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WHAT IF ANYTHING IS WRONG WITH CLONING A HUMAN BEING?*

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Is there anything wrong with cloning a human being? I do not think many people are going to be interested in cloning human beings. I think it's going to be a side show of human reproduction – of minor interest. When people truly understand human cloning, they lose interest in it once they realize what it can and cannot do. Cloning will not be an important way to make people in the future.

If anywhere, cloning's future is in animals.. Animal cloning will be used in the creation of cells and tissues, if we choose to allow it to happen here or in other countries.

Even if cloning for reproduction is not likely to prove very popular, I do not think that making human clones is as unethical or morally suspect as many others do.

Oddly it is animal cloning that has commanded the most corporate attention but the least ethical commentary. There are companies that advertise on the internet, like Genetic Savings and Clone, offering to make your Fido or Fluffy come back to you. I do not think they are entirely honest about what cloning can do.

So, what arguments are there against human cloning ? Lets consider some of the arguments that came up about making human clones when cloning was first announced – "Dolly style" cloning.

I am going to try and make some arguments that I think might appear to hold some weight against human cloning, but will turn out not to. I will supply you with some more persuasive arguments against cloning, but that do not quite make it as reasons to ban or prohibit cloning. They may give us reasons for ethical concern, but not really reasons for legal prohibition. I will give a little bit of a review on what took place in the wake of Dolly, in the wake of the Raelians, and some arguments that are commonly made against cloning that I do not think hold up. Please keep in mind while I do this that I do not think human cloning is going to turn out to be a very

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important biological or medical activity. It is not something that people are going to want to do. Even though I might end up opening the door to the use of cloning to make people, I will close it at the end of this talk by saying that it is pretty clear why most people will not care about it.

Cloning was shown to be possible in mammals using an adult cell only in 1997. In order to understand the ethics of cloning we need a short science interlude to explain why cloning was so exciting to scientists in 1997.

There are actually three major ways clones can come into being. One method is making a clone by twinning. If an embryo splits naturally in the course of its development, it can make two or more, sometimes three, genetically identical organisms. We do not really know why embryos divide that way in nature, but in ducks, monkeys, human beings, and other species, twins occur. Twins are clones. It may have already occurred to you that there are already clones among us. They walk the earth. They live next door, sometimes go to Case Western Reserve, and do all kinds of other things. It is important to point out that nothing happens to the public health or safety when genetically identical people are around.

It is also important to point out there have been no great metaphysical crises in churches or among philosophers about whether twins are people. Twins are understood to have spirits, free will, and souls. Twins have been around for a long time. I have yet to find any writings bemoaning their existence.

It is assumed twins are two separate people. They seem to exhibit all the properties that individual people do. So, on the weighty matter of whether clones are people too, we could, based on our knowledge of twins, have little bumper stickers made that say, "Yes, clones are people too." Twins have a genetic identity identical to someone else, but they are no less people because of their genetic commonality

The second method for cloning is to take embryos and try to split them. This is very technical, and I do not want to go into it at great length. Basically, you get a big knife and chop the embryo in half. That is it. This is a very common way to make animals for commercial purposes. It has been done for thirty-five, forty years – dividing an embryo in half.

Every class I ever went to on in vitro fertilization in animals had a couple of people come from human medicine who would sit in and watch how splitting was done in animal embryos. I will go further out on a limb. Somewhere, somebody probably has twinned humans artificially already. They just have not run around talking about it. Let's say you had fertility problems and are not able make sperm, or you could make only one or two viable eggs. If you went to an IVF clinic and said you would like to have more than one baby, but only have one embryo, I imagine somebody somewhere would divide a human embryo and make twins.. I can not prove this and this is not meant to be a news announcement, I just bet

somewhere there are artificial twins already made, clones, by dividing embryos in two.

Embryos have this weird power of total potency. They can turn into all the cells in your body. They lose that power after a few divisions. If you get that embryo early and split it, both parts of it will be able to produce entire organisms. That happens naturally, and it can also be done artificially.

The third way to make clones is the most mysterious and remarkable way. People thought that it would not be possible to get DNA from adult body cells – from your foot, nose, or the lining of your mouth, take the genes out of those cells, put them into anything, and get them to turn back on and make another organism. How is this done?

You all know something that many legislators I talk to do not know. You all know where your genes are in your bodies. I asked this question once a couple years ago. The Pennsylvania legislature asked me to talk about what to do about cloning. I asked them, "Where are your genes?" A quarter of them thought their genes were in their gonads. This was during the time when Bill Clinton was president, and Rudy Giuliani had a mistress. It was in the air, I guess, politically to be thinking about one's gonads if you were a politician. That response was a half credit answer. There *are* in fact genes in your gonads. A sperm and egg each have half of you're the total complement of genes.

A number of the legislators thought their genes were in their brains. That seemed very optimistic! They were partially correct as well; there *are* genes in all the cells of your brain. The whole truth, however, is that all your genes are in all the cells of your body.

Permeating your body are all the genes that were there when you were an embryo, except for the gonads. You can haul them out, look at them, and see that an entire set of genetic information is in every cell.

So what has to happen to move from an embryo to adulthood in terms of genes turning on or off? A lot of genes have to shut off. They can make everything at the moment of fertilization. Therefore, in order to make specialized cells, many genes have to shut off. Now, there are other genes that turn on later. You remember puberty. Not all genes shut off once everything is made, but for the most part, growth is driven by turning genetic messages off.

The reason people thought that if you took DNA from an adult cells it could never recreate a whole organism is because it looks like genes in an adult are shut off. Scientists had tried to do DNA transfer of the entire genome from body cells in many species. They tried it in frogs and tadpoles. They tried it in snakes and other amphibians. They had enjoyed some success in cloning amphibians and so-called lower animals way down the genetic scale. Animals had been cloned, frogs most notably, from adult

body cells. Everybody, however, thought that it would never work in mammals. They thought our reproduction was too complicated.

This is the problem that Ian Wilmut and his colleagues in Scotland figured out – how to transfer an entire genome, bring the right chemicals along with it, drop it into an egg from which you remove the DNA, and fuse it into the enucleated egg in this case using some electricity just as all the good old Frankenstein movies did to make dead things come alive. Once in a while – in the case of Dolly one in 400 times – something began to get the genes to turn back on. They began to recreate the organism from which they came.

There are already clones. There are naturally occurring twins. There are probably artificially made humans, by divided embryos. You can use adult cells to make animals again in many species. This is what nuclear transfer cloning is, and what we are going to be talking about the rest of the time that we are here today. Is it ethical to use Dolly-style cloning to make embryos or people?

It is important to understand that what fascinated the scientists who made Dolly was not clones. It was the turning on of genes that everybody thought were shut off in mammals, and watching them recreate something. Everybody thought this was impossible.

To this day, I should add, despite the fact there are journals and papers about this, I do not think anyone understands why these genes turn back on sometimes. No one knows why they turn on in such a way as to recreate and reprogram this new egg. Sometimes when genes fire up and turn back on, they become cancerous. They grow like crazy and make teratomas. This is not something well understood. We do not know why it worked.

You will recall when Dolly was made that about twenty of the embryos were constructed, out of more than 400 attempts. Twenty actually began to develop. Of those, nineteen were either stillborn or stopped developing with defects. Only one animal was born alive. That was Dolly. So the average success rate from starter kits, to transfer to eggs, to Dolly, a live born animal, was really poor. Roughly, one in 400 .

Subsequent to these studies, other animals have been cloned from different species – cows, pigs, oxen, sheep, goats. Some of you may have heard monkeys have been cloned. There is a report of one monkey at the Oregon Regional Primate Center, a monkey made by sticking a gene into an embryo that became Andy, the glowing monkey. The scientists put a luminescent gene in Andy that comes from bacteria. Have you ever walked on the beach, scraped the sand, and watched it glow? There is a gene that does that. They stuck it into the monkey for reasons that I do not know. I guess they were amusing themselves, and wanted to see whether the gene expresses itself as the monkey grew.

What was interesting about Andy the monkey is that Andy was not really an adult transfer clone. Andy the monkey was made from fetal cells, actually cumulous cells that are around the embryo when it first starts out. To put it another way, Andy the monkey was more like a split embryo that had been cloned from an adult cell organism. The reason that is very important is there is not as much success in cloning many species as we think.

People have been desperately trying to clone dogs. It does not work. Dogs have a complicated reproductive system. There has been one kitten cloned, and failures in many, many other cat breeds. There is a lot of money in pet cloning if you can do it, but it is not working at all, with the exception of one kitten. In primates there is a huge interest in cloning as well. But, as of 2004, no one has made an animal from a truly somatic cell from an adult gene source.

The reason this becomes important is – and here is my first empirical claim – that as we will see, it's as likely as not that humans are not clonable. When should you be interested when somebody announces something on TV about cloning, *vis-a-vis* humans? When somebody clones a primate by successfully using "Dolly-style" transfer techniques, when somebody succeeds in this, this will finally prove that primates are clonable using the Dolly technique. Until that happens, I will remain skeptical about the clonability of people.

So we know there are three ways to make clones. Two of them have probably already been done in people. Artificially splitting embryos or fetal or embryo cells, has probably already been done in us by some kindly IVF physician. And, the third kind of cloning from an adult cell genetic transfer works in some species, but not in others including those animals most like us – primates.

The other pertinent fact is that there is a five or six to one failure rate. Even in animals such as pigs, which people are interested in cloning to create human organ transplants, scientists need to try to create so called immuno-suppressed animals. Scientists are attempting to develop a technique for xenografting, which for those of you who follow that particular area, is design of animals with organs for transplant that are less likely to be rejected by people. It is not commercially viable yet because the failure rate of cloning is too high. Most animals die or they do not develop. The failure rate of cloning is still very, very high.

Why might this be? Why doesn't cloning work really well? Why is its failure rate so high with many embryos not doing anything, or animals that do develop often having medical problems and dying? There are probably two main reasons. One is – and this is sad to have to report to you, but I must do my duty – when you get older than about six months, your DNA starts to get beat up. Everybody in this room is a creaking bag of old DNA. As you wander around places like Cleveland in particular, your DNA is exposed to many mutagenic agents.. So there is background

radiation, chemicals out there, all sorts of things that whack your DNA around and cause it to mutate. Some people believe, that some of this mutagenesis is the cause of aging. But that is a talk for another day. Whether that is true or not, there are definitely changes that take place in our bodies over time that are due to this damaging of DNA.

Using damaged DNA to transfer back and make a new organism is going to lead to a high failure rate. Cloning works better the newer the source. If you take those cells that form early on right outside the developing embryo the way they made the monkey, (the so-called cumulous cells), they have no damage and work pretty well for cloning. The older the animal, the less likely it can be cloned with accuracy.

This is important because you can use this cloning procedure a lot, and never get better at it. You see people on TV saying we can make human clones, and that of course we're going to do it, we're practicing daily, and we're going to get better. If your DNA is damaged, it will never get better. If you are working with damaged DNA, you will always have the same failure rate, no matter what you do.

The other reason why cloning fails, is that in nuclear transfer cloning, the old DNA has to talk to the new egg. When it gets there they have to have kind of a handshake or interface. New egg chemistry is sometimes not looking for what old DNA is bringing along. One of the reasons people think that people are hard to clone is that it turns out there are a lot of key chemicals that are near the chromosomes. If you take out the genome to transfer it, by basically pouring it out and moving it, you are going to miss these key chemicals. They do not transfer. If you do not have them, you cannot drive the process of chromosome movement.

A little side note. The need for interaction between embryo and environment reveals something very important about when life begins. Those of you who think that a genome has the potential to be a person are thinking with too much preformationism. This is not the way life begins. You have to have the chemistry of the egg correct too to get something going. Obviously you need to have the correct chemistry coming into the embryo in order for cloning to go forward. A genome is not a potential person, nor is an embryo. Only with the right signals from the environment being present does the potentiality come into being.

Some people ask if it is ever right to destroy cloned embryos. I want to flag this point for you now. Life, when it begins, is interactive. It is not just contained in an embryo, it needs an environment, it is not just contained in a genome, it needs an egg chemistry to make it go. There is a lot of interactivity going on here. If this is not present, nothing is going to happen. If somebody asked me when human life begins, I would say it probably begins when a properly formed genome is merged in the right chemical environment. In the case of the sperm and egg coming together, you have got to get them in the right environment, so that the messages can come in to direct growth. If all that is not there, nothing is going to happen.

Inter-activism, not essentialist. A genome is not a tiny baby. An embryo is not a preformed baby. It has got to interact with the environment to make something happen. If you just put an egg in a dish, nothing happens. An embryo in a dish, just an empty dish, cannot go anywhere. There is no potential for life, zero, nothing, cannot do anything. It will lay there. Is it alive? No. You can make it come alive if you send the right message into it. It cannot do anything at all, it will do no metabolic thing, it is just sitting there in the dish. Nothing happens. It is not yet capable of life or personhood. .

Back to cloning. So what was the ethical reaction to Dolly? An announcement was made and the world went crazy.

In February 1997, there are all kinds of headlines and people yelling and screaming about the immorality of cloning. There were editorials in *The New York Times* saying that we cannot allow this cloning to go forward and that it's going to be used as a technology of abuse. People will try to use it to recreate Hitlers and Idi Amins and fiends of the past. Dan Quayle, Al Gore could be cloned. All kinds of people from who knows where with who know what character deficiencies will show up.

Bernadine Healy, former dean of Ohio State's medical school and head of the Cleveland Clinic Foundation's Reasearch Institute, was asked when she was the National Institutes of Health director, "What do you fear about cloning?" She said she feared it would be used to breed clones to make spare parts for people. That we will clone people from our own bodies so we can get tissues and organs; mine the clones for parts. Another worry was that we would use cloning to raise the dead. Use it to kind of circumvent the natural order of things by bringing back dead people. This was fueled in part by *Jurassic Park.*

I got a phone call once, about six months after the announcement, from a group that wanted to know if they could clone Jesus. How would you do that? Where would you get your DNA? The Shroud of Turin. That is absolutely right. You get a sample from the Shroud of Turin, and then clone Jesus. I said that, well look, first of all, you are trying to bring back one of the few people that are supposed to come back anyway. But, if you did clone Jesus, you would clone a very confused person. There is no temple of the money changers, the Roman Empire is not what it used to be. You do not want to go to the manger right now because there are people shooting each other there in Bethlehem. Regardless, it is not possible to get back Jesus using cloning.

In fact, let's look at these ethical objections to cloning. Can you recreate the dead? No, you cannot, because you would have to recreate the environment they grew up in – the one Jesus or Hitler or Ted Turner or whoever you are cloning grew up in. You need to have their parents, their maternal nutrition, and their experiences. You are not just your genes. There is a very bad version of genetic reductionism in play that says we can

use cloning to bring back lost relatives, or a child lost. You cannot. You can make someone who looks like the child. There are many traits that are under genetic control, but personality and behavior are not.

That is why I am so critical of the companies that promise to give you your cloned pet back. The new dog won't know his old tricks. You are not going to be able to make a Xerox copy of your dog by cloning because you would have to teach him all the old tricks and interact with him in exactly the same way you did with the former pet. That is going to be very hard to duplicate exactly.

If you could do it, you might as well just take another puppy, especially if you have a particular species or breed, since they are pretty genetically homozygous anyway. I have collies. I love my collies, they are very unique, but I have been to the place where collies are bred, and it is hard for me to tell which one is mine to tell you the truth. Those of you who can tell sheep apart, you are better than I am. I have to tell you, there is not a lot of variability in the sheep genome. Many of the dog or cat breeds are also virtually genetically identical

More to the point, you cannot just Xerox people or organs by cloning them. You have to have the exact same environment, plus the same genes to get the same outcome. You cannot use just DNA to breed clone armies.

Some of you are children, some of you have children. That means you are in that relationship of a 50 % genetic commonality with each of your parents. For those of you that are parents, I will ask you this question: If you have a 50 % genetic commonality with your offspring, can you get them to do anything you want? The answer to which is 'no'.

What is the problem here? The problem is adolescence. Adolescence intervenes between genetic commonality and your dreams about what the kid should do. There is no reason to think that if you raise 1,000 babies under the vicious Iraqi regime to be your clone army that 900 of them will not want to play the violin, and another hundred will not want to become mullahs in a religious group, anymore than the way you raise your kids will produce whatever kind of person you want.

To put it another way, you do not lose free will or your individuality because you are cloned. You may note that twins, who have both genes in common and parents and a shared environment, do not turn out to be spitting images of each other. They have many things in common, but even with identical child rearing, we can tell them apart; we know they are different people.

Back to breeding on demand by cloning, getting back the dead, restoring interesting figures from the past, and my favorite, spare parts. Well, you could clone someone to be your source of spare parts. You would face what in ethics we call the conundrum of the source running away. You say, "I need your liver." The clone says, "I don't think so."

Unless you are going to shackle the clone to you, lug it around, you are not going to be able to easily get your part when you need it. .

We already could take your organs and parts out if we needed them. We take kidneys and bone marrow. You've got tissues right now that would be of value to somebody in the world today. We in fact do not allow people to come and harvest you, just because they say they need these things. Even if you are genetically identical to my hapla type, you cannot go get my tissues. Clones would have no less a right to bodily integrity.

Some wise guy wrote a letter saying maybe we could breed headless clones. Then we would not have to worry about their consent; we could just keep them going somewhere. There are two problems with that. One, it is hard to make something headless and make normal organs. For many of us our heads do relate to the rest of our bodies.

More to the point, you do not need the body. What you want to make are the tissues. You would be making an enormous thing just to make an islet cell or liver stem cell. You do not need all that stuff for a source of organs. You can clone the tissues themselves and cells, or even in some case the organs, such as the making of sheets of skin. You do not need a whole person. That is bad thinking about how we get organs and tissues. That is not the future of how to get organs and tissues.

None of the ethical arguments against cloning are convincing. They are not good objections to making human clones. They reveal something important about why most people are not going to want a clone. You cannot use cloning to bring back the dead. Nor can it be used to become immortal. If you cannot bring people of historic interest or make spare parts farms, a lot of people's interest in this as a way to make people is going to severely diminish.

If you think about it, very few people are actually going to be interested in cloning, except people that do not have any other options as a way to reproduce. I would very strongly suggest that cloning will not replace sex. I mean given the options, and cloning costs money too, it is not likely that people are going to say. "Yeah, cloning, that is the way I'm going to reproduce, cloning."

I think cloning is going to be end of the line intervention for somebody who is single, does not have any gamete donors around, and thinks maybe this is the best way I can pass on my genes. Or perhaps an individual who wants to continue a genetic lineage for cultural reasons would be interested.

I cannot make up many scenarios where somebody would want to use an egg donor or sperm donor to replace sexual reproduction with cloning. I do not think cloning has much interest to anybody. It is not really a way that people are going to want to reproduce, particularly when we add in something else –failure rates.

Let's really talk turkey here for a second about cloning as a way to reproduce. You need eggs, you need surrogate mothers, and you need somebody to transfer the genetic material from adult cells carefully. A lot of people cannot make it work at all. You've got to deal with the stillbirths and failures. That is not likely to improve if the old DNA problem and handshake problems are inherent. That makes human cloning for reproduction not only not likely to be done much, it is not likely to be done at all. There is another thing I should remind you. No one has cloned a primate. We may not be clonable at all.

I have talked a lot about cloning and why I thought it probably would not be something to worry about too much. I saw a news announcement that said the German government has announced that as of January 30, 2003 it is going to shift its position at the United Nations. Its original position was to look for a ban of human cloning. It now wants to ban all forms of cloning, including making cloned embryos on which you might try to do research. Germany is now fearful due to the announcements of nuts and cults Raelians that you could open the door to human cloning if you allowed people to make cloned embryos just for research. The point I want you to understand now is the German government is making its policy based on a hoax.

When I got up that day and saw Brigitte Boisselier from Clonaid saying she was going to announce the first cloned baby, I thought well, I guess I'm just wrong. I have been looking at this for a long time, and I did not think humans were clonable. I was very doubtful you could do this secretly because you would need a lot of egg donors, in the hundreds, and a lot of surrogate mothers, in the hundreds. You would need a lot of scientists to transfer the cloned embryos and a lot of doctors to manage pregnancies, including the bad outcomes. I did not think you could do that secretively. One scientist told me once that if he were stopped from doing cloning, he would do it offshore in international waters. I said, "Well you better go on a big boat because you are going to have to have quite a crowd to pull this off." Here was this lady saying she had done it.

Did anybody see this press conference? This was one of the lowest moments in American journalism. The lady comes out and says she has a human clone. She has a videotape machine next to her, which she never touches. She produces no baby, no picture, no tests, nothing. She then goes on and basically spends an hour in a recruitment speech for Raelians, basically saying they were doing this, and this is how we all came to be here. They have a very rich metaphysical view of how humans got here by alien cloning methods that I do not understand at all. There was no proof offered. Nothing.

It is as if I stood up tomorrow and said, "I've discovered Atlantis, but I do not have any pictures, I do not have any soil samples, and I cannot tell you where it is. Really, I did." I would not get an hour's time if I did this,

unless I wore a very funny looking suit and it was a slow news day. There was no proof at all. Nothing. And nothing has shown up since.

There have been two more Clonaid baby claims – one in Japan, one in the Netherlands. One was allegedly by a Dutch lesbian couple, and the other by a family in Japan who allegedly cloned a child from stored tissue.

The first cloned baby Brigitte says they have now lost touch with. Okay. They were playing on fears. Reproductive methods by homosexuals --that gets people worked up. Basically the Raelians were using this as a way to fund raise and get publicity. No evidence, no proof. You remember they wanted an independent panel and scientists were going to be appointed. This all got lost. Nothing ever happened. Nothing is going to happen. There is no reason to think they can do what no one else can do. There is nothing here, except that it caused the German government to ban cloning.

You will recall right after this announcement that President Bush, Senator Brownback of Kansas, and Representative Weldon of Florida said we have to ban all cloning because look at the kind of nuts that can do this. The Pope spoke out, saying this type of reproduction is disrespectful to life. It's morally abhorrent. Many other world leaders weighed in as well.

Cloning drives us wacky. It drives us nuts. I have a theory about that too, which is that Hollywood has used cloning to capture everything we are worried about in the genetic revolution. *Jurassic Park.* Anybody see *Star Trek Nemesis*? The bad guys are clones. There are zillions of these movies from the *Boys from Brazil, Oh Lucky Man,* all the *Jurassic Park* movies, *Star Wars: War of the Clones, Sixth Sense* and on and on they go.

Hollywood loves clones. They love them to death. They can endow them with all kinds of properties and traits that we all are afraid of, fear, or worry about. There is a powerful ethos within our culture that the crazy kooks will use cloning to take over the world. If a crazy kook announces they are about to do this, take over the world, it resonates. In the hard harsh light of science, there is nothing there. Nothing.

Remember what I said before about cloning. Failure rates are enormous, inherent difficulties to do it, no primates have ever been cloned. There is no reason to think that a wacky group on the fringe would be able to do with humans what the mainstream cannot do with primates, not even with their big grants.

We want to believe they are out there, people on the fringe that can do things that the main stream cannot do. This is not one of those situations where it's feasible. There are situations where somebody can invent something, do something that the mainstream cannot do. Cloning is so technically hard to do, it requires so much rigmarole, like surrogate mothers, egg donors, and managing of the pregnancies that go wrong. There is just no way. The Raelian report was that five babies were born out

of ten attempts. That is pretty good. It is a signal though with those kinds of numbers that it just does not square up.

Let me sort of move to the end of this talk. To recap, there are different ways to clone. We already have clones. There is nothing threatening to you about a clone. Twins are clones. Even if somebody did make a clone of Max Mehlman, it would not cause the property values to drop in your neighborhood. Nothing is going to happen to you. Cloning is not a threat or danger to you. A cloned person is no more a danger to anybody than any other person. If you look at the science and look at what is going on, every animal study out there says this is going to be very tough to do. You have to be loony to try to do it in people right now. We cannot make it work in animals. Until you hear somebody safely clone a primate, it may not be doable in people.

Why wouldn't you do it if we can get over all that, which I'm not sure you could? There are probably three reasons I can think of beyond safety why cloning might be problematic. One is that it might be strange to be made in the image or appearance of somebody else who lived before you. If you were cloned Dolly style you would know much about how you might look, much about your appearance and presentation to the world. That probably could be something of a burden. You would have people always looking at you and saying, "Gee you remind me of your dad." People now already go through this without being actually genetically identical. It could be psychological or emotionally tough.

Second, you could also get into some strange emotional relationships. If I were to clone my wife, I would be looking at someone eventually if they grew up, presuming they were healthy and it worked, who looked exactly like my wife except she's twenty-five or thirty years younger. She actually has the same genes as my wife. I can have relations with her, and I am not technically committing incest. I call these Woody Allen problems. You can find yourself waking up to people at home, relating to people in ways that would be deemed emotionally inappropriate or psychologically difficult. You could find yourself sort of falling in love or having inappropriate feelings toward people just by their appearance.

There is another kind of psychological or social issue that might be difficult. I said that genes are not destiny. Genes are sometimes destiny. Some diseases and conditions are controlled by our genes. Heavily determined by them. You would know some things about your future, you would know what happened to your parents, know certain health facts about them. You might know that you are going to get early onset breast cancer, or have a strong disposition to Type II Diabetes, that you are going to go bald at thirty. Many other traits are under genetic control, not destiny. Some things are very tightly controlled by genes. It might be disturbing to have that information and have to live with it. You can ask people today if they want to get a test for Alzheimer's disease or Huntington's disease. If there is no cure, how many of you would want to know if you have a

certain chance of getting those diseases? We cannot do anything about it, we can just tell you. Would you want to know?

Well, the clone would know. The clone is going to know; it is going to be self-evident that those kinds of diseases, for example Alzheimer's if it's genetic, is going to afflict him or her. That would be a hard thing to live with. Is that enough to ban cloning? To have to go through life looking like someone else, having social expectations, having strange emotional issues you have to master, and to know something about your future. I do not think so. They are tough problems, and may keep us watching to make sure that people who were made by cloning are able to cope and families are able to cope. I am not convinced those arguments alone are enough to say that we better prohibit it.

A major argument for prohibition is safety. Cloning does not work well, and may never work well. If it does not get any better at making animals, we should prohibit it because it is too darn dangerous in people.

Let's assume it gets safe. Then the arguments about immortality and bringing back the dead and using people as parts, commodifying reproduction to get the traits we want still falls apart, because cloning cannot do these things.

There are some issues for the clone, not for us, to think about. I think they are tough, but not overwhelming to the point you would say then we better not have it. They are tough issues, but not so overwhelmingly awful to the self interest of the clone.

The ethical issues I would maintain about cloning, for human cloning, once past safety, are psychosocial issues for the clone. These are not public health issues, not public welfare issues, and not public safety issues. Clones do nothing to the rest of us, anymore than anybody else does. There is nothing to worry about with clones coming down the street, enrolling in school, or doing anything. They would just be people. They would be no more or less the subject an intrinsic moral concern than anybody else.

This will be the basis for the final thing I want to talk to you about. What good is cloning? I told you they do this in animals. We might tolerate deformity and certain kinds of production. That is an animal right's issue. It is a serious issue, and maybe we would prohibit it. I don't know. We can debate that.

The other thing to do would be to use cloned embryos to make cells and tissues. Why? If you remember way back at the beginning of my talk, I said embryos have the power to turn into all kinds of cells and tissues. They have this power until they divide a couple of times. If you can take out the business part of the embryo, the stem cell, you would have the genetic source of tissues and cells. You could put these back into your own body without them being rejected, because they would be genetically identical to you.

The reason that scientists are interested in cloning for stem cells, as opposed to adult cells, bone marrow, or making stem cells from sperm and egg or frozen embryos is genetic identity. This would solve the problem of rejection. Rejection of organs because they are a foreign tissue is a major hindrance to doing successful transplants for diseases. Because of rejection, transplanted organs fail and make patients sick, forcing them to take a lot of drugs. It is very expensive. It leads to many retransplants. .

If you can get genetically identical stem cells and tissues, that would be a reason to want to clone embryos. You could then turn them into those cells and tissues.

So there are really three ethical issues left. If you think the Raelians are right and you are the German government, you are going to ban everything because you are worried that nuts can clone. Then, I think you would be missing the point. I do not think human cloning is ever going to work. If it does not work, why wouldn't we make these things in dishes to turn into cells. To put it another way, until somebody clones a primate, what is in the dish? Is it an embryo? A lot of people are yelling at scientists who say they are not sure what is in that dish. They have transferred DNA into an egg, fused it together, but do not know what it is.

My argument is, an embryo is something that can become a whole organism. Can they? I do not know. I think there are a lot of reasons to think they cannot. If they cannot, what you've got is a ball of cells you could turn into something immediately useful.

Second claim. If you keep it in the dish, what is it? I told you before I do not believe that anything living is in the dish. It is a bunch of ingredients. If I go by a Home Depot or some kind of hardware store and there is a fire, a lot of lumber and nails and plumbing equipment would get destroyed. I would not read in the newspaper the next day that ten houses burned down. Embryos are ingredients. They need interaction with the environment to become something. To say that you won't honor the opportunity to cure spinal cord injury or fatal diseases because you are not going to work on something in a dish seems to me to be a missed point about the moral status of what is in the dish. Even if it can become a person, it cannot as long as it stays in that dish. It does not have the missing information coming into it to trigger its development, as long as that is where it stays. In the dish, you can try to trick it into becoming something, but it is not a person.

This is called therapeutic cloning. Cloning for research, cloning to make cells and tissues. This is an activity I favor. I think this is the right way to go in terms of what we would use cloning for. Cloning is not safe to use as a way to make people, and there is no reason to try to make people. It probably would not work to make people anyway.

President Bush, Senator Brownback, and Representative Weldon believe that we should ban all cloning in this country. That is what the fight will soon be about in cloning legislation. Specter in my state, Feinstein

from California, are proposing bills that favor the allowing of therapeutic cloning, but not cloning for reproduction. The United Nations is in exactly the same boat. The Germans were going to allow therapeutic cloning, but oppose human cloning. Now they seem to be shifting. The French are uncertain. Most of the countries of the UN want to see therapeutic cloning, not human cloning. I would not oppose a moratorium on human cloning on safety issues. I have no problem with that, if that is what people want to do. I do not think it is going to work, and I am happy enough to say do not even try it.

Here is the last point to consider. China, India, Singapore, United Kingdom, Israel and a number of other countries have said they are going to do therapeutic cloning. They are going to proceed doing this research. This is not an issue that is going to be settled by what we do on research.

If they are going to do it, the toughest moral question of all is whether we going to try to stop somebody from importing anything that is therapeutic into this country if it was made from cloned embryos or cloned cells? I do not believe we should. Nor could we. I think the fastest road to becoming an ex-politician in the United States is by saying you cannot fix your spinal cord injury because we cannot bring that in here; it was made in China from some kind of cloning technique.

The real tough questions before us is not what our policy should be about cloning for research. It is what are we going to do internationally. Other countries do not see any problems, or have any reservations about what is in that dish. The Chinese definitely do not. In the religious traditions of Mormons and Jews and many Muslims adhere to, there is no problem doing research on an embryo in a dish. They do not recognize that as a person. It is not alive. For lots of cultural, religious, metaphysical reasons there are countries that are going to be pushing down this road. The question for us is not whether we ban it, but whether we ban it and refuse anything to do with cloned tissues from anywhere else. Do we effectively give it to them, and not do it ourselves, which is the other economic reality that is on the table here.

What I tried to do is tell you why, ironically, human cloning probably is not likely and why it is not going to be of interest to many people. Why the arguments against it do not hold up very much. There are reasons to be concerned, but much more from the perspective of what would it like to be a clone. Clones would not threaten or harm or endanger anybody else. That is not where the ethics of this battle is. The real battleground becomes what are going to do about cloning for research? Allow it? Not allow it?

Very much hinges on what you think about the feasibility of human cloning. That is why Dr. Brigitte Boisselier, Dr. Severino Antinori, and Dr. Panos Zavos are so dangerous. They make people think that human cloning is imminent, when it is not.. They make us think what we made in that dish is human and has a potential to become a person, when it probably does not. Because they are able to prey on peoples fears and because Hollywood and

the media love to reinforce those fears, too many people with diabetes, severed spinal cords, Parkinsonism, heart disease and nerve damage may never benefit from a technology—therapeutic cloning that might have helped them.