“Making babies” revisited

LEON R. KASS

And the man knew not Eve his wife; but she conceived without him and bore Cain, and said: I have gotten a man with the help of Dr. Steptoe.  
_Ectogenesis IV_, 1

And Isaac entreated the NIH for his wife, because she was barren; and the NIH let itself be entreated of him, and Rebekah his wife conceived.  
_Ectogenesis XXV_, 21

Seven years ago in the pages of this journal, in an article entitled “Making Babies—the New Biology and the ‘Old’ Morality” (Number 26, Winter 1972), I explored some of the moral and political questions raised by projected new powers to intervene in the processes of human reproduction. I concluded that it would be foolish to acquire and use these powers. The questions have since been debated in “bioethical” circles and in college classrooms, and they have received intermittent attention in the popular press and in sensational novels and movies. This past year they have gained the media limelight with the Del Zio suit against Columbia University, and more especially with the birth last summer in Britain of Louise Brown, the first identified human baby born following conception in the laboratory.

Back in 1975, after prolonged deliberations, the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research issued its report and recommendations for research on the human fetus. And in the Federal Register of August 8,
MAKING BABIES

REVISITED

1975, the Secretary of Health, Education, and Welfare published regulations regarding research, development, and related activities involving fetuses, pregnant women, and \textit{in vitro} fertilization. These provided that no Federal monies should be used for \textit{in vitro} fertilization of human eggs until a special Ethics Advisory Board reviews the special ethical issues and offers advice about whether government should support any such proposed research. There has been an effective moratorium on Federal support for human \textit{in vitro} fertilization research since that time. But now the whole matter has once again become the subject of an intensive policy debate, for such a board has been established by HEW to consider whether the United States Government should finance research on human \textit{in vitro} fertilization and embryo transfer.

The question has been placed on the policy table by a research proposal submitted to the National Institute of Child Health and Human Development by Dr. Pierre Soupart of Vanderbilt University. Dr. Soupart requested $465,000, over three years, for a study to define in part the genetic risk involved in obtaining early human embryos by tissue-culture methods. He proposes to fertilize about 450 human ova, obtained from donors undergoing gynecological surgery (i.e., not from women whom the research could be expected to help), with donor sperm, to observe their development for five to six days, and to examine them microscopically for chromosomal and other abnormalities before discarding them. In addition, Dr. Soupart proposes to study whether such laboratory-grown embryos can be frozen and stored without producing abnormalities; it is thought that temporary cold storage of human embryos might improve the success rate in the embryo-transfer procedure used to produce a child. Though Dr. Soupart does not now propose to do embryo transfers to women seeking to become pregnant, his research is intended to serve that goal: He seeks to reassure us that baby-making with the help of \textit{in vitro} fertilization is safe; and he seeks to perfect the techniques introduced by Drs. Edwards and Steptoe in England.

Dr. Soupart's application was approved for funding by the National Institutes of Health review process in October 1977, but because of the administrative regulations it could not be funded without review by an Ethics Advisory Board. The Secretary of HEW, Joseph Califano, has constituted the 13-member Board, and charged it, not only with a decision on the Soupart proposal, but with an inquiry into all the scientific, ethical, and legal issues involved, urging it "to provide recommendations on broad principles to guide
the Department in future decision making.” The Board, comprising a distinguished group of physicians, academics, and laymen, has invited expert and public testimony on the widest range of questions. By the end of the first phase of its work, it will have held at least 11 meetings and public hearings all over the United States, offering all interested citizens or groups the chance to express their opinions.

I was asked by the Board to discuss the ethical issues raised by the proposed research on human in vitro fertilization, laboratory cultures of—and experimentation with—human embryos, and the intra-uterine transfer of such embryos for the purpose of assisting human generation. In addition, I was asked to comment on the appropriateness of Federal funding of such research and on the implications of this work for the provision of health care. The present article is based largely on testimony given before the Ethics Advisory Board, at its Boston meeting, October 13-14, 1978.

II

How should one think about the ethical issues, here and in general? There are many possible ways, and it is not altogether clear which way is best. For some people ethical issues are immediately matters of right and wrong, of purity and sin, of good and evil. For others, the critical terms are benefits and harms, risks and promises, gains and costs. Some will focus on so-called rights of individuals or groups, e.g., a right to life or childbirth; still others will emphasize so-called goods for society and its members, such as the advancement of knowledge and the prevention and cure of disease.

My own orientation here is somewhat different. I wish to suggest that before deciding what to do, one should try to understand the implications of doing or not doing. The first task, it seems to me, is not to ask “moral or immoral?” “right or wrong?” but to try to understand fully the meaning and significance of the proposed actions.

This concern with significance leads me to take a broad view of the matter. For we are concerned here not only with the proposed research of Dr. Soupart, and the narrow issues of safety and informed consent it immediately raises, but also with a whole range of implications including many that are tied to definitely foreseeable consequences of this research and its predictable extensions—and touching even our common conception of our own humanity. The very establishment of a special Ethics Advisory Board testifies that we are at least tacitly aware that more is at stake than in ordinary
biomedical research, or in experimenting with human subjects at risk of bodily harm. At stake is the idea of the humanness of our human life and the meaning of our embodiment, our sexual being, and our relation to ancestors and descendants. In reaching the necessarily particular and immediate decision in the case at hand, we must be mindful of the larger picture and must avoid the great danger of trivializing this matter for the sake of rendering it manageable.

III

What is the status of a fertilized human egg (i.e., a human zygote) and the embryo that develops from it? How are we to regard its being? How are we to regard it morally, i.e., how are we to behave toward it? These are, alas, all-too-familiar questions. At least analogous, if not identical, questions are central to the abortion controversy and are also crucial in considering whether and what sort of experimentation is properly conducted on living but aborted fetuses. Would that it were possible to say that the matter is simple and obvious, and that it has been resolved to everyone’s satisfaction!

But the controversy about the morality of abortion continues to rage and divide our nation. Moreover, many who favor or do not oppose abortion do so despite the fact that they regard the pre-viable fetus as a living human organism, even if less worthy of protection than a woman’s desire not to give it birth. Almost everyone senses the importance of this matter of the decision about laboratory culture of, and experimentation with, human embryos. Thus, we are obliged to take up the question of the status of the embryos, in a search for the outlines of some common ground on which many of us can stand. To the best of my knowledge, the discussion which follows is not informed by any particular sectarian or religious teaching, though it may perhaps reveal that I am a person not devoid of reverence and the capacity for awe and wonder, said by some to be the core of the “religious” sentiment.

I begin by noting that the circumstances of laboratory-grown blastocysts (i.e., 3-to-6-day-old embryos) and embryos are not identical with those of the analogous cases of 1) living fetuses facing abortion and 2) living aborted fetuses used in research. First, the fetuses whose fates are at issue in abortion are unwanted, usually the result of “accidental” conception. Here, the embryos are wanted, and deliberately created, despite certain knowledge
that many of them will be destroyed or discarded. Moreover, the fate of these embryos is not in conflict with the wishes, interests, or alleged rights of the pregnant women. Second, though the HEW guidelines governing fetal research permit studies conducted on the not-at-all-viable aborted fetus, such research merely takes advantage of available "products" of abortions not themselves undertaken for the sake of the research. No one has proposed and no one would sanction the deliberate production of live fetuses to be aborted for the sake of research, even very beneficial research. In contrast, we are here considering the deliberate production of embryos for the express purpose of experimentation.

The cases may also differ in other ways. Given the present state of the art, the largest embryo under discussion is the blastocyst, a spherical, relatively undifferentiated mass of cells, barely visible to the naked eye. In appearance it does not look human; indeed, only the most careful scrutiny by the most experienced scientist might distinguish it from similar blastocysts of other mammals. If the human zygote and blastocyst are more like the animal zygote and blastocyst than they are like the 12-week-old human fetus (which already has a humanoid appearance, differentiated organs, and electrical activity of the brain), then there would be a much-diminished ethical dilemma regarding their deliberate creation and experimental use. Needless to say, there are articulate and passionate defenders of all points of view. Let us try, however, to consider the matter afresh.

First of all, the zygote and early embryonic stages are clearly alive. They metabolize, respire, and respond to changes in the environment; they grow and divide. Second, though not yet organized into distinctive parts or organs, the blastocyst is an organic whole, self-developing, genetically unique and distinct from the egg and sperm whose union marked the beginning of its career as a discrete, unfolding being. While the egg and sperm are alive as cells, something new and alive in a different sense comes into being with fertilization. The truth of this is unaffected by the fact that fertiliza-

---

1 In the British procedures, several eggs are taken from each woman and fertilized, to increase the chance of success, but only one embryo is transferred for implantation. In Dr. Soupart's proposed experiments, as the embryos will be produced only for the purpose of research and not for transfer, all of them will be discarded or destroyed.

2 A perhaps justifiable exception would be the case of a universal plague on childbirth, say because of some epidemic that fatally attacks all fetuses in utero at age 5 months. Faced with the prospect of the end of the race, might we not condone the deliberate institution of pregnancies to provide fetuses for research, in the hope of finding a diagnosis and remedy for this catastrophic blight?
tion takes time and is not an instantaneous event. For after fertilization is complete, there exists a new individual, with its unique genetic identity, fully potent for the self-initiated development into a mature human being, if circumstances are cooperative. Though there is some sense in which the lives of egg and sperm are continuous with the life of the new organism-to-be (or, in human terms, that the parents live on in the child or child-to-be), in the decisive sense there is a discontinuity, a new beginning, with fertilization. After fertilization, there is continuity of subsequent development, even if the locus of the embryo alters with implantation (or birth). Any honest biologist must be impressed by these facts, and must be inclined, at least on first glance, to the view that a human life begins at fertilization. Even Dr. Robert Edwards has apparently stumbled over this truth, perhaps inadvertently, in the remark about Louise Brown attributed to him in an article by Peter Gwynne in Science Digest: "The last time I saw her, she was just eight cells in a test-tube. She was beautiful then, and she's still beautiful now!"

But granting that a human life begins at fertilization, and comes-to-be via a continuous process thereafter, surely—one might say—the blastocyst itself is hardly a human being. I myself would agree that a blastocyst is not, in a full sense, a human being—or what the current fashion calls, rather arbitrarily and without clear definition, a person. It does not look like a human being nor can it do very much of what human beings do. Yet, at the same time, I must acknowledge that the human blastocyst is 1) human in origin and 2) potentially a mature human being, if all goes well. This too is beyond dispute; indeed it is precisely because of its peculiarly human potentialities that people propose to study it rather than the embryos of other mammals. The human blastocyst, even the human blastocyst in vitro, is not humanly nothing; it possesses a power to become what everyone will agree is a human being.

Here it may be objected that the blastocyst in vitro has today no such power, because there is now no way in vitro to bring the blastocyst to that much later fetal stage at which it might survive on its own. There are no published reports of culture of human embryos past the blastocyst stage (though this has been reported for mice). The in vitro blastocyst, like the 12-week-old aborted fetus, is in this sense not viable (i.e., it is at a stage of maturation before the stage of possible independent existence). But if we dis-

---

*Peter Gwynne, “Was the Birth of Louise Brown Only a Happy Accident?” Science Digest, October 1978, (emphasis added).
tistinguish, among the not-viable embryos, between the pre-viable and the not-at-all viable—on the basis that the former, though not yet viable is capable of becoming or being made viable— we note a crucial difference between the blastocyst and the 12-week abortus. Unlike an aborted fetus, the blastocyst is possibly salvageable, and hence potentially viable if it is transferred to a woman for implantation. It is not strictly true that the in vitro blastocyst is necessarily not-viable. Until proven otherwise, by embryo transfer and attempted implantation, we are right to consider the human blastocyst in vitro as potentially a human being and, in this respect, not fundamentally different from a blastocyst in utero. To put the matter more forcefully, the blastocyst in vitro is more “viable,” in the sense of more salvageable, than aborted fetuses at most later stages, up to say 20 weeks.

This is not to say that such a blastocyst is therefore endowed with a so-called right to life, that failure to implant it is negligent homicide, or that experimental touchings of such blastocysts constitute assault and battery. (I myself tend to reject such claims, and indeed think that the ethical questions are not best posed in terms of “rights.”) But the blastocyst is not nothing; it is at least potential humanity, and as such it elicits, or ought to elicit, our feelings of awe and respect. In the blastocyst, even in the zygote, we face a mysterious and awesome power, a power governed by an immanent plan that may produce an indisputably and fully human being. It deserves our respect not because it has rights or claims or sentience (which it does not have at this stage), but because of what it is, now and prospectively.

Let us test this provisional conclusion by considering intuitively our response to two possible fates of such zygotcs, blastocysts, and early embryos. First, should such an embryo die, will we be inclined to mourn its passing? When a woman we know miscarries, we are sad—largely for her loss and disappointment, but perhaps also at the premature death of a life that might have been. But we do not mourn the departed fetus, nor do we seek ritually to dispose of the remains. In this respect, we do not treat even the fetus as fully one of us.

On the other hand, we would I suppose recoil even from the

---

thought, let alone the practice—I apologize for forcing it upon the reader—of eating such embryos, should someone discover that they would provide a great delicacy, a "human caviar." The human blastocyst would be protected by our taboo against cannibalism, which insists on the humanness of human flesh and which does not permit us to treat even the flesh of the dead as if it were mere meat. The human embryo is not mere meat; it is not just stuff; it is not a thing." Because of its origin and because of its capacity, it commands a higher respect.

How much more respect? As much as for a fully developed human being? My own inclination is to say "probably not," but who can be certain? Indeed, there might be prudential and reasonable grounds for an affirmative answer, partly because the presumption of ignorance ought to err in the direction of never underestimating the basis for respect of human life, partly because so many people feel very strongly that even the blastocyst is protectably human. As a first approximation, I would analogize the early embryo in vitro to the early embryo in utero (because both are potentially viable and human). On this ground alone, the most sensible policy is to treat the early embryo as a pre-viable fetus, with constraints imposed on early embryo research at least as great as those on fetal research.

To some this may seem excessively scrupulous. They will argue for the importance of the absence of distinctive humanoid appearance or the absence of sentience. To be sure, we would feel more restraint in invasive procedures conducted on a five-month-old or even 12-week-old living fetus than on a blastocyst. But this added restraint on inflicting suffering on a "look-alike," feeling creature in no way denies the propriety of a prior restraint, grounded in respect for indivuated, living, potential humanity. Before I would be persuaded to treat early embryos differently from later ones, I would insist on the establishment of a reasonably clear, naturally grounded boundary that separates "early" and "late," and which provides the basis for respecting "the early" less than "the late." This burden must be accepted by proponents of experimentation

---

5 Some people have suggested that the embryo be regarded like a vital organ, salvaged from a newly dead corpse, usable for transplantation or research, and that its donation by egg and sperm donors be governed by the Uniform Anatomical Gift Act, which legitimates pre-mortem consent for organ donation upon death. But though this acknowledges that embryos are not things, it is mistaken in treating embryos as mere organs, thereby overlooking that they are early stages of a complete, whole human being. The Uniform Anatomical Gift Act does not apply to, nor should it be stretched to cover, donation of gonads, gametes (male sperm or female eggs), or—especially—zygotes and embryos.
with human embryos in vitro if a decision to permit creating embryos for such experimentation is to be treated as ethically responsible.

IV

Where does the above analysis lead in thinking about treatment of in vitro human embryos? I shall indicate, very briefly, the lines toward a possible policy, though that is not my major intent.

The in vitro fertilized embryo has four possible fates: 1) implantation, in the hope of producing from it a child; 2) death, by active "killing" or disaggregation, or by a "natural" demise; 3) use in manipulative experimentation—embryological, genetic, etc.; 4) use in attempts at perpetuation in vitro beyond the blastocyst stage, ultimately, perhaps, to viability. I will not now consider this fourth and future possibility, though I would suggest that full laboratory growth of an embryo into a viable human being (i.e., ectogenesis), while perfectly compatible with respect owed to its potential humanity as an individual, may be incompatible with the kind of respect owed to its humanity that is grounded in the bonds of lineage and the nature of parenthood.

On the strength of my analysis of the status of the embryo, and the respect due it, no objection would be raised to implantation. In vitro fertilization and embryo transfer to treat infertility, as in the case of Mr. and Mrs. Brown, is perfectly compatible with a respect and reverence for human life, including potential human life. Moreover, no disrespect is intended or practiced by the mere fact that several eggs are removed for fertilization, to increase the chance of success. Were it possible to guarantee successful fertilization and normal growth with a single egg, no more would need to be obtained. Assuming nothing further is done with the unimplanted embryos, there is nothing disrespectful going on. The demise of the unimplanted embryos would be analogous to the loss of numerous embryos wasted in the normal in vivo attempts to generate a child. It is estimated that over 50 percent of eggs successfully fertilized during unprotected sexual intercourse fail to implant, or do not remain implanted, in the uterine wall, and are shed soon thereafter, before a diagnosis of pregnancy could be made. Any couple attempting to conceive a child tacitly accepts such embryonic wastage as the perfectly acceptable price to be paid for the birth of a (usually) healthy child. Current procedures to initiate pregnancy with laboratory fertilization thus differ from the natural "procedure"
in that what would normally be spread over four or five months \textit{in vivo} is compressed into a single effort, using all at once a four or five months' supply of eggs.\(^6\)

Parenthetically, we should note that the natural occurrence of embryo and fetal loss and wastage does not necessarily or automatically justify all deliberate, humanly caused destruction of fetal life. For example, the natural loss of embryos in early pregnancy cannot in itself be a warrant for deliberately aborting them or for invasively experimenting on them \textit{in vitro}, any more than stillbirths could be a justification for newborn infanticide. There are many things that happen naturally that we ought not to do deliberately. It is curious how the same people who deny the relevance of nature as a guide for evaluating human interventions into human generation, and who deny that the term "unnatural" carries any ethical weight, will themselves appeal to "nature's way" when it suits their purposes.\(^7\) Still, in this present matter, the closeness to natural procreation—the goal is the same, the embryonic loss is unavoidable and not desired, and the amount of loss is similar—leads me to believe that we do no more intentional or unjustified harm in the one case than in the other, and practice no disrespect.

But must we allow \textit{in vitro} unimplanted embryos to die? Why should they not be either transferred for "adoption" into another infertile woman, or else used for investigative purposes, to seek new knowledge, say about gene action? The first option raises questions about the nature of parenthood and lineage to which I will return. But even on first glance, it would seem likely to raise a large objec-

---

\(^6\) There is a good chance that the problem of surplus embryos may be avoidable, for purely technical reasons. Some researchers believe that the uterine receptivity to the transferred embryo might be reduced during the particular menstrual cycle in which the ova are obtained, because of the effects of the hormones given to induce superovulation. They propose that the harvested eggs be frozen, and then defrosted one at a time each month for fertilization, culture, and transfer, until pregnancy is achieved. By refusing to fertilize all the eggs at once—i.e., not placing all one's eggs in one uterine cycle—there will not be surplus embryos, but at most only surplus eggs. This change in the procedure would make the demise of unimplanted embryos exactly analogous to the "natural" embryonic loss in ordinary reproduction.

\(^7\) The literature on intervention in reproduction is both confused and confusing on the crucial matter of the meanings of "nature" or "the natural," and their significance for the ethical issues. It may be as much a mistake to claim that "the natural" has no moral force as to suggest that the natural way is best, because natural. Though shallow and slippery thought about nature, and its relation to "good," is a likely source of these confusions, the nature of nature may itself be elusive, making it difficult for even careful thought to capture what is natural.
tion from the original couple, who were seeking a child of their own and not the dissemination of their "own" biological children for pre-natal adoption.

But what about experimentation on such blastocysts and early embryos? Is that compatible with the respect they deserve? This is the hard question. On balance, I would think not. Invasive and manipulative experiments involving such embryos very likely presume that they are things or mere stuff, and deny the fact of their possible viability. Certain observational and non-invasive experiments might be different. But on the whole, I would think that the respect for human embryos for which I have argued—I repeat, not their so-called right to life—would lead one to oppose most potentially interesting and useful experimentation. This is a dilemma, but one which cannot be ducked or defined away. Either we accept certain great restrictions on the permissible uses of human embryos or we deliberately decide to override—though I hope not deny—the respect due to the embryos.

I am aware that I have pointed toward a seemingly paradoxical conclusion about the treatment of the unimplanted embryos: Leave them alone, and do not create embryos for experimentation only. To let them die "naturally" would be the most respectful course, grounded on a reverence, generically, for their potential humanity, and a respect, individually, for their being the seed and offspring of a particular couple who were themselves seeking only to have a child of their own. An analysis which stressed a "right to life," rather than respect, would of course lead to different conclusions. Only an analysis of the status of the embryo which denied both its so-called "rights" or its worthiness of all respect would have no trouble sanctioning its use in investigative research, donation to other couples, commercial transactions, and other activities of these sorts.

V

The attempt to generate a child with the aid of in vitro fertilization constitutes an experiment upon the prospective child. As yet, we have no knowledge of the range of such risks. It thus raises a most peculiar question for the ethics of human experimentation: Can one ethically choose for a yet hypothetical, unconceived child-to-be the unknown hazards he must face, obviously without his consent, and simultaneously choose to give him life in which to face them? This question has been much debated, as it points to a seri-
ous and immediate ethical concern: the hazards of manipulating the embryo as it bears on the health of the child-to-be.

Everyone agrees that human-embryo transfer for the sake of generation should not be performed until prior laboratory research in animals has provided a sound basis for estimating the likely risks to any human beings who will be born as a result of this transfer and gestation. Argument centers on whether a sufficiently sound basis for estimating the likely risks to humans can be provided by animal experiments, and, if so, whether adequate experimentation has been done, and what level of risk is acceptable.

There is, it seems to me, good reason for insisting that risk of incidence and likely extent of possible harm be very, very low—lower, say, than in therapeutic experimentation in children or adults. But I do not think that the risk of harm must be positively excluded (and it certainly cannot be). It would suffice if those risks were equivalent to, or less than, the risks to the child from normal procreation. To insist on more rigorous standards, especially when we permit known carriers of genetic disease to reproduce, would seem a denial of equal treatment to infertile couples contemplating in vitro assistance. Moreover, it is to give undue weight to the importance of bodily harm over against risks of poor nurture and rearing after birth. Wouldn't the couple's great eagerness for the child count, in the promise of increased parental affection, toward offsetting even a slightly higher but unknown risk of mental retardation?

Finally, to insist on extra-scrupulosity regarding risks in laboratory-assisted reproduction is to attach too much of one's concern to the wrong issue. True, everyone understands about harming children, while very few worry about dehumanization of procreation or problems of lineage. But those are the things that are distinctive about laboratory-assisted reproduction, not the risk of bodily harm to offspring. It should suffice that the risks be comparable to those for ordinary procreation, not greater but no less.

It remains a question whether we now know enough about these risks to go ahead with human-embryo transfer. Here I would defer to the opinions of the cautious experts—for caution is the posture of responsibility toward such prospective children. I would agree with Doctors Luigi Mastroianni, Benjamin Brackett, and Robert Short—all researchers in the field—that the risks for humans have not yet been sufficiently assessed, in large part because the risks in animals have been so poorly assessed (due to the small numbers of such births and to the absence of any prospective study to identify and evaluate deviations from the norm).
VI

Many people rejoiced at the birth of Louise Brown. Some were pleased by the technical accomplishment, many were pleased that she was born apparently in good health. But most of us shared the joy of her parents, who after a long, frustrating, and fruitless period, at last had the pleasure and blessing of a child of their own. The desire to have a child of one’s own is acknowledged to be a powerful and deep-seated human desire—some have called it “instinctive”—and the satisfaction of this desire, by the relief of infertility, is said to be one major goal of continuing the work with in vitro fertilization and embryo transfer. That this is a worthy goal few, if any, would deny.

Yet let us explore what is meant by “to have a child of one’s own.” First, what is meant by “to have”? Is the crucial meaning that of gestating and bearing? Or is it “to have” as a possession? Or is it to nourish and to rear, the child being the embodiment of one’s activity as teacher and guide? Or is it rather to provide someone who descends and comes after, someone who will replace oneself in the family line or preserve the family tree by new sproutings and branchings?

More significantly, what is meant by “one’s own”? What sense of one’s own is important? A scientist might define “one’s own” in terms of carrying one’s own genes. Though in some sense correct, this cannot be humanly decisive. For Mr. Brown or for most of us, it would not be a matter of indifference if the sperm used to fertilize the egg were provided by an identical twin brother—whose genes would be, of course, the same as his. Rather, the humanly crucial sense of “one’s own,” the sense that leads most people to choose their own, rather than to adopt, is captured in such phrases as “my seed,” “flesh of my flesh,” “sprung from my loins.” More accurately, since “one’s own” is not the own of one but of two, the desire to have a child of “one’s own” is a couple’s desire to embody, out of the conjugal union of their separate bodies, a child who is flesh of their separate flesh made one. This archaic language may sound quaint, but I would argue that this is precisely what is being celebrated by most people who rejoice at the birth of Louise Brown, whether they would articulate it this way or not. Mr. and Mrs. Brown, by the birth of their daughter, fulfill this aspect of their separate sexual natures and of their married life together, they acquire descendants and a new branch of their joined family tree, and the child Louise is given solid and unambiguous roots from which she has sprung and by which she will be nourished.
If this were to be the only use made of embryo transfer, and if providing in this sense "a child of one's own" were indeed the sole reason for the clinical use of the techniques, there could be no objection. Yet there will almost certainly be other uses, involving third parties, to satisfy the desire "to have" a child of "one's own" in different senses of "to have" and "one's own." I am not merely speculating about future possibilities. With the technology to effect human in vitro fertilization and embryo transfer comes the immediate possibility of egg donation (egg from donor, sperm from husband), embryo donation (egg and sperm from outside of the marriage), and foster pregnancy (host surrogate for gestation).

Nearly everyone agrees that these circumstances are morally and perhaps psychologically more complicated than the intra-marital case. Here the meaning of "one's own" is no longer so unambiguous; neither is the meaning of motherhood and the status of pregnancy. On the one hand, it is argued that embryo donation, or "prenatal adoption," would be superior to present adoption, because the woman would have the experience of pregnancy and the child would be born of the "adoptive" mother, rendering the maternal tie even more close. On the other hand, the mother-child bond rooted in pregnancy and delivery is held to be of little consequence by those who would endorse the use of surrogate gestational "mothers," say for a woman whose infertility is due to uterine disease rather than ovarian disease or oviduct obstruction. Clearly, the "need" and demand for extra-marital embryo transfer are real and probably large, probably even greater than the intra-marital ones. Already, the Chairman of the Ethics Advisory Board has testified in Congress about the need to define the responsibilities of the donor and the recipient "parents." Thus the new techniques will not only serve to ensure and preserve lineage, but will also serve to confound and complicate it. The principle truly at work here is not to provide married couples with a child of their own, but to provide anyone who wants one with a child, by whatever possible or convenient means.

"So what?" it will be said. First of all, we already practice and encourage adoption. Second, we have permitted artificial insemination—though we have, after some 40 years of this practice, yet to resolve questions of legitimacy. Third, what with the high rate of divorce and remarriage, identification of "mother," "father," and "child" are already complicated. Fourth, there is a growing rate of illegitimacy and husbandless parentages. Fifth, the use of surrogate mothers for foster pregnancy has already occurred, with the aid of
against this background, it will be a surprise to learn that the
first (pregnancy) mother reports no feelings of attachment to the
child she carried and bore. Everyone is reportedly delighted with
the event. The trio has turned to the wif-an-want an artificial
insemination to donate his semen. Now some 10 years after this
virgin birth, the case has gone to court. The semen donor is suing for
visitation privileges, to see his son.

* An unmarried woman in Dearborn, Michigan, offered to bear a child for her
married friend, infertile because of a hysterectomy. She was impregnated by
artificial insemination using semen produced by her friend's husband, his wife
performing the injection. The threesome lived together all during the preg-
nancy. The child was delivered at birth by the biological-and-gestational-mother
to the wife-and-rearing-mother. The first (pregnancy) mother reports no
feelings of attachment to the child she carried and bore. Everyone is repor-
tedly delighted with the event. The trio has publicized its accomplishment and
is reported to be considering selling rights to the story for a TV show, a book,
and a movie. Their attorney has been swamped with letters requesting similar
surrogate "mothers." (American Medical News, July 28, 1978, pp. 11-12.)

* There are today numerous suits pending, throughout the United States, be-
cause of artificial insemination with donor semen (AID). Following divorce,
the ex-husbands are refusing child support for AID children, claiming, mini-
mally, no paternity, or maximally that the child was the fruit of an adulterous
"union." In fact, a few states still treat AID as adultery. The importance of
anonymity is revealed in the following bizarre case. A woman wanted to have a
child, but abhorred the thought of marriage or of sexual relations with men. She
learned a do-it-yourself technique of artificial insemination, and persuaded a
male acquaintance to donate his semen. Now some 10 years after this virgin
birth, the case has gone to court. The semen donor is suing for visitation pri-

It is not an easy question to answer. Yet, consider. We practice
adoption because there are abandoned children who need a good
home. We do not, and would not, encourage people deliberately to
generate children for others to adopt; partly we wish to avoid baby
markets, partly we think it unfair to the child deliberately to deprive
him of his natural ties. Recent years have seen a rise in our concern
with roots, against the rootless and increasingly homogeneous back-
ground of contemporary American life. Adopted children, in par-
ticular, are pressing for information regarding their "real parents," and
some states now require that such information be made avail-
able (on that typically modern ground of "freedom of information," rather
than because of the profound importance of lineage for self-
identity). The practice of artificial insemination has yet to be eval-
uated, the secrecy in which it is practiced being an apparent conces-
sion to the dangers of publicity. Indeed, most physicians who prac-
tice artificial insemination routinely mix in some semen from the
husband, to preserve some doubt about paternity—again, a conces-
sion to the importance of lineage and legitimacy. Finally, what about
the changing mores of marriage, divorce, single-parent families, and
sexual behavior? Do we applaud these changes? Do we want to

against this background, it will be a surprise, to learn, that the
first (pregnancy) mother reports no feelings of attachment to the
child she carried and bore. Everyone is reportedly delighted with
the event. The trio has turned to the wif-an-want an artificial
insemination to donate his semen. Now some 10 years after this
virgin birth, the case has gone to court. The semen donor is suing for
visitation privileges, to see his son.

It is not an easy question to answer. Yet, consider. We practice
adoption because there are abandoned children who need a good
home. We do not, and would not, encourage people deliberately to
generate children for others to adopt; partly we wish to avoid baby
markets, partly we think it unfair to the child deliberately to deprive
him of his natural ties. Recent years have seen a rise in our concern
with roots, against the rootless and increasingly homogeneous back-
ground of contemporary American life. Adopted children, in par-
ticular, are pressing for information regarding their "real parents," and
some states now require that such information be made avail-
able (on that typically modern ground of "freedom of information," rather
than because of the profound importance of lineage for self-
identity). The practice of artificial insemination has yet to be eval-
uated, the secrecy in which it is practiced being an apparent conces-
sion to the dangers of publicity. Indeed, most physicians who prac-
tice artificial insemination routinely mix in some semen from the
husband, to preserve some doubt about paternity—again, a conces-
sion to the importance of lineage and legitimacy. Finally, what about
the changing mores of marriage, divorce, single-parent families, and
sexual behavior? Do we applaud these changes? Do we want to

It is not an easy question to answer. Yet, consider. We practice
adoption because there are abandoned children who need a good
home. We do not, and would not, encourage people deliberately to
generate children for others to adopt; partly we wish to avoid baby
markets, partly we think it unfair to the child deliberately to deprive
him of his natural ties. Recent years have seen a rise in our concern
with roots, against the rootless and increasingly homogeneous back-
ground of contemporary American life. Adopted children, in par-
ticular, are pressing for information regarding their "real parents," and
some states now require that such information be made avail-
able (on that typically modern ground of "freedom of information," rather
than because of the profound importance of lineage for self-
identity). The practice of artificial insemination has yet to be eval-
uated, the secrecy in which it is practiced being an apparent conces-
sion to the dangers of publicity. Indeed, most physicians who prac-
tice artificial insemination routinely mix in some semen from the
husband, to preserve some doubt about paternity—again, a conces-
sion to the importance of lineage and legitimacy. Finally, what about
the changing mores of marriage, divorce, single-parent families, and
sexual behavior? Do we applaud these changes? Do we want to

It is not an easy question to answer. Yet, consider. We practice
adoption because there are abandoned children who need a good
home. We do not, and would not, encourage people deliberately to
generate children for others to adopt; partly we wish to avoid baby
markets, partly we think it unfair to the child deliberately to deprive
him of his natural ties. Recent years have seen a rise in our concern
with roots, against the rootless and increasingly homogeneous back-
ground of contemporary American life. Adopted children, in par-
ticular, are pressing for information regarding their "real parents," and
some states now require that such information be made avail-
able (on that typically modern ground of "freedom of information," rather
than because of the profound importance of lineage for self-
identity). The practice of artificial insemination has yet to be eval-
uated, the secrecy in which it is practiced being an apparent conces-
sion to the dangers of publicity. Indeed, most physicians who prac-
tice artificial insemination routinely mix in some semen from the
husband, to preserve some doubt about paternity—again, a conces-
sion to the importance of lineage and legitimacy. Finally, what about
the changing mores of marriage, divorce, single-parent families, and
sexual behavior? Do we applaud these changes? Do we want to

It is not an easy question to answer. Yet, consider. We practice
adoption because there are abandoned children who need a good
home. We do not, and would not, encourage people deliberately to
generate children for others to adopt; partly we wish to avoid baby
markets, partly we think it unfair to the child deliberately to deprive
him of his natural ties. Recent years have seen a rise in our concern
with roots, against the rootless and increasingly homogeneous back-
ground of contemporary American life. Adopted children, in par-
ticular, are pressing for information regarding their "real parents," and
some states now require that such information be made avail-
able (on that typically modern ground of "freedom of information," rather
than because of the profound importance of lineage for self-
identity). The practice of artificial insemination has yet to be eval-
uated, the secrecy in which it is practiced being an apparent conces-
sion to the dangers of publicity. Indeed, most physicians who prac-
tice artificial insemination routinely mix in some semen from the
husband, to preserve some doubt about paternity—again, a conces-
sion to the importance of lineage and legitimacy. Finally, what about
the changing mores of marriage, divorce, single-parent families, and
sexual behavior? Do we applaud these changes? Do we want to
contribute further to the confusion of thought, identity, and practice?  

Properly understood, the largely universal taboos against incest, and also the prohibition against adultery, suggest that clarity about who your parents are, clarity in the lines of generation, clarity about who is whose, are the indispensable foundations of a sound family life, itself the sound foundation of civilized community. Clarity about your origins is crucial for self-identity, itself important for self-respect. It would be, in my view, deplorable public policy further to erode such fundamental beliefs, values, institutions, and practices. This means, concretely, no encouragement of embryo adoption or especially of surrogate pregnancy. While it would be perhaps foolish to try to proscribe or outlaw such practices, it would not be wise for the Federal government to foster them. The Ethics Advisory Board should carefully consider whether it should and can attempt to restrict the use of embryo transfer to the married couple from whom the embryo derives.

The case of surrogate wombs bears a further comment. While expressing no objection to the practice of foster pregnancy itself, some people object that it will be done for pay, largely because of their fear that poor women will be exploited by such a practice. But if there were nothing wrong with foster pregnancy, what would be wrong with making a living at it? Clearly, this objection harbors a tacit understanding that to bear another's child for pay is in some sense a degradation of oneself—in the same sense that prostitution is a degradation primarily because it entails the loveless surrender of one's body to serve another's lust, and only derivatively because the woman is paid. It is to deny the meaning and worth of one's body, to treat it as a mere incubator, divested of its human meaning. It is also to deny the meaning of the bond among sexuality, love, and procreation. The buying and selling of human flesh and the dehumanized uses of the human body ought not to be encouraged. To be sure, the practice of womb donation could be engaged in for love not money, as it apparently has been in the case in Michigan. A woman could bear her sister's child out of sisterly love. But to the degree that one escapes in this way from the degradation and difficulties of the sale of human flesh and bodily services, and the

10 To those who point out that the bond between sexuality and procreation has already been effectively and permanently cleaved by "the pill," and that this is therefore an idle worry in the case of in vitro fertilization, it must be said that the pill provides only sex without babies. Now the other shoe drops: babies without sex.
treating of the body as stuff (the problem of cannibalism), one approaches instead the difficulties of potential incest and near-incest.

VII

Objections have been raised about the deliberate technological intervention into the so-called natural processes of human reproduction. Some would simply oppose such interventions as "unnatural," and therefore wrong. Others are concerned about the consequences of these interventions, and about their ends and limits. Again, I think it important to explore the meaning and possible significance of such interventions, present and projected, especially as they bear on fundamental beliefs, institutions, and practices. To do so requires that we consider likely future developments in the laboratory study of human reproduction. Indeed, I shall argue that we must consider such future developments in reaching a decision in the present case.

What can we expect in the way of new modes of reproduction, as an outgrowth of present studies? To be sure, prediction is difficult. One can never know with certainty what will happen, much less how soon. Yet uncertainty is not the same as simple ignorance. Some things, indeed, seem likely. They seem likely because 1) they are thought necessary or desirable, at least by some researchers and their sponsors, 2) they are probably biologically possible and technically feasible, and 3) they will be difficult to prevent or control (especially if no one anticipates their development or sees a need to worry about them). One of the things the citizenry, myself included, would expect from an Ethics Advisory Board and our policy makers generally is that they face up to reasonable projections of future accomplishments, consider whether they are cause for social concern, and see whether or not the principles now enunciated and the practices now established are adequate to deal with any such concerns.

I project at least the following:

1. The growth of human embryos in the laboratory will be extended beyond the blastocyst stage. Such growth must be deemed desirable under all the arguments advanced for developmental research up to the blastocyst stage; research on gene action, chromosome segregation, cellular and organic differentiation, fetus-environment interaction, implantation, etc., cannot answer all its questions with the blastocyst. Such in vitro post-blastocyst differentiation has apparently been achieved in the mouse, in culture; the use of other mammals as temporary hosts for human embryos is also a possibility. How far such embryos will eventually be perpetuated is anybody's
guess, but full-term ectogenesis cannot be excluded. Neither can the existence of laboratories filled with many living human embryos, growing at various stages of development.

2. Experiments will be undertaken to alter the cellular and genetic composition of these embryos, at first without subsequent transfer to a woman for gestation, perhaps later as a prelude to reproductive efforts. Again, scientific reasons now justifying Dr. Soupart's research already justify further embryonic manipulations, including formation of hybrids or chimeras (within species and between species); gene, chromosome, and plasmid insertion, excision, or alteration; nuclear transplantation or cloning, etc. The techniques of DNA recombination, coupled with the new skills of handling embryos, make prospects for some precise genetic manipulation much nearer than anyone would have guessed ten years ago. And embryological and cellular research in mammals is making astounding progress. On the cover of a recent issue of *Science* is a picture of a hexaparental mouse, born after reaggregation of an early embryo with cells disaggregated from three separate embryos. (Note: That sober journal calls this a “handmade mouse”—i.e., literally a *manu-factured* mouse—and goes on to say that it was “manufactured by genetic engineering techniques.”)¹¹

3. Storage and banking of living human embryos (and ova) will be undertaken, perhaps commercially. After all, commercial sperm banks are already well-established and prospering.

Space does not permit me to do more than identify a few kinds of questions that must be considered in relation to such possible coming control over human heredity and reproduction: questions about the wisdom required to engage in such practices; questions about the goals and standards that will guide our interventions; questions about changes in the concepts of being human, including embodiment, gender, love, lineage, identity, parenthood, and sexuality; questions about the responsibility of power over future generations; questions about awe, respect, humility; questions about the kind of society we will have if we follow along our present course.¹²


¹² Some of these questions are addressed, albeit too briefly and polemically, in the latter part of my 1972 “Making Babies” article, to which the reader is referred. It has been pointed out to me by an astute colleague that the tone of the present article is less passionate and more accommodating than the first, which change he regards as an ironic demonstration of the inexorable way in which we get used to, and accept, our technological nightmares. I myself share his concern. I cannot decide whether the decline of my passion is to be welcomed; that is, whether it is due to greater understanding bred of more thought and experience, or to greater callousness and the contempt of familiarity bred
Though I cannot discuss these questions now, I can and must face a serious objection to considering them at all. Most people would agree that the projected possibilities raise far more serious questions than do simple fertilization of a few embryos, their growth \textit{in vitro} to the blastocyst stage, and their possible transfer to women for gestation. Why burden the present decision with these possibilities? Future "abuses," it is often said, do not disqualify present uses (though these same people also often say that "future benefits justify present questionable uses"). Moreover, there can be no certainty that "A" will lead to "B." This thin-edge-of-the-wedge argument has been open to criticism.

But such criticism misses the point, for two reasons. \textit{First}, critics often misunderstand the wedge argument. The wedge argument is not primarily an argument of prediction, that A \textit{will} lead to B, say on the strength of the empirical analysis of precedent and an appraisal of the likely direction of present research. It is primarily an argument about the \textit{logic} of justification. Do the principles of justification now used to justify the current research proposal already justify \textit{in advance} the further developments? Consider some of these principles:

1. It is desirable to learn as much as possible about the processes of fertilization, growth, implantation, and differentiation of human embryos and about human gene expression and its control.

2. It would be desirable to acquire improved techniques for \textit{enhancing} conception and implantation, for \textit{preventing} conception and implantation, for the treatment of genetic and chromosomal abnormalities, etc.

3. In the end, only research using \textit{human} embryos can answer these questions and provide these techniques.

4. There should be no censorship or limitation of scientific inquiry or research.

This logic knows no boundary at the blastocyst stage, or for that matter, at any later stage. For these principles \textit{not} to justify future extensions of current work, some independent additional principles, limiting such justification to particular stages of development, would have to be found. Here, the task is to find such a biologically defen-

from too much thought and experience. It does seem to me now that many of the fundamental beliefs and institutions that might be challenged by laboratory growth of human embryos and by laboratory-assisted reproduction are already severely challenged in perhaps more potent and important ways. Here, too, we see the creeping effect of the aggregated powers of modernity and the corrosive power of the familiar. Adaptiveness is our glory and our curse: as Raskolnikov put it, "Man gets used to everything, the beast!"
sible distinction that could be respected as reasonable and not arbitrary, a difficult—perhaps impossible—task, given the continuity of development after fertilization. The citizenry, myself included, will want to know precisely what grounds our policy makers will give for endorsing Soupart's research, and whether their principles have not already sanctioned future developments. If they do give such wedge-opening justifications, let them do so deliberately, candidly, and intentionally.

A better case to illustrate the wedge logic is the principle offered for the embryo-transfer procedures as treatment for infertility. Will we support the use of in vitro fertilization and embryo transfer because it provides a "child of one's own," in a strict sense of one's own, to a married couple? Or will we support the transfer because it is treatment of involuntary infertility, which deserves treatment in or out of marriage, hence endorsing the use of any available technical means (which would produce a healthy and normal child), including surrogate wombs, or even ectogenesis?

Second, logic aside, the opponents of the wedge argument do not counsel well. It would be simply foolish to ignore what might come next, and to fail to make the best possible assessment of the implications of present action (or inaction). Let me put the matter very bluntly: the Ethics Advisory Board, in the decision it must now make, may very well be helping to decide whether human beings will eventually be produced in laboratories. I say this not to shock—and I do not mean to beg the question of whether that would be desirable or not. I say this to make sure that they and we face squarely the full import and magnitude of this decision. Once the genies let the babies into the bottle, it may be impossible to get them out again.

VIII

So much, then, for the meaning of initiating and manipulating human embryos in the laboratory. These considerations still make me doubt the wisdom of proceeding with these practices, both in research and in their clinical application, notwithstanding that valuable knowledge might be had by continuing the research and identifiable suffering might be alleviated by using it to circumvent infertility. To doubt the wisdom of going ahead makes one at least a fellow-traveller of the opponents of such research, but it does not, either logically or practically, require that one join them in trying to prevent it, say by legal prohibition. Not every folly can or should
be legislated against. Attempts at prohibition here would seem to be both ineffective and dangerous—ineffective because impossible to enforce, dangerous because the costs of such precedent-setting interference with scientific research might be greater than the harm it prevents. To be sure, we already have legal restrictions on experimentation with human subjects, which restrictions are manifestly not incompatible with the progress of medical science. Neither is it true that science cannot survive if it must take some direction from the law. Nor is it the case that all research, because it is research, is or should be absolutely protected. But it does not seem to me that in vitro fertilization and embryo transfer deserve, at least at present, to be treated as sufficiently dangerous for legislative interference.

But if to doubt the wisdom does not oblige one to seek to outlaw the folly, neither does a decision to permit require a decision to encourage or support. A researcher’s freedom to do in vitro fertilization, or a woman’s right to have a child with laboratory assistance, in no way implies a public (or even a private) obligation to pay for such research or treatment. A right against interference is not an entitlement for assistance. The question before the Ethics Advisory Board and the Department of Health, Education, and Welfare is not whether to permit such research but whether the Federal government should fund it. This is the policy question that needs to be discussed.

The arguments in favor of Federal support are well known. First, the research is seen as continuous with, if not quite an ordinary instance of, the biomedical research which the Federal government supports handsomely; roughly two-thirds of the money spent on biomedical research in the United States comes from Uncle Sam. Why is this research different from all other research? Its scientific merit has been attested to by the normal peer-review process at NIH. For some, that is a sufficient reason to support it.

Second, there are specific practical fruits expected from the anticipated successes of this new line of research. Besides relief for many cases of infertility, the research promises new birth-control measures based upon improved understanding of the mechanisms of fertilization and implantation, which in turn could lead to techniques for blocking these processes. Also, studies on early embryonic development hold forth the promise of learning how to prevent some congenital malformations and certain highly malignant tumors (e.g., hydatidiform mole) that derive from aberrant fetal tissue.

Third, as he who pays the piper calls the tune, Federal support would make easy the Federal regulation and supervision of this re-
search. For the government to abstain, so the argument runs, is to leave the control of research and clinical application in the hands of profit-hungry, adventurous, insensitive, reckless, or power-hungry private physicians, scientists, or drug companies; or, on the other hand, at the mercy of the vindictive, mindless, and superstitious civic groups that will interfere with this research through state and local legislation. Only through Federal regulation—which, it is said, can only follow with Federal funding—can we have reasonable, enforceable, and uniform guidelines.

Fourth is the chauvinistic argument that the United States should lead the way in this brave new research, especially as it will apparently be going forward in other nations. Indeed, one witness testifying before the Ethics Advisory Board deplored the fact that the first Louise Brown was British and not American, and complained, in effect, that the existing moratorium on Federal support has already created what one might call an “in vitro fertilization gap.” The pre-eminence of American science and technology, so the argument implies, is the center of our pre-eminence among the nations, a position which will be jeopardized if we hang back out of fear.

Let me respond to these arguments, in reverse order. Conceding the premise of the importance of American science for American prestige and strength, it is far from clear that failure to support this research would jeopardize American science. Certainly the use of embryo transfer to overcome infertility, though a vital matter for the couples involved, is hardly a matter of vital national interest—at least not unless and until the majority of American women are similarly infertile. The demands of international competition, admittedly often a necessary evil, should be invoked only for things that really matter; a missile gap and an embryo-transfer gap are chasms apart. In areas not crucial to our own survival, there will be many things we should allow other nations to develop, if that is their wish, without feeling obliged to join them. Moreover, one should not rush into potential folly to avoid being the last to commit it.

The argument about governmental regulation has much to recommend it. But it fails to consider that there are other safeguards against recklessness, at least in the clinical applications, known to the high-minded as the canons of medical ethics and to the cynical as liability for malpractice. Also, Federal regulations attached to Federal funding will not in any case regulate research done with private monies, say by the drug companies. Moreover, there are enough concerned practitioners of these new arts who would have a compelling interest in regulating their own practice, if only to es-
cape the wrath and interference of hostile citizen groups in response to unsavory goings-on. The available evidence does not convince me that a sensible practice of \textit{in vitro} experimentation requires regulation by the Federal government.

In turning to the argument about anticipated technological powers, we face difficult calculations of unpredictable and more-or-less-likely costs and benefits, and the all-important questions of priorities in the allocation of scarce resources. Here it seems useful to consider separately the techniques for generating children and the anticipated techniques for birth control or for preventing developmental anomalies and malignancies.

First, accepting that providing a child of their own to infertile couples is a worthy goal—and it is both insensitive and illogical to cite the population problem as an argument for ignoring the problem of infertility—one can nevertheless question its rank relative to other goals of medical research. One can even wonder—and I have done so in print—whether it is indeed a \textit{medical} goal, or a worthy goal for \textit{medicine}, that is, whether alleviating infertility, especially in this way, is part of the art of \textit{healing}.\footnote{See "Making Babies—the New Biology and the 'Old' Morality," pp. 19-20. See also my "Regarding the End of Medicine and the Pursuit of Health," \textit{The Public Interest}, Number 40, Summer 1975, especially pp. 11-18, and 33-35.} Just as abortion for genetic defect is a peculiar innovation in medicine (or in preventive medicine) in which a disease is treated by eliminating the patient (or, if you prefer, a disease is prevented by “preventing” the patient), so laboratory-fertilization is a peculiar treatment for oviduct obstruction, in that it requires the creation of a new life to “heal” an existing one. All this simply emphasizes the uniqueness of the reproductive organs, in that their proper function involves other people, and calls attention to the fact that infertility is not a “disease,” like heart disease or stroke, even though obstruction of a normally patent tube or vessel is the proximate cause of each.

However this may be, there is a more important objection to this approach to the problem. It represents yet another instance of our thoughtless preference for expensive, high-technology, therapy-oriented approaches to disease and dysfunctions. What about spending this money on discovering the causes of infertility? What about the prevention of tubal obstruction? We complain about rising medical costs, but we insist on the most spectacular and the most technological—and thereby the most costly—remedies.

The truth is that we do know a little about the causes of tubal obstruction—though much less than we should or could. For in-
stance, it is estimated that at least one-third of such cases are the aftermath of pelvic-inflammatory disease, caused by that uninvited venereal guest, gonococcus. Leaving aside any question about whether it makes sense for a Federally-funded baby to be the wage of aphrodisiac indiscretion, one can only look with wonder at a society that will have "petri-dish babies" before it has found a vaccine against gonorrhea.

True, there are other causes of blocked oviducts, and blocked oviducts are not the only cause of female infertility. True, it is not logically necessary to choose between prevention and cure. But practically speaking, with money for research as limited as it is, research funds targeted for the relief of infertility should certainly go first to epidemiological and preventive measures—especially where the costs in the high-technology cure are likely to be great.

What about these costs? I have already explored some of the non-financial costs, in discussing the meaning of this research for our images of humanness. Let us, for now, consider only the financial costs. How expensive was Louise Brown? We do not know, partly because Drs. Edwards and Steptoe have yet to publish their results, indicating how many failures preceded their success, how many procedures for egg removal and for fetal monitoring were performed on Mrs. Brown, and so on. One must add in the costs of monitoring the baby's development to check on her "normality" and, should it

---

14 Consider the following contributions of Federally-supported programs to rationalizing our sexual and reproductive practices. First, we have Federally-supported programs of sex education in elementary schools, so that the children will know what can happen to them (and what they can make happen). Next, in high school, Uncle Sam provides for teen-age contraception, to prevent the consequences of unavoidable sexual activity. Freed of a major deterrent to unrestricted sexual activity, our teen-agers indulge, but not without consequences: They get gonorrhea, which some of them will have treated, again at the taxpayers' expense through Medicaid. But for some the treatment comes too late to prevent scarring and oviduct obstruction: Federally-supported in vitro fertilization research and services come to the rescue, to overcome their infertility. Uncle Sam will, of course, also provide Aid to Dependent Children, if the mother is or goes on welfare. How wonderful it is to be infinitely resourceful.

15 There has been much objection, largely from the scientific community, to the phrase "test-tube baby." More than one commentator has deplored the exploitation of its "flesh-creeping" connotations. They point out that a flat petri-dish is used, not a test-tube—as if that mattered—and that the embryo spends but a few days in the dish. But they don't ask why the term "test-tube baby" remains the popular designation, and whether it does not embody more of the deeper truth than a more accurate, laboratory appellation. If the decisive difference is between "in the womb" or "in the lab," the popular designation conveys it. (See 'Afterword', below.) And it is right on target, and puts us on notice, if the justification for the present laboratory procedures tacitly also justifies future extensions, including full ectogenesis—say, if that were the only way a womb-less woman could have a child of her own, without renting a human womb from a surrogate bearer.
come, the costs of governmental regulation. A conservative estimate might place the costs of a successful pregnancy of this kind at between five and ten thousand dollars. If we use the conservative figure of 500,000 for estimating the number of infertile women with blocked oviducts in the United States whose only hope of having children lies in in vitro fertilization, we reach a conservative estimated cost of $2.5 to $5 billion. Is it really even fiscally wise for the Federal government to start down this road?

Clearly not, if it is also understood that the costs of providing the service, rendered possible by a successful technology, will also be borne by the taxpayers. Nearly everyone now agrees that the kidney-machine legislation, obliging the Federal government to pay about $25,000-$30,000 per patient per year for kidney dialysis for anyone in need, (cost to the taxpayers in 1978 was nearly $1 billion), is an impossible precedent—notwithstanding that individual lives have been prolonged as a result. But once the technique of in vitro fertilization and embryo transfer is developed and available, how should the baby-making be paid for? Should it be covered under medical insurance? If a National Health Insurance program is enacted, will and should these services be included? (Those who argue that they are part of medicine will have a hard time saying no.) Failure to do so will make this procedure available only to the well-to-do, on a fee-for-service basis. Would that be a fair alternative? Perhaps; but it is unlikely to be tolerated. Indeed, the principle of equality—equal access to equal levels of medical care—is the leading principle in the pressure for medical reform. One can be certain that efforts will be forthcoming to make this procedure available equally to all, independent of ability to pay, under Medicaid or National Health Insurance or in some other way. (I have recently learned that a Boston-based group concerned with infertility has obtained private funding to pay for artificial insemination for women on welfare!!)

Much as I sympathize with the plight of infertile couples, I do not

---

10 This figure is calculated from estimates that between 10 and 15 percent of all couples are involuntarily infertile, and that in more than half of these cases the cause is in the female. Blocked oviducts account for perhaps 20 percent of the causes of female infertility. Perhaps 50 percent of these women might be helped to have a child by means of reconstructive surgery on the oviducts; the remainder could conceive only with the aid of laboratory fertilization and embryo transfer. These estimates do not include additional candidates with uterine disease (who could "conceive" only by embryo transfer to surrogate-gestators), nor those with ovarian dysfunction who would need egg donation as well, nor that growing population of women who have had tubal ligations and who could later turn to in vitro fertilization. It is also worth noting that not all the infertile couples are childless; indeed, a surprising number are seeking to enlarge an existing family.
believe that they are entitled to the provision of a child at the public expense, especially at this cost, especially by a procedure that also involves so many moral difficulties. Given the many vexing dilemmas that will surely be spawned by laboratory-assisted reproduction, the Federal government should not be misled by compassion to embark on this imprudent course.

In considering the Federal funding of such research for its other anticipated technological benefits, independent of its clinical use in baby-making, we face a more difficult matter. In brief, as is the case with all basic research, one simply cannot predict what kinds of techniques and uses this research will yield. But here, also, I think good sense would at present say that before one undertakes human in vitro fertilization to seek new methods of birth control—e.g., by developing antibodies to the human egg that would physically interfere with its fertilization—one should make adequate attempts to do this in animals. One simply can't get large-enough numbers of human eggs to do this pioneering research well—at least not without subjecting countless women to additional risks not for their immediate benefit. Why not test this conceit first in the mouse or rabbit? Only if the results were very promising—and judged also to be relatively safe in practice—should one consider trying such things in humans. Likewise, the developmental research can and should be first carried out in animals, especially in primates. Though in vitro fertilization has yet to be achieved in monkeys, embryo transfer of in vivo fertilized eggs has been accomplished, thus permitting the relevant research to proceed. Purely on scientific grounds, the Federal government ought not now to be investing funds in this research for its promised technological benefits—benefits which, in the absence of pilot studies in animals, must be regarded as mere wishful thoughts in the imaginings of scientists.

There remains the first justification, research for the sake of knowledge: knowledge about cell cleavage, cell-cell and cell-environment interactions, and cell differentiation; knowledge of gene action and of gene regulation; knowledge of the effects and mechanisms of action of various chemical and physical agents on growth and development; knowledge of the basic processes of fertilization and implantation. This is all knowledge worth having, and though much can be learned using animal sources—and these sources have barely begun to be sufficiently exploited—the investigation of these matters in man would, sooner or later, require the use of human-embryonic material. Here, again, there are questions of research priority about which there is room for disagreement, among scientists and laymen.
alike. But these questions of research priority, while not irrelevant to the decision at hand, are not the questions that the Ethics Advisory Board was constituted to answer.

It was constituted to consider whether such research is consistent with the ethical standards of our community. The question turns in large part on the status of the early embryo. If, as I have argued, the early embryo is deserving of respect because of what it is, now and potentially, it is difficult to justify submitting it to invasive experiments, and especially difficult to justify creating it solely for the purpose of experimentation. But even if this argument fails to sway the Board, another one should. For their decision, I remind you, is not whether in vitro fertilization should be permitted in the United States, but whether our tax dollars should encourage and foster it. One cannot, therefore, ignore the deeply held convictions of a sizeable portion of our population—it may even be a majority on this issue—that regards the human embryo as protectable humanity, not to be experimented upon except for its own benefit. Never mind if these beliefs have a religious foundation—as if that should ever be a reason for dismissing them! The presence, sincerity, and depth of these beliefs, and the grave importance of their subject, is what must concern us. The holders of these beliefs have been very much alienated by the numerous court decisions and legislative enactments regarding abortion and research on fetuses. Many who, by and large, share their opinions about the humanness of prenatal life have with heavy heart gone along with the liberalization of abortion, out of deference to the wishes, desires, interests, or putative rights of pregnant women. But will they go along here with what they can only regard as gratuitous and willful assaults on human life, or at least on potential and salvageable human life, and on human dignity? We can ill afford to alienate them further, and it would be unstatesmanlike, to say the least, to do so, especially in a matter so little important to the national health and one so full of potential dangers.

Technological progress can be but one measure of our national health. Far more important is the affection and esteem in which our citizenry holds its laws and institutions. No amount of relieved infertility is worth the further disaffection and civil contention that the lifting of the moratorium on Federal funding is likely to produce. People opposed to abortion and people grudgingly willing to permit women to obtain elective abortion, at their own expense, will not tolerate having their tax money spent on scientific research requiring what they regard as at best cruelty, at worst murder. A prudent Ethics Advisory Board and a prudent and wise Secretary of Health,
Education, and Welfare should take this matter most seriously, and refuse to lift the moratorium—at least until they are persuaded that public opinion will overwhelmingly support them. Imprudence in this matter may be the worst sin of all.

An afterword

This has been for me a long and difficult exposition. Many of the arguments are hard to make. It is hard to get confident people to face unpleasant prospects. It is hard to get many people to take seriously such "soft" matters as lineage, identity, respect, and self-respect when they are in tension with such "hard" matters as a cure for infertility or new methods of contraception. It is hard to talk about the meaning of sexuality and embodiment in a culture that treats sex increasingly as sport and that has trivialized the significance of gender, marriage, and procreation. It is hard to oppose Federal funding of baby-making in a society which increasingly demands that the Federal government supply all demands, and which—contrary to so much evidence of waste, incompetence, and corruption—continues to believe that only Uncle Sam can do it. And, finally, it is hard to speak about restraint in a culture that seems to venerate very little above man's own attempt to master all. Here, I am afraid, is the biggest question and the one we perhaps can no longer ask or deal with: the question about the reasonableness of the desire to become masters and possessors of nature, human nature included.

Here we approach the deepest meaning of in vitro fertilization. Those who have likened it to artificial insemination are only partly correct. With in vitro fertilization, the human embryo emerges for the first time from the natural darkness and privacy of its own mother's womb, where it is hidden away in mystery, into the bright light and utter publicity of the scientist's laboratory, where it will be treated with unswerving rationality, before the clever and shameless eye of the mind and beneath the obedient and equally clever touch of the hand. What does it mean to hold the beginning of human life before your eyes, in your hands—even for 5 days (for the meaning does not depend on duration)? Perhaps the meaning is contained in the following story:

Long ago there was a man of great intellect and great courage. He was a remarkable man, a giant, able to answer questions that no other human being could answer, willing boldly to face any challenge or problem. He was a confident man, a masterful man. He saved his city from disaster and ruled it as a father rules his children,
revered by all. But something was wrong in his city. A plague had fallen on generation; infertility afflicted plants, animals, and human beings. The man confidently promised to uncover the cause of the plague and to cure the infertility. Resolutely, dauntlessly, he put his sharp mind to work to solve the problem, to bring the dark things to light. No secrets, no reticences, a full public inquiry. He raged against the representatives of caution, moderation, prudence, and piety, who urged him to curtail his inquiry; he accused them of trying to usurp his rightfully earned power, of trying to replace human and masterful control with submissive reverence. The story ends in tragedy: He solved the problem but, in making visible and public the dark and intimate details of his origins, he ruined his life, and that of his family. In the end, too late, he learns about the price of presumption, of overconfidence, of the overweening desire to master and control one's fate. In symbolic rejection of his desire to look into everything, he punishes his eyes with self-inflicted blindness.

Sophocles seems to suggest that such a man is always in principle—albeit unwittingly—a patricide, a regicide, and a practitioner of incest. We men of modern science may have something to learn from our forebear, Oedipus. It appears that Oedipus, being the kind of man an Oedipus is (the chorus calls him a paradigm of man), had no choice but to learn through suffering. Is it really true that we too have no other choice?