



BULLETIN

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Happy New Year!

New Year's Day may well be a time for new beginnings, new plans and new efforts. But, it is also a time to evaluate and consolidate. It is a time to keep what is good as well as strike out in new directions.

All of the above may be truer than usual as we approach the Third Millennium. Pope John Paul II has called us to new practices in evangelization, spreading the Good News far and abroad. What can be done?

One thing that could be done is using the Internet and World Wide Web. ITEST has a Website (can be accessed at <http://ITEST.slu.edu>). We could use people who are willing to be part of an ITEST "chat room." Already, we have one volunteer, Dr. John Matschiner, who's willing to be contacted. More volunteers would be welcome. Are you willing to be a part of explaining the faith/science message? Are you willing to talk to the Church's position on questions with a Christian interest? If so, please let the Staff know and we'll see to it that your e-mail address is listed on the website. If any of you have things to add to those pages, please let us know. We want the website to reflect as many constituencies as is consonant with the goals and purposes of ITEST.

I also want to remind you of the "scholarships" that we have available for students. About ten or twelve have been spoken for. We still have roughly 35 more available.

The only meeting of the year will be held in October. The topic will be *Creation AND Evolution*. The Board approved this topic while, at the same time, observing that we already have a perfectly viable position on it. Yet, that position is either not well known, or rejected both by the creationists and the evolutionists — or both. It is time to put together a coherent position and let the fringes do what they might. The dates for the meeting are October 17-19, 1997, here at Fordyce House in St. Louis County.

In the meantime, have a Happy and Peace-filled New Year.

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The ITEST Bulletin: Publisher, Robert Brungs, S.J.; Editor, S. Marianne Postiglione, RSM

ITEST Offices: Director, Robert Brungs, S.J.
Director of Communications, S. Marianne Postiglione, RSM
221 North Grand Boulevard
St. Louis, Missouri 63103 USA

ANNOUNCEMENTS

1. Mark your calendars for the October 17-19, 1997 workshop, *Creation AND Evolution*. Fr. Brungs notes that "It will be primarily a meeting developing the 'center ground' between the Darwinists and the 'creation science.'" Announcements/invitations will be sent out in early Spring. At that time we will have essayists and titles of essays for your information.

2. Plans are apace to celebrate the 30th anniversary of ITEST. As we mentioned in the Winter bulletin, the Board decided and approved such a convention celebration for 1999 even though our anniversary will occur in 1998. Since 1999 is the 31st anniversary of ITEST and the last year (or so) of the present millennium, we will combine the two occasions. The details (place, month, topic, and others) will be worked out prior to January, 1998. We shall keep the membership apprised of developments for this meeting. All ITEST members, of course, will be more than welcome to attend. If you have a particular place, time or topic in mind, please let us know relatively quickly so that it can be mentioned at the next (April) meeting of the Board.

3. We are getting some "hits" on our Web Site from various countries like Germany, New Zealand and Australia. We see this as an opportunity to "spread the word" about our work at ITEST. Young people in particular love to "surf the net"; we had two inquiries for information from junior college students writing papers on aspects of science and theology; these are prospective ITEST members.

4. Just a reminder that we still have some funds for students memberships. One new student member from Auckland, New Zealand wrote to thank ITEST for the gift. Doug Mawhinney writes: "I am very grateful to the ITEST members,...for deciding to extend this generous gift to students such as myself." He continues, "Your latest book, *Population Issues*, is indeed of interest to me. Last year we studied this topic in the B. Theol course, Christian Ethics II...A number of my friends are specialising in environmental restoration research and so I look forward to sharing with them the proceedings from your workshop on *Christianity and the Environmental Ethos*." Finally, he notes, "Please extend my thanks...and thank you for making me feel so welcome as a new member."

5. One of our members, a senior research physicist in France, has received permission to translate some of the bulletin articles into French for a small group

of scientists interested in delving more deeply into aspects of science/faith issues. They will be published in the journal *Connaitre*. We invite other members in countries outside the United States who would like to do similar work to contact us for permission.

6. We've begun to edit the transcripts from the October 25-27, 1996 ITEST Workshop on *The Patenting of Biological Materials*. This meeting, co-sponsored by BIO (Biotechnology Industries Organization) and ITEST, challenged those present from industry, academia and various professions to clarify their thinking on the terms, patenting, copyright and trade secret (see David Saliwanchik's essay in this issue of the bulletin.) The Proceedings will be published in March or April, 1997 and sent to all dues-paid members of ITEST.

7. BOOK RECEIVED: *The Cross and the Rain Forest: A Critique of Radical Green Spirituality*. R. Whelan, J. Kirwan and Paul Haffner, Acton Institute: Grand Rapids, MI., 1996, pp. 163. If anyone is interested in reviewing this book for the ITEST bulletin, please contact S. Marianne Postiglione, and she will send you the book. "While recognizing that care for the environment is a worthwhile pursuit, this book seeks to warn Christians about the pitfalls of an unqualified embrace of environmentalism." (quoted from the book jacket.)

8. We have not forgotten the need to develop faith/science material for students and faculty at all grade levels. At the March, 1996 Workshop it was noted that education (especially in the early grades) is needed. This can be said for education in the Christian Faith as well as in science. Many, even highly educated people, seem to operate "with a less than eighth grade knowledge" of what Christianity is and teaches. Any help that you can give the Board and the Staff (and each other) is needed and is deeply appreciated.

9. We are now able to receive and, of course, send FAXES directly at the ITEST office, thanks to the generosity of Dr. Bob Collier. The FAX number for the office is (314)-977-7264. FAXES sent to the old number [(314)-977-7211] will still reach us, but the new number is the one we prefer. It's more private, for one thing.

10. We are looking for articles for the *Bulletin*. If you have anything ready on faith or science, send it in to us. It will be given every consideration.

PATENTING OF BIOLOGICAL MATERIALS

ITEST Workshop
October, 1996

David R. Saliwanchik

The Congress shall have power ... To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries. U.S. Constitution, Art. 1, § 8, cl. 8.

Ingenuity should receive a liberal encouragement. V Writings of Thomas Jefferson, at 75-76.

§101 Inventions patentable

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.

35 United States Code §101.

Congress intended [patentable] subject matter to include anything under the sun that is made by man: S. Rep. No. 1979, 82d Cong. 2d Sess. 5 (1952); H.R. Rep. No. 1923, 82d Cong. 2d Sess. 6 (1952). *Diamond v. Chakrabarty*, Supreme Court of the United States.

We, the undersigned religious leaders, oppose the patenting of human and animal life forms. We are disturbed by the U.S. Patent Office's recent decision to patent human body parts and several genetically engineered animals. We believe that humans and animals are creations of God, not humans, and as such should not be patented as human inventions. 1995 Statement by Religious Representatives.

1. Introduction:

The above passages provide a framework for discussing the patenting of biological materials. The constitution of the United States contains a provision which provides Congress with power to create a patent system to promote the progress of science.¹ Thomas Jefferson's writings confirm that he, as one of the founding fathers of this country, believed in the importance of fostering human ingenuity.² The federal statutes enacted to implement the constitutional

provision calling for a patent system reflect the founding fathers' desire to promote ingenuity and the dissemination of information regarding new inventions.³ The Supreme Court of the United States has recognized and re-affirmed the broad role of patents in promoting the progress of science and mankind.⁴

Yet there remains an uneasiness felt by some about the patenting of biological materials. Although perhaps unartfully articulated, the 1995 statement by the religious representatives⁵ reflects the apprehension felt by those who oppose patents on biological materials.

The opposition to patents on this technology appears to be a manifestation of a variety of underlying concerns about biotechnology including, for example, the ethical propriety of this research, a fear of the potential uses of this technology, and a mistrust for the scientific intellectual elite. These underlying concerns may well have validity, and are certainly appropriate topics for informed debate. However, the opposition to patents on this technology is a misdirected and counterproductive means for addressing the underlying social issues. It appears that the opposition to biotechnology patents arises primarily as a result of unfamiliarity with the details of the patent system combined, ironically, with the widespread public awareness of the existence of the patent system. This awareness of the patent system makes it an attractive target for those who, for whatever reason, are uneasy with biotechnology research and its potential uses.

Like many legal topics which relate to morals, ethics, and/or theology, serious consideration of the patentability of biological materials can quickly yield to purely emotional and/or irrelevant arguments if the legal principles are misunderstood or if the metes and bounds of the discussion are not clearly defined. As a patent attorney specializing in biotechnology patent law it is my desire to provide here a summary of the relevant principles of the patent system and provide some insight into the history and current status of biotechnology patent law.

II. Personal Background

In order for the reader to understand my perspective relating to patent law I would like to provide a brief overview of my experience in this field. In addition to

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my ten years of professional practice in the patent field, I had the good fortune of growing up with my father, Roman Saliwanchik, who is one of the pioneers in the field of biotechnology patent law. I was in my third year of college when my father participated in the 1981 ITEST program on the *Patenting of Recombinant DNA*. I remember well my father sharing his ideas on this topic with our family. In fact, I am not so sure that, at that time, I believed it to be such good fortune to have a father who lectured on patent law at the dinner table and practiced his appellate arguments in the living room to a captive family audience. I now have a much greater appreciation for my father's vision of patent law as he participated in landmark legal decisions which have helped shape the evolution of biotechnology patent laws and, consequently, the development of the biotechnology industry.

As longtime ITEST members will recall, the 1981 conference followed the Supreme Court's affirmance of the decisions by the Court of Customs and Patent Appeals (CCPA) in the Bergy⁶ and Chakrabarty⁷ cases holding that living cells can be patented. In the Bergy case my father had successfully argued in favor of the patentability of "biologically pure cultures." The Chakrabarty decision acknowledged the patentability of cells which had been genetically engineered to confer upon those cells new and advantageous capabilities. These legal decisions were important points in the evolution of biotechnology patent law, and perhaps more importantly, the infant biotechnology industry. These legal decisions provided a critical spark which propelled the fledgling U.S. biotechnology industry forward. In the fifteen years since the Bergy and Chakrabarty decisions, the biotechnology field has rapidly expanded into a multibillion dollar industry employing thousands and producing products which will benefit all of mankind. This rapid growth could not have occurred without the investment of enormous sums of time, effort, and money. It is extremely unlikely that such investment could have occurred without a legal mechanism for providing some limited protection for the fruits of this highly speculative research. The proper application of the patent laws by both the Patent and Trademark Office and the Courts have provided the necessary environment for this industry to flourish.

Although my background involves extensive experience with the patent system, I have also had significant exposure to the viewpoints of individuals who believe that the role of patents should be limited. My law school intellectual property courses at the University of Michigan were taught by Professor Rebecca Eisenberg. Professor Eisenberg has written extensively

on the role of patents in protecting government inventions — particularly in the biotech area. One topic which I will discuss in greater detail below is the efforts made by the NIH to patent DNA segments from the human genome. Professor Eisenberg, as well as others, have stated that the efforts by NIH to patent these DNA segments may be inappropriate.⁸ Professor Eisenberg's views are based primarily on economic and market grounds while others have objected to DNA patents on ethical and/or religious grounds.

Our law firm frequently represents foreign clients. We also represent domestic clients seeking to obtain patent protection throughout the world. To effectively represent foreign clients and obtain international patent protection it is important to recognize that, as a general rule, each country has its own patent laws. Patent protection can be obtained in a particular country only if the requirements of that country have been satisfied. Many of the basic requirements for patentability are common to all countries. For example, most patent systems have provisions limiting the availability of patent protection to inventions which are new and involve some significant advance compared to previously known subject matter. Although there are these basic similarities between virtually all patent systems, there are also important differences. For example, there are countries which will not grant patent protection for methods for treating humans.⁹ Other countries do not grant patent protection for pharmaceutical or biotechnology inventions.¹⁰ From my knowledge of foreign patent laws I am aware of the practical implications arising from such limitations on patents.

Even within the United States there are instances where patent protection may not be available for a particular invention or where, even if available, patent protection is not the best option for a particular technology. For example, inventors must often choose between patent protection and trade secret protection.¹¹ Trade secret protection is available for technology which can be kept secret. Once an invention is known to the public it, by definition, can no longer be kept as a trade secret. In sharp contrast to trade secret protection, a critical aspect of the patent system involves *full public disclosure* of how to make and use the invention.¹² This full disclosure occurs when a U.S. patent is granted and/or when a foreign patent application is published.¹³ Therefore, an inventor can initially pursue patent protection while maintaining trade secret protection; however, ultimately, these two forms of protection are mutually exclusive.

Also, our firm represents many colleges, universities,

and other non-profit organizations. Some have argued that inventions at such institutions should not be patented and, instead, should be free for the taking. This issue will also be discussed in more detail below.

When distilled to its most basic elements, the patent system is simply a means to encourage innovation and promote public dissemination of new ideas and discoveries.

Therefore, although my background includes extensive exposure to, and involvement with, the patent system, I am also very familiar with instances where consideration is given to limiting the role of patent protection.

In order to discuss whether patents should be awarded for DNA and other biotechnology subject matter, it is important to know the basic principles upon which the patent system is based as well as to have an understanding of the procedures through which patents are obtained. Therefore, I will provide here a brief overview of the purposes of the patent system, the legal requirements for patentability, and the administrative procedures which have been developed to enable the patent system to accomplish its goals.

III. Principles of the Patent System

When distilled to its most basic elements, the patent system is simply a means to encourage innovation and promote public dissemination of new ideas and discoveries. As noted above, the founding fathers of our country included within the constitution of the United States a provision calling for patents and copyrights to "promote the progress of science and the useful arts."¹⁴ Virtually every developed country in the world has some analogous legal system designed to foster creativity and expedite the public dissemination of new innovations. Thus, patent systems are not a product of capitalism or any other economic system, nor is the patent system linked to democracy or any other political system. It is even more basic than that — it is simply a means for encouraging creativity and, just as importantly, a means for facilitating the rapid public dissemination of new ideas.

The goals of the patent system are not only admirable, and consistent with the premises of virtually every known religious, moral, and/or ethical system, these goals are crucial to the mental and physical well being of all people. The spirit of innovation which is encouraged by the patent system is behind such disparate accomplishments and goals as the elimination of polio, putting a man on the moon, finding a cure for cancer,

improving crop yields to help feed the world population, and the concept of the American Dream itself. Although there will likely always be Luddites and Rifkens who believe in the status quo and who are afraid of progress and man's ingenuity, I have faith in the inherent goodness of people and believe that the prospects for innovation, invention, and advances in technology provide the basis for optimism that the quality of life for an people of the world can be improved.

Although I am a firm believer in the necessity for innovation and creativity, I do not advocate imprudent or careless use of technology. The risks inherent in the development or implementation of all new technologies should be carefully considered and weighed against the potential benefits of the technology. If the risk/benefit relationship is such that a new technology should be developed, then continued efforts should be made to minimize any potential risks. The analysis of the risk/benefit relationship, as well as the promulgation of regulations to ensure public health and safety, is carried out by trained professionals in governmental agencies such as the EPA, USDA, NIH, and FDA. This process of risk/benefit analysis and risk minimization should be carried out with the benefit of as much relevant information as possible. Thus, although the government has ultimate responsibility for many decisions relating to public health and safety, the scientific community, religious and academic leaders, and the general public all can, and should, provide informed input in this process.

In order to provide such informed input it is critical for these sectors of society to have as much access to up-to-date accurate technological information as possible. In this regard patents perform a critical function in providing public dissemination of state-of-the-art technological information. Therefore, rather than seeking to curtail the use of patents in the biotechnology field, anybody who is truly concerned with reviewing and thoughtfully considering relevant scientific information should be seeking ways to *promote* the use of patents as an efficient means to disseminate technological information.

IV. Procedures and Legal Requirements for Obtaining a Patent

Patents are granted only after the Patent and Trademark Office has determined that an invention, and its patent application, meet the strict requirements for patentability which have been established by Congress. The Patent Office employees given the responsibility of reviewing patent applications and making patentability determinations are known as patent examiners.

There are hundreds of examiners in the U.S. Patent and Trademark Office. Each examiner has at least a bachelor's degree in some scientific field; many examiners have doctorates, are lawyers, and/or have significant work experience.

Each patent application received by the Patent and Trademark Office is assigned to an examiner who is trained in the scientific field to which the invention pertains. The patent examiner reviews the application to ensure that all of the requirements relating to the form and the substance of the application have been satisfied. Of primary significance with regard to the content of the application is the requirement that the applicant provide a complete written description of how to make and use the invention.¹⁵ This description must be sufficiently detailed and complete so as to enable a person skilled in the art to make and use the invention without undue experimentation. Such a full, detailed description is known as an "enabling" disclosure.¹⁶ This complete detailed account of the invention is published when a patent is granted in the United States, and/or 18 months from the filing date if an international application is filed. The publication of this description plays a central role in the patent system. Specifically, this publication enables other researchers and interested parties to have full knowledge of the technology so that they can improve on the technology and combine these teachings with their own knowledge and/or other such teachings, thereby efficiently expanding the store of human knowledge.

In addition to the written description of the invention, a patent application must include at least one "claim."¹⁷ A claim is a concise statement, found at the end of a patent application, which succinctly states the subject matter which is to be covered by the patent. When a patent is granted, the patent holder can prevent others from making, using, or selling *only* the subject matter *covered by the claims*. Thus, an issued patent may contain a broad disclosure of certain technology but claim only a small aspect of the technology. On the other hand, the claims of a patent can *never* cover more than what has been enabled by the patent's description. If a patent is granted, the duration of the patent rights is only 20 years from the filing of the application.

In addition to the requirements of the patent application there are, of course, strict requirements on the characteristics of the inventions which can be patented. These requirements have been promulgated by Congress in order to ensure that patents are awarded only for inventions which are the result of *human inventive ingenuity* and which represent substantial advancements of anything which was previously known

to man.

In the United States there are three primary requirements which an invention must meet in order to be patentable. These are novelty, non-obviousness, and utility. I will discuss each of these requirements very briefly here and explain how these requirements prevent the patenting of subject matter which is useless, does not involve human intervention, or does not represent a significant advancement over known technology.

Novelty: To be "new" under the patent laws, an invention must not have been known and available to the public prior to the time when the applicant for patent "invented" it.¹⁸ Accordingly, if an uninformed researcher were to independently "discover" penicillin today, a patent would not be awarded because isolated and purified penicillin is already known and in the public domain. Similarly, chemicals, cells, viruses or other entities which exist in nature prior to the date of invention *can not* be patented because they are not new.

Non-obviousness: The U.S. patent statutes express the non-obviousness requirement as follows:

A patent may not be obtained though the invention [satisfies the novelty requirements] if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.¹⁹

The purpose of the non-obviousness criterion is to prevent the granting of patents for inventions which are merely predictable and/or are small advances over known technology. Therefore, the patent applicant may need to demonstrate that the invention was unexpected, highly advantageous, or otherwise more than the next logical step in the course of research, in order to satisfy the non-obviousness requirement.

Utility: Another requirement for patentability is that the invention be useful.²⁰ Accordingly a chemical molecule for which there is no known use cannot be patented.

The novelty, utility, and non-obvious requirements, together with the enabling description requirement, work in unison to ensure that only the most deserving innovations receive patent protection and, once a patent is granted, the public is provided with full access to the teachings of the inventors.

In the biotechnology field, the patent review process often takes 2-5 years or more, and typically will involve multiple communications between the applicant and the patent examiner. As a result of the thorough examination given to each application, every granted patent carries with it a presumption of validity.²¹ Despite the presumption of validity accorded to each patent, a patent may be held to be invalid after it has been issued.

With a few exceptions, a patent application must be filed in each country where protection is sought. These patent applications and the inventions which they describe must meet the substantive and procedural requirements of the particular country where protection is sought. Therefore, it is possible that an invention may be patentable in one country but not in another.

V. Patents on Biological Materials

A. The 1995 statement by Religious Representatives

The 1995 statement by religious representatives is the precipitating event for this ITEST workshop revisiting the issue of patenting of biological materials. Therefore, I will briefly specifically address this statement. However, because the statement is short and somewhat unclear, I will also address some of the concerns which are often expressed by those who have reservations regarding the use of patents to protect biotechnology inventions.

The 1995 statement by the religious representatives contains language which is ambiguous regarding the subject matter at issue. First it states that the religious representatives are opposed to the patenting of "human and animal life forms." It is unclear if human and animal "life forms" are different than "humans and animals." If these are the same things then it seems that it would have been easier to simply refer to patenting of "humans and animals." The next sentence adds to the uncertainty by referring to human "body parts." This clearly suggests that the religious representatives have in mind something more extensive than a ban on the patenting of humans and animals. However, the final sentence of the petition, which provides the rationale for the representatives' opposition to patents, is restricted to humans and animals. This final sentence of the petition states that humans and animals should not be patented because they are "creations of God." It is not clear whether the religious representatives believe that plants and microbes are *not* creations of God. There are many who would argue that divine influence is not limited to the

creation of humans and animals, but rather, pervades all that exists and all that is known or done. Thus, divine creation, on its own, does not appear to be a logical basis for asserting the non-patentability of humans and animals.

The wording of the statement of the religious representatives also evidences a misunderstanding of the requirements for obtaining a patent. Specifically, the statement indicates that humans and animals should not be patented because they are not "human inventions." The U.S. Patent Office has already stated that it will *not* grant patents on humans. To my knowledge, nobody has criticized this decision. With regard to animals, no animal, or any other subject matter, can be patented in its naturally-occurring form. To be patentable, an invention must be new. A microbe, plant, or animal, *as it exists in nature* is not new. Furthermore, for subject matter to be patentable, the characteristic which makes the subject matter new, i.e. different than what exists in nature, must be supplied by human inventive input. Thus, for any invention to be patentable it must involve the "hand of man."²²

In addition to the novelty requirement which precludes the patenting of subject matter as it exists in nature, the patent laws have additional stringent requirements which prevent the patenting of subject matter which is not a substantial advancement over previously known technology. The most important of these is the requirement that an invention be "non-obvious" in order to be patentable. Thus, in order to be awarded a patent it may not be enough to simply isolate a new protein (or other chemical molecule). The new protein must be non-obvious. Unusual and/or unexpected advantageous properties are characteristics which can help establish that a new protein is unobvious. Also, difficulties in obtaining the protein may make it unobvious. These requirements of novelty, nonobviousness, and involvement of the "hand of man" apply to *every* invention for which patent protection is sought.

Furthermore, contrary to popular belief the grant of a patent is not the grant of an ownership right, rather, the grant of a patent only gives the patent holder the right to exclude others from making, using or selling the patented subject matter for a limited period of time.

A careful inspection of the valid patents which have issued for chemical compounds, animals, microbes, and plants would reveal that in each case the inventors have provided society with something that is not only new but is even non-obvious compared to any-

thing previously made by man or known to exist in nature.

As discussed above, a further requirement of the patent law is that the patent applicant must provide a description of the invention in such detail that a person skilled in the art of the invention, reading the description, can make and use the invention without undue experimentation. This requirement is at the heart of the patent system because it ensures that, if a patent is granted, the public will be able to learn from the invention, improve upon the invention, and when the patent expires, practice the invention without any patent restriction.

B. Other Issues Relating to Biotechnology Patents

1. Attempts to Block Biotechnology Research

Some of the opposition to patents on biological materials has come from people who wish to curtail or eliminate research in the biotechnology field. In view of the availability of trade secret protection I believe that such efforts are unlikely to successfully stop this research and, instead, would only have the effect of slowing or eliminating the flow of information to the public.

2. "Ownership" of Life

Another rationale sometimes heard from those who oppose biotech patents is that people should not be allowed to "own" life forms or the basic chemical molecules which are fundamental to life. As discussed above, patents are only granted for inventions which meet the strict novelty, utility, and non-obviousness requirements. These requirements preclude the granting of patents to things as they exist in nature. The "hand of man" must be involved before there is a possibility of issuing a patent. Furthermore, contrary to popular belief the grant of a patent is *not* the grant of an ownership right, rather, the grant of a patent only gives the patent holder the right to exclude others from making, using or selling the patented subject matter for a limited period of time. The grant of a patent does *not* give the patent holder the right to use the invention. The right to use the invention may be blocked or restricted by federal health, safety, or environmental regulations; by another's dominating patent; by contractual obligations; by state laws; by international treaties; and by a host of other impediments and/or safeguards which exist within our society.

In considering the issue of patents and whether inventors should "own" life forms or chemical mole-

cules of basic importance, I am reminded of Joyce Kilmer's famous poem "Trees" which concludes "But only God can make a tree."²³ I wonder how many of those who are opposed to the granting of patents on mice are also opposed to ownership of real estate including plants and trees.

3. Invention Made With Public Funds

Many have argued that gene sequences, and especially gene sequences identified utilizing public resources (i.e. NIH or Universities), should not be patented and, instead, should be made available to the "public." In these cases, the role of patents in expediting public disclosure is perhaps less critical in view of the tendency for such researchers to publish their results. However, a careful analysis of these situations reveals that, contrary to popular belief, patents can play a crucial role in the effective commercialization of this technology and the equitable distribution of profits which may result from such commercialization.

Take, for example, the NIH discovery of a new gene or protein with potential usefulness as a therapeutic agent. It is my understanding that the current cost of bringing a new pharmaceutical to market is in the neighborhood of \$300 million. Clearly, the NIH does not have the expertise or resources to take this new gene or protein all the way from the laboratory to the market place. Therefore, the technology must be developed by an outside entity. In order for that outside entity to have a realistic chance of recouping its investment it is critical to have a limited period of exclusivity for that product. Without any prospects for patent protection, a new technology is far less attractive to a potential licensee.

Patents can also play an important beneficial role in university technologies which *are* likely to be published *and* are likely to be commercialized even without patent protection. In this regard, consider the process of development of university technologies prior to the use of patents. At universities which did not seek to protect their intellectual property it was common practice for big companies, and other private entities, to directly contact researchers who had promising technologies. Often, for the price of a dinner, that company could have immediate and complete access to valuable technology. When that company developed the technology, no compensation was given to the university. Rather, that company reaps a windfall from publicly funded research. By contrast, if the technology is patented by the university, the company will be required to obtain a license for the technology and share its profits with the university. Typically, the funds paid to the university will be distributed among

the inventors, the university department from which the invention came, and the general funds of the university. In this way, the taxpayer's money which originally went towards university research has paid dividends in the development of the technology as well as the enhanced funding of the university.

VI. Conclusion

Although patents have achieved almost a mystical status in our society, the truth is that patents simply provide a limited bundle of negative rights to the inventor who, in turn, discloses his or her invention to the world in complete detail for all to see, ponder, and improve upon.

While arguments against patenting biotech inventions may raise issues of great social moment and/or provide topics for spirited intellectual debate, when carefully analyzed they do not provide any compelling basis for denying intellectual property protection to the fruits of biotechnology research.

References and Notes

* Shareholder, Saliwanchik & Saliwanchik, A Professional Association.

This paper reflects only the present considerations and views of the author, which should not be attributed to Saliwanchik & Saliwanchik, or to any of its attorneys or clients.

1. U.S. Constitution. Article 1 Section 8 clause 8.
2. V Writings of Thomas Jefferson, at pages 75-76.
3. See, for example, 35 United States Code § 101 (describing subject matter which can be patented) and § 112 (describing the requirement for the patent applicant to provide a full written description of the invention).
4. *Diamond v. Chakrabany*, 206 USPQ 193, Supreme Court 1980.
5. This statement was issued by The Joint Appeal Against Human and Animal Patenting. This group was organized by the United Methodist Church and activist Jeremy Rifkin's Foundation on Economic Trends.
6. *In re Bergy*, Court of Customs and Patent Appeals, 201 USPQ 352 (1979).
7. *Diamond v. Chakrabarty*, 206 USPQ 193, United States Supreme Court 1980.

8. See, for example, Eisenberg, R.S., "Limiting the Role of Patents in Technology Transfer," *The Journal of NIH Research*, October 1993, Vol. 5.

9. The European Patent Office, for example, does not grant patent protection for methods of treating humans.

10. India, for example, does not grant patents on pharmaceutical inventions.

11. For a comparison of trade secret and patent protection see R. Saliwanchik, "Protecting Biotechnology Inventions: A Guide for Scientists," *Science Tech/SpringVerlag*, 1988.

12. 35 USC §112 requires the patent applicant to provide a complete written description of how to make and use the invention. This written description is published for all the world to see when the patent is granted.

13. International patent applications are published 18 months from the original filing date, regardless of whether patent protection is granted.

14. The U.S. Constitution, Article I Section 8 clause 8.

15. 35 USC § 112.

16. An interesting area of biotechnology patent law pertains to the rules and procedures which have been established for providing an enabling disclosure of technology which utilizes specific biological materials. For example, if a novel process for producing an antibiotic requires the use of a newly isolated fungus, a written description of the process would not be enabling if it did not disclose a way to obtain the new fungus. For this reason, patent applications for biotechnology inventions often contain references to deposited cultures. The cultures have been placed on deposit at a depository which is recognized by the Patent Office. The conditions of the deposit must ensure that the biological material will be viable and available to the public for a period of at least 30 years commencing when the patent issues.

The rules followed in the United States with respect to the deposit of biological materials are derived from, and consistent with, international law followed by many of the developed countries of the world. The primary source of this international law is the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure. The Budapest Treaty establishes regula-

tions for the deposit of biological materials for patent purposes.

17. 35 USC § 112.

18. 35 USC § 102.

19. 35 USC § 103.

20. 35 USC § 101.

21. 35 USC § 282.

22. *Diamond v. Chakrabarty*, 206 USPQ 193, United States Supreme Court 1980.

23. TREES

I think that I shall never see
A poem lovely as a tree.

A tree whose hungry mouth is prest
Against the earth's sweet flowing breast;

A tree that looks at God all day
And lifts her leafy arms to pray;

A tree that may in summer wear
A nest of robins in her hair;

Upon whose bosom snow has lain;
Who intimately lives with the rain.

Poems are made by fools like me,
But only God can make a tree.

Joyce Kilmer (1913)

REVIEW OF EMBRACING EARTH: CATHOLIC APPROACHES TO ECOLOGY

by Albert J. LaChance & John E. Carroll, editors., New York, Maryknoll, 1994.

Sister Wörman Carolyn Sur is a theologian for Greco Institute. Her background includes a Masters in Science with emphasis in mathematics, and a Ph.D. in historical theology from St. Louis University. She is a vowed religious with the School Sister's of Notre Dame.

Wayne Teasdale's concluding remarks on the text, *Embracing Earth: Catholic Approaches to Ecology*, point out that Catholicism does not have a monopoly on the ecology issue. The Parliament of the World's Religions used Global Ethics as its theme in the earlier part of this decade. Numerous international gatherings have addressed ecology as perhaps the single issue that unites the world beyond national and denominational interests. In this sense it is catholic and transcends Catholicism. Thus, the text, *Embracing Earth: Catholic Approaches to Ecology*, is both catholic and Catholic in its scope. The dual editors, Albert LaChance and John Carroll, have a broad, if not comprehensive selection from the contributors. The text offers twenty essays from the perspectives of laywomen, laymen, clergy, as well as those of eight religious communities. The editors draw from the following professions: a geographer, a farmer, two monks, a hermit, and academicians representing an even wider variety of interests. These include: environmental conservation, religion and culture, organic chemistry, biology, philosophy, twelve-step counseling, social justice, and mysticism.

Several of the contributors are knowledgeable of multicultural or multi-denominational aspects of

cultures which transcend any one religious denomination: Canadian-American relations, Asian, Indian, and mysticism, the latter of which has been said to be a common thread in the world religions. In addition, its contributors cover the eco-spiritual issues over an historical span of twenty years, beginning in the mid-sixties.

Thomas Berry, C.P., makes the opening remarks of the text, placing the future of the Catholic church in America dependent on "its capacity to assume a religious responsibility for the fate of the earth." In the *Foreword*, Miriam Therese MacGillis, O.P., calls the book a "collection of stories . . . drawn from a variety of Catholics who are responding to the planetary crises." For the traditionalist, she reassures that, "there need be no denial of the past or of tradition by Catholics entering into the ecological stage of Christian evolution." These words anticipate Pope John Paul II's statement in 1996 which embraces the theory of evolution as more likely, while, in Vatican style, keeping the statement open-ended.

In the *Introduction*, co-editor John Carroll calls the book a chance for Catholics to, "converse within the family circle about ways to renew their life together,"

without denigrating Christian ecumenism. He suggests that the renewal of one's own spirituality is connected to that of the planet. Carroll's editorial promise, that the essays run the gamut from the "highly mystical to the rigorously analytical," is fulfilled by the essayists. Albert LaChance, the second co-editor, appeals to those with a sacramental insight when he makes the association that the anointing and healing in sacramental reconciliation and the sacrament of the sick is revelatory of God's forgiveness through "oils pressed from the earth's vegetables." We are healed both physically and spiritually by the earth's life. LaChance offers the insight that, "cultures blossom forth from sacred stories." Institutions which cushion and protect the sacred stories, such as the church, function as a nest. When the psychic nests are destroyed, chaos and hysteria result. "Examples of nest-destroyers are apartheid, Communism, black slavery and Native American genocide." He suggests that the sicknesses of the society which are manifest in alcoholism have their source in ecology when he says, toxic environments breed intoxicated people," and "dizzying levels of ever more horrendous violent crime." Twelve-Step Programs re-orientate the addicted back to God as do the sacraments.

That several of the writers use the theological aspects of love and union as joint themes in an ecological focus may surprise the reader perhaps brow-beaten about recycling.

LaChance identifies Noah's ark as what we now call "Gaia," hinting, in the opinion of the reviewer, that the goddess concept has been labeled as "pagan" for too many centuries and unfairly juxtapositioned against Christianity. He seems to imply that perhaps the tradition should take another look at the metaphor. He identifies covenant as relational, right brain and feminine. He implicitly connects God and the feminine when he connects God and earth, when he redoes the Prologue to John's Gospel. He changes the Scriptural text from, "In the beginning to," to "Before the beginning." This change of preposition, of course, implies that before matter there was no time. With no planets to rotate about their sun, no sunrise and sunset, time is meaningless. Before that was God. "God's Word was within the fireball, and that Word became matter." A summary of his paraphrase would not do it justice, for his treatment of this already unique Scripture is both creative and profound. "From matter the galaxies came forth. From the galaxies the earth appeared. From earth came water, and in the water the Word became living cells. From living cells organisms appeared. . . . The Word became human and told stories about God." The paraphrasing of John's Prologue was one of the book's many engaging

moments.

That several of the writers use the theological aspects of love and union as joint themes in an ecological focus may surprise the reader perhaps brow-beaten about recycling. Richard Rohr suggests that St. Francis' love of nature brought him into harmony with all things. According to Rohr the proper attitude of stewardship of the earth, versus the attitude of fixing and controlling the earth, will release anger and bring one to a stance of loving and forgiving. Francis preached to the birds and reminded them, "The Creator loves you very much." He implied that we should love them too, and, if we love the birds as God's creatures, then all the more should we love one another. Animal lovers will find a prayer for the animals at the end of the text which hangs in the Diocese of Chichester, England.

Beatrice Bruteau writes that God's act of creating the world is an act of pure love; she, too, connects love to forgiveness. Instead of humanity's forgiveness, her approach is to focus upon God's mercy in God's creation of free will. She quotes Joseph Campbell's reference to mercy in Romans 11:22, "For God has consigned all [people] to disobedience that [God] may have *mercy* upon all." [Italics mine.] She associates love with union and includes the negative of union, separation, when she toys with the definition of sin as separation. According to Bruteau, separation is essential to God's *original* plan, not the undoing of human work. This is a one-hundred-eighty degree on the traditional theology of original sin as a reversal of God's plan. She manages to do her theology without the denial of the existence of sin, which denial as been one of the more controversial aspects of Matthew Fox's *Original Blessings*. For Bruteau, creation is involved in a love-dance of separation and union back to God. Without sin, without differentiation and separation, there would be no union. Her reflections bring the reader to consider the positive, end result of sin.

Frederick Levine spans east coast and west coast spirituality with his background of cultural-historical studies in Judaism from both the Harvard Divinity School and Berkeley. The concept Christian sacrifice has its roots in the sacrifices offered at the Temple, constructed on the top of Mt. Zion. Mt. Zion is "the cosmic mountain, the *axis mundi*, the intersection of heaven and earth. It is the place where God and humanity meet." Because the fruits of the earth were burnt, the earth itself was a sacrificial and sanctifying agent for human moral transgression. When the Temple was destroyed in 70 C.E., first-century rabbi Johanan ben Zakkai reassured a colleague that "sacrifice was unnecessary as long as they could perform

deeds of loving kindness." In that sense, Levine, too, picks up the theme of love.

In our century, Teilhard de Chardin renamed Christ, the Omega point, as the apex of the *axis mundi*. Christ is not merely the place, [Mt. Zion, according to Levine] but the *person* in which humanity and divinity meet. Levine, with a background in Jewish mysticism, does not choose to make this explicit connection. Beatrice Bruteau credits Mary, the Blessed Virgin, with being the meeting place for God and flesh. While only implied, Mary as the first to transform matter, human body and blood into Christ, is mediator and shares in Christ's priesthood.

John Carroll presents a Christology "from below" in his essay, "Christ the Ecologist." Christ, the initiator of Christianity, lived the four ecological principles which he challenged his followers to embrace: 1) love your neighbor as yourself; 2) avoid the worship of false idols (money); 3) avoid false pride. This, according to Carroll, is more easily done by living *in* community, as do the Amish and members of religious communities. If this is not an option, as is the case for most Christians, then Carroll invites others to at least be *conscious* of the world community, to avoid excess; to live with less is an ecological principal. 4) Finally, he requests, live simply, differentiate needs from wants. Carroll's essay lays out a practical approach to simplicity — making simplicity a more attractive appeal. Its emphasis and by-product is freedom rather than "giving up." "The fewer possessions, the simpler the life; the more freedom."

Both the scientist and the theologian will find a connection between respect for the earth and the dignity of the human person in Embracing Earth.

Mary Rosera Joyce, in, "A Revolution in Human Ecology," asks, "What is the genus in the definition of the human person?" Are we basically a rational animal as Aristotle proposed, or, are we more intuitive than we are rational? The answer, in her theory, determines whether we are more like foxes and lions, or more like angels and the Holy Spirit, in essence, more like God than animals. She concludes that "we are probably about 90 percent intuitive and 10 percent rational. Because we are so predominately intuitive, we actually know far more than we know that we know." We are more centered in the heart than in the intellect. However, scientists and sociologists who may look for raw data to back specific percentages will not find them. New literature is available on the physical differences between the male and the female brain which gives evidence why women, in general are more

intuitive than men. It remains a question as to whether science and Western society can confirm that men have the desire and psychic or mental equipment to operate on a 90 percent intuitive and a 10 percent rational basis.

Joyce attacks the false sexual revolution proposed by Freud which is connected to our lack of reverence for the ecology. A revolution in human ecology, one's immediate environment, becomes a true sexual revolution. Thus, she connects the ecology to sexuality when she implies that sexuality is bodily environment. Joyce poses three ways of being sexually active in man and woman, not just one way as in animals. "First, there is the inner way of receiving sexual feelings as energy to develop manhood or womanhood without genital activity. . . . Second, there is the intimacy and co-creation of mutual sharing of thoughts, feelings, values, hugs, and other friendship activities without genital involvement. Third, there is the intimacy of marriage, genital intercourse. . . . She describes the first as the most important, as foundational for the second and third. Her approach is thought-provoking in that it addresses the reality of energy. The reader knows experientially that energy is dual, is both masculine and feminine, both of which are incorporated by either gender, yet, energy transcends gender. The approach of using feminine *energy* as a reflection of God, would seem much less controversial than the approach taken by much of the feminist literature, namely, of using feminine *images* of God. The first, which focuses upon *energy*, is a "both/and" issue which does not threaten the dominant culture, in that men know themselves to have nurturing, feminine energies. The second, which focuses upon *images*, may be viewed superficially as an "either/or" issue, since one normally experiences gender as either male or female but not both.

Both the scientist and the theologian will find a connection between respect for the earth and the dignity of the human person in *Embracing Earth*. Special attention is given to women's connection to the earth. Since women are feminine reflections of God's image they are closely connected to the earth and to God through the common denominator of giving life. Mary Rosera Joyce attempted this connection in her essay on human sexuality. To her credit, she extends sexuality well beyond the physicality of "sex," a distinction sorely lacking in the media, but fails to develop the ecological parallel to an equal extent. Still, her essay was refreshing and may contain new insights for some who have not considered sexism and unqualified capitalism as siblings. The editors, either consciously or unconsciously, sequenced Joyce's essay with Toolan's, who implies that education and economics will raise the status of women, and thus, of society.

David Toolan, S.J., contributes, "Open to Life--and to Death: The Church on Population Issues." He begins by praising Pope John Paul II for his words in the 1990 World Peace Day message that, "a right to a safe environment" is a "human right." At the same time he questions why the Vatican, "plays down the role of overpopulation in ecological destruction. At best, it concedes it is a problem in 'some' areas." Economic development, environmental degradation and irresponsible fertility behavior are closely related. He leaves the definition of irresponsible fertility behavior to the moralists. The statistics on human population are well-established but he updates them. It took until 1800 to reach 1 billion people; slightly over a century (between 1918 and 1927) to reach 2 billion; about 33 years to reach 3 billion in 1960; 14 years to reach 4 billion in 1974; 13 years to reach 5 billion in 1987; almost another half of a billion in the next 7 years, that is, 5.4 billion in 1994. Toolan predicts 8.4 billion in 2025; in 2050 the UN Population Fund forecasts, Toolan notes, that we will be at 10 billion, leveling off at 11.6 billion after the year 2050. The question remains whether the planet's soil, water and air will stretch without political, social and ecological meltdown. Currently, one out of five of the world's 5.4 billion people are so malnourished that they do not have energy for a day's work. Already, in 69 out of 102 developing nations, the food production lags behind population growth. If we have an environmental refugee problem now, just wait. We have to ask what the situation will be when we add another three billion people, 94 percent of them in the hungry Third World, by the year 2025.

Toolan affirms the Catholic church for insisting that sex is not recreational, that it is to be exchanged in loving mutuality. However, Toolan questions *Humanae Vitae* for insisting that "each and every marital act must remain open to the transmission of life," instead of emphasizing the total relationship or loving union as the context for judging the morality of sexual conduct as many believe. He publicly asks the question which has long loomed in the minds of the Abortion/Pro Life controversy, "Does the church's stand on contraception, then, indirectly promote abortion? . . . [In Chile] so many women suffered medical complications from illegal abortions that the hospitals were being flooded, leaving less and less space for live-birth mothers." He ends by affirming John Paul II's stance on human rights in general, but questions whether it is strong enough to deter women from getting the idea "that the church wants to keep them in the unequal place to which many societies relegate them." He avoids other questions on the birth control issue that would come more from the woman's perspective. For example, there is the question about

whether Natural Family Planning really "natural" for the woman, in that she refuses her husband when she naturally most desires him.

Beatrice Bruteau in, "The Theotokos Project," calls the cosmos itself, the "Godbearer." The cosmos itself is the embodied word of God. Instead of a take-off on how this differs from pantheism, a necessary and long established distinction in Catholic thought, she places the responsibility of the distinction upon the Incarnate God, who is the Exegete, the revealer of the sacred mysteries. "The icon of the *Theotokos* takes up the birth-giving character of the world and regards the offspring as divine." *Theotokos* is personified and historically incarnated by the Blessed Virgin Mary. She suggests that *Theotokos* is perhaps remotely foreshadowed by the Hebrew, the feminine *Shekhinah*, the feminine dwelling or presence of God on earth. The metaphor of the female Godbearer over the duration of the two Testaments gives a sense of gestation, a sense of gradual formation and emergence for the hidden divine feminine in the material world. She suggests that the time of emergence is the now. She quotes the Epistle to the Romans 8:22, 19, 21 in which the whole creation has been groaning in travail together. It would have been a perfect opportunity to develop the Black Madonna as symbol of humus and offer this sacred connection to women of African interests or origin. The womanist perspective as lacking in the text's "catholicity" was its weakest area. Had Joyce and Bruteau merged their insights, it might have happened.

William J. Wood presents the Ignatian Spiritual Exercises from personal experience as having cosmological and ecological overtones on three levels. First, he finds their structures as a way of conversing with God "as if God and creation were there for me alone." Secondly, he puts himself in the place of *suffering* humanity and draws on God's power to relieve suffering and to usher in an era of unimaginable peace. Thirdly, he puts himself in the place of *creation*, taking on the persona of a woman "painfully groaning to give birth to whole new creation." He reminds the reader that each person is a microcosm of the universe.

Wood, credits the term *cosmo-genesis* to Thomas Berry. Actually, the term was first coined by Teilhard de Chardin in 1955, in *Le Phenomene Humain*, 1955 by Editions du Seuil, Paris; English edition, 1959 by Wm. Collins Sons & Co. London: Harper & Row, Pub. However, in his defense, Berry uses Teilhard profusely. In addition, Jesuits were forbidden to read Teilhard in the early years of his publications. Perhaps Wood has read Teilhard through Berry, even though condemnations of Teilhard's work have dissipated.

Tessa Bielecki, O.C.D., traces Gaia from the Greeks to British scientist, James Lovelock. To describe Gaia, she resorts to Lovelock's definition: "The entire range of living matter on Earth, from whales to viruses, from oaks to algae, [which can] be regarded as constituting a single living entity." She suggests "Rosetta Stones" for Gaia's slow acceptance into orthodox Catholicism: 1) the Mystical body of Christ which would rename the body, long established in the tradition, of an earth mother goddess; 2) the Genesis Story which teaches that both male and female, are formed out of the dust of the earth; 3) Psalm 139 which thanks God for fashioning us in the depths of the earth. This is perhaps more valuable for one looking for subtle threads of Gaia in the tradition.

William McNamara, O.C.D.'s contribution might be an English teacher's golden ring. He likens the garbage of the environment to "garbage words" which are either not words or words which are trivialized by over-use: *like, okay, hey, yuh know, I know where you're coming from*. In this array are included other word-related concepts of ambiguity: gossip, crying wolf with the word "discrimination," abuse of the psychotherapy, along with the vocabulary of scientific theology which leaves no room for doubt and thus, no room for faith. His punch line is that the Word is the ultimate message. "The Word was with God and the Word was God," contains the crisp, staccato, and real message of Truth.

Albert Fritsch, S.J., linked Eucharist and technology, reminding the reader that liturgy means "the work of the people." His comment that bread and wine are not natural gifts, but need to be worked by many people, associates working together with the earmark of Catholicism, community. His statement, "if all creatures are interrelated, what harms some will harm the rest," has been said before, but he finds it important enough to reiterate. He ends a long and well-developed essay with this statement: "As a priest I find a more ministerial role in developing a better dry-composting toilet than attempting to craft the final word on eco-spirituality." The conclusion may be the evidence a tired academic in need of some fleshed-out experience. They lead the reader to believe that his presentation is not done from some ecclesiastical throne removed from life's daily functions. After all, even the dignified Lady Julian of Norwich could thank God that her body opened and closed for its eliminations like a well-made purse! Liberation theology insists upon theology in context.

Paula Gonzalez, S.C., tackled a difficult topic with ecology as a spiritual awakening in parishes. She suggests that eco-spirituality takes place primarily

through the feast of Easter with its emphasis on water as the symbol of life. Her work on Gaia parallels ideas in Tessa Bielecki's essay. The earth is an organism which exhibits characteristics associated only with living systems. Humanity as the consciousness of the earth is quite in sync with Rahner's emphasis on human consciousness as the starting point of God's revelation. She quotes Thomas Berry who presents the universe as "the primary revelation of the divine." Does Berry mean that the divine unfolds in the universe more clearly than in other theological structures: church, sacraments, Scripture? Is the universe more or less Catholic than these other revelations? Gonzalez does not address those aspects of the issue but one concludes that the universe as primary revelation of the divine is embraced with a catholic mentality which would incorporate the Asian religions.

Keith Warner, O.F.M., plays with Norwegian philosopher Arne Naess' term, "deep ecology." Deep ecology asks questions of society which are beneficial for the whole of the universe. He decries shallow ecology which studies small sections of life and ignores human behavior. Other aspects of his essay parallel the Franciscan spirituality presented by Richard Rohr.

Wayne Teasdale returns to the Eucharistic theme in "Concluding Reflections." He reminds the reader that "Catholics have a profoundly beautiful tradition, a spirituality that is unassailable, and the precious treasure of the Eucharist."

David M. Sherman has the broadest task in his essay, "Choose Life: Ascetic Theology, History and Ecology." He points to the Holy Spirit as the link from theoretical statements in dogmatic theology to practical applications in ascetic theology, particularly through the Charismatic Renewal program. His is among the more critical of the essays, as he accuses the priesthood of sexual immorality and intemperance, and Southern culture through "carne-val." He finds no reason to include the "feast of the flesh" in the Christian life. Is this a remnant of Jansenism; is it an evidence of the Catholic church's long exclusion of the feminine and thus the body, or is this an accurate critique? The reader can decide.

Judeo-Christian literature is about sacred stories. The solar system has its sacred story, evolving from plate tectonics through, the atmosphere, the oceans and land masses. The Earth Story has its sacred story, evolving from prokaryotic through eukaryotic, fish, bird, reptile, mammal primate to human. The Life Story has its sacred story, evolving from tribal through

neolithic, classical, modern and postmodern. The text, *Embracing Earth* in LaChance's essay, gives the reader an opportunity to embrace and reflect upon her/his place in the sacred story.

Because the text is situated within the "Catholic" position by its title and, according to MacGillis, its contributors are Catholic, one might expect several essayists to address the central Catholic ritual, the Eucharist. Marc Boucher-Colbert does so with the Eucharist's connection with the fruits of the earth — bread and wine. Boucher-Colbert addresses the connection when he speaks of Jewish agricultural festivals of spring and fruit (wine) ripening. "That these agricultural gifts and motifs have been understood to reveal divinity so profoundly attunes us to the sacramental power of the earth." Unfortunately, in his opinion, electric lights, processed foods and condominium developments with their remote connection to the natural rhythms, to the ground, keep one from this awareness. Eucharist as community, the earmark of Catholicism, is elaborated upon in Boucher-Colbert's entry, "Eating the Body of the Lord: Eucharistic and Community-Supported Farming."

Wayne Teasdale returns to the Eucharistic theme in "Concluding Reflections." He reminds the reader that "Catholics have a profoundly beautiful tradition, a spirituality that is unassailable, and the precious treasure of the Eucharist." Thomas Berry points out so effectively through Teasdale that "these function within the reality of the earth itself." Not in the text, but parallel to Berry and Teilhard, St. Louis University's Francis Cleary, S.J., makes Catholicism explicit and inviting when he notes, "Catholicism succeeds so well because we sacramentalize what is natural: eating, drinking, marrying, struggling with illness and eventually dying."

Richard Haas addressed the Eucharist in the pre-

Vatican II *language of*, "The Mass," but did identify its essence in the post-conciliar concept, namely, as "a celebration of our richness, [fellowship with men and women and fellowship with Christ] which stimulates our sense of gratuity." Some feel that the continued reference of Mary as humble servant keep women in a subservient position in society and in the church. His presentation of Mary is in the mode of Catholic, traditionalist theology. Mary, according to Haas, as "one who accepts her status as servant," is in juxtaposition to the strong *Theotokos* of Beatrice Beautreau, Mary who emerges as female Godbearer. The different theologies of Mary may be why the editors were wise to approach the topic from an inclusive gender perspective. As catholic, that is universal, the Catholic church, by its essence, must transcend gender biases to convey the balance of truth on any given theological topic.

This text is neither about, a "practical economic interests of workers and their families [nor about] elitist concern for inconsequential plants and animals," to use the opening line from Haas' essay, "A Loaves and Fishes View of Productivity." It is deeper and richer than either end of that spectrum. Readers could use Teasdale's concluding remarks as an overview of the text.

African-American/Black Catholics and eco-feminists, granted two small but important subsets of the text's perspective readers, will want to supplement its negations. But for secondary teachers of upper level courses in either theology or science, for parish educators and college professors of both graduate and undergraduate levels, and also for seminary instructors, I could recommend the text, *Embracing Earth: Catholic Approaches to Ecology*. The text covers a broader scope than most.

NEW MEMBERS

BENVENUTI, Piero; Karl-Schwarzschild-Str. 2, Garching bei München, D-85748 Germany; Astrophysicist/Head/ST-ECF, Space Telescope European Coord. Facility; Science-Faith; ☎ +49-89-32006291; FAX +49-89-32006680; E-MAIL pbenvenu@eso.org.

BIBLIOTHEQUE SÈVRES; 35 bis rue de Sèvres, Paris, 75006 France; Library, Bibliotheque Sèvres; ☎ 1-44-39-75-09; FAX 1-45-44-32-06; E-MAIL sjsevres@wanadoo.fr.

BIRTEL, Dr. Frank T.; Tulane University - 308 Gibson Hall, New Orleans, Louisiana 70118 U.S.A.; University Professor (Mathematics), Tulane University; Science, religion & human values, math; ☎ (504)-865-5646; E-MAIL ftbirtel@inailhist.tis.tulane.edu.

BROWN, James; 4116 N.W. 21st. Terrace, Oklahoma City, Oklahoma 73107 U.S.A.; Student, St. Gregory College; Ecology; ☎ (405)-942-4797.

DE SOCIO, Rev. John A.; 314 Gregory St. - Becket Hall, Rochester, New York 14620-1307 U.S.A.; Vocation Director, Diocese of Rochester; Physical chemistry.

ENGLAND, Janine V.; 3431 Kings Cross Road, Alexandria, Virginia 22303 U.S.A.; Naval Officer/E. Engineer (fiber optics), Naval Sea Systems Command; Science & theology; ☎ (703)-960-5549; FAX (703)-602-5404; E-MAIL jvej9@aol.com.

FORSTHOEFEL, SJ, Fr. Paulinus; 4001 West McNichols Road - PO BOX 19900, Detroit, Michigan 48219-0900 U.S.A.; Prof. of Genetics (emeritus), University of Detroit/Mercy; Genetics; ☎ (313)-993-1643; FAX (313)-993-1653.

GOTO, Tafadzwa; 1900 W. Mac Arthur Drive, Shawnee, Oklahoma 74801 U.S.A.; Student, St. Gregory College; Working with people; ☎ (405)-878-5280.

HAAS, Dr. John M.; 186 Forbes Road, Braintree, Massachusetts 02184 U.S.A.; Administrator, Pope John XXIII Medical Ethics Ctr.; ☎ (617)-848-6965; E-MAIL jhaas@pjcenter.org.

HUGHES, Carey; P.O. BOX 1641, Duncan, Oklahoma 73534 U.S.A.; Student, St. Gregory College; Photography, travel; ☎ (405)-252-2012.

KING, Donna; Luther House - 211 N. W. 23rd St., Corvallis, Oregon 97330 U.S.A.; Campus Minister, Lutheran Campus Ministry - Oregon State; Women in science & technology, ethics; ☎ (541)-753-5213.

LEE, Dr. Thomas F.; 87 St. Anselm Drive - St. Anselm College, Manchester, New Hampshire 03102-1310 U.S.A.; Professor, St. Anselm College; Biotechnology, genetics, engineering; ☎ (603)-641-7152; FAX (603)-641-7116; E-MAIL tomlee@anselm.edu.

LORI, Most Reverend William E.; P.O. Box 29260, Washington, District of Columbia 20017 U.S.A.; Auxiliary Bishop, Archdiocese of Washington; ☎ (301)-853-4542.

MACIOR, OFM, PhD, Lazarus Walter; University of Akron - Dept. of Biology, Akron, Ohio 44325-3908 U.S.A.; University Professor, University of Akron; Floral evolution in research; ☎ (330)-972-7163; FAX (330)-972-8445; E-MAIL Macior@akron.edu.

SALCIDO, Aurora; 1900 W. Mac Arthur Drive - BOX 376A, Shawnee, Oklahoma 74801 U.S.A.; Student (psychology), St. Gregory College; ☎ (405)-878-5375.

SCHRZA, Wayne M.; 1900 W. Mac Arthur Drive, Shawnee, Oklahoma 74801 U.S.A.; Student, St. Gregory College; Ancient history; ☎ (405)-273-9270.

SQUIRE, James; 1702 Lake Shore Drive, St. Charles, Missouri 63303 U.S.A.; Software engineer/student, McDonnell Douglas/LSTC; Lay theologian, Internet (WWW), tv, movies; ☎ (314)-949-7646; E-MAIL Jamess1889@aol.com.

CHANGE OF ADDRESS

BROGLE, Rob; 280 S. Euclid Avenue #324, Pasadena, California 91101 U.S.A.; Physicist, Aerojet Corporation; Physics & cosmology; ☎ (818)-564-9102.

BROOKS, Christopher C.; Cardinal Creek Blvd., Norman, Oklahoma 73072 U.S.A.; Student, University of Oklahoma; Anthropology, environmental concerns; ☎ (405)-447-8398; E-MAIL christopher.c.brooks-15@ou.edu.

BURKE, Most Rev. Raymond L.; P.O. Box 4004 (Diocese of La Crosse), La Crosse, Wisconsin 54602-4004 U.S.A.; Bishop of La Crosse; Bioethics, philosophy of science; ☎ (608)-788-7700; FAX (608)-788-8413; E-MAIL 102556.3147@compuserve.com.

FERGUSON, Mr. James K.; 7500 Woodmont Ave., Apt. L05, Bethesda, MD 20814-5362 U.S.A.; Investment Counselor, Ayrshire Associates; Theology and science; ☎ (202)-293-9113.

FISCHBACH, Mr Ryan; 4226 Pueblo Street, Carmichael, California 95608 U.S.A.; Computer software designer, Retail Technologies International Inc.; Computers, theology, science; ☎ (916)-483-1656; FAX (916)-481-6903; E-MAIL ryan@rti.uucp.netcom.com.

HOGLE, MM, Sister Jean; 42 Kuei Ho Street, Taichung 403, Taiwan, R.O.C.; Medical technologist, Maryknoll Sisters; Bioethics, ecology.

MÜLLER, Francisco J.; 8025 SW 15th St., Miami, Florida 33144 U.S.A.; Physicist, University of Miami (retired); Natural philosophy, electromagnetism, music; ☎ (305)-266-1595; FAX (305)-264-7062.

NAVIA, Dr. Juan M.; 729 Comer Drive, Birmingham, Alabama 35216 U.S.A.; Professor Emeritus (Public Health), Univ. of Alabama, Birmingham; Nutrition/public health; ☎ (205)-822-4901; FAX (205)-823-8682; E-MAIL naviajm@wwisp.com.

O'DONNELL, CSP, Fr. Robert J.; 86-11 Midland Parkway, Jamaica Estates, New York 11432-3041 U.S.A.; Priest/Vice Pres., Paulist Fathers; Cosmology, evolution, mind, technology; ☎ (718)-291-5995; FAX (718)-291-6646; E-MAIL rjodcsp@aol.com.

POTO, E. Rita; 6618 Colonial Drive, Sarasota, Florida 34231 U.S.A.; Humanities; Science/tech., religion/faith; ☎ (813)-923-5147.

SALMON, SJ, Fr. James F.; 4501 N. Charles St. - Loyola Jesuit Community, Baltimore, Maryland 21210 U.S.A.; Treasurer/Chemist, Society of Jesus/Loyola College; Chemistry, theology; ☎ (410)-532-1418; FAX (410)-532-1419.

SHARPE, Kevin; 65 Hoit Road, Concord, New Hampshire 03301-3328 U.S.A.; Editor, Science & Spirit Newsletter; ☎ (603)-226-3328; FAX (603)-229-9053; E-MAIL ksharpe@science-spirit.com.

SUR, SSND, PhD, Sister Carolyn; 11134 Parkside Drive, Shreveport, Louisiana 71115 U.S.A.; Theologian, Diocese of Shreveport; Ecology, cosmology, eco-spirituality; ☎ (318)-227-3168; FAX (318)-222-2080.

CHANGE E-MAIL; PHONE

Michael Alavanja: E-MAIL Alavanjm@epndce.nci.nih.gov

Robert E. Joyce: E-MAIL rjoyce@csbsju.edu

Rocco Martino: E-MAIL rmartino@xrt.com

Edward J. O'Boyle: E-MAIL Oboyle@linknet.net

Michael Szupper: E-MAIL Szuptmo@udel.edu

Robert J. White: E-MAIL ERose@mhnet.mhmc.org (216)-778-4383; FAX (216)-778-5616.

IN MEMORIAM

We announce the death of a long-time member of ITEST:

Mr. Neil Dewan

We ask you to pray for him and for his family. We also ask your prayers for ITEST members who are ill. May they feel the restoring hand of the Lord.

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