

Chapter Six

The Ethics of Cloning-for-Biomedical-Research

I. The Manner and Spirit of This Inquiry

The question of whether or not to proceed with human cloning-for-biomedical-research is a morally serious and difficult one. On the one hand, there is the promise that such research could lead to important knowledge of human embryological development and gene action, especially in cases in which there are genetic abnormalities that lead to disease. There is also the promise that such research could contribute to producing transplantable tissues and organs that could be effective in curing or reversing many dreaded illnesses and injuries—including Parkinson’s disease, Alzheimer’s disease, juvenile diabetes, and spinal cord injury. On the other hand, there are the morally relevant facts that this research involves the deliberate production, use, and ultimate destruction of cloned human embryos, and that the cloned embryos produced for research are no different from cloned embryos that could be used in attempts to produce cloned children. Complicating the moral assessment are questions about the likelihood that this research will deliver its promised benefits and about the possibility of equally promising, yet morally less problematic, approaches to the same scientific and medical goals. Finally, there is the ever-present danger of creating false hope among patients, and the risk of allowing the goodness of the end (finding cures for disease) to justify moral indifference to the means used to achieve it. Morally serious people may differ in their final judgment of the ethics of cloning-for-biomedical-research. But they do—or should—agree on this: that fidelity

both to the highest moral and human aspirations of science and medicine and to the moral standards of the wider community requires that we consider not only why and how to proceed with new lines of research, but also whether there might be compelling reasons not to do so or certain limits that should be observed. Both the facts (scientific and moral) and our ethical principles must be consulted in trying to judge what is best.

Yet despite this general agreement, it is difficult to know how best to proceed in the present case. There are multiple questions about the right context for considering the ethics of cloning-for-biomedical-research. First, we must weigh whether to take up this matter in the context of deciding what to do about cloning-to-produce-children or in the somewhat different context of the ethics of embryo and stem cell research more generally. The issue has in fact emerged in the public moral debate over anti-cloning legislation, as a complication in the effort to stop cloning-to-produce-children. Generally speaking, the most effective way to prevent cloning-to-produce-children would arguably be to stop the process at the initial act of cloning, the production (by an act of somatic cell nuclear transfer [SCNT]) of the embryonic human clone. Yet such a measure would rule out cloning-for-biomedical-research, and many scientists and patient advocacy groups have argued that the human and moral costs of doing so are too great. Alternatively, we could take up this matter in what seems philosophically to be its more natural context, namely, as a sub-species of a larger inquiry into the ethics of embryo and stem cell research.

Each of these contexts—what to do about cloning-to-produce-children and what to do about embryo research—is certainly plausible. Yet each, by itself, is less than satisfactory. The first risks giving excessive weight to the fact that the embryos wanted for research are *cloned* embryos; the second, ignoring the aspect (central to cloning) of *genetic manipulation*, risks the opposite error by requiring that the ethics of cloning-for-biomedical-research be argued entirely in terms of what it is proper to do with *embryos as such*. We can imagine, in advance of any discussion, a variety of moral opinions that would emerge, influenced in part by how

the question is formulated: one person could defend stem cell research performed using embryos produced by IVF but oppose research using cloned embryos for reasons of prudence (such as decreasing the likelihood of cloning-to-produce-children). Another person, holding IVF embryos in higher regard than cloned embryos, could reach precisely the opposite conclusion. Some people will hold that research on any human embryo, cloned or not, is always morally unacceptable (or acceptable), independent of whether ethical or legal guidelines are in place, while others will judge one way or another depending on whether appropriate guidelines and effective regulations have been established.

We have decided to discuss the ethics of cloning-for-biomedical-research in the broader moral-philosophical context, rather than the narrower moral-political one that has taken shape around the current debate over anti-cloning legislation. Though we are mindful of the importance of these public policy debates—and will consider them in the following chapter—we do not want our moral analysis to be skewed by the specific legal or policy questions at issue, especially as the moral questions discussed here have implications beyond the current political debate and even beyond the question of human cloning itself. We opt to take up the moral questions in their fullness.

A second question about context is even more difficult to assess. Should we regard cloning-for-biomedical-research as just the latest—and continuous—step in trying to unlock the secrets of human development and to discover cures for diseases? Or should it be seen—instead or also—as the earliest stage of a revolutionary new science of enhancement or eugenics, which will go beyond treating individuals with disease and disability to attempt engineered improvements in human genetic endowments? Because innovations like cloning come to us gradually and piecemeal, and because it cannot be known in advance how exactly they will be used or where they might lead, there is a temptation to stay close to the present and to ignore possible future implications.

Yet the alleged perils of going ahead with the research are arguably no more speculative than the promised benefits. And it would be morally and prudently shortsighted for this Council, charged with investigating “the human and moral significance of advances in biomedical science and technology,” to refuse to think about where this research might lead. We will therefore consider, even if we cannot know in advance, whether and how the sort of genetic manipulation of embryos exemplified by cloning-for-biomedical-research is new or “revolutionary.” Genetic therapy for existing diseases and non-therapeutic genetic modifications of our native endowments raise profoundly different questions. Accordingly, we will keep in sight not only the moral questions surrounding the *means* of cloning-for-biomedical-research—which is to say, the significance of using or not using nascent human life as a resource—but also the possible *ends* to which our expanding knowledge and capacities might be put. At the same time, we will be careful not to equate genetic medicine that is truly in the service of human life with genetic manipulation that is not, and to avoid both the unjustified fear and exaggerated promises that sometimes accompany biomedical progress.

A third difficulty concerns the relation between the ethics of research on embryos (cloned or not) and the ethics of abortion. For many people, these issues are linked, and there is doubtless an overlap in the moral questions involved. Yet the issues are, in important respects, quite distinct. In the case of abortion, the fetuses whose fate is at issue are unwanted and (usually) the result of unintended conception. The embryos produced for research are wanted, indeed deliberately created, with certain knowledge and intent that they will be used and destroyed. More important perhaps, the extra-corporeal embryo (whether produced specially for research or left-over in IVF procedures) does not exist in conflict with the wishes, interests, or rights of a woman who is pregnant. Also, although abortion is widely practiced, each decision to abort is made one at a time, case by case. In contrast, to embark on creating cloned embryos only for purposes of research is to countenance at one stroke the large-scale production of developing human life for routinized use and destruction. For

these reasons, we shall try to consider the question of the ethics of research on embryos in its own terms, distinct from the ethical questions about abortion.

Finally, there is the question of the spirit in which this examination should be conducted. Reflecting the situation in American society, there are major differences within the Council regarding the morality of research involving early human (cloned) embryos. These differences turn largely, though not exclusively, on different judgments regarding the nature and moral status of the early human (cloned) embryo: namely, to what extent is it, or is it not, "one of us," a human life in process? Having explored these questions collegially among ourselves, we have come to think that *all* parties to this debate have something vital to defend, something vital not only to themselves but *also to their opponents in the debate*, and indeed to all human beings. No human being and no human society can afford to be callous to the needs of suffering humanity, cavalier regarding the treatment of nascent human life, or indifferent to the social effects of adopting in these matters one course of action rather than another.

We believe, therefore, that we can make our best contribution to a truthful and appropriate moral understanding of the issue by developing, in a single document, the moral cases both *for* and *against* proceeding with cloning-for-biomedical-research (and also articulating, where necessary and as clearly as possible, important differences within each of these cases). Each Member of the Council has been asked to help strengthen the case made for both sides, regardless of which side he or she inclines toward. By proceeding in this way, we hope to make clear to the President and the nation exactly what is morally and humanly at stake in the controversy and what may be gained *and lost* in whatever choice is finally made.

Thus, notwithstanding our differences, we stand together as the authors of the entire chapter, hoping by this means to shed light rather than heat on this most vexing of moral and policy questions. At the same time, we have tried fully and fairly to articulate our differences, and to do so by speaking, in the first person,

as members of a deliberative body called upon to make our own best judgments. *This means that the “we” that now embraces all Members of the Council will stand in the particular sections presenting the moral case for and the moral case against cloning-for-biomedical-research (Parts III and IV, respectively), only for those among us who subscribe to the specific arguments being made in those sections. In other words, each opinion is a self-contained brief, representing not the Council as a whole but only a portion of the Council. And even within the cases for and against, Members of the Council disagree over matters of substance and emphasis.* But while the Council has strong differences of opinion, as delineated in the sections that follow, the Council speaks in a single voice in its affirmation that the debate must not be won by dismissing, ridiculing, or demonizing the other side. Important human goods are to be found on all sides of the debate, a fact too often overlooked.

We begin, in Part II, with a discussion of the human meaning of healing, for it is only by an analysis of this uniquely human activity that the contours of the debate over cloning-for-biomedical-research can be properly traced and understood. Here the Council speaks as one. What follows this framing discussion are two separate opinions: in Part III, a portion of Council Members make the moral case for biomedical research; in Part IV, a portion make the opposing moral case against. Going beyond just listing the arguments, pro and con, each opinion is a sustained attempt at moral suasion. Yet each opinion, by self-imposed stricture, has tried to respect and respond to the legitimate moral concerns of the other side and to indicate how it means to do them justice. Each has tried to address what is owed to embryonic human life, what is owed to suffering humanity, and what is owed to the moral well-being of society. This approach to public moral discourse is, we are well aware, an experiment. Whether it is successful or not is for the reader to judge.

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II. The Human Meaning of Healing

Before presenting the two opinions, we will place the moral questions surrounding cloning-for-biomedical-research in their larger human context. Just as we did in discussing the ethics of cloning-to-produce-children, we step back from the particular technological possibility at hand to look carefully at the larger human goods that we seek both to serve and defend. We look specifically at the human meaning of healing the sick and aiding the suffering, as well as the spirit and practice of biomedical research that aims to make such healing possible. This exploration will better prepare us to see what is humanly at stake in our moral judgment about cloning-for-biomedical-research, and to face soberly both what is gained and what is lost in either proceeding or not proceeding. The subsequent moral arguments, both pro and con, are informed by these larger reflections.

To be human is to be mortal. To be alive is to be vulnerable to suffering. No one is better situated to appreciate these truths than the physician. To understand what it means to heal, one must therefore understand the doctor's special encounter with human suffering—as both an experience (a crying out) of the patient who lies before him and as a central mystery of human existence. Why do human beings suffer? Why do they suffer in ways that cannot be explained—entirely or perhaps at all—with human notions of justice? In this role, the doctor is sometimes a *messenger* of human finitude. He must tell patients that their days are numbered or that their time has come; he must tell grieving family members that death is at the door. But the healer is also and more importantly—in the eyes of both doctor and patient—a *deliverer*. Not only is he well armed to deliver us from specific maladies and miseries. He is also a much-needed ally against the deadly disease—traditionally regarded as a sin—of despair. Because of the moral aspirations of his calling, the physician is a trusted source of hope that the living might yet still live and that in his skill and the powerful techniques of modern medicine might lie the possibility of renewal. The doctor is, at different times, a reminder of the intractable sadness of human life, but

also explicitly a conqueror who beats back suffering and disease with the saving hand of medical knowledge and technique, and who inspires us with hope to go forward even in the absence of cure and relief.

Until roughly the second half of the twentieth century, physicians delivered more hope than cure, and they conquered few diseases. Since then, their arsenal against disease (at least in technologically advanced nations) has grown enormously, and it promises to grow greater in the decades ahead. New healing powers will surely emerge from the work of medicine's ally, biomedical research, firmly grounded in the principles and methods of modern biomedical science. This noble field of human endeavor also has a context in the larger domain of human life. Celebrating its achievements and eager for its gifts to human welfare, modern societies embrace and invest heavily in medical research and grant scientists great freedom to inquire and experiment. Because of the way science advances, freedom is crucial to the successful realization of its goals.

Dr. William Osler, one of the founding figures of modern medicine, described the aspirations of biomedical research as follows:

To wrest from nature the secrets which have perplexed philosophers in all ages, to track to their sources the causes of disease, to correlate the vast stores of knowledge that they may be quickly available for the prevention and cure of disease—These are our ambitions.¹

It is in the very nature of a “secret” that one cannot know in advance which areas of research and discovery will prove the most fruitful. One proceeds by trial and error. One makes hypotheses grounded in what is already known, in the effort to discover what remains a mystery. One begins with basic research into disease processes and mechanisms, in the hope that new knowledge will yield new medicines and new cures.

One motive for such research is simply the love of knowledge itself—the distinctively human desire to know, to see, to understand more than one already does. But biomedical research is also guided, above all, by the humanitarian desire to apply new knowledge in the service of those who suffer, to correlate knowledge that it “may be quickly available for the prevention and cure of disease.” Biomedical scientists aim to weld the virtues of charity, beneficence, and responsibility to the human ambition to “wrest from nature” her secrets. This is the moral heart of both the medical profession and the research tradition that supports it: to do everything in our power, consistent with law and morals, to provide cures, amelioration, and relief to those who need them.

“Consistent with law and morals”: this requirement qualifies “everything in our power.” This limitation has been traditionally understood to be part of the healing vocation. Moral philosophers and philosophers of medicine have long held that the duty to heal is an “imperfect duty,” meaning that it does not trump all other considerations. Physicians perhaps understand this best of all, learning their limits empirically from their encounters with patients whom they cannot save or even comfort. The duty to heal *this* patient, *at this time*, is also an imperfect one. After all, a cure for one person at the direct expense of another—for example, harvesting a vital organ from someone who is living to save someone else who is dying—would violate the first principle of medicine to “do no harm.”

It is also true that scientific freedom and medical progress are not the only human goods worthy of our commitment and protection. Research must be judged both by the means it employs and by the ends it serves (both those that were intended and those that were not). The Nuremberg Code, the Helsinki Declaration, and the Belmont Report, discussed in the last chapter, are all efforts to set moral limits on biomedical research and to ensure that science serves human beings rather than the other way around. Among other things, these ethical codes embody the recognition that those who do research *about* human beings can never escape (nor should they) their status *as* human beings.

Those who investigate human biology are always both the *knowers* and *the subject that is known*, both the potential healers and the potentially afflicted. And therefore they must never treat that which is their equal—their fellow human beings—as something less than human.

But in the end, however imperfect it is as a duty and whatever its less than supreme place among all other human goods, the obligation to heal and to seek remedies is a powerful one. It is a mark both of man's natural limits (as the being in need of healing) and his capacity for goodness (as the being who heals). And so, the freedom of inquiry that makes biomedical research possible should be restricted only for the most important reasons, lest we do damage to the entire enterprise, or to the human beings and the society that benefit from the "vast stores of knowledge" it creates.

At the same time, however, those who have accepted the "healer's covenant"—and those who defend, engage in, and benefit from the research that improves and expands the human capacity to heal—must avoid the seduction of medical triumphalism: the belief that all human suffering, both physical and psychic, can be conquered by modern technique, and therefore that no form of biomedical research should be opposed. Doctors and scientists must not become partial human beings who evade moral responsibility by claiming that they are not qualified to judge the moral implications of their own medical research or, worse, that medically beneficial research is always self-justifying, and hence that there are no real moral dilemmas at all. In addition, they must avoid the cruelty of creating false hopes among patients and their loved ones, and the folly of creating messianic or utopian visions of what science and medicine can accomplish. And patients, even as they heroically fight against suffering, must not forget their own mortality—including the often unpredictable nature of how and when death comes.

These reflections point to the following conclusions: In judging the moral beneficence and moral hazards of medical research, we must remember that suffering should not be opposed by any

means possible. We would be less than human if we did not desire to alleviate such suffering, but we would be imagining ourselves to be more than human if we thought and acted as if we could alleviate it once and for all. Rather, we must acknowledge that as human beings we live in a difficult “in-between.” Whether as doctors, scientists, or as patients, we all wish for the possible renewal of life through medicine, but also acknowledge that suffering and mortality are part of being alive. We are morally obliged to seek relief of suffering, but only in ways that preserve our humanity.

With these realities in mind, this chapter will now take up the ethics of cloning-for-biomedical-research, and specifically the moral and human questions raised above: What is owed to those who suffer from debilitating injuries and diseases? What is owed to nascent human life? And what is owed to the moral well-being of society? These are the central questions in the debate, questions that Members of the Council over the past year struggled to answer, and that indeed every member of society must ponder when considering the ethics of cloning-for-biomedical-research.

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A note about how the remainder of the chapter proceeds: Part III, delivered in the voice of some Members of the Council, makes the case for going forward with cloning-for-biomedical-research. Part IV, delivered in the voice of other Members of the Council, presents the opposing case, the argument against cloning-for-biomedical-research.

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III. The Moral Case for Cloning-for-Biomedical-Research

The moral case for cloning-for-biomedical-research can be stated in the following straightforward way: American society and human communities in general have an obligation to try to heal the sick and relieve their suffering. This obligation, deeply rooted in the moral teaching of “love of neighbor,” lies heaviest on physicians and health-care professionals who attend to individual patients. But it guides also the activities of biomedical scientists and biotechnologists whose pioneering research and discoveries provide new and better means of healing and relieving those who suffer. Research on cloned human embryos is one more path to discovering such means. Like embryonic stem cell research, to which it is partially related, it offers a promising approach to gaining knowledge and techniques that could lead to new treatments for chronic genetic or acquired degenerative diseases and disabilities.² If successful, it could help save countless human lives and ameliorate untold human suffering.

It is true that human cloning-for-biomedical-research raises ethical questions, mainly because it involves the production, use, and destruction of cloned human embryos. It is also true that cloned embryos produced for research could be used in attempts to produce cloned human children, and the availability of such cloned embryos for research and the perfection of cloning techniques might increase the likelihood that people will succeed in cloning children. We appreciate the concerns of people who voice these objections and risks, and we are prepared to accept certain limits and safeguards against possible abuses. Yet we believe that, on balance, the objections to cloning-for-biomedical-research are outweighed by the good that can be done for current and future individuals who suffer. The moral balance lies on the side of endorsing and encouraging this activity.

We who endorse cloning-for-biomedical-research will attempt to make a version of this case here. But we will do so, for the most

part, in a somewhat different spirit, one that is informed by the discussion of healing just concluded. In moral debates about these matters, people often speak as if saving lives is the only value that counts and that everything else must be sacrificed to advancing potentially beneficial research. Others speak as if any failure to prevent death or suffering from disease is sinful. Our defense of cloning-for-biomedical-research is more complex and nuanced and, we believe, more true to the merits of the case in question. As we make our case, we will also confront—and accept—the burden of what it means to proceed with such research, just as those who oppose it must accept the burden of what it means not to proceed.

In making our case, we begin in Section A by summarizing the specific medical benefits that might be achieved by proceeding with this avenue of research. We then consider in Section B the moral dilemmas of this research. However, among those of us who believe the research should go forward there is disagreement about how seriously to take certain moral objections, and thus two distinct positions for proceeding are presented.

A. The Medical Promise of Cloning-for-Biomedical-Research

Many people suffer from chronic debilitating diseases and disabilities, including, among others, juvenile diabetes, Parkinson's disease, Alzheimer's disease, spinal cord injuries, heart disease, and amyotrophic lateral sclerosis. These terrible diseases shorten life, limit activity (often severely), and cause great suffering both for the afflicted and their families. The inspiring example of exceptional persons who bear bravely the great burdens of illness or injury should not blind us to the powerful warrants for research and therapy that might lift these burdens. The likelihood of premature death, in particular, can shadow the life of the patient and the patient's family even before it arrives, and its advent can impoverish and devastate families, dash hopes, and cast a chill on the lives of survivors. It is certainly admirable to confront, endure, and redeem these unchosen afflictions. But it is also admirable, where possible, to ameliorate through

also admirable, where possible, to ameliorate through research and medicine the diseases and injuries that cause them.

Cloning-for-biomedical-research may offer unique ways of investigating and possibly treating several of these diseases. To unlock the secrets of a disease, scientists must explore its specific molecular and cellular mechanisms, carefully observing both normal and pathological development. This research could be greatly facilitated by in vitro cellular models of human disease. It is here that the potentially most valuable and unique benefits of research on cloned human embryos may lie. This section summarizes some of these benefits, with specific examples.

1. Cloning to Improve Understanding of Human Disease

The creation of cloned embryos using nuclei from individuals carrying genetic mutations—specifically, genes that predispose them to particular diseases—might be used to better understand and treat those diseases. Consider, for example, Parkinson's disease. A characteristic of Parkinson's disease is the aggregation in dying brain cells of a protein called alpha-synuclein. Two different mutations in the alpha-synuclein gene produce forms of the protein that aggregate more readily. Individuals carrying these gene mutations suffer from early-onset Parkinson's disease.

To study how genetic disease develops, scientists look for suitable laboratory models. One strategy for producing such disease models is to inject the disease-causing human genes into human or animal cells in tissue culture to produce a cell-system expressing the abnormality. Although it has been possible to introduce copies of mutant genes into various kinds of human and animal cells, the resulting in vitro cell-systems imperfectly model the human disease. In part this is because the behavior of specific proteins within cells is influenced by their interactions with other cellular proteins. For example, human alpha-synuclein in a mouse cell cytoplasm interacting with mouse proteins is unlikely to behave the same way that it does in a human cell surrounded by human proteins. To study human disease, it is generally preferable to work with human cells and tissues.

A preferable alternative to introducing mutant genes into normal cells is to begin with human cells that are already abnormal—in this case, cells carrying the mutant genes that predispose their bearers to Parkinson’s disease. If one could obtain embryonic stem cells derived from cloned embryos produced using nuclei from individuals carrying these mutant genes, one could then stimulate them to differentiate into dopamine-producing nerve cells in vitro. These cells would provide a vastly improved model for understanding the metabolism of alpha-synuclein and its role in the development of Parkinson’s disease.* In this example, the availability of improved in vitro models for genetic and neurodegenerative diseases could shorten the time required to understand them and to devise new treatments.

It is true that adult stem cells (or multipotent adult progenitor cells^{3,4}), isolated from patients carrying the mutant genes that predispose them to Parkinson’s disease, might also be stimulated to become dopamine-producing neurons in vitro. But there are unanswered questions about the ease of culture and long-term viability of such cells, and the likelihood of success with cellular models of disease derived from adult stem cells remains unknown. In the absence of a certain and superior alternative, it would be wrong to forgo the possibly unique benefits of cloning for disease research.

2. Cloning to Devise New Treatments for Human Diseases

The same cellular model systems used to study disease processes are also potentially useful for assessing and developing chemical or pharmaceutical treatments for the disease in question. To continue with the Parkinson’s disease example, neurons derived from stem cells containing the alpha-synuclein aggregation muta-

* Once such cells were produced in one laboratory, they could be stored at low temperatures and supplied to other laboratories for study. And so, for at least this particular area of cloning-for-biomedical-research, it might not be necessary to perform the cloning experiment more than a few times for each disease, making it possible that the number of cloned embryos required will be limited.

tions would be very useful for testing compounds that might prevent aggregation of this protein. Chemicals that effectively prevented aggregation in this model system could be useful starting points for the development of new drugs for the specific treatment of Parkinson's disease. Here, too, neuronal cell-systems derived from adult stem cells carrying the mutations might serve as well as those derived from cloned embryonic stem cells. But there is no way of knowing in advance which of the alternative routes is more promising. From a medical and scientific point of view, research on cloned embryos may offer unique benefits.

3. Cloning to Produce Immune-Compatible Tissues for Transplantation

Some animal studies suggest that tissues derived from embryonic stem cells can, if injected under certain conditions, populate disease-stricken areas and differentiate so as to compensate for the loss of function caused by the diseased tissue. For example, liver or heart muscle cells injected into an animal with liver or heart disease could help regenerate the diseased tissues and restore normal function. But these cells would have a chance to do this only if they can survive the normal immunological rejection response to foreign material. Cloning-for-biomedical-research offers the possibility that scientists could someday generate individualized, "rejection-proof" replacement cells and tissues to help patients fight disease and restore health. Stem cells and tissues derived from an embryonic clone of the patient would have the same genes as the patient, and so, hypothetically, would not be rejected by the patient's body as foreign.

It is true that this possibility (what is sometimes called "therapeutic cloning") remains unproved.* As before, there may be alternative (nonembryonic or adult) sources of such "rejection-proof" stem cells and tissues derived from them. And there is ongoing research to circumvent the rejection problem altogether, by, for example, modifying the surface of an unrelated (embryonic) stem cell so as to enable it to escape detection as "foreign"

* See Chapter Four, in the section on stem cells and regenerative medicine.

tissue when transferred to patients for therapy. But, once again, it is too early to say which approach will work, and therefore it is important, from a medical and scientific perspective, not to close off any avenue of promise. The only way to verify this hypothesis is to try it—first in animals, then in human volunteers.

4. Cloning to Assist in Gene Therapy

Cloning techniques could also be combined with precise genetic manipulation to devise genetic treatments for genetic diseases. For example, a cloned embryo produced from a patient with severe combined immunodeficiency could be genetically modified to correct and repair the disease-causing mutation. Stem cells taken from the genetically modified cloned embryo might then be used to develop bone marrow stem cells to transplant back into the patient. This combined approach to gene therapy has shown early promise in one attempt to correct a genetic abnormality in the immune system of mice.⁵

B. Possible Moral Dilemmas of Proceeding

The potentially unique medical benefits of cloning-for-biomedical-research are, to those of us who favor it, abundantly clear. Yet the moral meaning of proceeding, still to be considered, is the subject of some debate among us. Most of us who favor proceeding believe that this area of promising research is nonetheless fraught with moral quandaries and ethical trade-offs; a minority of us do not share these concerns. The minority view, labeled Position Number Two, follows the principal moral case for cloning-for-biomedical-research under strict limits, designated here as Position Number One. Each opinion is presented in turn.

1. Position Number One

What makes this research morally controversial is that it involves the production, use, and intentional destruction of cloned human embryos. To determine whether or not the science should proceed—or, if it does, what limits should be placed on this re-

search—it must be asked what, if anything, is owed this nascent form of human life. Only then can an evaluation be made of whether the possible benefits of this research justify its potential human cost. Other moral hazards must be considered that are either inherent in, or possible consequences of, this line of research. These hazards include the following: the possibility that cloned embryos will be developed and experimented upon beyond the blastocyst stage (the stage from which stem cells are taken); the possible exploitation of women who would be donors of eggs; the possibility that the production of cloned human embryos will lead—intentionally or unintentionally—to cloning-to-produce-children; and the possibility that engaging in such research will weaken or undermine society’s respect for human life, and therefore undermine the very good (life) that it is meant to serve. Each of these moral challenges will now be addressed.

(a) What is owed to the cloned embryo? The subject of the moral status of developing human life is a difficult and controversial matter, one about which American society is and appears likely to remain deeply divided. We are well aware of the fact that we cannot do it full justice in the present context. Yet we believe that the moral defense of cloning-for-biomedical-research requires a consideration of what is owed nascent human life (cloned or not). There is also the question—considered at great length in Chapter Three—of whether cloned embryos are the moral equivalent of fertilized embryos, or whether the different nature of their origins and the uncertainty of their capacity to become full human beings means that our moral duties to them are somehow different.

Nevertheless, those who wish to defend cloning-for-biomedical-research—as we do here—must consider what is owed to *embryos as such* as well as the significance of the fact that the embryos in question would be *cloned*. That said, the relevant arguments, especially in this subsection and the next, are in most crucial respects the same as those regarding the treatment of embryos produced by IVF.

Let us be clear about what we are talking about when we speak of cloned *embryos*. We are talking about the very earliest stages in development, from the single cell product of SCNT, through the early cleavage stages, up to the blastocyst stage. This is a structure comprising some 100 to 200 cells not yet differentiated into specific tissues, let alone organs (though there is differentiation into inner cell mass and trophoblast; see Chapter Four). It is true that the embryos at the blastocyst stage, if implanted in a woman's uterus or (hypothetically) an animal or artificial womb, could be made to develop to later stages, and this potentiality must be taken into account. But it is important to keep in mind the primitive and undifferentiated condition of the embryonic stage that is relevant for the research in question.

We begin with a series of questions: Is destroying an embryo or cloned embryo at the blastocyst stage morally the same as killing a child? Is it the same as clipping a fingernail? Is it more like one of these acts than the other? Is it like neither? Does the moral status of an embryo depend on whether it is implanted in a woman's uterus or remains in a laboratory? Does the moral status of an embryo depend on its origins, or how it was produced? Does it depend on the motives of those who create it?

In our view, embryos have a developing and intermediate moral worth, such that the early human embryo has a moral status somewhere between that of ordinary human cells and that of a full human person. We acknowledge the difficulty of setting perfectly clear lines marking when an embryo's moral status goes from "less than a human person" to "like a human person" to "fully a human person." But we believe there are sound moral reasons for not regarding the embryo in its earliest stages (certainly in the first fourteen days) as the moral equivalent of a human person, though it does command significantly more respect than other human cells. We also hold that the embryo can be used for life-saving or potentially life-saving research while still being accorded the "special respect" it deserves, and while still preventing abuses such as research on later-stage embryos or fetuses or the production of cloned children. We will develop this view by taking up the significance of (i) twinning, (ii) implanta-

tion, (iii) the human form, and (iv) the notion of “special respect.”

- (i) *The possibility of twinning.* First, it is still unclear in the initial fourteen-day period whether an embryo will develop into one or more human beings. The possibility for “twinning” is still present, suggesting that the earliest-stage embryo is either *not yet* an individual or is a being that is not confined to becoming *only one* individual. There are continuing philosophical debates about how to understand what happens in twinning: for example, whether one individual embryo “clones” itself to produce a second, or whether an organism that resembles (but is not *yet*) an individual embryo divides into two truly individual beings.* Nevertheless, the biological—and we believe moral—significance of the possibility for twinning is clear: after fourteen days (or after the primitive streak is formed), the being in question *can no longer be anything but a single being*—that is to say, no embryo after this stage, and thus no fetus or live-born baby, can replicate or divide to form another identical being. Before fourteen days, this possibility remains.
- (ii) *The moral significance of pregnancy and implantation.* Both IVF embryos and cloned embryos in vitro differ from comparable embryos conceived through sexual intercourse, for two reasons. First, the possibility for pregnancy with IVF or cloned embryos requires human assistance—that is, it requires the medical procedure of transferring an embryo into the woman’s uterus. There is thus no possibility of the IVF or cloned embryo becoming a human child in its original in vitro environment. Second, embryos that are conceived through sexual intercourse have a direct physical connection with the individual women who carry them, whereas an in vitro embryo (cloned or not) has no such connection unless it is trans-

* In the first case, human individuality would be present from the start, in the second case, it would not, a morally significant distinction to some people.

ferred into a woman's uterus. Thus, transfer of cloned or IVF embryos into a woman's uterus is a significant moral step, insofar as such embryos cannot be removed—they can never again be held in human hands—without a direct physical intrusion or violation of the pregnant woman. Of course, it might become technologically possible in the future for in vitro embryos to develop beyond the blastocyst stage—and perhaps even to birth—without implantation into a woman's uterus (that is, in an artificial womb). Moreover, just because those embryos (cloned or not) that exist in vitro cannot continue to develop in a self-directed way beyond the blastocyst stage—that is, they require human artifice of some kind to develop further—does not mean that the preimplantation embryo is morally insignificant. But implantation does mark a significant point in these two respects: after implantation, self-direction toward birth (without external human artifice) becomes *possible* and external human control of embryos becomes *impossible* without intruding upon or violating the pregnant woman.

- (iii) *The significance of the developed human form.* Generally speaking, our moral sentiments respond very differently to the prospect—or the sight—of the destruction of an embryo and the murder of a child. In other words, there is a difference between *what we respect* and *what we consider inviolable*. The destruction of embryos might inspire concern or solemnity. In contrast, our reaction to the murder of a child would be one of horror, outrage, grief, and violation. James Q. Wilson has discussed how these two fundamentally different moral reactions change as the embryo develops into a fetus and then into a child—and correspondingly, how our concern and solemnity transform into horror and outrage.⁶ Specifically, human beings exhibit a distinctly different moral sympathy for, and therefore greater willingness to protect, those organisms that have begun to resemble human beings in their developed form. The practice of sacrificing the life of the unborn in order to save the life of the pregnant

woman—while not a moral parallel to the case of using cloned embryos for biomedical research—shows that there is some moral precedent for subordinating nascent human life to more developed human life. Of course, taken to an extreme, such a principle would justify the most grotesque uses of developing human fetuses for scientific experiments. Moreover, the case is not strictly analogous, for in the case of the pregnant woman, two lives are in conflict, a confrontation absent with free-standing embryos. We do not take the life of woman A's unborn fetus to save the life of woman B, not even with consent. But these difficulties notwithstanding, there is (again) a moral insight in this example. It demonstrates the important moral obligation of caring for those who already dwell among us, and the inevitable moral complexity of weighing different forms of human life, especially nascent and developed human life, against one another. It also suggests ways in which the claim on our protection may increase with the emergence of powers of awareness and suffering. Of course, such examples—and our moral sentiments in general—are not by themselves decisive. They are the beginning, not the end, of reasoning about our moral responsibilities. But they should also not be ignored for what they reveal about the nature of particular beings and particular acts—and in this case, for what they suggest about both the *developing* and *intermediate* status of the early human embryo.

- (iv) *The meaning of “special respect.”* Finally, there is the question of whether it is possible to accord early-stage embryos “special respect” while still using them for biomedical research. We might reason here by an admittedly imperfect analogy. Various religions have rules governing the killing of animals for food. These exist in part to restrain cruelty. But they also serve to demonstrate respect for beings that command our affections and our wonder, because they are (like us) part of the mystery of existence. In a similar way, many hunters have a deep-rooted respect and even affection for the animals they

kill. This is not to say that human embryos are the same as animals, because, in our opinion, they are indeed human organisms, if not fully developed human beings. But it is to show that there might be ways both to respect beings and to use them—for serious, not frivolous, reasons, and as part of our place in the order of being, not simply as an extension of our subjective will.

For the above-stated reasons, we would assign an intermediate and developing status to the human embryo. Those who treat the developing early embryo as nothing more than “mere cells” (see Position Number Two below) are in danger of ignoring its direct and inherent connection to the profound mystery of the origins of human life and seem willing to ignore the fact that an embryo will (and a cloned embryo might) eventually become one (or more) human being(s). This view greatly underestimates the moral seriousness of the question of whether to proceed with research on nascent human life. And it gravely mischaracterizes the meaning of potentiality—specifically, the difference between having the capacity to become anything at all (a pile of building materials, for example) and the capacity to become something in particular (an individuated human person or persons).

At the same time, those who believe that early-stage embryos are the moral equivalent of a human person (see Part IV below) are also, we believe, misguided. Just as we must listen to—and then articulate—the moral meaning of our disquiet at the idea of cloning-to-produce-children, we must listen to and articulate our fundamentally different moral responses to the destruction of an embryo on the one hand and the murder of a child on the other. While no single criterion like “appearance,” “self-consciousness,” “the capacity to express needs and desires,” or “the capacity to feel pain” can by itself be decisive in conferring human dignity, the absence of all such criteria in the early-stage embryo or cloned embryo suggests that it is not a truly human being, but something different, commanding our respect because of what it is and may become, but yet not fully one of us.

In sum, what is owed the embryo is not the same protections, attachments, and rights as a human person; nor is it no respect at all. In making the decision to proceed with research on embryos or cloned embryos, we must do so only for the most compelling reasons—namely, the reasonable expectation that such research will save human lives—and only with eyes open to the moral burden of doing what we believe to be morally best. Even as we establish the biological and moral grounds for using human embryos in certain forms of research, we must face and accept the solemnity of what we propose. Finally, we must proceed with the paradox that accompanies all human suffering and human imperfection in full view: that sometimes we seem morally obligated to do morally troubling things, and that sometimes doing what is good means living with a heavy heart in doing it.

(b) The problem of deliberate creation for use in research. We next address whether the creation of embryos explicitly for the purposes of biomedical research presents additional ethical problems, beyond those just examined. In the case of research on cloned embryos, this form of deliberate production and destruction—rather than the use of leftover embryos initially created for reproductive purposes—is the only means of proceeding, if, at the same time, society prohibits cloning-to-produce-children. It is one thing to overcome the respect owed to an already existing embryo that would die even if not used for research. It is, some argue, quite another thing to bring the embryo into being solely for use and exploitation in research. Willing to accept the first, they reject the second.* In this connection, three issues seem worth considering.

First, the fundamental moral judgment about whether to proceed with cloning-for-biomedical-research must be grounded in

* See, for example, “The Ethics of Stem Cell Research,” by Gene Outka, a paper presented and discussed at the Council’s April 2002 meeting. Outka extends the principle “that nothing more be lost” to justify use of excess IVF embryos in research, but argues that this principle cannot be used to justify *creating* cloned (or IVF) embryos explicitly for research (available online at www.bioethics.gov). A slightly revised version has been published in the *Kennedy Institute of Ethics Journal* 12(2), 175-213, 2002.

our judgment about the moral status of the embryos themselves, not the purpose of their creation. If an embryo or a cloned embryo had no moral standing, then creation for research and eventual destruction would present no moral problem. If the embryo or cloned embryo were morally the equivalent of a child, then regardless of how or why it was produced, experiments upon it would be morally abhorrent. But if, as we have just argued, an embryo or a cloned embryo has a developing and intermediate moral status, certain worthy uses of them may be justified regardless of how and why they were produced. Because the use of stem cells from cloned embryos may in the future provide treatment for serious human diseases, the creation of cloned embryos and their subsequent disaggregation to isolate stem cells can be justified.

Second, the moral responsibilities for producing new embryos *solely* for research and for producing extra IVF embryos *later used* in research are not really so different. In the case of IVF and leftover embryos, the individuals who create them for reproductive purposes typically and deliberately create more embryos than they are likely to use, and therefore know in advance that some will probably be destroyed. It is true that they are produced with the intent of initiating a pregnancy and that the embryo wastage is not all that different from what obtains in efforts to conceive *in vivo*. But the moral responsibility for production, use, and destruction of leftover embryos are finally no less than for deliberate production for use (and subsequent destruction in research). (We acknowledge that some who accept this logic come to the opposite conclusion—namely, not that cloning-for-biomedical-research is morally permissible but that IVF should be morally restricted to creating one embryo at a time, if permitted at all.)

Third, in both cases—creating embryos to aid fertility or creating embryos for biomedical research—the ultimate goal is something humanly good: a child for an infertile couple or research that holds promise for curing debilitating diseases and easing suffering. Thus, in the case of cloning-for-biomedical-research, it is wrong to argue, as some do, that embryos are being “created

for destruction.” Certainly, their destruction is a known and unavoidable effect, but the embryos are ultimately created for research in the service of life and medicine.

In the end, while we acknowledge the risk of turning nascent human life into a “resource”—fully separate from its intrinsic connection to human procreation—we hold that the concern over deliberate creation and destruction is misplaced. What matters instead is whether a proper regard is shown for the created embryos, and therefore whether a proper moral and legal framework can be established that limits and governs their use in accordance with the respect they are owed as *human* cloned embryos.

(c) Development and use of cloned embryos beyond the earliest stages. A perceived danger of allowing cloning-for-biomedical-research is that some researchers will develop cloned embryos beyond the blastocyst stage for research purposes. There are good scientific reasons and even moral arguments for doing so: one could learn much more about development, normal and abnormal, by going to later stages; and differentiated tissues taken from cloned fetuses would likely be more useful in regenerative medicine than stem cells. There is already at least one animal study showing the potential of this approach.⁷ Transplantable functioning kidney tissue has been attained from six-week-old cloned cow fetuses, developed from cloned cow embryos transferred into a cow’s uterus for partial gestation. Cloned human embryos might be developed past the blastocyst stage by implantation into an animal or human uterus, by the development of artificial wombs, or by advances in sustaining nascent human life in vitro.

This is a serious concern for those of us who believe that the cloned embryo has only an intermediate moral status and who also recognize the difficulty of drawing bright lines for when developing human life changes from “less than a human person” to “like a human person” to a “fully developed person.” Clearly, the longer cloned embryos are allowed to develop, the more severe the moral burden in using them. And at some point, the moral burden of proceeding becomes a moral obligation not to

proceed—even if significant medical benefits might be gained from doing so. In such circumstances, the medical principle of “do no harm” must override the researcher’s desire to do good, lest we undermine the humanistic principles and spirit of the entire medical enterprise.

The moral tradition of “erecting a fence around the law”^{*} may provide a useful guide in this case. We recommend that research on cloned embryos be strictly limited to the first fourteen days of development—a point just about when the primitive streak is formed and before organ differentiation occurs. We acknowledge that by erecting the fence more widely, we might be more certain to prevent this particular abuse (developing cloned embryos beyond the blastocyst stage). We also acknowledge that relaxing this limit to permit research beyond fourteen days might yield additional medical benefits. There is a moral burden in both directions. But we hold that there is a point of development beyond which research on nascent human life is morally intolerable no matter what the potential medical benefits. By raising a permanent fence at fourteen days, the dignity of human life will be sufficiently protected.

(d) Exploitation of women who are egg donors. Additional concerns in proceeding with cloning-for-biomedical-research are the possible dangers to, and exploitation of, women who are egg donors. The removal of eggs remains an unpleasant and (owing to the hormone treatments needed to hyperstimulate the ovaries) a risky medical procedure for women. It is therefore restricted mostly to circumstances where such a procedure is necessary to treat infertility—that is, where the women themselves are the beneficiaries of the procedure. Moreover, one possible avenue of cloning-for-biomedical-research—namely, the creation and future use of in-

^{*} To increase the chances of keeping people from a serious transgression (the law), a prohibition is imposed (the fence) on activities that might lead or tempt one to commit it. For example, if the goal is to keep people from engaging in commerce on the Sabbath, one makes it unlawful for them to handle money on the Sabbath.

dividualized stem cells—would potentially require, if it became feasible, a very large and indefinite number of eggs.

These are genuine concerns. But they can be addressed by strictly adhering to the established body of ethics for research on human subjects. These ethical codes suggest the following requirements: regulation to prevent the creation of improper financial incentives for participating in such research; full disclosure by the users of human eggs of their practices; a commitment to consider using nonhuman eggs, so as to decrease the need for human egg donors^{*}; and strict limits on the uses of cloned embryos for only those investigations that uniquely require them.

(e) The connection to cloning-to-produce-children. The final moral concern is that cloning-for-biomedical-research will lead—intentionally or not—to cloning-to-produce-children. For the reasons described in Chapter Five, we believe that the creation of cloned human children would be unethical and that society has a moral responsibility to ensure that this does not happen. Thus we are obliged to consider whether the pursuit of cloning-for-biomedical-research is consistent with a serious commitment to stopping cloning-to-produce-children. A number of points must be considered.

First, the production of cloned embryos, even for research purposes, crosses a new line by bringing into existence for the first time forms of nascent human life that are asexually produced. Second, experience with producing cloned embryos for biomedical research might well improve the technique of cloning itself, and therefore result in the greater perfection of the first step toward cloning-to-produce-children. Third, cloning-for-biomedical-research means that cloned embryos would exist in laboratories where they could be available for efforts to initiate a pregnancy. Finally, a society that allows cloning-for-biomedical-

^{*} This means of reducing demand for human oocytes would imply increased SCNT of human nuclei into animal eggs, a practice that may bring additional moral questions. It was unanimously opposed by the National Institutes of Health Human Embryo Research Panel in its 1994 report (p. 82).

research, while setting strict legal limits on cloning-to-produce-children, will likely require the mandatory destruction of nascent human life.

The first concern is intrinsic to cloning-for-biomedical-research in itself. Are we a different society because we have brought asexually produced human embryos into existence? In some ways, perhaps we are. We are confronted by the scope of our powers to change human life, to alter human procreation, and to modify the nature of human origins and the genetic makeup of new life. But we are also reminded of what should be the animating purpose of that power: to cure disease and relieve suffering. We are reminded of both new and unique possibilities for human harm (from the production of human clones) and new and unique possibilities for human benefit (from research on cloned embryos). This is, we suggest, the meaning of crossing this line.

The second and third concerns are connected to where this research might lead: namely, to a perfected cloning technique and to the intentional production of cloned children. This is indeed a genuine concern. It is perhaps the case that the best way to prevent the production of cloned children is to prohibit the creation of cloned embryos. But in the end, we are not convinced that cloning-for-biomedical-research will inevitably lead to cloning-to-produce-children; rather, we believe that the best approach is a system of regulation that prevents such an abuse. Such a system would include: a legal ban on the implantation of cloned embryos in *any* uterus (human, animal, or artificial); a prohibition on developing cloned embryos beyond fourteen days; a requirement that any individual or group engaging in cloning-for-biomedical-research register with proper regulatory authorities; prior scientific review of all proposed uses of cloned embryos to judge their medical and scientific benefits; and strict accounting of all cloned embryos that are produced to prevent their removal from the lab of origin or their use in attempts at cloning-to-produce-children.

Of course, no system of regulation is perfect. There is always the possibility of malfeasance or error. The prudential question in this case is whether the likelihood of cloning-to-produce-children is increased—at all, slightly, or significantly—by allowing the production and use of cloned embryos for biomedical research. But there is also the question of whether some additional risk of cloning-to-produce-children is justified or tolerable given the human goods that might be achieved through cloning-for-biomedical-research. In our view, it is.

The final concern is that to pursue research on cloned embryos while preventing cloning-to-produce-children would require laws that mandated the destruction of nascent human life. In assessing the moral significance of this fact, we return to our judgment about the moral status of cloned embryos, what is owed to them, and whether the human goods that can be achieved by cloning-for-biomedical-research justify the real and potential human costs. In our view, the possible existence of a law requiring the destruction of cloned embryos at or before fourteen days of development would force moral clarity about what we are doing—and the burdens of doing it. Such a law might remind society of the ambiguity and limits of the efforts to “heal the world,” and therefore the dangers of trying to do so by any means possible. The need for such a law requiring the destruction of nascent human life would also remind us that there is a burden in acting just as there is a burden in not acting.

(f) Conclusion. The case for cloning-for-biomedical-research—as with all research that involves the use of nascent human life—should not consist simply of guessing how many people might be saved and how many embryos might be lost. The moral concerns cannot so simply be taken up, addressed, and retired. They are permanent concerns and permanent burdens.

We believe, in this particular case, that the promise of cloning-for-biomedical-research justifies proceeding, but that the genuine possibility of moral harm requires strict regulations of how we proceed. We have tried to articulate what such a system of regulation might include: (1) a legal requirement not to develop

cloned embryos beyond fourteen days of development and not to implant cloned embryos in any uterus, human, animal, or artificial; (2) the creation of a governmental oversight body to regulate individuals and groups who engage in this research, and to account for all cloned embryos that are produced so as to prevent their removal from the lab of origin or their use in cloning-to-produce-children; (3) a ban on commerce in living cloned human embryos; (4) adherence to the highest standards of the ethics of research on human subjects, especially when it comes to procuring eggs; (5) a prior scientific review of the proposed uses of cloned embryos to judge their unique medical and scientific benefits; and (6) continued research into possible non-embryonic sources of stem cells and tissues for developmental studies, and ways other than cloning to solve the immune rejection problem. Such regulations amount to much more than mere bureaucratic red tape. They embody a profound ethical insight—namely, that the means of serving human beings must never corrupt our responsibilities to human beings.

2. Position Number Two

A few of us who favor proceeding with cloning-for-biomedical-research have few of the ethical qualms expressed by our colleagues in Position Number One. It is our view that this research, at least in the forms and for the purposes presently contemplated, presents no special moral problems, and therefore should be endorsed with enthusiasm as a potential new means of gaining knowledge to serve humankind. Because we accord no special moral status to the early-stage cloned embryo, we believe that the moral issues involved in this research are no different from those that accompany many existing forms of biomedical research, requiring mainly the usual commitment to high standards for the quality of research, scientific integrity, and the need to obtain informed consent from, and to protect the health of, donors of the eggs and somatic cells used in nuclear transfer.

It is also our view that there are no sound reasons for treating the early-stage human embryo or cloned human embryo as anything special, or as having moral status greater than human so-

matic cells in tissue culture. A blastocyst (cloned or not), because it lacks any trace of a nervous system, has no capacity for suffering or conscious experience in any form—the special properties that, in our view, spell the difference between biological tissue and a human life worthy of respect and rights. Additional biological facts suggest that a blastocyst should not be identified with a unique individual person, even if the argument that it lacks sentience is set aside. A single blastocyst may, until the primitive streak is formed at around fourteen days, split into twins; conversely, two blastocysts may fuse to form a single (chimeric) organism. Moreover, most early-stage embryos that are produced naturally (that is, through the union of egg and sperm resulting from sexual intercourse) fail to implant and are therefore wasted or destroyed.

There is a moral precedent for using materials from early human embryos in the widely accepted practice of using organs from brain-dead human beings. Upon determination of death, and with permission from the next of kin, surgeons routinely harvest organs to save the lives of sick or dying patients. In a similar way, donors of somatic cells and human oocytes could justifiably grant a biomedical scientist permission to use cells derived from the resulting cloned five-to-six-day-old blastocyst, which also completely lacks a brain and a capacity for consciousness.

Some argue that the transplantation analogy is misleading, because a blastocyst has the potential to become a fetus and ultimately a child, whereas the brain-dead individual does not. But the *potential* to become something (or someone) is hardly the same as *being* something (or someone), any more than a pile of building materials is the same as a house. A cloned embryo's potential to become a human person can be realized, if at all, only by the further human act of implanting the cloned blastocyst into the uterus of a woman. Such implantation is not a part of cloning-for-biomedical-research, whose aims and actual practice do not require it.

Moreover, thanks to the results of nuclear transplantation research, there is reason to believe that every human cell has the

genetic potential to develop into a complete human being, if used in cloning efforts to produce a child. If mere potentiality to develop into a human being is enough to make something morally human, then every human cell has a special or inviolable moral status, a view that is patently absurd.

“Slippery slope” warnings that the use of early-stage cloned embryos for research would lead necessarily either to the production of cloned children or to research on later-stage cloned fetuses should be treated with skepticism. Appropriate regulations can easily be established and enforced to prevent any such abuses. Although the continuity of biological development means that there is no naturally given moment after which an embryo or fetus becomes a person, defensible boundaries can be set. It is perfectly possible to treat a blastocyst as a clump of cells usable for lifesaving research, while prohibiting any such use of a later-stage embryo or fetus.

Where to set the boundary is a matter for prudent judgment. For the foreseeable future, the moral line might be safely drawn at fourteen days of development, when no nervous system has developed and when a distinct identity as a single individual has not yet been preordained. Also, derivation of the valuable stem cells can be accomplished well before fourteen days. Whether society will be faced, in the future, with reason to reconsider such a line is for now a matter of speculation. If such an occasion ever arose, it would require an evaluation of the proposed scientific use and its likely medical benefits and a moral consideration of whether the research in question justified using embryos beyond the fourteen-day point.

* * *

IV. The Moral Case against Cloning-for-Biomedical-Research

Our colleagues who joined in Part III in making the case for cloning-for-biomedical-research began their analysis by describing the medical promise of such research. Those of us who maintain—for both principled and prudential reasons—that cloning-for-biomedical-research *should not* be pursued similarly begin by acknowledging that substantial human goods might be gained from this research. Although it would be wrong to speak in ways that encourage false hope in those who are ill, as if a cure were likely in the near future, we who oppose such research take seriously its potential for one day yielding substantial (and perhaps unique) medical benefits. Even apart from more distant possibilities for advances in regenerative medicine, there are more immediate possibilities for progress in basic research and for developing models to study different diseases. All of us whose lives benefit enormously from medical advances that began with basic research know how great is our collective stake in continued scientific investigations. Only for very serious reasons—to avoid moral wrongdoing, to avoid harm to society, and to avoid foolish or unnecessary risks—should progress toward increased knowledge and advances that might relieve suffering or cure disease be slowed.

We also observe, however, that the realization of these medical benefits—like all speculative research and all wagers about the future—remains uncertain. There are grounds for questioning whether the proposed benefits of cloning-for-biomedical-research will be realized. And there may be other morally unproblematic ways to achieve similar scientific results and medical benefits. For example, promising results in research with non-embryonic and adult stem cells suggest that scientists may be able to make progress in regenerative medicine without engaging in cloning-for-biomedical-research. We can move forward with other, more developed forms of human stem cell research and

with animal cloning. We can explore other routes for solving the immune rejection problem or to finding valuable cellular models of human disease.* Where such morally innocent alternatives exist, one could argue that the burden of persuasion lies on proponents to show not only that cloned embryo research is promising or desirable but that it is *necessary* to gain the sought-for medical benefits. Indeed, the Nuremberg Code of research ethics enunciates precisely this principle—that experimentation should be “such as to yield fruitful results for the good of society, *unprocurable by other methods or means of study.*” Because of all the scientific uncertainties—and the many possible avenues of research—that burden cannot at present be met.

But, we readily concede, these same uncertainties mean that no one—not the scientists, not the moralists, and not the patients whose suffering we all hope to ameliorate—can know for certain which avenues of research will prove most successful. Research using cloned embryos may in fact, as we said above, yield knowledge and benefits unobtainable by any other means.

With such possible benefits in view, what reasons could we have for saying “no” to cloning-for-biomedical-research? Why not leave this possible avenue of medical progress open? Why not put the cup to our lips? In *The Winter’s Tale*, Shakespeare has Leontes, King of Sicilia, explain why one might not.⁸

There may be in the cup
A spider steep’d, and one may drink, depart,
And yet partake no venom, for his knowledge
Is not infected; but if one present
The abhor’d ingredient to his eye, make known
How he hath drunk, he cracks his gorge, his sides

* We are especially impressed by the promise of the research of Dr. Catherine Verfaillie and her group, showing the stability and multipotency of cells derived from bone marrow of animals and human adults. Should this work prove successful, it might serve all of the purposes said to require cells from *cloned* embryos. See presentation by Dr. Verfaillie at the April 25, 2002, meeting of the Council (transcript on the Council’s website, www.bioethics.gov) and the papers cited in endnotes 3 and 4 to this chapter.

With violent hefts. I have drunk, and seen the spider.

To discern the spider in the cup is to see the moral reality of cloning-for-biomedical-research differently. It is to move beyond questions of immediately evident benefits or harms alone toward deeper questions about what an ongoing program of cloning-for-biomedical-research would mean. In part, this approach compels us to think about embryo research generally, but cloning (even for research purposes alone) raises its own special concerns, since only cloned embryos could one day become cloned children. We need to consider and articulate the reasons why, despite the possibility of great benefits, society should nevertheless turn away and not drink from this cup, and why the reasons for “drinking with limits” (offered by our colleagues in Position Number One above) are finally not persuasive.

Our analysis proceeds along three pathways: what we owe to the embryo; what we owe to society; and what we owe to the suffering. We differ, among ourselves, on the relative importance of the various arguments presented below. But we all agree that *moral objections to the research itself* and *prudential considerations about where it is likely to lead* suggest that we should oppose cloning-for-biomedical-research, albeit with regret.

A. What We Owe to the Embryo

The embryo is, and perhaps will always be, something of a puzzle to us. In its rudimentary beginnings, it is so unlike the human beings we know and live with that it hardly seems to be one of us; yet, the fact of our own embryonic origin evokes in us respect for the wonder of emerging new human life. Even in the midst of much that is puzzling and uncertain, we would not want to lose that respect or ignore what we owe to the embryo.

The cell synthesized by somatic cell nuclear transfer, no less than the fertilized egg, is a human organism in its germinal stage.* It

* That the embryo in question is produced by cloning and not by the fertilization of an egg should not, in our view, lead us to treat it differently. The

is not just a “clump of cells” but an integrated, self-developing whole, capable (if all goes well) of the continued organic development characteristic of human beings. To be sure, the embryo does not yet have, except in potential, the full range of characteristics that distinguish the human species from others, but one need not have those characteristics in evidence in order to belong to the species. And of course human beings at some other stages of development—early in life, late in life, at any stage of life if severely disabled—do not forfeit their humanity simply for want of these distinguishing characteristics. We may observe different points in the life story of any human being—a beginning filled mostly with potential, a zenith at which the organism is in full flower, a decline in which only a residue remains of what is most distinctively human. But none of these points is itself the human being. That being is, rather, an organism with a continuous history. From zygote to irreversible coma, each human life is a single personal history.

But this fact still leaves unanswered the question of whether all stages of a human being’s life have equal moral standing. Might there be sound biological or moral reasons for according the early-stage embryo only *partial* human worth or even none at all? If so, should such embryos be made available or even explicitly created for research that necessarily requires their destruction—especially if very real human good might come from it? Some of us who oppose cloning-for-biomedical-research hold that efforts to assign to the embryo a merely intermediate and developing moral status—that is, more humanly significant than other human cells, but less deserving of respect and protection than a human fetus or infant—are both biologically and morally unsustainable, and that the embryo is in fact fully “one of us”: a human life in process, an equal member of the species *Homo sapiens* in the embryonic stage of his or her natural development. All of us who oppose going forward with cloning-for-biomedical-

cloned embryo is different in its origins, but not in its possible destiny, from a normal embryo. Were it brought to term it too would indisputably be a member of the human species. We caution against defining the cloned embryo into a “non-embryo”—especially when science provides no warrant for doing so.

research believe that it is incoherent and self-contradictory for our colleagues (in Position Number One) to claim that human embryos deserve “special respect” and to endorse nonetheless research that requires the creation, use, and destruction of these organisms, *especially when done routinely and on a large scale*.

The case for treating the early-stage embryo as simply the moral equivalent of all other human cells (Position Number Two, above) is entirely unconvincing: it denies the continuous history of human individuals from zygote to fetus to infant to child; it misunderstands the meaning of potentiality—and, specifically, the difference between a “being-on-the-way” (such as a developing human embryo) and a “pile of raw materials,” which has no definite potential and which might become anything at all; and it ignores the hazardous moral precedent that the routinized creation, use, and destruction of nascent human life would establish for other areas of scientific research and social life.

The more serious questions are raised—about individuality, potentiality, and “special respect”—by those who assign an intermediate and developing moral status to the human embryo, and who believe that cloned embryos can be used (and destroyed) for biomedical research while still according them special human worth (Position Number One, above). But the arguments for this position—both biological and moral—are not convincing. For attempts to ground the special respect owed to a maturing embryo in certain of its developmental features do not succeed. And the invoking of a “special respect” owed to nascent human life seems to have little or no operative meaning once one sees what those who take this position are willing to countenance.

We are not persuaded by the argument that fourteen days marks a significant difference in moral status. Because the embryo’s human and individual genetic identity is present from the start, nothing that happens later during the continuous development that follows—at fourteen days or any other time—is responsible for suddenly conferring a novel human individuality or identity. The scientific evidence suggests that the fourteen-day marker does not represent a biological event of moral significance;

rather, changes that occur at fourteen days are merely the visibly evident culmination of more subtle changes that have taken place earlier and that are driving the organism toward maturity. Indeed, many advocates of cloning-for-biomedical-research implicitly recognize the arbitrariness of the fourteen-day line. The medical benefits to be gained by conducting research beyond the fourteen-day line are widely appreciated, and some people have already hinted that this supposed moral and biological boundary can be moved should the medical benefits warrant doing so (see Position Number Two, above).

There are also problems with the claim that its capacity for “twinning” proves that the early embryo is not yet an individual or that the embryo’s moral status is more significant after the capacity for twinning is gone. There is the obvious rejoinder that if one locus of moral status can become two, its moral standing does not thereby diminish but rather increases. More specifically, the possibility of twinning does not rebut the individuality of the early embryo from its beginning. The fact that where “John” alone once was there are now both “John” and “Jim” does not call into question the presence of “John” at the outset. Hence, we need not doubt that even the earliest cloned embryo is an individual human organism in its germinal stage. Its capacity for twinning may simply be one of the characteristic capacities of an individual human organism at that particular stage of development, just as the capacity for crawling, walking, and running, or cooing, babbling, and speaking are capacities that are also unique to particular stages of human development. Alternatively, from a developmental science perspective, twinning may not turn out to be an intrinsic process within embryogenesis. Rather, it may be a response to a disruption of normal development from which the embryo recovers and then forms two. Twinning would thus be a testament to the resilience of self-regulation and compensatory repair within early life, not the lack of individuation in the early embryo. From this perspective, twinning is further testimony to the potency of the individual (in this case two) to fullness of form.

We are also not persuaded by the claim that in vitro embryos (whether created through IVF or cloning) have a lesser moral status than embryos that have been implanted into a woman's uterus, because they cannot develop without further human assistance. The suggestion that extra-corporeal embryos are not yet individual human organisms-on-the-way, but rather special human cells that acquire only through implantation the potential to become individual human organisms-on-the-way, rests on a misunderstanding of the meaning and significance of potentiality. An embryo is, by definition and by its nature, potentially a fully developed human person; its potential for maturation is a characteristic it *actually* has, and from the start. The fact that embryos have been created outside their natural environment—which is to say, outside the woman's body—and are therefore limited in their ability to realize their natural capacities, does not affect either the potential or the moral status of the beings themselves. A bird forced to live in a cage its entire life may never learn to fly. But this does not mean it is less of a bird, or that it lacks the immanent potentiality to fly on feathered wings. It means only that a caged bird—like an in vitro human embryo—has been deprived of its proper environment. There may, of course, be good human reasons to create embryos outside their natural environments—most obviously, to aid infertile couples. But doing so does not obliterate the moral status of the embryos themselves.

As we have noted, many proponents of cloning-for-biomedical-research (and for embryo research more generally) do not deny that we owe the human embryo special moral respect. Indeed, they have wanted positively to affirm it.* But we do not under-

* Thus, for example, the 1994 report of the National Institutes of Health Human Embryo Research Panel, even while endorsing embryo research under certain circumstances, spoke (p. xi) of “respect for the special character of the preimplantation human embryo” and affirmed (p. x) that “the preimplantation human embryo warrants serious moral consideration as a developing form of human life” (though not, the report added, “the same moral status as infants and children”). Another report, *Ethical Issues in Human Stem Cell Research*, released in 1999 by the National Bioethics Advisory Commission, while declining to claim that the embryo should receive “the same level of respect accorded persons” (p. 50), spoke of and seemed to endorse the “ethical intui-

stand what it means to claim that one is treating cloned embryos with special respect when one decides to create them intentionally for research that necessarily leads to their destruction. This respect is allegedly demonstrated by limiting such research—and therefore limiting the numbers of embryos that may be created, used, and destroyed—to only the most serious purposes: namely, scientific investigations that hold out the potential for curing diseases or relieving suffering. But this self-limitation shows only that our purposes are steadfastly high-minded; it does not show that the *means* of pursuing these purposes are *respectful of the cloned embryos* that are necessarily violated, exploited, and destroyed in the process. To the contrary, a true respect for a being would nurture and encourage it toward its own flourishing.

It is, of course, possible to have reverence for a life that one kills. This is memorably displayed, for example, by the fisherman Santiago in Ernest Hemingway's *The Old Man and the Sea*, who wonders whether it is a sin to kill fish even if doing so would feed hungry people. But it seems difficult to claim—even in theory but especially in practice—the presence of reverence once we run a stockyard or raise calves for veal—that is, once we treat the animals we kill (as we often do) simply as resources or commodities. In a similar way, we find it difficult to imagine that bio-technology companies or scientists who routinely engaged in cloning-for-biomedical-research would evince solemn respect for human life each time a cloned embryo was used and destroyed. Things we exploit even occasionally tend to lose their special value. It seems scarcely possible to preserve a spirit of humility and solemnity while engaging in routinized (and in many cases corporately competitive) research that creates, uses, and destroys them.

The mystery that surrounds the human embryo is undeniable. But so is the fact that each human person began as an embryo, and that this embryo, once formed, had the unique potential to become a unique human person. This is the meaning of our em-

tion” that “the act of creating an embryo for reproduction is respectful in a way that is commensurate with the moral status of embryos, while the act of creating an embryo for research is not” (p. 56).

bodied condition and the biology that describes it. If we add to this description a commitment to equal treatment—the moral principle that every human life deserves our equal respect—we begin to see how difficult it must be to suggest that a human embryo, even in its most undeveloped and germinal stage, could simply be used for the good of others and then destroyed. Justifying our intention of using (and destroying) human embryos for the purpose of biomedical research would force us either to ignore the truth of our own continuing personal histories from their beginning in embryonic life or to weaken the commitment to human equality that has been so slowly and laboriously developed in our cultural history.

Equal treatment of human beings does not, of course, mean identical treatment, as all parents know who have more than one child. And from one perspective, the fact that the embryo seems to amount to so little—seems to be little more than a clump of cells—invites us to suppose that its claims upon us can also not amount to much. We are, many have noted, likely to grieve the death of an embryo less than the death of a newborn child. But, then, we are also likely to grieve the death of an eighty-five-year-old father less than the death of a forty-five-year-old father. Perhaps, even, we may grieve the death of a newborn child less than the death of a twelve-year-old. We might grieve differently at the death of a healthy eighty-year-old than at the death of a severely demented eighty-year-old. Put differently, we might note how even the researcher in the laboratory may react with excitement and anticipation as cell division begins. Thus, reproductive physiologist Robert Edwards, who, together with Dr. Patrick Steptoe, helped produce Louise Brown, the first “test-tube baby,” said of her: “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.”⁹ The embryo seems to amount to little; yet it has the capacity to become what to all of us seems very much indeed. There is a trajectory to the life story of human beings, and it is inevitable—and appropriate—that our emotional responses should be different at different points in that trajectory. Nevertheless, these emotions, quite naturally and appropriately different, would be misused if we calibrated the degree of respect we

owe each other on the basis of such responses. In fact, we are obligated to try to shape and form our emotional responses—and our moral sentiments—so that they are more in accord with the moral respect we owe to those whose capacities are least developed (or those whom society may have wrongly defined as “non-persons” or “nonentities”).

In short, how we respond to the weakest among us, to those who are nowhere near the zenith of human flourishing, says much about our willingness to envision the boundaries of humanity expansively and inclusively. It challenges—in the face of what we can know and what we cannot know about the human embryo—the depth of our commitment to equality. If from one perspective the fact that the embryo seems to amount to little may invite a weakening of our respect, from another perspective its seeming insignificance should awaken in us a sense of shared humanity. This was once our own condition. From origins that seem so little came our kin, our friends, our fellow citizens, and all human beings, whether known to us or not. In fact, precisely because the embryo seems to amount to so little, our responsibility to respect and protect its life correspondingly increases. As Hans Jonas once remarked, a true humanism would recognize “the inflexible principle that utter helplessness demands utter protection.”¹⁰

B. What We Owe to Society

Having acknowledged all that, we would miss something if we stopped with what is owed to the embryo—with the language of respect, claims, or rights. An embryo may seem to amount to little or nothing, but that very insignificance tests not the embryo’s humanity but our own. Even those who are uncertain about the precise moral status of the human embryo—indeed, even those who believe that it has only intermediate and developing status—have sound ethical-prudential reasons to refrain from using embryos for utilitarian purposes. Moreover, when the embryos to be used have been produced by cloning, there are additional moral dilemmas that go beyond the ethics of embryo research alone. There are principled reasons why people who *accept*

research on leftover IVF embryos created initially for reproductive purposes should *oppose* the creation and use of cloned embryos explicitly for research. And there are powerful reasons to worry about where this research will lead us. All these objections have their ground not only in the embryo's character but also in our own, and in concern not only for the fate of nascent human life but for the moral well-being of society as a whole. *One need not believe the embryo is fully human to object vigorously to cloning-for-biomedical-research.*

We are concerned especially about three ways in which giving our moral approval to such research would harm the character of our common life and the way of life we want to transmit to future generations: (i) by crossing the boundary from sexual to asexual reproduction, in the process approving, whether recognized or not, genetic manipulation and control of nascent human life; (ii) by allowing and endorsing the complete instrumentalization of human embryos; and (iii) by opening the door to other—for some of us, far greater—moral hazards, such as cloning-to-produce-children or research on later-stage human embryos and fetuses.

1. Asexual Reproduction and the Genetic Manipulation of Embryos

It is worth noting that human cloning—including cloning-for-biomedical-research itself and not simply cloning-to-produce-children—would cross a natural boundary between sexual and asexual reproduction, reducing the likelihood that we could either retrace our steps or keep from taking further steps. Cloning-for-biomedical-research and cloning-to-produce-children both begin with the same act of cloning: the production of a human embryo that is genetically virtually identical to its progenitor. The cloned embryo would therefore be the first human organism with a single genetic “parent” and, equally important, with a genetic constitution that is known and selected in advance. Both uses of cloning mark a significant leap in human power and human control over our genetic origins. Both involve deliberate genetic manipulation of nascent human life. It is, of course, precisely this genetic control that makes cloned

embryos uniquely appealing and perhaps uniquely useful to those who seek to conduct research on them. But we should not be deceived about what we are agreeing to if we agree to start to clone: saying yes to cloned embryos in laboratories means saying yes *in principle* to an ever-expanding genetic mastery of one generation over the next.

2. *The Complete Instrumentalization of Nascent Human Life*

By approving the production of cloned embryos for the sole purpose of research, society would transgress yet another moral boundary: that separating the different ways in which embryos might become available for human experimentation. It is one thing, as some have argued, to conduct research on leftover embryos from IVF procedures, which were created in attempts to have a child and, once no longer needed or wanted, are “destined” for destruction in any case. It is quite another to create embryos *solely* for research that will unavoidably and necessarily destroy them. Thus, for example, the National Bioethics Advisory Commission (in its report on stem cell research) reasoned that in circumstances where embryos were going to be discarded anyway, it did not undermine the moral respect owed to them if they were destroyed in one way (through research) rather than another (by being discarded when no longer wanted for IVF).¹¹ By contrast, the Commission reasoned that it was much harder to embrace the language of respect for the embryo if it were produced solely for purposes of research and, having been used, then destroyed. This argument maintained the following moral and practical distinction: that embryos created for reproduction but no longer desired could, with proper consent, be used as research subjects, but that embryos ought not be produced solely in order to be used as research subjects. So long as we oppose morally and may perhaps one day prohibit legally the production of cloned children, it is in the very nature of the case that cloned human embryos will not be acquirable as “spare” embryos left over from attempts at reproduction. To the contrary, they will have to be produced solely and explicitly for the purpose of biomedical research, with no other end in view.

Some have argued that there is no significant moral difference between creating excess IVF embryos for reproduction *knowing in advance* that some will be discarded and creating cloned embryos for research *that leads necessarily* to their destruction. Because in both cases embryos are wittingly destroyed, there is, so the argument goes, no moral difference here.

When viewed simply in terms of the fates of embryos once they are created, the distinction between using leftover embryos and creating embryos solely for research may indeed be morally insignificant. But when viewed in terms of the different effects these two activities might have on the moral fabric of society—and the different moral dispositions of those who decide to produce embryos for these different purposes—the issue is more complex. In the eyes of those who create IVF embryos to produce a child, *every embryo*, at the moment of its creation, is a *potential child*. Even though more eggs are fertilized than will be transferred to a woman, each embryo is brought into being as an end in itself, not simply as a means to other ends. Precisely because one cannot tell which IVF embryo is going to reach the blastocyst stage, implant itself in the uterine wall, and develop into a child, the embryo “wastage” in IVF is more analogous to the embryo wastage in natural sexual intercourse practiced by a couple trying to get pregnant than it is to the creation and use of embryos that requires (without exception) their destruction.

Those who minimize or deny this distinction—between producing embryos hoping that one of them will become a child and producing embryos so that they can be used (and destroyed) in research—demonstrate the very problem we are worried about. Having become comfortable with seeing embryos as a means to noble ends (be it having a child or conducting biomedical research), they have lost sight of the fact that the embryos that we create as potential children are not means at all. Even those who remain agnostic about whether the human embryo is fully one of us should see the ways in which conducting such research would make us a different society: less humble toward that which we cannot fully understand, less willing to extend the boundaries of human respect ever outward, and more willing to transgress

moral boundaries that we have, ourselves, so recently established, once it appears to be in our own interests to do so. We find it disquieting, even somewhat ignoble, to treat what are in fact seeds of the next generation as mere raw material for satisfying the needs of our own. Doing so would undermine the very prudence and humility to which defenders of limited embryo research often appeal: the idea that, while a human embryo may not be fully one of us, it is not humanly nothing and therefore should not be treated as a resource alone. But that is precisely what cloning-for-biomedical-research would do.

3. Opening the Door to Other Moral Hazards

This leads directly to our third concern—that the cloning of human embryos for research will open the door to additional (and to some of us, far greater) moral hazards. Human suffering from horrible diseases never comes to an end, and, likewise, our willingness to use embryonic life in the cause of research, once permitted, is also unlikely to find any natural stopping point. To set foot on this slope is to tempt ourselves to become people for whom the use of nascent human life as research material becomes routinized and everyday. That much is inherent in the very logic of what we would do in cloning-for-biomedical-research.

In addition, the reasons justifying production of cloned embryos for research can be predicted to expand. Today, the demand is for stem cells; tomorrow it may be for embryonic and fetal organs. The recent experiments with cloned cow embryos implanted in a cow's uterus¹² already suggest that there may be greater therapeutic potential using differentiated tissues (for example, kidney primordia) harvested from early fetuses than using undifferentiated stem cells taken from the very early embryo. Should this prove to be the case, pressure will increase to grow cloned human blastocysts to later stages—either in the uteruses of suitably prepared animal hosts or (eventually) using artificial placenta-like structures in the laboratory—in order to obtain the more useful tissues. One can even imagine without difficulty how a mother might be willing to receive into her womb as a

temporary resident the embryonic clone of her desperately ill child, in order to harvest for that child life-saving organs or tissues. In such ways the coarsening of our moral sensibilities can be the fruit of understandable desires. Indeed, to refuse such further steps in the name of moral wisdom might come to seem increasingly sentimental, and, even if we were reluctant to give our approval, we might be hard-pressed to say why.

We should not be self-deceived about our ability to set limits on the exploitation of nascent life. What disturbs us today we quickly or eventually get used to; yesterday's repugnance gives way to tomorrow's endorsement. A society that already tolerates the destruction of fetuses in the second and third trimesters will hardly be horrified by embryo and fetus farming (including in animal wombs), if this should turn out to be helpful in the cure of dreaded diseases.

We realize, of course, that many proponents of cloning-for-biomedical-research will recommend regulations designed to prevent just such abuses (that is, the expansion of research to later-stage cloned embryos and fetuses). Refusing to erect a red light to stop research cloning, they will propose various yellow lights intended to assure ourselves that we are proceeding with caution, limits, or tears. Paradoxically, however, the effect might actually be to encourage us to continue proceeding with new (or more hazardous) avenues of research; for, believing that we are being cautious, we have a good conscience about what we do, and we are unable to imagine ourselves as people who could take a morally disastrous next step. We are neither wise enough nor good enough to live without clear limits.

Cloning-for-biomedical-research could require thousands of human eggs and would, as presently contemplated, give rise, as we have said, to a new industry of embryo manufacture. This industry would depend on eggs procured from women, themselves participants in the research, who would need to take drugs stimulating ovulation and to submit to the egg retrieval procedure. One might wonder whether their informed consent is sufficient to permit this in circumstances where, in the very nature

of the case, the research is so preliminary that it cannot possibly provide effective therapies for patients. We might also worry lest women who are potential donors (because, for example, they have sought in vitro fertilization) might be vulnerable to pressure to participate in this research or financial inducements to do so. Even if such pressure does not rise to the level of coercion, we should acknowledge that there are inducements a just society would not offer and risks it would not ask potential research subjects—themselves vulnerable for a variety of reasons—to accept.

To get around the shortage of human eggs and the ethical dilemmas it could produce, scientists are exploring the possibility of substituting animal eggs in the initial cloning step of SCNT. Experiments creating animal-human hybrid-embryos, produced by inserting human DNA into enucleated rabbit oocytes, have already been conducted in China, with development up to the blastocyst stage.¹³ Yet far from solving our ethical dilemma, the use of animal eggs raises new concerns about animal-human hybrids. We have no idea where these and later interspecies experiments might lead. Yet the creation of such chimeras, even in embryonic form, shows how ready we seem to be to blur further the boundary—biological and moral—between human being and animal.

Finally, if we accept even limited uses of cloning-for-biomedical-research, we significantly increase the likelihood of cloning-to-produce-children. The technique will gradually be perfected and the cloned embryos will become available, and those who would be interested in producing cloned children will find it much easier to do so. The only way to prevent this from happening would be to prohibit, by law, the implantation of cloned embryos for the purpose of producing children. To do so, however, the government would find itself in the unsavory position of designating a class of embryos that it would be a felony not to destroy. It would *require*, not just permit, the destruction of cloned embryos—which seems to us the very opposite of showing such cloned embryos “special respect.”

4. Conclusion: What Prudence Requires

As history so often demonstrates, powers gained for one purpose are often used for other, less noble ones. We are about to harness powers over our own (human) nature to be used for our own well-intentioned purposes. But the knowledge that provides this power does not teach us how to use it. And given our fallibility, that should give us pause. We should consider, in making our moral judgment about cloning-for-biomedical-research, not simply the origin of these cells, but their possible uses (and misuses), as well as their place in the larger story of our increasing technological powers. We must keep in mind not simply where we took these cells from, but where they might take us, and what might be done with them.

In light of these moral and prudential dangers—namely, the crossing of the boundary from sexual to asexual reproduction; the possible misuse of our new genetic powers over embryonic life; the reduction of human embryos to nothing more than a resource and the coarsening of our moral sensibilities that would come with it; the prospect of a law that would mandate the destruction of nascent human life; and the prospect of other (greater) harms down the road, most notably the production of cloned children, research on later-stage fetuses, or genetic engineering of future generations—we must take pause and resist. In trying to discern where a wise and prudent boundary must be drawn—to protect those beings who are humanly inviolable, to prevent the dangers that most tempt us, and to protect the moral fabric of society—we hold that the boundary must be drawn by prohibiting the production and use of cloned embryos. To cross this boundary or to set it further down the road—that is, “with limits”—is to invite (and perhaps ensure) that some (or all) of the dehumanizing possibilities described above will come to pass.

C. What We Owe to the Suffering

The final question to be considered is what we owe to the suffering. Like our colleagues who endorse cloning-for-biomedical-research, we believe it would be less than human to turn a blind eye to those who suffer and need relief, or to stand silent in the face (especially) of suffering and premature death. In saying “no” to cloning-for-biomedical-research, we are not closing the door on medical progress—not in principle and not in practice. We are simply acknowledging that, for very strong moral reasons, progress must come by means that do not involve the production, use, and destruction of cloned embryos and that do not reduce nascent human life to a resource for our exploitation. This does mean, of course, that advances in basic research and progress in the cure of disease, though not halted, might be slowed (though, as described above, this is far from certain on scientific grounds). It is possible that some might suffer in the future because research proceeded more slowly. We cannot suppose that the moral life comes without cost. And honesty compels us not to offer guarantees where our human limits—and the unpredictable nature of the future—ensure that no such assurances are possible.

There may be occasions in life when the only means available for achieving a desired end is a means that it would be wrong to employ. This is especially true in circumstances such as those considered here; for to give our initial approval to cloning-for-biomedical-research is to set foot on a path whose deepest implications can scarcely be calculated. People sometimes imagine that human beings are responsible for all the harms they could prevent but do not; yet, this cannot be true. When we refuse to achieve a good outcome by doing what is wrong, and thereby perhaps accept some suffering that might have been avoided, we are not guilty of causing that suffering. To say otherwise would mean that sufficiently evil men could always hold us morally hostage. In order to obligate us to do an evil deed, they need only credibly threaten to do great harm unless we comply. Were we actually responsible for all the harm we might have prevented

but did not, they would have us in their moral power. If our duty to prevent harm and suffering were always overriding, if it always held moral trump, we could not live nobly and justly.

We are not deaf to the voices of those who desperately want biomedical research to proceed. Indeed, we can feel the force of that desire ourselves, for all of us—and those we love most—are or could one day be patients desperate for a cure. But we are not only patients or potential patients. We are human beings and citizens, and we know that relief of suffering, though a great good, is not the greatest good. As highly as we value health and longer life, we know that life itself loses its value if we care only for *how long* we live, and not also for *how* we live.

Suppose, then, that we refrain from such research and that future sufferers say to us: “You might have helped us by approving cloning for research, but you declined to do so.” What could we say to them? Something like the following: “Yes, perhaps so. But we could have done so only by destroying, in the present, the sort of world in which both we and you want to live—a world in which, as best we can, we respect human life and human individuals, the weak and the strong. To have done it would have meant stepping across boundaries that are essential to our humanity. And, although we very much want to leave to our children a world in which suffering can be more effectively relieved, that is not all we want to leave them. We want to bequeath to them a world that honors moral limits, a world in which the good of some human lives is not entirely subordinated to the good of others, a world in which we seek to respect, as best we can, the time each human being has and the place each fills.”

This understanding of what commitment to our shared humanity requires is not alien to the efforts of scientific researchers to make progress in the cure of disease and relief of suffering. Theirs is, after all, a moral mission, which serves us all and which we all support. But if history teaches anything, it is the danger of assuming that, because our motives are praiseworthy and our hope is to heal, our actions cannot possibly violate or diminish

human well-being. Indeed, we may be least likely to see the dangers when we are most confident of the goodness of our cause.

Scientists already accept important moral boundaries in research on human subjects, and they do not regard such boundaries as unwarranted restrictions on the freedom of scientific research. More generally, the scientific enterprise is a moral one not only because of the goals scientists seek but also because of the limits they honor. Indeed, it is precisely the acceptance of limits that stimulates creative advance, that forces scientists to conceive of new and morally acceptable ways of conducting research. Surely, therefore, before society takes a step that cannot be undone, it should ponder soberly the moral implications of accepting cloning, even for research.

To approve cloning-for-biomedical-research, to drink from that cup, is an inviting prospect indeed, but there is a spider in the cup. When we consider what we owe to the embryo, to our society, and to the suffering, we can see it more clearly and can, perhaps, acquire the wisdom and even the courage not to put this cup to our lips.

* * *

V. Conclusion

In this chapter, Council Members have presented as best we can the moral cases for and against cloning-for-biomedical-research, seen in the contexts of efforts to heal the sick; present and projected developments in reproductive, developmental, and genetic biotechnology; and the moral concerns for nascent life and the moral well-being of American society. Our different moral outlooks and judgments have been preserved and, we hope, clarified. We are now ready to move from ethics to public policy, in search of the best course of action regarding human cloning.

ENDNOTES

¹ Osler, W. "Chauvinism in Medicine" *Aequanimitas, with Other Addresses to Medical Students, Nurses and Practitioners of Medicine* Philadelphia: Blakiston, 1943, p. 267.

² For more information about the scientific and medical case for cloning-for-biomedical-research, see the following two reports: (1) National Research Council/Institute of Medicine (NRC/IOM), *Stem Cells and the Future of Regenerative Medicine*, Washington DC, National Academy Press, 2001. (2) National Academy of Sciences (NAS), *Scientific and Medical Aspects of Human Reproductive Cloning*, Washington, DC, National Academy Press, 2002.

³ Reyes, M., et al. "Origin of endothelial progenitors in human postnatal bone marrow" *Journal of Clinical Investigation*, 109: 337-346, 2002.

⁴ Jiang, Y. et al. "Pluripotency of mesenchymal stem cells derived from adult marrow" *Nature*, 418: 41-49, 2002.

⁵ Rideout III, W.M. et al. "Correction of a genetic defect by nuclear transplantation and combined cell and gene therapy" *Cell*, 109: 17-27, 2002.

⁶ Wilson, J.Q. "On Abortion" *Commentary*, 97(1): 21ff, 1994.

⁷ Lanza, R.P., et al. "Generation of histocompatible tissues using nuclear transplantation" *Nature Biotechnology*, 20: 689-696, 2002.

⁸ Brian Appleyard calls attention to this passage in his book, *Brave New Worlds: Staying Human in the Genetic Future* (New York: Viking, 1998).

⁹ Cited in Kass, L. "The Meaning of Life—in the Laboratory" *The Public Interest*, No. 146, pp. 45-46, Winter 2002.

¹⁰ Jonas, H. "Philosophical Reflections on Experimenting With Human Subjects" in *Readings on Ethical and Social Issues in Biomedicine*, ed. Richard W. Wertz (Prentice-Hall, 1973), p. 32.

¹¹ National Bioethics Advisory Commission, *Ethical Issues in Human Stem Cell Research*, volume I, p. 53. Bethesda, MD: Government Printing Office, 1999.

¹² See endnote 7, above.

¹³ Leggett, K., and A. Regalado. "China Stem Cell Research Surges as Western Nations Ponder Ethics" *Wall Street Journal*, March 6, 2002, p. A1.