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by

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"When did I begin?" queries Rev. Dr. Norman Ford *(Linacre Quarterly* November 1990). His response: about 14 days after fertilization, when the primitive streak appears. Fr. Ford agrees with the teachings of *Humanae Vitae,* and therefore "disapproves of interrupting the generative process by aborting preimplanted human embryos and destructive experiments on human embryos" (p. 65) and calls for a debate to allow the truth to emerge. I will try to show that the human individual exists from the time of fertilization, not 14 days later, taking up his arguments one by one.

Random Sharing of DNA Does Not Terminate Identity

The first cell division and cleavage "begin with the *random* sharing *(emphasis his)* of the original and replicated chromatid threads from each pair, so that the parent cell is no longer present once the first two daughter cells are formed. It no longer exists once it shares its cytoplasm and chromosomal genetic material to give rise to its identical daughter cells of equal age" (Ford, op. cit. p. 62). His meaning, then, is that the parent cell goes out of existence because it randomly shares its DNA and cytoplasm with two daughter cells. There cannot be an individual substance before the primitive streak appears, he claims; before that stage is reached, each parent cell loses its identity when it cleaves, becoming two identical daughter cells of the same age.

What is the original identity of the parent cell, and why should it lose identity by cleavage? The original and replicated DNA chromatid threads are coded messages. The code is not affected by the materials which print the code. The Morse code communicates messages which are identically intelligible whether tapped on wire by electric transmitter, or flashed by intermittent lighting. Whether the DNA coding is transmitted from parent cell to cloven cell by original DNA materials, or by replicated DNA materials, the message of the parent cell remains as before. It is the message which identifies, not the materials on which it is composed.

Do we need proof? Police who use DNA analysis to identify criminals look

for the message of the DNA code, not for the materials on which the code is written; if they find hair, or skin, or blood, they disregard the variegated tissue but look for that DNA printed code. Then they find their man.

DNA analysis to identify criminals is now a method used by courts in the U.S., Great Britain, Germany, and other countries. The National Police Agency of Japan decided that from 1992 the Agency will use DNA analysis to identify suspects in criminal investigations *(Mainichi* 25 May 1991). Identification depends on the order in which the four types of molecules that make up DNA are arranged. Japan's NPA developed its own system, different from that announced in Britain in 1985; namely the NPA looked at a part of the DNA where the molecular pattern repeats itself; the identity of the individual is established by the number of times the pattern is repeated. The test is said to be almost foolproof when used in conjunction with such tests as blood serum and enzymes.

DNA is indeed small in size, but mighty in its power over life. And it is this identification of life which parents cells communicate to their cloven offspring at the time of cell cleavage. No identity is lost in the process. Geneticist Jerome Lejeune testified on August 10, 1989 before the Circuit Court for Blount County, Tennessee, that a DNA molecule of a sperm and of an ovum, [therefore before being joined at fertilization] is a long thread a meter in length, cut into 23 pieces which are each coiled tightly around themselves to make spiral of spiral of spiral, so that finally it looks like a rod which can be seen as a chromosome under a microscope. Yet, he said, if the DNA of all the sperms and ova to make the five billon persons on earth were to be packed and brought there, the volume would be roughly two aspirin tablets. He continues, stating how the DNA then manipualtes the movement of particles and atoms and molecules and organizes them to live:

> That tells us that nature, to carry the information from father to children, from mother to children, from generation to generation, has used the smallest possible language. And it is very necessary because life is taking advantage of the movement of particles, of molecules, to put order inside the chance development of random movement of particles, so that the chance is now transformed according to the necessity of the new being.
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> All the information being written, it has to be written in the smallest language possible so that it can dictate how to manipulate particle by particle, atom by atom, molecule by molecule. We have to be with life at the real cross between matter, energy and information (testimony, August 10, 1989, before the Circuit Court for Blount County, Tennessee, printed by Michael J. Woodruff, Director, Center for Law and Religious Freedom, Annandale, Virginia, p.39).

The concept that DNA shapes the particles to organize them into life renders the difficulty of Fr. Ford about randomly shared original and replicated chromatid threads obsolete. Our identities are constituted by the DNA which manipulates particles, atoms, and molecules into a living organism; our identities are not constituted by materials - by particles, atoms and molecules - which are interchangeable among humans and other and living beings. Dr. Lejeune made a beautiful comparison to illustrate the critical difference between the printed code of life and the building blocks which the code uses for its printing base:

A chromosome is very comparable to a mini-cassette, in which a symphony is written, the symphony of life. Now, exactly as if you buy a cartridge on which *Eine Kleine Nachtmusik* from Mozart has been registered, if you play it in a normal recorder, the musician would not be reproduced, the notes of music will not be reproduced; they are not there; what would be reproduced is the movement of air which transmits to you the genius of Mozart. It's exactly the same way that life is played. On the tiny mini-cassettes which are chromosomes are written various parts of the opus which is for a human symphony; and as soon as all the information necessary and sufficient to spell out the information necessary and sufficient to spell out the whole symphony (is there), this symphony plays itself; that is, a new man is beginning his career (op. cit., p.41)

Sharing of Cytoplasm

Fr. Ford theorizes that the first cell no longer exists after it shares its *cytoplasm* "to give rise to its identical daughter cells of equal age" (op. cit. p. 62). Our reply is brief: it is the DNA which replicates the cytoplasm of the parent cell in the daughter cell; the materials - particles, atoms, molecules - of the cytoplasm are interchangeable; provided their arrangement follows identical DNA instructions in both cells, the structure and functions of the cytoplasm will match. Thus sharing of cytoplastic materials does not undo the identity of the first cell.

The Sequential Nature of Cleavage Indicates Continuity

Fr. Ford asserts that identical twinning by human zygotes is analogous to the case of an amoeba or bacterium dividing into two by fission: "The original parent cell loses its ontological individuality and ceases to exist when two offspring result from the equal sharing of its genetic material. The parent individual actually ceases to exist when the two new ones begin to exist" (op. cit. 62; the quotation is from his book: WHEN DID I BEGIN? Cambridge: University Press, 1988, p.121).

Note the closed circle of this *ipse dixit* logic: the two are *daughter* cells, *therefore* they cannot be parent cell and daughter cell; the two are *new* cells, *therefore* one of them cannot be the original cell. The assertion is tautological, saying the same thing twice. As proof he had pointed to the *random* sharing of DNA, and the sharing of cytoplasm, which was shown above to be no proof. What is new here is the example of fission by one amoeba or bacterium into two, with the claim that this is analogical to the process of cell cleavage in a multicellular organism.

Fr. Ford has locked himself into a blind assertion that a parent cell loses its identity at cleavage, that two supposed new daughter cells of equal age result; at this point he no longer sees a need to distinguish genuine twinning from serial cell cleavage. It reminds me of the story told of a habituate, who awoke from a drunken stupor in pitch black darkness at midnight. He was in a park where iron grills protected trees. He felt the bars of one of them; not a bar missing! Round and round he went, but every bar was in place. He circled the opposite way. Same result. "Just as I thought," he groaned. "In jail again!" The fixation of thought on "daughter cells of equal age" are bars fencing in logic about serial cell cleavage, and turning the argument round and round upon itself. "Neither of the daughter cells is the same one, the same ontological individual, as the parent cell" he asserts

(p. 62). In this mental construct, then, no continuous stream of unbroken organized life from the unit cell to the two cell and multi-cell stage is possible. Cleavage, when it occurs before the primitive streak is achieved, always breaks the chain of individual life, he believes.

He asserts also: "With the second mitotic division there are four distinct, contiguous, genetically identical cells within the zona pellucida. Each lives and behaves as an individual . . . At the four-cell stage, each cell is still totipotent, i.e. given a favorable environment, each has the capacity to generate the cell progeny required for the complete individual human offspring" (p. 63).

That identical twins resulting from a cleavage of the initial human cell after fertilization can be equal and independent, we do not deny. But that the initial cell loses its identity when another cleaves from it, does not follow. It is there still, with DNA and cytoplasm fully in place as before, in full readiness to begin its own life chain. The brother or sister twin, now sharing the nest within the confines of the zona pellucida and the corona radiata, does nothing to make the first cell lose its identity. The original cell did not lose its capacity to begin the series of sequential cleavages which will lead to full body form; and the twinned brother or sister cell has achieved the capacity to do the same, independently of the other.

Twinning Follows Biological and Genetic Regulations

Fr. Ford explains that soon after the four cell stage totipotency is restricted to groups of cells. But we ask whether any and every kind of groups of cells can cleave off a twin once they have become specialized. When the first cell twins, the entire DNA message is intact. If a second generation cell cleaves a twin, it may already have one or other sequenced specialization; despite this, it may still have the capacity to build the entire structure of a viable body. But a few generations of cleavage later, most of the cells are already too specialized to twin off a new human being. The launching of a twin may be possible by cells at or near the point of origin, those which parented other sequences but are themselves not irreversibly sequenced. The fission of an amoeba is not analogous to the division of human cells which specialize sequentially from one cleavage generation to the next.

Crudely illustrated, the analogy fails as follows: 1 amoeba divides and 2 identical amoeba result; two divide, 4 result; then 8, 16, 32, 64 amoeba; all are the same, undifferentiated. With human cells the process differs totally: H cell divides into H and Ha; Ha into Ha and Hab; into Hab and Habc; into Habc and Habcd; into Habcd and Habcde . . . into Habcdefghijklmnopqrstuvwxyz and that and more. The 13 billion nerve cells of a human are each different. How many different other cell forms there are I don't know, but I will not live long enough to count them. (Were I to count even the 13 billion nerve cells, taking one second for each count, it would take one hundred years to do so.)

Even before the sixth day after fertilization, the day when implantation occurs, some of the cells have become so specialized that they secrete the hormone human Chorionic Gonadotrophin (hCG) by which menstruation is blocked (see

Stuart Ira Fox, *Human Physiology,* Wm.C. Brown, Dubuque, Iowa, 1984, p. 666). On day 6 the inner cell mass is specialized from the trophoblast cells, the former becoming the embryo, the latter developing to become the supporting systems of the chorion and the placenta. By day 8 the variety of specialized cells forms the amnion and the amniotic disc around the amniotic cavity, the endoderm cells around the yolk sac, the cytotrophoblast cells to build the chorion, and the synctiotrophoblast cells to develop into the placenta.

We ask: can a syncytiotrophoblast cell — or group of such cells — cleave off another complete human being, which will begin the sequence from point zero again? We should rather suppose that sync cells will produce next generation sync cells, the offspring being one sequence advanced beyond the parent. Soon down the line some of them will be villi, exchange posts between mother and the conceptus. If a new and integrated human can be cloven from any of the cells on day 6 or 8, it will not be a highly specialized cell — or group of cells — which cleaves into an identical twin; rather, it will be one of the cells of the inner mass which initiates specializations, but which itself is not overly specialized.

Geneticist Lejeune on Differentiation

In the magnificent testimony which Dr. Lejeune gave before our Blount County, Tennessee Court, he explained that the message written on DNA is written by change of the various bases which come in sequence in the one metre long molecule; about twenty years ago it was found that some of the bases of DNA were carrying an extra little piece, a methyl (CH3), hooked on to it, which changes a bit the form of one of the "bars" [coded message] of this long scale which is the DNA molecule. The methyl piece is put on the base cytosine, which is then transformed into methylcytosine. What it does is similar to what an editor does when he wants to underline some passage of a book, or delete another. Methylation silences one gene, which remains in place; but if it is demethylated with the next [cell] division, it will become active again.

The tiny change on the DNA, continued Dr. Lejeune, changes the surface of the big groove of the helix of DNA; inside of this big groove some proteins will hook on different segments specific of the DNA. This is a kind of language of instructions. It tells the chromosome: "Speak here; give this information here; but be silent there; don't pass on that information." There is simply too much information in ourselves to allow them all to speak at once, telling all they know. Some genes must remain silent while others speak.

We believed for years, continued Dr. Lejeune, that the chromosomes of human males and females are identical. Now we know that the DNA carried by the sperm is not underlined, or not crossed out, by methylation in the same places as in the DNA carried by the ovum. Underlining or deleting is not done in the same way in the male chromosome and its equivalent female chromosome. When male and female unite, some information is to be read as coming from the male chromosome, some from the female.

When the original human cell, the fertilized ovum, divides into two cells, that written information goes from one cell to the other: "When it's split in two we

know that exchange of information comes from one cell to the other. When it's split in three it receives information: we are an individual." [Dr. Lejeune had explained that the original cell splits into two cells; one of the two then splits again, and there are three. After some time, the other also splits, and there are four.] And when the cleavage continues progressively, the underlining and deleting is progressively changed so that the cells differentiate, becoming specialized "in doing a nail, doing hair, doing skin, doing neurons, doing everything." In the first cell not only the entire genetic message was there in the way it is still in every cell; the first cell also had written in it the sequences, how they are to be read one after another. Like in the program of a computer, you tell the computer to do that, and if it works, then continue the program in that line; if you don't get the desired result, you tell the computer to go to the other program. At the end of the process, when the organism has grown up, it puts the counter on zero again by producing its own reproductive cells to rejuvenate itself in the next generation (Lejeune, op. cit. pp. 45-47).

Dr. Lejeune goes on to show how male and female gametes are complementary to each other, building up the body and its parts by cooperative action. When two male nuclei are inserted into an ovum from which the female nucleus has been removed, the sequential program does not move forward to build an entire body; instead it produces an androgenote, little cysts which look like the chorion and placenta. Two female nuclei make spare parts, pieces of skin, of teeth, little nails. In other words, when not sequenced properly by pre-programmed methylization of paternal and maternal gametes, the ability to build a viable body is not there. [The sequencing appears to get stuck, like a needle in a groove of a broken record.]

Conclusion

1) The random sharing of DNA and cytoplasm by cell No. 1 and cell No. 2 does not destroy the individual identity of Cell No. 1, because the transfer of materials does not scramble the DNA message.

2) In the first cell, not only the entire genetic message is present, but also the written serial DNA sequences which are to be read one after the other. The first cell thus initiates and heads the entire life process which follows as one unbroken continuum. The life of a human being is therefore that of an individual from the point of fertilization (or twinning) to adulthood. The serial nature of cleavages demonstrates that an individualized DNA directs the natural bodily development of this one individual from point alpha to point omega, from fertilization (or twinning) to maturity.

3) If an identical twin cleaves from the original cell, that twin's departure affects the continuation of the existing individual not at all. The individualized DNA sequences of the parent cell remain in place and are unique to this life process.

4) The identical twin begins individualized life at the time of cleavage and develops in accordance with instructions of his or her unique and personalized DNA, which instructs not only about physical growth but also about the

unbroken sequence in which this growth proceeds.

Objections Answered

1) OBJECTION: Experiments with mice indicate that single cells taken from three separate early mouse embryos can be joined to form a single viable chimeric mouse. Surely the chimeral mouse did not begin at zygote stage (Fr. Ford, p. 63).

RESPONSE: So the three original mice continue their individual existence (if they are not killed); and the chimeral mouse begins its individual life at its own point alpha (which may be point beta or later in the series of sequences of the parent mice).

2) OBJECTION: Prior to the early blastocyst stage, the developing cells do not differentiate sufficiently to determine which of them will form the inner mass cells, and which will form the supporting systems. Furthermore, animal experiments show that by the late blastocyst stage, when the inner cell mass is already formed, it is not yet determined which cells' progeny will give rise to the definitive embryo proper. There can be no person before the formation of a distinct on-going individual human body (Fr. Ford, p. 64).

RESPONSE: Neither do we see eyes and skin and hair in the initial cell; but these eventually appear anyway, on schedule, at the end term of the sequential series where they belong. In the above case, the cells *do* differentiate if you give them enough time to reach that scheduled sequence as it is written in the DNA schedule of events.

The DNA of Identical Twins

One final question remains in my mind, and perhaps in yours: In identical twins, do the DNA sequences start from point Alpha in both; or does the cloven twin begin at point Beta or further down the line? Perhaps one or other of the readers knows.
