

What Lies Within

In the Womb's New Views of Nascent Life

Ever since Aristotle studied bird embryos at different stages of development to divine their secrets, humans have been fascinated by the way we (and other species) reproduce and gestate. Some of the more creative theories of early embryologists—such as seventeenth-century scientist Antony van Leeuwenhoek's notion that tiny humans dwelled in

the “animalcules” he found in semen—have given way to more precise knowledge about the role of sperm and egg, uterus and placenta. But until recently, our ability to view actual fetal development was limited to the grainy images afforded by conventional two-dimensional ultrasound technology.

Recent advances in ultrasound, however, including the use of three- and

four-dimensional scans, now allow us to view the fetus in the womb in much greater detail. Three National Geographic television specials—*In the Womb* (which first aired in the United States in 2005) and companion shows focusing on animals and multiples in the womb (2006 and 2007, respectively)—offer a fascinating tour of the pregnant body and developing fetus.

As *In the Womb* begins, a sonorous narrator guides us through the stages of pregnancy, beginning with fertilization and the predictable, albeit impressively detailed, computerized image of millions of sperm, tales whipping enthusiastically, making their journey to the egg. From there we follow a developing baby girl through three trimesters of pregnancy, all the while peppered with suggestions about what her perspective in the womb might be—what she is able to hear, see, feel, and do—and what this will mean for her eventual life outside the womb. “This is *her* story,” our guide tells us. The 4D (that is, three-dimensional plus real-time motion) sonogram images give us glimpses of a real baby’s movements *in utero*—the fetus grimacing, yawning, and making a range of other fleeting facial expressions and movements.

If 4D ultrasound technology is the star of this series, then supporting actor status goes to Artem, a “specialist model-making and visual effects company” that made the many detailed models filmed in addition to the real fetuses. Under the direction of Dr. David Barlow, the Artem team created wax, rubber, and silicone models of

early-stage fetuses, sperm, and eggs, and even labyrinthine wombs out of acrylic domes. Many of the models feature beating hearts and other technologically sophisticated movements. And unlike models in older science documentaries, which often resemble tarted-up plastic baby dolls, the Artem models rarely betray their synthetic origins. They are superbly well lit and shown floating happily in their faux amniotic fluid; the filming at times produces an almost chiaroscuro effect as we view close-ups of miniature feet or eyebrows. One wouldn’t expect footage of bobbing plastic fetuses to be graceful, but this is—offering a pleasingly ethereal contrast to the ultrasound footage of real babies.

In the companion book to *In the Womb*, written by Peter Tallack, the tone is straightforward and the science accessible. Like the television series, the book adopts a “we’re cracking the mysteries of the human body” tone. In the introduction, Heidi Murkoff (author of *What to Expect When You’re Expecting*, one of the best-selling and bossiest baby books of all time) summarizes: “That fantastic nine-month voyage that transforms a ball of cells into a bundle of joy was shrouded more or less in mystery, leaving parents in the dark about the budding life growing within those uterine walls.” Now, however, technology has given us access to this world. Adjectives such as “awe-inspiring” and “groundbreaking” appear frequently, but the book also alludes to the many remaining gaps in our knowledge—such as why

the mother's body doesn't reject the placenta and what, exactly, triggers labor. There are amusing asides as well, such as the fact that most mammals' babies emerge from the womb with far more advanced survival skills than human beings. Human mothers "would have to undergo a 21-month pregnancy and then give birth to a toddler" to achieve this feat, the book states matter-of-factly.

In the Womb: Multiples focuses on three pregnancies, two of which are quite rare: one woman who is pregnant with triplets—two of whom are identical twins, and the third a fraternal sibling—and another woman pregnant with fraternal quadruplets. (The third woman is pregnant with twins.) The series remains neutral on matters relating to assisted reproduction, noting only that it has led to an increase in multiple births. So, too, has delayed childbearing: older women are more likely to give birth to multiple babies.

But amid remarkable footage of twins and other multiples in the womb we learn some unusual facts: doctors now believe that "a staggering 12 percent of pregnancies may begin as twins, with up to 70 percent of these converted to singleton pregnancies when one dies." Also, although multiples are at higher risk of suffering complications during pregnancy (and are typically born earlier than single babies), some of the things they experience in the womb might actually be beneficial once they are born. For example, footage of identical twins kicking and touching each other in the womb has led scientists

to propose that multiples' spatial skills function at a higher level than single babies' do—in part because they experience resistance to other objects—their siblings—throughout their nine months in the womb. Studies have also found that certain behavior in the womb, such as fraternal twins feeling each other's faces between the thin membrane that separates their individual amniotic sacs, can be observed later in life; these same twins' favorite game as toddlers was hiding on either side of a curtain, feeling each other's faces through the fabric.

In the Womb: Animals follows the development of elephant, golden retriever, and dolphin fetuses—again making use of remarkably realistic models and computer graphics. Here we learn that elephants experience the most strenuous reproductive odyssey—a 22-month gestation produces a single, 250-pound baby that needs four gallons of milk a day and remains dependent on its mother until it is 13 years old. Although entertaining, *In the Womb: Animals* is often a little too eager to make comparisons to humans, regaling us with information about dolphin foreplay, for example, and noting that, like humans, dolphins "use sex as a form of bonding within their social group." (Unfortunately for the dolphins, sex lasts only a few seconds.)

On the whole, however, the science in all three installments of the series is presented in a clear and uncomplicated fashion—leavened with appropriate images—and perfectly streamlined for

the short attention spans of today's television viewer. (Some of the footage, including the dramatic groans and panting of women in the delivery room and subsequent births, is not for the faint of heart, nor for younger children.)

Although the series does not delve into the many ethical questions raised by reproduction (this is not its intention), it does prompt some. Throughout the series we hear frequently about how inspiring our new knowledge of human and animal development is. But inspiring in what way? Is the knowledge we are gaining by seeing more clearly into the womb bringing us any more wisdom about our ability to control what goes on inside of it? It is perhaps ironic that at the moment we are able to see so much about prenatal life, we are also mired in debates about when life begins, and pondering the ethical implications of the power our technologies give us (to harvest stem cells from embryos, for example, or to select embryos with certain genetic traits or of a certain sex).

The series also prompts questions (and a few concerns) about the extent to which technology now intrudes on (and illuminates) life from its earliest moments. Parents can now track a child's development from his earliest days. Whether or not this is entirely a good thing—given the cult of child-rearing in the United States, with its irrational baby-proofing, its generally frenetic pace, and its consumerist, overachieving ethos—remains to be seen. But it likely won't be long before

little junior is including in his application to Harvard the 4D sonogram picture detailing his early fetal precocity.

More broadly, the *In the Womb* programs prompt one to ask, what does it mean to make visible something that was for most of history entirely hidden? How has this changed our understanding of pregnancy and of the process of becoming a parent? It has made aspects of pregnancy much safer, of course, and for that we should be grateful. It has also made it a more visceral and immediate bonding experience for pregnant women (which is one of the reasons why opponents of abortion want to make early sonograms more commonplace). Any woman who has had a sonographer slide a cold probe around her pregnant belly and watched as a flickering screen suddenly reveals a glimpse of a tiny arm or leg—or the surprise of two babies rather than one—understands the power of this technology. But it has also, perhaps, made us more amenable to accepting the idea of manipulating fetal life—both for better (through advances in fetal surgery) and worse (such as sonograms used to justify the termination of a pregnancy because the fetus has a cleft palate or happens to be female). In the end, these documentaries remind us that the tools that help us see ourselves and our world more clearly do not guarantee that we will act more wisely.

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