



# BULLETIN

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Lent is upon us. Rather than stress the past, perhaps we could look into the future which holds the certain promise of the fulfillment of faith, our unity in love with Jesus Christ; it holds too the promise of a blossoming science. The two are not divorced from each other.

The Trinity who created and gifted the world willed that we live our lives in it, getting to know it as best we can at any given time. The Trinity also wanted us to shower our love for God on each other and the universe. What if we showed that love in working to develop the world as best we can? Wouldn't that take us a long way on the path to growing in the love of God?

Some of our ancestors believed the world was flat. They were in the best scientific tradition of the time. They took the data at hand, applied their reasoning to it and came to certain conclusions. Others of our ancestors thought the heavens were filled with mythical men and beasts. They too took the data they had and interpreted it in the only way they could. The flat-earthers rarely traveled far from home, but when they did there was always a relatively flat horizon before them. The presence of mountains could be explained. As we progressed we learned that earth is a sphere and the heavens are populated, not with beasts and men, but with stars, moons, planets, nebula and who knows what else. We now have a vast data pool from which to draw but we do not interpret that data in a much different manner than our ancestors did. We shouldn't be quite so superior to our forebears in figuring what the world is and what it is meant to be. There is still far, far too much still to be known for us to be that superior – that condescending. We should give our ancestors credit for working with the data that was available to them.

But what about the future? Do we know enough even now, with all the data available to us and all our best interpretations, to say anything definitive about anything? Should not all peoples look seriously at questions (from our own origins to the future of the universe) with a bit more humility. We do not know everything. We might be able to say something about these issues, but we certainly can't say everything. God alone can do that. Whatever we do for Lent, let God's love for us transform our lives. Let our love for God grow in our hearts together with a growing love for the universe he has created. I pray that you have a Blessed Easter!

*Robert Brungs, S.J.*

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## ANNOUNCEMENTS

1. The date for our October 20-22, 2006 workshop entitled, *Education for the Faith/Science Mission/Ministry*, has been set. Sister Carla Mae Streeter, OP, Professor of Systematic Theology at Aquinas Institute, will treat the faith component of the two-pronged presentation while Dr. Thomas P. Sheahen, Physicist, will treat the science component. Members of the Advisory Council, established to assist and guide the project manager of the faith/science interface modules, will serve as the response/reflection panel for the presenters.

This working conference will lay the groundwork in theology and science for the educational modules in faith/science, the program we plan to pilot in selected parochial schools from kindergarten through fourth grade. A number of publishers have provided us with their textbooks on religion and science for examination, analysis and study. We now have a well qualified full time Project Manager, Evelyn P. Tucker, on board. (See the article in this issue for more information.)

You may register for this working conference by calling the ITEST office at 314-633-4626 using Visa or MasterCard or by mail after you receive the registration materials which we plan to have ready by the end of May. The total cost for the weekend (lodging, pre-papers and proceedings) is \$225.00 for ITEST members; \$250.00 for non-members and \$135.00 for students. Because there is a limited number of rooms, early registration would assure you of a place at this "working conference."

2. We have recently revised and printed new ITEST brochures. We will send multiple copies to anyone who

would like to enlist new members, especially scientists, technologists and theologians. You could also spread the word by dropping off the brochures at appropriate venues, for example, physicians' offices, church vestibules, business offices or your own workplace. Someone may pick up a brochure, during a long wait in a doctor's office, become interested in our work and join us in membership.

3. Our new Project Manager has designed and produced an attractive brochure detailing and illustrating the facets of *Exploring the World, Discovering God*. We would be happy to send copies of those as well to members. It is important that we get the word out on this innovative program: a faith/science interface project consisting of educational modules for Kindergarten through grade 4 and funded in part by the *Our Sunday Visitor Institute*.

4. Special thanks goes to Dr. Greg Pouch, Geologist and long-time ITEST member for generously volunteering to redesign and rework our website. You may access the site at <http://www.faihtscience.org>. This is a work in progress since Greg is still collating and coding the vast amount of material we've generated during the past 38 years or so. We would appreciate any input you could give us on your reaction to the site and any concrete suggestions you could offer to make it even better. Is it attractive? Is it easy to find information? Would you visit the site a second time? Just e-mail your reactions/responses to [postigm@slu.edu](mailto:postigm@slu.edu) and Sister Marianne will forward them to Dr. Pouch. In the interim, Greg, thank you very much. (That's as direct as we can be.)

### ITEST PROJECT MANAGER ON BOARD

We welcome to the ITEST staff Evelyn P. Tucker as Project Manager of our faith/science interface educational modules, *Exploring the World, Discovering God (EWDG)* not only for her broad experience in elementary, high school and adult education teaching but also for the strong contacts she has already made in the midwest and beyond. Her background in liberal arts has prepared her well not only for her concentration in theology and religious education at all levels but for a deep appreciation of science and how the realm of faith and the study and appreciation of science can enrich the lives of students if taught with an eye to interfacing the two areas.

Since her first day on the job, February 1, Evelyn has set in motion a number of initiatives that are important to the success of the program. As a first step, she

invited scientists, theologians and teachers of science and religion to join an approximately ten member Advisory Council which will assist and guide the Project Manager, offering counsel and assistance when needed. The first task of the Advisory Council which will meet in May is to construct and develop an outline of the faith/science modules.

Tucker's second step was to establish the *Creative Teacher Think Tank*, composed of primary and elementary teachers of science and religion who will take the outlines and develop educational modules for testing in their respective schools. Her third, and most "formidable" task was to set up and archive the Curriculum Library materials of science and religion texts used in the schools (K - 4th grade) and donated by a number of publishers. Other steps included contacting principals to



nominate teachers for the Creative Teacher Think Tank, designing a brochure for the project, attending various conferences where she informally networked with professionals in the field and writing to superintendents of schools in the midwest initially to enlist their help in nominating teachers. Evelyn reports in her own words:

As you can see, the project office has been busy. I have more irons in the fire! I am continuing to build our curriculum library of texts and supplementary materials in science and religion classes both in schools, parish schools of religion and home schooling venues. I will be finalizing the Advisory Council seats, sending out the agenda for the meeting and finalizing the arrangements for our meeting at Our Lady of the Snows in Belleville, Illinois.

Further, I will be contacting the regional principal meetings to request time for brief presentations and encourage the nomination of teachers. I hope to have 50 teachers for each grade level. These teachers will form the nucleus for the pilot teacher phase of the project.

I will be attending the NCEA/NPCD (National Catholic Education Association/National Association of Parish Catechetical Directors) national convention in Atlanta, GA the week after Easter and will represent our Project in either a formal exhibit with Our Sunday Visitor – from whom I have requested shared space – or informal spreading the word among the principals and DRE/CRE's attending the convention.

After the May Advisory Council Meeting I hope to have some clear directives and advice from the scientists, theologians and educators of the Council. I also will have the basic outline of the tool that the Creative Teacher Think Tanks will use to do their work.

I look forward to meeting the ITEST members who, through their enthusiasm and creativity, are sponsoring this project. If you have questions, please contact me. I'll be happy to hear from you at [projectmanager@faithscience.org](mailto:projectmanager@faithscience.org)

## THE FAITH/SCIENCE INTERFACE

Robert A. Brungs, SJ

Director: ITEST

### *Introduction*

I have been active for almost forty years in the faith/science dialogue and it seems appropriate to write down some of my hopefully deepening awareness of aspects of this crucial mission that hadn't occurred to me before. I ask you to be patient with me as I try to work my way through these new thoughts.

Doctor John Matschiner and I began ITEST with the conviction that one of the real, but unrecognized, problems in the church was its lack of knowledge and concern about what was happening in scientific laboratories around the world. In brief, it was clear that the church had no "research and development" operation to help foresee what would be happening in science and technology in the near or intermediate future. To do something positive about this situation became the first of our goals when ITEST was established as a not-for-profit corporation in October, 1968.

It has become clearer over the years that, while this lack of knowledge was and is a part of the problem, it was not the most important factor in the church's engagement with the world. Even though ITEST has been successful in meeting the goal of helping to inform the churches about what is going on, it now seems to meet

only a small part of the need. The real need, I think, is evangelization and everything that that implies, especially educating for our laity (starting with the youngest among us) in things concerning science *and* faith. In what follows I will emphasize this notion of teaching and evangelizing in several of its aspects.

### *Background*

"Whatever things were rightly said among all men, are the property of us Christians." So stated Justin Martyr in the second century (c. A.D. 165). Saint Augustine repeats this sentiment in a somewhat different way: "whatever they [here, scientists, etc.] can really demonstrate to be true of physical nature, let us show to be capable of reconciliation with our Scriptures."<sup>1</sup> It is an ancient testimony to the fact that Christianity is the earthiest of all religions. It is also a testimony to the basic Christian openness to the "works of man." Despite the criticism directed against it over the centuries, Christianity has been the most accessible of all religions to new ideas and new knowledge – this definitely includes science and technology. Despite the propaganda of many of the followers of the Enlightenment, the church is open to most scientific advances, but not to all of them. Some – like embryonic stem cell technologies – are considered radically immoral in their nature. The church brings a



legacy of interest and concern to the faith/science ministry and mission.

The faith/science dialogue is basically a subset of the more general issue of the place of human culture in the Revelation of Christ – one element in the problem of change and stability. In brief, it is a statement of creation in Christ, Incarnation, Death, Resurrection, Ascension and happiness and true union with God and with each other in the eschaton. Together with the energy of the Holy Spirit we can combine our own energy into an exploration and development of the realization of what creation in Christ really means. As such we can trace its history back to the very beginnings of the Faith. In fact, we can trace the encounter of God's Revelation with what we have come to call Greek culture back to intertestamental times, to the "clash" of Greek thought and practice with Jewish life in the period of intense Hellenization following the death of Alexander the Great.

The faith/science effort in one sense brings nothing new to the church. What is new is the fact that we have come full circle to the situation in intertestamental times and in patristic times – the most crucial part of the dialogue is its effect on the lives of individual people. We cannot afford to lose sight of its effect on the individual and collective lives of people. The faith/science dialogue is not simply an intellectual discussion. We are not talking of the *science/theology* dialogue which can be almost totally theoretical – useful especially to 'experts' writing to and for other 'experts'. It may be that that dialogue is of necessity far more theoretical than *faith/science* work. ITEST is far more interested in the latter – in faith/science work.

In reality, the voices in the church on the matter of issues of faith and culture have always been ambivalent. In the earliest days of the church, "experts in theology" like Justin, Origen, Pseudo-Clement and Clement of Alexandria were quite open to the ambient culture while Tertullian and Irenaeus, in different evangelical situations, were far less happy with what we call "inculturation." This ambivalence, fortunately, has always been present in the church throughout its history. I say "fortunately" because this tension is evidence of a healthy search for the truth which is ultimately a vigorous search for union with God, for union with the Lord Jesus Christ in the power of the Holy Spirit.

One of the great ironies of the history of the faith is that the welfare of science, based on the intellectual foundations of St. Basil, was preserved and fostered in the monasteries (later universities), which were based on spiritual disciplines advocated by Tertullian and Irenaeus. Basil<sup>2</sup> in his *Hexaemeron* (The Six Days of Creation) established the basis for the interaction between the faith and science in particular. Basil's essential

position is described as follows in Christopher Kaiser's book, *Creation and the History of Science*, Eerdmann Publishing Company, Grand Rapids, MI, 1991, p. 5:

- (1) the behavior of the elements must be understood in terms of law ordained by God rather than in terms of their essences;
- (2) the heavens are corruptible like the earth so that the same laws of physics should apply to both;
- (3) nature, once created and put in motion, evolves in accordance with the laws assigned to it without interruption or diminishment of energy.

In many ways, the subsequent story of faith/science is a nuancing of these key elements of Basil. In our day, however, especially in view of the shift from physics to biology, this nuancing is hardly adequate to our need. There is another element in this history that we must notice. Kaiser<sup>3</sup> phrases it in this way:

But the creationist tradition (we are not referring to "creation science") and Basil's contribution, in particular, were not just theoretical in nature. They had strong practical components that were closely related to the theoretical, but took on a life of their own and influenced the history of science just as much, if not more, than the theoretical. We have already discussed the importance of the liturgical concern for time and the regulation of monastic life as vehicles for the sense of regularity in the rhythms of the cosmos. In this section we turn to the healing and helping ministries of the early church, rooted in the biblical beliefs of creation, resurrection, and the possibility of the miraculous, which, through the work of Basil and his contemporaries, gave rise to the Christian traditions of medical science and technology in the middle ages.

Especially in view of the growing centrality and importance of the life sciences, this tradition of healing and helping must be reconstituted as one of the cornerstones of faith/science endeavors. One of the problems is developing educational programs which reflect the notion that physics is no longer "king" of the sciences in any practical sense. While physics may still form the definitional basis of science, it is not presently central to the ongoing growth in scientific advance. At least for the foreseeable future, unless there is a radical advance in physics, it has been moved from center stage. It may come back from its "demotion" but presently it seems to be "on the periphery."

*Our Present Condition*



Although physicists and perhaps chemists may drag their feet in acknowledging the fact, biology has assumed centrality in science. We need not linger on this beyond noting that the small book, *What is Life?*, of Erwin Schrödinger published in 1944, may well be the most significant scientific event of the 20th century, relativity, nuclear fission and fusion notwithstanding. Shortly after World War II, several physicists became interested in problems of biological science. Within ten years or so of the publication of *What is Life?*, the work of Watson, Crick and Franklin had identified the Double Helix, the structure of DNA. Molecular biology was off and running, with implications for human life beyond our imagination.

In its own way molecular biology represents the fullest expression of what is implied in the phrase: "the physics of living systems." It will go a very long way in determining the "scientific culture" and the lives of individual human beings of this century and, perhaps, of the next millennium. Currently we have the worst of two worlds. We are laboring under the burden of the Enlightenment *and* the new discoveries. The latter now are being dominated by the old and largely discredited notions of the former and will be for some time. This will have an enormous impact on how the new discoveries will be used.

Until the time of Darwin, physics, and to a lesser extent, chemistry, dominated the history of science (and the history of the faith/science relationship). Darwin changed everything, although it took many decades for this to be fully realized. Nonetheless, from the time of Schrödinger's book, the methodologies of physics were introduced into the life sciences. Over the last fifty years or so the life sciences have moved from a basically observational posture, through a very rapid and intense analytical phase, to a synthetic capacity.<sup>4</sup>

Biology has moved from cataloguing species to commerce and industry. This may well be the most significant science/technology development of our lifetime – perhaps, even of any day, bar none. We will all be affected (and later maybe effected) by the uses of such sciences as embryology, genetics, neurosciences, cloning and even adult and embryonic stem cell research. This is truly a revolutionary science and a revolutionary (in promise) way to live. It hopes to leave nothing untouched in human life and in human relationship to other living systems. In promise, we may be "immortal" in some immanent way. Until we get there, however, we may live a hundred and fifty or so years. Who can say what will be?

#### *A Typical Doctrinal Issue*

As I have said many times in the past, one of the most

important, if not *the* most critical issue that the church will face, is that the sciences, especially the biological sciences, technology and industry are predicting the making of a *new human*. Cosmological questions and astrophysics, as important and interesting as they are, pale in comparison with this prediction. Cosmological issues deal with systems we are not able to change nor will we be able to change in anything like the foreseeable future. This is not true of the biological sciences. The human race will be changed, perhaps even radically, by the results of the biological sciences. From its earliest teaching Christianity preached a *New Human* in Christ. Are these two *new humans* (the new human promised by "science" and the New Human taught by Christianity) related or are they necessarily in conflict? Logically we can look at three possible arguments.

Possibility number one: these new humans (the Scriptural *New Human* and the scientific *new human*) are totally unrelated. It is at least conceptually possible that this may be true. It is not, however, a realistic possibility for Christians. Unrelatedness would imply that there is no connection between "this world" and the "next world", between the "material world" and the "spiritual world." That notion is anathema to a Christian since it implies that there is no place for the divine presence in the world of science.

However we might try to explain that proposition, a Christian could never maintain that what we do on earth is totally unrelated to what happens in heaven – even to the possibility, or perhaps likelihood, of there not being a heaven. Christianity, faith in the Lord Jesus Christ, despite what we've done to it theologically and spiritually, is an earthy religion; it's also an urban religion, a concept of the world partially built on human effort, not on a totally natural world. It is a world in which synergy with the Holy Spirit, and hence with God since the Spirit is God, is possible. This synergy with God does not involve human separation from nature. Rather it demands human connectedness with the forces of nature and with God. It's the only major religion in the world – at least the only major one I know – that began in a city and developed in an urban environment. It is a faith that is totally "at home" in the metropolis.

Christianity does not look forward to the recreation of the Garden of Eden – far from it in fact. Recreating and repopulating the Garden of Eden should be repugnant to the Christian. Christianity is not retrogressive; it does not look for fulfillment in the past. Our future, as revealed, does not lie in the Garden of Eden, or any other garden. Rather, the New Jerusalem, the home of the blessed, is described in the Bible as a city.

I don't intend to prove anything from this statement beyond noting that a "city" is a suggestive, even provoc-



ative, use of images. There seems to be some kind of a divine "urbanization program" taking place. I do not quite know what this may involve but it seems to me to be a compelling argument against a total divorce between "this world" and the "next world", between the church militant and the church triumphant. Such a separation would certainly fly in the face of centuries of Christian tradition.

A second conceptual possibility maintains that the scientific *new human* and the Christian *New Human* are identical – the one is the other. This option, I think, can be disposed of as easily as the first. Before anything else, the scientific *new human* is immanent in the world. The *New Human* of the Scripture and Tradition is eschatological, i.e., a stage to be reached only in the final Kingdom of God. That is unequivocally reason enough to say that these "two humans" cannot be identical.

Our current phase of living is sacramental (pointing to the full reality to be revealed in heaven) and our activity has "only" sacramental value. Suffice it to say now that we await the transformation of the cosmos that will be definitive (even knowable) only when Christ returns to us in glorious splendor. We are totally unable to accomplish that transfiguration which St. Paul talks about (Romans and Philippians) when Christ will come down from heaven to transform these "wretched bodies of ours" into copies of his own glorified body. (Phil. 3: 21)

The third conceptual possibility – the only one I think a Christian can accept – is that somehow or other these *new humans* are very tightly related, even inescapably related. We don't as yet have a precise, definitive, position to maintain; there is a lot of room here for speculation. We don't have a theology capable of asking the proper questions that will have to be asked. There is a growing theological awareness that serious issues are involved. Many who have ventured into this area, like myself, are inclined to be popularizers rather than serious researchers and systematic thinkers. Others will have to delve more deeply into the divine will. That will be a great gift to the church because the work of science and the cultural tendencies we face and into which these powers will fall demand a significant development of genuine Christian doctrine. This comprises a major part of the agenda for doctrinal development in the foreseeable future. We cannot let the present moment pass without major effort.

I see particular need in the biological mix – *in vitro* fertilization, molecular biology, embryology, cloning and stem cells among others. These are some of the areas, especially when treated together, that raise significant moral issues for Christians and demand a vital advancement in our understanding of doctrine. One thing seems totally clear: our current understanding of the body at

*most* allows us to *begin* to search for the proper *questions* we must put to the Tradition and to the culture. At the risk of being reckless – I am not a systematist by profession – I'll include a brief doctrinal approach to these issues a bit further on. Before doing that, however, I'd like to call upon my experience in faith/science work to say something about the dialogue itself.

### *The Dialogue*

There has been a significant increase in interest in what forty years ago was seen as an esoteric concern. I believe that there have been more "high-level" meetings this past year than we were accustomed to experience in several years. In fact, there may be ten or twenty times as many groups in the United States alone than there were interested individuals forty years ago. This is certainly true in Catholic circles and I feel sure was true of Protestant circles as well. In the midst of growing attention to the faith/science dialogue it is necessary to be aware of many levels of issues and opportunities for evangelization, the extending of the *faith*. It is imperative to keep several distinctions in mind.

These distinctions seem to deal with the people involved in the dialogue and in the purpose of a particular dialogue. In general, there are three models, each important in itself and each with its agenda and methods.

The first model is the type of meetings that the Bishops' Committee on Science and Human Values conducts with a group of people from the National Academy of Sciences. One purpose of such meetings is encouraging people in science and in religion to get to know other. Another goal is exchanging information about basic approaches to issues – a why-we-hold-what-we-hold position. This type of dialogue is very important because members of the National Academy of Science (and other such groups of "leaders") are often called on to help shape governmental postures and practices on issues with a significant scientific/technical component. An example of a panel made up of "experts" is the President's Council on Bioethics.

Also, the bishops are given the opportunity to learn about the issues from these "experts" and to explain to these scientists basic Catholic positions on various types of issues. They can show that their religious positions rest on solid foundations and are not simply the products of medieval myths or reactionary obscurantism. It is somewhat surprising to see how many of the experts seem to believe that religious thinking stopped somewhere back in the Dark Ages.

A second type of dialogue is composed of researchers in science meeting with those involved in doctrinal investigation. This type of dialogue can be, and should



be, more wide ranging and open-ended than the more official type mentioned above. It is concerned more with the questions posed by scientific advance and the opportunity these provide for Catholics to develop their understanding of and commitment to their faith. This type of dialogue can be the most intellectual of the three, but it can never be solely intellectual. It is concerned with a dimension that Pope John Paul II mentioned in a letter to the head of the Vatican Observatory about fifteen years ago:

For science develops best when its concepts and conclusions are integrated into the broader human culture and its concerns for ultimate meaning and value. Scientists cannot, therefore, hold themselves entirely aloof from the sorts of issues dealt with by philosophers and theologians. By devoting to these issues something of the energy and care they give to their research in science, they can help others realize more fully the human potentialities of their discoveries. They can also come to appreciate for themselves that these discoveries cannot be a genuine substitute for knowledge of the truly ultimate. Science can purify religion from error and superstition; religion can purify science from idolatry and false absolutes. Each can draw the other into a wider world, a world in which both can flourish.

A third type of dialogue – I think that it is the most important for everyone concerned – is between theologians and Christians in science in order to introduce the latter to the riches of their faith. It has been stated over the years by many ITEST members that people operating at the peak of scientific performance cannot be satisfied with only a grade-school knowledge of the Christian faith. Among other elements, a rationale for this third type of dialogue is that these people are crucial in breaking down the myth of a conflict between science and belief. We are not dealing with issues that can be solved (or moved forward) on the basis of the faith that these scientists may have learned in grammar school.

It is a question of the difference between the necessary and the sufficient. Grammar school education is certainly necessary but it is hardly sufficient to all learning. We learn by building on the foundation of things we learned when we were younger. Further growth in knowledge is a part of the evangelization promulgated in Vatican II and in papal encyclicals since the Council. Catholics in science are basically the only evangelists we have in the scientific/technological communities. I would recommend the statement by the American delegates at the Fifth Synod of Catholic Bishops in 1977. [The text of that statement is on the ITEST web site at <http://www.faithscience.org>. Click on Search (top right). Go to Google and type in Fifth Synod of Bishops.

Enter. Click on *The Vineyard* and go to Appendix 3.]

Many Christians in science tell me that their work in science is called into question if they are discovered to be believers. If that is sometimes the mindset of influential scientists, it is clear that the myth of conflict is alive and must be broken down before solid dialogue is as effective as it might be. Excellent Christian scientists who are also believers are essential to the success of the faith/science mission. In fact, it cannot be achieved at all if Christians in science are not involved. The ground must be cleared of weeds for them to be accepted as authorities in science and in faith. It has often been said that greatest contributions Christian scientists can make to the faith/science dialogue is true expertise in their specialties. This is true but it is not sufficient to the problems of dialogue. In addition to scientific expertise, as necessary as this expertise is, Christians in science need (and are expected to provide) the full extent of Christian appreciation for God *and* for creation.

#### *Campus Ministry Programs – one avenue*

It should be clear that no single group nor one type of dialogue is sufficient in itself. In fact, the more groups that are involved, the greater progress there will be in one of the critical issues of our times. As an addendum to these distinctions, I would remark that probably the most crucial aspect of the across-the-bench dialogue is the education in their faith of young Christians in science. At present almost the only place left for any concentrated effort in this regard is the campus ministry center. In the United States, at least, most Christians in science will be trained in secular and state universities.

Generally, but not yet totally, excellent Catholic university programs in the various sciences are a thing of the past. The only venue for significant faith enrichment is the campus ministry program. Yet, very few campus ministry programs seem disposed to work in this area. Even fewer are equipped to do so. Moreover, little effort is expended in recruiting knowledgeable Christian faculty members to conduct faith/science programs. Except in a few university settings, there seems to be little effort to remedy this very sad situation.

Please allow me a personal anecdote. Some years ago I visited Iowa State University at the invitation of the Catholic Campus Ministry Center. Part of the program was a small get-together with "a few Catholic students in science." It was scheduled to last only an hour or so on Sunday evening after the 7:00 PM Mass. The pastor expressed sorrow that so few students would be at my talk. He expected that perhaps a dozen students would attend. As it turned out there were more than 80 and the discussion went on for many hours. I found an intense hunger on the part of these young people in sci-



ence for an integration of their career in science with their Christian faith. But their knowledge of the faith was rather sketchy despite the fact that many of them had Catholic primary and secondary educations. That seems to be the state of much of the catechesis today. I would guess that this problem exists across the board in Christian education.

This type of "evangelical work" is extremely important in any faith/science dialogue simply because these young Christians in science will be the only evangelists we will have in the scientific/technical community. A great deal of effort must be put into fostering the faith in this very important group of people. In this regard I would simply point to part of the intervention of the American Bishops at the Fifth Synod in Rome in 1977:

... evangelization and catechesis by scientists who are men and women of faith are extremely important. They should be encouraged by the church. They constitute one of those small groups which will be responsible for so much of the mission of the church in the years to come. Scientists who acknowledge the reign of God should be encouraged to form communities where they may grow in their own understanding, experience and response to their Catholic faith, and where they show their insights into how the mysteries of redemption can be presented to their brothers and sisters who are seeking answers to the dilemmas posed by their scientific research.

What are we doing to fulfill this prophetic statement of the Bishops? It is clearly a significant part of the dialogue between faith and science. It would be a better world if Christians in science knew enough about their faith to promote the faith in the scientific community. We are not advocating here that these committed Christians proselytize – referring every advance to God's action alone. But believing Christians in science are rather different from non-believers in the same vocation. Yes, doing science is a vocation in the church.

Scientists knowing the full content of their faith could imbue other scientists with a different view of nature – an even more adventurous and imaginative vista than the views of non-believers. Christianity was never a brake on the intuitive in nature. Rather, it is a spur. The promotion of a further view of reality will have to be done humbly and carefully. We cannot afford to "turn off" scientists with triumphalist-sounding speeches. But we do have to preach, even if we do this merely by being the best scientists we can possibly be and by living the faith to its fullest.

A theologian without knowledge of "sound" science is at a disadvantage. Only scientists have a sure grasp of

sound science to pass on to theologians. Theologians must learn their theology from the very best sources. Otherwise their message will be largely unheard in the scientific community. Why not learn scientific information from excellent Christians in science? There is in ITEST a place where such "cross-education" of theologians and scientists can take place. With scientists writing and speculating on the impact of scientific progress on faith and theologians doing the same in their area, we can help the churches deal with the issues that will inevitably arise. Educating each other and promoting the notion of the importance of both science and theology in research will have a profound effect on the growth of the Christian churches.

### *The Education of the Youngest Christians*

But even before students enter Catholic schools (in the pre-school age bracket) their education in both faith and science can (really must) begin. The environmentalists, among others, have shown us the way. Pre-schoolers are taught environmental messages at an early age. The future students (maybe as young as four or five) know more about dinosaurs (not Barney) than I do. They can rattle off the names and the characteristics of dinosaurs as if born with the knowledge. If this kind of knowledge can grow in the pre-school years with respect to dinosaurs, it can also flourish in the areas of faith and science. What is needed is guidance (both printed and electronic) to help the teachers learn about appropriate religious and scientific material for these very young students. Such material is scattered around in website after website and in teachers minds and hearts as well. That material should be collected to ease the work of teachers in the early grades. The minds of the young are more open to material about dinosaurs and about God than the more "highly cultivated" minds of adults. Our minds have become closed to the more imaginative thoughts we had when we were little.

Teachers could give excellent examples of nutrition, even of the very basic material of genetics, of basic chemistry, of appropriate physics – of the sciences in general – to very young children. One thing that we can't do is underestimate the amount of learning of which even very young students are capable. The same is true with examples of faith. "Religion teachers" can come up with the same type of examples in the realm of faith. We can't start too early to teach children that God loves them and to let them know that God's creation is the only tool at God's disposal to interrelate with us. Creation is the thread that binds us to God and God to us. Without the things and events inherent in creation, interaction with God is minimal or distorted.

We can begin to teach them that God is courting them, working to bring them to full union with himself. They



can be introduced into the notion that God wants them and that God wants the fullest expression of their humanity. God created things so that each one of us can reach out to God in everything we do. We can give the children a beginning appreciation of growing to share in the divine life of heaven – even the "first" beginnings of that union here and now in our lives. If each child had only a hint of possible union with God in and through Christ it would go a long way in showing them both the love of God and the necessity of creation in fulfilling that union with God.

In the long run, this is the path that ITEST must take in building in the church a real appreciation of the importance of both faith and science in the making of a full Christian. It is no longer enough to love God in some ethereal way, in a way totally divorced from the world that is. We cannot do without God and we cannot do without creation. Both are emphatically necessary to us and we can honor that relationship by showing that God and creation "depend" on each other. God seemingly has decided to contact his creatures only through his creatures. I can't think of any other way he can contact them or love them. What an adventure we have been given – to love the creation because it is our primary avenue to the God who made us, wants us and above all loves us with a divine love, who is agape. So much did God love us, indeed, that God felt he must enter into his creation to bring us to union with him.

#### *Doctrinal Considerations*

The central issues challenging the faith historically revolve around our understanding of our *bodied* existence. This is true even of our basic understanding of the nature of the church. St. Paul says in Ephesians 5:31-32:

"For this reason, a man must leave his father and mother and be joined to his wife, and the two will become one body." This mystery has many implications; but I am saying it applies to Christ and his church.

The Church has a sacramental existence. It points to the heavenly realm where we will be in full, integral union with Trinitarian love. Each age in the church has its own genius, its own challenges and its own answers. Those responses best suited to, say, the Middle Ages are almost certainly not the best suited to the 21st century. In the Middle Ages the theological thrust was concerned more with our rational powers, less with our affective powers. Thomism, at least as it was taught in the school of theology at which I was trained, was directed more to the "rational" aspects of the human being than to the "animal." I doubt that my training in philosophy was vastly different from that of most students of the Thomistic system. On the first day of class we were told

that "man is a rational animal." We spent two years, eleven months and twenty-nine and a half days on "rational" and an afternoon on "animal." This is, of course, an exaggeration, but not too much of one. We spent little time on the emotions and on the passions with which every human must cope. In effect, we treated only "half" of an individual human and only a "quarter" of a married couple.

I was trained in theology in the early 1960s by one of the best Catholic theological faculties ever assembled in the United States. We spent a lot of time on the union of the divinity and humanity of Christ. Classes dealt with discussions of the *hypostatic union*. That was interesting vocabulary, but it was terribly abstract, general and maybe even ethereal. It was not directed to the central Christian revelation of God's covenantal love for his people. It spoke little of love and beauty as the major part of a Christian approach to God – who is Beauty, who is Love. That was the theological milieu in which I grew up: "almost all spirit and very little body." "Christianity-is-meant-to-help-us-transcend-the-body" was the message I remember receiving. It was not so much the case that the training denied the bodily; it was more that it simply ignored it. But Christianity is meant to help us in the transfiguring of our being (body and soul) into eschatological joy. Anything else is simply a distortion of the full truth of the Christian mystery.

In fact, once the center of the theological effort moved from the monasteries to the universities in the twelfth and thirteenth centuries it became highly intellectually oriented. Yet, as St. Paul stressed, it is love that makes the building grow. I believe that the realization of this was what prompted Thomas Aquinas to say that all his writing about God left much to be desired – implying that he thought that he should have been more concerned with God's love for his creation. This is something, of course, that is well known; unfortunately we have not carried out its implications in our catechesis.

If every Christian were to write down the points most basic to the faith, each would have a different list. That is a healthy type of diversity, I believe, because we have no evidence whatever that God's approach to us is the same for all of us. Despite the corporate nature of Christianity, despite the fact that the church is the body of Christ, we still have various gifts from God. God did not proclaim a cookie-cutter Christian church. Rather, he has given each Christian gifts quite distinct from others so as to build a fuller, more brilliant symphony of a church. There is an important passage in St. Paul's First Letter to the Corinthians (12: 12-30) that deserves far more attention than it usually receives:

Just as a human body, though it is made up of many parts, is a single unit because all these parts,



though many, make one body, so it is with Christ. In the one Spirit we were all baptised, Jews as well as Greeks, slaves as well as citizens, and one Spirit was given to us all to *drink*. [We might meditate on what "drinking the spirit" might mean.]

Nor is the body to be identified with any one of its many parts. If the foot were to say, "I am not a hand and so I do not belong to body," would that mean that it stopped being part of the body? If the ear were to say, "I am not an eye, and so I do not belong to the body," would that mean that it was not a part of the body? If your whole body was just one eye, how would you hear anything? If it was just one ear, how would you smell anything?

Instead of that, God put all the separate parts into the body on purpose. If all the parts were the same, how could it be a body? As it is, the parts are many but the body is one. The eye cannot say to the hand, "I do not need you," nor can the head say to the feet, "I do not need you."

What is more, it is precisely the parts of the body that seem to be the weakest which are the indispensable ones; and it is the least honourable parts of the body that we clothe with the greatest care. So our more improper parts get decorated in a way that our more proper parts do not need. God has arranged the body so that more dignity is given to the parts which are without it, and so that there may not be disagreements inside the body, but that each part may be equally concerned for all the others. If one part is hurt, all parts are hurt with it. If one part is given special honour, all parts enjoy it.

Now you together are Christ's body; but each of you is a different part of it. In the church, God has given the first place to apostles, the second to prophets, the third to teachers; after them, miracles, and after them the gift of healing; helpers, good leaders, those with many languages. Are all of them apostles, or all of them prophets, or all of them teachers? Do they all have the gift of miracles, or all have the gift of healing? Do all speak strange languages, and all interpret them?

This long citation, as I have indicated, is far more important than we usually think because it gives definite clues as to the nature of God's relationship with us. First, it says that God's love for each of us is intensely personal – God loves each one of us differently from the way he loves every other human. We are all different, with varying strengths and weaknesses; each one of

us is genetically different; each one has a different temperament and a definitely singular destiny. This citation reinforces the fact that we are all different and God treats each of us individually and in doing so treats us differently. It tells us that God, quite deliberately, arranged for a particular world, not a general, abstract world. Even the "creation of souls" is not general; it is highly specific. There is no generic "pile of souls" in heaven waiting to be implanted in embryos. We are fully ourselves from the first moment of our conception.

To put it more forcefully, I see no evidence that God ever does the same thing twice. Even "in the beginning" Cain was a farmer and Abel was a shepherd and each served God in different way. God did not treat Gideon as he treated Ehud, Jephthah, Samson or Samuel. Elijah prophesied one way, Elisha another and Amos yet another. God called David in a different way from the way he called Saul, to say nothing of the calling of Matthew or John. His love for his mother, Mary of Nazareth, was different from his love for Martha or Mary Magdalen. Even their destinies in heaven are vastly distinct. God has a very personal love – a very personal gift – for each and every one of us. It *may* be one of our privileges in heaven to explain our own personal love affair with God to everyone else.

God is indeed personal, as the above passage of Scripture hints. More than personal, though, it says that he is very particular. No abstract statement – no generality – can be made about God's love for each individual human and maybe even for fish, birds and animals. About things like that we can only conjecture. But God is very particular and cannot be categorized. His love is simply unique for each of us. What he wants of one is quite different from what he wants of others. That's about all that can be said. Our spiritualities, while they may seem similar, are quite different each from the other.

The same passage indicates that our responses to God are unique. We slowly come to love God as he wants to be loved. No one can tell me how to love God. I have to develop my own way to respond to God's gifts. They can make suggestions but my response to God in the last analysis is my response alone. Only I can respond to God in a way that God wants me to respond to him in love. The love affair of an individual with God belongs only to God and the individual.

*Does God have a body?*

I have already said that God may have decided to become human even *before* the world began. That seems likely but I fully admit that I know nothing about anything *before* time began. No creature one else does either. Whatever Christ's task was "in the beginning" it included his "future" incarnation as a human being. That



God could have possibly thought of himself as human is beyond our imagination. "How could he?", we might ask ourselves.

As Romano Guardini emphasizes in his book, *The Lord*, God now has a body; God now has a destiny in creation. God has become part of human history, part of the history of his creation. He has now, in Christ, covenanted himself to a particular people; we are a "people set apart to sing the praises of God", as St. Peter says. This is not an "ethnic people," nor a "regional people," nor a "national people." It is not a people assembled along any humanly conceived division. His "people set apart to sing the praises of God" are, first, the Jews and then the members of his church – those who have accepted God's covenant. Note, however, that the "people" is not set apart to be apart, but is set apart to sing the praises of God.

God, as Guardini maintains, has made himself weak and humble, he has emptied himself lest he overwhelm us with his beauty and love. God bends over backwards not to coerce us in any way. He wants our *free* acceptance of and our *free* response to his overtures. We should think long and hard about this when we talk about our covenant with our "meek and humble" Lord. After all, his talk of "Woe to you, blind Pharisees" did not reflect some namby-pamby response to his foes. Christ was fully capable of calling a spade a spade.

Sexuality is at the heart of any realistic understanding of our being bodied. Our bodiedness is at least as important to our being human as our reasoning ability. We are bodied and our sexuality is written in every cell. Contemporary science and technology are creating the need (a blessed opportunity from the Spirit, I think) to rethink and redevelop our doctrinal theology. Most people with whom I discuss this immediately start into ethics – we more accurately used to call it moral theology. I am *not* talking about ethics. I am talking about systematic theology and church doctrine. I'm talking about a deeper approach to the Psalmist's question: "What is Man that you are mindful of him, the son of Man that you should care for him?"

We are bodied. Our destiny is to remain bodied when we (hopefully) enter into glory. God's providence for us is evident in our bodiedness. There is a period of only a day or two in the history of the universe when we can be conceived. What are the odds of a particular sperm uniting with a particular egg in that period of only a few hours? Then multiply those odds by the odds involved in the conception of each of our ancestors over maybe 10,000-20,000 generations. That's the probability of any of us being alive. Either we are totally trivial and our being here has no lasting meaning – or God deeply wanted *us*. The same genetic probability holds for

Christ. Since he was of the house of David, he had very specific ancestors. His coming was preceded by very definite, individualized ancestors. His great, great grandparents were not interchangeable with anyone else – and so on down his whole lineage. Mary had her own genetic lineage. I find it hard to believe that the Spirit of God became interested in her only after she was born, only after her genetic lineage had been set. It seems to me that the Spirit of God was with her ancestors "from the beginning."

A pivotal part of our lives in Christ depends on our parents and each of our ancestors. A significant part of our worshipful approach to God depends on our bodies. All of the sacraments are *material* and all of them (except the Eucharist, interestingly) depend on the physical presence of (and communication between) at least two human beings. They are material signs and they are communal signs. We cannot overlook the communal nature of our being; we are oriented by our bodies to each other. Our bodies are covenantal signs.

The body provides the only means of communication we have with each other and with God. We do not communicate by thought; we do it with words, gestures and changes in tone of voice. Indeed, a grimace or a smile may be worth many words; and no thought or expression is uncommunicable. In fact, they are meant to be communicated to someone – whether God or human.

Perhaps I say this only in my ignorance, but, as I mentioned before, God has chosen to communicate with us through our bodies and in particular God has done this in and through Christ's body. Mystics seem to remember what happened to them in their visions, so the experience is clearly written into their brains. Furthermore, it is the body that makes us specific human beings – another gift from God. It is our bodied character that differentiates us from each other and from all other creatures, angels included. This is true on the level of the species, the sexes and individuals of the same sex. In Romans 12:3 St. Paul says "Just as each of our bodies has several parts and each part has a separate function, so all of us, in union with Christ, form one body, and as parts of it we belong to each other." This says all that needs to be said about the necessity of our communion with each other. We live in our bodies in communion with others, in our love for each other.

Our bodies individuate us and allow (even demand) that we be members of a community. We are not some material substrate that can be pummeled into any shape or form that someone else would prefer – or that scientists may devise. We *are* bodied in a specific way and *always will be*. Our physical heritage matters to us – probably much more than we seem to realize. It certainly ties us to the past and to the future, even to the eschaton. In



any case we will not get to heaven by ourselves. We will get to heaven only by relying on more human beings than we know. Also, we will be relied on by more people than we know. We will find out in blessedness how wide the ripples of our good deeds (and our evil deeds) extend. It will be far more than we ever suspected.

How we will be bodied here (and hereafter) depends on the uses to which we shall put the new powers we are gaining especially from the biological sciences – genetics, neurosciences, life extension and others – and computer technologies. We are clearly entering a new era of human living. No matter how many years or decades it may take for us to be ready to alter the shape and texture and function of our bodies predictably and reproducibly, we have already begun in what we may call small ways to work toward it. Popularizers of microbiology particularly talk about directing our further human evolution. This is eugenics – not necessarily in a bad sense – but eugenics indeed.

This will indeed be a complicated process. Just how our genetic composition impacts bodily changes is extremely complex and will remain so for quite a while. We have now identified the human genome but how much will that mapping help to simplify matters? All it has done is open up another even more daunting set of complexities. As Dr. Brendan Niemira said in his draft essay for the October, 2005 ITEST conference:

By combining, dividing, modifying each other, inhibiting or enhancing each others activities, the cell's proteins determine how a cell or tissue behaves. The collected entirety of genes and their interactions is what makes up a genome; by analogy, the constellation of proteins in a cell and their interactions is called a proteome. The study of this interaction of proteins is called proteomics.

If the challenges of genomics are daunting, then those of proteomics are breathtaking. To be sure, the potential benefits are as miraculous as ever – understanding exactly why certain cells, tissues and entire organisms behave the way they do under any given set of circumstances is immeasurably valuable. The conceptual framework of observing how the entire proteome changes in response to stimuli has led to the establishment of other “omics” fields. These use genomic and proteomic techniques to focus specifically on particular issues within the larger question of the functioning of living cells, tissues and organisms. These “omics” fields include, investigations of, among others, the entire complement of transcription products (“transcriptomics”) how gene expression responds to specific food components (“nutrigenomics”), how cell constituents are broken down and recy-

clad (“degradomics”), and how cells communicate using peptides (“peptidomics”).<sup>6</sup>

But if we are going to direct our further evolution, in what direction shall we further it? It presumes that we know our destination. What is our goal as humans? Does science give us any hint of a direction it would be proper for us to go? No! Does philosophy? Not really! Does theology? Not yet completely but it can certainly lead us toward the proper direction. Does the Faith? Yes, it tells us the goal of our pilgrimage, but we have not spent nearly enough time or energy in working out an itinerary. We only know that we have to go forward into the future with an open mind and, even more, with an open heart. We cannot afford to cringe in fear or to be giddy with success. In general, the genetic technologies will be the same as past technologies – partly good and partly bad. They will increase our sense of accomplishment (we will make “new humans”) and our sense of anxiety (why have we made “new humans”? to what end? life everlasting?).

I shall list five guidelines which I think are a part of any attempt to “improve” ourselves and our stock. They most probably are not exhaustive, but I have been speaking of them for more than thirty years and I have yet to have anyone add to them. But that situation could change quickly if we dedicated ourselves to this needed development of doctrine. The five are:

- 1.) Does the proposed physical alteration enhance our individual dignity?
- 2.) Does the proposed advance enhance our individual freedom?
- 3.) Does the proposed advance enhance our communal freedom? Does it amplify our ability to live freely in society? Is it ordered to uniformity or to the exotic? Does it enhance the sense and the reality of community?
- 4.) Does the proposed change enhance our ability to worship God? This concerns sexuality particularly, though not exclusively.
- 5.) Does the proposed alteration give us a deeper understanding of the true role of our body in our salvation or does it present an exaggerated view of our “physical nature”? Does it promise “everlasting life” or some equivalent of it? Does it help us come to grips with both our fallibility and our need for each other and for God? Is it concerned with our bodily integrity?

It is too early in our recognizing the tremendous importance and beauty of our bodied existence to go into detail. It is of primary urgency right now to realize that Christianity is a religion of specifics, not generalities. It



is critical now to realize that the incarnation is exactly that – God becoming a unique human and remaining so. It is crucial to realize that God is forever a part of his creation and *it forever has a destiny in him*. It is urgent to understand that the sacramental realism of the church must be maintained and to perceive that human history is really salvation history. The history of the church contains cosmic history. They are not distinct.

It is important for us to re-focus on the historical reality of the sacraments and of the church. The church is not an assembly whose growth is established on the faith of its members. Rather, it grows dynamically with the power of the Eucharistic Christ. I simply refer to the parable in Mark about the seed growing under its own dynamism (ch. 4). The church grows "on its own." Like its members, it lives in a sacramental (and marital) relationship with Christ which points to his integral (not sacramental) union with Mary. God has a destiny in history in the church. The angels, Paul says, learn the fullness of the mystery of Christ in and from the church.

It is doctrinally radical (in the original sense of the word – *radix*, rooted) to note and develop the idea that *all of creation* awaits freedom from sin and death. As we sin in the body, we are saved in it as well. Somehow or other we are being brought into sharing the divine nature, without losing our humanity. The Greek Fathers of the church referred to this as *divinization*. I am assuming the prophetic role proper to my being a Christian in stating that it may be that, as we are being divinized, the world around us is being humanized.

I do not know in any detail what that might mean. I do know that there will be a heaven and a hell. I know that we shall rise recognizably ourselves – with our own history, ancestral background and memories. I know that creation will be freed from decadence. I know that Christ will transfigure our bodies into copies of his own glorious body. I know that somehow (the *how* belongs to God, not us) we shall have been involved in the making of heaven – the greater work will have been his. I know that all will be one (though it will remain itself) in the Father. That is the goal.

The church is historical. It changes, as does everything historical. Science and technology are a part of the history of the universe – not yet a dominant part as the universe goes – but a significant part. Whether we are considering genetics, neuroscientific advance, computers or more theoretical philosophical things like the beginnings of the universe or of life, our intellectual and affective theology must include them. The church has grown over the intervening 2,000 years and is still growing and changing. Science and technology are part of this growth. The church still faces a problem that has dogged its steps since the beginning: how to preserve an

unchanging message of salvation while everything is changing. The church has to present eternal truth by updating its statement of that truth. She is able to do so; she has done it for two millennia. The crux of the issue is the same: the church must live in history. To be true to herself she has to change.

These are the ideas that I think should be given far more consideration in our systematic theology. In their context they create a wide-open arena for faith/science work. Our task is to help direct now the course of our bodied history. Rarely has any generation received so great and glorious a challenge.

### Conclusion

If the goal of the faith/science dialogue is evangelization, we cannot be defensive about the church's centrality to human history and to the cosmos. If the church is not the center of God's plan for his creation there is no sense in belonging to it. If the goal is simply to dialogue (to talk, but not to evangelize) then I believe we can forget Christ's mandate to "preach the Gospel to the whole world." I am old-fashioned enough to believe that our actions speak louder than our words. If our love for the church and for Christ is not apparent, all our intellectual attainments and our eloquence will have little long-term effect. St. Paul in Corinthians mentions "Booming gongs and clashing cymbals." In dialogue, whether with the National Academy of Sciences or graduate students, "passionate belief" will (or at least should) carry more weight than abstract intellectualisms. Belief, and the hope it generates, is more appealing than intellectual argument. Hope is an attractive virtue.

I can think of no purpose for the faith/science dialogue other than our evangelical duty to preach the Good News in season and out of season. Evangelization is a privilege and duty imposed on us in baptism and enabled in confirmation. By the fact of our baptism we are sent to "preach the Word who is God." We don't need ordination or any other sacrament to give us a mandate to teach. The clergy never were meant to be the only evangelists in the world nor are they the most important ones. To raise up evangelists we have to inform them of their baptismal obligations; we have to show them that that is a part of our lives – without apology. We must let them know that they need no permission from anyone to fulfill an obligation.

We have to convince ourselves and them that teamwork is critical. As an ITEST member mentioned at the ITEST 25th anniversary Convention, "an army without a general is a rabble, a general without an army is ridiculous." Evangelization must operate at all levels of the dialogue and, as Vatican II and subsequent papal encyclicals have stated, they will operate effectively only



"in community." Faith/science dialogue is a cultural movement, requiring many inputs and many interests and skills. It demands faith, hope and love – and love is still the greatest of these. After all, Saint Paul teaches that "it is love that makes the building grow."

A Protestant theologian of the last century, Horace Bushnell, noted that power always follows the direction of hope. Do we personally and communally have the faith in Christ that will make our hope in him visible? Do we so share in Christ's love that it shows forth on its own? If we cannot show Christ's love vividly enough to validate our hope in the future, all the dialogue in the world will be futile. We should, in St. Paul's words, radiate the brightness of the Lord.

I am convinced that we have that love and that our defensiveness in the face of great scientific achievement is decreasing. While scientists may know more about the detailed workings of the human body and of the cosmos, we Christians have had revealed to us the meaning

of our existence in the body – indeed, the meaning of creation – in the church. We have a duty in love to share it with humility, kindness and the flavor of wit that St. Paul recommends. With God's help we shall do so. It can come only from us.

We should carry the words of Athanasius in our hearts:

Like a musician who has attuned his lyre, and by the artistic blending of low and high and medium tones produces a single melody, so the Wisdom of God, holding the universe like a lyre, adapting things heavenly to things earthly, and earthly things to heavenly, harmonizes them all, and, leading them by His will, makes one world and one world-order in beauty and harmony.<sup>7</sup>

The faith/science mission can help make "one world and one world-order in beauty and harmony." Our decisive task on earth is aiding in this work of the Spirit.

#### Endnotes

1. Augustine, *De Genesi ad litteram*, 1b, 1c 21, no. 41.
2. Basil of Caesarea (d. 379) ranks among the greatest of the Fathers of the Church. For a history of the relationship between Christian thought and science I recommend: Christopher Kaiser, *Creation and the History of Science*, Grand Rapids: Eerdmans Publishing Company, 1991; Fr. William Wallace, OP, "History of Science and Faith," in *Transfiguration: Elements of Science and Christian Faith*, St. Louis: ITEST Faith/Science Press, 1993. I would also recommend the books of Fr. Stanley Jaki, OSB.
3. Kaiser, op. cit., pp. 34-35.
4. By *synthetic* I mean the capacity to build or rebuild living systems – plants, animals and human beings.
5. *Adversus Haereses*, V, ch. VI, no. 1.
6. Draft paper by Dr. Brendan Niemira for the ITEST Workshop on *Biological Advance, Patenting and Law*, October, 2005.
7. Athanasius, *Contra Gentes*, 41, p. 26.

### EXCERPTS from FAITH, SCIENCE AND SACRAMENTAL REALISM

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*[The following is excerpted from the article, Faith, Science and Sacramental Realism, delivered at the Seminar With Father Stanley Jaki in 1991. The first part of this paper is printed below. The remainder of the article will appear in a future Bulletin.]*

ITEST has been concerned over the more than two decades of its existence with the interplay of Christianity, experimental science and technology. Insofar as memory serves, the emphasis of the ITEST conferences over those years has been rather upon the impact of

technology on a Christian culture than on the classic issue of the relation of the knowledge which is the Christian faith to that which is had by way of experimental science. Apart from the confrontations of those persons who are committed to an evolutionary origin of



the universe with those who are committed to its creation out of nothing, which have enlivened discussions of academic freedom over the recent past,<sup>1</sup> and apart from the disagreements developed over the past half century and more among physical cosmologists concerning the role of causality in physics, the faith-science relation has not in fact lately generated a great deal of discussion among scientists or theologians even on the informal level.

There are signal exceptions, however, to this disinterest; due very largely to the books, articles, lectures, and broad influence of Fr. Stanley Jaki, the long-suppressed discovery by Pierre Duhem of the medieval origins of the first of the laws of motion is becoming well known, while Fr. Jaki himself, who has long since achieved a world reputation at once as a Catholic theologian and a historian of science, has for many years been pointing out the indispensability for the physical sciences of the Jewish and Christian belief in the divine creation of the universe.

It would be impertinent to treat here of his work, given that he will be here to do so in person, and that the prospect of his presence among us during this Conference has drawn most of you to it. Instead, I wish to propose and to develop an ancillary viewpoint, one which owes more to a reading of Fr. Jaki's work than I can easily identify, but which also concentrates more particularly than does his work upon the pertinence of Catholic sacramental realism to the physical and specifically the experimental science.

I will argue that it is ... this sacramental realism that permits the optimism which characterizes the experimental sciences, which underlies their experimental mode. Such an assertion requires some considerable unpacking. The physical sciences exist by their common refusal to permit any received or desired theoretical integration of experimental data to foreclose the continuing quest for the experimental verification of the theory in possession. The classic instances of this refusal to permit abstract theoretical constructs to triumph over historical fact include the discovery by Michelson and Morely in 1887 of the constant velocity of light, and by Max Planck in 1900 of the constant quantum of energy. These discoveries forced the transcendence of the Euclidian geometry and the Newtonian mechanics by Einstein's special and general theories of relativity, and by the wave or quantum mechanics developed for the most part by Planck, Bohr, Einstein, Schrödinger, Heisenberg, and Dirac. Since then, the quest for a unitary theory which might embrace relativity and quantum mechanics, somewhat as Maxwell's equations synthesized the classical physics of the middle third of the nineteenth century, has been unavailing. Recently, the interest in, or perhaps better, the fascination with frac-

tals and the non-linear differential equations which describe them has again underwritten the incapacity of theory to comprehend the data disclosed by the experimental method of physics.

The resulting paradox is well illustrated by the notion, recently popularized, of a "science of chaos."<sup>2</sup> The paradox had been anticipated after a fashion by the disagreement, extending over more than fifty years, concerning the proper interpretation of quantum mechanics: on this point the tension between the determinist views of Einstein and the so-called Copenhagen interpretation of Heisenberg's uncertainty principle is still alive.

Recently our conferences have been enlivened by discussions of the implications of John Bell's experiments of some quarter century past, which on quantum mechanical grounds seem strictly to require that the notion of causality be dropped from the epistemology of physics. Fr. Jaki has written cogently to the refutation of this conclusion, and I shall leave it for him to address. My interest here is not directly in such issues, whose competent discussion require a training beyond that which is mine as a theologian; rather I wish to use them as illustrative of a dilemma common not only to physics, but also to theology, to law, to linguistics, to historiography – to all those fields of scholarly inquiry which traditionally rely upon historical experience, and which employ theoretical constructs at once to unify the experimental data and to suggest the pertinence of further experimental inquiry.

The reliance of rational inquiry upon *historical* rather than ideal criteria is relatively novel in intellectual history; it is only in the Western world, in the cultures formed by the Judaeo-Christian religious tradition,<sup>3</sup> that the experimental sciences have flourished by reason of that recourse to experimental verification of understanding. Fr. Jaki has written a great deal stressing the significance of the massive ten-volume study written by Pierre Duhem early in this century.<sup>4</sup> The latter five volumes of this work, whose publication were delayed by an atheistic French academic establishment for nearly forty years, point out the anticipation of the first law of motion, which underlies all of experimental physics, by John Buridan, a fourteenth century scholar who taught for perhaps fifty years at the University of Paris. A nominalist who identified intellect and will, his name is better known from its association with a dilemma foisted on him by his adversaries, and known to philosophy as that of Buridan's Ass; you may recall that it finds an indecisive donkey starving to death between two equally attractive stacks of hay. But Buridan was better than that; his excogitation in the late Middle Ages of the notion of "impetus"<sup>5</sup> had been forgotten for centuries when Duhem's magnificent historical scholar-



ship recovered it. Buridan had been driven to the derivation of this novel idea by the Judaeo-Christian postulate of a created universe whose diverse motions were also contingent and consequently had beginnings in time, instead of being inherent in materiality as such as Aristotelianism had supposed. Buridan's inference of a temporal beginning from the fact of the creation of the physical world placed him in this respect within the Augustinian camp, whose view of creation had been developed earlier by St. Bonaventure in the course of controversy with St. Thomas.<sup>6</sup> St. Thomas had defended the rational possibility of the creation of what amounts to an Aristotelian universe, one without a temporal beginning, in which motion is interpreted as a dynamism or *appetitus* necessarily intrinsic to material substance insofar as light or heavy. St. Thomas therefore denied that the contingency of creation required a beginning, and thus that it implied the particularity and contingency of motion and so of time.

In this thirteenth century controversy between the defenders of an Aristotelian quasi-animism and the Franciscan-Augustinian emphasis upon the novel implications of a truly contingent creation, there is remotely foreshadowed an undeveloped and unsuspected tension between the necessitarian rationality uncritically accepted by medieval Aristotelianism,<sup>7</sup> and the doctrine of creation with its implication of the contingent substantiality of creation *ex nihilo*, and therefore of radically contingent truth. This tension is further latent, still obscured by an uncritical scholastic investment in Aristotelian logic, in the Scotist insistence against the Thomists, upon a noncategorical and therefore intuitive and free intelligibility immanent in the concrete singular thing or event (*haecceitas*), which Aristotelianism denied and which denial is implicit in some aspects of Thomism.<sup>8</sup>

This tension persists to our own time. On the one hand, there is effective in many academic disciplines, including physics and theology, the hardy conviction that whatever is objectively true can be shown to be necessarily true; on the other there is a common-sense, commonplace and communally lived commitment to a host of realities whose objectivity is vital to us, and which are very clearly free, neither necessary nor random. This paradox pervades all scientific inquiry, which must be at once free and methodologically controlled.

The freedom of such academic inquiry is more than academic, for it underlies the possibility of any learning whatever. It is too little remarked that this freedom of inquiry is not merely a personal immunity from constraint, a "freedom from": it is also at the same time, and far more significantly, a responsibility, a "freedom for" a truth which one's inquiry cannot control and which is therefore fascinating, intrinsically interesting

because possessed of an inexhaustible – because free – intrinsic truth. The freedom of the inquiry cannot but connote a freedom in the object, which presents itself to inquiry as continually novel, as finally and radically unpredictable, and so as continually interesting, for it is also responsive to the presupposition of all inquiry, that its object is coherent and intelligible independently of the knower; in the end, this requires as well that the intelligibility of the object of the inquiry be free, for it could not otherwise be known to be independent.

The question of the cause of an immanent and necessary intelligibility, i.e., whether that cause be the immanent rationality of the mind, or the immanent rationality of the cosmos, is incapable of resolution and finally banal because falsely posed: it could make no difference whatsoever whether one's rationality were a mere participation in and submission to a universal *logos*, or in the alternative it were the autonomous imposition of an ideal order immanent to the mind upon an objectively meaningless chaos: no experiment could determine the issue. In either case, there would be no novel truth to discover, nothing to learn from historical experience, and no scientific inquiry could proceed.

But insofar as science is truly concerned for knowledge as novel, as the product of a learning from history, which is to say, insofar as it is concerned for experimental verification, the scientific inquiry presupposes a free coherence in the objective physical world. Because it presents itself as continually and always interesting, as always novel, always free, this free coherence can never be systematized, never reduced to formulae. Were that reduction to occur, it would show the object of inquiry not to have been free in the last analysis, and its intelligibility consequently to be no more than a reflex of the method of an inquiry discovered to be self-ruled and autonomous, submitted to no extrinsic criteria, rather than freely governed by a free object transcending the free inquiry as an answer transcends a question.

The debate occasioned by Einstein's refusal of the Copenhagen interpretation of quantum mechanics by which a methodological indeterminacy (the uncertainty principle) is projected upon reality to become ontological, provides an illustration of this impasse of a rationality self-enclosed within its own logic. Einstein preferred an unfree and determinate rationality – "God does not play dice" – to the objective disorder presupposed by the Copenhagen school's projection of the methodological indeterminacy principle of quantum mechanics upon the objective physical world.

While it is evident that from the merely random, nothing can be learned, it is perhaps less immediately evident that the random is supremely without interest,



in the sense that it neither arouses nor can arouse curiosity. Of course, it can evoke the Faustian desire to impose order upon the putatively disordered: it is thus that much of modern science is no longer a *quaerens intellectum*, but a *quaerens potestatem*: a search not for understanding, but for power.

However, Einstein's refusal of such chaos is itself also an a priori and ideal projection of a method governed by the Enlightenment postulate of autonomous and finally necessitarian rationality: he proposed no alternative to the Copenhagen school of quantum mechanics other than just such an impersonal and unfree rationality, reductively that of a pantheism.

But the physical sciences can afford neither limb of this *aut chaos aut determinismus* dilemma; either would suppress the possibility of experimental method. Oddly, this result seems to be accepted, even proclaimed, by the scientific community: e.g., the goal of physics is seen by many physicists to be a universally comprehensive theory which will make all further learning trivial.<sup>9</sup>

One must then reject the foregoing rationalist dilemma – in which much of the contemporary discussion is locked – according to which one is forced to choose between reality conceived as a jungle, or as a cage. This puzzlement arises out of the supposition that an *ideal* nonhistorical method controls the discovery of truth in physics, which is in consequence itself ideal and nonhistorical. In order to continue to experiment, in order to continue to learn from the experimental examination of the physical data of the concrete *historical* world, one must postulate that the significance of that world is historical and free rather than ideal and necessary.

However, when one refuses the fatalist presupposition underlying most of the contemporary physical cosmology, the question cannot but arise as to the ground, the source or cause of the free intelligibility of the objective physical order which any experimental curiosity not only takes for granted but apart from which it cannot be sustained. This intelligibility is clearly not derivable from the phenomena: such derivation, whether by induction or deduction, insofar as logical would not be free. Neither is that free intelligibility derivable from the immanent laws of human reason; insofar as such laws are discoverable and may be thought to be sufficient, they also must impose a priori a logical necessity upon the data, which again would negate their freedom and novelty. Further, the impossibility of such an autonomously coherent rational order has been established by the publication of Kurt Goedel's theorem some sixty years ago.<sup>10</sup>

But Goedel's proof of the impossibility of such autonomously coherent rationality does not establish the exist-

tence of an alternative free historical rationality. It is not at all obvious that, for all its indispensability to experimental learning, there is or can be a free order of reality. Neither is it easy to imagine what a free coherence might be, for in the first place, as free, it can have no a priori possibility; nonetheless, the imagination inevitably enters upon an attempt to discover such a prior possibility of freedom within the immanent possibilities of autonomous rationality. For illustration of this fatal flaw, one need only recall the schoolboy debates over the reconciliation of divine omnipotence and human freedom, which invariably turn on schemes for the reduction of reality to necessity by establishing its prior possibility: the imagination simply cannot conceive of a creation *ex nihilo*, without any prior possibility; in fact, much of medieval thought resolutely denied its possibility while at the same time affirming it: witness St. Thomas denial of any relation from the Creator God to his creation, despite his affirmation of the personal unity in Christ of humanity and divinity.

However, inasmuch as such efforts to rationalize freedom by its reduction to necessity are clearly futilities, we need not pursue them.

It remains that the greatest minds of the pagan world never so much as considered the possibility of a free truth, and philosophers of the Christian and post-Christian traditions seem to be in no better case in their own speculation, for over and again, they also return to the perennial pagan problematic, that of relating, under a heading of rational necessity, the indispensable unity of unity, goodness and truth, to the multiplicity and mutability of the physical world. This, the rationalized and dehistoricized problem of the one and the many or, otherwise put, of the unity of *historical* substance, defeated the highest reaches of pagan philosophy; neither Plato nor Aristotle resolved it. But that philosophical tradition accepted a priori the necessity of truth, while for the bi-millennial Western intellectual tradition, the pagan and determinist version of the perennial problem of the one and the many has been transposed and transvalued, however little this may be recognized by those who depend upon that tradition.

This transformation of that classic and permanent problem of metaphysics does not arise simply because its solution now must embrace a physical universe whose radius is some ten or fifteen billion light years; while that consideration enlarges its range of implication it does not change the nonhistorical character of the ancient philosophical dilemma. It is rather the very meaning of the problem of the one and the many that has been transformed by the postulate of the freedom of their relation, a postulate which is no more than a technical expression of the Judaeo-Christian tradition of the good creation. The objective truth of creation is



historical, for the actuality (not the possibility) of free truth, of free reality and free objectivity that is the good creation must be historical, which is to say, given and received in a free event.... (to be continued)

### Endnotes

1. For a current instance, see the exchange between the author, Eric Lerner, and a reviewer of a recent work, *The Big Bang Never Happened: A Startling Refutation of the Dominant Theory of the Origin of the Universe* (New York: Random House, 1990), in the New York Times Book Review, Sept. 1, 1991, p. 4.
2. James Gleick, *Chaos: Making a New Science* (New York: Penguin Books, 1987).
3. The term "Judaeo-Christian" is employed, rather than simply "Christian" or "Catholic," not to enlist Jews and Protestants into the Roman Catholic liturgical/doctrinal tradition, but to stress that the dividing line, conversion to a free truth, a free objectivity, is the revelation of the One God of the Covenant.
4. *Système du monde: Histoire des doctrines cosmologiques* (Paris: A. Hermann, 1913-1959) I: *La cosmologie hellénique* (1913). II: *La cosmologie hellénique (suite). L'astronomie latine au Moyen Age* (1914). III: *L'astronomie latine au Moyen Age (suite)* (1915). IV: *L'astronomie latine au Moyen Age (suite). La crue de l'aristotélisme* (1916). V: *La crue de l'aristotélisme (suite)* (1917). VI: *Le reflux de l'aristotélisme; les condamnations de 1277* (1954). VII-IX: *La physique parisienne au XIVe siècle (1957-1958)*. X: *La cosmologie du XVe siècle; écoles et universités au XVe siècle* (1959).
5. It had been supposed by the Aristotelianism of the day that a body in motion was sustained in it by the action (*antiperistasis*) of the surrounding medium, in the sense that a projectile such as an arrow would be at once drawn and pushed forward by the air through which it passed. By "impetus" Buridan understood a force imparted by the mover to the moved, proportional to the speed and mass of the object moved. The concept of impetus invited the measurement of the force by experimental means.
6. Cyril Vollert, S.J., Lottie Kendzierski, and Paul Byrne, eds., *St. Thomas, Siger of Brabant and St. Bonaventure On the Eternity of the World (De aeternitate mundi)*; trans. with an introduction (Milwaukee: Marquette University Press, 1964).
7. Aristotelianism is commonly said to have been "received" in the Latin West during the thirteenth century. This is certainly true with respect to the bulk of Aristotle's writing, but the impact of Aristotle's logical works had been felt in the West much earlier, first by way of the Neoplatonic "old logic" of Boethius and Porphyry, then as "dialectic" or "new logic" during the Carolingian and early medieval Eucharistic controversies, and finally through the Neoplatonizing interpretations of Aristotelian metaphysics by Moslem and Jewish scholars whose translations into Latin in the thirteenth century restored the profound link, long forgotten, between the familiar Aristotelian logic and the unfamiliar Aristotelian metaphysical analysis of the immanent intelligibility of substance in terms of its necessary intrinsic causes; on this see David Knowles, O.S.B., *The Evolution of Medieval Thought* (New York: Random House, A Vintage Book, 1962). The threat of this rationalization of metaphysics, through its reduction to intrinsically necessary causes, to the historical realism of the Christian faith was recognized by St. Thomas in his controversies with the Averroists such as Siger of Brabant; it also fueled the resistance of such Franciscan theologians as John Pecham to the Aristotelian analysis exemplified above all others by St. Thomas. St. Thomas' own conversion of the metaphysical analysis to the doctrine of creation may be seen to have been flawed by the same determinist presuppositions he criticized in the Averroists: while the contingency of creation entered into his metaphysical analysis of created substance at the level of existence-essence, it did not enter into the equally substantial form-matter and accident-substance analyses. This mistake permitted him to deny contingency (beginning) in the matter of temporal duration as controlled by his still-determinist form-matter and accident-substance analyses.
8. For instance, the Thomist moral theology rests upon an abstract definition of human nature as rational animality, ignoring the masculine-feminine polarity, and intends to ground the historical morality of the Ten Commandments on that definition. A considerable amount of ink is currently spilled over the resulting problem of monism vs. dualism in anthropology: e.g., the Catholic Biblical Association Report of its Task Force on the Ordination of Women, "Women and The Priestly Ministry: The New Testament Evidence," *Catholic Biblical Quarterly* 41 (1979) 608-613, 616, reprinted as "C.P.A.. Task Force Report: Women in the Church," *Origins* 9 (1979) 450-454, and the Catholic Theological Society of America Task Force Report on the Ordination of Women, C.G.S.. *Proceedings* 33 (1978) 271-272; reprinted as "The Ordination of Women," *Origins* 8 (1978) 86-88.
9. Sheldon Lee Glashow provides a particularly clear expression of this odd ambition in "Toward a Unified Theory of Physics," *Michigan Quarterly Review* 23 (Spring, 1984).
10. Ernest Nagel and James R. Newman, *Gödel's Proof* (New York: New York University Press, 1958).