareness of one's self" and thus valuable in defining "personhood," then the embryo at 5 to 6 weeks of age qualifies.<sup>17</sup>

Van Den Haag's premise implies that there is some point in development at which a brain or a neural system, and/or *sentience*, suddenly appears and

dispenses "awareness." Sagan and Druyan suggest that "thinking" — "human thought" and all of its advantages — is the most dramatic "human characteristic" and occurs at 30 weeks of fetal age. They state this should be related to the end point of permissible abortions, (coincidentally implying they should be allowed up to 30 weeks). Of course, thinking is not unique to humans. We simply do more of it than other living creatures. However, they suggest that fetuses after 30 weeks can "think" and, by inference, that prior to this they cannot.

Development of the nervous system is a progressive phenomenon. Our best evidence from the standpoint of functional embryology unequivocally states that as soon as the first synapse forms, it functions. This occurs during embryonic age, *before* nine weeks post-fertilization. What would occur at any given later stage, perhaps at 30 weeks, would be enough electrical potential to evoke a tracing on an electroencephalogram. Thus, it would seem the value of a human fetus is reduced to its ability to move a stylus on graph paper. By this reckoning the previous 29 weeks and 6 days of synchronized and orchestrated preparation has all gone for nought and could be dismissed as irrelevant.

### Human Embryology and The Socio-Legal Issue

The failure by contemporary writers to acknowledge what is current and true about human development sustains and nurtures the continuing controversy surrounding abortion. Two different types of consequences which significantly mold public opinion may be illustrated:

1) The joint Los Angeles Times-Washington Post Service recently issued the following statement (Tucson Citizen, January 1, 1991):

Should parental choice be limited to eliminating serious genetic defects? or does the procedure involve such early embryos — *they are still microscopic specks* — that few people would object to discarding them for such reasons as having an unwanted hair color or being the wrong sex? (Italics-my emphasis.)

Our existence as a "microscopic speck" is certainly not trivial, because our "specks" represent the history of more than 4.5 billion years of trials, failures, and successes. Yet, the sense of such a characterization actually diminishes our early embryology and its survival.

2) The Rev. Richard McCormick, writing in the Kennedy Institute of Ethics Journal, now questions the judgment of the Catholic Church relative to the time of ensoulment from conception to sometime later in development.<sup>18</sup> He uses the term *preembryo* which is not an established embryological term.

He relies specifically on Grobstein's definition of "developmental individuality" which he claims occurs when the inner cell mass no longer will divide to produce monozygotic twins or multiple copies. World-wide this would account for less than 4% of the total population. Based on this statistic, 96% would be denied "ensoulment" until 4% have been *determined*. In fact, 30% of that 4% are determined in the first 3 division stages after fertilization.<sup>12</sup> Grobstein's concept of "developmental individuality" is fraught with errors and is not scientifically founded.



## Conclusion

Development is an integrated biological progression of events, involving each cell, tissue, organ and organ system, all dependent on their preceding events for any particular biological significance. If these events are of proper significance to policy formulation and law making in deciding whether the embryo or fetus may be disposed of with impunity, they must be considered *in toto* and in context of a *continuum*. No point, time or stage of our development stands alone to the exclusion of all others to be judged relevant or irrelevant to any socio-legal consideration.

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