



We're once again looking ahead to Advent — a time of anticipation and a time for reflecting on the year's work.

Looking back has its dangers. We may see only the good or only the not so good. As is usually the case, the truth is more complicated. While we ran two good conferences, we did not truly advance on all fronts. We should have worked harder on the campus ministry program — there never seemed to be enough time. We could have done more on setting up the WebSite. I should have done more on the Summary volume (*Biology, Law and Public Policy*) — there never seems to be enough time.

In anticipation we can reflect on what lies ahead. We have major plans for the future. First, I shall try very hard this coming year to complete the Summary volume. The campus ministry work will continue with greater energy. We hope to have a volume ready for the very young but much of that is dependent on the health of an older nun who is doing it. We shall, in any event, work as hard as we can to make next year a memorable one.

In fact, we live in hope. We hope in Him who sent his Son to give the Spirit to us. We hope in Jesus who was born, lived and died for us and for all. As we anticipate his Birth, let us join hands and hearts to live out the blessings he has sent our way. There is much to be done in faith/science. We are in a "culture of death," as Pope John Paul keeps reminding us. It is incumbent on us to work to reverse the evil by our prayers and our deeds. Scientifically, problems will continue to multiply for both science and church. We can help mitigate them.

We must always remember the prophecies of Isaiah which came true in their proper time. He prophesied the coming of the Baptist and the One who would follow him. In some of the world's most beautiful poetry he foretold the coming of Christ. Let us pray in union with him that we too may be found waiting when Christ comes to us. May the coming of Christ find us waiting in great anticipation for Him. Happy and blessed Christmas and 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. Let me remind you that one of our members has very generously offered to finance memberships (for calendar year 1997) for up to twenty five students. These will be for new members, not for those who are already members. The ITEST board of Directors has voted to match that offer. Consequently, we will offer fifty new complimentary memberships for 1997. We ask our members to nominate those whom they feel are interested in faith/science work (two or three per member, please). We need your cooperation on this. We feel that many of these students, once they are familiar with our work, will remain members. We would like to reserve about 30% (approximately 15) of these new memberships for students from outside the United States. So far, we have received the names of eight such students. Can't we do better than that?
2. The Proceedings of the March Workshop on *Christianity and the Environmental Ethos* have been sent to all dues-paid members. With them also was sent the updated (it will be in use in 1997) Membership Directory. We have tried to make this as error-free as possible, but we are certain that it is not error-free. If you note any errors, — or have updated information — please let us know. We will publish corrections in future issues of the *ITEST Bulletin*.
3. The October 25-27, 1996 ITEST Workshop on *The Patenting of Biological Materials* was well attended. This meeting was co-sponsored by BIO (Biotechnology Industries Organization). Each group sent representatives and the meeting seemed to have gone quite well. The Proceedings will be published in about six or seven months and sent to all dues-paid members of ITEST.
4. There will be no ITEST meeting in March, 1997. The Board of Directors had decided some time ago that there should be some years during which ITEST sponsors only one meeting. This decision was made because of the cost involved and the wear and tear of two meetings per year on the staff. The staff needs time to work on extra material like the Website and the long-promised summary volume on Biology, Law and Public Policy. It would be good to complete the latter within the "memory of man."
5. The Board of Directors has chosen evolution/creation as the topic for the Workshop of October 17-19, 1997. Quite frankly, we have avoided this topic because the feeling on the Board has been that this is a very old issue that should no longer agitate anyone. But, the Pope's recent statements have raised some questions on it. Moreover, in the real world this is a "live" issue and, consequently one which ITEST should address. We hope to "develop" a middle position (so that both sides can attack us). We hope to concentrate on issues such as scriptural interpretation and a paper dealing with the philosophical and theological baggage that much of the controversy carries. If you have any suggestions, please let us know by the end of the year.
7. After the ITEST 25th anniversary convention in Holyoke, Massachusetts in 1993, most of the attendees expressed a desire for a similar meeting to celebrate the 30th anniversary. Rather than 1998, the Board decided and approved such a convention for 1999. That's the 31st anniversary of ITEST and the least 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 one (January) or two (April) meeting of the Board.
8. Let us remind you that you can access the ITEST Website at <http://ITEST.slu.edu>. We ask you to do so if you can. We are just beginning and are open to suggestions for further development. We are planning on linking with other groups who have the same sort of interests. We are planning to include many of the essays that we have published since 1969. It is truly amazing how many of them are still "forward looking." Also, if we ever get the time to do so, we would

like to summarize the discussions from the meetings through the 1980s. That will be a huge job, but we shall do it if we can. There is a great deal of excellent information in the discussions. If you are asked for a URL when you type in the information, give www.

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 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.

11. The 44th annual Star Island Conference will be hosted by the Institute on Religion in an Age of Science (IRAS). Date: July 26 - August 2nd; Topic: Evolution of Morality; Place: Star Island, New Hampshire. For more information contact: Bonnie Falla, registrar; 810½ North 9th St.; Allentown, PA 18102; USA. Telephone no. (610)-432-8711.

BOARD OF DIRECTORS ANNOUNCES SEARCH FOR ITEST DIRECTOR

The search is on for a successor to Fr. Robert Brungs, SJ, co-founder of ITEST and director since 1968. Fr. Brungs will become "chairman of the board" as soon as a new director is in place. His 28 years of "full-time" service to the organization has afforded little opportunity to write. He hopes to devote his energy to research and writing on aspects of the faith-science ministry.

Position: Director of ITEST
Requirements: PhD in Theology or Science, with an appropriate competence in the other area.
Responsibilities: Organizational development (membership, fund raising, program administration),

(1) designing workshops/conferences for college/university professors, professionals in business and industry, scientists/technologists, clergy and church leaders and college and university students in theology and the sciences — all with a view to "meaning" for the Christian living in the world; (2) lecturing on topics of science/faith/theology; (3) writing on these same topics for publication, either in-house or in journals; (4) exploring new areas of ministry or service (i.e., campus ministry).

Salary/Stipend: Very modest, but somewhat negotiable
Conditions: One to two-year internship or residency with present staff.

Contact: S. Marianne Postiglione, RSM, Dir. of Communications and member of search committee. (314)-977-2703; FAX 977-7264. Or send resumé with letter of intent.

THE PAX ROMANA SCIENCE SECRETARIAT (SIQS)
(Reprinted with permission from) *Culture and Faith*. IV-2, 1996. p. 148

Peter Hodgson, President of SIQS

Science affects our twentieth century culture in many ways. Most fundamentally, it affects the way we think about the world and our place and destiny within it. We are now aware that we are living on a relatively small blue ball poised in the vastness of space, circling around our splendid sun, which is in fact a rather ordinary star on an outer arm of a vast galaxy of billions of stars, and that this galaxy is one of billions of such galaxies in the whole universe. This is the cosmic background against which the drama of our Salvation is played. It can induce some humility, as we ask: "What is man, that You are mindful of him?". In the background is another question: "Is it really very likely that the Creator of the whole immense universe would become man on that insignificant blue ball?". The mental background to our thoughts is provided by modern cosmology, not by the cozy earth-centered views of the Hebrews and the Greeks that underlie the Old and New, Testaments.

On a more direct but less fundamental level, science affects our lives through all the technological advances that it has made possible. Some of them, such as those concerning travel and communication, simply allow us to go on doing what we have already been doing, but more rapidly and efficiently. Others, particularly in the medical field, open up quite new possibilities that often have serious moral dimensions.

Within this modern scientific world view many activities, such as praying for rain, can look ridiculous. Do we really believe that God, in response to our prayers, will start moving the atmosphere around to give the result we want? In the same context, many of the Bible stories are simply unacceptable, and so-called miracles just cannot happen. If young people are brought up believing that the biblical story of the creation of the world in six days is literally true then, when they learn about the scientific account, they reject the Bible as naive and false. Einstein in his autobiography recalled that he abandoned his early religious beliefs at about the age of 12 when he realised that many of the stories in the Bible could not be true.

The Abbé Michonneau, a worker priest, found that the apparent conflict between the scientific experience and the six-day creation story was more effective in alienating the working classes from the Church than glaring social injustices.

Scientific culture thus exerts a powerful influence on young and impressionable minds, and gradually they drift away from the Church. What they need is a clear and convincing exposition of the Faith that takes full account of the latest scientific advances, and this can only be done by one who is familiar with both. It is a difficult task because to resolve and answer the difficulties mentioned above, and many others, requires many careful distinctions and analyses at a higher intellectual level. Is the average parent able to do this? Or the parish priest? Does the religious instruction in schools and seminaries equip the parent, teacher and parish priest to steer those in their charge through the treacherous shoals and minefields of modern secular culture, backed by all the resources of the mass media? The teachers may be well-instructed in the Faith, though even this is less likely today, but if they are not also familiar with the science required, this will immediately be evident to their students and excite their ridicule and destroy the last vestiges of their waning authority.

Can we rely on the Catholic Press, periodicals and books by Catholic authors, to provide the needed education? With a few notable exceptions, this is little more than a disaster area. Most of the Catholic Press simply adopts the views of the secular media on matters related to science, and sometimes even seeks to solve the problems by making fun of and undermining science itself. Are Catholic libraries, in schools and seminaries, well stocked with sound books? All too often, one finds books by Hawking, Dawkins and Capra, but not those of Duhem, Jaki and Crombie, devout Catholics whose writings are immeasurably superior both in quantity and quality, showing massive scholarship and a deep understanding of the relation between theology and science in the context of human history.

What can be done about this situation, which is causing havoc in the Church? The responsibility lies squarely on the shoulders of Catholic scientists. We have the necessary knowledge of science and we should know our Faith well enough to deal with these problems. We should be writing articles and books, lecturing and teaching.

There are large numbers of well-qualified Catholic scientists, but few are accepting their responsibilities. One often finds excellent scientists who are devout Catholics but who never seem to connect their science with their faith. Scientific research is a full-time

occupation, and it is not easy to acquire the necessary theological knowledge to understand accurately and clearly the relation between the two. By themselves, theological and scientific knowledge are not enough; they must be supplemented by a good knowledge of philosophy and history. Without this knowledge, it is easy to do more harm than good, and a consciousness of this inhibits many from even making the effort to gain the necessary knowledge.

These are difficulties to be overcome, not excuses for inaction, and the Science Secretariat of Pax Romana (SIQS) exists to help and encourage Catholic scientists to play their full part in the life of the Church. Pax Romana is the world-wide Organisation uniting Catholic intellectuals in universities and colleges of higher education, in industry and in a wide range of other occupations. The Science Secretariat is responsible for matters concerning the physical and biological sciences, and provides an Organisation and a forum to assist and stimulate Catholic scientists to fulfil their vocation.

In order to do this, contacts are maintained with Catholic scientists worldwide, and the aim is to have in each country a representative who seeks out Catholic scientists and encourages them to undertake the necessary extra studies. Annotated book lists are provided to facilitate these studies and meetings and lectures are arranged. Close contacts are maintained with the Pontifical Council for Culture, which is concerned with the same problems in a much broader way. The Pontifical Council has worldwide contacts at the highest level and thus facilitates communication between the Science Secretariat and Catholics in many countries.

A particularly important contribution is made by priest scientists, as they have the necessary theological training. The extensive writings of the Benedictine Professor S. L. Jaki are of inestimable value, as they provide essentially all that is necessary for Catholic scientists to become familiar with all aspects of the relation between theology and science. There are too few such people in the Church, and yet there could easily be many more. There are many priests who were trained as scientists before embarking on their theological studies, and they have the potential to make a vital contribution to the life of the Church. Unfortunately they are seldom given the opportunity to undertake further study, and so are not able to integrate their theological and scientific knowledge to the highest scholarly level. Instead, they are frequently given teaching and administrative duties that are certainly important but could be done just as well by many others. If they were given the opportunity for

higher studies they could return as teachers in seminaries and universities and exert a powerful influence on the whole Church.

Particular importance is attached to the extensive writings of the Popes, especially of the present Holy Father, on science and technology. In many addresses he has reflected on most of the current problems and encouraged scientists to carry out their work for the glory of God and for the benefit of humanity. Most of these were addressed to meetings of scientists organised by the Pontifical Academy of Sciences. The Proceedings of these meetings are a valuable resource, but they are very seldom given the publicity they deserve. There are plans to publish a collection of some of the Holy Father's most important addresses on scientific questions.

An important activity of the Science Secretariat is the day devoted to scientific matters that is part of the large international Pax Romana Conferences that take place every three or four years. The last one took place in Warsaw in 1995 and was devoted to the theme of the nature of material reality. The next one will be on *The Place of the Scientist in the Life of the Church*, and will address both the responsibilities of scientists themselves, and the ways we can cooperate with teachers in schools, seminaries and universities, and also with the media, to ensure that scientific questions are treated with objectivity and accuracy, and that moral problems are tackled in accord with Catholic moral principles. Five sessions are planned. In the first two, physicists and biologists will reflect on the scientific, technical and moral problems raised by their work. Some of these, for physicists, are the most recent cosmological discoveries, the choice of energy sources and the consequent effects on the environment. In the biological sciences there are problems raised by evolution, the origin of humanity and of life. The remaining three sessions will be devoted to the problems of bringing sound knowledge of scientific matters to the Church as a whole. Consideration will be given to the place of science in schools, in universities and in the formation of priests and religious. A vital role is played by the Catholic Press, including the weekly newspapers and the more scholarly monthly or quarterly periodicals, and it is planned to discuss ways of improving coverage of scientific matters. In addition to the main speakers, written contributions will be welcomed, and the texts of the principal lectures and a summary of the conclusions will be published and widely distributed.

There is still much to do to develop contacts between Catholic scientists worldwide, to encourage them to play their full part in the life of the Church, and to

provide the means necessary for them to do so. All Catholic scientists are welcome to contact the Secretary of SIQS, Professor W. Derkse (Postbus 37, Radboudstichting 5260 AA Vught, The Netherlands) and he will ensure that they receive the Bulletin on the

activities of SIQS. Scientists of the Orthodox tradition, who are so close to us, are most welcome to share in all our activities. If you are not yourself a scientist, please pray for us, and tell any Catholic scientists you meet about our work.

THE SCIENCE/RELIGION DIALOG-A CATHOLIC PERSPECTIVE

Some Comments on a Recent Conference on Science and Theology

by Alfred Kracher

In the last issue of the ITEST Bulletin I reported news from the 6th European Conference on Science and Theology that was held in Cracow, Poland, March 26-30, 1996. In this second part of my report I would like to add some personal impressions of the conference and offer reflections on the role of Catholic thought in the science — religion dialog in general.

One attractive feature of ESSSAT, the European Society for the Study of Science and Theology, which organizes the biennial European Conferences, is the ecumenical mix of its officers and members. All major Christian denominations are well represented, and the discussions often demonstrate how fruitful an exchange between them can become. In part this is simply because the dialog with science takes place at a very fundamental level, at which all Christians, as well as the few Jews and Muslims attending these conferences, have much in common. But even on issues where the differences between the denominational traditions can become significant, such as the evolution of morality, the common goal of better understanding keeps the dialog open and productive.

Having said that it strikes me as surprising, however, that the theological contributions from the different sides do not have equal weight. After attending three conferences, I have heard a great deal about 20th century theologians, but with the inevitable exception of Teilhard de Chardin not a Catholic among them. To some extent this is a coincidence due to the particular workshops I happened to attend, but it is not an isolated experience.

Even Catholic participants seem more at ease discussing, say, Niebuhr and Tillich rather than Rahner and de Lubac.

As a Catholic one sometimes feels as if the entire Catholic tradition were thoroughly out of touch with contemporary science. A great deal of Catholic reflection is expended on moral evaluations of technology, but from an epistemological distance as if we

were looking at the issues from alpha Centauri. Like everyone else, Catholics engage in the science-theology dialog, but they do so as citizens, not as Catholic theologians. The specifically Catholic voice seems to have been dumbfounded in the face of the profound epistemological revolution that has come with 20th century science.

Some of this may be merely a subjective impression based on limited data. But I have often enough heard Catholics claim that science has no bearing on theology (except as an object of moral reflection) to make me very much worried indeed about the future of Catholic thought. While other theologians confront science and wrestle with the most serious problems of our time, the most widespread Catholic attitude appears to be one of problem denial and facile traditional answers that fail to engage the real issues.

Notwithstanding the fact that many Catholics are active and articulate participants in the science-religion dialog, one cannot avoid the impression that something has gone very wrong on the Catholic side of it. It is as though Catholic theologians, at least the majority of them, speak a different language from everyone else, and without being aware that they do. At the European Conference some participants referred to this language as "Aristotelian." That label may not be entirely accurate, but it points to a serious problem. We have forgotten the reason why Catholic theology from about the 13th to the 17th century was cast mostly in Aristotelian language. The lasting insight of Thomas Aquinas was that theology had to proceed by using the *best science available*, which in his day happened to be found in the recently rediscovered writings of Aristotle. What happened to theology after Galileo was, to the eyes of a scientist, a monumental betrayal of this crucial idea. Instead of continuing the dialog with the best science of the day, which by the mid-1600s had mostly shed Aristotle's terminology as well as his principles, much of Catholic theology actually seemed to enjoy the possession of a private language which it had so fortuitously acquired.

Thus it missed the point that it was using terminology that no longer retained its Medieval, fact-oriented meaning, if indeed it retained any meaning at all.

Tracing the root of Catholic speechlessness back this far may tell us something about the history of the crisis, but it is only one aspect of the problem that we are facing. For suppose we were to make a new start, like some 19th century Protestants tried to do, by re-inventing theology in the language of the day. This effort would certainly lend itself to a more easily intelligible dialog with science, but it would create a new problem no less pernicious: how do we make sense of our tradition, scriptural and ecclesial, in the light of modern science? Having no common language at all now reduces tradition to a dead object, to be inspected from outside, in much the same way that the Aristotelian theologian treats contemporary science. Under this demythologizing glare, the Bible shrivels into a fairy tale, and the richness of ritual desiccates into compulsive superstition. This cannot be the right outcome of a science-oriented inquiry either.

If we consider these stark alternatives, it becomes perhaps less surprising that one denomination that has assumed a disproportionately large role in advancing the science-religion dialog is the Church of England, which has retained a considerable part of Catholic tradition, while being free to revise those parts that are no longer tenable in the light of modern science. The only way to take the theological as well as the scientific tradition seriously is to find ways of translating their respective languages. This mediation between traditions is an intellectually demanding and highly creative enterprise, and like all creative activities it requires an environment of freedom to flourish.

At this point we encounter another, more contingent and more political problem that besets the Catholic side in the science-religion exchange: the deplorable state of academic freedom in contemporary Catholic theology. The ability to conduct a serious dialog

depends on the credibility of the dialog partners. If a scientist sits down with a Catholic theologian for an exchange of ideas, it is of crucial importance that both sides can speak their minds freely. In academic discourse, someone who has to fear censure for his or her academic views is useless as a dialog partner. Especially in the precarious exchange between science and theology, even the *appearance* of such a fear can put the success of the dialog in jeopardy.

Until recently this has been well understood, but the current situation in the Catholic church is very peculiar in this regard. Pope John Paul II appears to be more interested in the science-religion dialog than any of his predecessors in at least a hundred years. He has revived old institutions for the purpose, and encourages meetings on the subject. Many diverse opinions are welcome there *as long as they are not put forward by Catholics*. When it comes to Catholic doctrine, only the language of insiders is permitted. This guarantees its irrelevance in the larger discussion, making even those voices suspect which would have something of value to contribute. Other denominations, too, have their Aristotelians. But within their theology, the latter are somewhat of a curiosity, not privileged wardens of official doctrine.

Sadly, the prospect for genuine improvement is not good. An institution whose pastoral hallmark was to have clear-cut answers to any problem is ill equipped for opening communication in a different language. The extreme difficulty and tentativeness of such a conversation makes problem denial an attractive alternative. But calling ourselves Catholic, which means universal, makes at the very least the demand on us to speak in a language that is universally understood. I am concerned that as far as the science-religion dialog is concerned we have not done that for quite some time.

© 1996 by Alfred Kracher
1403 Coolidge Drive, Ames, IA 50010-5130
(akracher@iastate.edu)

CONGRATULATIONS TO

Dr. Brendan Niemira on the completion of his doctoral research at Michigan State University. To emphasize our congratulations we here reprint the Abstract of his dissertation.

Arbuscular Mycorrhizal Fungi Alter Productivity and Morphology and Decrease Storage Rot in *Solanum Tuberosum* under High Input Conditions

Arbuscular mycorrhizal (AM) fungi are ubiquitous soil fungi that form beneficial associations with the roots

of most crop species, including potato (*Solanum tuberosum*). The AM spore population structure in agricultural soils devoted to potato production is influenced by the type of management employed (low-input vs. high-input), and, to a lesser extent, by the specific rotation used. Low-input management and complex rotations tend to foster a greater complexity

and resiliency in the AM spore population than high-input management and simple rotations. In a greenhouse setting, the reproductive physiology of potato plants grown in the presence of AM inoculum is altered, resulting in increased production of minitubers, and a production shift in favor of smaller minitubers. Plants exposed to AM had longer stolons, increased total stolon length per plant, more uniform stolon development, and more tuber initiates per plant than plants grown in sterile medium. Minitubers produced in the presence of AM inoculum showed significantly increased resistance to *Fusarium sambucinum*, an important potato storage dry rot. Four week old potato roots colonized by AM showed significantly reduced total activity of peroxidase, a defense related

enzyme. Collectively, these data suggest that AM induce a systemic resistance response in potato during the earliest stages of their association. A given species' propensity to establish AM associations is related to its capability to produce border cells (BC, formerly known as "sloughed root cap cells"). It is observed that strongly mycorrhizal families (e.g. Poaceae, Fabaceae) produce thousands of BC per root tip, moderately mycorrhizal families (e.g. Solanaceae, Amaranthaceae) produce dozens or hundreds of BC per root tip, and minimally or non-mycorrhizal families (e.g. Brassicaceae, Chenopodiaceae) do not produce BC. The mechanism of the role of BC and BC-produced compounds in the development of AM associations has not been determined.

Jack Kinney on the publication of his book:

CONSERVATIVE ENVIRONMENTALISM REASSESSING THE MEANS, REDEFINING THE ENDS

James R. Dunn and John E. Kinney

JACKET/ABI COPY: If America's current environmental laws and regulations are left unchanged, they will ultimately contribute to the destruction of the human and natural environments. Dunn and Kinney argue vigorously that the environmental movement as it now operates is counterproductive; solutions can be found only in political systems where people are free to develop wealth through industry and technology. Rational, non-political efforts based on reality, not ideological propaganda, are essential. Dunn and Kinney show what these facts are and how they have been distorted to benefit what are often misguided, self-serving political agendas. Dedicating their book to the environmentally concerned, Dunn and Kinney meticulously document and correct misconceptions that have taken hold among certain environmental activists. Issues of sustainability, industrialization, urbanization, economics and politics are discussed in detail. For anyone uncertain of the facts or baffled by conflicting viewpoints on environmental problems and how to solve them, *Conservative Environmentalism* will come as fresh air, bringing hope and encouragement that solutions are possible.

Dunn and Kinney show that the greatest environmental gains in human history have occurred in democrat-

ic First World nations over the past century, nations that have not only expanded their natural resources but also improved the human condition as well. The authors maintain that the environmental "Left" has largely ignored these gains. Instead, it has stressed imperfections, some of them real, many imagined, and has promoted fear through unfounded, unproved theories or deceptions. To solve the problems they see, the Left uses regulations — but regulations that severely impede technology and efficient productivity, the very things that actually improve environmental conditions. Instead of excessively regulating industrial productivity, Dunn and Kinney argue for its expansion. In doing so they define 31 environmental principles that differ radically from conventional wisdom, but which will help people see what many environmental leaders have missed or misrepresented. The authors compare "downside" and "upside" effects of environmental actions in both First World and Third World countries. They examine the negative effect U.S. EPA and U.S. AID edicts and proscriptions have on development and on the environment.

For more information, you can reach Jack Kinney at (313)-662-0131. His FAX number is the same.

To Father Walter Ong, S.J. on the publication of

Ze, David (Simon Fraser U, Burnaby, BC, Canada)
"Walter Ong's Paradigm and Chinese Literacy"
Canadian Journal of Communication 20:4 (Autumn
1995) 523-540

Shows how literacy (including printing from movable character type), enabled the Chinese elite (literate) to reinforce the oral mind-set of the lower (illiterate) classes because text made it possible to store and retrieve with greater efficiency than oral memory could the formulae and otherwise fixed phrases which, as Ong shows, mark oral cultures. Writing, abetted by print, was thus used by literates to operate

on oral folk not by teaching these folk to write, thereby opening to them ways to analytic freedom, but by locking them even more into the oral mind-set. However, in thus proceeding, the literate teachers thereby enslaved themselves further to oral knowledge processing. This use of literacy to reinforce the oral mind-set strongly marks Chinese culture. Cites Walter J. Ong, *Interfaces of the Word* (Ithaca, NY: Cornell UP), *Orality and Literacy* (London: Methuen, 1982), and "Some Psychodynamics of Orality," in R. Eugene Kintgen, Barry M. Knoll, and Mike Rose (eds.), *Perspectives in Literacy* (Carbondale: Southern Illinois UP, 1988).

SOME (unedited) REFLECTIONS ON THE OCTOBER 25-27, 1996 MEETING
The Patenting of Biological Materials

Dr. David Byers

We usually end our bishops' dialog the final morning by trying to define common ground. Then we proceed to put together a little publication based on what the group agrees to. Usually it turns out that there is more common ground than would have been suspected at the beginning. I think that this has happened in this dialog — conversation may be a better word.

I know I've shifted my views on gene patenting to some extent. I gather from others that they have altered their view as well. I entered the discussion feeling that it wasn't a terribly significant issue and now, after participating in the conversation and hearing others views, I realize that there are very important issues to be considered. I don't think I've moved from my position that gene patenting in itself is an instrumentality that's hardly neutral and that use is important. But I think that there are very important issues embedded in it.

These are just some things that occurred to me as a consensus statements of the group, although I don't propose these for further debate, rather for reflection. I'd like to try to end these conversations on a positive note — not emphasizing where we disagree but where we agree.

The first one stated by Sister Virginia (Kampwerth) yesterday is that knowledge is good. I don't think anyone would disagree with that. The question is to what use knowledge is put. The area where the knowledge is used could become problematical.

The second point is that biotechnology is as likely to confer great power for good as for ill. It will probably be used for good *and* for ill. That is a significant statement because some people, some parties to this discussion, might take an extreme view one way or another. It is very important to insist on the morally ambiguous nature of bio-technology. That in its way brings everybody into the discussion.

The third point is that, while rapid advances in genetic science and technology *may* be inevitable, people must continue seeking ways to bring the light of our moral traditions to bear upon it. I wouldn't say it remains under judgment because I don't know whether we're in a position to render judgment to anyone but ourselves. Certainly we must try to continue giving the gift of the Christian Tradition to this emerging set of technology.

The fourth point is: ownership is not a helpful way of describing humanity's relationship with God. Dominion has been suggested. That perhaps represents an improvement.

Fifth, the patenting of genetic information may be useful in developing new pharmaceuticals. Under no circumstances may individual human beings be patented. Other uses of gene patenting should be approached with caution. This is kind of a minimalist statement; perhaps we could improve on it.

Sixth, the science, business and religious communities

can benefit from a mutual exchange of views on gene patenting and other issues related to the development of human genetics. If we could even get widespread agreement on this last one we would have made a major step forward. That the scientific, religious and business communities all have things to say about this, and that there may be benefit in exchanging their views, is a rather basic understanding of the situation.

One last general comment: I emphasize that I have no fundamental disagreement with essayist Ben Mitchell on these issues. I appreciate the fact that he's raised the questions that he has raised. We would probably disagree on the specifics of gene patenting even at this

point, but not on our general moral approach to it. And I do want to end where he ended. I made the remark to our gene patenting dialog group earlier this week that, while religious communities must sometimes issue judgments on things, in order to be true to itself, what it mostly does is bring a message of faith and hope to the dialog, to the discussion. We would say in the final analysis of bio-technology that we have faith that the development of these technologies which has landed in our laps, will eventually contribute to the human welfare as long as we are vigilant to bring to bear what we know from Revelation and from reason about these matters.

RELIGION AND SCIENCE: MUST THERE BE CONFLICT

William Wallace, O.P.

[The following is a re-print from the March, 1983 ITEST publication, Science-Faith conflict?. What Fr. Wallace proposes should be considered. There seems to be a real opportunity for partnership with science in the religious communities. Scientists (some of whom still propagate the old conflict) should be made aware of this.]

To one inquiring whether religion and science must be in conflict, a sobering reply might be: propose an alternative. If not conflict, or Andrew Dickson White's "warfare," between religion and science, then how else characterize their ongoing relationship? It is that problem with which we shall be largely concerned here. Simple enough it is to deny the necessity of warfare, for that is the answer we expect and all would like to hear. Yet to do so is to take on a difficult task: to go against the historical record and claim that the skirmishes of the past were simple misunderstandings, or to propose that the future, notwithstanding the ominous clouds gathering in genetic manipulation and other areas, will usher in an era of perpetual peace. Most people are neither scientists nor theologians, and yet I suspect they are sufficiently acquainted with both to realize that there is no easy answer here. If not warfare or its absence, it will be difficult to define a middle ground that can satisfy our reasonable expectations for the twenty-first century.

Before getting into that, let me dispose quickly of another reply to the question "Must there be conflict?" — the forthright but irreverent answer, "Why not?" After all science is concerned with man's way of looking at things, and religion with God's way of looking at things, and we all know that God's ways are not our ways. Centuries ago Tertullian asked the pointed question, "What has Athens to do with Jerusalem?" meaning by that what has science, the

rational thought of the Greeks, to do with the heavenly city wherein God has made himself known to man. His answer was simple enough: "Nothing." And if we accept that, then of course this can be a very short lecture. But some astute Fathers of the Church, and I am thinking of Clement of Alexandria and Gregory of Nyssa, saw that a premature divorce between reason and faith could do more to hurt Christian apologetics than the attempt to promote a marriage between them. The Church of the present day has inherited this mentality, and in its spirit we address the problem before us. But the mere mention of these Fathers of the Church should alert us to the fact that the debate between science and religion is but one phase of a larger controversy that has been going on for twenty centuries, that, namely, of the respective provinces of reason and belief in man's attempts to know about God and the universe he has made.

What then of the middle ground between conflict and concord, if we rule out the forced isolation that comes by erecting this high wall of separation? There are various possibilities: dialogue, even with the recognition that this can get heated and erupt into controversy; if it does, conflict resolution, which at least can end in compromise; more optimistically, collaboration on the part of scientist and believer, wherein areas of competence are recognized and some form of complementarity readied. These are some of the avenues we might explore this evening. In my view, conflict,

controversy, and compromise have in the main characterized the past history of the science-religion relationship. Yet there have also been periods of collaboration, and even of euphoria when a genuine complementarity seemed realizable, if not completely attained. Its true attainment, I am afraid, remains largely a program for the future, but we will have made some advance if we come to recognize this, and think seriously how it may be brought about in the decades that lie ahead.

GALILEO AND BELLARMINE

Dialogue is the indispensable starting point, and so I propose to review for you several of the great dialogues of the past; to see what we can learn from them about the directions in which they tend to lead. The first will be the most famous of all, that between Galileo and Bellarmine, which started out innocently enough in 1615 but ended in the bitter conflict of 1633, wherein Galileo was forced to capitulate, vanquished by the Inquisition, the most celebrated casualty in the warfare between science and religion. Galileo's initiative was clear and unpretentious: with his newly perfected telescope he had made discoveries that seemed to contradict the sayings of Scripture. But, he reasoned, the Book of Nature and the Book of Scripture have the same author, and truth cannot contradict truth. Therefore, reinterpret those sayings of Scripture to ways that accord with my scientific discoveries, and harmony will once again be restored. Yes, replied Bellarmine, your principles are excellent and you reason well, but have you actually discovered what you think you have? Are you presenting scientific truths that are clearly demonstrated, or are they simply hypotheses that enable one to calculate the positions of the planets but say nothing certain about the structure of the heavens? If demonstrations, convince your fellow scientists of their truth; if not, leave the Scriptures to the Scripture scholars, for they are more expert than you in telling what the word of God means.

We need not review again the tragic events of 1633, for we have here all we need to point up our problem. Both Bellarmine and Galileo were agreed on a common goal: truth. In his *Letter to Christina* Galileo had implicitly assumed, and in this he was merely following Bellarmine's lead in his letter to Foscarini, that the growth of scientific knowledge must have important implications for one's interpretation of the Bible. Once a person knew, by reason, the details of the movements of earth and sun, he could no longer accept on faith an interpretation that failed to take such movements into account. In other words, biblical exegesis could not be made on the basis of tradition

alone but would have to respect "matters of fact" as these were established by science. As a corollary of this, religion could no longer stand completely aloof from science. Henceforth there would have to be continuous dialogue between scientist and believer, the former furnishing the truth about the universe as knowable through reason alone, the latter using such knowledge for the fullest understanding of divine revelation.

On their goal, then, Bellarmine and Galileo were agreed. Their difference came precisely over whether that goal had de facto been achieved. As my researches have shown, both subscribed to an Aristotelian theory of science and demonstration, wherein reason, unaided by special revelation from on high, could arrive at certain and unrevisable truth about the physical universe. In 1615, when both letters were written, I think Galileo felt he already had a strict demonstration of the earth's motion. Bellarmine, backed up by Jesuit astronomers of the Collegio Romano, was just as convinced that such a demonstration had not yet been attained. And the consensus of modern historians of science seems to be that, whatever people might regard in the present day as adequate proof of the earth's motion, such proof was not produced in Galileo's lifetime. Reason seemed more fallible than faith, and so the great "Father of Modern Science" was vanquished — not for the ideal he had proposed, but because he was judged a failure in its attainment. The victory was the Church's, but we should note that it was made possible only by the force of authority, both civil and ecclesiastical, that reigned in the Italy of the *seicento*. At that time reason could no more demonstrate the earth's rest than its motion, but authority could be imposed despite reason's limitations, and its imposition was what brought about Galileo's downfall.

BENTLEY AND NEWTON

The Church's teaching authority was not monolithic, however, and the next dialogue we shall examine took place in a more relaxed atmosphere, that of Protestant England at the end of the seventeenth century. By then science had achieved considerably more stature than in Galileo's Italy, and there were those, such as Thomas Hobbes, who were using its findings to advance the cause of atheism. A new battle was looming on the horizon, one between belief and disbelief, and so the theologian Richard Bentley went to the foremost scientist of his day, Sir Isaac Newton, to enlist his help on the side of religion. The dialogue between Bentley and Newton was much different from that between Bellarmine and Galileo, for Newton was able to produce arguments that supported, rather than

contested, the prevailing interpretation of the Scriptures. His mechanics, he wrote to Bentley, could explain many features of the solar system, but it could not explain the stability of planetary orbits or why they had their particular orientation in space. Far from being a superfluity for the scientist, God had become more of a necessity than ever. In a powerful creative act at the beginning of time, God himself must have arranged the planets in space and impelled them with forces exactly calculated to put them in elliptical orbits around the sun. Not only that, but God must continually intervene, as an active principle, to maintain the planets in those orbits and thus assure the smooth running of the universe. Bentley was delighted. Not only could reason and belief coexist, but religion was actually reinforced by the new findings of science, and so atheism could be refuted and revelation restored as a credible source of truth about the physical universe.

Newtonian concordism, if we may call it that, was a master stroke, and it promoted harmony between science and religion throughout most of the eighteenth century. Yet it contained a fatal flaw that needs to be pointed out, for it strongly influenced the later course of the dialogue we are investigating and ultimately brought it to an impasse. The flaw has been labeled the "God of the gaps" doctrine. Newton had produced a mechanical explanation of the universe that was of surpassing beauty and ingenuity, but there were gaps in his mechanical explanation. What he had done, unwittingly perhaps, was use God as a way of filling those gaps, and thus giving a complementary explanation to the one provided by his mathematical physics. This was good as far as it went, but Newton was not sufficiently far-sighted to see ahead to the *Mécanique céleste* of Pierre Simon de Laplace, wherein the gaps in the Newtonian system could be filled using more sophisticated mathematical methods than he himself had worked out. Newton had tied science and religion with such strong bonds that advances in the one would inevitably entail retreats in the other. Like Galileo before him, Newton had thought to place his science at the service of religion. But when his gaps disappeared, there was the invitation to make his "God of the gaps" disappear along with them, and so permit the rejection of religion in the name of the very science he had cultivated.

The Bentley-Newton compromise could be patched up, it was then seen, by eliminating God as the active principle required to keep the solar system going, and by localizing his activity as the Alpha and the Omega, as it were, in the creation at the beginning of time and at the eschaton that would mark its end. In this way religion could tell us about man's origin and

destiny, but the present universe would become the exclusive preserve of science. Many believing scientists in Britain, far removed from the authoritarian teachings of Rome, were quite content to adopt this type of concordism. As Anglicans they had started with the triune God of Christian revelation, but they settled for God the Creator alone, having no role in their science for the other Persons of the Trinity. This perhaps explains how in Newton's own case Trinitarian belief gradually degenerated into Unitarianism. It would be but a short path from there to the rationalism of the Enlightenment, wherein many of Newton's compatriots, supremely confident in the power of reason, would adjust all of the doctrines of Christianity to fit the science of their day. In Rome the voice of authority had become strident and oppressive; in England it would be barely heard, with unfortunate consequences for the deposit of faith.

Yet dialogue continued, with most religious thinkers quite unaware that the temporal division of labor had unduly restricted their scope. Without their knowing it, the development of science had effectively narrowed the range of what people henceforth would be allowed to believe. The role of faith had diminished, the province of reason had expanded. This notwithstanding, a majority of scientists were still believers in a general way: they were amenable to the view that knowledge of God, man, and the universe could still be derived from two sources, the Book of Scripture and the Book of Nature. The Scriptures, as we have seen, could provide valuable and otherwise unavailable data about origins and ends, whereas the Book of Nature, for the intelligent observer, would provide convincing evidence of the order that was the hallmark of its Maker. The invention and perfection of telescope and microscope had opened up vistas hitherto unimagined by man, and soon the argument from design became the accepted fashion. By the end of the eighteenth century and with the beginning of the nineteenth, a whole series of new theologies sprang into being: star theologies, plant theologies, insect theologies, fish theologies — all purporting to show, from the vast expanse of the universe to the intricacy of detail in its smallest organism, how each must be the work of a Supreme Intelligence, the Designer and Author of Nature.

BUCKLAND AND LYELL

Then, as the nineteenth century wore on, a new initiative came, one particularly helpful for understanding the creationist debates of the present day. Science for the first time paid serious attention to the bowels of the earth. Men began to dig in earnest, fossils were uncovered in great numbers, and the

stratification of the earth's crust was revealed in ever newer detail. Such archeological and geological discoveries were of momentous importance for the dialogue between religion and science. Apparently strange things had happened in times past, evidences of floods and other catastrophic events, which might be seen as God's hand manifesting itself in the history of our planet. Scientific geology quickly opened out to Scriptural geology, and it is noteworthy that William Buckland, professor of geology at Oxford, devoted his inaugural lecture there in 1819 to showing that the study of geology confirms the evidences of natural religion, "that the facts developed by it," and I quote, "are consistent with the accounts of the creation and deluge recorded in the Mosaic writings." As Buckland saw it, science could uncover the effects of God's actions but revelation alone was able to tell man about their causes. The euphoria of complementarity to which I have alluded thus began to sweep over the university community. Science could best study the present, but religion was necessary for the past; science could inform us of phenomenal effects, but religion alone could reveal their ultimate causes.

Amid the resulting complacency there were few who realized that the day had again been saved by a "God of the gaps" doctrine. But just as Laplace had shown that the astronomical effects Newton explained by his God could be just as well, or better, explained by mechanical forces, so another thinker appeared on the geological scene to sound a deeper note of conflict. I refer to Charles Lyell, the "Father of Modern Geology," who set himself the unassuming task of showing that every geological change in the earth's history could be explained by causes similar to those still known to be acting in its interior. The success of his program proved as rapid as it was unexpected, with the result that God's intervention was soon recognized to be as superfluous in geology as it had been in celestial mechanics. Lyell himself was a believer, so let me be clear on this: he was not rejecting God entirely as a principle of explanation. Like most believing scientists of his day, he still allowed that God's creative act was the only way of explaining how *man* came into existence on the earth's surface. But a young naturalist whose name is well known to you, Charles Darwin, took Lyell's *Principles of Geology* with him when he set out on the Voyage of the Beagle. It is now recognized that his monumental achievement was to apply Lyell's principles to the changing history of life itself. Darwin would explain by natural causes operative in present experience the many transformations life had undergone in its long history. In his hands, scientific laws would become the exhaustive explanation of organic development, so much so that

no room was eventually left for religion to supply useful information about man and his origins.

HUXLEY AND WILBERFORCE

With regard to all this, what Darwin held in his innermost thoughts is quite revealing: he became more and more agnostic, and by the end he was a complete atheist. However, his wife's solicitude and his son's editing gave him needed protection, and he did not have to proclaim this in public. That fortune fell to his advocate and propagandist, Thomas Huxley. *The Origin of Species* was published in 1859, and in 1860 the British Association for the Advancement of Science met at Oxford. Not only were orthodox scientists concerned about these new developments in biology, but so was the Church of England. A debate was therefore scheduled at the meeting between Huxley and Bishop Samuel Wilberforce, who had not read the *Origin* but had been coached in its refutation by an eminent British scientist, Sir Richard Owen. You probably have heard how that encounter ended. Wilberforce resorted to the rhetoric of *ad hominem* argument, and turned to Huxley at one point to inquire: "Is it on your grandfather's or on your grandmother's side that the ape ancestry came in?" Huxley's reply was a classic that loses none of its appeal from having often been cited:

I have asserted and I repeat that a man has no reason to be ashamed of having an ape for a grandfather. If there were an ancestor whom I should feel shame in recalling it would be a man of restless and versatile intellect who, not content with success in his own sphere of activity, plunges into scientific questions with which he has no real acquaintance, only to obscure them by aimless rhetoric and distract the attention of his hearers from the point at issue by digressions and appeals to religious prejudice.

Well, as one writer reports, the bishop was put in his place, and though many people present were shocked, and Lady Brewster, among other notable women, thought it proper to faint, the final consensus was overwhelmingly on the side of science and the great concept of evolution. Wilberforce had been vanquished just as completely as Galileo had been, with the British Association adopting the authoritarian stance formerly taken by the Roman Church.

ADJUSTMENTS & COMPLEMENTARITIES

Dialogue, as I have noted, is the obvious way to head off conflict between science and religion, and by now we have looked at several between the years 1615 and 1860: Galileo and Bellarmine, Newton and Bentley, Lyell and Buckland, and now Huxley and Wilberforce. After this last, let me say that the conversation Galileo hoped to initiate with Bellarmine had been effectively reduced to a monologue. In Galileo's day, to be sure, science was in its infancy and religion exerted the most powerful social and political pressure of which it was capable. By the end of the nineteenth century and throughout most of the twentieth the tables had been turned completely. If there was anything to say about the state of the present universe, and about knowable events throughout its long history, this would have to be said by science; religion would no longer be necessary — some would hold not even relevant — to their understanding. After each encounter from 1615 onward less and less was left for religion to contribute to the content of human knowledge.

The adjustments of believers to these developments were quite predictable. In a battle wherein they were constantly being defeated, not surprisingly most decided either to join forces with the enemy or to change the ground of battle entirely, so that religious belief would remain forever unaffected by subsequent advances in science. A new type of complementarity would gradually be asserted, phrased differently by the various orthodoxies, but all amounting, as we shall see, to the same thing. One type would take its inspiration from Immanuel Kant, whose lifelong endeavor to lead philosophy along the secure path of Newtonian science led him finally to reject metaphysics as a transcendental illusion. The only valid knowledge for him henceforth would be at the phenomenal level, the field of science, and this would engage all the energies of the intellect; if religion were to have its domain, this would have to be lodged in the will. God and morality were for Kant still subjects of great human concern, but these could no longer pertain to knowledge — rather they were matters of belief and so depended on one's will. From this it would be an easy step to handing over the entire scope of objective and verifiable knowledge, public knowledge if you will, to science, and leaving religion to one's private concern — a matter of personal choice on which people were not expected to agree. This, you will recognize, has become the American creed: science can be taught in our public schools, but not religion, which is too subjective, too voluntarist, too divisive, to count as valid and communicable knowledge.

The Kantian complementarity of the rational and the voluntary, the scientific and the religious, finds echo in various existentialist themes, those for example of Martin Buber and Karl Heim. For them science differs from religion precisely on the same basis as objectivity differs from subjectivity. For something to be objective is for it to be "out there," something in the past, something that already "has been." The subjective, as opposed to this, puts one in contact with the "now"; it defines an area of personal communication and understanding that shows what really is, what actually exists. Linguistic analysis works along a parallel line: science and religion differ in that they use different languages, and this because of their mutually exclusive concerns. The language of science is instrumental: it enables one to summarize data, to make predictions about the future, even to control the course of nature. The language of religion performs a different function: it orients a person's life in matters of ultimate concern, worship, and devotion. Conflict again has been defused, but at the expense of enforcing such dichotomies as those of the reason and the will, the objective and the subjective, the natural and the personal.

Unhappy with these compromises, others have made the most of yet another polarity, that between immanence and transcendence. Liberal theologians such as Friedrich Schleiermacher, unhappy with continual retreat, decided to take over the enemy — by the simple expedient of assimilating all of science's discoveries within a weakened religious context. They chose the path of immanence. For them, God is immanent within nature, himself a part of the evolutionary process. Man is sinless; when people speak of "original sin" they obviously are referring to his undeveloped state, from which he is rapidly progressing through the advances of science. God is so identified with nature that it is impossible to discover him as Newton and Buckland hoped to do; rather he must be sought within ourselves, in an affective way, in the "miracles" he works in our daily lives. Reacting to such over-emphasis on immanence, Karl Barth chose instead the path of transcendence. For him, God is not immanent within nature; rather he is completely transcendent, the "wholly Other." Far from being sinless, man has been so degraded and blinded by sin that his reason is powerless to understand the world as God's handiwork. The gulf between God and sinful man, in fact, is so vast a person can never cross it through moral consciousness or religious experience. Not on his own initiative, but only when God chooses to reveal himself, can a human being come in contact with his Maker. The liberals bought science with its entire package; the Barthians slammed the door on science and took Tertullian's way out — religion and

science have no more in common than have God and man, which is absolutely nothing.

KUHN AND THE CREATIONISTS

By now you will have recognized that we have come almost to the present day. Some of the themes I have mentioned may already have begun to work their way into CCD classes. But then, in the early 1960's, just about the time of the Second Vatican Council, signs of a different development began to appear, and quite unexpectedly. This time it was not religion that proved to be in disarray, but rather science. From within the ranks of scientists voices of dissension were heard, and science itself began to face what has been referred to as its "crisis of legitimation." The spokesman for the "crisis" is well known to historians and philosophers of science; he is Thomas Kuhn, and what he has to say has great bearing on the science-religion controversy.

Kuhn interested himself in the many changes that have taken place in science throughout its history — the changing face of science as seen in its revolutions — and saw something there that had not been noted before. Science was not the objective enterprise people thought it was; its record did not reveal the cumulative growth of knowledge usually claimed for it; above all, its goal was not truth about the universe. Its methodology, far from being governed by flawless logic, was dominated instead by socially conditioned paradigms — paradigms taught authoritatively in the universities, whose warrant for acceptability is their value in solving problems. Science progresses all right, but it does so simply by solving problems — problems, oddly enough, always formulated in ways that make amenable to solution by the reigning paradigm. So its progress, like beauty, is in the eyes of the beholder. Scientific revolutions are nothing more than paradigm shifts, and these shifts, as those in a visual Gestalt, merely present a different view of the universe, incompatible of course with previous views, but in no way closer to truth. Subjectivity and intuition are not the exclusive domain of the humanist; they are part and parcel of the scientist's ways of thought also.

So enter finally the scientific creationists. Evolution had been proposed from the beginning as a theory, and in this way it was no more offensive than Galileo's heliocentrism in the early seventeenth century. The uproar came when a stronger claim was made: that evolution was a fact, certified and established beyond all doubt by the findings of science. If evolution's truth-status could be questioned, if Kuhn's views, for example, about the nature of science were correct, then why teach evolution to our children in the schools? At least give the alternative equal time:

if you must teach scientific evolutionism, then teach scientific creationism along with it. Note the adjective, "scientific" creationism, for the creationists saw that the American creed, the law of the land, would be their undoing if religious belief were suspected, if their teaching were not as scientific as that of their adversaries. The battle was lost in the courts, as you are well aware, and I suppose you noted how the ACLU secured the victory in this most recent battle between science and religion. They brought in the "authorities," scientific authorities to be sure, to say that creationism was not science and thus had no place in our schools. Be not deceived: knowledge did not define the parameters of the engagement, any more than it did in the tribunals of the Inquisition. Authority again had the last word, only this time it happened to be on the side of science rather than on that of religious belief.

THE PROGRAM FOR THE FUTURE

The Catholic Church sat on the sidelines of the creationist dispute, just as it did during the Huxley-Wilberforce confrontation. How, you ask, could this happen? Are fundamentalists the only ones convinced that creation is a fact, that it took place at the beginning of time? Do Catholics buy the whole package of evolution, do they believe in a "two-truths" doctrine, or have they adjusted their religious truths to fit the truths established by science?

Difficult questions to answer, these. But I suspect that American Catholics share a general feeling that we are faced here with a pseudo-problem, because truths in the old-fashioned pre-Vatican II sense are not really at stake. One is no longer forced to declare oneself on the side of religion or of science. Thomas Kuhn is probably right; scientific method, so-called, has always been suspect by Catholic philosophers for making more claims than it can fully justify. And now we have come to suspect, through ecumenical dialogue, that religious truths do not have the inflexibility attributed to them heretofore. Perhaps most beliefs of earlier times are open to new interpretation; let us not be too dogmatic in proclaiming what actually did happen in the past, or even what the word of God, as contained in the deposit of revelation, is all about. Couple this new awareness with the fallibility and the revisability of science, and the problem dissolves before our eyes. Neither science nor religion has an uncontested claim to truth. If a conflict appears on the horizon, there is an easy way out: simply weaken cognitive claims on both sides of the dispute. Reason cannot know all the answers, but neither can faith. Harmony and concord reign once again because truth, at best, is an elusive ideal. We need not die on the

barricades defending a transcendental illusion; agnosticism is the safer course, and surely it offers the greatest hope for procuring a lasting peace.

Attractive as such irenicism may appear, I believe it is a false irenicism that can have more disastrous consequences than any "God of the gaps" doctrine of earlier centuries. As I see it, there is a true complementarity between science and religion. This complementarity, however, is not easy to define or achieve, and most efforts I have already sketched prove to have been of little value in its attainment. To make progress I am convinced that we must go back to square one, to the dialogue between Galileo and Bellarmine, wherein the rights of truth and of authority in knowledge were first clearly promulgated. Science's claim to legitimation can only be, Thomas Kuhn to the contrary, its claim to truth. Clearly it is not found in science's self-certifying authority — although I do not deny that truth, once found, will have competent authorities as its defendants. Belief based on revelation must build on truths established by reason, but in matters of religious belief authority becomes crucial, for a community of believers cannot be the result of private interpretation. For Catholics there has always been agreement on this: authoritative teaching is the safeguard of religious belief, and this is the responsibility of the Church's magisterium. Thus science and religion have their meeting ground in truth: scientific truth as established by reason, religious truth as proposed by the Church and assented to by faith.

There is an important difference, however, between the two truths. Religious truth can be certified by a single authoritative pronouncement, as we are well aware, whereas scientific truth requires the consensus of many investigators, often spanning continents and even centuries for its full certification. Here, then, is the essential tension behind the science-religion disputes of the past. Science takes time, it weaves its way through devious paths, before it attains the truth that is its goal. Its breakthroughs and discoveries are rarely definitive; they have no counterpart to the infallible decree from the Vatican. But, paradoxically enough, the very time that science takes, plays an important part in the development of religious doctrine. The total content of revelation was not available for authoritative definition with the death of the last Apostle. Only through slow and painstaking scientific investigation were the literary genres of the Bible uncovered and the rules for its interpretation ascertained. The example is simple, but it illustrates well

the true complementarity of science and religion, of reason and belief. Were such rules known to Rome in 1615 and 1633, Galileo would have been spared the indignity to which he was finally subjected. But had he not suffered that indignity, had he not been motivated by the passionate desire for truth that brought it about, Scriptural studies would never have achieved the status they enjoy today.

Unbelievers will be unconvinced by all this, and even for believing scientists it poses a problem. Galileo warned about it centuries ago in his *Letter to Christina*: the tasks the Catholic scientist sets for himself are difficult and time-consuming, and the Church has the power to crush him at any time. Pope John Paul II, sensitive to the injustices of the past, has called now for Galileo's rehabilitation and for a restoration of harmonious relations between science and religion. This is a hopeful omen for the future. But let me make it clear that at the moment it is only a program, an agenda yet to be carried out. Must every finding proposed by a scientist be conclusively demonstrated before the believer may take it into account? Such was the norm Bellarmine used against Galileo in 1615. To my knowledge it is still in effect, or at least I know of no forum where current theories and probabilities are being seriously entertained for their doctrinal and ethical implications. Perhaps such a forum is what the Holy Father has in mind for the Pontifical Academy of Sciences and the Vatican Secretariate for Non-Believers, when he asked these groups to reopen the Galileo case. And yet we know that, even in the recent past, the encyclicals *Humani generis* and *Humanae vitae* were not notably receptive to the thought of Catholic Progressives such as Teilhard de Chardin and John Rock on evolutionary theory and biochemical advances respectively.

At the outset we asked about conflicts between science and religion, and now we see why the potential for conflict is always there. The basic reason is that the problems being addressed permit of no instant solution. Science is time-conditioned and must undergo its own evolution. Religious doctrine also evolves, though in the hands of a conservative guardian most conscious of its authoritative responsibility. Tension is the inevitable concomitant of such wary collaboration between reason and faith. But the goal is so priceless — truth about God, man, and the cosmos — that we do well to live with it as we approach 1984 or 2001, with the many problems they most certainly will have for us.

NEW MEMBERS

ALDRICH, SJ, Rev. Louis; Fu Jen Univ.- Coll. of Law & Management, Hsinchuang, Taipei Hsien (242) Taiwan, ROC.; Professor of Moral theology & Ethics, Fu Jen University.

ANDREWS PhD, Frank A.; 2004 Homewood Road, Annapolis, Maryland 21402 U.S.A.; College Professor (ret.), The Catholic University of America; Physics, evolution, cosmology; ☎ (410)-757-1954; FAX (410)-757-8949; E-MAIL fandrews@annap.infi.net.

BLACKBURN, Mr. James F.; 6 Oakwood Drive, Wappingers Falls, New York 12590 U.S.A.; Programmer (retired), Creation science; ☎ (914)-297-2038.

DOMINICAN INSTITUTE, AMEN FOUNDATION; PO BOX 10223 - 2903 Mills Ave., N.E., Washington, District of Columbia 20018 U.S.A.; Mission Director, Amen Institute; ; ☎ (202)-832-5168.

DOMINICAN INSTITUTE, Attn: Rev. Fr. Iheanyi Enwerem, OP; P.M.B. 5361, Ibadan, Oyo State, Nigeria, West Africa; Dominican Institute; ☎ 234 2 810-4795; FAX 234 2 810-0011.

DORMAN, Mr. Christopher; 71 Lloyd Avenue - Mount Albert, Auckland, 3 New Zealand; Medical student (5th year), Mt St Mary's College; Medicine/theology/ethics/biol.sci/social ethics; ☎ 64-9-846.2489; E-MAIL chrisd@codeworks.gen.nz.

LU, SJ, Rev. Bosco; Fu Jen Univ.- Coll. of Law & Management, Hsinchuang, Taipei Hsien (242), Taiwan, ROC; Chairman/Dept. of Religious Studies, Fu Jen University.

LUKANIMA, Bishop Fortunatus; P.O. BOX 3044, Arusha, Tanzania; Bishop, Arusha, Tanzania; ; ☎ 255 57 2313.

MAWHINNEY, Mr. Doug; 76 Namata Road, Onehunga, Auckland 1006 New Zealand; Student, University of Auckland; ; ☎ 636.6700.

MITCHELL, Prof. C. Ben; 2825 Lexington Road, Louisville, Kentucky 40280 U.S.A.; Professor of Christian Ethics, Southern Baptist Theological Seminary; ☎ (502)-897-4607 (o); (502)-326-9460 (h).

ROSS, SJ, Rev. Daniel; Fu Jen Univ. - Coll. of Law & Management, Hsinchuang, Taipei Hsien (242), Taiwan, ROC; Asst. to President-Int. Academic Cooperation, Fu Jen University.

SHEETS, SJ, Most Rev. John R.; 1701 Miami Street, South Bend, Indiana 46613-2819 U.S.A.; Auxiliary Bishop, Diocese of Fort Wayne-South Bend; Theology; ☎ (219)-289-5539.

SSEWANNYANNA, Mr. Henry; P.O. Boz 16206, Kampala, Uganda; ☎ 256 41 231 824.

WAMALA, Emmanuel Cardinal; P.O. Box 14125, Mengo, Kampala, Uganda; Cardinal, Kampala, Uganda; ; ☎ 256 41 245 441.

WATERSTON, MD, PhD, Robert; Box 8501 - 4444 Forest Park Blvd., St. Louis, Missouri 63108 U.S.A.; Director of Genome Sequencing Center, Washington University.

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DE VERTEUIL, Joanne; 508-A Rte 239, St-Germain de Grantham, Quebec J0C 1K0 Canada; Engineer; Ultrasound/3-D Imagery/pro-life; ☎ (819)-395-5273; E-MAIL devertj@9bit.qc.ca.

LUTZ, Dr. Paul E. Change e-mail from plutz to pelutz@goodall.uncg.edu

MC CARTHY, SJ, John; 5935 Iona Drive, Vancouver, British Columbia V6T 1J7 Canada; PhD student; Forest ecology/environmental ethics, faith/sci.; ☎ (604)-822-4463; FAX (604)-822-4659; E-MAIL 103135.1661@compuserve.com.

MILLER, Robert E.; 118 W 119, Kansas City, Missouri 64145 U.S.A.; Sales; Most charities; ☎ (816)-333-3000; 942-0017; FAX (816)-942-5350.

MURPHY, RSM, Sr. Mary Ellen; 278 Whites Bridge Road, Standish, Maine 04084-5263 U.S.A.; Dean, St. Joseph's College; Extra-terrestrial life, environmental issues; ☎ (207)-892-6766; (h)893-6641; FAX (207)-893-7861; E-MAIL mmurphy@sjcme.edu.

VESSEY, RSM, Sr. Rita Marie; 90 Mountain Rd. Epsom, Auckland, 1030 New Zealand; Religious, RSM's Health Service Council; Health care services; ☎ 0-9-638-8600; FAX 64-9-638-8605; E-MAIL smhsc@xtra.co.nz.

IN MEMORIAM

Mr. Félix Albani

Fr. Walter A. Markowicz

We ask you to pray for them and their families and loved ones. We also ask your prayers for ITEST members who are ill. May they feel the restoring hand of the Lord.

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