

# The Beginning of Human Life

FRITZ K. BELLER<sup>1,3</sup> and GAIL P. ZLATNIK<sup>2</sup>

Submitted: February 27, 1995

Accepted: June 9, 1995

*The beginning of human life is seen differently by different individuals, groups, cultures, and religions. Embryonic and fetal life are a continuum, within which are time sequences and points—birth of a newborn, viability, neuromaturation, implantation, and conception—that may be declared as the beginning of human life. For each of these there are ethical and legal implications and considerations. Abortion laws reflect the interests of a given society at a given time. Although we have witnessed a change in the United States from virtual denial of the right to abortion to acceptance for certain reasons, abortion laws remain ambiguous. With the recent introduction of the antiprogesterones, it is conceivable that we will soon witness yet another procreation revolution with consequent increased controversy. Fundamental to productive debate and reconciliation between minority and majority groups is an understanding of the ill-defined concept of “the beginning of human life.”*

**KEY WORDS:** ethics; abortion; personhood; beginning of human life.

Any answer to the question which ignores the biological and genetic basis of human development and individuality is to be rejected.

Daniel Callahan (1)

## INTRODUCTION

When does human life begin? This question—until two decades ago a matter of idle curiosity—has been answered differently by different religious groups, cultures, and moral philosophies. Recently, however, two apparently unrelated developments in the United States have focused intensive interest in

these answers: first, the ongoing and sometimes violent U.S. debate over abortion and abortion laws, and, second, the agreement in 1981 upon a definition of brain death by a presidential commission (2). At present the public abortion debate is couched in broad, even superficial, often dramatic terms; we believe that an agreement on terminology is fundamental to move the debate to more thoughtful levels.

In this paper we discuss various biological and philosophical terms that have been used to define the beginning of human life, as well as their relevance to abortion and abortion law. We also suggest some practical and moral implications of the process of definition.

## TERMINOLOGY OF THE BEGINNING OF HUMAN LIFE: BIOLOGICAL TERMS

### Delivery

Before the era of Aristotle, who taught that human life begins when the fetus is formed, human life was considered to begin at birth. Prior to birth the fetus was not an independent human being but, like an organ, part of the mother (3). Thus the birth of a full-term infant has been used in the laws of various countries to signify the beginning of that human life that is to be protected. The gestational ages encoded in abortion law were sometimes odd, like week 28 of pregnancy in Germany at a time when a newborn of 34 weeks' gestation was considered to have almost no chance of survival. The significance of the birth process as a marker has become arbitrary as the chances for very small prematures have improved.

### Quickening

In effect an arbitrary point in gestation, quickening signifies maternal perception of fetal movement. Smaller fetal movements that go unrecognized by

<sup>1</sup> 15031 Ponta Rassa, Ft. Myers, Florida 33908.

<sup>2</sup> Unaffiliated.

<sup>3</sup> To whom correspondence should be addressed.

the mother are disregarded. Quickening is felt by the multiparous patient earlier than by nulliparas, presumably because of experience.

### Viability

Becker states that the concept of viability "confuses a criterion with a definition"; it is "a rough *criterion* for the completion of the process of metamorphosis" of the fetus and "not a *definition* of 'human being'" (4). In *Roe v. Wade* the United States Supreme Court equated viability with the end of the second trimester, which, however, is actually at the beginning of the 27th week pm and not the 24th week pm, as in the court decision (5). Additionally, U.S. law has not precisely defined what viability means: the ability of a neonate to sustain life outside of the womb with/without artificial means, or a certain number of gestational weeks.

In the 27th week of gestation the fetus weighs about 1000 g. Although nowadays premature infants of this weight have an 80% survival rate in neonatal intensive care units, the survival rate was considerably lower when *Roe v. Wade* was decided. In *Webster* (6) the Supreme Court changed the criterion for viability to the 22nd week pc (or 24 weeks pm), at which time the fetus weighs 500 g. Approximately 30% of newborns of this size survive, 5–10% of them with severe handicaps.

The 22nd week pc is an interesting cut-off point for obstetrical reasons. The end of the 22nd week pc logically marks, according to usage in U.S. law, both the end point for "abortion" and the beginning of "viability" (7). In any case, it is questionable practice to use weeks of pregnancy to determine viability. For example, at 21.5 weeks, terminating the pregnancy can be called a delivery or an abortion, depending entirely upon the intent of the procedure. This gray area has to date been unexplored (8). However, variation in fetal weight at this point is considerable, and the methodology of weight determination by ultrasonography is not very precise. A fetus of 650 g at 21.5 weeks who is able to sustain extrauterine life could therefore be legally aborted, under the laws of many countries, including the United States (9).

EEG activity has also been considered as an indicator of viability: demonstrable as early as 14 weeks, with more generalized activity during the 22nd week, fetal EEG patterns resemble adult patterns only at 32 to 36 weeks (10). Thus EEG activity

is an extremely conservative measure of the beginning of human life.

### Neuromaturation

This concept was apparently first formulated in 1968 by Fritz Zimmer, a German obstetrician (11) and, independently, by several ethicists in the United States (12). It suggests that the beginning of human life requires the neural fusion of the periphery with the center, as well as sufficient development of the brain itself (13). In this context Brody formulated the so-called symmetry concept: If the death of a human being requires the death of the brain, the beginning of human life shall correspond with the beginning of the life of the brain, considered to be at day 32 pc (14). However, Sass has correctly pointed out that fusion is not established anatomically without neurons which form synapses, which would be expected from embryological development at 70 days (8 weeks) pc. He proposed a Uniform Determination of Life Protection Act that incorporates the work of Truog and Fletcher in defining death (15):

An individual developing or having integrated brain functions deserves moral recognition and legal protection. A determination of integrated brain function must be made in accordance with accepted medical standards. Bioethical assessment of established biomedical facts suggests the protection of human life from the presence of neuro-neuronal connections in the cortical plate zone, when personal life becomes imminent, to the absence of integrated brain functions, when somatic death becomes imminent.

### Twelfth Week of Pregnancy

It is rather surprising that nearly all countries of the Western world use this time period as the limit for legal abortion. It is not the end of the first trimester, which is 13.3 weeks, and there is no other particular biological event to justify this limit.

### Implantation

The fertilized ovum needs approximately 6 to 8 days to reach the endometrium. The implantation process is terminated, by definition, by day 14 pc. Since conception can occur only after ovulation (on day 14 pm), implantation occurs 28 days after the beginning of the last menstrual period.

Implantation coincides with the development of the primitive streak in the embryo. Although in a set

of twins one individuum can disappear (as ultrasonic studies have shown), genetic and individual identities are now more or less equivalent. Many eminent Catholic writers, among them the Australian priest Norman Ford, author of *When Did I Begin?*, consider implantation to mark the beginning of human life; they maintain that the preembryo has only intrinsic potential and must be protected only from the time of implantation (16).

### Conception

There is only marginal advocacy nowadays for the view that sperm and ovum are living cells and therefore the beginning of human life. For many groups, especially the Catholic church, conception—the penetration of a sperm into an ovum—constitutes the beginning of a genetically unique human being. The church sees the resultant human zygote as equivalent to an existing and actual person integrated to the full realization of his or her personhood (17).

However, there are biological and ethical obstacles which make of this definition less a scientific enterprise than a spiritual one.

1. The genetically unique, newly developed DNA, a genome, is not established until 48 h after sperm penetration. The ovum and sperm lie side by side for more than 48 h before they finally merge. In biological terms this renders conception as a *process* that occurs over time and not a specific point in time.
2. Nature works in this process with an extreme surplus. Several millions of sperm are needed, and of fertilized ova more than 70% disappear. These facts have puzzled Karl Rahner, a fundamental German Catholic moral theologian, who has questioned the enormous loss of souls under such a definition (18).
3. The cells of the blastocyst are totipotent. That is, by virtue of their identical DNA content, any fetal cell can through cleavage develop into either normal or abnormal trophoblastic tissue, the latter resulting in a placenta, a mole, or a tumor (e.g., teratoma), none of which can lay claim to being human life.
4. Two or more human beings can develop from the cleavage of one cell; the resultant zygotes may be several hours younger than the preembryo that occurred as the result of fertilization.
5. The chimera, resulting from the recombination of two individua to become one individuum

(and detectable through genetic testing), provides another argument against the equivalence of conception and the beginning of human life: no individuum has died, yet one has ceased to exist.

These facts make it clear that genetic identity is not the same as individual identity. As Grobstein has noted, "The fact that new individuals can emerge without genetic discontinuity obliges us to discard genetic identity at least as a sufficient criterion for individual identity (19).

### PERSONHOOD AND POTENTIALITY

Viewpoints on the nature of "personhood" and what it means ethically and legally vary widely. In his proposed Life Protection Act, Sass acknowledges that a fetus with formed synapses is not a "person" in the usual sense of the word, connoting self-consciousness and conscience (20). Veatch sees the problem as defining the life that has full moral standing (21), while Knutson (22) has noted that "those who employ spiritual or religious definitions of when life begins tend to place the beginning of life earlier than those who employ psychological, sociological, or cultural definitions." His studies have shown that women tend to believe that human life begins at an earlier point in development than do men. For the neonatologist, the newborn—a potential person—has a *prima facie* claim to the moral benefits of personhood, including the right not to have its life terminated (23). Lastly, although few lawmakers would debate the statement that the newborn does not reach personhood until some point in childhood, the newborn is nevertheless protected by law as if it were an adult in all countries of the Western world. This protection becomes effective in many countries at the time of any birth at 24 weeks pm or thereafter. The fetus has become an infant, and infanticide at any time thereafter is considered murder.

The concept of "potentiality" has also been used, sometimes only implicitly, to clarify the beginning of protected human life. The terms "marginal person" (24), "human in being" (25), and "potential person" (26), to mention only a few used to refer to the fetus, suggest that neither the preembryo nor the fetus is a person. For Engelhardt the term "person" connotes the "social person" only (27). It seems obvious in light of this ongoing discussion that personhood is a developing quality that

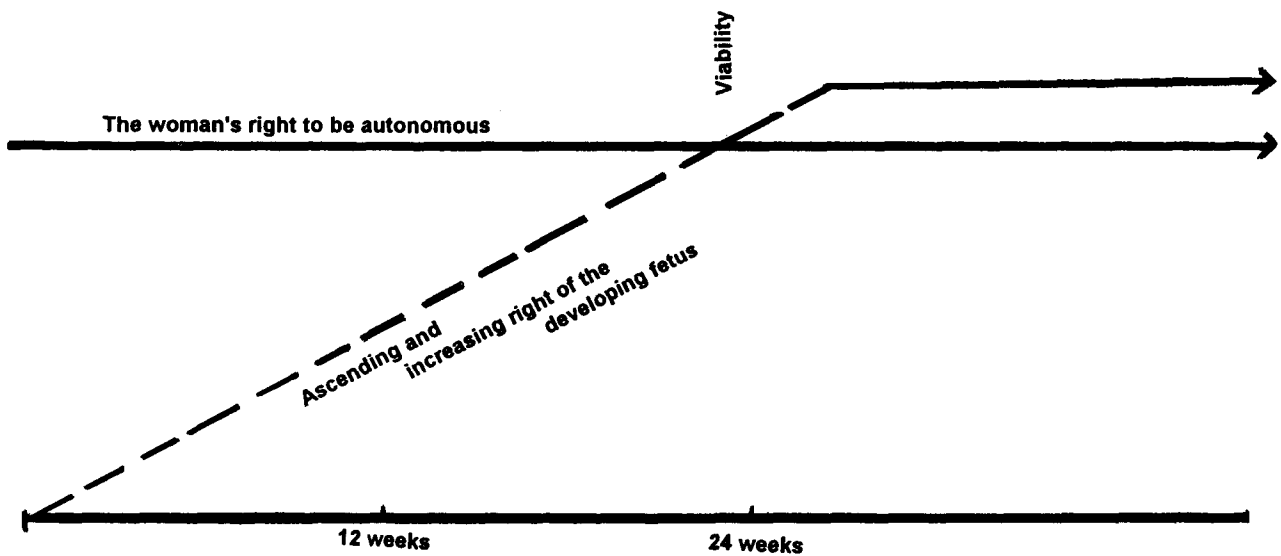


Fig. 1.

becomes more securely instated as pregnancy progresses and the fetus matures. In the constitutions of many countries one group of laws supports the right of the "person" to self-determination, and another group protects the life of a fetus or newborn. Young graphed the two rights against each other: in his scheme the maternal right to self-determination decreases as pregnancy advances, and he equates viability with 26 weeks of gestation (28). Yet it can be argued that in fact maternal right is of a given magnitude that does not vary during pregnancy. The right to life of the fetus, however, does increase with his or her development and as his or her potentiality matures. At some time during pregnancy fetal right becomes equivalent to and may conflict with maternal right. When this occurs is dependent upon the decisions of the lawmakers of a given country (Fig. 1).

Ultimately, even the term "human life" poses a semantic problem. The placenta is "human life," as is every individual cell or organ of the human body, but "human life" is clearly not equivalent to "human being." It is therefore mandatory to differentiate between organic or vegetative human life and "potential personal human life." The latter term allows various groups to identify a point of the continuum between abortion and birth to which they can ascribe appropriate values and rights.

## CONTRACEPTION AND ABORTION

If the term "conception" is biologically vague, the term "contraception," a contraction of *contra*

and *conception*, must be correspondingly vague. And if conception is not the issue, usage of the term is merely disputations. It is also made obsolete by laws in various countries, including Austria, Germany, the Netherlands, and New Zealand, that state that potential human life begins with implantation.<sup>4</sup>

The terms contraception and early abortion are now used with some interchangeability by certain groups, notably the Catholic church. Yet for a Catholic the difference in words and terms is not a matter of hair-splitting but a true problem: contraception is prohibited, but abortion is punished by excommunication.

The new antiprogesterones (RU 486 and others) permit abortion to be performed with safety up to 48 days pm. Recently it has become apparent that, if taken once or twice a week, these drugs also act as ovulation inhibitors. Since they obviate the need for an abortion clinic, the time at which they are taken and the motivation for taking them, as well as the mode of action, become matters of personal decision. The blurring of the terms contraception and abortion was taken into consideration when the new

<sup>4</sup> The laws of some countries seem self-contradictory: in Germany the rather vague term "human dignity" appears in the constitution and is applied from conception onward. One law makes research on the preembryo a criminal offense, punishable by up to 5 years in prison, yet in abortion law human life is said to begin with implantation. This terminology was used to protect "contraceptive" methods that interfere with the implantation process. Philosophical writers use the IUD as an example, although its effectiveness is not actually due to implantation inhibition, as is true for the so-called morning-after pill.

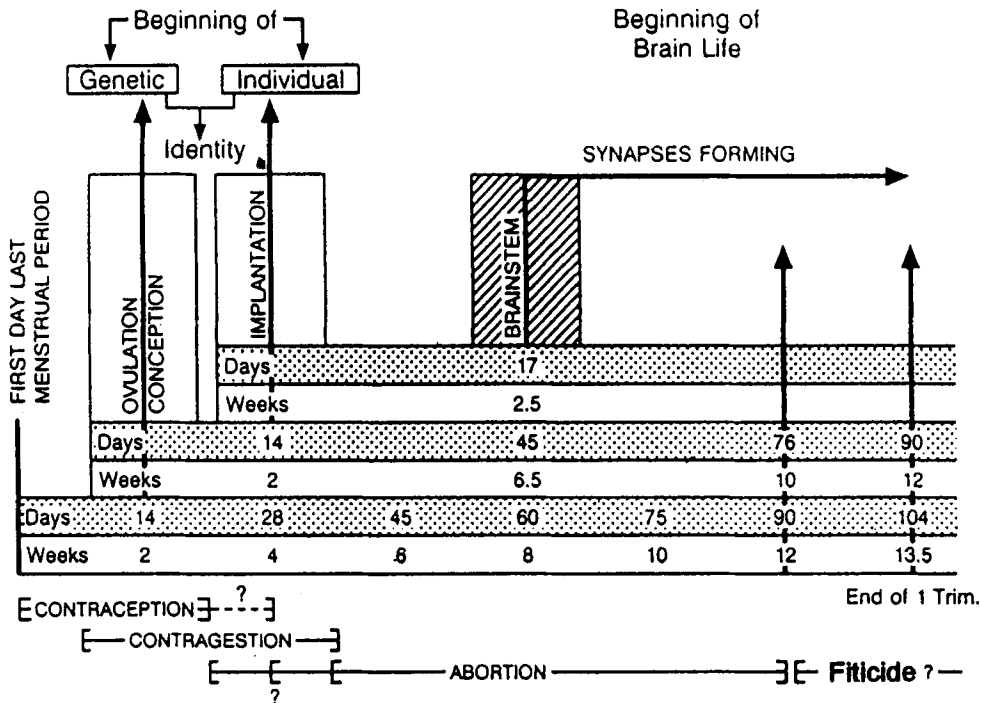


Fig. 2.

term “contragestion” was introduced (Fig. 2) (29). In most instances, of course, terminology is irrelevant to the individual woman, whose concern is that the “new pill” be effective.

It is not difficult to foresee, concurrent with the beginning of the new century, a new procreation revolution that will presumably change society even more than did “the Pill.” Abortion laws that indicate that life begins at a certain fixed time will become meaningless because they cannot be implemented. As a result, society will be required to abandon abortion laws and to replace them with laws that protect the fetus *in utero*.

Various abortion laws extend the legality of abortion after diagnosis of a malformed fetus (in practice, predominantly Down syndrome). Thirty years ago, Hellegers expressed the view that such an indication is really a social one in the truest sense of the word. That is, it is not the fetus but society at large which is aided, because society need not bear the burden of caring for the malformed individual. In some states, such as Germany and Austria, the law permits abortion of a malformed fetus up to 22 weeks pc. (It should not go unnoted here, however, that the assumption that a malformed fetus or child is a burden no longer goes unquestioned.)

Fetal indications for abortion frequently overlap with maternal indications, among which pregnancy

resulting from rape is usually included (except in Ireland, Poland, and Hong Kong, as well as some South American countries). Theoretically, pregnancy may be interrupted at any time when maternal life is endangered, and medical indications to protect maternal life were fairly numerous until the end of World War II. Since then the number has shrunk to a handful, in part because of medical advances (30). Nevertheless, no state law has up to now clarified what is meant by maternal endangerment, and certain laws seem to confuse psychological indications with medical ones. For example, the German law reads: “The termination of pregnancy is not punishable by law if the malformation of the fetus is so grave that it is an undue burden for the mother to continue the pregnancy.” The nature of the burden goes unspecified but seems to be understood as emotional rather than physical.

THE FETUS AS A PATIENT

A new concept, that of the fetus as a patient (31), may help to illuminate the area of overlap between maternal and fetal interest. For example, the maternal patient may reject a cesarean section deemed necessary for the fetal patient. Termination of the pregnancy—that is, preterm delivery—has been

considered to be in the interest of the fetus when there is maternal drug abuse, for example.

(We might note at this point the term "feticide," the active causation of fetal death, which is at present used primarily in the context of reduction feticide, in which the number of fetuses in a multiple pregnancy is "reduced" in order to allow one or more remaining fetuses to survive. "Feticide" is *not* used in other cases, regardless of the length of the pregnancy, yet logic dictates that the term be used between 20 and 22 weeks. Also, the term implies that methods are available to cause fetal death instantaneously. In fact, when abortion is induced around the time of viability, it is expected that labor will kill the fetus, hardly a humane process. The implications of the clinical term "feticide" have rarely been examined.)

## REFLECTIONS AND CONCLUSIONS

The point at which human life begins will always be seen differently by different individuals, groups, cultures, and religious faiths. Embryonic and fetal life is a continuum, but there are points and processes within the continuum—birth of the newborn, viability, neuromaturation, implantation, and conception—that may be considered as the beginning of human life. For each of these there are ethical, medical, and legal implications and considerations.

Abortion laws are reflections of the interests of a given society at a given time. In recent years in U.S. law we have witnessed a change from virtually absolute prohibition of abortion to conditional but widespread acceptance. Most recently, we have seen advocacy of the earlier position, now a minority opinion, become increasingly violent, even murderous.

Abortion is, in the final analysis, a yes-or-no issue: if we agree that human life is worthy of protection, the only flexibility is at that point where, we can further agree, human life actually begins. In democracy there are always at least two sides, and the center holds only when the majority realizes that without a minority democracy itself is lost. The minority in turn must realize its best chance lies in persuasion by reason and thoughtfulness rather than fanaticism.

The ethical debate over abortion rests in part upon ill-defined but crucial biological terms. Our

goal has been to contribute some guidelines for clearer definitions, thus more constructive debate.

## REFERENCES

1. Callahan D: The beginning of human life: philosophical considerations. *In* What Is a Person?, MF Goodman (ed). Clifton, NJ, Humana Press, 1988, p 35
2. President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research: Defining death: a report on the medical, legal, and ethical issues in the determination of death. Washington DC, Government Printing Office, 1981. When the definition of death was reevaluated, the concept of brain death came to replace the "breathing" definition of death. In Japan, where the brain-death definition has not been implemented, there is also no organ donation. Death in Japan is considered to be a social or cultural event rather than an individual death. The difference in attitudes toward death may explain why abortion is available and acceptable in Japan. Beller FK, Zlatnik GP: The beginning of human life: medical observations and ethical reflections. *Clin Obstet Gynecol* 1992;35:720-728
3. It is likely that early Jews adopted this view, which may also be reflected in the more liberal view of some modern Jews despite the Orthodox condemnation of abortion. See Connerly JR Jr.: The ancients and medievals on abortion. *In* Abortion and Constitution, DJ Horan, ER Grant, PC Cunningham (eds). Washington DC, Georgetown University Press, 1987, p 124
4. Becker LC: Human being: The boundaries of the concept. *In* What Is a Person?, MF Goodman (ed). Clifton NJ, Humana Press, 1988, p 10
5. *Roe v Wade* 1973; 410 US 113. Reiter RC, Johnson SR, Beller FK: Abortion: is there a rational concept? *Obstet Gynecol* 1991;78:464-467. It must be stressed in this context that any time designations in pregnancy without reference to the first day of the last menstrual period (pm) or conception (pc) are misleading, since 2 weeks more or less *in utero* may decide the prognosis for a given fetus. More than half the abortion laws in the United States do not make this distinction (Beller FK, De Prosse CA: The confusion of trimester and viability and the consequences for the abortion laws in the USA. *J Repro Med* 1992;37:537-540) nor, notably, do many studies in the pediatrics literature.
6. *Webster v Reproductive Health Services*; 109 S Ct 3040
7. Reiter RC, Johnson SR, Beller FK: Abortion: is there a rational concept? *Obstet Gynecol* 1991;78:464-467
8. One review revealed that subspecialty obstetricians do not consider performing a cesarean section before 22 weeks pc or 500 g because of the low survival rate and the considerable risk of brain damage. Amon E, Shyken JM, Sibai M: How small is too small and how early is too early? A survey of American obstetricians specializing in high risk pregnancies. *Am J Perinat* 1992;9:17-21
9. Beller FK, De Prosse CA: The confusion of trimester and viability and the consequences for the abortion laws in the USA. *J Repr Med* 1992;37:537-540
10. Jones DG: Brain birth and personal identity. *Med J Ethics* 1989;15:173-178

11. Zimmer F: Probleme am Anfang des Lebens. *Dtsch Apotheker Ztg* 1968;43:1733
12. Brody B: The morality of abortion. *In Contemporary Issues in Bioethics*, TL Beauchamp, L Walters (eds). Belmont, CA, Wadsworth, 1982, pp 240–250; Goldenring J: The brain life theory: towards a consistent biological definition of humanness. *J Med Ethics* 1985;11:198–204
13. Beller FK, Reeve J: Brain life and brain death: the anencephalic as an explanatory example. *J Med Philos* 1989;14: 5–20.
14. Brody B: *Abortion and the Sanctity of Human Life: A Philosophical View*. Cambridge, MIT Press, 1975, p 109
15. Sass HM: the moral significance of brain-life criteria. *In The Beginning of Human Life*, FK Beller, RF Weir RF (eds). Dordrecht, Kluwer, 1994, pp 57–70 Truog ES, Fletcher JC: Brain death and the anencephalic new born. *Bioethics* 1990; 4:199–215
16. McCormick KA: Who or what is the preembryo? *Kennedy Instit Ethics J* 1991;1:24–28. Mahoney SJ: *Bioethics and Belief*. London, Sheed and Ward, 1984, p 80. Ford NM: *When Did I Begin? Conception of the Human Individual in History, Philosophy and Science*. Cambridge, Cambridge University Press, 1986
17. *Congregation for the Doctrine of the Faith. Instruction on Respect for Human Life and Its Origins and the Dignity of Procreation*. Vatican
18. Rahner K: *Encyclopedia of Theology: The Concise Sacramentum Mundi*. New York, Seaburg, 1984, p 134
19. Grobstein C: *Science and the Newborn*. New York, Basic Books, 1988, p 14
20. Sass HM: Brain life and brain death: a proposal for normative agreement. *J Med Philos* 1989;14:45–59
21. Veatch RM: The beginning of full moral standing. *In The Beginning of Human life*, FK Beller, RF Weir (eds). Dordrecht, Kluwer, 1994, p 19
22. Knutson AL: When does a human life begin? Viewpoints of public health professionals. *Am J Publ Health* 1967;57:2167
23. Weir RF, Bale JF Jr: Selective nontreatment of neurologically impaired neonates. *Neuro Clin* 1989;7:807–822
24. Becker LC: Human being: the boundaries of the concept. *In What Is a Person?*, MF Goodman (ed). Clifton, NJ, Humana Press, 1988, p 63
25. Grobstein C: *Science and the Newborn*. New York NY, Basic Books, 1988, p 14
26. Goodman MF (ed): *What Is a Person?* Clifton, NJ, Humana Press, 1988, p 3
27. Engelhardt HT: Medicine and the concept of a person. *In What Is a Person?*, MF Goodman (ed). Clifton, NJ, Humana Press, 1988, p 175
28. Young EW: *Alpha & Omega. Ethics at the Frontiers of Life and Death*. Reading, MA, Addison Wesley, 1989, p 75
29. Baulieu EM: Contraception and the other clinical applications of RU-486, an antiprogestone at the receptor. *Science* 1989;245:1351. Cook R: Antiprogestin drugs: medical and legal issues. *Fam Plann Perspect* 1989;21:267–272
30. Beller FK, Kyank H: *Erkrankungen während der Schwangerschaft*. 5th ed. Leipzig, Thieme, 1990, p 615
31. Chervenak FA, McFarley MA, Walters L: When is termination of pregnancy during the third trimester morally justifiable? *New Engl J Med* 1984;310:501–504