INSTITUTE FOR THEOLOGICAL ENCOUNTER WITH SCIENCE AND TECHNOLOGY

BULLETIN

DATE: WINTER, 2000 VOL: 31 NO. 1

Y2K has come and gone and doesn't seem to have registered an impact on our computers. I can't quite decide whether to welcome you into the Third Millennium or the New Year, 2000. It's probably best that I not make a decision beyond reminding you that the calendar date represents little else than the conventional way we calculate it. It is simply a mental construct, with or without a foundation in reality.

It might be appropriate, in the light of expectations coming from biology, to ask what we can do in the coming years. One thing we can do is meet the challenges and opportunities presented to the Faith with Christian dignity. The problems and promises are vast and essentially unpredictable, though, we know, they will partake of the generally utilitarian view of the human so prevalent in our society at present. It will do us little good to sit on the sidelines and say: "It wasn't like this in the past."

One thing we can do is both purify and extend our understanding of the human being, especially of "the body," if we can speak thus. In the long history of Christianity there seems to be this movement: in the early centuries the key issue was the nature of God. Who is God? The Christological and Trinitarian dogmas resulted from this turmoil. Then, over an extended period, there were (and there still are) arguments on the nature of the Church and the sacraments. Though those issues are still not settled between the traditions, we are entering into the new questions of who and what are we.

ITEST's contribution to this discussion has been an ongoing, on and off, anthropological discussion, especially on the body. The body will be the pivot on which the argument will turn. We are aware that we cannot define the person solely in terms of the body, but our physical nature is much more important than has been generally recognized in the Church. We are promised that in the final Kingdom of Christ, He will transfigure our bodies into copies of His own glorified body. We wait for that transfiguration in faith. But what will it be? We really have no idea. Still, we must work toward an understanding of this mystery, knowing that even our best answers may be wildly off the mark. In the meantime, a Joyous New Year!

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ANNOUNCEMENTS

1. On Saturday, March, 11, 2000 ITEST will sponsor a one-day workshop in St. Louis on the basement level ballroom of St. Francis Xavier College Church. The title: *The Computer and Virtual Reality: Windows on the Inner World?* Lecturers: John Ashby, Director of the Instructional Media Center, St. Louis University, will present a paper entitled, "Computing and Convergence — Digital Data in General: Present and Future Effects," Dr. John Cross, Assoc. Professor of Psychology, St. Louis University will treat the philosophical/psychological implications and Sr. Timothy Prokes, FSE will deal with the theological issues arising from virtual reality. You should be receiving invitations to this workshop with registration information shortly. We are also inviting teachers, administrators and staff from the elementary through college level in the bi-state (Missouri/Illinois) area and neighboring area.

2. MEMBERSHIP ALERT: The Board has decided that the yearly dues will remain the same for the year 2000. You have already received the first renewal notice and many have already paid. We thank those members who added a little "extra" to the dues and to those who added quite a bit. For both types of these donations we are grateful. Some members have asked to pay dues using credit cards. We have looked into this; but after doing some research we found that the cost would be prohibitive, amounting to a 17% charge on each credit card submission.

Alternative methods of payment:

a. *Western Union* - Overseas members may pay via Western Union. Although retrieving the payment is a slight inconvenience for us, we would accept this method of payment.

b. *Check* - Many overseas members use this method of payment. However, the check must be drawn on an American bank and must include the "routing numbers" on the check. If the American bank neglects to use the röuting numbers, our bank cannot process the check. Our bank then, either, 1) returns the check to us, or 2) sends it to a designated bank for collection thus charging us a 60% fee. There is no problem with checks or money orders from members within the continental US.

3. We often receive written and phone requests for labels of our membership list. We *never* give our list of labels to anyone nor do we sell the list. Anyone who becomes an ITEST member, of course receives the membership directory with information on our members. However, many of the groups who ask for our list want it for a one-time use. They are not eager to scan or to type all the information into their data bases.

4. Mark your calendars for the October 20-22, 2000 workshop. We will examine the theological (mainly systematic and doctrinal) issues emerging from biological advance. ESSAYISTS: Msgr. Paul Langsfeld, Professor of Theology at Mount St. Mary's Seminary, Emmitsburg, MD; Fr. Donald J. Keefe, SJ, Professor of Systematic Theology at St. Joseph's Seminary, Dunwoodie, Yonkers, New York; Dr. Michael Hoy, Dean, Lutheran School of Theology in St. Louis and Dr. Carolyn Schneider, Professor at Texas Lutheran University.

This workshop will follow the usual ITEST weekend format: Friday Evening to Sunday Noon at a new location, for us: Mercy Center, 2039 North Geyer Road, St. Louis, Missouri 63131. Situated in West St. Louis County, the 70-acre campus is located within 30 minutes of downtown St. Louis and Lambert International Airport. Owned and operated by the Sisters of Mercy, Mercy Center Conference/Retreat ministry provides comfortable space for conference and retreat activities. The grounds are beautifully landscaped and suitable for various activities: reflection, prayer, walking, and so on. We pray for good weather for this October weekend.

5. KUDOS FROM MEMBERS - From time to time you let us know if you've enjoyed or disagreed with aspects of our publications. We print both your responses, according to space limitations, when we can. The following comments provided encouragement and lifted our spirits at the ITEST offices. Monsignor Louis Meyer writes, "Just a note to congratulate you on the published proceedings of your workshop, *The Family of the Future/The Future of the Family...*" I greatly appreciate your accomplishments. I am not a theologian, philosopher or a scientist but an 'ole Monsignor' plugging along." And Fr. Edward Murphy, SJ, writes from Tapei, Taiwan, "...I have already finished reading it *(The Family)* from cover to cover. I could hardly put it down...the four essays/papers were outstanding as were the following discussions. I will look forward to your future works...it is great to see such a mixture of laymen, Sisters, priests, scientists and members of other religions. Would that ITEST might be listened to and followed by the USA and the rest of the dithering world today!"

6. Request for review: We have a CD-ROM from Dr. Rudy Brun for review. The title is: *Christianity, Science, and Art: Toward an Updated Christian Doctrine of Creation*. (with a sequence of nine paintings by Vasily Kandinsky, illustrating his discovery of a new perspective on the deep-structure of the world...) Contact the ITEST Offices for a copy of this CD for review. We would encourage anyone who would like to purchase of copy of the CD to contact the author at Texas Christian University P.O. BOX 298930, Fort Worth, Texas 76129.

As we promised in the Fall, 1999 issue of the *Bulletin,* we are continuing in this issue to publish excerpts of work published by ITEST in the 1990s - in honor of the new millennium. The authors and the sources of the following essays are reproduced with the presentations.

FROM *THE VINEYARD*
CHAPTER II. TECHNOLOGY

Doctor (Sister) Eva-Maria Amrhein was awarded a PhD in physics at the University of Wurzburg, Germany in 1963 and Venia Legendi in 1969 at the University of Marburg. She was on the faculty at the latter university until she moved to the United States in 1971. Here she taught and did research at the American Foundation for Biological Research (Madison, Wisconsin), the University of Missouri-Rolla and the University of Puerto Rico. She has about 40 publications in the field of non-crystalline solids and in microwave and sub-mm spectroscopy. She is a member of the Schoenstatt Sisters of Mary, one of the nucleus communities of the international Apostolic Movement of Schoenstatt. She was formation director of the community at the Schoenstatt International Center at Waukesha, Wisconsin from 1974-1983. She has also written on Catholic spirituality for the laity. She is very interested in serving the mission of the Church by enabling faith and science to meet and unfold their full potential within the person of the scientist. At present, Dr. Amrhein lives in Germany, serving as a consultant to the general government of her Institute. Father Robert Brungs, SJ is Director of ITEST. The following is an excerpt from The Vineyard: Scientists in the Church, *ITEST Faith/Science Press, 1992.*

INTRODUCTION

In this century the human pursuit of technological processes and products has undergone significant change. The close alliance that grew up between research chemistry and the chemical industry, especially for weapons development during World War I, helped pave the way for a much tighter relationship between science, technology and industry. Physics followed this same pattern during World War II (and since) with work on nuclear weapons and radar. Then solid state physics research developed into the electronics industry. Now, computer capability provides the means for science to move into quite different ways of investigating extremely complex systems through computer simulation.

Biology, especially in microbiology and genetics at present, is leading into perhaps the most significant technological revolution we humans have ever experienced. Other areas of biological technology are certain to assume great importance — specifically the technologization of the brain at some time in the future. Other technical developments, like the use of the assembly line and mass communication, coupled with the great advances based on science, have made the Twentieth Century the greatest technological watershed in human history. This radical technological growth has had significant effects in every area of human life, extending even to how we think and how we propagate the race.

We can begin this consideration with three questions. Do technology and theology by their very nature have anything to do with each other? If so, how urgent is a dialogue between them? What kind of theology would be relevant to the world of technology?

TECHNOLOGY AND THEOLOGY

We speak of technology as including all the artifacts and procedures invented and applied by humans to make use of the resources of nature.[1] Historically we have used our technology without much reflection on the essence of the tool itself. However, since science and technology have become so closely related, technological innovation has accelerated greatly. The knowledge and use of the forces and mechanisms of nature allow modern technologies to function with a certain autonomy. They have in themselves become practically a new cultural force[2] which competes with other orders of human life, for example, in the social, humanistic and religious spheres.

Human beings are both subjects and objects in this new order of technology. Human beings are the subjects, the powerful agents who form and transform their natural surroundings to achieve their freely chosen aims. But Man[3] is also the object of technological changes and is affected (and increasingly, effected) by them. We are learning that advances in one sphere of life can threaten another sphere. Thus, technology must be seen not only in its autonomy but also in its interdependence on other aspects of human life and on the aims it seeks. If we are to achieve this view we need philosophical and theological reflection. "Technology as a culture of means forces us to reflect on the ends."[4] By its very nature contemporary technology calls for broader philosophical and theological consideration.

to Man and thus "reveals man to himself,"[5] has something in common with technology. They both challenge us to reflect on the ultimate purpose of our lives and consciously to dedicate our life's efforts toward its fulfillment. As the *science* of God and God's relation to Man and the universe, theology must always deal with two poles: divine revelation *and* the human and cosmic reality into which God enters and about which God speaks. For this reason, an understanding of other fields of human knowledge is an absolute necessity for theology.

Today's theology can gain from science and technology new and deeper insights into the earthly reality, insights which can help to understand God's revelation in a deeper manner. Technologists have every right to expect from theology answers to questions of meaning and orientation toward the ends of technology, its place within the broader aspects of human life and its service to mankind. Questions about its humanizing and de-humanizing effects, about the ultimate meaning of the technological endeavor beyond what can easily become an eventually self-destructive self-fulfillment must be answered by the united effort of the scientist, engineer, philosopher and theologian. Since all these disciplines reveal various aspects of Man, they can complement and enrich each other. If humanity and its future are existentially threatened by technology today, as many maintain, there is both a logical and a moral imperative to listen to each other and to work together to mitigate the danger.

URGENCY OF THE THEOLOGY/TECHNOLOGY DIALOGUE

Technical progress has "radicalized the problems of present-day society."[6] Since technology amplifies the effects of human deeds, it has "opened perspectives for a full humanness" which were unthinkable before, but it also shows the consequences of inhuman action in a "gigantic projection of human malice."[7] Is mankind mature enough to handle its technological effort and to control its own creation? Obviously, humanity is challenged to raise the "ultimate issues"[8] of religion and theology anew, namely the meaning of our historical existence. Von Weizsäcker categorically states that "a culture cannot be stable as long as its means are developed one order of magnitude better than the awareness of its ends. . ."[9]

There are very many examples of technologies which have outpaced ethics. For instance, we have developed extraordinary means to cure people or to keep them alive but we really have not developed a sense of how to apply these techniques. We quarrel about their just distribution (e.g., who gets the organ transplant?) and how shall we manage to pay for them. We also wonder about how long we shall furnish technological means to keep people alive. We have developed atomic weapons but we have not devised political structures that would efficiently tame the greed for power of individual rulers or collective systems. We have wonderful data banks but we do not yet have public means to secure the protection of citizens' privacy. This list could easily be extended to great length in almost every aspect of technological development.

The reflection on the ends for which technology exists is not a part of the ethics of technology. Ethics is basically concerned with the means to an end. A study of ends and purposes must enlist philosophy and theology. From the study of ends we may be able to develop an ethics that is new and takes into account the radically new character of much of human action as technical action.[10] We are no longer dealing with action from person to person and immediate effects but with deeds having a new radius of causality and with a new responsibility. Now almost any technical process, once started, may influence generations to come. It may alter whole natural systems or it may alter the human genetic endowment. How does one evaluate the collective and cumulative effects of nuclear technology, of experimentation in the life sciences and so on? Is it not possible to meet the ethical demands concerning the very nature of things and of human beings without recourse to metaphysics or to religion. "The adventure of technology with its far-reaching risks compels us to risk far-reaching reflection."[11]

Other urgent appeals for dialogue between technology and theology are voiced by Gilke[12] Mesthene,[13] Cauthen[14] and, longer ago by Dessauer[15] and Teilhard de Chardin.[16] However, several centuries of alienation between science and theology[17] move us to question whether any of our traditional religious beliefs are relevant to our actual experience, whether any recent theology has been informed by the issues of the technological age.

THEOLOGY'S RELEVANCE TO TECHNOLOGY

If theology is to give meaning and orientation to technology, which issues should it address and what kind of religion can meet the challenge? Certainly it is not met by a religion that separates Man's contact with his Creator, his *re-ligio*, from the reality of Man's work on this earth. It is not met by a religion that asks Man to *close his eyes* in order to find himself.

In view of the positive potential of technology, we expect theology to treat creation's task in regard to Man, Man's task regarding this world, the meaning of human endeavor and history, the sacramentality of the natural order (the relation between nature and grace). "Only a religion related to history, to social existence and to the human in its social and historical context can complement, shape and temper technology.[18] In view of the dangers from technology, we expect of theology the assurance of Man's inward-

ness, personal dignity and personal bonds. We ask theology to help show us a way out of the *ambivalence* of technology and out of the paralyzing anxiety of our age into purposeful, hopeful and active shaping of the future. Theology can do this only insofar as it relates God's revelation to the signs of our time.

AN APPROACH TO A THEOLOGY OF TECHNOLOGY

In trying to define the meaning of our present-day culture, it seems logical to examine that tradition first which is largely responsible for its formation.

Christian theology has as its object the Revelation which culminates in the life and teaching of Jesus Christ. Revelation, passed down to us through the centuries in Scripture and Tradition, is the knowledge, the data-base the theologian has to work with. As Pope John XXIII said, "in order to interpret the Scriptures one must be able to read the signs of the time."[19] In order to unfold and apply all that Revelation includes, we need a knowledge not only of the content of Revelation but also of the essence of things and the dynamism of their development, the impulses of the time and the inspiration and aspiration of the individual and of the community. Thus, in our introduction, we could say that the new insights of science and technology are relevant to theology, just as Greek and Arabic thinking was relevant to the theology of the Middle Ages, to forming a comprehensive world view. Conversely, the theological appraisal of technology can give new insight and motivation to those who work in the technological community.

Which aspects of technology are signs of the time that stimulate theological reflection? We believe that theology, if it is to give meaning to technology, must take up the ' most crucial question, i.e., the *ambivalence of technology*.[21] In what follows we ask about the character of this ambivalence and then we turn to Christian Revelation for an interpretation and possible resolution.

Defining the ambivalence of technology, Van Melsen[22] distinguishes between an external and an intrinsic ambivalence. External ambivalence is what technology has in common with any human activity. Like other human efforts it can be used or misused. Here, we should also note that with modern technology the responsibility to avoid misuse becomes greater because the effects of our actions are greater and more immediate.[23] In addition, there is an intrinsic ambivalence in the very nature of technology's relationship to the human person. It is both a liberation of the spirit from the restrictions of matter and a submission of the spirit to the demands of matter. It is a means to serve human goals by using the inherent orientation of the powers of nature. This inherent orientation of the powers of nature is not totally under the control of Man, neither in itself (because our knowledge of it is incomplete) nor in its effects on the social order and on Man as a whole. The technical order develops according to its own laws, i.e., mechanically as opposed to organically.[24] It forces the one responsible for it to be constantly attentive, to control and correct — a challenge which the engineer faces daily.

For example, what is the day-to-day effect of such seemingly benign products as home entertainment centers? One aspect that needs at least a slight critique is the tendency to isolation that could develop from the use of headphones. This is a curious paradox. Often a person might use the headphones out of consideration for the privacy of the people about him or her. Yet, that very use might cut that person off from valuable social interaction. In the past, concert-going was the privilege of the rich or near-rich. Now concert music is available to the masses, but without any social environment. The same is true with automobiles on a clearer and more socially important level. Many technologies, while offering opportunities for significant cultural awareness and interaction at the same time encourage isolation from such interaction. There must be more consideration paid to such individual and social effects of our technology and its products.

Although the powers of technology are blind regarding the purpose they serve, they work on material of a higher order, such as Man and society. These orders have their own inner life and autonomy even though, from the technical point of view, they represent nothing but a "composite of elements to be modified."[25] Thus the autonomy of one system infringes on the autonomy of another. Technology's "tormenting temptation is technocracy."[26] If we want to avoid the ambivalence of technology we have to treat it not only as a closed system of relative autonomy but also as an open system which is related to and forms part of other orders of human life, namely, the natural, social, political and spiritual orders. The one in control of the powers of technology cannot afford being blind regarding the consequences of his or her action. Technology constantly challenges us to assume responsibility. We must continually judge whether using our car (or any technological "toy") liberates or enslaves us, whether we take a medication or are becoming a drug addict — in short, whether we are humanized or de-humanized, whether nature is enhanced or degraded by certain technologies. This is very definitely a human task. "To despair of technology is to despair of man."[27]

Man, however, is personally involved both as subject and object of technology; he is responsible for its design, endures its impact and enjoys its fruits. Will he have the inner freedom to make right judgments without recourse to some absolute norm of action? This shifts the question to

another level. Is Man in his own world a totally autonomous system or is this human "system," as religious experience down the centuries testifies, open and accountable to a higher dimension, call it conscience or God? To answer this question we must consider both the nature of technology and the nature of Man. Both have autonomy and independence. Both are characterized by relatedness, interdependence, being for others. In other words, their autonomy is only relative, not absolute. A theology, in considering technology and its effects on the human, must deal with both the autonomy of the technical and human order as well as their relatedness. It must give meaning to their mutual relationship and search for criteria that guarantee the stability and moral integrity of this relationship. We are attempting to take such an approach in our consideration.

First, we shall try, in a brief review, to show how far this question of autonomy and relatedness of the created order has been developed in Christian theology. Christianity was born two millennia ago as a religion which defines Man's relation to God as a child-father relationship rooted in a unity of life into which Man is drawn by becoming one with Jesus who is the Son of the Father. Since the Church's early years, inquiry into this new relationship has been the foremost object of its theology. The world external to Man was included since it, too, had entered into a new relation to God through our human mediation.

Before the late Renaissance, through the Patristic period and the Middle Ages, a God-centered view of creation was in place in the Church and in Western society. This God-centeredness, however, was not one of passive, otherworldly submission, as has so often been suggested. Rather it was one of active cooperation in building the Kingdom of God. As Christians looked at creation as a gift and task from the Father, they did so with increasing interest. The Christian West, having wedded the God of Sinai and Calvary to the heritage of antiquity, gave birth to natural science. In the West, Man learned the secret of success of all research and construction: to recognize the reality of the natural order as such and to respect its autonomy. Science and technology began to learn the inherent laws of nature and came to use them often to the point of substituting them for religion.

As we all know, the relationship between Christianity and science has been troubled. The battles between the Anglican Bishop Wilberforce and Julian Huxley in England brought the questions of human origins to the fore in the wake of Darwin's *Origin of Species*. Today, it seems, at least on the surface, we as a culture seem to feel that the need for relatedness to God had ceased to exist. And yet the latest developments of scientific pursuit and of technological advance in this century have made men and women aware of the ambivalence of technology and the need to view and handle it within a larger perspective. Currently also, there is a small but growing awareness among theologians that it is necessary to take a more comprehensive view of Man and creation not only in their relatedness to God but also in their autonomy and proper value.

Reflection has begun anew on the task of the Christian as a part of, as well as an agent of, the realities of this world and its history, and of the interwovenness between the Kingdom of God, the Church and world. These reflections as they found expression in Catholic thought, are summarized in the *Documents of Vatican Council II*.[28] This same renewal can be noted as well in the positive appraisal of human work in the social teaching of the church as early as 1891.[29] It has found a practical application in the spirituality of secular institutes and lay movements of the church.[30] Their relevance to technology is taken up in the following parts.

Nature's autonomy and relatedness to Man

Since technology is in essence what human work can make of the possibilities of nature, its theological appraisal must begin with aspects of the theology of nature and human work. Christian doctrine in this field can be summarized under the headings of: the goodness of creation, the uniqueness of Man's place within creation, the positive value of Man's work on creation (technology).

The original goodness of creation

Throughout its history theology has fought dualism (of spirit and matter, between good and evil) within and outside the Church. For the Christian, nature is creation made, willed and held in existence by God. "God saw all he had made, and indeed it was very good."[31] This quote from Genesis speaks of the original goodness of creation. Vatican II confirms this interpretation: "For by their very circumstance of having been created, all things are endowed with their own stability, truth, goodness, proper laws and order";[32] and extends it to all the orders of our present-day world: "the many elements that make up the temporal order, namely the good things of life and the prosperity of the family, culture, economic affairs, the arts and professions, political institutions, international relations and other matters of this kind as well as their development and progress."[33] This ontological goodness of creation finds an ultimate confirmation in the New Testament: God "came to his own domain"[34] and in so doing manifested his lasting interest in and infinite love for those things which he created.

Man's place within creation

The Genesis account reflects a twofold relationship between Man and the rest of creation. On the one hand,

Man is part of creation — taken from dust, a product of the development of the universe — and experiences the realities of nature as his natural boundary conditions. On the other hand, Man transcends nature in his ability to form and transform it. He has a task with regard to the cosmos and this task links him to the Creator himself:

> God created man in the image of himself; in the image of God he created him; male and female he created them. God blessed them saying to them, 'Be fruitful, multiply, fill the earth and conquer it. Be masters of the fish of the sea, the birds of heaven and all living animals on the earth'.[35]

According to this passage, mankind has a threefold calling, namely to be God's image, to multiply and to subdue the earth. Better said, his calling has a threefold aspect.[36] Only as God's image and in the companionship of love is Man to fill and conquer the earth and only then, as we will show later, is he permitted to do so, is he capable of doing so.

This commission to subdue the earth, i.e., to work, finds its continuation in the parables of Jesus on the talents to be worked with, the vineyard to be cultivated, the heritage of the Father not to be wasted, and so on. It is a mandate, a commandment, but it is not a sanction to exploit. Pope John Paul II describes it as "a dominion consisting in conscious docile adherence to the loving purposes that the Creator entrusted to nature from the beginning."[37] Moreover, it is not a dominion to be taken for granted but to be conquered with 'suffering and sweat' because of Man's rebellion. The passage quoted above (Gen. 1:28) when complemented by Gen. 3:17-21, makes us aware of both "the capacity of human beings to be co-creators with God" and "the conflicts and oppressions which human freedom can and does create."[38] Nevertheless, these passages attribute to Man a certain authority over nature; they imply that nature is for Man, just as Man is for God.

The teaching of the Vatican Council essentially complements and specifies the Christian position toward the natural order. It confirms nature's relatedness to Man and God, its anthropological and theocentric orientation but at the same time its autonomy. It also stresses the fact that relatedness does not abolish its autonomy nor vice-versa.[39] Confirming the intrinsic value of "the many elements that make up the temporal order," it continues:

> This natural goodness of theirs takes on a special dignity as a result of their relation to the human person for whose service they were created. Last of all it has pleased God to unite all things, both natural and supernatural, in Christ Jesus 'that in all things he may have first place' (Col, 1:8). This destination, however, does not deprive the temporal order of its independence, its proper goals, laws, resources and significance for human welfare, but rather perfects the temporal order in its own intrinsic strength and excellence and raises it to the level of man's total vocation on earth[40]

How this perfection and elevation of nature through Man (in the service of God and Man) is realized, is a question of the theology of human work. Much has been said and written about this recently.[41] In the Christian view work perfects nature because:

First, it perfects Man as the subject of work. Through work Man realizes himself as a person "capable of acting in a planned and rational way, capable of deciding about himself"[42] and of "unfolding his physical, psychic and spiritual potential."[43] At the same time work, the "participation in the creative and self-giving activity of God"[44] brings Man closer to his Creator and also, because of its intrinsic toil and openness to misuse, to the Redeemer.[45]

Secondly, human work perfects nature as its object; this holds true of technological work to a special degree. It brings to unfolding "embryonic basic forms of creation," the "seminal powers" placed into it, and thus "continues the ongoing process of creation." Friedrich Dessauer, Alfons Auer *et al* have written about this cosmic aspect of technology.[46]

Thirdly, human work is service to mankind; it contributes to the socialization of the human race, and its products in one way or the other are to the profit of all. This gives an ethical value to the things Man uses. Man "mediates to them the quality of 'being there for someone', 'raising' them to a spiritual order of being."[47] Technology imparts to this transformed material certain rational, spiritual and humanitarian considerations. In this way it widens and increases the worth of existence and also that of the innate perfection of matter.

Technology enables Man to fulfill his task toward creation to a unique degree. At the same time, however, we may (and often do) use technology to abuse creation. As a human activity not only within and with but on creation, technology demands special consideration.

Man's Work on Creation

In the process of 're-making nature' Man subordinates himself and the product of his work to the mechanisms of nature, for instance, the classical statistical laws of physics and chemistry. With the rise of the biotechnologies, biology will also determine the nature of the product. There is a sense in which it can be said that Man, then, functions as matter itself functions. The machine, the computer, the car become his extended self. Depending on one's point of

view, however, it can also be said that matter in the process becomes more life-like (the computer is an example). The point of either view is that the human/non-human relationship is changed by technology. If not carefully monitored, Man's activity can center exclusively on specialized, objective, impersonal work, impoverishing the creative and self-giving powers of his being. He can lose himself in the rationality and anonymity of technology. As van Melsen has pointed out:

> In fact technology can lead to an unnatural way of life by *disturbing the balance* between exteriority and inwardness, between domination and understanding, between recognition and reflection, between the creation of means and their use by man.[48]

Thus work on nature changes the subject of work, the technologist himself or herself. This demands a special maturity on the part of the technologist (or even in craftsmen in a lesser degree), namely, to consider the end while being fascinated by the means. This really is the virtue of prudence,[49] namely, to master nature in adherence to nature's own end which is nature's relatedness to the service of Man. It is an obligation not to release powers that ultimately may turn against nature and ourselves. More precisely, an obligation to aim, through a continued dialogue with specialists in other fields and with the One who created and redeemed us, to discern what serves the true good of the human being (and all of creation) and what does not.

The product of our technological work may some day come back to us as our 'new nature' endowed with unequaled quasi-autonomous power. The 'thinking computer' and the robot may become examples of this quasi-autonomy. It is the situation which Goethe invoked in his poem *The Sorcerer's Apprentice* who, overpowered by the spirits he had called with the imperfect use of the spell, desperately calls for the master to save the situation, to rid him of the spirits he has called.

In working with and on natural things we must acknowledge the necessity to adjust our efforts so that they conform to nature's autonomy (for the success of the work) and we must recognize its relatedness or meaning in regard to us. This raises the question of the character of our freedom and of our own autonomy and relatedness. Our freedom to change things has never been an absolute freedom of choice. Rather it is the possibility to realize more fully our own humanness. That this humanness includes a likeness to God is nowhere more evident than in our ability and need to manipulate (this word is being used in a neutral sense) nature. We are made in the image and likeness of God. As such we are born to freedom. But freedom, as Pope John Paul II is fond of pointing out, cannot exist in chaos. In other words, "not everything goes." Our freedom can be exercised only within the real world. The "real world," as it is and not as we would like it to be, forms the "boundary conditions" of the mutual relation between nature and Man. In other words, human autonomy demands relatedness. This brings us back to a theological discussion of Man and creation. This will be considered formally in the next two chapters.

ENDNOTES

1. *Nature*, as used here, means the *material universe.*
2. Heinrich Beck, *Kulturphilosophie der Technik* (Trier: Spee Verlag, 1979).
3. We are aware of the problems of "exclusive language." There is presently, however, no easy way to deal with the genus "homo" in English except with the word man. When used as a collective, we use upper case *Man.*
4. Andreas van Melsen, *Naturwissenschaft und Technik* (Koeln: Verlag Bachem 1964) p. 284f.
5. John Paul II, *Redemptor Hominis*, No. 8.
6. Carl Friedrich von Weizsäcker, *Der Garten des Mesnchlichen* (Frankfurt: Fischer Verlag, 1980) p. 46.
7. van Melsen p. 296.
8. Langdon Gilkey in *Understanding the New Religions?* ed. J. Needleman (Seabury 1978) summarizes this experience with: "Ultimate questions grow out of the loss of proximate answers." p. 133.
9. von Weizsäcker, p. 76.
10. Hans Jonas, "Technology and Responsibility: Reflections on the New Task of Ethics," *Social Research 40*, 1 (1973).
11. Hans Jonas, "The Concept of Responsibility: An Inquiry into the Foundations of an Ethics for our Age," *Knowledge, Value and Belief*, eds. H. T. Engelhardt and D. Callahan (Hastings on Hudson, NY, 1977), p. 8 in the German edition.
12. Langdon Gilkey, "The Religious Dilemmas of a Scientific Culture," in *The Interface of Technology, History and Religion in Being Human in a Technological Age*, ed. D.M. Borchardt and D. Stewart (Athens, Ohio, Ohio University Press).
13. Emmanuel Mesthene, *Religion and Values in Technological Age.* No date available on this reference.
14. Kenneth Cauthen, *Christian Biopolitics*, Nashville: Abingdon Press, 1971.
15. Friedrich Dessauer, *Mensch und Kosmos*, Frankfurt: Knecht Verlag, 1959.
16. For a summary of Teilhard's thought on this matter, cf. "Comment je vois" in *Les Directions de lavenir*, Paris: *Editions du Seuil*, 1973.
17. See Martin Marty, *The Modern Schism: Three Paths to the Secular* (1969); also Ian G. Barbour, *Science and Secularity,* Harper & Row, 1970.
18. Langdon Gilkey, p. 87.
19. John XXIII, quoted in J. Kentenich, "Talk to Students and Academics" August 16, 1967, Schoenstatt-Vallendar, Germany.
20. Alexander Menningen, *Christ in welthafter Existenz,* Schoenstatt-Vallendar: Patris Verlag 1968, p. 40.
21. There is a difference of perspective on the *ambivalence of technology* between the authors of this book. One (Amrhein) seems to see it more in the technology itself, while the other (Brungs) would tend to locate the ambivalence in the technologist or the consumer. Part of this may reflect differences between

European and American perspectives on technology. Generally speaking, European approaches to these questions seem to be a bit more concerned about runaway technology than Americans. The reader should be aware of this difference.

22. van Melsen, p. 254 ff.
23. See Hans Jonas *et al.*
24. See Elena Lugo *et al,* "Technolgia y Humanismo," *Carolina,* Vol. 3, 1983.
25. van Melsen, p 259.
26. Gabriel Vahanian, *God and Utopia*, New York: The Seabury Press, 1977, Chapter 4.
27. van Melsen, p. 298.
28. "Gaudium et Spes, Constitution on the Church in the Modern World," *The Documents of Vatican II* (New York: America Press, 1966).
29. See John Paul II, *Laborem Exercens*, Encyclical on Human Work Boston: St. Paul Editions, 1981; also, John Paul II, *Centesimus Annus* (1991).
30. See M.D. Chenu, *The Theology of Work,* Chicago: 1966; Alfons Auer, *Open to the World* Baltimore: Helicon Press, 1966; Alexander Menningen, *loc. cit.*
31. Genesis 1:31, this reference and the following ones are taken from *The Jerusalem Bible*, Garden City, New York: Doubleday and Company, Inc., 1966.
32. *Gaudium et Spes*, No. 36.
33. Apostolicam Actuositatem, No. 7, in *The Documents of Vatican II.*
34. John 1:11.
35. Genesis 1: 27-28.
36. Edith Stein, *Die Frau*, Frieburg: Verlag Herder 1959, p. 19.
37. John Paul II, "Message to the Director of the Center for Scientific Culture," August 14, 1982, in *Osservatore Romano* (Eng. Edition) No. 36. September 6, 1982.
38. David Hollenbach, "Human Work and the Story of Creation," prepared for Symposium: *Co-Creation, A Religious Vision of Corporate Power*, University of Notre Dame, May 3-5, 1982.
39. Alexander Menningen, p.24f, regarding the anthropocentric orientation see *Gaudium et Spes*, No. 12.
40. *Apostolicam Actuositatem*, No. 7.
41. See John Paul II, *Laborem Exercens*, 1981; *Sollicitudo Rei Socialis, 1988; Centesimus Annus*, 1991. See also Gregory Baum, *The Priority of Labor*, New York: Ramsay, 1982 and *The Logic of Solidarity:* Comments on John Paul II's Encyclical "On Social Concern," New York, 1990.
42. *Laborem Exercens*, No. 6.
43. Herta Schlosser, *Der Neue Mensch - Die Neue Gesellschaftsordnung*, Schoenstatt-Vallendar: Schoenstatt Verlag 1971, p. 71.
44. J. Kentenich, *Oktoberbrief 1949*, Schoenstatt-Vallendar: Schoenstatt Verlag, 1970, p. 74. See *Laborem Exercens,* No. 25.
45. *Laborem Exercens*, No. 27.
46. Alfons Auer, *Open to the World*, p. 199.
47. Herta Schlosser, p. 95.
48. van Melsen, p. 268.
49. Thomas Aquinas, *Summa Theologiae*, II-II, q 91, art. 1; Josef Pieper, *Das Viergespann*, Muenchen: Herder, 1964; also Eric Voegelin, cited in Chapter 4.

FAMILIES IN THE 21ST CENTURY
Some Speculation about Families of the Future

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THE FAMILY OF THE FUTURE - "*To the unknown child*

Everyone's past, humanity's future."[29]

That family will exist in the twenty-first century seems almost certain. How it will look is a different issue. How are we to regard the present situation of our country and the families within it? Are we, as Strauss and Howe suggest, in a *Third Turning*, a time of "unraveling," a "downcast era of strengthening individualism and weakening institutions, when the old civic order decays and the new values regime implants"?[30] Are families in the United States in a similar state of "unraveling"? In biology the process is called decay and decomposition. These processes can be viewed with alarm and with grief over the losses involved or seen as a necessary phase so that the cycle of life can continue with new growth.

[T]o suggest that family is possible is most assur-

> edly not to assert that the family of twentieth-century vintage is either necessary or sufficient for the well-being of society or individuals. Instead, what is possible is a new image of *family* in synchronization with the twenty-first century, supplying benefits to both society and individuals. (Italics in original.)[31]

Several trends affecting family life are already with us and will affect the composition, structure, and functioning of families in the next century: the freedom to associate;[32] increased mobility; emphasis upon quality rather than duration of relationships:" the changed status of women;[34] an aging population.[35] I anticipate some interesting convergences in the twenty-first century which will change how we think about family.

The freedom to associate and the emphasis upon marriage and couple relationships as a voluntary association independent of economic and procreative purposes means that men and women are less likely to stay in marriages and/or relationships which are abusive, affected by addictions, or otherwise unsatisfying. *In vitro* fertilization makes it possible to have children without sexual intercourse. Cloning of human beings would be another avenue to offspring without sexual intercourse. These two means of having children without a sexual partner, for reasons suggested earlier, will raise a range of feelings and emotions for the human person who is the "product" of such technologies. In the case of cloning, some of my interviewees raised questions about its purposes, what it would do to family, concern about creating an underclass.

Economic factors will probably ensure that technology such as *in vitro* fertilization is available only to those who can afford it. Thus, a single woman who can afford the procedure will most likely be able to raise her child with adequate financial support. This is not always the case for women who are heads of households as a result of divorce, death, or absent father. McLanahan and Sandefur claim that children who grow up with only one parent do not do as well as children who have both parents.[36] We can all probably think of exceptions to this based on our personal experience. According to McLanahan and Sandefur, though,

> the evidence is quite clear: *Children who grow up in a household with only one biological parent are worse off, on average, than children who grow up in a household with both of their biological parents, regardless of the parents' race or educational background, regardless of whether the parents are married when the child is born, and regardless of whether the resident parent remarries.* Compared with teenagers of similar background who grow up with both parents at home, adolescents who have lived apart from one of their parents during some period of childhood are twice as likely to drop out of high school, twice as likely to have a child before age twenty, and one and a half times as likely to be "idle" — out of school and out of work — in their late teens and early twenties. (Italics in original.)[37]

Remember what was said above about economics and its impact on people's ability to obtain the technology which is so much a part of our world today. Single parenthood is, of course, one among many factors, that will affect a child. What occurs along with single parenthood are deprivations of "important economic, parental, and community resources."[35] Without adequate financial resources, without a solid educational foundation, children of single parent households will be at a serious disadvantage compared to children raised with both biological parents in the home. Among the resources not available to them will be some of the tools of technology which are essential to economic advancement.

As the introduction to this paper makes clear, mobility is not a new phenomenon. Human beings have wandered far from their birthplaces for eons. What makes this different now is a declining birth rate among the educationally and economically advantaged coupled with the increasing life span. More elderly people are likely to be living alone in the twenty-first century and fewer of them will have children available as care-givers.[39] While the communications technologies will keep the elderly and their children linked, who will be available *on site* to provide the care that is frequently required as aging progresses? If the life span continues to lengthen, another factor to consider will be having sufficient income to support oneself through a lengthy retirement. Perhaps the idea of retirement will become extinct as it already has among religious communities of men and women who have had to face the situation of growing numbers of elderly members being supported by fewer and fewer younger religious; those who are able to continue to work do so regardless of age.

Although the numbers of nuclear families (two parents residing in a home with their children) so common in the mid-twentieth century is declining, it is not extinct and is not likely to be in the future. In such families various means of conception will probably continue to be used: sexual intercourse, with or without the use of fertility drugs; *in vitro* fertilization with husband and wife as donors or with donor sperm. The use of fertility drugs is producing increasing numbers of pregnancies with multiple babies; some parents are choosing to attempt to carry all the babies to term, others are choosing to abort some of the babies, and yet others are foregoing additional attempts at pregnancy via fertility drugs because they neither want more than one child nor wish to select which babies to abort. Genetic screening and gene therapy hold the pro-

mise of families being able to have children without the stress of difficulties associated with parenting a child who is ill due to a genetic defect.

Blended households are already with us and will continue to be as long as men and women marry, divorce, and remarry or live together, separate, and live with another partner. These blended households of "yours, mine, and ours" children will probably incorporate some of the same reproductive technologies outlined above.

The changed status of women includes women's "views of themselves, of their rights and their potential."[40] Unfortunately, some women continue to have children outside of marriage with men who cannot or refuse to assume their share of responsibility, and this bodes ill for their children. Figures from 1990 show that the poverty rate for children of never-married mothers was 53 percent compared to a 31 percent rate for children of divorced or widowed mother.[41]

The factors of mobility, detrimental effects on children due to being reared in a family without both parents present, and an aging population mean that community will play a larger role in the families of the future if we are to overcome some of the negative effects of separation. Neighborhood, subdivision, church could all take on aspects of family if people turn to them for support in the absence of family members related by blood. In a world linked through the Internet and e-mail, perhaps we will also begin to think of the human family on Earth as being as important as the immediate families with which we are so accustomed.

WHAT WILL BE? - "*Men's courses will foreshadow certain ends, to which, if persevered in, they must lead ... But if the courses be departed from, the ends will change.*"[42]

When Charles Dickens wrote *A Christmas Carol* in 1843 the society in which he lived and for which he wrote was in the throes of the industrial revolution. He used Ebenezer Scrooge to give us a view of the consummate narcissist, a man isolated from himself, his family, his friends, and his community; a man unconcerned about the suffering people around him. In the story three spirits visit Scrooge. Two of them speak to him as they show him the realities of the past and the present. The final nocturnal visitor, the Ghost of Christmas Yet To Come, does not speak; it shows him how things will turn out if present trends continue and points to his final end.

Such is our situation. The past and the present can speak to us; the future cannot. We can identify trends and speculate about what they may mean and to where they will lead. We might ask, as Scrooge did, "Are these the shadows of the things that Will be, or are they shadows of the things that May be, only?"[43]

Technological choices and choices about how to live with and among each other are ancient dilemmas for human beings; we are not exempt any more than our ancestors were. The choices we face are very complex. The tendency is to try to use scientific methods, so useful in chemistry and physics, on systems in which the variables are numerous and the ability to limit inputs impossible. For example, the evidence tells us that single-parenting, *on average,* leads to poor outcomes for children. Is it even meaningful to ask, "How do we solve this problem?" Might we learn more from studying how families stay together, how individuals develop a sense of responsibility?

The nation has an interest in having healthy families; they are still the cornerstone of democracy and "essential to the sound development of U.S. children and communities."[44] Whatever can be done through community organizations, churches and mutual help groups to support intact families is time and money well spent. Efforts aimed at increasing the economic and social well-being of single-parent households need the support of the whole community especially those people who can offer employment, mentoring, modeling. Programs for prevention and treatment of addictions need to include family in them. Treatment programs, as a matter of routine, ought to involve the family and offer long-term support to recovering individuals and their families. Domestic violence is a continuing tragedy for all the family members involved — spouses or partners and children. Integrated community programs uniting the legal system, the providers of services to the abused, the providers of treatment to the abusers, and the addictions treatment specialists would offer hope to all involved. If we adopt the attitude that certain human behaviors cannot be treated or corrected, we subject the people with those behaviors to alienation from the community. 'ne alienated do not go away just because we have rejected them.

Religious leaders, both the ordained and the lay, have an obligation to preach the Word and the word "whether convenient or inconvenient" (2 Timothy 4:2). Rampant materialism, unhealthy individualism, and unfettered narcissism need to be challenged. Acquiring all the latest technology, all the best and newest gadgets may actually weaken the family. Borgman writes,

> The moral fabric of family life is typically patterned not so much by practices as by acquisitions, by material decisions ... rather than by practical decisions. Of course, parents do not make their fundamental decisions in a vacuum.[45]

Parents face such fundamental choices regarding careers, material well-being, the intrusion of technology into the

family. Can they set limits, say "no," say "enough"? To participate in church and community programs requires the capacity to set limits with the job, to be able to turn off the cell phone, the pager.

If, as Strauss and Howe suggest, the "fourth turning," a "crisis," is imminent,[46] those individuals and families who will survive and thrive in the twenty-first century, will be those joined in communities which promote, sustain, and link the strengths of each person and each family to other individuals and families.

ENDNOTES

29. Jonathan Kingdon, *Self-Made Man: Human Evolution from Eden to Extinction?* (New York, 1993), dedication page.
30. William Strauss and Neil Howe, *The Fourth Turning: An American Prophecy,* (New York, 1997), p. 3.
31. Scanzoni, pp. 22-23.
32. Knoke, p. 292.
33. Working Group III "Youth and the Impact of Technology," in Hall, *op. cit.,* p. 132.
34. McCorduck and Ramsey, p. 18.
35. *Ibid.*, p. 15. Sheila R. Zedlewski, Roberta B. Bames, Martha R. Burt, Timothy D. McBride, and Jack A. Meyer, *The Needs of the Elderly in the 21st Century*, (Washington, D.C., 1990), p. 3.
36. Sara S. McLanahan and Gary Sandefur, *Growing Up With a Single Parent: What Hurts, What Helps*, (Cambridge, 1994), p. 1.
37. *Ibid.,* pp. 1-2.
38. *Ibid.,* p. 3.
39. Zedlewski *et al., op. cit.,* p. 4.
40. McCorduck and Ramsey, p. 18.
41. Farley, p. 126.
42. Charles Dickens (1812-1870), *A Christmas Carol, in The Annotated Christmas Carol* with an introduction, notes, and bibliography by Michael Patrick Hearn, (New York, 1976), pp. 159-160.
43. *Ibid.,* p. 159.
44. Sharon L Kagan, "America's Family Support Movement: A Moment of Change," in *Children, Families, and Government: Preparing for the Twenty-First Century*, edited by Edward F. Zigler, Sharon L Kagan, and Nancy W. Hall, (New York, 1996), p. 156.
45. Albert Borgmann, *Crossing the Postmodern Divide*, (Chicago, 1992), p. 112.
46. *Op. cit.,* p. 3.

EXCERPT FROM *TRANSFIGURATION*

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The Twentieth Century

The nineteenth century had been a period of rapid growth in chemistry, geology and biology. At its end attention was once more directed to physics, with the great discoveries of Max Planck of quantum theory around 1900 and of Albert Einstein's special theory of relativity in 1905 and his general theory of relativity in 1915. Neither of these thinkers would be regarded as atheists, and actually both have stimulated extensive discussion of the proper relationship that should obtain between science and religion, between reason and faith. Their influence among scientists has also spread far beyond the confines of physics, and thus it is best left for fuller discussion in other chapters of this volume, dealing as they do with the contemporary scene.

A few words may nonetheless be said about the general orientation of scientists vis-A-vis religious faith in light of the long history that has been sketched. Obviously there is no longer the strong liaison between faith and science that characterized the Middle Ages and the early modern period. At the same time the tension and conflict between the two portrayed so graphically by Andrew Dickson White has largely disappeared. It seems now to be generally admitted that there is no necessary connection between scientific competence and religious faith. The predominant note has instead become one of irenicism. Where there used to be tension between scientist and believer there now tends to be a high wall of separation between them.

One could say that the attitude of most scientists towards religion is basically no different from that of other professional and university-educated people. Among the ranks of

scientists and non-scientists alike an entire spectrum of views toward religion is discernible, from the hostile to the enthusiastic. Some actively combat the Church, seeing no need or room in the twentieth century for any commitment to the supernatural. Others are tolerant of religion even though it poses intellectual problems for them; for them it has great moral and inspirational value, and can tide other people over their speculative difficulties. Yet others are more sympathetic on the grounds that religious faith can complement science by providing it with a metaphysics that lies forever beyond the pale of scientific investigation. And finally there are those who are enthusiastic, seeing religious faith as basically concordant with, and even an indispensable part of, their science, with both working together to provide an integral view of God and the universe.

In a pluralistic society where one finds such a spectrum of views, much difficulty can be avoided by clarifying more precisely the respective spheres of science and faith. Perhaps this can be done along the following lines. In modern science the work of reason is paramount, even though much that results turns out to be conjectural and uncertain. A scientist may indeed be a religious person, but there is no rightful place for divine faith in his or her science. Scientists must penetrate the secrets of nature by their own ingenuity, relying only on the accumulated knowledge of their fellow humans. When they finally do arrive at the frontiers of knowledge, however, a good part of their research yields conclusions that are only probable. Frequently they have to wait years for a consensus to develop among their co-workers on the problems that most interest them.

This is not to say that it is impossible ever to attain truth and certitude in science. Though most theories may still be open to question, a vast number of facts and laws of the universe have been so well confirmed that they form the indispensable matrix on which modern scientific knowledge is based. That is the knowledge students come to college or university to learn. To say that nothing is ever certain, that one answer is ultimately as good as another, is to adopt an epistemological position that is both naive and uncritical. It is especially pernicious when extrapolated beyond the confines of science to areas about which scientists are not at all competent to judge.

Supernatural religion is one such area, for it is here that faith is paramount. Faith is not emotion, or sentiment, or feeling; rather, it is true intellectual conviction. Such conviction is generated, not by any ability to see and understand the truths assented to, but by confidence in the authority presenting such truths to the human mind. Natural faith is based on human authority: this is the faith children have in their parents, students in their teachers, and scientists in colleagues who may be remote from them in space and time. Supernatural faith is quite different: it consists in assent to matters the human intellect cannot fully understand, on the authority of God himself. This is the faith on which revealed religion is founded. God reveals himself to us, and we accept what he tells us of himself simply because he is God, who can neither deceive nor be deceived.

On this understanding the certitude of faith is not to be confused with the certitude of science. Granted, it is extremely difficult to attain scientific certitude when investigating the secrets of nature. But when the Creator of the universe reveals to us the most important truths, namely, those necessary for our salvation and eternal happiness, we can be certain of these simply from the fact that he has told them to us. We need not understand fully all that they mean in order to be assured of their value or their fixed and immutable character.

Some scientists in the present day make much of "the freedom to doubt," citing this as an imperative for scientific progress and making uncertainty an essential part of the scientist's intellectual makeup. This, in their view, restricts them in principle from having the absolute type of certainty religious commitment inevitably implies. Here again, however, an illicit extrapolation has been made. Systematic doubt may well be part of scientific method, but even at the level of reason the scientist cannot doubt everything. To do science he must be assured of his sanity, his wakefulness, his laboratory, his instruments and his means of calculation. And yet, even in this order his certitude is inferior to that of divine faith. There is difficulty, no doubt, explaining this to the scientist who does not possess such faith. For this reason it is rarely advisable to argue the point with those who refuse assent to revealed religion. If they do not experience supernatural faith, it is futile to compare the certitude of such faith with what they find, or do not find, in their science.

Within the Catholic tradition, as stated at the outset, the relationship between modern science and religion is simply but a part of the age-old problem of the relationship between reason and faith. For Catholic scientists the most disturbing part of the long history we have been sketching has not been the Church's infallible decrees relating to faith and morals, but disciplinary decrees such as that directed against Galileo in 1633. For this reason it is fortunate that the papal commission already mentioned as working on the "rehabilitation of Galileo" has recently concluded its work. Pope John Paul II presented the main results of their labors in an address to the Pontifical Academy of Sciences on October 31, 1992. Fuller details were provided by Cardinal Paul Poupard, President of the Pontifical Council of Culture, who chaired the papal commission, in presenting his report to the pope and the Pontifical Academy.

Pope John Paul II formally acknowledged that the Church erred when it condemned Galileo for maintaining that the earth revolves around the sun. He attributed the error to the theologians who passed judgment on Galileo, for, though they acted in good faith, they proved "incapable of dissociating faith from an age-old cosmology," that, namely, which regarded the earth as the center of the universe. This was a "subjective error of judgment," one that caused Galileo much suffering, added Cardinal Poupard. The pope used the occasion to stress the need for theologians to keep themselves regularly informed of scientific advances to see whether there is cause for "introducing changes in their teaching." He foretold that this might create pastoral difficulties, but that it was especially necessary in the areas of biology and biogenetics, because their applications affect human beings "more directly than ever before."

In his report Cardinal Poupard noted that although the Church had not previously taken the formal action it now has, it had in several ways already revoked Galileo's condenmation. The first action came in 1741, when Pope Benedict XIV gave the *imprimatur* to the first edition of the complete works of Galileo. The 1757 edition of the *Catalogue of Forbidden Books* then removed from the index all books favoring the heliocentric theory. In 1820 Canon Settele, a professor of astronomy at the University of Rome *(La Sapienza)*, still encountered difficulty obtaining an *imprimatur* for a textbook he was preparing. Upon Settele's appeal to Pope Pius VII, the Dominican in charge of the Holy Office, Father Benedetto Olivieri, drew up a document in 1822 granting the *imprimatur* to works presenting Copernican astronomy as an established thesis and not merely as a hypothesis. Each of these steps was made on the basis of increasing scientific evidence, and it is interesting to note that this decisive step, in 1822, preceded by several decades the discoveries of Bessel and Foucault on which proofs for the earth's motion are now based.

The pope's announcement to the Pontifical Academy of Sciences thus closed the book on what has long been called "the Galileo Affair." He made it in a session of the Academy devoted to the discussion of complexity in modern science. Recall that Bellarmine had insisted that Galileo actually *demonstrate* the earth's motion before the Church would consider revising its longstanding interpretation of Sacred Scripture. Pope John Paul II admitted in his address that this requirement is much too stringent to be enforced in the present day. If a scientific theory cannot be known to be definitively true, he said, at least it should be "seriously and solidly grounded." In fact, he went on, the purpose of the Academy of Sciences as advisor to him is "to discern, and to make known, in the present state of science and within its proper limits, what can be regarded as an acquired truth or at least enjoying such a degree of probability that it would be imprudent or unreasonable to reject it. In this way, unnecessary conflicts can be avoided." This seems to be the most important lesson the modern papacy has learned from the Galileo case, one whose recognition can only be applauded by those concerned lest there be future conflicts between science and their religious faith.

Suggestions for Further Reading

Literature on the history of science is vast, and anyone wishing to delve into it should have access to a good university library. With regard to science's relation to the Catholic faith, a number of key works have been published by the Vatican and other European presses and may not be readily available in the U.S. The following is a select list of books on which the above account is based and which may be consulted to flesh out fuller details.

The best general source for the history of science in all periods is the *Dictionary of Scientific Biography*, ed. C. C. Gillispie, New York: Charles Scribner's Sons, 16 vols., 1970-1980. This may be supplemented, on points of interest to Catholics, by articles in the *New Catholic Encyclopedia*, ed. W. J. McDonald et al., New York: McGraw-Hill Book Co., 1967, 15 vols. plus three supplements (1974, 1979, and 1989). On the general subject of science and faith, the best overall treatment is *God and Nature: Historical Essays on the Encounter Between Christianity and Science*, eds. D. C. Lindberg and R. L. Numbers, Berkeley-Los Angeles-London: University of California Press, 1986. This is especially good for periods prior to the seventeenth century; it is weak in its treatment of Galileo, and thenceforth concentrates mainly on the encounters of science with Protestant theology.

For the ancient and medieval periods, the best brief introduction is Olaf Pedersen, *The Book of Nature*, Vatican City: Vatican Observatory Publications, 1992. Also helpful is *Science in the Middle Ages*, ed. D. C. Lindberg, Chicago: University of Chicago Press, 1978; A. C. Crombie, *Augustine to Galileo*, London: Heineman, 1952, reissued in 2 vols. as *Medieval and Early Modern Science,* New York: Doubleday Anchor, 1959 and Etienne Gilson, *Reason and Revelation in the Middle Ages*, New York: Charles Scribner's Sons, 1938. Specialized studies include A. C. Crombie, *Robert Grosseteste and the Origins of Experimental Science*, Oxford: The Clarendon Press, 1953; J. A. Weisheipl, *Albertus Magnus and the Sciences*, Toronto: Pontifical Institute of Mediaeval Studies, 1980; Thomas Aquinas, *Summa theologiae*, 60 vols. under the general editorship of Thomas Gilby, Vol. 10: *Cosmogony*, ed. and trs. W. A. Wallace, New York: McGraw-Hill, 1967; and J.A. Weisheipl, *Nature and Motion in the Middle Ages, ed.* W. E. Carroll, Washington, D.C.: The Catholic University of America, 1985.

On Galileo and his trial, the basic documents are given in *The Galileo Affair: A Documentary History*, ed. and trs. M. A. Finocchiaro, Berkeley-Los Angeles-London: University of California Press, 1989. Studies made by the Papal Commission to evaluate the trial include *Galileo Galilei: - Toward a Resolution of 350 Years of Debate*, 1633-1983, ed. Paul Poupard, Pittsburgh: Duquesne University Press, 1987; *Reinterpreting Galileo*, ed. W. A. Wallace, Washington, D.C.: The Catholic University of America Press, 1986; and *The Galileo Affair: A Meeting of Faith and Science*, eds. G. V. Coyne *et al.*, Vatican City: The Vatican Observatory, 1985. The report of the Papal Commission to the Pontifical Academy of Science is given in French in *Atheism and Faith*, 27.4 (1992), pp. 241-255, and in English translation in *L'Osservatore Romano*, Weekly Edition in English, November 4, 1992. Special studies include W. A. Wallace, *Galileo and His Sources: The Heritage of the Collegio Romano in Galileo's Science*, Princeton: Princeton University Press, 1984, and *Galileo's Logic of Discovery and Proof*, Dordrecht-Boston: Kluwer Academic Publishers, 1992; and R. J. Blackwell, *Galileo, Bellarmine, and the Bible*, Notre Dame-London: University of Notre Dame Press, 1991.

On more recent science, see Amos Funkenstein, *Theology and the Scientific Imagination from the Middle Ages to the Seventeenth Century*, Princeton: Princeton University Press, 1986; *Religion, Science, and the Search for Wisdom*, ed. D. M. Byers, Washington, D.C.: U.S. Catholic Conference, 1987; *Physics, Philosophy, and Theology: A Common Quest for Understanding*, ed. R. J. Russell *et al.*, Vatican City: The Vatican Observatory, 1988; *John Paul II on Science and Religion: Reflections on the New View from Rome*, ed. R. J. Russell *et al.*, Vatican City: The Vatican Observatory, 1990; and *Newton and the New Direction in Science*, ed. G. V. Coyne *et al.*, Vatican City: The Vatican Observatory, 1988.

Stanley L. Jaki has written much on the relations between science and the Catholic faith. His works relating to this essay include *The Relevance of Physics*, Chicago: University of Chicago Press, 1966; *Science and Creation: From Eternal Cycles to an Oscillating Universe*, New York: Science History Publications, 1974; *The Road of Science and the Ways to God* (The Gifford Lectures 1974-75 and 1975-76), Chicago and London: University of Chicago Press, 1978; and *Uneasy Genius: The Life and Work of Pierre Duhem*, Dordrecht: Martinus Nijhoff, 1984. See also R. A. Brungs and Sr. M. Postiglione, eds., *A Seminar with Father Stanley Jaki* (ITEST Workshop, October 1991), St. Louis: ITEST Faith/Science Press, 1992.

EXCERPT FROM PATENTING OF BIOLOGICAL ENTITIES

Father Donald Keefe, SJ, has been Professor of Dogmatic Theology at St. Joseph's Seminary, Dunwoodie, New York since 1994. Prior to his present tenure, he was a theologian in the Denver Archdiocese. Father Keefe has taught dogmatic theology at Canisius College in Buffalo, St. Louis University and Marquette University. After serving in the U.S. Navy in World War II, Father Keefe earned his J. D. at Georgetown Law School before entering the Society of Jesus. He was a member of the Bar if the District of Columbia, of the State of New York and the Supreme Court of the U.S. He has written several books on theology and theological method, notably, Thomism and the Ontological Theology of Paul Tillich *and the two-volume work,* Covenantal Theology: The Eucharistic Order of History, *He is the author of more than thirty articles on dogmatic theology.*

We are growing accustomed to thinking of the abstract "person" as the unitary subject of legal rights and duties, even to the excogitation of artificial persons such as the corporation, whose very impersonality not only does not bar it from being such a unitary subject, but in fact, as totally the creature of law, fits the atomistic definition of person without remainder, as historical human beings never can, for their nuptially-ordered freedom and dignity is the *prius* of all law. The nonhistorical, abstract, and rationalistic analysis of the human person viewed as a fungible social unit presupposes an impersonal, a dehistoricized legal entity, indifferently identical to any other, each the subject of rights and privileges which are entirely dependent upon the edict of impersonal law, and possessing those utterly identical rights and privileges simply as the evident implication of their being *intrinsically* devoid of them, mere irresponsible objects of manipulation by irresponsible governmental power. The incongruities which this logic can work are now evident, in the law's manifest embarrassment over the discovery of very obvious, indisputable differences between men and women, long recognized in common law.

The denial that such differences can be given legal recognition has made of American law a laughing stock: driven by that doctrinaire egalitarianism we have subordinated the occupations historically requiring a masculine strength and aggressiveness to the *a priori* cosmic equality of women, with the results to be expected when an institution or profession is assigned purposes simply ideal, alien to its

historical constitution. When a major consideration in the curriculum of the military and naval academies is that women shall not be disadvantaged by the physical and psychological rigor which have traditionally been part of the curricula, other goals are in view than the adequate defense of the nation. When the admission and training policies of police and fire departments of American cities must be more concerned for the adequate representation of women in their ranks than for the safety of the cities they are there to serve, and must consequently turn a blind eye to the obvious physical incapacity of women for such employment, then the law is in full flight from concrete historical reality.

The degradation of the feminine is notoriously indispensable to this flight; the nullification of women by their redefinition in the agonistic masculine terms of office, rank, contest, achievement, success and failure, is intent upon serving an ideal and utopian perfection to whose attainment all historical nuptially-ordered sexual differentiation is an obstacle and therefore an injustice to be overcome and annulled. Most particularly, as is obvious, that most refractory expression of the historical exercise of free responsibility, covenantal marriage, must be neutralized where it cannot be nullified, for its efficacious symbolic power to refashion the world in the image of God by its own public presence, by the indisputable public efficacy symbolic of its free symbolism, is a continual threat to the secular agenda, to the nonhistorical goals set by the cosmological soteriology.

Nor should the masculine corollary to the cosmological degradation of women be missed. This degradation of the feminine forces the redefinition of the masculine. The projected redefinition of masculinity requires that those salient characteristics of attitude and presence which identify historical masculinity be suppressed and all that differentiates men from women be devalued - again in the service of the immanentization of the androgynous eschaton.

The subject of the law of a free people is a free community, whose freedom is not an idea but a free praxis and so an event, the event which is self-commitment to the unconditioned dignity and worth of another human being who is personally and covenantally — which is to say, nuptially — irreducible to oneself. Only in this event does freedom, whether as masculine or as feminine, reach its adequate historical expression: the unconditional self-bestowal upon an irreducible and complementary other, and a simultaneous joyful affirmation of the self-bestowal of that other as the supreme gift, the completion of one's own full dignity as man, as woman. There, in that self-sacrifice and celebration, all freedom finds its adequate expression, all free society its covenantal ground, and the equality of all people in personal dignity, freedom, and responsibility, which undergirds any free legal system is concrete in the nuptial ordering of humanity.

Man as atom is man as mythic, nonhistorical. The myth is ancient in paganism: the cosmological imprisoning of the individual within the circuit of Necessity, of the cosmos, the closed realm of antecedent logical possibility. Thus he is rendered intrinsically lost: timeless, immutable, irrelevant, insignificant, homeless and hopeless: intrinsically, inherently, simply as human, he has no place to be, nowhere to go, nothing to do, and is without defense, because without friends, being incapable of love — for love is nuptial and elective, while man as atom is fungible, indistinguishable, the object of manipulation rather than of an elective and covenantal love.

For atoms, by definition, have no meaning, no significance, no dynamic of their own; meaning must be given them from without, and this is always by some kind of limitation upon the meaningless infinity of their possible random motion in the cosmic void. Law as cosmological must be conceived as the application upon atoms of force *ab extra*; it becomes merely the suppression of the senseless disoriented randomness of the atom in the void. At the same time the theory which legitimates the application of this force expresses, in its suppression of the senseless randomness of atoms, the very meaning of justice, and therefore must long for that which will conclude all suppression, all suffering: the lure of law thus conceived is always unitary: the void, emptied of atoms.

The end and goal of the cosmological law is the nullification of the cosmos itself, the shutting down of the eternal return, the achievement of the nameless peace of which nothing can, and Nothing must, be said. This is the final cosmic sophistication: history is agony; therefore flee from all that is historical. Within the scope of this inhuman vision, the nuptial covenant, the imaging of God, must be anathematized, and is.

Illustrations of this cosmologizing of the law are lavishly at hand. Few if any are the product of the free political process, of legislation. Almost exclusively, they are expansive bureaucratic interpretations of the unchallenged usurpation of political functions by federal and state courts. The correlative disenfranchisement of the electorate, the removal of more decisions from the jurisdiction of their legislatures, the progressive nullification of the political process of the free society, is a fundamental aspect of the promotion of the servile society. The cumulative impact of this disenfranchisement on the public law of this nation over the past forty-five years is patent. Scarcely any of the present multitudinous tutelary and utilitarian limitations upon the freedom of the common people is a product of a political debate and its political resolution; we are governed by non-historical, non-political and abstract ideals, imposed upon us by the fiat of the federal courts.

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IN MEMORIAM

Joseph P. Windham, MD

We also ask your prayers for ITEST members who are ill. May they feel the restoring hand of the Lord.

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