



# Institute For Theological Encounter With Science and Technology

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## Opening Message

The annual March for Life took place in Washington DC on January 22. Amid the generally gloomy economic conditions, about 200,000 people made the trip to express their commitment to the sanctity of human life. This event has grown steadily over the decades since the infamous *Roe v. Wade* Supreme Court decision of 1973 that legalized abortion.

It's very encouraging to see the dedication of people who travel by bus from Indianapolis, Kansas City, and similar distant locations. I was happily surprised to meet a group of students from Kenrick-Glennon seminary, who had made the 800+ mile trip from St. Louis to participate in the March. Some of them had attended a previous ITEST annual conference.

The most optimistic aspect of the March for Life is the very large number of young people who participate. Contrary to the media's spin, opposition to abortion is not just some rear-guard action by aging Catholics who won't "get with the program," but is ongoing every day in colleges and high schools all over the country.

Science and technology play a role in the changing outlook of the public. There are children in kindergarten who bring to "show and tell" a *sonogram* of themselves while still in their mother's womb. They are aware that they were persons before they were born. The customary excuse of Planned Parenthood and the abortion industry that "it's just a blob of tissue" is unpersuasive when confronted by clear scientific evidence about pre-born humans.

A month later I volunteered at a skiing competition sponsored by the *Special Olympics*, which serves developmentally-disabled people. The outpouring of love, by families, friends and the handicapped athletes themselves, is truly uplifting. An event like this shows Americans at their best.

Thanks to the scientific advance known as the *fetal monitor*, there are no longer many children there who suffered *anoxia* during birth (a tangled umbilical cord cuts off oxygen flow, causing mental retardation). At present, *Down's Syndrome* is the leading source of disability among participants in the Special Olympics. This brings up the dark side of science: there is a genetic marker for Down's Syndrome that can be recognized *in utero* via *amniocentesis*, which in turn allows parents the option of eliminating a potential Down's Syndrome child by abortion. Meanwhile, R&D funding for an actual cure of Down's Syndrome has not been nearly as strong as that for several more politically-correct afflictions. Eliminating Down's Syndrome, as contrasted to curing it, may be the easy option, but morally it is the completely wrong path.

The struggle to restore respect for human life at every stage still has a long way to go. Scientists can contribute to this effort in many ways, especially by insisting in every conversation where the subject arises that *science* has very clearly displayed the early development of human beings, thus removing the topic from being "a matter of opinion." Young people already know this. The problem lies with the adults who control the political system.

Thomas P. Sheahan, PhD  
Director: ITEST

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## Announcements

1. Mark your calendars and save the dates, October 23-25, 2009 for the conference on *Environmental Stewardship in the Judeo-Christian Tradition*. Registration begins at 5:00 pm on Friday at the hotel on the grounds of Our Lady of the Snows Conference Center in Belleville, Illinois, and closes at Noon on Sunday. Again we urge you to register early for we have a limited number of rooms at the center. We will mail invitational brochures to all members who enjoy a special discounted rate for the weekend. As more information on our speakers becomes available we will contact you via e-mail or through our web site at <http://www.faithscience.org> under News and Events. A \$25.00 non-refundable deposit remitted to ITEST before September 2 will reserve your room. We accept checks and MasterCard or Visa.

In order to make our conference more international in scope we ask you to contact us if you know someone who has ministered/ worked in Africa, Asia, Central or South America whom we could invite to be an essayist for the conference above. Don't be shy about recommending yourself if you have had experience in those parts of the world where constant hunger and drought/flooding, poor sanitation, wasteful agricultural practices and other problems cry out for solutions. The late Mr. John E. Kinney, P.E. DEE, an environmental engineering consultant, who worked in Africa, Australia and the South Pacific, presented an essay at an ITEST workshop Christianity and the Environmental Ethos in 1996. In his essay, "Truth and Ethos: An Essay Appraising Environmental Ethos," he wrote, "As you know, there are four sources of wealth—extractive industries, manufacturing, tourism, service industries. Only the first two produce new wealth; the others redistribute. Many Third World nations have natural resources but are kept on dole rather than assisted in meaningful development. That is the aim of those who would control population and prevent poor nations from assuming a rightful role in the world." Are those sentiments still important today almost 12 years later? How do they affect us as members of a world community? Are these questions grist for the discussion mill at a conference on Environmental Stewardship.

2. At the end of February we mailed the second renewal notice for calendar year 2009 membership in ITEST. If you have not renewed yet, please do so at your earliest convenience. Remember, we accept checks, MasterCard and Visa as methods of payment. We appreciate your tucking in an extra donation to help us in continuing our ministry. Even the "widow's mite" would be most welcome. We've enclosed an ITEST brochure in each envelope. Please give it to a friend or a colleague who might be interested in joining us.

3. If you receive the ITEST bulletin through the US Post Office but would like to receive it via an e-mail attachment, we would be very happy to oblige. We now mail a hard copy of the bulletin to 116 members; the rest are sent via e-mail. Just drop us a line letting us know that you are willing to change from receiving a hard copy of the bulletin to receiving an e-mail attachment. Remember, the hard copy is in black and white; whereas the digital attachment is in color. Volumes 38 and 39 from 2008 & 2009 are accessible on our web site [www.faithscience.org](http://www.faithscience.org)

4. Good News! Since [www.creationlens.org](http://www.creationlens.org) went on line, December 8, 2008, Evelyn Tucker, our project manager for *Exploring the World, Discovering God*, has been very busy e-mailing and FAXing, not only every Catholic (arch) diocese in the United States and English speaking countries but other denominations as well: Episcopalian, Anglican, Lutheran and others. As of February 16, we have tracked the actual number of faith/science lessons downloaded from the web site with specific details about each download. Thus far the total downloads number over 54000 with more downloads recorded every day. We are totally amazed at the phenomenal response. These complete lessons or modules interfacing faith and science from Kindergarten through grade 4 are invaluable for teachers who are looking for creative ways to show that religion and science, as Tom Sheahen writes, "... can go hand in hand as complementary ways of reaching toward God."

We are geared up for the next phase of the project for grade 5—8. However we need funds for this next step in order to fulfill the goals Fr. Brungs set for this project over five years ago. We have applied to two granting agencies, *Our Sunday Visitor Institute* (who largely funded the first three-year phase) and *The Raskob Foundation*. We need your help in identifying either private donors with an interest in faith/science education or, of course, foundations with funds specified for elementary education.

5. Congratulations to a long-time ITEST member and avid sportsman, Monsignor Louis F. Meyer, former director of the archdiocesan Catholic Youth Council, on his induction into the Saint Louis University Billiken Hall of Fame. Monsignor Meyer, among his other many accomplishments, served as director of the Catholic Youth Council from 1960 to 1990, establishing many opportunities for the youth of the St Louis archdiocese to participate in organized sports. Since his retirement, Monsignor Meyer has been active in a number of areas, from volunteering as an airport chaplain to serving on the USO board and with Cardinal Glennon Children's Health Center in St Louis. He has been a loyal member of ITEST encouraging the work in the faith/science mission and ministry.



**Institute For Theological Encounter with Science and Technology**  
Cardinal Rigali Center • 20 Archbishop May Drive • Suite 3400-A • St. Louis, Missouri 63119 • USA  
314.792.7220 • [www.faithscience.org](http://www.faithscience.org) • E-mail: [mariannepost@archstl.org](mailto:mariannepost@archstl.org)

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## Gaudium et Spes : Joy and Hope The Church in the Modern World 43 Years Later

Carla Mae Streeter, OP

Aquinas Institute of Theology

*Vatican II went through a firestorm with its primary document on the Church. The schema left over from Vatican I's unaddressed business was brought to the floor, only to receive the scathing critique of Bishop De Smet that it was riddled with triumphalism, legalism, and clericalism, and could not be used as it was. When the schema returned to the floor, the beautiful Lumen Gentium document was the result. But it was not enough. The bishops realized the document dealt with the Church's inner life, not its mission to the world. And so a second document was crafted. Its title was to be Gaudium et Spes, in English, The Church in the Modern World. Little known and even less implemented, this second document on the Church in the midst of the world holds a vision not only for the Church. It offers a vision and a challenge to humanity.*

### Introduction

This is an anniversary year for ITEST. The organization known as "The Institute for the Theological Encounter with Science and Technology" is forty years old. This same year the Vatican II document known as *Gaudium et Spes* or in English, *The Church in the Modern World*, is forty-three years old. It is fitting that we ask if there is any wisdom this document might have to offer us as we celebrate this anniversary.

We will begin by taking a good look at the context at the time of the birth of ITEST, and the context that made Vatican II so significant. But we live with today's challenges, and we will then highlight our own present context.

A curious question often asked is "Why two documents on the Church?" The answer to this question points to a significant shift that took place at the Council itself, a shift that made *Gaudium et Spes* not only possible but necessary. As we reflect upon what the Church has written about its own relationship to the modern world, we will be both amazed and saddened. The amazement comes from the vision of the document itself. The sadness stems from the fact that it is one of the Church's best kept secrets. Really implementing the document would transform the Church.

### The Context: Then

It has often been said that those who do not know history are condemned to repeat it. A wide view of what has taken place in the history of culture and of the Church gives us a framework, a backdrop for what is happening today. Present events influence future events, both in the Church and in the culture.

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***We often forget that the Church  
lived in fear much of the time until  
the Edict of Milan in 313.***

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We often forget that the Church lived in fear much of the time until the Edict of Milan in 313. At that time it was at last free to come above ground and gather publicly. With this freedom came the beginnings of the outer structures of the Church that we know today. Buildings were dedicated. New territories were evangelized with bishops placed as overseers. As Christianity

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### Sister Carla Mae Streeter, OP, ThD Brief Biography

Carla Mae Streeter, OP, ThD is a Dominican of the Congregation of Catherine of Sienna in Racine, Wisconsin. She is currently associate professor of Systematic theology at Aquinas Institute of Theology, a graduate school sponsored by the Dominicans of the Central Province at St Louis University and a member of the ITEST Board of Directors.. Her experience includes eleven years of lay leadership training on the parish level. Using the resources of the Lonergan Research Institute in Toronto, she completed her doctoral studies at Regis College, theologate for the Upper Canadian Province of Jesuits at the Toronto School of Theology in 1986. She was co-recipient of the first Jean-Marc Laporte Scholarship Award for Academic Excellence and the first woman to be granted a theological doctorate from Regis College. Her special interest is the thought of the Canadian Jesuit, Bernard Lonergan, as that thought provides a framework for the dialogue between Christianity and other religious traditions.

Sister Carla Mae has many publications to her credit, among them is her book, *Seasons of the Soul: An Intimate God in Liturgical Time*.

became the religion of the Roman Empire, the authority of the Church grew even in political matters due to the fact of feudal structures and emerging city-states. The clergy were often the most educated men around, and so looked to for leadership.

The medieval context, those centuries immediately prior to 1750, knew a remarkable synthesis. Life was not yet rigidly compartmentalized, but instead offered a wholeness of the sacred and secular dimensions of daily living. The Church was everywhere in the culture, and the culture greatly influenced the shape of the Church.

With the Enlightenment, dated about 1750, all of this changed dramatically. Reason stepped boldly forward, asserted its prominence, and relegated faith to the periphery of life where it was tolerated by some and dismissed by others. Taken with the emergence of the physical sciences, intellectuals unfortunately set up a false dichotomy between faith and science, pitting one against the other. Science and reason would finally explain everything to us, pushing aside the need for faith in what extended beyond reason's grasp. It would simply be a matter of time, and faith would not be needed. Science would explain it all. The real was reduced to what the human mind could comprehend.

The dawning of the twentieth century with its World Wars, its industrialization and technological progress and its interest in human psychology, fed the ideology that science and reason would one day triumph, vanquishing the need for religious faith, the authority of the Church, and religion itself at last. Modernism was born. Its worship of human intelligence was a wonder gone astray. The industrial age was unveiling one startling new invention after another, and so, with the help of psychology, the self and its intelligence and creativity took center stage. *Modernism* placed the human reason as prime and ultimate authority. No government, church, mosque, or synagogue was going to tell us what to do.

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***The gods of science and reason suddenly had clay feet. Reason and science could wreak self-destruction.***

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The mid-twentieth century brought a rude awakening. The depression, the H-bomb, the death camps, and the horror of the two World Wars revealed what horrors the human intelligence could devise. With all our best scientific effort, the Challenger still exploded. The gods of science and reason suddenly had clay feet. Reason and science could wreak self-destruction.

With this realization, modern self-perception entered a period of disenchantment. If reason and its prodigy science could no longer be worshipped, where shall we turn to pledge our

allegiance? The newly discovered science of psychology held the answer. The narcissistic exploration of inner space began. Interiority would explain ourselves to ourselves.

And so the exploration into the human psyche and how it influences behavior began in earnest. *Post-Modernism* is marked by the quest for personal experience and personal value, and that experience alone as the litmus test for what is real. The result is highly critical self-analysis, and a relativist understanding of truth. There is only my truth and your truth, verified by our experience and our interpretation. There is no *the* truth. This is our age. This is the prevailing philosophy of our age, captured well in such current films as *The Golden Compass*. The enemy is any authority, including the Church, that questions the effects of my exercise of personal freedom.

### **The Shift in the Church's Self-understanding**

The Church is people. The people of God are part of the culture and the shifts we have described. What then has been happening to the Church in this historical unfolding from a medieval self-understanding through Enlightenment, Modernism and finally Post-Modernism? The Church too has been developing. The "wheat" has been growing with the "weeds." Each historical shift has brought both blessing and curse. We have been describing the curse – the rapid disintegration of the medieval synthesis into the fractured relativism of our present day. Contrary to the opinion of some, the Church is not being destroyed. Rather, it is learning, for this age is asking questions of itself and of the Church that could not have been asked in a former time.

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***Faith knows that the truth is ultimately a person, the One who has shown us what is real and what is passing away.***

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We would do well to remember that the *sensus fidelium*, the deep sense of the faith that dwells in the heart of the Church by the presence and action of the Spirit of God, gives the community the *nose* to detect what does and does not belong to the spirit of the gospel. The Church sniffs out the truth and knows that it is not merely self-induced. Faith knows that the truth is ultimately a person, the One who has shown us what is real and what is passing away. This sense gives the Church the capacity to distinguish what is good in each of these developments while at the same time being wary of what is poisonous to its life in God. This is the heart of discernment.

The medieval synthesis was not all good. While recognizing that the faith, religion, and the Church are a vital part of human life, this world view also tended to sacrifice the individual to the

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common good. The individual was expendable. An example of this weakness was the fact that peasant taxation, indentured servants, and human slavery were not seriously questioned as facts of life. Despite this weakness, the “wheat” of this period can be identified as a “wholeness,” a sense that religious conviction was a vital part of all human endeavor. During this period, Christ the King was on the *offensive*.<sup>1</sup> The Church as the religious authority took the lead in influencing social life, economics, and political authority.

With the Enlightenment a radical shift occurred. With roots in the emergence of individual interpretation espoused by the Protestant Reformation, reason now struggled to break free of faith and set out on its own. The Church, divested of its unity by the middle of the sixteenth century, attempted to regroup and attempt its own reformation through the Council of Trent (1545-1563). Christ the King was no longer the great Pantocrator, ruling in majesty from above the main altar of the basilica, but the suffering Christ of the cross. As was clear in the language of the Council of Trent, the Church went into *defensive* mode.

As reason continued to ascend the throne in its rise to prominence, it was joined in its rise to power by the impressive retinue of the physical sciences. Faith, religion, and the Church were more and more marginalized as impediments to reason’s power and self-sufficiency. Once again, despite the obviously bloated perception of human intelligence, “wheat” can again be identified. The Modernist worship of human reason and its scientific capability gifted the world with a remarkable self-confidence in human intelligence, creativity, and invention. This gift would usher in undreamed of progress for the human family.

“Pride goeth before a fall.” Thus reads the old proverb. The arrogance of the Enlightenment with its rational and scientific prowess peaked in the events of the twentieth century. The industrial revolution was underway. Flight was developing a capacity for use in war. The World Wars scarred Europe’s landscape. The atomic bomb devastated Hiroshima and Nagasaki. The Nazi death camps horrified the world. This is what the new deities of reason and science had wrought. The world sank into depression. The “wheat” of this disillusionment was the honest realization that we could self-destruct by use of our reason and science.

The period of disillusionment that followed saw the promises of Modernism recede, and give way to a different focus. The concentration was still on ourselves as holding the solution to our own development, but the inquiry turned to the source of both reason and science: human consciousness. The consciousness- philosophers beckoned us on to explore inner

space. We shifted our attention now to search out the source of human thought, emotion, and decision. Moral decadence had led us into the desert. We began the trek into interiority, and it is here that we, and the Church with us, find ourselves in the beginning of the twenty-first century.

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***Christians have long believed that deep within the human spirit the Triune God has taken up residence.***

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Socrates had long ago said, “Know thyself.” Christians have long believed that deep within the human spirit the Triune God has taken up residence. This would imply that a genuine self-knowledge leads to knowing God. Although the turn to philosophical interiority in our present age is secular in origin and pursuit, for those who see with the eyes of faith it is an opportunity for the rediscovery of the role of faith, religion, and the Church in a way never experienced before in human history. There can be no turning back. There can only be a moving forward. Like it or not, we stand on the shoulders of those who have flagrantly dismissed the divine to the periphery of human life. At the same time, human seekers are being led to the inner depths of the human heart where that divine resides. What is different in our age is that we have already worshipped at the shrines of the idols and know they don’t deliver. Reason and science have their limits.

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***Yet some are still convinced that the ultimate shrine and god is ourselves: the human, distinct and separate from everything and everyone...***

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Yet some are still convinced that the ultimate shrine and god is ourselves: the human, distinct and separate from everything and everyone, ruling with unlimited power. If we can unlock the secrets of consciousness, perhaps we can control the very source of human decision, and with that knowledge achieve the most ancient of yearnings: to be like unto God.

But there is another possibility. It is to rediscover ourselves as *already* like unto God, made so by that very Mystery. This would mean to rediscover ourselves, to find ourselves once again, now with all our discoveries, with all our intelligence and creativity, once more *in the midst* of the very Mystery we have relegated to oblivion. Christ the King is no longer either Pantocrator-ruler nor crucified victim. He is the Christ of the open heart, the Christ of mercy. Christ the King in our time is the servant footwasher, the shepherd king, kneeling at the feet of a stubborn sin-infected world.

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### **The Context: Now**

The sketch above was necessary for us to know the situation in which we now find ourselves. We are, if the cultural anthropologists are right, in a second axial shift. The first was the shift to reason and science from ritualism. The second is the shift from reason and science to interiority. We have been disillusioned from an absolutist dependence on reason and science, and have turned to the pursuit of an understanding of human consciousness itself. We want to know what goes on there, and we want to know how to control what goes on there. Evolution continues, and it is not only biological.

For the first time in human history there is global concern about human issues: war, refugees, despotic rulers, failing economies that are not ours, debt forgiveness, human rights, clean water, ecological responsibility, conservation, recycling, health care, education, housing, trade and oil, to name just a few. Communications has made it possible for us to know what is going on across the world in seconds, to know and care about it.

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*Before our very eyes  
the world is being restructured.*

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### **Social Restructuring**

Before our very eyes the world is being restructured. Socially, economically, and politically we have seen the European union emerge. South and Central America are considering something similar as well as Africa and the Mediterranean region. China is becoming a giant. India is becoming technologically literate.

The fact that a country is not providing for its people can no longer remain a secret. Communications will continue to expose Eastern European trafficking of women and children to feed the sex trade. No longer can vice confidently rot away human lives in hidden secrecy, but may find itself exposed to the prying eyes of someone in Kabul carrying a cell phone camera. On the positive side, people are talking to friends and family regularly anywhere in the world. Although we need to put down our cell phones while we drive and take care of other communication abuses, the world has never been more connected.

Human life issues are no longer just the concerns of the Mother Teresa's of the world. Marriage, family, procreation, and sexual orientation are common topics of conversation among both young and not so young. End of life issues are of real concern to hospital personnel. So is pre-natal care. Disease control of aids, viruses, cancer, diabetes, and autism are researched in laboratories all over the world. What will interiority have to

say to the fact that the world as we know it is being gradually united into a virtual community whether we like it or not?

### **The Church in Transition**

We no longer live in a medieval Church. We no longer live in an immigrant Church defending itself against the Modernist onslaught. We are living in a Church immersed in a time of Post-Modern relativism, where the Church's very existence is irrelevant, even to some of the baptized. How do we evangelize in such a time? How do we speak to this Post-Modern age in such a way as to get the attention of its people and speak to the realities and struggles of their lives? To merely mouth the ancient truths, held dear to those who know how they have been forged in the fires of prayer and struggle, is not enough. Communication must find a bridge between those ancient truths and the spiritual hunger of this age. The message needs to engage the images and language of this time as carriers of the good news. How begin?

The Church will first need to assess its relation to this new world. How will it position itself? Offensively as in the past? Will it draw in and ghettoize itself to protect its ancient truths? Will it retreat with a whimper, walling itself up once again as an ancient fortress, concerned only about its own rules and inner order? Or will it assume the posture of its master, as shepherd-servant? What structure will serve it today? Will the former feudal structure continue to serve or must a more participative arrangement be found that is more life-giving?

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*The search today is for spirituality,  
while religion is avoided.*

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The search today is for spirituality, while religion is avoided. What has made religion distasteful? Why is spirituality sought to replace religion rather than be supported by it? And most difficult of all, what is the image the Church needs to present to be taken seriously by a world that too quickly dismisses it as having no meaning?

### **Gaudium et Spes:**

#### **The Church in the Modern World Document**

In the chaos of the sixties, when post-war Post-Modernism had broken upon us, the Catholic Church held a world-wide meeting. Kennedy was in office, draft cards were being burned, students at university campuses were rioting, and an elderly cardinal, Angelo Roncalli, became Pope John XXIII. The cardinals had hoped to calm things down so the Church could ride out the storm. The Holy Spirit had other ideas. The Church, still in its defensive mode like a medieval castle, shuttered and

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with its moat bridge drawn up, entered right into the midst of the fray. The Church's labor and social documents were still unknown and unread. Pius XII had set the stage for renewal, but those in Rome, fearful of "upsetting the boat" kept the lid on any efforts toward real innovation. John XXIII, nearing the end of his life, pressed on and brushed aside their objections. In 1962, on October 11, the Second Vatican Council opened.

### **A Second Document on the Church?**

As it engaged in its business and neared its closing in 1965, some cardinals and bishops realized something important was missing. The document on the Church, *Lumen Gentium*, had updated the Church's perspective on its own inner life. But it occurred to the Council Fathers that it said little or nothing about the Church's relation to the World. This would never do. And so a scramble was made to write a final document. The schema was prepared and a title was chosen. The document would be called *Gaudium et Spes*, Latin for "Joy and Hope," taken from the opening words of the text. In English the document is called "The Church in the Modern World."<sup>2</sup>

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### ***It was the first document addressed to all of humankind...***

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The document was unique in several ways. It was the first document addressed to all of humankind, not merely to the baptized.<sup>3</sup> It is an international, transglobal, and ecumenical document addressed to people of goodwill everywhere. The document's significant mover and shaker was Belgian cardinal Leon-Josef Suenens. In a speech on December 4, 1962 he had proposed that the schema on the nature of the Church be divided into two parts: the first dealing with the inner nature of the Church, and second dealing with the Church's relation to the world. Suenens insisted that the Council enter serious dialogue with society, and his speech that day was met with such sustained applause from the Council participants that the president reprimanded the body for what he considered too boisterous a response! In the days that followed, many joined Suenens in his request, foremost among them Cardinal Montini, soon to be elected Paul VI.

As time moved forward and the full agenda of the Council was addressed, the Suenens suggestion waited in the background. Finally, after considerable work by the Suenens' supporters, a schema for *The Church in the Modern World* as a separate document was presented on October 20, 1964. The debate began. Several of the Council Father found the document much too social in character, and suggested it was not fit for the Council's consideration. The international press began to be very interested.

Corrections were made by subcommittees, and the final text was composed by Father Haubtmann of Paris, working closely with Father Bernard Häring. Still, from January 31 to February 6, 1965, and again from March 29 to April 6 that year, twenty-nine Council fathers plus other experts met to incorporate amendments to the text.<sup>4</sup>

Yet the debate continued. In the face of the pressure of the Council moving toward closure, the work still continued, and the draft met its deadlines. It came to the floor for a vote on December 7, 1965 and passed by a vote of 2,309 to 75.

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### ***With this second document we have a charter for the future of the Church as it moves through time.***

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For those who do explore the Vatican II documents, one of their main stops will be *Lumen Gentium*, the first document on the Church's own inner life and structure. Is it no wonder then, that this second document is little known and little read? Yet without this document the Church is not known in its entirety. With this second document we have a charter for the future of the Church as it moves through time.

### **The Themes**

Anyone who judges the Church to be out of step with modern day concerns will be challenged by this document. The document is in two parts. Part I deals with the human person and the Church's role in the world. Part II addresses several current problems that face all of us in the modern world. We will address its main themes briefly, and then ask how the document speaks to the scientific disciplines.

This council...having already looked in depth at the Church itself, now turns its attention on the whole of humanity. We want to state clearly our understanding of the presence and function of the Church in the world of today. ..Our entire subject is humankind, men and women: whole and entire with body and soul, with heart and conscience, with mind and will. .. We now wish to enter into dialogue with the whole human family about all this.<sup>5</sup>

The entire Preface paints the situation of a struggling humanity, often caught in the mismanagement of its own outstanding progress. Then with bold strokes, Chapter I moves to a discussion of the dignity of the human person as the central issue. The chapter addresses the various opinions about the human being stemming from the Post-Modern angst that characterizes the culture. After taking the real situation seriously, the council fathers describe human dignity, sin, the intelligence, liberty, moral choice and atheism, drawing from

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the Church's biblical base. The chapter closes with a reference to Christ as the fullness of a healed humanity.

Chapter II expands this vision communally, and Chapter III focuses on humanity in action, and reveals the Church's vision of human progress:

Thanks primarily to increased opportunities for many kinds of interchange among nations, the human family is gradually recognizing that it comprises a single world community... far from thinking that works produced by man's own talent and energy are in opposition to God's power... Christians are convinced that the triumphs of the human race are a sign of God's greatness and the flowering of His own mysterious design... Hence the norm of human activity is this: that in accord with the divine plan and will, it should harmonize with the genuine good of the human race, and allow men as individuals and as members of society to pursue their total vocation and fulfill it.<sup>6</sup>

With Chapter IV, the document plunges into the Church's role in the progress of humankind.

...the Church proclaims the rights of man... the rightful autonomy of the creature... [in doing so humanity] is reestablished and its own dignity strengthened... She acknowledges and greatly esteems the dynamic movements of today by which these rights are everywhere fostered. Yet these movements must be penetrated by the spirit of the gospel and protected against any kind of false autonomy. For we are tempted to think that our personal rights are fully ensured only when we are exempt from every requirement of divine law. But this way lies not the maintenance of the dignity of the human person, but its annihilation... [The Church has] no proper mission in the political, economic, or social order ... [her mission] is a religious one... a function, a light, and an energy which can serve to structure and consolidate the human community according to the divine law... Hence... her very universality can be a very close bond between diverse human communities and nations... the Church is willing to assist and promote all these institutions to the extent that such a service depends on her and can be associated with her mission... They are mistaken who... shirk their earthly responsibilities... let there be no false opposition between professional and social activities... and religious life... [but] gather... humane, domestic, professional, social, and technical enterprises into one vital synthesis with religious values... Thanks to the experience of past ages, the progress of the sciences, and the treasures hidden in the various forms of human culture, the nature of man himself is more clearly revealed and new roads to truth are opened.<sup>7</sup>

This basic vision, now over forty years old, is yet to be fully absorbed by the faith community. Such an affirmation of human effort is foundational to what follows in Part II of the document. Here the Council addresses several prime areas of practical concern.

Part II of the document has five chapters. The first is dedicated to marriage and family. This key area is followed by four other chapters discussing the proper development of culture, socio-economic life, the life of the political community, and the fostering of peace and the development of a community of nations. Each of these chapters provides a vital blueprint for addressing the pressing problems that plague the human family. Yet each of these chapters has hardly been tapped as the world community struggles daily to address the problems that haunt it.

We might ask what difference it makes for the Church to have written this document when it is so little known and read. The significance is great, for once you have written your convictions, the entire world can hold you responsible for living them out. In declaring itself, the Church has made itself vulnerable to the very influence of the world whose wisdom it has declared it humbly seeks.<sup>8</sup>

## The Critical Importance of Science

### In Implementing the Vision of the Document

In taking so affirmative a stance regarding the progress of humankind while realistically pointing out how we can abuse our very humanity, the Church reaches back into history to affirm every positive development while refusing to focus on the horrors perpetrated by human beings who twisted those developments to their own devious purpose. By setting this course, she invites us to a stance of keen discernment. She also invites us to keep the bigger picture always in view.

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***Faith affirms that there is reality that reason cannot as yet comprehend.***

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That bigger picture simultaneously holds all of reality in tension. The divine plan and purpose is probed by our faith, a knowing that is born of religious love. Such knowledge refuses to eject the vision of a reality beyond measurable data. Faith affirms that there is reality that reason cannot as yet comprehend. This knowing is not unreasonable. It simply posits an intelligible that is now beyond our sensory grasp with all its means of measurement. Yet as intelligible, it is most knowable, and will one day be comprehended by a reason transformed to be able to embrace it. The fever of human arrogance and impatience will

*Continues on page 9*

push for dismissal of what it cannot immediately understand in the face of this process of human transformation.

The natural sciences are affirmed and celebrated by this document. Physical science provides a knowledge of the building blocks for our understanding of the cosmos. As such, the physical sciences become a sacred metaphor for an evolving revelation of the continuing creative power of God.<sup>9</sup> The *Church in the Modern World* document provides a basis for the ongoing collaboration between theologians and physical scientists, each finding deeper understanding in light of the insights of the other.

The same holds true of the social and psychological sciences. Both deal with the human being and the conditions for human flourishing. The human sciences have and will continue to call into question our penal systems, our health care systems, and our understanding of mental illness.

The urgency of the study of human consciousness promises to be an exciting frontier. Rather than succumb to the absolutism of the human as totally self-sufficient and autonomous, such study can disclose the need for social and communal support for human development and full human flourishing. Once the study of the energy of human love and forgiveness is plumbed, data now being financed and researched by secular institutes, the findings can shed significant light and direction on human spiritual development beyond the limits of psychological measurement.

Finally, there is no doubt in this document of the intimate relationship between science and the probing questions of meaning posed by philosophy and theology. The age-old questions of human meaning, human purpose, and human suffering need to include in their pursuit the hard data provided by the physical, social, and psychological sciences. The assuming of matter in the form of DNA by the Incarnate Word of God is either the final and definitive text on which the divine has written, or we who preach this wonder are deceiving the human family. In this mystery the most important affirmation has already been given. This One has become one with us physically, socially, and spiritually. The Church has done well in taking its clues from such a Mystery, for this fact sets its face toward becoming a vital part of the world assumed by the One who is the object of its faith and the love of its life. Perhaps then, and only then, will the insight of a current anonymous writer be realized:

*There will not be  
A renewal of Christianity  
Until a manual of science  
Cannot be written without a reference to the Incarnation.*

## End Notes

- 1 I am indebted to Joe Holland of the Center of Concern in Washington, D.C. for this three-fold description of the transitions of the Church.
- 2 For the full text of the document, see Walter M. Abbot, SJ, *The Documents of Vatican II*. (Piscataway, NJ: New Century Publisher, Inc., 1966): 183-316. The Flannery edition also provides the full text, as well as the Vatican website. Readers might be interested to know that this document is the longest of all the Council documents.
- 3 For readable and clear background on the Council and its documents see Bill Huebsch, *Vatican II in Plain English: The Constitutions*. (Allen, Texas: Thomas More, 1997), and Gerald O'Collins, SJ, *Living Vatican II: The 21<sup>st</sup> Council for the 21<sup>st</sup> Century* (New York/Mahwah, NJ: Paulist, 2006).
- 4 See Huebsch, 121-125.
- 5 Preface. See also Huebsch, 126-127.
- 6 Abbott, 231-233.
- 7 Abbott, 239-246.
- 8 Ibid., 245-247.
- 9 For a challenging read by this very title see Elizabeth Michael Boyle, OP, *Science as Sacred Metaphor: An Evolving Revelation* (Collegeville: Liturgical Press, 2006). Another provocative study is *Environmental Stewardship in the Judeo-Christian Tradition* published by the Acton Institute, 2007.

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## An Agreement Between Science And Religion On The Uniqueness Of Individuals

By Deacon Donald Sparling, PhD

A fundamental premise of ITEST is that science and theology can and do affirm and support each other. For example, Fr. Jaki [1], Haught [2] and others have argued that if the Judeo-Christian concept of monotheism and a creator God that fashioned the universe in an orderly way was not required for scientific thought and investigation, it certainly facilitated those activities. The concept that nature and the universe are orderly stimulated the systematic pursuit for knowledge about the rules that God Himself designed. This pursuit opened the way for modern science and the application of the scientific method. Once humans believed that the universe was orderly, their natural thirsts for knowledge and understanding were liberated and the long pursuit began.

In contrast, pantheistic religions inhibited an active pursuit for understanding the laws that govern nature because without a belief in an intelligent, transcendent creator, there was no guarantee that nature was organized at all. Similarly, polytheism as practiced by many other traditions taught that man was at the mercy of idiosyncratic, sometimes mischievous or even belligerent gods and there was little impetus to try to understand something that was more whimsical than organized. Thus, the theology of the Jews and Christians provided a strong incentive to understanding nature for through that study man might be able to know his Creator just a little bit better. In a complementary way, science and reason can support theological concepts in many ways. For many people (myself included) the very fact that the universe does follow rules lends great credence to the notion that there is a Creator; it is very difficult indeed

to envision organization coming from chaos. That seems to be counterintuitive and even contrary to science itself.

In this brief essay I would like to provide one brief example of how science can support theological thought. Pope John Paul II said “Through the knowledge of genetics and molecular biology, scientists can look with the penetrating gaze of science into the inner fabric of life and the mechanisms that characterize individuals, thus ensuring the continuity of living species.” [3] At the time of this speech, the Holy Father primarily addressed our growing knowledge of genetics and the human genome. The modern study of genetics will, no doubt, reveal a great deal about the human organism and how it relates to other members of God’s creation but even the beginning student of genetics can use his/her knowledge to support a basic premise of Christian thought, the uniqueness and special quality of every human.

*If a shepherd has a hundred sheep, and one of them has gone astray, does he not leave the ninety-nine on the mountains and go in search of the one that went astray? And if he finds it, truly I tell you, he rejoices over it more than over the ninety-nine that never went astray. So it is not the will of your Father in heaven that one of these little ones should be lost [4] Mt 18:12-14.*

*Are not five sparrows sold for to pennies? Yet not one of them is forgotten in God’s sight. But even the hairs of your head are all counted. Do not be afraid, you are of more value than many sparrows [5]*

Its actually quite easy to show, through genetics, that each and every person is unique from the moment of conception. Not to dwell on the obvious, but in the human genome there are two sets of chromosomes, each set consisting of 23 chromosomes for a total of 46. In every human one set of chromosomes came from the father and the other from the mother. Matching pairs of chromosomes are called homologous. On each homologous chromosome there are hundreds of genes which are composed of strands of DNA and each one is responsible for a given trait. The physical site of a given gene (for example, the ability to roll one’s tongue) is call a locus. The specific gene that resides at the two loci on homologous chromosomes can take different forms or alleles. If the two alleles are the same we call the condition for that specific gene homozygous; if they differ we call the condition heterozygous. Now, given that we have hundreds of genes occupying hundreds of loci on

### Deacon Donald Sparling, PhD Brief Biography

Don Sparling is Associate Professor of Biology and Associate Director of the Cooperative Wildlife Research Laboratory at Southern Illinois University, Carbondale, Illinois and a Deacon in the Diocese of Belleville, Illinois. He also serves on the ITEST Board of Directors. While his research focuses on the effects of pollution on wildlife, he has strong interests in the interface of theology and science. He has written approximately 80 scientific papers and is lead editor for *Ecotoxicology of Amphibians and Reptiles*, published by SETAC Press. Don is also in the early stages of writing a commentary on St. Peter.

the homologous chromosomes, there is an extremely high probability that at least one pair of alleles are heterozygous. In reality, there are probably many loci with heterozygous loci but for our argument, we only need one per homologous pair of chromosomes.

Through the process of meiosis cells that reproduce to form two gametes divide their chromosomes into individual sets, each carrying a full complement of chromosomes but the gametes have only ½ of the chromosomes of their parent cell. A truly important factor in meiosis is that the separation of the chromosomes is completely random. Any given chromosome of a homologous pair has an equal chance of going to either of the new gametes that are generated by the parent cell. Through the laws of probability then, any parental cell giving rise to gametes can produce  $2^{23}$  or 8,388,608 different kinds of gametes (two possibilities raised to the power of the number of potential events, or chromosomes).

Eight million combinations are not as important in males as it is for females. An average, healthy male will evacuate 5 million or more sperm at a time. So the probability of producing two identical sperm cells appearing in a given evacuation is relatively high (approximately 5/8 or 0.62). Multiply that by the number of ‘attempts’ to fertilize an egg and you have a good probability that a man will produce several gametes that are genetically identical in his life time. However, if fertilization is to occur, only one of those sperm cells can fertilize an egg. For human females, however, the number of viable gametes is far less. Very roughly, women will often ovulate only one mature egg per menstrual cycle. Of course, some women may ovulate more than that, setting up the potential for fraternal twins or even triplets, but one egg per cycle is the rule. If the average menstrual cycle length is 28 days and we round the reproductive period to 30 years from menses at 15 to menopause at 45, give or take, that means that a typical woman will produce approximately 390 viable gametes in her life time. Even if we increased that by four or five fold, which is very unlikely to occur, the odds that a woman will produce two genetically identical, viable eggs is very, very low - about one in 4 million.

But wait, the odds of having a man and woman produce two genetically identical children (with the exception of identical twins, of course) is the probability of two genetically identical sperm cells from the father fertilizing two genetically identical eggs from the mother. The very **best** odds we can have of that occurring is  $8,388,608^2$  or 1/70,368,744,180,000 or 1 in over 70 trillion. In fact, we may have to divide that by something like 4 million, the probability of two identical eggs being ovulated - so the

realized probability is more like 1 in  $2.8 \times 10^{20}$ ; statisticians, check me out. That’s one chance in 28 followed by 19 zeroes. Since our current human population is approximately 6.7 billion as of January 22, 2009[7], it is not much of a stretch to say that never in the course of human history have a man and a woman given birth to identical fraternal twins.

Given all that, it is also safe to say that, aside from identical twins, each and every person who ever lived on earth is genetically unique. Thus, in this very elementary way, we see a concurrence between science and religion.

In ways not fully fathomed by science, God determined that all life, from the simplest bacterium and amoeba to vertebrates including man, would be linked through a common means of passing on their characteristics from one generation to another. It is elegant that the genetic code provides simultaneously the mechanism to maintain commonality within the members of a species while at the same time, provides the means for the uniqueness of every organism produced through sexual reproduction. We may very well enter into this era of cloning, genetic modification and tampering with the human genetic code at our own peril. As the Vatican’s International Theological Commission expressed:

*The use of genetic modification to yield a superhuman or being with essentially new spiritual faculties is unthinkable, given that the spiritual life principle of man – forming the matter into the body of the human person – is not a product of human hands and is not subject to genetic engineering. The uniqueness of each human person, in part constituted by his biogenetic characteristics and developed through nurture and growth, belongs intrinsically to him and cannot be instrumentalized in order to improve some of these characteristics. A man can only truly improve by realizing more fully the image of God in him by uniting himself to Christ and in imitation of him.[6]*

#### End Notes

- 1 Jaki, S. 2004. Bible and Science, Christendom Press
- 2 Haught, J. 1995. Science and Religion: From Conflict to Conversation. Paulist Press
- 3 Address to the Pontifical Academy on Life, 1986.
- 4 Matthew 18:12-14, NRSV
- 5 Luke 18:12-14, NRSV
- 6 International Theological Commission. Communion and Stewardship: Human Persons Created in the Image of God. 2002



**In Memoriam**  
**Leno S. Pedrotti, PhD**  
**1927-2008**

*Years ago in 1986, not long after I started working at ITEST, Father Brungs and I saw the need to showcase the talents of our members, most of whom have professional standing in academics, industry and business. As a result we began a quarterly feature in the ITEST bulletin focusing on the achievements of individuals in their specific areas of concentration: science, technology, engineering, theology, philosophy, law, medicine and others. We published a number of those one-page sketches in subsequent bulletins for about five years, and then the well ran dry. We suspected that our members were either too humble to trumpet their accomplishments, or even more likely, too pressured by the pace of daily life and work to take on another task. However, occasionally we showcase the accomplishments of ITEST members who have died. In this issue we proudly present the “bona fides” of a scientist, noted in the field of optics, devoted husband (of Jean) and father of eight children. In this tribute we will quote liberally from the letter of his wife, Jean, to me and the memorial given by his friend and colleague, Dan Hull. (Editor)*

Leno S. Pedrotti, physics professor, became a member of ITEST in 2005 after meeting Father Brungs, a fellow physicist at the “old” ITEST offices at Jesuit Hall in St Louis. Leno and his brother Fr. Frank (both physicists) collaborated in publishing a successful textbook, *Introduction to Optics*, (1987) —now in its third edition —

with the help of Leno’s son, Leno M. Pedrotti, a professor of Physics at the University of Dayton. Leno and Fr. Frank also collaborated on *Optics and Vision*, a textbook for schools of Optometry and Ophthalmology, with input from son, Michael, who is an optometrist. While at the Center for Occupational Research and Development (CORD) in

Waco, Texas, Leno wrote valuable educational material for training the technological work force there. His *Principles of Technology* is a noteworthy example.

*Who's Who in American Education* lists his extensive credentials in academia and industry but the “flesh and blood” man is best portrayed in the following testimony by Dan Hull, President and CEO of the Center for Occupational Research and Development (CORD).

Leno received his BS in physics from Illinois State University in 1949 and his MS at the University of Illinois in 1951. He married a fellow science teacher, Jean Sullivan and raised eight children. One of his sons, Leno M. Pedrotti, is a professor and optical physicist at the University of Dayton; another, John Pedrotti, is chair of the Laser/Optics Technology department at Texas State Technical College.

Leno began his **first professional career** in 1951 at the Air Force Institute of Technology (AFIT) at Wright Patterson Air Force Base in Dayton, Ohio. He took a leave of absence from 1957-1958 to work on his PhD at the University of Cincinnati where he studied along with his brother Frank, a Jesuit priest. After Leno finished his course work and exams he returned to AFIT in Dayton to resume teaching. He was promoted to associate professor in 1959 and began work on his doctoral dissertation with a scientist, Don Reynolds, who had made his name as the world's leading expert on II-VI semiconductor compounds at a time when the semiconductor was just coming into its own. Leno received his PhD in 1961 and in 1964 he was appointed head of AFIT's physics department where he remained department head until 1982; at that time he retired from federal service and joined CORD in Waco, Texas.

Leno's career at AFIT was legendary. He was an outstanding teacher, formally recognized by the students so many times that he removed his name from the competition so that others in the department would have a chance to be recognized. As head of the physics department he was charged each year with the education of over seventy-five officers at both the master and doctoral levels in nuclear weapons effects, directed energy, space physics and other fields. As a result, he indirectly influenced many programs throughout the U.S. Air Force. He was the “mover” who put AFIT into the high-energy laser business. At the request of the AF Weapons Lab, Leno led AFIT to offer a somewhat classified program on megawatt laser systems – not available at any civilian university – for the purpose of funneling approximately 15-20 officers a year into the Weapons Lab program.

While at AFIT, Leno taught most of the courses offered in the department, including both the nuclear courses and those in laser engineering. He was in charge of a laboratory complex of approximately ten labs supporting research in the areas of optics, lasers, solid state physics, plasma physics, nuclear weapons and infrared systems.

Leno's **second professional career** began in 1982 when he joined Dan Hull at CORD (a national nonprofit educational R&D organization) to develop curricula and teaching materials in mathematics, science and emerging technologies. As Vice President for Curriculum Leno wrote a new college science course entitled *Unified Concepts in Physics* and a series of forty instructional modules in applied mathematics. These course materials designed especially for applied or “contextual” learners, have been used by over one million students in ten countries.

Leno responded to invitations to speak before hundreds of groups of high school math and science teachers. His message encouraged and motivated thousands of teachers to improve math and science education for struggling students. Using a grant from the Anders Foundation, Leno developed a successful mathematics course for “at risk” secondary school students.

Perhaps some of the deepest appreciation for Dr. Pedrotti as a teacher comes from the math and science teachers themselves who participated in his workshops. Charles Rouse, former high school principal from Leander, Texas writes, “Dr. Pedrotti, through his unique approach to teaching, caused a new ‘awakening’ to take place in math, science and technology courses. Teachers using contextual techniques (promoted by Pedrotti) saw students excited for the first time about learning and yearning for more.”

“We can know God only through the things God has created. We are creatures and God can reach us only through the gifts of creation. If we can unite the love of God and the study of creation and created things we may raise up a generation of Christians who know both their faith and the glories of creation revealed in part in science.”

– Fr. Robert Brungs, SJ, 2005 writing to a friend about the educational project, *Exploring the World, Discovering God*, faith/science lessons for Kindergarten through Grade 4.

## Profiles In Versatility: Finding Sanctuary in Faith and Physics

by Alaina G. Levine

*Alaina G. Levine is President of Quantum Success Solutions, "...a public speaking and corporate comedy enterprise that provides expertise on topics such as career success, organizational public relations, and personal branding and marketing to companies and individuals." (from the web site www.alainalevine.com) Levine also gives lectures and workshops on science and spirituality and religion, among many other topics. "She is also the Director of Special Projects for the University of Arizona College of Science, where her responsibilities include public relations, industrial relations, economic development and outreach." For more information contact her at the web site above. This article is reprinted with permission from the American Physical Society. Copyright 2009 and the author.*

A Priest and a Rabbi walk into a physics lab. It could be the start of a joke, but in this case it's the premise of the lives of Michael Heller, a Catholic priest, and Ronald B. Kopelman, a rabbi, both of whom also happen to be physicists.

Drawn to science as youngsters, Reverend Heller, 72, and Rabbi Kopelman, 56, both see religion and science as inherently connected. "Science gives us knowledge, and religion gives us meaning," says Heller. And as Kopelman puts it: "Science asks how and religion asks why...they deal with two sides of the same coin."

The two clergymen completed their physics and religious training in reverse order—Kopelman worked as a physicist for almost 15 years and then became a rabbi, whereas Heller went to Seminary in his teens and studied physics following his ordination as a priest.

Rabbi Kopelman received his PhD in physics, in the area of critical point phenomena in gas and liquid transformations, from the University of Maryland. He went straight into an industrial physics career, but had always been very interested in Judaism. Having been raised in an Orthodox Jewish household in Detroit, he had first contemplated becoming a rabbi in his younger days, although he ultimately chose to first pursue a career in science.

Kopelman had been attracted to physics because he was magnetized by measurements. "I was always excited at the thought of doing a measurement, of finding a number," he explains. "I liked the challenge of doing an experiment and getting a number with greater accuracy than anyone else had done before.."

His career transition from physicist to spiritual leader began in 1990, although Kopelman says it was "a midlife crisis 20 years in the making." At that time, at the age of 41, he was working for NASA in Cleveland while his family lived in Utica, NY.

Every weekend, he drove the three hours home and during the long drives he found himself thinking more and more about Judaism. He started reading books on the subject and learning Hebrew, and before he knew it, he realized he needed formal training to go further with his studies. "What started out as an avocation turned into a full-time pursuit," he says. He quit his job, enrolled in the Jewish Theological Seminary in New York City, and seven years later, emerged as a rabbi.

His first pulpit out of seminary was at a synagogue in Bowie, MD. Looking back, Rabbi Kopelman asserts that he would not have done

his training any other way. "What I am today is a reflection of both worlds and I wouldn't give either one up," he says. In fact, "I wish I could have spent a whole lifetime doing both."

Reverend Heller feels the same way. He was excited by science as a child, and says "my dream from the very beginning was to study the sciences. It was quite natural." And yet he knew "religion was something that was absolutely necessary (to be part of)".

"I was too ambitious," Heller admits, "I always wanted to do the most important things, and what can be more important than science and religion?" By the time he was in his teens, he knew he would pursue both. However, growing up in Poland at the end of World War II, and then under a communist regime, he knew getting a degree in physics was not a simple option. He chose the priesthood first. After graduating from seminary and being ordained, he went to study physics at Catholic University in Lublin, which at the time was the only university in Poland at which a priest could study openly.

Although there was no physics department at the institution, Heller was still able to take physics and mathematics courses. By 1966, he had graduated with a master's and a PhD in "philosophy of nature", with a thesis in relativistic cosmology.

*Continues on page 15*

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***"Science asks how and religion asks why... they deal with two sides of the same coin."***

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Since then he has served in academic positions in physics and astrophysics at universities throughout Europe, and has conducted astronomical research at the Vatican Observatory in Castel Gandolfo, Italy, among other places. He has also written several books with titles such as *Some Mathematical Physics for Philosophers*, *The New Physics and a New Theology*, and *Theoretical Foundations of Cosmology—Introduction to the Global Structure of Space-Time*.

Both the rabbi and the priest see connections and parallels between religion and science. “Religion permeates everything,” Heller says, and “science concerns everything.” He believes that everything was created by God, and through science, “we figure out how God did it.”

The rabbi distinguishes many places where science and Judaism, in particular, cross. For example, when someone creates a new material, Kopelman ponders whether one can make a kosher dish out of that material. “You’re taking very ancient laws that people know well but applying them in uncharted regions,” he says. “It’s the same thing when a new species is discovered; you have to determine if it is kosher. You have to ask: can you take the text that’s there and adapt it to new situations?”

Rabbi Kopelman notices that “you find very much the same thing in the lab.” “You know what the technology is,” he explains. “Can you take that technology and adapt it to find a new and better measurement? In a way both challenges are the same thing—you are looking at a specific question and you’re trying to see it in a new and novel way.”

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***Neither Heller nor Kopelman  
sees a conflict between  
religion and physics.***

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Neither Heller nor Kopelman sees a conflict between religion and physics. Says the Rabbi: “I have come to the conclusion that if Torah and science seem to be in conflict, then you’re not posing the question the right way. At no time should the two of those be in conflict. My scientific background lets me step back and see how these two could not be in conflict.”

Heller agrees. “(Science and religion) both are prerequisites of the decent existence,” he says. “The paradox is that these two great values seem often to be in conflict. I am frequently asked how I could reconcile them with each other. When such a question is posed by a scientist or a philosopher, I invariably wonder how educated people could be so blind not to see that science does nothing else but explores God’s creation.”

Rabbi Kopelman jokingly says he “hopes” that having studied

physics has made him a better spiritual leader. “It has allowed me to see my religion and what goes on in the Bible in unique ways that other rabbis don’t see,” he states. Furthermore, “it gives me another tool in my arsenal for studying Torah and our traditions and understanding them.”

For example, since he finds joy in physics and religion, and is still charmed by measurements, his unique background allows him to examine certain portions of the Torah, such as the 10 plagues, for its scientific relevance. “The ninth plague is darkness,” he notes, and “I as a physicist start thinking: can I find a solar eclipse that’s complete over the land of Egypt in certain centuries that come at a certain time of the year? If I find that then I can date the Exodus.” But he is quick to clarify that the majority of his teachings as a rabbi rely on his and his congregants’ faith. “What we are talking about is the novelty of my approach,” he explains. “That’s only part of the approach. I have a certain love and faith in my religion that transcends science.”

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***“I have a certain love and faith  
in my religion that  
transcends science.”***

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The rabbi and the priest have had extraordinary experiences. Rabbi Kopelman had the profound privilege of giving the sermon at a prayer service in memory of the victims of the Columbine massacre, as well as providing solace to the family of Liviu Librescu, an engineering professor (and Orthodox Jew) killed during the Virginia Tech massacre in 2007. Rabbi Kopelman performed Shemirah, a Jewish ceremony involving watching over the body from the time of death until burial, never permitting it to be alone. As the shomer (guard), he recited psalms and stayed with Librescu until other rabbis came to accompany his body to Jerusalem for the burial.

Reverend Heller was honored in early 2008 with the Templeton Prize, the world’s largest annual monetary award given to an individual. Bestowed by the John Templeton Foundation, the Prize is worth more than \$1.6 million. Heller is using the funds to launch the Copernicus Center for Interdisciplinary Studies in conjunction with Jagiellonian University and the Pontifical Academy of Theology in Cracow to further research and education in science and theology as an academic discipline.

Both theologians still consider themselves physicists. Rabbi Kopelman “doesn’t do much physics”, but “would feel comfortable at an APS meeting.” He occasionally teaches mathematics at a community college. Reverend Heller, on the other hand, takes out a paper and a pencil and works out

*Continues on page 16*

a problem almost every day. He often carries a math book or some exercises with him. "If you stop doing physics you forget everything," he says. So his math work "must be done." He quips that he regards himself as "the best physicist among priests and the best priest among physicists."

Was it divine intervention that led these two mortals to devote their lives to physics and faith? Was it free will? Or perhaps it was a combination of many elements, a celestial fusion of divinity, mortality, and quantum mechanics that directed these philosophers to incorporate science with the sacred. In any event, the priest and the rabbi have contributed much to

the discussion of the bond between religion and science, as crystallized in the words of another philosopher physicist, who famously wrote that "science without religion is lame, religion without science is blind."<sup>1</sup>

***Was it divine intervention that led these two mortals to devote their lives to physics and faith?***

<sup>1</sup> Albert Einstein, paper prepared for initial meeting of the Conference on Science, Philosophy and Religion in Their Relation to the Democratic Way

of Life, New York City, September 9–11, 1940.— Einstein, *Out of My Later Years*, chapter 8, part 1, p. 26 (1950, rev. and reprinted 1970).



"Anybody who has been seriously engaged in scientific work of any kind realizes that over the entrance to the gates of the temple of science are written the words: 'Ye must have faith.' It is a quality which the scientist cannot dispense with."

– **Max Planck [1858-1947]**  
*"Where is Science Going" (1932)*



"Selfness is an essential fact of life. The thought of nonselfness, precise sameness, is terrifying."

"The only solid piece of scientific truth about which I feel totally confident is that we are profoundly ignorant about nature...."

"...It is this sudden confrontation with the depth and scope of ignorance [about nature] that represents the most significant contribution of twentieth-century science to the human intellect."

– **Lewis Thomas [1913-1993]**  
*"On Cloning a Human Being"*



"Science increases our power in proportion as it lowers our pride."

– **Claude Bernard [1813-1878]**  
*"Pensees" (1937)*

