

ing of *Roe v. Wade*. In *Roe* the Court expressed a desire to decide the abortion issue "consistent with the relative weights of the respective interests involved . . ." 410 U.S. at 165. The Court's view of the relative weight of the interests of the unborn child was necessarily influenced by the Court's professed inability to determine whether the unborn child was a living human being. It is difficult to believe that the Court would again balance the respective interests in such a way as to allow abortion on demand, if the Court were to recognize that one interest involved was the life of a human being.

#### IV. THE SCIENTIFIC QUESTION: WHEN DOES A HUMAN LIFE BEGIN

During the course of eight days of hearings, fifty-seven witnesses testified on S. 158 before the Subcommittee. Of these witnesses, twenty-two, including world-renowned geneticists, biologists, and practicing physicians, addressed the medical and biological questions raised by the bill. Eleven testified in support of the bill and eleven in opposition.

The testimony of these witnesses and the voluminous submissions received by the Subcommittee demonstrate that contemporary scientific evidence points to a clear conclusion: the life of a human being begins at conception, the time when the process of fertilization is complete. Until the early nineteenth century science had not advanced sufficiently to be able to know that conception is the beginning of a human life; but today the facts are beyond dispute.

Physicians, biologists, and other scientists agree that conception marks the beginning of the life of a human being—of a being that is alive and is a member of the human species. There is overwhelming agreement on this point in countless medical, biological, and scientific writings. Extensive quotation from such writings would be unnecessarily redundant except for the strenuous efforts by some parties to deny or obscure this basic fact. The following are only a limited sample from the scientific literature:

*Zygote*. This cell results from fertilization of an oocyte by a sperm and is *the beginning of a human being*.

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*Development begins at fertilization*, when a sperm unites with an oocyte to form a *zygote* (from the Greek *zygotus*, meaning "yoked together"). Each of us started life as a cell called a *zygote*.

K. Moore, *The Developing Human* 1, 12 (2d ed. 1977).

In this first pairing, the spermatozoon has contributed its 23 chromosomes, and the oocyte has contributed its 23 chromosomes, thus re-establishing the necessary total of 46 chromosomes. The result is the conception of a unique individual, unlike any that has been born before and unlike any that will ever be born again.

M. Krieger, *The Human Reproductive System* 88 (1969).

[A]ll organisms, however large and complex they may be when full grown, begin life as but a single cell.

This is true of the human being, for instance, who begins life as a fertilized ovum . . . .

- I. Asimov, *The Genetic Code* 20 (1962).

It is the penetration of the ovum by a spermatozoon and the resultant mingling of the nuclear material each brings to the union that constitutes the culmination of the process of *fertilization* and marks the initiation of the life of a new individual.

- B. Patten, *Human Embryology* 43 (3d ed. 1968).

The formation, maturation and meeting of a male and female sex cell are all preliminary to their actual union into a combined cell, or *zygote*, which definitely marks the beginning of new individual.

- L. Arey, *Developmental Anatomy* 55 (7th ed. 1974).

A human being originates in the union of two *gametes*, the ovum and the spermatozoon.

- J. Roberts, *An Introduction to Medical Genetics* 1 (3d ed. 1963).

Bisexual reproduction is characteristic of all vertebrates, and *gametogenesis* (the production of *germ cells*) is its first phase. The next phase, the beginning of the development of a new individual, is the fusion of two germ cells (*gametes*) of different nature; one, the *spermatozoon* from the male parent; the other, the *ovum* from the female parent. The result of this fusion is the formation of the first cell of the new individual, the *zygote*.

- W. Hamilton & H. Mossman, *Human Embryology* 14 (4th. ed 1972).

The zygote thus formed [by the moving together of two sets of chromosomes] represents the beginning of a new life.

- J. Greenhill & E. Friedman, *Biological Principles and Modern Practice of Obstetrics* 23 (1974).

The zygote is the starting cell of the new organism

- S. Luria, *Thirty-Six Lectures in Biology* 146 (1975).

A new individual is initiated by the union of two gametes—a male gamete, or *spermatozoon*, and a female gamete, or *mature ovum*.

- J. Brash, *Human Embryology* 2 (1956).

Fertilization is significant in that new life is created, but specifically the cardinal features of fertilization are that (1) the diploid number of chromosomes [46] is reconstituted and (2) the sex of the conceptus is designated chromosomally.

- J. Thomas, *Introduction to Human Embryology* 52 (1968).

A new individual is inaugurated in a single cell (*zygote*) that results from the union of a male gamete (*spermatozoon*) with a female gamete (*ovum* or *egg*).

- T. Torrey, *Morphogenesis of the Vertebrates* 47 (3d ed. 1971).

The fertilized egg cell—or zygote—contains nuclear material from both parents. It marks the beginning of the life of a new human being and is a useful focal point for presenting all the diverse aspects of organic reproduction.

G. Simpson & W. Beck, *Life: An Introduction to Biology* 139 (2d ed. 1965).

Many witnesses who appeared before the Subcommittee reaffirmed the scientific consensus on this point. Dr. Jerome Lejeune of the Université René Descartes in Paris, discoverer of the chromosomal disease which causes mongolism, testified that, “[l]ife has a very, very long history, but each individual has a very neat beginning—the moment of its conception.”<sup>8</sup> *Hearings on S. 158* (April 23 transcript at 18).

Similarly, Dr. Watson Bowes, Professor of Obstetrics and Gynecology at the University of Colorado School of Medicine, stated, “If we are talking, then, about the biological beginning of a human life or lives, as distinct from other human lives, the answer is most assuredly that it is at the time of conception—that is to say, the time at which a human ovum is fertilized by a human sperm.” *Id.* at 61. Dr. Bowes ended his prepared statement as follows: “In conclusion, the beginning of a human life from a biological point of view is at the time of conception. This straightforward biological fact should not be distorted to serve sociological, political, or economic goals.” *Id.* at 65.

Dr. Hymie Gordon, Professor of Medical Genetics and physician at the Mayo Clinic, affirmed this consensus and recognized the distinction between the scientific question and the value question:

I think we can now also say that the question of the beginning of life—when life begins—is no longer a question for theological or philosophical dispute. It is an established scientific fact. Theologians and philosophers may go on to debate the meaning of life or the purpose of life, but it is an established fact that all life, including human life, begins at the moment of conception.

*Id.* at 31–32.

Dr. Gordon further observed:

I have never ever seen in my own scientific reading, long before I became concerned with issues of life of this nature, that anyone has ever argued that life did not begin at the moment of conception and that it was a human conception if it resulted from the fertilization of the human egg by a human sperm. As far as I know, these have never been argued against.

*Id.* at 52.

<sup>8</sup>Various possible biological nuances on this fact do not detract from the scientific facts relevant to this subcommittee’s findings. One witness testified that cases in which twins arise from a single embryo suggest that the individual has not yet been “stably constituted” until the point when twinning occurs. *Hearings on S. 158* (May 20 transcript at 19) (testimony of Dr. Clifford Grobstein). But even in such exceptional cases of “homozygous” twins, there is a being in existence from conception who is alive and human. That we can describe the formation of twins merely emphasizes that even at the earliest stages after conception we can have scientific knowledge of the existence of distinct, individual human beings.

The same witness also described the experimental process of the fusion of nonhuman embryos. *Id.* But such experiments have never been successfully performed on human beings, and even in other species, such as mice, fusion cannot be performed except within minutes of conception. *Hearings on S. 158* (April 23 transcript at 22) (testimony of Dr. Lejeune).