

More Uses of Ultrasound Safety

The question regarding the safety of diagnostic ultrasound exposure before birth is important not just because diagnostic ultrasound can detect an ever-larger array of fetal health problems, but because diagnostic ultrasound is a vital adjunct to the exciting new field of fetal medicine. Here, attempts are being made to correct fetal medical conditions by direct intervention in the womb rather than by altering the physiological state of the mother or by correcting the conditions after the infants are born.

For instance, Roy Filly, a radiologist at the University of California at San Francisco, and colleagues have used diagnostic ultrasound to help drain urine from a fetus with bladder obstruction (SN: 8/1/81, p. 70). Kenneth Gottesfeld, an obstetrician, Carol M. Rumack, a radiologist, and colleagues at the University of Colorado School of Medicine in Denver are using diagnostic ultrasound not only for this purpose but to help remove excess fluid from the brains of fetuses with hydrocephalus, a condition marked by excess fluid in the brain cavities that can lead to mental retardation, seizures or other developmental problems. Jason Birnholz, a radiologist at Harvard Medical School in Boston, and co-workers are using diagnostic ultrasound to assist in the removal of fluid from the bladders and brains of fetuses and from their lungs and other anatomical areas as well.

Diagnostic ultrasound, Birnholz told SCIENCE NEWS, could also be used to help treat malnourished fetuses in the womb. First, he explains, the ultrasound could detect growth retardation of a fetus because it can now estimate fetal weight within one to two ounces. Nutrients might then be injected into amniotic fluid, in hopes that the fetus might ingest them along with amniotic fluid. Diagnostic ultrasound could then be employed to determine whether the added nutrients improved fetal growth or not.

The question of diagnostic ultrasound's safety for unborn children is also important to scientific research because diagnostic ultrasound can now visualize fetuses not only as in still photographs but as in movies and thus could serve as a powerful tool for studying the central nervous system development of unborn children. In fact, such efforts are already underway. Birnholz and his colleagues have used diagnostic ultrasound to determine what constitutes normal and abnormal eye movements in human fetuses and have found that abnormal eye movements correlate with the fetal brain not developing properly (SN: 8/29/81, p. 142). More recently they have found that if they buzz a buzzer, a healthy fetus starts and turns its head away from the noise by 28 weeks of gestation, but a fetus whose brain is not developing normally does not.

David Harvey of Queen Charlotte's Maternity Hospital in London and colleagues reported in the March PEDIATRICS that they have used diagnostic ultrasound to determine which babies born small for gestational age will have intelligence, perceptual and motor skill problems as they grow older. The investigators used diagnostic ultrasound to determine the rate of growth of a number of unborn children. Then they selected 51 who were born small for their gestational age and divided them into two groups — group X (those who had started to slow in growth before 26 weeks of gestation) and group Y (those whose growth had slowed after 26 weeks of gestation or not at all). The children in groups X and Y were then matched with children of normal birth weight according to sex, social class, birth order and birth date. Then when the 102 subjects were between three and seven years old, they were tested for various mental and physical skills. The children in group X had significantly lower test scores in intelligence, perceptual and motor skills than children in group Y or children in the control group.

If diagnostic ultrasound is indeed safe for unborn children, it could also serve as a potent tool for studying human personality before birth and studying how personality and behavior before birth correlate with personality and behavior during childhood and later in life. Diagnostic ultrasound is already showing human fetuses engaging in a variety of behaviors — sleeping, doing aquanautics in amniotic fluid, sucking their thumbs, waving their arms, rubbing their eyes, even fighting (when there are twins in the womb). Says Birnholz: "We're trying to fix specific behaviors and get a sense of when they occur and what influences them."

The question of safety is also crucial because if diagnostic ultrasound is not harmful to unborn children, it might eventually be used routinely to help bond mothers to their unborn babies. As Harold E. Fox, an obstetrician at Columbia University College of Physicians and Surgeons in New York City, pointed out at the March of Dimes symposium, "I don't know of any study showing that diagnostic ultrasound makes mothers feel closer to their babies, but I'm sure that when it is used intrauterine bonding does take place." Those mothers who have been fortunate enough to visualize their unborn babies with ultrasound, including this writer, would surely agree with Fox: It's a powerful emotional experience, especially when you receive a complimentary Polaroid snapshot of your unborn child to take home and place in the family photo album.

— J. A. Treichel

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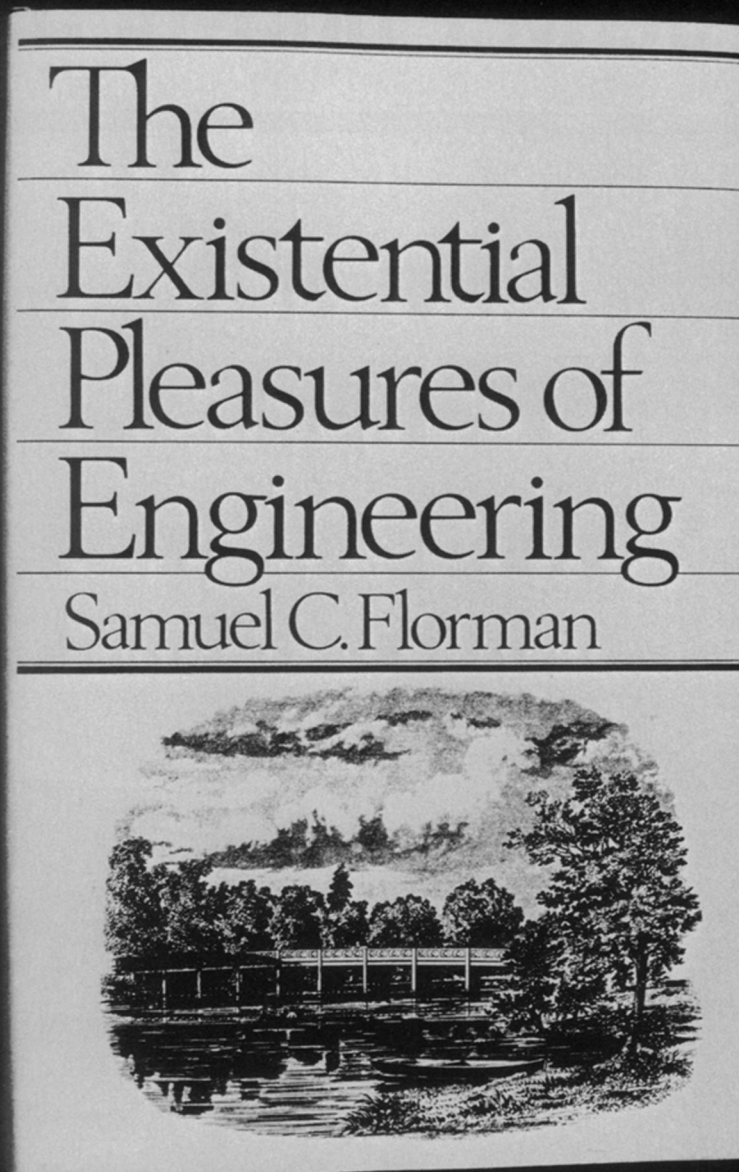
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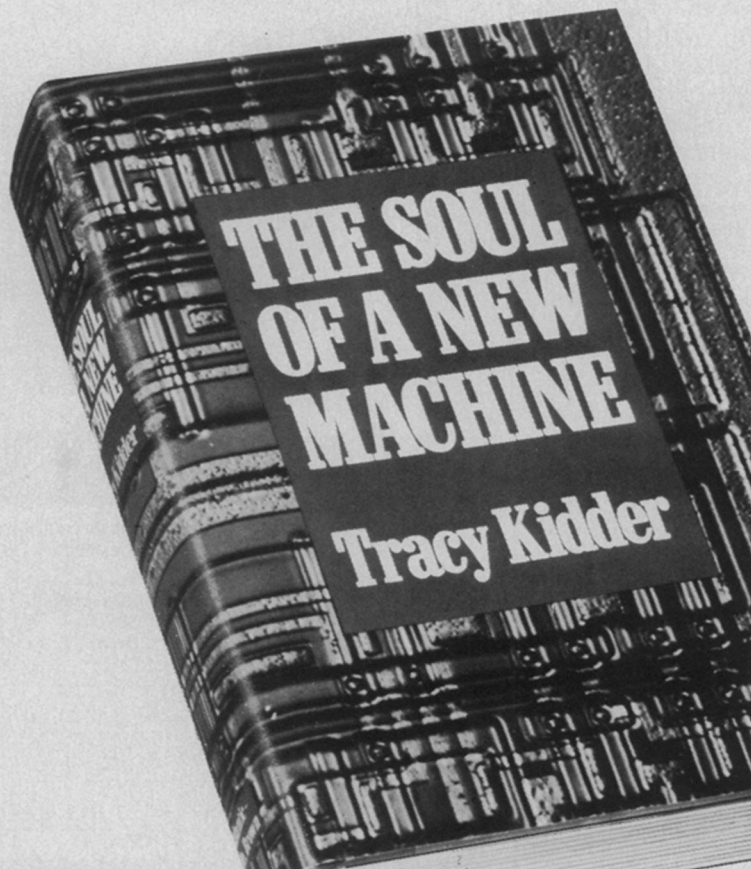
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