

# **Interface of Ethics with Science and Technology**

TAMERLANE R. LANA, O.P.

## **Introduction**

It is a mixed feeling of fascination and apprehension to see the parade of scientific and technological breakthroughs marching by at an increasingly fast pace. During the last decade, we have been witnesses to the wonders that technology has accomplished even in those domains that used to be reverently consigned to the “mysterious workings” of nature. For instance, the feats achieved in information technology and biotechnology are simply appalling.

The world now appears to be getting narrower because of the upsurge of computer and information technology, particularly of the Internet system. This paves the way towards the emergence of a borderless world which now gives clearer testimony to the inevitability and factuality of the phenomenon called globalization. The means of communication is now undeniably getting a cheaper commodity. Mobile phones have become popular here in the Philippines because of “text messaging.” Distance and time are not obstacles anymore to a prompt exchange of views and opinions among intellectuals and “sweet nothings” among friends and lovers. There is nothing to hinder us to strengthen ties, to purchase goods, and even to transact business anywhere and anytime we desire. By all indications electronic technology is now gradually paving the way for the decline of the cities and growth of electronic heartland which will allow an unbroken link between work and home, permitting people to move to more livable rural areas. However, in the face of these bright prospects, we already have to contend with the enor-

mous threats to society by the endless and almost uncontrollable possibilities in the computer and information technology. *Cyberporn* which is now accessible even to minors has been a source of serious concern among conscientious parents. On-line gambling and easy access to child prostitution, drug trafficking and corruption through internet are social problems taking new faces that we have to contend with. The horrendous terrorist attack in the United States that cost the lives of thousands of people was perceived to have dreadfully materialized because of global networking that was undeniably facilitated through hi-tech communication system. The capacity of the electronic gadgets to sow quick disorder through deception and dissemination of distorted facts is alarming as the widespread news on the alleged insolvency of two banks in this country last year that led to the abnormally heavy withdrawal of deposits and threatened their near collapse. Cyber crimes had suddenly surfaced in the wake of the recent electronic assaults as the so-called "Love Bug" virus that wreaked havoc in e-mail system worldwide, causing \$15 billion in damages.

In 1980's, when the so-called first test tube baby was reported, bioethicists, sociologists and theologians engaged in heated debates regarding the morality of reproductive technology, particularly the in-vitro fertilization (IVF). In 1997, we were alarmed by the news about the success of the cloning of the sheep called Dolly. Speculations about the possibility of human cloning turned to a chorus of protests. One of the basic objections raised against human cloning is that it is an affront against the dignity of human life if we subject the origin of the human person solely to technology. Arguing on religious grounds, one would see it as an indiscriminate encroachment into the creative power of God who is actively at work in the "begetting" of the human child. Of course, there are those who claim otherwise as the physicist Richard Seed who said: "Cloning is the first step in becoming one with God, a first step in discovering immortality." He boasted that he would clone the first human in 18 months and predicted as many as 200,000 clones a year. This was of course nothing but a groundless conjecture if we are to base it on the case of Dolly which claimed success only after 227 tries, with only 29 embryos surviving beyond six days (*Inquirer*, August 22, 2001). Then we heard the techniques that would enable women in their fourth, fifth and sixth decades to produce offspring. In our

eagerness perhaps to outwit time, the media have made a bestseller out of the possibility of "rewinding the biological clock" which, as one fertility expert would claim, is nothing but a freshly minted fiction (Rosenwaks, 2000). Recently, we heard the announcement of scientists that the entire human genetic code has been assembled. A group headed by Collins claimed that their effort has mapped 95 per cent of the human genome. A rival group, the Celera Genomics, claimed that it has completed 99 per cent of the genetic sequence. Says Francis Collins, the Director of the Human Genome Project: "Today we celebrate the revelation of the first draft of the book of the human life...It's the end of the beginning. Together we must develop the advances in medicine that is the real reason for doing this work."

Indeed the scientists are now seeing in clear light the promises that the genome project holds. The genetic information could be used to cure cancer, Alzheimer's disease or diabetes. It could give patients valuable information about their susceptibility to the heart diseases, schizophrenia or high blood pressure. It could reveal in detail how an adult human being arises from a single cell, functions through a lifetime and dies. Recent advances in the study of the stem cells for therapeutic purposes are now a hot issue especially in the United States. Stem cells are cells that have the ability to divide for indefinite periods in culture and give rise to specialized cells. These cells are normally extracted from the embryo (*National Institute of Health*, 2000). Scientists headed by James Thomson who led the first successful effort to isolate and culture human embryonic cells claim that the study of stem cells could help us understand the complex events that occur during human development. The research could also dramatically change the way we develop drugs and test them for safety. Perhaps the most far reaching potential application of human stem cells which scientists hope to achieve is the generation of cell tissues that could be used for so-called "cell therapies". These cells, stimulated to develop into specialized cells, offer the possibility of a renewable source of replacement cells and tissue to treat a myriad of diseases, spinal cord injury, stroke, burns, heart disease, diabetes, osteoarthritis and rheumatoid arthritis (*ibid*). Recently, the scientists in the University of Wisconsin, claimed that they have coaxed embryonic cells to form blood-making cells, a procedure that could lead to new therapies including safer blood

transfusions and organ tissue transplantations. Despite these bright promises the stem cell research offers, we could not help but be wary about the manner in which the procedure is done, that is, the inevitable destruction of early stage human embryos. We go back to the issue whether these embryos are human beings or not. If they are, then the research could not even stand the test of the most elemental principle in medical ethics as embodied in the Hippocratic oath: "Primum, non nocere." "Before anything else, do not harm the person." Responding to the moral controversy, President Bush offered a compromise decision on the matter, which allows federally funded researchers to use stem cell lines already in existence as of August 9 this year. He has restricted access by federally funded researchers to new stem cell lines created since his announcement. This of course disappointed some U.S. scientists who now consider leaving the country to pursue research abroad where the laws are seen as less restrictive.

But of course the possibilities do not end here. Given the ingenuity of humans, there could always be the "beginning after the end." Scientific knowledge of the genetic make-up of the human person does not only elicit wonder, it also prods the scientists to unearth deeper its mysteries and then explore even what is beyond the purpose why the research project was made. That's why the talk about the genome project is not only confined to gene mapping but also gene splicing, and thus the greater temptation to probe into the prospect of germ-line gene therapy or genetic enhancement: the possibility of improving the traits of man through genetic manipulation or alteration.

### **Technology as a Gift of God**

We can go on marveling the feats that science and technology have so far achieved and yet as we probe into the immense possibilities that these advances imply, we find ourselves nurturing a mixed feeling of fear and anxiety. What are the implications of all these? Where would all these eventually bring us? Uncertainty looms in the face of that big prospect that science and technology would finally cross the boundary between fiction and reality. But why these mixed feelings? Is there indeed reason for us to fear what technology can achieve?

We understand why some people, particularly the religious fundamentalists, are wary about what technology brings about. They do not trust its devices. Jacques Ellul (1980) once said "that modern technology is the temptation of the Serpent, a sin of pride and rebellion against the Creator." Though we see here an expression of dismay over the excesses in which human intelligence dares to venture, we do not exactly agree with this author's sentiment. As one known bioethicist, Benedict Ashley, would put it, "God would not have endowed human beings with creative intelligence and freedom if he did not want to share in his creative action" (Ashley, 1994). In the document "Gaudium et Spes", the Church teaches that technology is a gift of God that requires stewardship as do any other gifts." We see that it is not only the secular world which nurtures great hopes in technology. The Church clearly shows its trust in what science and technology can do to promote the progress of the society. So it is not science or technology *per se* which is scary. It is science and technology divorced from ethics that would give sense to our fears and anxieties. It is knowledge alienated from values that can be dangerous and even destructive.

### Science and Technology: Ethically Neutral?

Some people however claim that science itself is ethically neutral, or that knowledge itself is value neutral. To attain "knowledge for its own sake" seems to be a logical implication of this claim. The problem however with this claim is that it may convey the wrong idea that scientists do not have responsibility for the production of things (Boone, 1994). One author makes a distinction here when he said that this belief confuses the *findings* of science, which are ethically neutral, with the *activity* of science which is not (Bronowski, 1993). What this "activity" of science connotes needs further clarification. If this means the activity of the scientist who is a moral agent, then we do not have a problem about that. As a human activity, it cannot be conceived apart from its moral dimensions. Let it also be noted that this activity includes the application of the findings of science, in which picture technology can very well fit in. Viewed from this perspective it is also hard to say that there is no responsibility attached to it. Remember that science understood in this sense is not purely speculative or abstract activity, it is an activity geared towards not only the

discovery of new knowledge but also an accomplishment of certain human project to which that knowledge is applied. Here we understand clearly the role of technology, which, in reality, is applied science and which employs a technical method to achieve a practical purpose.

So we ask the question: *Is there such a thing as ethically-neutral technology, that is, can technology thrive humanly without an interface with ethics?* I argue that it could not. I would base my arguments on two points: first, the purpose for which technology is intended; second, the agents behind the making of the technology. What is the technology for? This is I believe is a very crucial question to ask before we can even inquire whether technology is ethically sound or not. Remember that technology as a human activity or a fruit of that activity is done on purpose. "Acts done on purpose" belong to the realm of morality, because they are products of human choices. Human choices involve man's reason and freedom. But what particularly is the purpose of technology: to serve humanity, to promote the progress of the society which redounds to the good of the humans. In short, *technology is at the service of the human person and human life*. (Some people may not feel comfortable with this anthropocentric, that is, "man-centered" worldview. What about the good of the Universe, the good of the world itself, the good of Mother Nature, or other beings of various life forms? Could technology also be not at the service of them? Let it be made clear however that if ever human beings direct their activities towards promoting the good of these realities, the intended goal is a still product of human choices, and therefore the human bias is there, which means that the intended promotion of their good would ultimately redound to the good of the humans themselves).

This brings us now to the second point, the persons responsible for the technology itself. They are the ones who bring about the particular technology with a distinctive purpose in mind. They do not do it only for the sake of doing it, but even if they do, they could not be totally relieved from the responsibility, because that technology which is a product of their chosen activity would already have effect on human beings. With this in mind, we cannot claim that technology is ethically-neutral, for to deny this is to reject the idea that technology as *techne*, or craft is not just systematic know-

ledge, but a *human technique*. As Fr. Walpole would put it, "technology is not the thing, the machine, the alien-like scientist, it is not summed up by the chip, the gene, nor the galaxy, it is above all *human*. Most of all technology is *human participation*, a working community for a better life" (Walpole, 1997).

### **Ethics Gives Conscience to Technology**

If science and technology are at the service of humanity, then ethics must be on guard since these disciplines through human machination tend to deviate from their true purpose. Scientists or technologists alone may not be in the best position to judge whether their activities or the results of their activity can really lead to the flourishing of humankind. On the contrary, their good intentions notwithstanding, they could even be destructive. And so ethics as a discipline must lend a hand to provide signposts, the ethical principles, for their needed guidance. Ethics brings conscience to technology and seeks to remove the ever widening chasm between knowledge and values, and thus re-unite the two. Fr. Dela Rosa (1996) noted that this separation was evident during the rise of the Classical Empiricism espoused by Bacon, Descartes, Newton, when the primacy of knowledge over values was fully articulated and espoused. With the mechanistic worldview espoused by many of the thinkers and scientists during this time, knowledge was separated from human values, and thus knowledge and the knowing process became *depersonalized, mechanized and later computerized* (ibid).

A similar chasm was evident between empirical science and Christian religion at the onset of the 20<sup>th</sup> century which contributed to the widening gap between science and values. Christianity wielded great influence in the moral thinking of the West during this time. Challenged by the threats posed by the natural sciences and historical methods, Christian thinkers "attempted to build a wall around religion and seal it off from the further attack from the empirical science (Donagh, 1986). This was not without serious repercussion to the relationship between science and religion which claimed competency on ethical matters. Two lines of inquiry continued on parallel tracks: while the practitioners extended mutual courtesies, they never really attempted to understand each other's challenge.

This relationship was seriously severed in the face of the challenge posed by Charles Darwin's theory of evolution. This theory was received by the religious community with shock and outrage. The religious thinkers clung tenaciously to the Genesis account of creation understood within the framework of the discarded scientific paradigm. By taking this stand, the religious understanding was impoverished by its inability to enter into a creative dialogue with the emerging scientific view of the world. Likewise, the scientific community was hampered and impoverished by the dichotomy between the secular and the sacred. Deprived of the perception that nature is "alive" or permeated with a spirit presence, its natural world became very mechanistic. Science then began to take on a savior role which many believed, in time, would eliminate the need for religion. Now we see the repercussions of this dangerous mechanistic view in the highly developed nuclear weapons threatening life; industrial pollution destroying air, water and soil; the vast majority of human livings living in poverty and subject to growing oppression and inequality (Donagh, 1986).

Presently, however, there seems to be change of hearts. Modern scientific thoughts in biology, genetics and relativity and quantum physics repudiate most of the materialistic vision of the mechanistic science. It is no surprise if scientists themselves challenge the savior role that science and technology has presumed to take. Now the religious community is coming to terms with the language and paradigm of science. Recently, Pope John Paul affirmed that there is grain of truth in the theory of evolution. Few years before this, he made a public admission of the Church's blunder in condemning Galileo. It appears now that science and religion can enter into a more fruitful dialogue, mutually enriching each other. This is the kind of interfacing of science, technology and ethics that is necessary during this cyber age wherein computer and information technology is starting to dictate the lifestyle, let alone the thinking and mentality, of the people in the world. The more that interfacing must take place in biotechnology which intimately touches on issues of human life, its origin and destiny, the nature of human being, his dignity, his rights which promote and secure his well-being like autonomy, privacy and confidentiality, justice and respect for his dignity as a human person. John Paul II said: "Scientific and technological discoveries create an enormous eco-

nomic and industrial growth, but they also inescapably require the necessary search for meaning, in order to guarantee that the new discoveries be used for the authentic good of individuals and of the human society as a whole."

### **Not Everything Technically Feasible is Humanly Acceptable**

We cannot ignore the advantage that science and technology can do for the betterment of human beings, but certainly there must be limits to what they can achieve. This concern is best reflected by the questions raised by an ethicist: *"Is everything which is technically feasible humanly acceptable?"* and *"Who can or should control the technological processes?"* Humans have the propensity to play God, that is, in crossing the boundary between what is humanly acceptable or not in his attempt to tamper the most elemental organic forces in the universe. The axiom not to play God is a reminder that we have to take a cautionary posture before we take a leap into the great uncertainties that biotechnology, particularly genetic engineering, brings in the shaping of our physical being, our social structure and moral culture. The precaution must be there if scientists are wont to interfere with nature. Will this interference enhance or diminish the human project? Up to what extent can that interference be allowed without destroying the values that are entrenched in the human person and the common good aimed at serving the human society? In the modern ethical thought, the limits are presaged by the so-called slippery slope argument. Also called the primrose path argument, the thin-edge-of-the wedge argument, this maintains that "once one starts sliding down a slippery slope, things get out of control." If we allow some morally dubious scientific projects to take the first steps down the primrose path then there is no slowing down, no turning back. If we allow genetic engineering for therapeutic purposes, then why not the improvement of traits and physical features of the person which constitutes eugenics? If we allow the harvesting of stem cells for cell therapies, then why not cloning for the same purpose? More than just a precautionary reminder, some ethicists warned that the logic used to justify current research and scientific research may already justify further developments. Reversing an old metaphor, Kaas said that "once the genies let the babies into the bottle, it will be impossible to get them out again." While some ethicists contest this ethical

argument, others could not deny its validity and importance for after all "the roadway traveled by those who make ethical decisions is unavoidably a slippery slope." To traverse it successfully, as Mahowald et al. maintain, requires placing wedges at the right places, in order to restrict or stop travel at those points where one is most likely to fall. And certainly to avoid its detrimental effect, there is a need to clarify really what one's purposes are and how far one is willing to go (Gobstein, 1985). If from the very start, the clear purpose of genetic research is only for therapy and not for eugenics, then the slippery slope can be avoided. But despite this how can we really be sure that the scientists would not cross the border from the permissible to the forbidden when one successful venture has brought them to just one step away from another scientific breakthrough?

Christian ethical thought gives emphasis to human's stewardship over the created realities. The paradigm of stewardship draws the line between legitimate intervention in nature and domination or manipulation. The intervention must respect the limits presaged in nature if it is to avoid manipulation which is a violation of human's calling as minister or steward of creation. But manipulation of nature could not be tolerated lest we become helpless over the feared destructive effects it may bring to humanity. I recall a prominent Philosophy professor making a distinction between unburdening and burdening nature. He maintains that it even devolves upon man to unburden, that is, to assist nature in the attainment of its end. But to attempt to burden nature because of man's greed, selfish interests and lust for power and pleasures would be destructive. Nature tends to self-destruct and boomerang when inordinately tampered. And the victim himself is man, the manipulator. Look at the degradation we have done to the environment because of human's unwise and arrogant domination of Mother Nature. Now we worry about the kind of world we would bequeath to the future generation. As Zwart said: "Manipulation would not only remove the natural from nature, but also the human from humanity (1994)."

Therefore one challenge raised by ethics is for humans to master science and technology so that it may not eventually control humanity. It could not be denied that technological inventions are two-edged swords. The potential advantage and the potential harm

of technology must both be recognized and to find the balance between the two can at times be a dilemma. The calculating method inspired by utilitarianism and, in liberal Catholic thought, proportionalism, though these ethical theories are replete with inadequacies, is certainly helpful in clarifying the advantages and disadvantages of scientific and technological endeavors, but they do not end there. Balancing between the two sides in order to bring ethical coherence is necessary. And definitely solid ethics norms and principles drawn from the demands of what is good for the human beings and human society have to be invoked on the bases on which the moral appropriateness of the scientific process and projects have to be judged. The scientists cannot be excused from the great responsibility to go through the tedious process otherwise he would be doing great disservice to humanity. Take for example the nuclear energy. It is not clear whether the capability to split atoms weighs more on the side of the good it may bring to humanity than the destructive effect it may cause. Then what about the enhancement of genetic traits, or cloning of human beings? Will they eventually bring real good or harm to humanity? It is obviously in these difficult cases that ethics takes a prominent role, especially if we come to realize that "technology's problem-solving innovations seem persistently to create new problems" (Boone, 1994). It would do well for the scientists to engage in a dialogue with the ethicist to understand the ethical implications of these breakthroughs.

## Conclusion

We could not underestimate, of course, the good intentions of scientists in engaging in research that would result to technological innovations for the betterment of the humans. But let us remember that technology is not the interest of scientists or technologists alone, but also of market and politics. There are the economic and political powers behind the scene that sustain and manipulate the use of technology. Knowledge alone is power and the practical use of that knowledge could indeed amass the perks of such power, and for that reason alone, technology could be a wise target of power brokers. Now I do not refer here only in the local context but also in the wider context of the global society. The more interested power brokers who would be concerned with utilizing technology to wield their influence and assert their superiority in the world are the

developed countries. Techno imperialism in an odd connivance with economic imperialism constitutes a powerful force that may eventually lead to wider gaps between the developed and the developing nations, and therefore result to inequalities. For which among the latter could compete with the superpowers in terms of capital and technology? So a deeper analysis of the ethical implications of this phenomenon would redound to the sensitive issue on justice in the allocation of resources. How ethically appropriate would it be to invest huge money to space technology or biotechnology when there are millions of the people who are hungry and in want of basic necessities? Certainly, success of our endeavors to conquer the universe and claim our place in galaxy brings forth the sense of grandeur and greatness which feed our insatiable quest for what is beyond. But what about the quest for the people lost in their struggle to compete and survive in this world? The poor and the hungry? The victims of unjust wars and discrimination? The abandoned and marginalized? Would the discoveries of science and technology aim at alleviating the plight and improving the quality of life of these human beings? The German President Joahness Rau who called for the banning of cloning at the international level struck the heart of the matter when he said: "The question is not that of a new human being. The question we have to ask is how we can help the existing beings." This serves indeed as a wake up call to scientists who are now falling in deep fascination for anything that science and technology could unearth.

To conclude, it is perhaps wise to be reminded that while we extol the noble intentions of scientists that led to the discovery of human technology, let us be wary about the external influences that wield power to deviate the purpose for which it was created. Scientists are also human beings, and given the tempting prospects of their discovery from within and from without, the *teleological thirst* they may be nursing in their inner beings may eventually deteriorate into what Boone (1995) termed as *technological lust*. How tragic if this would happen. □

### References

- Ashley, Benedict and O'Rourke, Kevin. *Ethics of Health Care*. Washington DC: Georgetown University Press, 1994.

- Boone, C. Keith. "Bad Axioms in Genetic Engineering," *Life Choices: A Hasting Center Introduction to Bioethics*. Washington DC: Georgetown University Press, 1995.
- Philippine Daily Inquirer, August 13, 2001; *Editorial*, August 22, 2001.
- Dela Rosa, Rolando. "The Responsibility of Scientists to Society", *Unitas*, Vol. 69, No. 3. Manila: University of Santo Publishing House, 1996.
- Health-ABCNEWS.com. September 4, 2001. *Scientists Create Blood From Stem Cells*. <http://dailynews.yahoo.com/h/abc/20010904/hl/stemcellblood010904-1.html>
- Kass, Leon. "The Meaning of Life in the Laboratory", *The Ethics of Reproductive Technology*, (Kenneth Alden, ed.). Oxford: Oxford University Press, 1992.
- Lana, Tamerlane. *Ethos and Eros*. Manila: University of Santo Tomas Publishing House, 1997.
- Mahowald, Mary, et al. "The Ethical Options of Transplanting Fetal Tissue," *Life Choices: A Hasting Center Introduction to Bioethics*. Washington DC: Georgetown University Press, 1995.
- McDonagh, Sean. *To Care for the Earth: A Call to a New Theology*. Quezon City: Claretian Publication, 1986.
- National Institutes of Health, *Stem Cells: A Primer*. May, 2000. <http://www.nih.gov/news/stemcell/primer.html>
- Reuters, September 5, 2001. Harvard Researcher Pursues New Stem Cell Research. [http://dailynews.yahoo.com/h/nm200110904/pl/health\\_stemcell\\_Harvard\\_dc\\_1.html](http://dailynews.yahoo.com/h/nm200110904/pl/health_stemcell_Harvard_dc_1.html)
- Walpole, Peter. "What Should Be the Catholic University Research Focus: The Four Challenges of Technologies," *The Catholic University as it Faces the Challenges of the 21<sup>st</sup> Century*, (Vincent Hanssens, ed.) Paris: IFCU Secretariat, 1997.
- Zwart, A.E. Hub. "The Moral Significance of our Biological Nature," *Ethical Perspectives*, 1, 1994. Center for Christian Ethics, University of Leuven, p. 73.