

# From the Vineyard Chapter II. Technology

**S. Eva Maria Amrhein, PhD**

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## Author Biography

*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.*

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**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)

## 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.<sup>1</sup> 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<sup>2</sup> 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<sup>3</sup> 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."<sup>4</sup> By its very nature contemporary technology calls for broader philosophical and theological consideration.

Theology, that is, reflecting on God as he reveals himself to Man and thus "reveals man to himself,"<sup>5</sup> 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.”<sup>6</sup> 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.”<sup>7</sup> Is mankind mature enough to handle its technological effort and to control its own creation? Obviously, humanity is challenged to raise the “ultimate issues”<sup>8</sup> 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. . .”<sup>9</sup>

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.<sup>10</sup> 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.”<sup>11</sup>

Other urgent appeals for dialogue between technology and theology are voiced by Gilke<sup>12</sup> Mesthene,<sup>13</sup> Cauthen<sup>14</sup> and, longer ago by Dessauer<sup>15</sup> and Teilhard de Chardin.<sup>16</sup> However, several centuries of alienation between science and theology<sup>17</sup> 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.<sup>18</sup> In view of the dangers from technology, we expect of theology the assurance of Man's inwardness, 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."<sup>19</sup> 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.<sup>21</sup> 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<sup>22</sup> 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.<sup>23</sup> 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.<sup>24</sup> 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.”<sup>25</sup> Thus the autonomy of one system infringes on the autonomy of another. Technology’s “tormenting temptation is technocracy.”<sup>26</sup> 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.”<sup>27</sup>

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.<sup>28</sup> 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.<sup>29</sup> It has found a practical application in the spirituality of secular institutes and lay movements of the church.<sup>30</sup> 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."<sup>31</sup> 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";<sup>32</sup> 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."<sup>33</sup> This ontological goodness of creation finds an ultimate confirmation in the New Testament: God "came to his own domain"<sup>34</sup> 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'.<sup>35</sup>

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.<sup>36</sup> 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."<sup>37</sup> 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."<sup>38</sup> 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.<sup>39</sup> 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.<sup>40</sup>

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.<sup>41</sup> 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"<sup>42</sup> and of "unfolding his physical, psychic and spiritual potential."<sup>43</sup> At the same time work, the "participation in the creative and self-giving activity of God"<sup>44</sup> brings Man closer to his Creator and also, because of its intrinsic toil and openness to misuse, to the Redeemer.<sup>45</sup>

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.<sup>46</sup>

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."<sup>47</sup> 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.<sup>48</sup>

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,<sup>49</sup> 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 unequalled 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 Menschlichen* (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 l'avenir*, 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, "Technologia 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, Friburg: 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.