

WERE YOU A ZYGOTE?

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I want to say immediately that this talk is *not* primarily about abortion. It's related to abortion of course; and I don't think I'd have become interested in the topic if it weren't for my interest in the morality of abortion. But still, though what I say will touch on the morality of abortion, I think that everything I'm going to affirm tonight could in principle be accepted by those who are tough-mindedly pro-choice.

So what is my question? Simply this: When did I begin to exist? I'm certainly a human being, an individual member of the species *homo sapiens*; and so when I began to exist a human being began to exist. Alright then: When do human beings—when do people—begin to exist?

First I want to present a simple argument; then I want to consider objections to this simple argument and complexify it a bit.[\[1\]](#)

So I start with myself. As I said: I am a human being. I am a person. Once upon a time, I—this human being standing before you—was a teen-ager; before that I was a ten-year-old; before that a toddler; and before that an infant. I realize I'm very different from what I was when I was a ten-year-old. But I also know that I was once ten years old. If I were writing my autobiography, I'd be writing about my experiences in 1957, and I'd know that those experiences were mine—not those of another being. I realize that I'm very different physically and psychologically now as compared to then, but I also know that *I was* that ten-year-old. Between me now and me then, there's a continuity of identity. This identity is an odd thing. It can exist despite great material changes—despite the replacement of every bit of matter that existed in my body when I was ten. And it can exist despite great—I'd say overwhelming—psychological changes. But whatever the *explanation* of the fact, I think we can all agree on the fact that every one of us here was once ten years old.

Now I want to consider something further. I was once an *ten-week-old* infant. I don't have any memories of what I was like at that time. I'd have to ask others who were older in 1947—like my mother. But if she tells me I cried a lot and kicked a lot, I'd know that it was *me* she was talking about. *I was* the one who cried a lot, *I was* the one who kicked a lot. Despite all the differences, despite all the changes, *I was* that little baby.

Go back with me a little further. I was born. I know my birth was difficult. I have no conscious memory of that, of course. I was told. My mother was in labor three days with me. I was well over twelve pounds. (It must have been like giving birth to a flesh-covered bowling ball!) But—and this is the important point—I was the being who underwent that difficult birth. It was *my* birth. I'm not just *like* the being who was born. In fact I'm *not* like that being. I—despite all the unlikeness—*am* that being.

But now let's try to push our way even further back. If my mother says, 'I felt you kicking at 24 weeks', I know that it's me she's speaking about. *I am* the being whom she felt kicking: the same being who was born, the same being who survived to ten weeks, ten years, and then to forty-eight years. I existed for a time in the womb of my mother. And when she says, 'I felt you kicking at 24 weeks', there are two things implied in that statement: that I existed in her body for

24 weeks before that point, and also that *my existence began*. I was that being who was conceived 24 weeks before I began to kick—or at least to have my kicks felt. That's what I want to insist on here. The individual organism that I am, this individual member of the human species that I am, began approximately nine months before I was born. At no point from conception to birth was some other individual substituted for me. *I am* the individual that began, grew, kicked, was born, learned to walk, to talk, was graduated from the University of Toronto, was ordained, and is speaking to you this evening.

No doubt I'm very different now from what I was like (say) just before I was born. And those differences can be summed up in the acronym **SLED**: **S**ize, **L**evel of Development, **E**nvironment, **D**egree of Dependency. I'm much bigger; I'm more developed; I'm differently related to my surroundings; I'm not quite so dependent on other human beings for my survival. It doesn't seem to me right to say that any of these changes constitutes an *essential* change in my being—as if change in Size or Level of Development or Environment or Degree of Dependency could change an organism from one *kind* of being to another: from a *non-human* being to a *human* being. Rather, I'd say that all the changes that happened to the being, the organism, conceived in my mother's body were *accidental* changes. That doesn't mean that they weren't important or momentous changes. It simply means that they were *non-essential*, i.e. changes that happened to an individual remaining essentially the same throughout them. That's why I can say that those changes, momentous as they may have been, were changes that happened to *me*. And I don't think I'm unique in this. Normal human beings begin in a certain way, by the joining of sperm and egg. The being that comes about from the successful joining of sperm and egg is a new member of our species; it is very small, very undeveloped, in a unique environment, and utterly dependent on that environment. It's called a zygote. Since the being that comes about by the joining of sperm and egg is the same being that later kicks and later is born and later walks and speaks and goes to graduate school, then it seems reasonable to say that I was that being; hence that I was a zygote. Once upon a time I looked very different from the way I look now; I didn't have a face or arms or legs. I also want to insist: that's how, once upon a time, everyone in this room looked. Almost every one of us here—I'll explain later why I'm qualifying this—began as that single cell. And *if* human beings—individual members of our species—just because they are human beings—have some claim upon us to respect, to consideration, to value, then it seems to me that small, undeveloped, dependent human beings make that very same claim upon us.^[2]

But there are those who deny all this. They argue that I am *not* identical with the conceptus (the being conceived in the body of my mother). They say that certain things occurring in the womb made an *essential* difference—not just an *accidental* or *non-essential* difference—to the kind of being that existed there.

This evening I plan to take up three such objections^[3] and put them to the test: to see whether they outweigh, or at least call into serious question, the simple argument I've just presented. And I plan to take them up in the reverse order of their importance. In other words, I'm going to take up what I consider to be the weakest of these arguments first, and then move on to the strongest.

A recent book by Harold Morowitz and James Trefil, called *The Facts of Life*,^[4] argues that in a significant sense, I, this human person, am not identical with the entity that existed as a one-

celled animal in the body of my mother. They say that this entity had first to acquire the property of *humanness*. It is this property that sets us apart from other living things; and this property involves the ability to think, to reason, to interact with others. At the very early stages of this organism, what exists is at most a *blueprint* for a later human being. As they put it:

Does this [genetic] information make the zygote a “potential life”? It does, but only in the sense that a blueprint is a potential building. Just as a whole constellation of workers and materials are needed to turn blueprints into a skyscraper, a great deal of machinery and material is needed to turn the zygote into a full-term baby. This machinery tends to be invisible to us, of course, because it is located inside the mother's body, but it is there nonetheless.^[5]

Well, if something is needed to turn the conceptus into a real human being, what is it? As I said, Morowitz and Trefil answer: *humanness*. And the conceptus acquires *humanness* by acquiring a cerebral cortex: that part of the brain which seems to control our higher mental functions—that part, at least, without which those higher mental functions would be impossible. They say:

Whether we start by looking at other forms of life that exist today or trace the development of our species through time, we see that what distinguishes human beings from other forms of life, both structurally and functionally, is the existence of a large, multiply connected cerebral cortex. In our usage, we say that our species acquired humanness when the enlarged cortex developed, and the individual human fetus acquires humanness when the cortex begins to function.^[6]

This argument calls for a number of comments.

When the cortex begins to form and function, it is not *already* functioning in such a way as to produce those characteristically human acts of self-consciousness that Morowitz and Trefil tell us are the very essence of humanity. That pre-birth functioning of the brain is merely the *precursor* to its mature functioning—something that can develop only after birth (though it's not clear exactly how long after birth). So what Morowitz and Trefil are telling us is that somewhere around the 24th week there is present in the fetus the *undeveloped* stages of that which will later, when it is more developed, give rise to the kind of mental/spiritual activity we all recognize as uniquely human.

But this creates a problem. For Morowitz and Trefil would have to say *either* that the fetus *after* 24 weeks—and in fact the born baby—up until the time its brain is actually able to support characteristically human acts of self-consciousness—is also a merely potential person, *or* that a not fully developed precursor is a sufficient criterion for humanness. But if a precursor is sufficient at 24 weeks, why not at 23, at 22, at 21, at 7, at 3? For at each of these stages we have ever more undeveloped forms—and the necessary conditions for each later stage—of that which comes to be the maturely functioning central nervous system. And since Morowitz and Trefil don't want to defend infanticide, I don't see why less developed stages of (say) the central nervous system should not suffice for humanness.^[7]

After all, the upper brain (and in fact all of the central nervous system) doesn't plop into this growing thing from outside, like raisins into cookie-batter; it is part of the natural, orderly, programmed development of that being which started out as just one single cell of a certain *kind*, having a certain *nature*: a *rational* kind of nature—that is, a kind of nature whose material

expression involves the production of specifically human structures like skeleton, reproductive organs, and that co-ordinating organ we call the brain. I'm saying that one of the characteristic, species-specific acts of a human being is to produce a mature human brain: that only if this organism is *already* a human being at an early stage of its development will it produce a mature human brain. So at a certain stage in your life you did not have a brain. Is that so shocking? When you were born, you did not have a brain capable of sustaining the kind of self-conscious thought you now enjoy. But that born baby was you; you know that; and its co-ordinating organ was the precursor to the organ of thought you now actually possess and use. Well, obviously the same is true before birth. As you push back, you have at each stage earlier and more undeveloped stages of the same individual human being.

A word about blueprints. At no stage does a blueprint literally turn into the building whose blueprint it is. There is an architect who produces the blueprint, studies it, modifies it at will, and orders various workers to gather materials for the building. At the completion of the building he may save the blueprint or throw it away. But the relation of zygote to fetus to neo-nate is in no way so extrinsic. A closer analogy would be this: An architect draws a blueprint. You place it in a fertile field; water it; give it lots of sunlight. Soon something begins to grow; it sprouts girders and cross-beams, slate and bricks, until you have a fully grown house. Let's say it takes a year for this continuous process to occur. If vandals come along and burn down what had been growing for, say, two months, would it be realistic to say that they've destroyed a mere *blueprint*? Would you be irrational to complain that they had destroyed your growing house? At any rate, what we'd mean in this case by 'blueprint' would be vastly different from what we now mean—and so would the value we'd be prepared to attach to blueprints.^[8]

This brings me to the second objection, the one made in a frequently cited little article by Carlos Bedate and Robert Cefalo.^[9] They say that the conceptus (up to 2 weeks, possibly longer) cannot possibly be a human being, not even a *potential* human being (such that we can be sure a mature human being will develop out of it). For example, some zygotes give rise to what are called hydatidiform moles—human biological entities that are not human beings. So there must be something from the mother, something that comes from *outside* the information contained in the zygote, that accounts for the coming to be of a human being. Also, they seem to say, the post-implantation embryo requires genetic information from the mother in order to differentiate and develop properly. Therefore one cannot say that the zygote/embryo has what it takes, *even genetically*, to be a human being.

What Bedate and Cefalo say—however influential it may be—seems to me wrong, and, as they state it, quite misleading. The fact is:

[H]ydatidiform moles do **not** develop from a normal human embryo, but carry gross **chromosomal aberrations**, with **no** capacity to develop into a normal human being....^[10]

For example, they may develop from an egg penetrated by an abnormal sperm that produces two paternal nuclei, or sometimes from the fertilization of an egg by two sperm. In any case, there is no evidence that the zygote needs more genetic information than it has to develop normally. It does need *more than* genetic information to develop. But so do we all—even well past birth.

Bedate and Cefalo *seem* to say that the post-implantation embryo requires genetic information

from the mother in order to differentiate properly and develop into a human being. But this is false. The mother does *not* give any genetic information to the conceptus—in the sense of giving something that changes this being from one *kind* of thing to another. It is certainly true that at and after implantation, the embryo needs certain molecules from the mother in order to develop properly. But note: the search for just these molecules is directed *by the embryo itself*; and this activity is determined by *what the embryo is and what it is striving to become*. In fact, it needs just *these* molecules because it is just *this* kind of thing—namely, a human being. That's why the embryo doesn't need fish enzymes or horse proteins or cat molecules. Why should this be so difficult for some to see, who have no difficulty seeing it in the case of horses and cats?^[11]

Now of course the zygote doesn't *actually* contain *all* the proteins and enzymes—all the stuff—a human being will ever need to live. But it is *programmed* to produce or obtain those things *as it needs them* at later stages of development; and the reason it produces them or searches for them is because it is the *kind* of thing that needs them and can produce them in the course of its development—namely, a human being. Let me quote Dianne Irving:

“[M]olecular information” or “positional information” *itself* is coded in the original single-cell human zygote.... [T]he genetic information in the original human zygote *determines* what molecules will be formed, which in turn *determine* what proteins and enzymes will be formed which *determine* which tissues and organs will be formed. In genetics this is called the “cascading effect.” That is, the information in the original single-cell human zygote “cascades” throughout embryological development—each previous direction causing the specific formation of each succeeding direction. Thus, *all* “positional” or “molecular” information or direction is already determined itself by the information which preceded it, and ultimately by the original information in the single-cell human zygote.^[12]

The third and last objection I take from Norman Ford's challenging book, *When did I begin?*^[13] Ford maintains that a new human being continuous with me could not have begun before what is called the primitive streak stage, about 14 days (say, 2-3 weeks) after conception. He admits that the zygote is living, human, and individual; but it is not a living, individual human being: something that could be continuous with a mature adult. Why not? Because, he says, the pre-14 days conceptus has the *natural active potential* to split into other human beings. For example, identical twinning is possible before the primitive streak stage. This means that one cell can break off from an embryo's other cells and form a whole new human being; and sometimes a cell that has broken off from other developing cells can be reabsorbed back into the embryo from which it originally split off. Thus, says Ford, in no realistic sense can we have at the stage before the primitive streak a real individual, a single organism oriented toward developing to maturity; in fact, when the zygote divides into two cells, the one human individual the zygote was no longer exists; you have instead two *new* human individuals. If the zygote does not survive cleavage, then I cannot trace my beginning back to the zygote; and since I am not two beings but one, I cannot trace my being back to the two cells into which the zygote divides. Nor can I trace my beginning back to the many individuals into which these two cells further divide. It is only when all of these many—well over a hundred—human individuals come together around day 14 to form one untwinnable human being do we have an entity from which it can be said that I continually develop.

Now a lot has been written about Ford's arguments.^[14] And I have to say I'm torn in two directions by them. Part of me wants to dismiss them as foolish. But I also believe that there's something very profound in what Ford has uncovered—though not perhaps in what he has made of it.

Ford is worried by the plasticity (or totipotentiality) of early cells—by their ability to make *maximal* use of their information (e.g., their ability to make up for various accidental losses, like the breaking away of one or more cells from the parent embryo, and the ability of such a separated cell to give rise to another embryo). But this plasticity *is essential for development through cell-division*. If early embryonic cells had the kind of role-specific rigidity proper to adult cells, then no embryo would ever give rise to an adult. The real question is: How could something develop from a single cell to a multi-cellular mature organism if the early cells were *not* thus plastic: were *not* able to make maximal use of their information? And unless Ford means to rule out from the start the possibility that a single organism *can* develop to maturity through cell-division, he needs to explain why *in this case* the conditions for such development rule out the possibility (or probability) that what is developing to maturity is a single individual organism.

Why is it, for example, that the overwhelming majority of embryologists still view the early embryo as a many-celled organism and not as many individual organisms? At least partly, I think, for this reason: *it seems* more like a single organism than a colony of “loosely organized developing cells and heterogeneous tissues.”^[15] Consider:

The organism is a whole; it functions as an integrated unit.^[16]

[A] multicellular organism, rather than being a haphazard structure, is formed with precision.^[17]

But:

The cells of the embryo work together in the very precise and complex way necessary for the embryo to develop into the fully formed baby, who is certainly one organism. The cells of a colony do not work in this way. The embryo thus exhibits much more unity than does the colony.^[18]

Ford would dismiss such observations as philosophically naive.^[19] Perhaps they are. But I'd like to know what *further* degree of unity these cells must have in order to satisfy Ford that they really are parts of an individual organism. When you realize that these early cells are dividing until they reach the normal size of somatic cells; when you realize that a single program is “cascading” through, and being concretely realized in, this division, so that some cells will have one function and some another *in the mature organism*; when you realize that these cells which touch and can communicate are held together within something which is *itself* part of the organism; when you realize that this process is taking place *for the sake of the developing whole of which these cells are parts*—when you realize all of this, it's very hard to take seriously Ford's picture of the early embryo as a loose collection of individuals in external relation one to another, “like marbles in a bag.”^[20]

Ultimately, Ford's argument turns on the question of twinning. If the embryo were *unable* to twin, then no doubt Ford would agree that it is a real individual human being with which a

mature adult could be continuous.

What exactly causes twinning? We don't presently know for sure.^[21] Ford is eager, for reasons of his own, to maintain that twinning is *not* genetically programmed, but the result of accidental circumstances.^[22] Well, let's grant him that. Still I ask: Why does the possibility of a cell's being broken off from other cells, and producing a new individual, mean that what it was broken off from was *not* an individual?

After all, we can take cuttings from a plant and make a new plant grow from that cutting. Does this mean that the plant from which we took the cutting was not an individual? We can cut a worm into two pieces and get two worms. Does this mean that it was not an individual worm which we divided? Closer to home: In normal human reproduction, a part of the man—the sperm—breaks away from his body and, by fertilizing a mature ovum, produces another human being. Does anyone think that the man is therefore not an individual?^[23] Or suppose I could be cloned—that is: suppose some of my cells could be broken off and made to behave like embryonic cells. That wouldn't mean that I'm not now a human individual (in fact the possibility of cloning would presuppose that I am). But it *would* mean that for mature humans *asexual* reproduction is a remote (but real) possibility. Well, so too, it seems, for the *immature* human being: because of the plasticity (the totipotentiality or pluripotentiality) of early cells, asexual reproduction may be a remote (but real) possibility.^[24] This might be surprising or even disturbing. But it should not lead anyone to deny that the early conceptus is an individual human being, continuous with the mature adult it develops into.^[25]

Nor should these facts have led Ford to say that the embryo has a natural *active* potential to twin. For readers would most naturally take this to mean—contrary to Ford's own stated thesis—that it is twinning which is programmed *and non-twinning which is accidental*. But that position is incredible on the face of it, since the vast majority of embryos *do not twin*.

So obviously this cannot be what Ford means when he claims that the early conceptus has a natural *active* potential to twin. But what then does he mean? I believe Ford's claim is really a way of *restating* his thesis that the early cells do not form a single individual—that they form a colony, each member of which, through cell-division, *in fact produces 'twins'*, i.e. generates two genetically identical, yet distinct, living individuals. But if this is right, then Ford seems to be arguing in a circle: the early embryo is not an individual because it has an active potential to twin, and it has an active potential to twin because it is not an individual. It's a bit like the plight of the Poor Little Gingerbread Boy: he couldn't run unless he got hot, and he couldn't get hot unless he ran!

Thus I don't think Ford's argument disproves the claim that I'm identical with the organism that began in my mother's body 48 years ago: the organism we call a zygote. And I'd say the same goes for most of you in this room. If you're an identical twin, then it *may* be that you can't trace your own beginning back to the zygote your parents conceived; you may have come to be at a later stage; it may be that only your brother or sister can trace their history back to such an earlier beginning.^[26] In any case, none of this shows that there are not real ontological individuals in the womb before the primitive streak stage—any more than the fact that I can be cloned proves that I am not a human individual.

But this is all a bit too easy and superficial. And I think it's wrong to leave you with the impression that there remains no lingering darkness. I've looked often at films of the early embryo, of the zygote as it divides. That division, probably the most perfect moment of reproduction in the life of a human, where the genetic structure is exactly replicated—that division is a wonderful and a terrifying thing. And it should remind us that the unity of a human being is also a manyness—a manyness in which a force of unity dominates. Perhaps the most primitive location for that dominating force is within the nucleus of the zygote.^[27] But there is real and obvious manyness just the same.

Those of you who are familiar with theories of Mind and Body may have heard the name Roland Puccetti. He maintained that this thing you see standing before you which looks like one person is really two people. There is the person who thinks and speaks and writes lectures; but there is also another person who is dominated, held in check, but very real all the same. That would be the person set free by commissurotomy, an operation in which the brain is bisected: in which the corpus callosum, which binds the two parts of the brain together, is virtually sliced through. This is done to relieve symptoms of severe epilepsy. And when it happens something is unleashed. For example, I may be stacking dishes carefully with one hand while the other is smashing them on the floor. And yet I have no idea that I am doing these things. Puccetti says that *I* am *not* doing these things; rather, it's the inarticulate *other* using the part of the brain freed up from domination by this rational me.^[28] Does this sound like science fiction? I suppose it does. But it points us toward something important about ourselves that we are apt to forget.

Yes, there is a unity within us. *I* ask questions. *I* seek answers. *I* have a history. But we also sometimes wonder: Was that *me* who reacted in such a heartless way, who wanted this, who was willing to lie for that? We surprise ourselves, shock ourselves, by parts of ourselves that we never thought were parts of ourselves at all. And we can wonder sometimes what the unity is which joins the parts of our lives—all those changes of which I have no memory, all those early joys and fears, those hopes, those dreams, those choices, good and bad. Sometimes our life seems to have no more unity than “marbles in a bag.” And yet I know there's greater and deeper unity than that. For all the vast differences, *I* exist as this unity in many, or as many in one. But in the early stages of our lives this manyness is undisguised.

So was I a zygote? Yes; and so were most of us here tonight. And when we look at that dividing single cell, we're looking at—what? Something one with itself yet torn from itself; something destined to be both in itself and outside itself; a unity which must nevertheless strive after unity, but is able to achieve it only partially and transiently. In other words, we're looking at ourselves.^[29]

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ENDNOTES

^[1] For fuller versions of this argument, cf. Stephen D. Schwarz and R.K. Tacelli, “Abortion and Some Philosophers: A Critical Examination” (*Public Affairs Quarterly*, 3 [1989], pp. 81-98), and

Stephen D. Schwarz, *The Moral Question of Abortion* (Chicago: Loyola University Press, 1990). Also very helpful: Germain Grisez, “When Do People Begin?” (*Proceedings of the American Catholic Philosophical Association*, 63 [1989], pp. 27-47).

[2] On the question of our duty to respect other human beings, cf. Germain Grisez, *The Way of the Lord Jesus* (Quincy: Franciscan Press, 1993), vol. 2: *Living a Christian Life*, Chs. 6-8.

[3] For a consideration of many more objections, cf. Schwarz, *The Moral Question of Abortion*; and Francis J. Beckwith, *Politically Correct Death: Answering the Arguments for Abortion Rights* (Grand Rapids: Baker, 1993). Perhaps the most learned and exhaustive critique of alternative positions is by Dianne Nutwell Irving in her (as yet unpublished) doctoral dissertation, *Philosophical and Scientific Analysis of the Nature of the Early Human Embryo* (Washington: Georgetown University, 1991).

[4] Harold J. Morowitz and James S. Trefil, *The Facts of Life: Science and the Abortion Controversy* (New York: Oxford University Press, 1992).

[5] *The Facts of Life*, p. 49.

[6] *The Facts of Life*, p. 152.

[7] For more on this cf. Grisez, “When Do People Begin?” pp. 32-5; cf. also Benedict Ashley, “A Critique of the Theory of Delayed Hominization” (in D. McCarthy and A. Moraczewski, eds., *An Ethical Evaluation of Fetal Experimentation* [St. Louis: Pope John XXIII Medical-Moral Research and Education Center, 1976], pp. 113-33).

[8] Cf. also Schwarz' *The Moral Question of Abortion*, pp. 74-5.

[9] “The zygote: to be or not to be a person,” (*Journal of Medicine and Philosophy*, 14 [1989], 641-5).

[10] Dianne Nutwell Irving, *Philosophical and Scientific Analysis of the Nature of the Early Human Embryo*, p. 72. Irving continues: “Hydatidiform moles of the complete type...arise from androgenic eggs (i.e., eggs with two paternal nuclei). The usual mechanism is the fusion of an egg and sperm followed by duplication of the **sperm** genome and **loss** of the female nucleus. Sometimes the mechanism is due to dispermy (i.e., **two** sperms enter the egg at fertilization) with the loss of the female nucleus. Either way, hydatidiform moles do **not** originate from normal human embryos....”

[11] Cf. Irving, *Philosophical and Scientific Analysis of the Nature of the Early Human Embryo*, pp. 64-70; cf. also Benedict Ashley, “Delayed Hominization: Catholic Theological Perspectives” (in R.E. Smith, ed., *The Interaction of Catholic Bioethics and Secular Society* [Braintree: The Pope John Center, 1992], pp. 166-7).

[12] Dianne Nutwell Irving, “Scientific and Philosophical Expertise: An Evaluation of the Arguments on ‘Personhood’” (*Linacre Quarterly*, 60 [1993], pp. 18-46 [reprinted in C. Ward Kischer and Dianne N. Irving, *The Human Development Hoax: Time to Tell the Truth* (Clinton Township: Gold Leaf Press, 1995), pp. 110-138]).

[13] Norman M. Ford, S.B.D., *When did I begin? Conception of the human individual in history, philosophy and science* (Cambridge: Cambridge University Press, 1988).

[14] Among the many critiques of Ford cf.: Hadley Arkes, "On 'Delayed Hominization': Some Thoughts on the Blending of New Science and Ancient Fallacies" (in R.E. Smith, ed., *The Interaction of Catholic Bioethics and Secular Society* [Braintree: The Pope John Center, 1990], ch. 9); Benedict Ashley and A.S. Moraczewski "Is the Biological Subject of Human Rights Present from Conception?" (in P.J. Cataldo and A.S. Moraczewski, eds., *The Fetal Tissue Issue* [Braintree: The Pope John Center, 1994], ch. 3); Anthony Fisher, "'When did I begin?' Revisited" (*Linacre Quarterly*, 58 [1991], pp. 59-68) and "Individuogenesis and a recent book by Fr. Norman Ford" (*Anthropotes*, 7 [1991], pp. 199-244); Paul Flaman, "*When Did I Begin?* Another Critical Response to Norman Ford" (*Linacre Quarterly*, 58 [1991], pp. 39-55); Grisez, "When Do People Begin?" pp. 35-40; Irving, *Philosophical and Scientific Analysis of the Nature of the Early Human Embryo*, ch. 3; Mark Johnson, "Reflections on Some Recent Catholic Claims for Delayed Hominization" (*Theological Studies*, 56 [1995], pp. 757-61); Nicholas Tonti-Filippini, "A Critical Note" (*Linacre Quarterly*, 56 [1989], pp. 36-50). The items by Fisher and Flaman are specially recommended.

[15] *When did I begin?* p. 175.

[16] E. Fenster and U. Sorhannus, "On the Measurement of Morphological Rates of Evolution: A Review" (*Biology*, M.K. Hecht et al., eds. [N.Y.: Plenum, 1991]), vol. 25, p. 396.

[17] W. Tefler and D. Kennedy, *The Biology of Organisms* (N.Y.: John Wiley and Sons, 1961), p. 83.

[18] John Gallagher, *Is the Human Embryo a Person?* (Toronto: Human Life Research Institute, 1985), p. 28. This and the two preceding citations are taken from Flaman, "*When Did I Begin?* Another Critical Response to Norman Ford," pp. 47-8.

[19] Cf. *When did I begin?* p. 117.

[20] This phrase is taken from Grisez, "When Do People Begin?" p. 46, n. 50.

[21] Cf. I. MacGillivray et al., eds., *Twinning and Twins* (N.Y.: John Wiley and Sons, 1988).

[22] Cf. *When did I begin?* p. 119.

[23] Cf. Tonti-Filippini, "A Critical Note," pp. 43-4.

[24] Cf. Ashley, "Delayed Hominization: Catholic Theological Perspective," pp. 168-9.

[25] Consider Ford's statement of his thesis: "The zygote is not the same ontological individual as either one of the eventual twins that result from its development, notwithstanding its genetic identity continuing throughout all its subsequent cleavages" (p. 119). What meaning can the word "its" in that sentence possibly have?

[26] It may be, as Stephen Schwarz has argued (*The Moral Question of Abortion*, pp. 54-6), that twins can *already* exist, though in a materially unseparated way, *prior* to segmentation. Or perhaps the being your parents originally conceived died in giving rise to you and your brother or sister. On this possibility, cf. Grisez, "When Do People Begin?" p. 39.

[27] Cf. Ashley and Moraczewski, "Is the Biological Subject of Human Rights Present from Conception?" pp. 45-50.

[28] Cf. his “Brain Bisection and Personal Identity” (*British Journal for the Philosophy of Science*, 24 [1973], pp. 339-55).

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