



We are beginning the 35th Volume of the *Bulletin* and we are looking forward to your submitting articles on science, faith or faith/science to ITEST for possible inclusion in future issues of the *ITEST Bulletin*.

In the December 12, 2003 issue of *Science* we read: "This spring, scientists and bioethicists were rocked by a report that mouse embryonic stem (ES) cells could become egg cells in a dish. The news spawned speculation that babies might someday be born whose genetic "mother" was a stem cell line. Now, two independent teams have shown that sperm, too, can develop in the lab from mouse ES cells. But bioethicists have plenty of time to puzzle out the implications before any babies-from-a-dish become reality. No one has yet repeated the feat with human cells or shown that the dish-derived mouse gametes can produce live offspring....

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".... Daley's team is trying to reproduce the feat using human ES cells, but 'we're certainly not taking it toward assisted reproduction,' he says. Developmental biologist Hans Schöler ... who showed in May that oocytes could develop from mouse ES cells, cautions against attempting to apply the findings to human infertility. The risk of introduced mutations is too high, he says, because there would be no way to test whether the ES cells had acquired mutations in the lab."

I suppose that, according to many scientists, it would be fine to breed humans this way if we could assure that we didn't induce mutations. We had better think (and pray) long and hard about the *possibilities* this opens up for human "reproduction." Do we want children produced this way in the lab? Do we want human beings with spare parts from embryos produced this way? Is it possible that the worst enemy of the human race may not be sickness or death? Can it be that medicine may finally come to be the greatest temptation for and greatest evil of mankind? Is this research medicine? It is, at least to some extent, being done by doctors. Does that automatically elevate it to what we have called medicine? Is healing necessary for medicine? These are questions that we must continually ask ourselves and those scientists who might be open to listening to it -- in season and out.

God has primary care for the planet and mankind. No matter how this works out, let us experience the peace and joy of God. In the final analysis that is what we are all about. A Blessed New Year.

Robert Brungs, S.J.

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ANNOUNCEMENTS

1. Following closely on the heels of the September, 2003 workshop on *Globalization in the 21st Century: Christian Challenges*, comes the next ITEST event, *Artificial Intelligence, Computers and Virtual Reality* slated for October 15-17, 2004 at Our Lady of the Snows Shrine, Belleville, Illinois. Since ITEST last visited this topic in 1984, the advances, developments and improvements in computer theory and technology have accelerated far beyond most 1980's projections. Therefore, the Board decided that this area of interest merited a revisit. Dr. Charles Ford, ITEST Board member and professor of mathematics and computer science at St Louis University, has invited essayists -- to be named later -- with specialties in computer science, software and robotics. Sister Carla Mae Streeter, OP, professor of systematic theology at Aquinas Institute, will concentrate on the philosophical/anthropological aspects of the topic while Sister Mary Timothy Prokes, FSE, Notre Dame Graduate School in Virginia, who has completed a book on virtual reality, will focus on the theological aspects of computers and virtual reality.
 2. *Communication Research Trends*, Vol. 22, No. 4 published a book review (pp.28-29) of *Advances in Neuroscience: Social, Moral, Philosophical, Theological Implications 2002*. Fr. William Biernatzki, SJ, review editor of the publication based at Santa Clara University in California wrote a succinct overview of the proceedings noting that "... the topic selected for discussion ...was the particularly difficult one of 'the state of scientific knowledge of the biology of the brain ...[and the] complex moral, social and theological questions raised by the new neuroscience' according to Dr. Amalia Issa, essayist and neuroscientist." *Communication Research Trends* is a quarterly publication of the Centre for the Study of Communication and Culture, an international service of the Society of Jesus established in 1977 and currently managed by the California Province of the Society of Jesus.
 3. **Invitation and Call for Papers:** The European Society for the Study of Science and Theology (ESSSAT) invites you to attend the Tenth European Conference on Science and Theology in Barcelona, Spain, April 1-6, 2004. The topic, *Streams of Wisdom?* probes the question of science, theology and cultural dynamics. "The interaction of science and religion, of ancient traditions and modern knowledge, contributes to the dynamics of cultures. It is of great interest for ESSSAT to consider the way science and theology shape and are shaped by cultures." If you would like more information on this conference, go to their web site at: www.ope-uex.com/esssat2004.
 4. The long promised venture on the ITEST website is coming soon. *Essays in Faith and Science II*, will be on our electronic bookshelf by February 1, 2004 at the very latest. This book will be available free of charge on the ITEST web site at <http://ITEST.slu.edu>. Originally published in 1997 as a spiral-bound book for campus ministry discussion groups on faith/science issues, the "web" book has been expanded to almost 300 pages with articles by various authors, mostly ITEST members, under the general categories of faith/science and science, technology and theology. Titles include, environment and the believer, reproductive biologies, the Christian notion of freedom, spirituality of the scientist, evolution and the Bible, Christianity and modern science, animal research, reproductive technologies, stem cell research, and others.
- Parish adult discussion groups often searching for such material could well benefit from a treasury of wide ranging topics within the area of faith/science and theology/technology. The articles for the most part, designed to be short in length, can be read within one sitting, reflected upon and analyzed within a small group or even by oneself. We are working now to make this "e-book" visible on the first page of the ITEST home site without disturbing the original design of the page. Let us know your response to the revised edition of the book; we would be glad to receive any suggestions we may use to effect a wider distribution on the web. We already have links with other similar web sites, but we would like to expand that capacity as much as possible.
5. We are waiting to hear from a large foundation about our proposal for producing faith/science modules at all levels of education. This idea grew out of the dilemma we have experienced in the field of faith/science during the past 35 years -- good scientists often have little more than a grade school education in their faith and conversely, theologians have little education in science beyond the grade school level. The program summary submitted to the foundation reads: "...funds for planning a project to benefit Christian students and their Christian churches by constructing, developing and implementing a faith/science program for Christian affiliated schools, K through adult. Through this project we will prepare students to understand better the place of science and technology in their lives as Christians and to witness to this awareness as people educated in and committed to their faith." We will keep you informed about this project in the following months and we may be calling on volunteers to help us with its construction as we proceed with the planning.

OBITUARY OF DOCTOR JOHN MATSCHINER

This has been an incredibly hard year on the past and present members of ITEST. First Bob Bertram died, then Dick Cusack and now John Matschiner among many other faithful members. That means that another of the founding members (John was member #2) has gone to his reward. I strongly feel that now we have another member praying for the success of the group that was so much a part of their lives.

I (Father Brungs) met John 37 years ago. Dr. Leo Hohnstedt, professor of chemistry at Saint Louis University, provided the introductions over a couple of beers at the campus watering hole. John and I hit it off from the beginning and the seeds of a new organization began to sprout. We initially gathered a few other interested people around us, held some meetings with Fr. Edward Schillebeecx, OP and Fr. Karl Rahner, SJ. back in the 1960s. Then, working with this and other experiences in the chosen apostolate we incorporated ITEST as 501 (c) (3) corporation and obtained federal tax exemption -- again still in the 1960s.

John had a very serious bout with cancer around this time and subsequently had successful surgery for colorectal cancer, but from this time on he had to wear a colostomy bag. This put a damper on some of his activities but never really impacted the work he did for ITEST nor his devotion to it.

The next decade saw John's departure from the Biochemistry Department at Saint Louis University where he was working on vitamin K under Dr. Edward Doisy, a Nobel Prize winner in 1943, to the University of Nebraska Medical School in Omaha, Nebraska. John remained deeply interested in and committed to ITEST during this time. He faithfully attended and contributed to most of the ITEST meetings while he was in Omaha except for the several years when his wife Mary was dying from cancer. John stayed in Omaha and took loving care of her. I think I can say that few men loved their wives more than John loved Mary.

In the last several years, however, John at times fell into deep depression. He had several bouts of it but always managed to come out of the darkness. Several years ago John had a serious auto accident on a farm he was turning into a retirement getaway in central Missouri. Until that accident, John was lively, enjoying himself and the farm and looking forward to developing the land for his grandkids. After the accident he began to go downhill and closed down many of relationships. He was truly a victim of a deep depression. I am told that John contracted pneumonia a little while ago and died of complications from that disease.

John was an uncomplicated human being, saying what was on his mind in a simple and honest sort of way. At the same time he was a most complicated human being; he rarely left you in doubt of what he thought yet he was very close about things that affected him most deeply. John was quite knowledgeable about things biological and chemical but being human he had gaps in things concerning some of the other sciences like physics. But we all have such gaps. There is hardly anyone running around these days who is truly a Renaissance Man (or should I say Person?).

While I would really like to say more about my relationship with John, some of it is too private to speak about. I can say that John, for all his intellectual power, was really more of a lover than a thinker. His relationship with his wife was one about which he never went into any great detail, yet he loved her with his whole being. He loved the countryside, especially the mountains and forests of the West where he grew up -- as well as the woods and fields of Missouri. I think John much preferred the life of a "guy in the woods," to the scientist at the bench. Yet he did his science uncommonly well.

Now I have once again to adjust my life to the loss of another good friend. It won't be easy but I will be able to do it, knowing that John is out of his depression now and enjoying himself in heaven. John often remarked how he wondered what heaven was like, how he knew that he could not even imagine the joy and love he would know if and when he got there. Now he knows.

How can I sum up a friendship of forty years in a few pithy statements? How can I capture John's smile, especially after he had just come out with some outlandish joke? I can't. I've known John at the top of his game and the bottom and I can't choose which I preferred. There was some quality about John that let you know your friendship was deeply appreciated. John was always around in a pinch, always ready to help in any way he could. That was John as I knew him.

John will be missed -- as is Bob Bertram and Dick Cusack and the others that we have lost this year. To them all I say, "we shall not forget you. We shall meet again and when all the faith/science issues will have been resolved forever we'll link our arms and march on that heavenly commissary and pour a drink to celebrate the successful culmination of our work. Then we can return to our true and only vocation -- loving God and each other with all our being." Take care, John, and God bless you and Mary.

STEM CELLS, CLONES AND PATENTS

Robert A. Brungs, S.J.
Director: ITEST

INTRODUCTION

On an Internet site (Culture and Cosmos) it was reported recently (December 9, 2003) that

"A little noticed House of Representatives vote yesterday on patent law may prove to be a profound victory for the fight for the Culture of Life in the United States.

"In a 242 to 176 vote, the U.S. House of Representatives passed H.R. 2799, the Federal Year 2004 Commerce-Justice-State appropriations bill. Imbedded within the 1000-page bill is an amendment introduced by Dave Weldon (R-FL) banning any governmental right to process and issue patents of "human organisms" such as human embryos (including those created in vitro) and cloned humans....

"Advocates of the ban on the patenting of humans argue that such patents would violate the 13th amendment of the Constitution, which prohibits 'slavery or involuntary servitude,' since the patented humans would be legally owned by others. In fact, the US Patent Office (USPTO) has advanced this argument at least since 1987, when it decided that 'a claim to or including within its scope a human being will not be considered patentable subject matter... [since] the grant of a limited, but exclusive property right in a human being is prohibited by the Constitution.'

"In addition, the proponents of the ban contend that human life would be transformed into a commodity to be commercialized if such patents were issued. As Lori Andrews, director of the Institute for Science, Law and Technology at the Illinois Institute of Technology stated in a recent Chicago Tribune opinion piece, 'This obscure question of patent law will have a profound impact on the type of society our children will grow up in. If patents on human embryos are allowed, then biotech companies will market babies with certain traits just like Perdue markets chicken or Ford markets sports-utility vehicles.'

"The biotech industry, represented by BIO, the Biotechnology Industry Organization, contends that the amendment goes much further than the 1987 US Patent Office decision, and that it will stop potentially life-saving medical research. BIO argues

that if such a law were passed, it would prevent patents on cell lines, genes, living organs, and stem cells, which 'sets a dangerous precedent and stifles research.'

"However, Weldon argues that BIO opposes all regulations, including the USPTO regulation. According to Weldon, 'My amendment has exactly the same scope as the current USPTO policy, and cannot be charged with the radical expansions of policy that BIO and its allies claim. In reality, BIO opposes this amendment because it opposes the current USPTO policy as well, and has a better chance of nullifying this policy in court (or having courts reinterpret it into uselessness) if it lacks explicit support in statutory law. This goal is apparent from BIO's own 'fact sheet' opposing the amendment. There BIO argues that human beings should be patentable, if they arise from anything other than 'conventional reproduction' ...In other words, humans should be seen as 'inventions' and thus be patentable on exactly the same grounds as animals are now.

"Andrews thinks BIO is driven by considerations of hefty potential profits. 'What, then, is BIO's real agenda? Perhaps where others of us see smiling babies, BIO sees dollar signs. With more than 4 million births a year in the United States, the market for genetically enhanced embryos might be as lucrative as that for Prozac or Viagra.'¹

Writing in *Science*, on November 24, 2003, Jocelyn Kaiser published a very brief notice entitled "Stem Cell Groups Fret Over Patent Amendment."

"As *Science* went to press, advocates of stem cell research were working furiously to head off a congressional provision that they said could strangle research on human embryonic stem cells.

"A coalition of biotech and patient-advocacy groups was alarmed last July when the House inserted language into a 2004 spending bill banning patents on 'a human organism.' The U.S. Patent and Trademark Office already denies patents on a human being but has never clarified how that is defined. Advocates worried that the language would rule out obtaining patents on human stem cell lines, which are derived from

embryos. Last week, Sam Brownback (R-KS) circulated language excluding stem cell lines from the House-Senate report on the Commerce-Justice-State appropriations bill. But Carl Feldbaum, president of the Biotechnology Industry Organization in Washington, D.C., says 'it's not much of an improvement,' adding that 'it's a backdoor attempt' to make patent policy. Congress hopes to complete work on all 2004 spending bills by next week."²

Two weeks later (December 5, 2003) *Science* again carried another brief piece entitled "Congress Moves to Write Human Patent Ban into Law" -- but clearly with a different set of concerns from that of the Culture of Life Foundation.

"Congress has moved to cement into law U.S. Patent and Trademark Office (PTO) rules that bar the agency from issuing patents on 'human organisms.' But researchers are relieved that lawmakers have made it clear that the ban won't apply to stem cells derived from human embryos.

"The provision, sponsored by Representative Dave Weldon (R-FL), is part of a massive spending bill now before Congress (see *Science*, p. 1636). Stem cell scientists and companies feared it might complicate efforts to transform basic stem cell findings into practical therapies, and after discussions last month (*Science*, 21 November, p. 1311) the House and Senate agreed to include clarifying language in a statement that accompanies the bill. In addition, PTO Director James Rogan told Congress in a 20 November letter of support that the law is 'fully consistent' with current policy.

Slipping patent policy into a spending bill 'sets a dangerous precedent,' says Biotechnology Industry Organization policy chief Michael Werner. But his group is satisfied with the arrangement."³

WHAT IS A HUMAN?

The opposing sides are pretty well decided that they are both correct. But it is equally clear where the real problem between them lies. That unresolved (and rationally insoluble) question is the definition of the human being. "What is man that you should spare a thought for him, the son of man that you should care for him?" (Psalm 8) That question was asked about three thousand years ago. Men have been trying to answer it since it was asked, but after three thousand years and many philosophies we are still looking for (or awaiting) an answer. The rational question that haunts us now and will continue to haunt the honest among us is the same ques-

tion the Psalmist asked: who or what is man? We cannot answer this question fully with logic alone. The only true answer depends on faith as well as reason. As it is a pre-Enlightenment question, it must have a pre-Enlightenment answer. Any other answer will not suffice. It seems clear to me that we need at least a philosophical answer to the question or the problem will never be resolved short of a judicial fiat. If a "backdoor attempt" by Congress does not resolve the issues of embryonic stem cell research, cloning of human beings and patenting of human embryos maybe a "backdoor attempt" by the courts will suffice. A judicial attempt would almost certainly satisfy BIO and research scientists straining at the bit to do research on embryonic stem cells. Adult stem cells seem to work just as well but there is always the lure of "potentially life-saving medical research" -- still potential. As the late Dr. John Matschiner, a biochemist of some note, used to say: "back in the old days we use to wait until we had actually accomplished something before we went public." No attempt to use embryonic stem cells that I am aware of has been accomplished successfully.

From a merely logical point of view it seems to me that both sides merely state that the embryo is human or that it is not human. One side asserts its humanity; the other side denies it, especially in the case of parthenogenic life. But, after all, even a "human" embryo obtained asexually is said to have human characteristics. Where did these characteristics come from?

I hold that a human embryo is a human being, but I hold it because I "believe" it as well as "know" it. I believe it because I believe in God. If I did not believe in God I too could have all sorts of ideas why the embryo is not human, or why it might be patentable. After all, why not? It probably won't be allowed to live beyond the time of the experimentation or the taking of its organs. I believe it was G.K. Chesterton who said that in an age of unbelief credulity is rampant. But it had better be politically correct credulity. We can't allow any politically incorrect ideas to gain currency. The humanity of the embryo may be one of those politically incorrect ideas. If the embryo is human, we might have to treat it like a human being. This may not make any difference a few decades down the road because we may find it expedient to treat human beings any way the powerful might choose. That is not impossible. Profit may become more important than our common humanity; it may happen.

None of the very fine qualities that we like to think of as human characteristics -- life, liberty, human happiness, freedom, -- are permanent gifts of the Creator. We can give them away to those who have power or prestige or presumably know what is better for us.

These are things that we must continually fight to keep. These are the very traits we should think about as we contemplate things like abortion. All the major advances of biology in the last 50 years ask the same question: that of the Psalmist. "What is man?"

PATENTING OF LIVING SYSTEMS

At the *ITEST Conference on The Patenting of Recombinant DNA*, March 13-15, 1981, Mr. Roman Saliwanchik summed up his presentation as follows:

It is common ground that the patent system is a progressive system which benefits the public. It is *not* a system which gives an inventor a right to force something upon the public against the public will. This arises from the fact that the patent grant allows the patent owner the right *only to prevent others from using* the patented invention during the 17-year [*presently 20 years from the date of application for the patent*] term of the patent. For example, a patent on a new medicine *does not* give the patentee a right to sell the medicine. We all know that before medicines can be marketed the Food and Drug Administration must approve.

Those who extrapolate the decision allowing the patenting of living microbes to patenting higher forms move faster than the law. Without much doubt many inventions will be made in the genetic engineering field relating to improved medicines, better ways to grow crops, raise food animals, provide energy, and preserve the environment. These will be new, unobvious, and useful inventions. The patenting of these interventions will require creative patent services to meet the unyielding patent law requirement of a full disclosure of the invention. The law will grapple with a variety of possible procedures, and this will take time.

This time factor becomes even more extensive where artificial barriers are erected by those wanting no change at all. Well, the truth of the matter is that change and advancements are the nature of science. It behooves the public to become knowledgeable in these changes as soon as possible. The patent system provides this early alert system by its disclosure feature. Any act which weakens this public disclosure system does not stop science; it merely stops scientists from disclosing their inventions to the public.⁴

Mr. Saliwanchik concludes by quoting Robert Penn Warren (1946) *All the King's Men*.

The end of man is knowledge, but there is one

thing he can't know. He can't know whether knowledge will save him or kill him. He will be killed, all right, but he can't know whether he is killed because of the knowledge which he has got or because of the knowledge which he hasn't got and which if he had it, would save him.⁵

In the discussion Mister Saliwanchik explored in some detail the *Bergy* and *Chakrabarty* patents:

After I filed the application [*for Bergy case*] I decided to put a claim into the application directed to the microbe itself... It is a new micro-organism, and it is an essentially pure culture. The patent application I originally filed was directed to a process for making an antibiotic, a very valuable antibiotic, namely, lyncomycin. I'm sure some of you have taken it....

I had claims in the application, which I filed in the Patent Office, to a process for making the antibiotic using this culture. I subsequently amended the application to put in a claim directed to a biologically pure culture of this micro-organism. As soon as I did that the Patent Office went to pieces. They rejected it: "you can't patent a living thing." And yet for many years I have been getting patents with claims ... directed to a process using a living thing. Yet when I tried to claim the living thing itself, I was denied. The application was rejected in the Patent Office. We went up to the Court of Customs and Patent Appeals (CCPA), which is the highest court before the Supreme Court for our system of appellate procedures in the United States. That court was very receptive to this idea, and they reversed the Patent Office's position. As far as the CCPA was concerned we did have patentable subject matter. The *Bergy* case was the first decision by a court in the United States that the patent system was such that you could patent a living thing, a micro-organism. Now remember, this is a micro-organism. This is not a human being. Far from it!

The *Bergy* case was followed by *Chakrabarty*. That case was a little different from *Bergy* which dealt with a biologically pure culture. *Chakrabarty* was working on *Pseudomonas*. There are four *Pseudomonas* micro-organisms... These four micro-organisms had four different capacities to utilize hydrocarbons. The capacity to utilize hydrocarbons comes from plasmids within the bacteria themselves. They have the genes on those plasmids that enable the micro-organisms to utilize a certain hydrocarbon. *Chakrabarty* took these intact plasmids out of four *Pseudomonas* micro-organisms. This is what is called genetic engineering, but it was not recombinant

DNA. He did not change these plasmids. He took these four plasmids and put them into one *Pseudomonas* micro-organism. So previously, where you had four *Pseudomonas* doing four different things, you now have one doing all four things. This is the organism that Chakrabarty wanted to get patented. This organism was considered to be desirable where there are oil spills. You can just spread the organism out on the oil spills and, presumably, the oil spill would be digested, and then the fish would eat the end product.⁶

Chakrabarty came up to the CCPA after the Bergy case. This Court, the CCPA level, reversed the decision of the Patent Office in the Chakrabarty case, just as they had done in the Bergy case, citing Bergy as a precedent. Subsequently both went to the Supreme Court. Bergy dropped out to simplify the issue for the Supreme Court. The issue was whether or not a living thing can be patented under the U. S. patent statute. That was the single issue in both cases. So Chakrabarty went up to the Supreme Court and in June, 1980, I believe, the decision came out that in fact a micro-organism was an entity which was not outside the patent statute....⁷

The point that living micro-organisms can be patented having been made, the discussion then passed on to Father James Schall, S.J. As a part of his intervention he mentioned:

In dealing with the issues involved in recombinant DNA I find myself on both sides of the question. This is because I make a distinction between working on micro-organisms and working on human beings. My reason for that is that every time questions come up we always justify all these processes insofar as they have something to do with aiding mankind. The opponents of these processes keep saying that all this science and technology is about to get out of control. They promote another form of what I call apocalypse, namely, that we are going to destroy the world because, in the case of recombinant DNA, somebody may invent a bug which we wouldn't know how to control. This is given as a reason to stop the whole process.

Also of interest to me, among many other things, is the question relative to the relationship between faith and reason. The question arose in the work of Thomas Aquinas and arises in contemporary philosophical literature. I find myself in this context, relative to science and technology, on the side of those who argue that the human intellect is capable of both knowing and controlling and, indeed, reorganizing, many things. The human intellect is

capable of doing that, and, therefore, to some degree ought to do that as its natural and good function -- provided we have some kind of an understanding about ourselves and our relation to the rest of the cosmos. This, of course, brings us back to the first part of the Book of Genesis, where it deals with the relationship of mankind to the rest of creation....

Father Schall then moved to a slightly different aspect of the issue:

.... One of Leo Strauss's great questions is precisely that of the nature of the human intellect, the relation of the human intellect to the political order, and the relation of the political order to everything else. In that context he is deeply concerned with the relationship between revelation and reason. He is concerned also about how to talk to an intellectual community in the modern world which will not listen to any questions which come from revelation.... Therefore such questions must be broached very prudently. He says, however, in his book on Machiavelli, that we should be about recruiting people who will listen to these questions.

.... There is another side to this question which is pertinent to me here. One of the basic issues in both political theory and philosophical theory is: how is the political order limited? I think that this issue has arisen from religion. But why is the political order not absolute? Aristotle suggests somewhere that, if you do not have a theoretical order -- if, in other words, you do not have a metaphysics -- then you can create whatever you want to create, including human beings. Therefore, we have a great and deep interest in trying to understand what our intellectual limits are. What are our own limitations? What are our limits in relation to nature, in relation to God....?

Such people [*among whom Father Schall includes Jeremy Rifkin*] seem to me to say that we must give the state a wide degree of control over all these new developments. My own viewpoint [Schall] in all of this is that our intellects, by virtue of the fact that they are human, are limited. Yet, As Aristotle has pointed out, they are made to know all things. We know all things by virtue of experiment, by virtue of knowledge, by virtue of reflection. So there is a quite positive side to the kinds of knowledge we shall be discussing.

Let me conclude with the idea that the whole scientific process we are talking about is a good thing, provided we can have some kind of systematic un-

derstanding about what we are and how what we are relates to the production of, guidance of, control of those things which we make under the direction of our intellects. Thus, it seems to me, that on positive (the Aristotelian) side of our tradition we can do these things. But we ought to do them with a conscious understanding of what we, as human beings, are.

This brings me back to my question about the relation of revelation and reason. I would argue that historically -- and probably still in the contemporary intellectual world -- we find out with the guidance of revelation what the human being is and how we are limited.

I conceive that revelation has been addressed precisely to our reason. Revelation is addressed to us, in order to teach what we are, and in knowing what we are, we realize what are the reaches of our intellect and what we can do intellectually. If we do have that understanding, then it seems to me that the fears which are in all of this literature about what might happen have a very strong, solid foundation. If you follow St. Augustine, as I tend to do, then there is a very worrisome notion about what is possible to and for us, if we are not careful in the guidance of ourselves and one another in the public order.⁸

In response to some questioning about the advisability of assigning patents for living micro-organisms, Mister Saliwanchik said:

The Supreme Court is the highest court we have. The Supreme Court is simply interpreting the statute. They are using statutory interpretation techniques. There is some argument about what should be interpreted into this statute. Five of the Justices thought in a certain way. That is a majority, and that is the system. That doesn't mean that others can't do something if there is any disagreement. If Congress decides that this subject matter should not be patented, it can legislate. Whether or not it would choose to do so is another thing.... Congress has looked at the DNA issue ever since the middle seventies, ever since the DNA research started. Congress is well aware of research in this area.

In the following paragraphs Saliwanchik waxes "prophetic":

Granting a patent on a research invention does not form a necessary condition for the research work to be done. Some people think that, if no patents were granted on this type of intervention, the research

might disappear. But I think the research would continue anyway. The research has its own momentum. Most of the universities throughout the world are into this research. The real things we have to do is to understand it....

But for now the case is one of statutory interpretation only.... In the context of these two interventions which we are talking about, microbiological inventions, it is absolutely proper. When we move up to a higher form of life, there will probably be more resistance. There will be different problems. What we are doing here now is trying to get at an understanding of what has to be done at this stage. That does not mean that it can be extrapolated rapidly to an area that you don't want to see happen.⁹

At this point in the meeting the discussion turned to general comment from the floor. The first notion that surfaced was one of practical importance. It concerned the ethical treatment of these issues. The technology is already here and the most important part of the ethical treatment of recombinant DNA and concerns over patenting center on questions of what we will do with the knowledge we are gaining. How will we use this knowledge and these powers to change organisms which we are acquiring. This topic was particularized somewhat quickly into a series of questions about what we "value" in our culture, what the culture deems important.

Academic science once was thought to be the only "real" science. People were simply looking for "the truth of how the world was put together." There was indeed much of that but even the "purest" science can be used for other purposes. Some science was used for the purposes of discussion of an idea. That may seem quaint in the light of Francis Bacon's work (and propaganda) on the nature of science. Bacon's work certainly interested people in the notion of science as controller. After all, it is a truism that knowledge is power.

Now the question of priority in science has assumed a new importance. It was always important, but in a commercial society, winners in the priority race are commercially rewarded -- even to millions of dollars, or more. We have not suddenly jumped from the "search for truth" to the "desirability of patents." It used to be in physics fifty years ago or so that the search for truth was accompanied by the need for grants. But even before that, questions arose concerning priority -- take the case of Newton and Leibniz arguing over who was first to discover the calculus.

This need for establishing priority was definitely increased with the establishment of prizes, like the Nobel

Prizes in the sciences. The first scientist to publish a discovery is indeed in line for a Nobel Prize provided the discovery turns out to be "important" or to be really commercially viable. In the case of obtaining a patent being first seems to be an absolute requirement. It doesn't pay to be second. This, however, is not something that is all that new.

Joseph Fletcher, writing years ago in the *New England Journal of Medicine*, stated that in view of the Supreme Court's decision on *Roe vs Wade*, no one has the moral right to question someone else's decision to opt for abortion. His particular stance, namely, that the Supreme Court adjudicates in the area of morality is a position we should look at seriously. It has implications far broader than abortion. It equates legality with morality, with moral rightness. Surely moral rightness is a far broader category than legality. There is indeed a moral question involved in "owning life"; it raises questions about society, free enterprise, democracy and so on. Make no mistake about it; our freedom hangs on a thread. It always has. There are always people who, given the power to do it, would "enslave" the rest of us. But in reality, are we more than merely the stewards of creation? This is in no way meant to denigrate the notion and the vocation of being a steward. It is merely to situate us vis-a-vis God. We did not create the universe and we should thank God for the privilege of regulating our relationship to creation. It may well be that there are limits on our alteration of creation -- something we should always keep in mind as we go about making changes.

It is fascinating to realize that *precision* and *prescind* probably come from the same root. At least they sound a lot alike and the action described in both instances is about the same. We can get precision by prescinding from a lot of real-world limits. That is part of what is meant by limits in nature. It may be more precise to have something to say about the vibrations of an infinitely big drum head, but is it more valuable in the long run to talk about a real drumhead. That is behind the whole notion of boundary-value problems. To have something to say scientifically means in many cases to "prescind from" the very things that are more interesting in real life. That is one of the problems with linearity. Not very much in life is truly linear.

At this point in the meeting discussion turned to the fascinating notion of progress. Progress had been used a couple of time previously during the meeting but it finally surfaced as a topic in its own right. Progress is one of the presuppositions with which we are constantly working. Since the dawn of civilization it has been the goal, maybe unconscious in the beginning, for parents to want their children to be at least slightly better off

than they were. I don't think there was probably ever a time for parents to wish that their children would be worse off than they were. And if it did happen, it most likely happened on an individual level. I doubt that it was ever a social response to any situation. Somewhat hidden in the notion of progress is the idea that we are much better off than people were, say, a thousand years ago, five hundred years ago, fifty years ago. In terms of the physical and sometimes the social aspects of our culture, that is clearly true. It is certainly true in the area of transportation. Two hundred years ago a horse's gallop was the top speed available for most people. There quickly followed travel by train, plane and now space-craft. People are moving faster and faster; some say culture is rocketing along as well. Science, in almost every sense, is advancing at an ever increasing pace.

What the men of the Renaissance saw was highly conditioned by the unusual platform from which to take their retrospect. They saw behind them the high peaks reached by the Greeks, representing for them the summit of human reasoning. Then they had to cope with the loss of this summit. They saw themselves as engaging in recovering these peaks. In a lot of ways the Renaissance was more dubious about the notion of progress than was the much-maligned Middle Ages.

PROGRESS

The whole notion of progress has something to do with Christianity's providing a meaning for history as well as a purpose to which the whole cosmos moved. The idea of progress represented the secularization of an initially religious attitude which looked to some far-off time for fulfillment. The prevailing view saw history as leading to something great -- even if only "later." As usual, even for Renaissance thinkers, despite defending the ancient Greeks and Romans, that military science ought to have at its disposal all the then-modern inventions.

Even in the sixteenth century, though, some thought that "modern" inventions -- the mariner's compass, the invention of block type, the use of artillery -- were every bit as momentous, as pregnant of the future, as the inventions of the ancients. The new worlds revealed to Europe by the voyages of discovery -- the explorations of Vasco da Gama and Christopher Columbus -- and the bulk of the books produced by the new printing press were a very heavy counterweight to the superiority of the ancients.

It was not very long before it was realized that certain forms of scientific knowledge profited from the lapse of time and the accumulation of data. Even Ptolemy was seen to have benefitted from the work of his predecessors. So, too, Copernicus benefitted from the work

done by others.

Basically, achievements in science propelled the whole notion of progress into ascendancy. Fontenelle (d. 1757) pointed out that science was still in its infancy with a future before it. People began to dream about and write about the time when "this mechanic civilisation" would be taken to countries that were not so developed or were undeveloped.¹⁰

Fontenelle set out to show that nature in the seventeenth century is the same in all ages -- she can still put forth men of genius capable of holding their own with the giants of ancient times. He asserts that nature in the seventeenth century has lost none of her prolific power -- the modern oak-trees are as big as those of ancient Greece. At the same time -- maybe almost incidentally -- the idea is asserting itself that a general improvement is taking place in conditions, and particularly in things that concern the welfare of ordinary human beings.

It was these ideas, a growing sense of optimism in things -- that found their way into the early legislation on patents. It was this spirit, maybe not fully developed in consciousness, that was behind the attempt in the Constitution to help develop a sense of industry and a note of optimism about the future. What happened to the notion of progress in the nineteenth century in France should not directly concern us right now. Now it is sufficient to say that the Founding Fathers had a definite sense of the rightness of human endeavor in the "arts and sciences."

This was not a deep theoretical vision of the way things are or ought to be. It was an abiding practical way of approaching the notion of the human's place in creation. And perhaps, the luckiest of the patent holders could look forward to a reward. This was done, of course, before the notion of progress became the Gospel of Progress with people like Proudhon who was a prophet of human, rather than divine, providence. The religious, or rather the anti-religious, notion of Providence was still in the future when the Constitution was written.

Part of our intellect is directed to discover what is knowable in the universe. But the major problem is not in the arena of knowledge. Even if all of knowledge and the uses to which it is put were in the hands of some monastic order or other, it would still not foreclose somebody using that knowledge for his or her own ends. A person who is capable of knowing the most sophisticated kinds of things, who is able to sort out the most involved things, is also capable of being selfish, of being a wretch. Whether knowledge will be used for good or for evil depends on human will, not intelli-

gence. Really, the meaning of our humanness is at stake in all the debates over the goodness of genetics and the patenting of living things. Decision is located in the will.

It may be said that the greatest danger to society comes from knowledge divorced from the structure of things, apart from the structure of the cosmos. The danger does not lie in knowledge. The atom or molecule is not dangerous. If we were to get into a position that any knowledge is dangerous then we are going in a Luddite direction. This is a road that we probably don't care to travel.

Some have mentioned the takeover of science by some ideology or other. At the risk of some oversimplification we can mention three great unitary moments in science over the last 300 years or so. In 1687, with the publication of Newton's *Principia* we had a powerful scientific synthesis which told us that celestial and terrestrial mechanics followed the same laws. This was a most important result, a most significant unifying principle. But very rapidly the science of that day was taken over by literary skeptics like Fontenelle and Voltaire. Among other things, they used the success of science as a club to beat existing institutions over the head.

The same was true of Darwin's synthesis, the unity of the species. That system as well as that result was taken over to a great extent by the progressivists. We are referring to Proudhon, Auguste Comte, Spencer and others -- the Gospel of Progress people. Again, the success (and in this case also the content) of science was used as a weapon against contemporary institutions. Now we are at the beginnings of another great unification, namely, the unity of all life at the cellular level, a great advance over the Darwinian synthesis.

We may have the potential for another ideological takeover of applied science, the most important aspect of science these days. "Pure" science has probably never existed despite the fact that it was lauded fifty years ago as the only true science. Science has always been a part of something else, as it should be. It is part of human life. One of our great worries nowadays is which ideology, or what set of concepts, is going to direct our future use of science.

BIOETHICS

While we are discussing patenting it might be advantageous to discuss priority, patents, winners and such. Maybe we ought to be discussing cooperation and matters of interdependence. These considerations of cooperation and patenting may be of very great ethical concern and of significant political importance. What will we finally decide as a culture as to what we value

and work for? Will we still decide in favor of priority and winners of the patent race or will we stress cooperation and interdependence. Can we still continue advancing the notion of being a winner in today's society which more and more stresses interdependence. After all, the "Environmental Age" has arrived. But so has interdependence and competition. Is it true historically that our need for interdependence across the globe has grown out of the successes of those people we have designated winners? Are we in a position to begin to contemplate planetary interdependence apart from the successes those "winners" in the patent races have had? Is interdependence dependent on some sort of independence, on some form of competitiveness? It is not an either/or world; it is rather a both/and world. We are trying, however slowly and haltingly, to bring these shattered pieces back into unity. Can competitiveness and interdependence be integrated? We have to try.

Finally, let it be noted that there are several types of interdependence. In a cave society or early agricultural society there is need of interdependence for sheer survival. But as society developed and a "leisure class" evolved, the need for a conscious feeling of interdependence declined and people more and more looked on themselves as radically independent. It is fervently hoped now that we have grown beyond radical independence to an interdependence in terms of a higher degree of planetary stewardship. That would indicate a significant amount of progress. Whether or not that sense of stewardship would clash with the idea of patenting and the modes that are set up to accomplish and oversee it remains to be seen.

The professional ethics that a scientist is taught and learns at his or her mentor's knee involves mainly that a scientist should not fudge results. Another point: do not steal someone else's data or results. The ethical treatment is really a question of ethical method; the question of whether or not a particular project be undertaken or a particular thing should be done is rarely, if ever, raised.

Should we find out, for example, how the cell works? Yes, but ethicists never get around to helping us to ask questions about it until we are already in the process. Then, ethically, every one seems to get upset because it is already happening. Some take the occasion to give up hope that we can truly have anything to say about the applications of specific cases that will come later. The "should" case must come first. Should this be done? Should it be developed? Should it be used in this particular case. If we give up asking these questions simply because any field is too big, say, recombinant DNA, we will be in a lot of trouble.

Students in bioethics will, above all, need a personal relationship with God if they are going to be effective in ethics and if they going to be good Christians. Let's note, though, that in all these discussions, we are talking about bacteria which, by the way, are alive. But they are certainly not higher organisms.

Most of those present at the meeting seemed to agree that the ultimate purpose of patenting is commercial. Included in all of this is competitiveness -- who will get there first -- the protectiveness, the secrecy. But all of that seems to consider patenting as some sort of thing isolated from the human race. The real question, it was stated by one attendee, before anyone ever goes to the patent office, is whether we should patent anything. The answer would have to come from a larger and more representative group than scientists and technologists.

At this point in our meeting a theologian made an important theological intervention. He began by stating that we put together the moral concern and the particular expression of that concern, namely the patent process and its implications. "As stated, it was written into the Constitution itself; it says something very ancient in American law. It does project a somewhat optimistic vision of the world. It supposes that human enterprise is a value, that it should be rewarded, that its net effect upon the human condition is good rather than evil.

Over against this in our constitutional system is the Commerce Clause, which in recent times has been put into the service of a kind of a vision of an administered world, a world in which the various perils to be avoided are avoided by an essentially bureaucratic organization of human conduct. These two visions, as explored in our recent conference on government regulation, are at some odds with each other. For example, the anti-trust legislation, which has been developed on the basis of the Commerce Clause, seems to be directly opposed to the quasi-monopolistic grant of rights which patents are.

Thus we have a quandary. Should we, in this country and in the western world generally be optimistic about the future and keep to the sort of principles that seem to underwrite the patent process? Or is the ever-increasing necessity, as it appears from many viewpoints, of an administered world -- one made safe; therefore, and one is fundamentally fearful of a future which is uncontrolled -- is this vision the one that we should consider to be more Christian? It seems to be the function of such intelligence, as we can bring to bear on these problems, to justify one or other of these mutually exclusive visions of the future. I believe that in their exclu-

sivity they exhaust the possibilities. I'd like to explore this analysis a little further.

Our understanding of our existence in time generally conforms to three paradigms. That existence can be thought to be simply, radically meaningless. It is therefore in need of a meaning which would be imposed from the outside or else is fundamentally engaged in the pursuit of some sort of cataclysm, a grand finale, a *Gottterdammerung*, some sort of ultimate disaster which inevitably approaches. This kind of pessimism, I suspect, finds expression in such films as *Jaws*, *The Towering Inferno*, etc. -- these petty apocalypses that attract a great deal of attention today, and which seem to resonate to something in the culture.

Over against this is the mechanist's view of the future. This has a zero sum optimism: everything will work out alright, if we are very, very careful. In this kind of a world, freedom is an absurdity. It is a problem, something to be minimized. You try to limit the consumption of whiskey. You don't drive fast automobiles. You do various things which restrain the boisterousness of the human condition. In this kind of a vision, the ultimate evil, sin, is any kind of conduct that eludes the rationalism of the mechanism.

This kind of an administered world -- to use the standard phrase -- has great attraction for some kinds of minds, and less for others. There is an alternative which would protect the freedom of the meaningless world: whatever you do doesn't make any difference, so you might as well do it. This would protect the structure of the mechanized world in which things, however limited, seem to have at least the possibility of being understood.

There is a third rationale, a third paradigm. This is the supposition that the future is not meaningless, but rather mysterious. That is to say that we are in search for a meaning in which the synthesis of truth and freedom is a guarantee, sustained not by us but by God. This then is a covenanted world whose guarantee is a human guarantee, but not one given simply by humanity. Then we are immediately engaged not in philosophy or in science, but in the theological inquiry. From the Christian viewpoint, the human future, and the ultimately human character of the objects of our knowledge, is guaranteed by the fact that this world is created in Christ. Often this is a sort of religious expression which has no real content. "Created in Christ" sounds nice and pious, and we can all agree to it; but we don't always look at it in a very profound way.

What it really means, if I am not entirely mistaken, is that the very structures of the world are measured by what a human being is. It is not then accidental that our minds are in some sort of odd consonance with the materiality that we investigate. It is not strange that the processes in time and space, into which our physicists inquire, find some sort of response in our own thought processes. This would seem to be the basis of whatever optimism motivates the scientific intelligence. Scientific curiosity moves into an ever-increasing and ever-expanding inquiry, which the scientist is utterly confident will not be disappointed or frustrated. It is the kind of optimism that underlies the business entrepreneur who feels that energy, intelligence, ingenuity, and such honesty as may be forced upon him or her, will ultimately contribute to the welfare of humanity as such; in other words, the business enterprise is as valid and as legitimate as any other work of a human hand.

This kind of optimism, then, would seem to have something to do with upholding, for instance, patent rights. It would also seem to offer an answer to those who can point to the indefinitely numerous dangers which any advance in science brings forward. If, indeed, the sciences and their products are to be understood and exploited according to a rationale, then the mysterious character of the sciences and of the world they explore, is abdicated in favor of some redistribution of the world's resources in terms of some decision of practical intelligence which is no more than the redistribution of power.

What alternative does Christian theology propose which sees in our humanity the expression of God, that which God makes when He presents Himself within His creation? If our humanity is really the work of God, if the Incarnation is that which God does when He would create, then the limits of the farthestmost galaxies are human limits. The macroscopic and microscopic worlds alike are human. The financial world is human. The world of economics, physics, chemistry, biology, whatever, is a human world. We have the freedom of God to work and play in that world. Indeed, we have the responsibility to do so, but to do it under a responsibility which is finally the responsibility to worship. And therein lies the rub.

What might that rub be? There are people who worship money, who worship power, who worship sex. There are people who worship collections of this, that or the other. There are hobbies of all kinds elevated to absolutes. We are surrounded by this sort of thing, and we are tempted by it. How do

we avoid that kind of idolatry? It would appear that, if this is going to be avoided, it is going to be avoided by that loyalty to the Covenant by which the world is sustained in its history. It is avoided by that pursuit of the salvation offered by the Lord of history, namely, the fundamentally sacramental worship of the Church, according to which what we do in space and time has the value -- whether we will have it so or not -- for good or evil.

Something of that kind of vision, however diluted by Deism and by the effects of the Enlightenment, still found its way in the United States Constitution. The Constitution is a notably plastic instrument in our day, but one can still find in it at least those negative conditions and possibilities which underwrite and make possible the worship of the Lord of history. Out of this worship *may* come a consensus, a consensus so radically lacking today. There is no methodology by which this consensus can be provided. The only thing that can provide an historical consensus, one which is optimistic and wishes to live in history, is precisely the worship which sustains it. This is given very graphically in the Eucharist.

This is given throughout our historical existence. It is the only base on which we can face the possibilities of such things as biochemistry without fainting by the wayside.... We have no way whatever to avoid the enormities proposed by councils of scientists and humanists today, who can draw for us a picture of what will happen when a nuclear bomb lands at the Arch. We have no way of guaranteeing rationally that this whole business we call the world may not blow up in the next ten minutes. That, however, is not a justification either for denying our responsibilities and ceasing to be free, or abdicating our responsibility in favor of some mechanism, political or otherwise.

It should rather spur us, just as it spurred people in search of salvation throughout our history, to turn to the Lord from whom alone that salvation is available. This is not mere piety. It is a resolve to live freely in a free society, to live responsibly, to try to seek out the parameters -- if I may use the jargon -- of our responsibility within the structure of our worship. Only in that worship do we find guaranteed at once truth and freedom. These -- truth and freedom -- are the twin needs without which human existence is meaningless, indeed impossible.

Whether we are talking about the patent process or any other process, this is the quandary which we continue to meet. It is also the one which, humanly speaking, we are unable to resolve. Were we able to

resolve it, we would not need a Savior, a redemption, a second coming of the Lord. But as has been noticed now and again, we do stand in need of such things and it is well to remember it. It prevents that heady optimism which supposes the next scientific discovery will bring about the *eschaton*, and it also prevents that pessimism that says that people are worth nothing.¹¹

There was a general consensus at the meeting on *The Patenting of Recombinant DNA* in 1981 that the patenting of "living organisms" was on balance a good idea. Most of the attendees agreed that the openness to the future that the patent law seemed to portray was a good thing. The process of patenting "living organisms" as represented by the *Pseudomonas* of Chakrabarty was certainly in conformity with the Christian outlook on the law. One "slight" caveat was supplied by the late Ann O'Donnell:

I guess that at least most of us had assumed that the patenting process was ethical. Anyway, let's assume that it is ethical, and that, if it were not in place, we would not be discussing the questions of genetic engineering at the cellular level. Dr. Virginia Harrison complained that the scientists are not prepared by ethicists and moralists to deal with the issues until the experiments are already done in the laboratory. I am aware that right now we're not engineering higher life forms, and that we are talking about work at the cellular level. But we are talking about living organisms. Someone mentioned before that there is a unity in living things. So, I am asking if the decisions we make with regard to genetic engineering at the cellular level will in fact have implications about how we deal with genetic engineering at the human level later on. I think that we have a struggle at the present level because we sense that we are dealing with something which is vitally important... it is such a volatile issue because it is directly related to decisions we will have to make about human genetic engineering.

Someone mentioned fences earlier, putting fences around property to protect what we have. Perhaps the emotional and intellectual debate that is going on over genetic engineering arises because we suspect that it relates to what we'll do with human beings. It has to do with our lives and our "property." Therefore we are suspicious, careful and frightened at intervention into this mysterious process, because we value it so highly. These are really questions I have. But I feel that this genetic engineering at the cellular level is vitally important because it directly impacts on how we will deal with human beings in the future.¹²

These questions were not specifically addressed at this meeting. The scientists at the meeting felt that what we are trying to do with recombinant DNA was to understand how the cells in multi-cellular organisms operate. "We hope to be able sometime to alter defective cells and thereby benefit mankind by curing disease." We were then dealing basically with micro-organisms.

There were very many worthwhile interventions made in the March, 1981 meeting. Unfortunately, one would need a book-length manuscript to note them. That book, however, is presently available on the web at <http://ITEST.slu.edu> under the rubric "Publications for the 80s." Right now, it has merely reproduced the talks given at that meeting; it does not have the discussion of these papers. Perhaps in the future we shall be able to provide them. This is also true of the same general subject matter treated at another ITEST meeting held at Adamstown, Maryland in April, 1987.

At the latter meeting it was stated that there is a constellation of powerful forces coming together in our society. These forces have changed or are changing our society and will continue to do so in the future. It was stated that there is a radical new direction in science and in the way it is practiced. By and large science and technology were directed to the betterment of human beings by changing the environment external to us. The building of bridges, the draining of swamps, transportation networks, communications, the domestication of various plants and animals have looked to human betterment. Now, especially in the life sciences we're reaching for a technology aimed at bettering human beings. There is a great difference between *betterment* and *bettering*.

Also, not too long ago science was primarily directed to knowledge. We did science, we were told, in order to learn how the universe was put together. That was then the fundamental thrust of science. Now that thrust seems to be at least partly subordinated to a desire to alter the natural systems, particularly living systems. We have in biology put heavier emphasis on alteration than on perception and knowledge.

APPLIED SCIENCE

There has also been a revolt against communal and social authority which goes back at least to World War I and the subsequent breakdown of what Walter Lippmann called the "public philosophy" and John Courtney Murray called the "public consensus." The lack of a public consensus has a step-child, the "right" to privacy. We emphasize our individual rights over our communal responsibilities. Walter Lippmann 75 years ago said that ethics is now simply a traffic code that will allow as

many desires to run along with as few collisions as possible. That's part of the social matrix in which we look at biotechnology and law. We might ask whether this will lead to a tyranny not of law but of laws. Murray pointed out that, as laws multiply and become more intrusive, they become more impotent.

After a scientific exposition of the work being done with animals and plants Mr. Roman Saliwanchik stated:

The last time I talked to this group six years ago, our topic was the patenting of a living organism. I tried to show that the patent system could handle this scientific advance. There could still be a suitable public disclosure. I argued that there was no problem with the patenting of a living organism. I was asked: "Is the patenting of a human being next"? If those asking that question had really understood what was being done at the scientific level, they would not have asked the question at all. As Dr. Krivi can attest, the laboratory work is designed primarily for industrial, environmental and medical benefits. We're not trying to capture the human mind or to control the human race in any form....

What do patents for biotechnology mean to the public? A patent comes after an invention. An invention has to be made. You don't get a patent for something that doesn't contribute to solving some problem in society. What benefit accrues to the public? The public learns of the invention. If we didn't have a patent system, we would keep our work secret. We don't have to disclose it to anyone. The common law says that, if you know something, you don't have to disclose it to another person.... The law recognized this problem way back in the 1700s in the United States and in foreign countries. The issue was how the public would gain knowledge of these inventions. This is important for the public in assessing the necessity for the invention, the risk in putting it to use and then, going forward, making new inventions.¹³

RELIGIOUS CONSIDERATIONS

Father Donald Keefe, at the meeting in 1987, stated:

... Our worship of the Lord of history guarantees for us a history into which we go sustained only by that [worship] guarantee. We cannot by ourselves provide the security of our future. Yet our desire, our demand, our insistence upon living into a free future is the very structure of freedom as we understand it in the western world.

The passage from cosmos to history is not an easy

one. The Book of Exodus records that at the waters of Meribah the followers of Moses wished to turn back to seek again the securities of a world which might well be servile but, nonetheless, one in which the trains ran on time, so to speak. This is a temptation for all of us who worship the Lord of history, however vagrantly, fugitively, inadequately. We are all tempted to close down the quest for the new because it's dangerous. It is dangerous: the future is at risk and we cannot guarantee it. Attempts to do so are always attempts to nullify that future by closing off the freedoms which make it new.

We are passing then from a cosmological uniformity to some kind of historical community whose nature is in some manner up for grabs. There is within our society a perennial temptation to recede from historical unity and to seek refuge from the perils of freedom in a determinist community where whatever is listed is commanded and whatever is free is forbidden.

In the years in which I have been involved with this search for historical pluralism, tensions have mounted on many, many levels -- the church-state problem which began with the Everson case in '47; the meaning of patriotism at issue in the Korean War and more in Vietnam; the meaning of our religious unity at issue in the founding of the World Council of Churches in 1948 and more in the Vatican Council 15 years earlier. It is probable that the roots of this tension can be traced back to the fifth century, although contemporary historians tend to trace them back to the 11th. Several scholars suggest that the basis of western law and the nation of a dynamic process of history toward a free future begins pretty much with the Gregorian reform in the middle of the 11th century. That reform overthrew the static cosmological world view of feudal Christianity.

The question of the meaning of freedom as opposed to the authority of society has become crucial. Over and over again the ancient cosmological problem has been posed: how can man be free if the cosmos is to remain safe? Over and over again the answer is returned: man's freedom is dangerous, nonetheless he must be free. The temptation, on the one hand, to flout the security of society, or on the other, to derogate from human freedom is the continuing temptation before all law makers, whether voters, legislators, judges, attorney, whatever. This is the continuing enduring problem caused by the presence of Christianity in the world, by the presence of the impetus toward the new thought to be "the good" on grounds which can never be proven.

There is no logical justification whatever for supposing that the new is the good. Yet every baby that learns to walk knows that this is a good idea, even though it bumps its head every time it takes a step. Every child that goes to school scared stiff is nonetheless fascinated by the new. So it is for everyone of us until the day we die. This goes against all the rationalizations of the world at least from Plato onward. The notion of securing the state against time, the devourer of all things, has been a foremost item on the agenda for a very long time.

Today, technology poses the "great threat." It does not take much imagination to see that playing games with *E. Coli*, the pet bacterium of the genetic researcher, can get out of hand. All of us are hosts to a large number of these little animals. If they get out of hand, so also does our interior mechanism. Inasmuch as this is very intimate to us, we may all be profoundly concerned. This, of course, is only the beginning.¹⁴

There is much wisdom in the quote above, not least for the sentiment that this is only the beginning. First we had the intervention of Ann O'Donnell in the meeting of 1981. Now we have a veiled warning -- at least it can be so interpreted -- of Father Keefe. But they were both warnings about a future that *may* be. Even in 1987 there was no serious talk about the patenting of human organisms. Very few, if any, people were talking about "owning" other humans.

ITEST returned to the subject of patenting and cloning again in the fall of 1996. The occasion for the meeting was a press conference called on May 18, 1995. Representatives of United Methodist, Southern Baptist, Jewish and Muslim organizations joined Jeremy Rifkin, president of the Foundation on Economic Trends, in calling for a moratorium on the issuing of new patents on genetically engineered animals and human genes, cells, organs, tissues and embryos. This ITEST Workshop was held partly in response to that call for a moratorium on new patents and partly to update ITEST members on the issue of patenting and new thinking that might influence it.

At both the 1981 and 1987 meetings a consensus of sorts emerged that we should move ahead cautiously with bioengineering and that there was nothing basically wrong with the patenting of biological material. It was natural that this topic be taken up again by ITEST. Patenting may have been the occasion for this (1996) Workshop but the questions ranged far beyond that issue. In our discussions we considered such questions as what is patenting and what does it do. What privileges does it confer on the patent holder and what re-

quirements does it set? Who can apply for a patent and who is liable to get one? What does it mean to talk about God's "ownership rights"? What is life? What about financial profit or profit more generally? Is the involvement of a corporation somehow evil in itself? What about genetically engineered microbes or plants? Why aren't they listed in the call for a moratorium? How would research be funded if patents were banned? May humans actively intervene in the physical composition of living things, including the human body? What is involved in such intervention? The discussion of biotechnology at this level is an important subset of a more general relationship between faith and science that deserves our attention.

Faith/science relationship belongs to the more general problem of the relation of Christianity to "profane" learning. It involves the issue of faith, knowledge and praxis. Jeremy Rifkin says that we are at the beginning of an historic discussion. There is a sense in which that is true, but there is also a sense that that discussion has been going on for a couple of millennia. Its specific Christian beginnings can be found in the writings of the Fathers of the Church, particularly in the *Hexaemeron* of Basil the Great in the fourth century. The question really is no different from the one asked by the Psalmist three millennia ago: what is the human that you should spare a thought for him, the son of man that you should care for him?

Dr. C. Ben Mitchell, then consultant on biomedical and life issues for the Southern Baptist Christian Life Commission, raised the issue of divine ownership. He maintained that this is one of the "ultimate questions" that must be treated in any religious approach to things like experimentation and patenting. Does God's ownership preclude human ownership? Is that term (ownership) meaningful? Is God's "ownership" (dominion was offered as a substitute) such that humans are precluded from such activity as patenting? The participants tilted one way or another in answering that question. Dr. Mitchell's concern that patenting may lead to the "commodification" of human biological products seems to have a certain validity. Whether that "commodification" arises from patenting or would be present even if there were no patenting, deserves some attention. It might be that a desire for wealth or power may have sources other than patenting. These items are worth considering. On a deeper level, a key issue in the discussion of ownership is our relation with God and, reductively, with each other and with the whole of creation. The conversation must continue since its basis is mystery.

Mr. David Saliwanchik, following in his father's (Roman Saliwanchik) footsteps, took us through a quick but thorough education on the legal mechanics of patenting

-- an extremely valuable update on the law and the way it is being practiced in the mid 90s. Back in 1981 Roman Saliwanchik stated: "Contrary to the concerns of some, the patenting of a living microbe is neither a patent on life itself nor a *carte blanche* with regards to patenting higher forms of living entities. Patenting 'life' itself is not an issue to rational minds. On the other hand, patenting higher living forms such as farm animals cannot be dismissed as a possibility."

Patenting may seem a mere practical issue to be disposed of by easy arguments on one side of the issue or the other. From a Christian point of view it is a narrow issue but one leading into a much broader issue set. Again, it is a question of the Psalmist: "what is man that you should give a thought to him..." The whole subject of cloning which is agitating people and governments is a part of this discussion. While cloning may have taken many of us by surprise, it did not astonish Dr. John Matschiner, a biochemist. At one point in the discussion he said: "Given the fact that the Supreme Court has denied the rights of an embryo to life, are we not to look forward to cloned human embryos. Cloned adults? The answer is obvious: 'Yes,' of course, 'that's down the road.' And not that far away."¹⁵

Again, if any consensus developed at this meeting it was one of "Yes, let's allow patenting of biological material, but let's do it with caution, questioning our assumptions every few years." There was no "firm and forever" type of agreement. These questions need far deeper reflection than has been given to them to date.

Our bodies are most important to our salvation and glorification. Can the Christian community simply ignore the questions, challenges and tremendously exciting vistas opened up by our physicality? If our bodies are not terribly important, if we are not meant to rise bodily (and boldly) -- recognizably ourselves -- why did Christ ascend *bodily* into heaven. This is our real task and that of the community, the *Body* of Christ: to discern more deeply God's wishes and prospects for our bodily future. As St. Paul says: "... our homeland is in heaven and from heaven comes the savior we are waiting for, the Lord Jesus, and He will transfigure these wretched bodies of ours into copies of his glorious body."

CONCLUSION

The stakes in the "patenting of human beings" are very high, as are the issues (and efforts) in the rush to protect the "inhumanity" of human embryonic stem cells. After all, if the embryo were consciously recognized to be human, could we kill the embryo to harvest the stem cells. That doesn't seem to bother BIO or many of the scientists working in this area. It may be that the work

on and with embryonic stem cells may some day aid human beings. But at what price? As in many other things, the ultimate act is reconciling the humanity of the embryo with *Roe v. Wade*. After all, if one can kill an embryo in the name of unfettered abortion, it is difficult to see that one cannot use the human embryo for experimentation on stem cells.

I do not believe that we have to worry about "designer babies" as much as we have to worry simply about patenting a human embryo and the implications of that patenting. If the human embryo, however created and for whatever purpose it was created, is a human being, then we cannot violate its dignity. This is true even if it will never come to term in any proper sense. If it is not human, patenting seems to be a proper function of the law. But if it is not human, would it be appropriate for making human stem cells? Why would one want to clone such an embryo? Isn't it precisely because of its humanity that we want to do "applied science" on it. [At some point in the future I will do an article on the distinction: theoretical science, experimental science, applied science and engineering. It is in the context of this set of distinctions that I refer to applied science. That may be the best description we can give for the type of "research" mentioned by the proponents of patenting human beings.]

It was stated in *Science* note for December 5, 2003 that "Congress has moved to cement into law U.S. Patent and Trademark Office (PTO) rules that bar the agency from issuing patents on 'human organisms.' But researchers are relieved that lawmakers have made it clear that the ban won't apply to stem cell derived from human embryos."

Plainly, such a ban on the patenting of human clones will never last. It means nothing. In the name of political opportunity the ban has been eviscerated even before it is passed. The possible (maybe even likely) clon-

ing of an embryo to use in an effort to transform basic stem cell findings into practical therapies.

At our meeting on *Patenting of Biological Entities* David Byers stated: "... the patenting of genetic information may be useful in developing new pharmaceuticals. Under no circumstance may individual human beings be patented. Other uses of gene patenting should be approached with caution." I agreed completely with that statement when it was made. I wonder if now it ought not be looked at again. Stem cells were virtually unheard of ten years ago. Nor did we know enough to clone a human being. Perhaps now we do. It would not be out of place to reexamine the whole issue again.

ENDNOTES

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5. *Op. cit.* p. 18.
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8. Fr. James Schall, S.J., "The Patenting of Recombinant DNA," in *ITEST Proceedings, March, 1981*, pp. 53-54
9. *Op. cit.* pp. 64-65.
10. Herbert Butterfield, *The Origins of Modern Science*, 1965, Free Press, Macmillan, Inc., p. 222f.
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13. Roman Saliwanchik, "Biotechnology and Law," in *ITEST Proceedings, April, 1987*. pp. 68-69.
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THE HIDDEN FACE OF GOD by Gerald L. Schroeder

Reviewed by Doctor Thomas P. Sheahen

In his latest book, *The Hidden Face of God*¹, Gerald Schroeder offers an exceptional level of scientific explanation to support the view that religion and science are compatible, not opposed. Indeed, the book's subtitle, "Science reveals the Ultimate Truth," tells us that the author finds in science a pathway toward God.

Born in America and educated at MIT, Schroeder emigrated to Israel some years ago, where he studied the Torah with great care, including especially the interpretation given to it by the Kabbalistic school of thought. An earlier book by Schroeder, *The Science of God*, com-

bined the thinking of the 13th-century Kabbalist scholar Nachmonodies with modern cosmology and general relativity, and thereby found a way out of a dilemma (a seeming conflict) between modern physics and an Orthodox reading of Scripture. In *The Hidden Face of God*, Schroeder leaves physics and instead goes into molecular biology.

He also shows that the proponents of scientific materialism are missing a lot of the essential science when they glibly say that evolution and natural selection are driven only by random fluctuations. They revert to cog-

nitive dissonance in order to cling to materialism in the face of overwhelming evidence for a metaphysical cause. Schroeder says he used to believe that line, until he took the trouble to study molecular biology.

Schroeder's key theme is wisdom. His version of the first line of Genesis 1 is: "With wisdom God created the heavens and the earth." -- this differs from the customary translation "in the beginning," but comes from the Kabalistic tradition. Throughout the book, Schroeder frequently shows how a feature along the road to humanity is not just a "surprising coincidence" but is evidence that wisdom was built into the system from the outset. In several instances, after presenting scientific facts, he identifies a place in Scripture and shows how it says the same thing, and points out the link to the wisdom hidden beneath it all. Schroeder goes on to assert that wisdom is the basis of information, and "...our universe may be the manifestation of information."

Rooted in Orthodox Jewish tradition, Schroeder is unquestionably among those who accept that the universe is intelligently designed, but adds a scientific aspect. He carefully describes the way the human eye works, and points out the apparent "design error" of having the photoreceptors behind the retina, such that the pathway for signals produced there leads back through to the front of the retina, where ganglions are bundled into the optic nerve, which then goes back through the retina once again enroute to the brain. "In essence, the human retina is designed inside-out." (This has been a favorite argument of neo-Darwinists against intelligent design.) Schroeder cites Biblical examples to conclude that "...intelligent design, even at the level of the Divine, is not necessarily perfect design." He warns "If your image of God is based on a simplistic model of the Divine, don't expect that image to rest easily with the Bible's concept of God or with the real world." Schroeder is entirely comfortable in his science and his religion, and thus provides a good example to many others striving to reconcile the two. In Schroeder's presentation, the science comes first, and Scripture confirms it.

In a series of chapters that describe the nervous system, the brain, and the distinction between the brain and the mind, Schroeder conveys a high level of scientific information while maintaining a high level of clarity and readability. The brain is surely the platform for the mind, but the mind is a new, emergent property that cannot be squeezed into the limits of scientific materialism. He cites the example of a chess-playing computer to illustrate the difference.

Regarding consciousness, there is a remarkable similarity in Schroeder's thoughts to the ideas of Teilhard de Chardin² a half century ago: Schroeder writes: "A grain

of sand contains the slightest hint of the skyscraper of which it is to become a part. Do the very elements of the brain, the carbon, hydrogen, nitrogen, have within them the barest trace of consciousness, which will combine and emerge as the complexity of a fully functioning brain?" This is all quite similar to Teilhard's notion of "the within" of everything, in which there is an element of consciousness associated with every atom, remaining nascent through the emergence of successive layers of complexity, until consciousness emerges at last. It might be enormously fruitful to combine the future-oriented Christianity of Teilhard with the Talmudic scholarship of Schroeder -- who knows where it might lead?

The book contains three helpful appendices that explain DNA, proteins, cells and muscular action to the unfamiliar reader. Incidentally, Schroeder's chapter 5, "Meiosis and the Making of a Human", is the classiest description of human reproduction I have seen. Parents can read it along with their pre-teen child with complete confidence in the scientific accuracy and the respect for human dignity contained in Schroeder's words.

This book contributes to advancing the mind/brain discussion, by emphasizing the distinction between them, and explaining the linkages with care. His biology is rock-solid, accurate and readable. By insisting upon close attention to detail, Schroeder gives the reader a vision of God's hand at work in the creation of human beings (including the brain and mind).

This is the first book I know of that makes accessible to the lay reader a clear understanding of microbiology and brain function. Rather than dumbing-down for the non-biologist, Schroeder motivates the reader to step up to learn more. Book-reading clubs can read and discuss one chapter per week.

Thanks to a high level of lifetime scholarship spanning physics, microbiology and Orthodox Jewish tradition, Gerald Schroeder writes from a position of strength, unswayed by popular fashion among pretenders to scientific expertise. The religiously oriented reader will be reassured to find so many ways in which modern science is confirmed by Scripture. The reader antagonistic to religion will be challenged to reconsider materialistic beliefs that may have been formed hastily, without adequate attention to the scientific evidence.

The Hidden Face of God is an excellent book. I recommend it highly.

1. Touchstone Books, Simon & Schuster: 2001. Paperback, ISBN 0-7432-0325-9 (\$ 13 retail); 187 pages + appendices + index.
2. P. Teilhard de Chardin, *The Phenomenon of Man*, (French, 1955; English transl by B. Wall, Harper Torchbooks: 1961)