



The human embryo at 30 days, 31 days, 34 days, 40 days, 44 days, 56 days. In this time, it grows in length from about a quarter of an inch to an inch and a half.

By Maggie Scarf

"I can remember a situation in which a woman entered the hospital with a miscarriage. It was a case of spontaneous abortion, and she came in because she'd been told it was about to happen. The baby, however, was born alive. It weighed less than 500 grams, or just under a pound—which was below the legal definition of a live birth (this was in Baltimore). No birth certificate was made out, therefore, and it wasn't legally born. Since it was alive, however, it was taken over to the premature unit where it survived for two days. Eventually, being at that very borderline weight, it did die. . . . As it happened, the woman had given birth on Dec. 31; and so the two days of infant care had been during the first two days of the New Year. The parents, when they received the hospital bill, were unable to claim any tax deduction. The father was incensed and he took the position that since there never had been any legally born 'person'—no birth certificate and no death certificate—they couldn't hold him responsible for the costs of treatment. Why should he be made to pay for the care of a child who had never even existed? The hospital, on its own part, was put in the odd position of having spent 48 hours treating an individual who wasn't even, technically speaking, born. They finally did cancel the charges, I believe, and they agreed to forget the whole thing. . . ."

DR. RICHARD E. BEHRMAN,
Medical Director, Babies Hospital, in
an interview.

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When does a fetus become "a person"? At what point in the slow continuum of fetal growth—from fertilization, to implantation in the uterine wall, to the time of the first heartbeat, to "quickening" (when the mother first perceives movement within her womb), to "viability" (the stage of fetal maturation at which the organism becomes capable of surviving outside the mother's support system, outside the uterus), to birth itself—does it become possible to say that, yes, from here onward, the fetus is

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The fetus as guinea pig

Is such experimentation an insult to our humanity? Or is it a step toward life-saving knowledge?



The fetus at 12 weeks: "Not a person in the whole sense," according to the Supreme Court, but to others, a "human subject" that deserves protection.

to be regarded as a fully human individual, endowed with status as a person and a set of protectable human rights?

Legally, the position of the fetus was stated clearly in *Roe v. Wade*, one of the Supreme Court decisions on the abortion issue, which was handed down in 1973. The Court said that the fetus is not to be regarded as a "person in the whole sense" prior to the age of viability. Viability, as defined in the *Roe-Wade* decision, is the point in fetal development at which the growing organism is "potentially able to live outside the mother's womb, albeit with artificial aid"; the Court placed the stage of fetal viability at "seven months (28 weeks)," but noted that it could occur earlier, as early as 24 weeks. The Court took the view, in short, that a fetus that is born alive is not to be construed as a "person"; the fetus that can maintain a biologically independent existence—that can live, grow and develop outside the womb—is to be so regarded.

As one may readily see, the *Roe-Wade* decision has a curious impact upon our perception of the fetus prior to the age of viability. It places that fetus not only in an odd legal limbo, but in a metaphysical and moral one as well. For, by defining the fetus in the first two trimesters of pregnancy as "not a person in the whole sense," the Court leaves open the entire question of what it actually is—and, more important, what may be done with it.

Since the time of the Supreme Court abortion decisions, live and dead fetuses, fetal tissues, fetal organs and similar materials have become widely available for use in a dizzying array of scientific investigations. At the same time, antiabortion forces, who believe that fetal work "legitimizes" abortion practices, as well as people who are simply opposed to this experimentation on moral and ethical grounds, have been pressing for legislation that will impede or halt fetal research entirely. Opponents of this work have decried it as a form of "mad science" and an assault on human values and human dignity. Scientists, for their part, have been protesting what they view as persecutory tactics, spearheaded by "anti-science" fanatics.

In 1974, in response to a surge of public concern over fetal and other kinds of research that utilized "human subjects," Congress enacted legislation to establish a (Continued on Page 89)

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The commission, whose members were selected by the Secretary of Health, Education and Welfare, was entrusted with the task of studying the various types of human research and suggesting possible regulations for experimentation that might go on in the future. While the National Commission was to have no legal power to enforce its decisions, the Congressional legislation did require the Secretary of H.E.W. to respond to whatever report it made (either negatively or positively) when he drew up his guidelines for the protection of human subjects.

The same act of Congress that established the National Commission also provided for a ban on all experimentation involving live, whole fetuses, before or after an induced abortion—and it instructed the commission to investigate fetal research in advance of all other kinds of human research, as its very first order of business. As if these moves were not sobering enough for scientists working in this area, the Department of Health, Education and Welfare then suggested that a voluntary "moratorium" on any even mildly questionable fetal studies be entered into by investigators whose research they were supporting.

It was thus in an atmosphere of some apprehension and a good deal of bitter misunderstanding that the National Commission for the Protection of Human Subjects was appointed; it consisted of three lawyers, three physician-investigators, two medical ethicists, two psychologists and one "public representative." Perhaps the thorniest issue they had to consider was that of the fetus's humanity—does fetal work involve research on "human beings," or are fetuses, prior to viability, "nonpeople," and therefore perfectly legitimate subjects for use in potentially valuable scientific studies?

The question of what the fetus is, as one philosopher working as a consultant to the National Commission remarked to me, is not so much a moral and ethical as it

is a pre-ethical issue. "You have to define what it is you're talking about," he explained, "before you can define whatever you're doing as right or wrong. . . ." The word "person" is variously defined, but generally signifies a being characterized by the ability to experience consciousness of self, to communicate, to experience sensations of pain and pleasure, to reason, to behave autonomously both in the moral and physical sense, and so forth. If the fetus cannot do that, then to what else may it best be equated? Is the fetus, for instance, more nearly similar to an animal than it is to a fully human "person"? The ancient philosophers, in point of fact, did so characterize it—they took the view that the developing organism moved from the merely vegetative stage to the animal and finally to the rational level. If it is true, as recent researchers at Albert Einstein Medical School have suggested, that "brain life"—the capacity for human intelligence, including consciousness, self-awareness and other generally recognized cerebral functions—does not come into being until after the 28th week of fetal life, then can experimentation on the fetus up until the end of the seventh month of pregnancy be seen as nothing too different from experimentation on a monkey or a rabbit? We, as a society, certainly do permit and find morally justifiable a wide range of biomedical investigations that make use of living animal subjects. And such experimentation has yielded impressive medical and scientific benefits—the human community has clearly profited from them.

Perhaps the fetus might, in the early months of pregnancy, more profitably be viewed as something that is simply a part of the mother's body—something similar to her gall bladder or her appendix. If she should choose, due to some pressing set of reasons, to have her gall bladder, appendix or her fetus removed, then she might give consent to have the excised part of her body studied. Isn't her permission—since the fetus was once a part of her—all the moral justification the investigator needs in order

to proceed with an experiment?

Many scientists think so. But in a paper on fetal experimentation prepared for the National Commission, Dr. Leon Kass of the Kennedy Institute of Bioethics at Georgetown University said flatly: "The assertion that the fetus is a part of the mother is simply false. The fetus, in its varying stages, is a self-developing, self-changing whole, which assimilates and transforms food supplied by the mother, and grows and differentiates itself according to the plan encoded in its own DNA. . . ." Other experts consulting with the commission have attacked the validity of maternal consent on different grounds. If the mother has determined to abort her fetus, they argue, isn't the meaning of her consent highly equivocal? Generally speaking, in cases involving experimentation on a living, human child, the parent's proxy consent is required—i.e., the parent of a 4-year-old child suffering from leukemia would have to give consent if the physician wished to treat the child with a new and unproven drug. The parent is assumed, in such an instance, to "speak for the child," to be the one who has the child's best interests at heart. In a situation in which the mother has already decided upon abortion, however, her own interests (wanting to terminate her pregnancy) would appear to be in some conflict with the interests of the fetus. Is she, then, the person who may most properly "speak on behalf of the fetus," the person who can be assumed to hold the best interests of that fetus closest to heart?

□ Paul Ramsey, the Princeton theologian and ethical philosopher, has suggested that a good deal of biomedical research involving the human fetus can be seen as similar to experimentation upon unconscious or dying patients. For the fetus, like the unconscious or dying person, is a nonconsenting, vulnerable and helpless human subject. In his recent book "The Ethics of Fetal Research" (Yale University Press, 1975), he carried this analogy further: "In cases of induced abortion," he wrote, "the fetal human being resembles not only the dying; it also closely resembles the condemned (even if necessarily and justly, but tragically, still the condemned)." Dr. Ramsey, 63, has been serving as one of the battery of consultants to the National

Commission for the Protection of Human Subjects over the course of the past year. "One might argue," he pointed out, during the course of a talk we had in his Princeton office, "that capital punishment presented us with a similar 'golden opportunity' to do high-risk medical experimentation. After all, the condemned prisoner, like the living previable fetus, was going to die anyhow. . . . So why is it that we didn't research someone in that position to death? Such experimentation could, you know, have been seen as 'ennobling' the death of the human subject by using him to make great contributions to mankind. . . ."

Ramsey smiled briefly: "I think we all know that would be a morally degrading use of the condemned for us, as a society, to make."

I suggested to Ramsey that the classes of persons to whom he was comparing the fetus—that is, the unconscious, the dying, the condemned—were all among the more "helpless" kinds of human beings. This seemed to beg the whole question of the "personhood" of the fetus; and hence its eligibility for the customary human rights and protections. "I myself," he responded at once, "am of the opinion that the unborn fetus is a protectable human being."

Professor Ramsey leaned forward: "What we're really discussing here is not an object called the live but nonviable fetus. We're really discussing a tragical case of a dying baby—and the concern I am expressing is about the dying; that is, about imposing research upon this dying creature, who cannot consent. . . . I mean, all of a sudden here are these 'things' that can be used for scientific experimentation—and the human fetus could easily become the most unprotected primate in medical research."

Fetal research is not something new under the sun—embryonic human tissues taken from live but nonviable, spontaneously expelled fetuses were, for example, vitally necessary for culturing the viruses that led to the creation of polio vaccine back in the nineteen-forties. What is new is the extraordinary growth and vitality of this area of study: Fetal experimentation is a "hot" field in medicine, not only because of some striking recent advances, but because the ready availability of fetuses and fetal organs—as a result of the 1973 abortion decisions—

has itself stimulated a good deal of work.

Some medical ethicists have, as a matter of fact, contended that if we as a society do condone abortion, then there can be no earthly reason for our refusal to condone experimentation on the fetus. If, as in the Roe-Wade decision, we are making the claim that a mother has the right to abort her previable fetus because the fetus is not yet a "person in the whole sense," with its own set of rights and protections, then why defend and protect the fetus from experimental procedures? Drs. Willard Gaylin and Marc Lappé, of the Institute of Society, Ethics and the Life Sciences, have asserted that such a position—i.e., permitting abortion but drawing the line at much or all fetal experimentation—has "an element of the irrational about it." Writing in the Atlantic Monthly in May of 1975, the two authors observed that the fact that some people do hold these mutually contradictory positions ". . . perplex [es] many of us. Such absolute and complete defense of the dignity and autonomous rights of the fetus seems bizarre, when . . . in abortion, we condone procedures which subject the fetus to dismemberment, salt-induced osmotic shock, or surgical extirpation. No experimentation so far imagined would do the same. If society can condone abortion procedures which subject the live fetus to these unimaginable acts of violence, how can it balk at giving a mother an aspirin prior to those procedures in order to determine if the drug crosses the placenta—with the hope that the knowledge thereby gained will prevent damage to future wanted babies? . . ."

Why not indeed? Critics of the Gaylin-Lappé position have pointed out that their moral justification for experimentation on the live fetus seems to be predicated on the fact that we're going to be committing "unimaginable acts of violence" upon it anyhow. In other words, because the worst will be visited upon the fetus ultimately, lesser acts along the way ought (rationally speaking) to be tolerated. This is a worrisome kind of argument to use in defense of any type of research.

It is true, furthermore, that experimentation can sometimes involve a good deal more than simply having



At Mount Sinai Hospital, Dr. Thomas Kerenyi performs amniocentesis—drawing fluid from the pregnant woman's womb to check on the health of her fetus. The procedure is considered an important part of developing fetal research.

mothers swallow aspirins just prior to abortion procedures. In that instance, the moral costs of the research would appear—in my own view—to be low, and the possible benefits to be high; there are, however, other instances in which the weighing-up of costs and benefits might tilt the argument strongly in the other direction. An experiment called "An Artificial Placenta," for example, involved an attempt to simulate the role of the placenta in supplying oxygen to the immature fetus. For that experiment, eight fetuses were obtained by hysterotomy—an abortion procedure often used after the fifth month of pregnancy—which is much like a Caesarian operation. The living fetuses, ranging in weight from 300 to 980 grams, were then placed in tanks filled with warmed, saline solution (to mimic amniotic fluid). Small cannulas, or tubes, were inserted in the umbilical arteries and veins—for pumping in and removing oxygenated blood. The researchers had constructed an elaborate circulation system, which, they hoped, would prove able to play the mother's role in supplying oxygen to the fetus. In the case of the wanted fetus, this could be the means of assisting the pre-

ature infant to survive until its lungs had matured enough to allow for breathing; the experiment described here was simply intended to test out the oxygenation circuitry. The following is taken from the investigators' report, and details the death of the largest (980 grams) fetus used in the study:

"For the whole 5 hours of life, the fetus did not respire. Irregular gasping movements, twice a minute, occurred in the middle of the experiment but there was no proper respiration. Once the perfusion [i.e., the pumping-in of oxygenated blood] was stopped, however, the gasping respiratory efforts increased to 8 to 10 per minute. . . . After stopping the circuit, the heart slowed, became irregular and eventually stopped. . . . The fetus was quiet, making occasional stretching limb movements very like the ones reported in other human work. . . . The fetus died 21 minutes after leaving the circuit. . . ."

"An Artificial Placenta" is a study that has provoked a storm of ethical criticism: Not only does it smack uncomfortably of research on the dying, but it brings to mind old tales of mad science, the "living beings preserved in tanks." This makes it all

the more interesting to note that, shortly after this research was completed, it won the Foundation Prize Award from the American Association of Obstetricians and Gynecologists.

A more recent fetal investigation, which has not yet attracted much attention and criticism—but which undoubtedly will—was reported upon in a 1975 paper innocuously entitled: "Oxidation of Glucose and D-β-OH Butyrate by the Early Human Fetal Brain." This research was directed toward ascertaining whether or not the fetal brain is capable of utilizing the breakdown products of fat bodies when the usual source of "brain energy" (which is glucose, a sugar) happens to be in short supply. It was already known that when an adult was starving, D-β-OH butyrate, a breakdown product of fat stored in the liver, could be taken up and used by the cerebral tissues; thus, when the adult brain was not being nourished by its usual energy source, glucose, it could survive on derivatives of the body's stored fats. But, given a state of fetal emergency—say, if a diabetic mother were failing to provide adequate glucose to the growing organism—was it possible for the fetus's brain to function in the same way?

In order to answer this question, 12 human fetuses between 12 and 21 weeks of gestation were studied. The fetuses were, at these ages, nonviable; all died soon after delivery. Once the fetal heartbeat had ceased, a catheter was inserted into the major artery leading to the brain (the carotid). The head of the fetus was then, as the investigators phrased it "isolated surgically from the other organs"; in other words, the fetuses' heads were cut off. The fetal brains were then perfused, first with the glucose, and then with D-β-OH butyrate, and the rate at which the cerebral tissues took up each of these substances was carefully measured. In this way, it was possible to demonstrate that the fetal brain can support metabolism of D-β-OH butyrate as an alternative "brain fuel" in the event that normal glucose supplies are unavailable. (It should be explained that while the fetuses were officially dead at the outset of this experiment—heartbeat having ceased—their brain tissues were living, for death at the cellular level had not yet occurred.)

Shades of "Donovan's

organism is not capable of experiencing pain, and is dying as well—the researcher can, therefore, do it no serious harm. If consent for experimentation is given by the mother or both parents, no suffering will be caused on the part of those who might otherwise experience sadness, loss and anguish. The researcher will not be brutalized by the work he is doing, because he is experimenting on a "not-yet-viable" subject—an organism related to the human community in potential, but not yet in fact. Lastly, the society that permits such research will not be brutalized—as we would be, were we to permit experimentation on other kinds of vulnerable, nonconsenting subjects, such as the unconscious or dying person, the infant, the condemned prisoner—because we will not have violated our own strong sense of the worth, protectability and value of the individual human life.

In a conversation with Dr. Bok at her home in Cambridge, I asked when, in her estimation, the developing fetus becomes "a person." Bok, who has the wide blue eyes and blond haircut of a Dutch schoolgirl—so that the force and determination of her personality take one slightly by surprise—shook her head quickly. "I think that's a wrong question to ask," she said. "People have become simply mesmerized by that question, and it's really a question that has no answer. Because we are, after all, talking about something that is biologically 'human' not only after fertilization, but before—the ovum cell and the sperm cells are certainly both

living and human even before they meet.

"But if we are talking about 'personhood,' then I believe it's impossible to speak of the fertilized egg, early in gestation, as 'a man,'" she continued, "although I realize that some theologians and others do. . . . It's as if one were to have to contemplate having funerals for two- or three-month fetuses that had miscarried or investigations for murder each time a fetus died *in utero* for reasons that weren't completely clear."

What it is essential to do, suggested Dr. Bok, is to draw a line—"an artificial line, admittedly, because as I said, nature hasn't provided us with a biological one"—at some point early in pregnancy, and to say that beyond that stage of development no experimentation will be allowable. The line must, she stated, be drawn at a time in pregnancy when there can be no question whatsoever about the possible viability of the fetus to be used as a subject in biomedical research. "I think," she added, "that we'll always have to be very careful anyhow, and that it will be essential for us to continue having experimentation committees that can oversee and regulate all proposals for this kind of research."

Last May, the National Commission for the Protection of Human Subjects, headed by Dr. Kenneth J. Ryan, submitted a full report on their deliberations and conclusions concerning research on the fetus to the Secretary of Health, Education and Welfare (and most of their recommendations were subsequently adopted and incorporated into

Brain!" It is undeniably somewhat strange to read, in the researchers' account of this experimentation, that the fetal heads were placed in something they referred to as an "organ chamber." And one cannot help but wonder if, on balance, it is worth doing this kind of experiment in order to obtain this bit of knowledge of fetal physiology. Some types of scientific research, particularly those that may serve to harden or brutalize the investigator (and the society he or she serves as well) may simply not be worth the moral price they exact.

But this is my own opinion; others would view this work as totally unobjectionable biomedical research. As the author and bioethicist Dr. Joseph Fletcher complained (in "The Ethics of Genetic Control," Anchor Press, 1974): "Many people's belief propositions are entirely visceral, not rational—witness, for example, the repugnance some people feel at perfusion of a separated fetus head while feeling none at the perfusion of its kidney. Where we start from is essentially important in understanding our own moral judgments and others. . . ." In Fletcher's opinion, as stated repeatedly both in his book and in a paper prepared for the National Commission, the great advances in health and welfare that may accrue to the human race as a direct result of this experimentation are justification enough for such research on the human fetus.

According to Dr. Maurice J. Mahoney, Associate Professor of Human Genetics and Pediatrics at Yale University, experimentation involving the use of the whole, living fetus after an abortion—or, as may also occur, during the abortion procedure itself—represents well under 1 per cent of published fetal research. Dr. Mahoney, another of the consultants working with the National Commission, has compiled an overview of all fetal work carried out between the years 1969 and 1975. "Most fetal research has actually addressed itself to diagnosing the fetus that is sick inside the uterus," he told me, "and to finding ways to help and treat that fetus." He himself, Dr. Mahoney said, takes a negative view of the small amount of fetal experimentation that falls into the "artificial placenta" and "severed heads" category. "I think there's something about invading the human body in these ways that makes most of us feel uncomfortable."

Nevertheless, he noted, even such morally dubious studies as these have been motivated by sincere attempts to solve real and urgent medical problems.

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Is it possible that the living fetus suffers during experimental procedures? Could the eight fetal subjects used in the "artificial placenta" research, for example, have been experiencing pain during their hours in the fluid-filled tank? It seems to be impossible to answer this question with total certainty.

However, in the opinion of every medical expert that I spoke to, it seems extraordinarily improbable that the fetus—at least before the age of 28 weeks—could have the capacity to suffer. The central nervous system is apparently still too underdeveloped. The nerve endings in the skin have not yet extended outward with any of the degree of the affluence to be seen later on; the surface of the brain is relatively smooth, showing little in the way of the convolutions seen in the mature human brain cortex. The nerve endings have not yet developed their fatty myelin sheaths—and without these sheaths, which play some crucial role in the transmission of nervous "messages" from one nerve cell to the next, it is hard to imagine sensations of pain "getting through."

The fetus's "incapacity for experiencing pain" is one of the four major reasons set forth by Sissela Bok in support of continuing—though carefully regulated—research involving living fetal subjects. Dr. Bok, who is a lecturer on Medical Ethics at Harvard Medical School, is another of the consultants working with The National Commission for the Protection of Human Subjects. In a position paper prepared for the commission last March, she cited four major reasons for not permitting experimentation on nonconsenting human subjects. These were: (1) because we would not want to cause harm or suffering to the victim, (2) because we would not want to cause grief to those who were bound to the victim by ties of affection, love or economic dependence, (3) because we would not want to permit brutalization or criminalization of the researcher and (4) because we would not want to permit the brutalization of society—since we all have a stake in the protection of human life.

In the case of the nonviable fetus, Bok pointed out, the

new guidelines set by the Secretary in August). They suggested that the total ban on experimentation involving the living human fetus be lifted; they also called for the end of the moratorium on H.E.W.-supported fetal research. At the same time, they set the "age of viability" at 20 weeks (four and a half months) and 500 grams; this was much more conservative than the Supreme Court's definition had been. What this means, in essence, is that any fetus above the age of 20 weeks is "possibly viable," and therefore not a candidate for use in biomedical studies.

The commission also proposed a set of guidelines that would serve to restrict and carefully regulate (in some instances, prohibit outright) certain types of fetal experimentation. One kind of research procedure, for example, involves injecting the pregnant mother—who has already decided upon abortion—with drugs whose effects upon the fetus are not fully known. Then, following upon abortion procedures and the fetus's death, an autopsy is performed in order to ascertain the extent to which the drug was able (if it was able) to cross the placental membrane and affect the fetus. This kind of information is often invaluable to the physician treating the pregnant woman who plans to bring her baby to term.

In research such as this, the commission has now ruled against the "testing out" of potentially harmful drugs on fetuses whose mothers have decided upon abortion. The fetus whose mother plans to abort it, the commission has asserted, is no different in itself and in its own essence from a fetus whose mother plans to bring it to term; the only distinction between them is our knowledge of the impending abortion. This ought not, in the commission's opinion, serve to render the fetus-to-be-aborted into a testing animal. Mothers do sometimes change their minds about going ahead with a planned abortion—and for this reason, the commission has proscribed all experimentation involving the

fetus in utero that entails anything more than "minimal risk."

It is interesting to note at this point that fetal work carried out by the defendants in the "Boston Grave-Robbing Case" would be permissible under the commission's new ruling, even though it is now about to be prosecuted by law. The case involved an attempt to find out what kinds of antibiotics might best be prescribed for pregnant women who had syphilis and who were allergic to penicillin. The syphilis, left alone, would invade the fetus and cause congenital defects; the penicillin, while capable of treating the fetus in utero, could not be tolerated by the pregnant mother. The question was what other antibiotic might most effectively be used in its place. In order to find out, researchers performed routine experimentation with 14 pregnant women, all planning abortions, who agreed to accept injections of two different antibiotics while their fetuses were still in utero. Later on, after the nonviable fetuses were aborted and had died, the investigators did autopsies to find out which of the two substitute antibiotics had penetrated the placental barrier most effectively. The doctors who performed this research apparently neglected to get the mothers' signed permission to do the autopsies, which left them vulnerable to prosecution under grave-robbing statutes. Three of the doctors were indicted more than a year and a half ago, but their trial date has not yet been set.

One of the most sensitive issues to be discussed by the National Commission was the whole problem of research involving the intact, living fetus—in practical terms, an aborted fetus that is alive after delivery, but not viable and predictably going to die. Such a fetus must, the report of the commissioners stated, be viewed as a "dying subject." Stating that "issues of violation of integrity are . . . central," the commission recommended that "out of consideration

for the dying subject," no experimental procedures be permitted that would alter the duration of the fetus's existence, either shortening its life by methods that might literally research it to death, or prolonging its life. (Enforcement of this regulation would, obviously, serve to prohibit research of the type reported upon in "An Artificial Placenta.")

In a section of their report entitled "Deliberations and Conclusions," the commissioners reviewed some of the complex problems that were debated during their effort to set some reasonable medical-social policy in this truly formidable area. But it is fascinating to note that nowhere in their summing-up document does the commission try to define the nature of the fetus (nonhuman? pre-human? animallike? "somewhat-human"? "person?"); aside from the fact that the fetus is discussed under the rubric of "human subject," they remain silent on this question. But consultant Paul Ramsey, his sharp blue eyes glittering humorously, observed: ". . . the fact that the National Commission has drawn up any protective legislation concerning the human fetus has demonstrated that they do consider it to be a vulnerable, nonconsenting subject of research which is entitled to rights and protections of some kinds. It seems to me," he added, with a sly pursing of his lips, "that once you've conceded that much—I mean that you are talking about something which is, in some sense 'human' and protectable—why you've obviously conceded quite a lot."

Why do fetal experimentation at all? Why not, given that this research has ruffled so many moral feathers and aroused such antipathy among certain portions of the population, simply drop the enterprise altogether? The issue need not be linked to the question of abortion—we could, for example, think of continuing to permit abortions to women who want them during the early weeks of pregnancy, but prohibit the use of the abortives (or the products of spontaneous miscarriages) as material for study in biomedical experimentation. Is there, in fact, some technological imperative urging us implacably onward? Is this research really necessary?

The fact is that fetal experimentation has become important in medicine because it

seems to be exploding in a number of different directions, and many real advances have already been made. One of the most important among these, according to Professor Richard E. Behrman, M.D., Chairman of the Pediatrics Department at Columbia and Director of its Babies Hospital, has been the development of amniocentesis.

The word means, literally, "piercing of the amnion," the sac enclosing the fetus; and the procedure involves sending a fine needle through the mother's belly and into her womb. By withdrawing a sample of the amniotic fluid and subjecting it to careful analysis, physicians are able to diagnose the presence of any of several dozen known genetic (and other) fetal diseases. For instance, Down's syndrome—

If we can condone abortion, some ask, then how can we possibly object to fetal research?

called mongolism—one of the common causes of mental retardation, can readily be detected in utero by this means, and the prospective parents can then be forewarned of the danger and make their own choice about whether or not to terminate that pregnancy. "Now the whole development in this area did involve fetal research," observed Dr. Behrman. "I mean, someone did have to take the risk of putting that needle into the mother's uterus. And it had to be done not only in instances where the fetus was thought to be suffering from a disease, but in cases where it was known to be perfectly healthy—so that we could make the necessary comparisons between the 'sick' and the 'normal' fetal cell."

The development of amniocentesis, Behrman continued, was crucial to the discovery of effective treatments for Rh-diseased fetuses and infants. Rh-disease, known also as Rh-incompatibility, used to result in the births of scores of severely damaged—retarded and deaf—children, and in the delivery of many dead infants as well. The problem arises when a mother and

her fetus are of differing blood-types and cells in the mother's blood have become sensitized to the red-blood cells of her developing offspring.

What occurs is essentially an immune reaction on the mother's part. She forms antibodies that literally attack and destroy the red blood cells of the fetus much as they would attack and annihilate an invading virus. By means of amniocentesis doctors are now, however, able to detect the distressed fetus before too much harm has taken place and take steps to treat it while it remains lodged in the womb.

Fetal research whose effects will be felt in the future is directed mainly toward precise measurement of several dimensions of behavior in utero: For instance, the fetus's ability to perceive sound (and the subsequent effects upon heart-rate and brain activity), its swallowing and breathing and gasping patterns, its pattern of urination and its periods of apparent sleep are all currently under study. More exact knowledge of these fetal functions can make a life-and-death difference in circumstances where an early delivery may be indicated and the doctor is uncertain about the maturity of the fetus and therefore its capacity to survive outside the womb. Such information may also be vital to the earlier detection of fetuses that have become ill inside the uterus.

A number of fetal scientists, sensitive to recent criticisms, assert that a failure to pursue such research at this point would be an abandonment of the fetal patient; they add, too, that there has been far too little public awareness of the real gains that have been made in fetal medicine. For instance, researchers have learned to peer directly into the womb and identify structural defects in the developing fetus (such as hydrocephalus, or "water on the brain," and anencephaly, the failure of the brain to develop). These increasingly sophisticated diagnostic techniques do suggest that more sophisticated methods of treatment will be in the offing.

And many questions about fetal life and development, some of them of a pressing nature, remain unanswered. In numerous instances, for example, it is not known how the drugs a pregnant woman is taking are going to affect her fetus. If the mother is taking antidepressants (which cause changes

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in her mood by effecting alterations in her brain chemistry), are those drugs entering the brain of the growing fetus as well? And if so, do they affect brain development and functioning—and in what ways? Much more needs to be learned about the effects of maternal psychotropic drug-taking, maternal smoking and environmental pollutants that the mother may be ingesting . . . a recent study has, for instance, linked the taking of common aspirin with the incidence of stillbirths.

Thus far, it appears to me, the real advances in fetal knowledge have not come from the more brutal, invasive "cutting and chopping" experimentation, or research protocols that call for maintaining live fetuses in amnionlike brine, but rather from the standard kinds of medical research that are more or less directed towards caring for and helping the particular fetuses involved. The major gains (thus far) have really been in areas in which the fetus was the "subject to be treated," not the "object to be studied." Undoubtedly, however, we are now moving into a time in which critical choices are going to have to be faced and made. We do, on the one hand, share a strong presumption that experimentation on dying people is wrong, and that human life is not to be treated casually. On the other hand, many of us also do have doubts regarding the "personhood" of the fetus and realize that we may be balancing its welfare against that of untold numbers of babies who will live to enter the human community, and can be benefited vastly from this research. On the one side are our concerns about permitting medical researchers to make use of something human; on the other, the promise of great scientific good to be obtained. There is an element of ultimate conflict in this whole, peculiar situation. ■