Go, Rebuild My Church!

Our Relationship to Science and Technology

Comprehensive Course on the Franciscan Mission Charism

Lesson Unit 24

The documents of Vatican II, Pope Paul VI's *Evangelii Nuntiandi,* and Pope John Paul II's *Redemptoris Missio* have deeply affected the understanding of mission. Constant efforts are being made to clarify its purpose and objectives, and to determine the most appropriate methods to carry it out. *Go, Rebuild My Church: A Comprehensive Course on the Franciscan Mission Charism,* provides a particular context to stimulate dialogue about the many dimensions of mission and the inevitable recognition of the equality, dignity and humanity of all persons. The course is unique, since it is genuinely inter-Franciscan and inter-cultural. An ongoing process for exchange among all members of the Franciscan Family from six continents provides for a creative meshing of the best in current theology, Franciscan research and pastoral practice. The vast and profound changes of present-day society make all the more urgent our search for a fuller understanding of humanity in the light of the Gospel and the Person of Jesus Christ.

As Franciscans, with the world as our *cloister,* we welcome this refreshing moment of intercultural dialogue. Francis was the first among founders to situate the missionary dimension of the Gospel call clearly within his rule. This study reawakens us to the challenge and genuineness of Francis' message for our own times.

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Contents

Our Relationship to Science and Technology

From the Sources

What Francis thought of Science

For Francis it was cause for great sorrow when he saw that his Brothers were occupied in acquiring knowledge at the expense of virtue.

Above all, he suffered when this endangered their vocation to the evangelical way of life.

'The Brothers who let themselves be carried away by the thirst for knowledge,' he said, 'will stand empty-handed at the Day of Judgement. I would rather see them full of virtue. Then God would be with them in the time of trial. For in the time of trial book-learning goes for nothing, and books themselves remain on the shelves. But virtue will stand them in good stead in the time of trial.'

(Paraphrased from 2C 195)

Introduction

A

he achievements of science and the devastating consequences

Science and technology are two determining factors in our world today. Thanks to them we have achieved much, but they have also had disastrous consequences, which we are only now gradually beginning to understand (cf. LU 12).

An in-depth discussion on Science and Technology is therefore necessary. By its very nature such a discussion deals with a difficult subject matter, but as it is highly significant we do not want to avoid it.

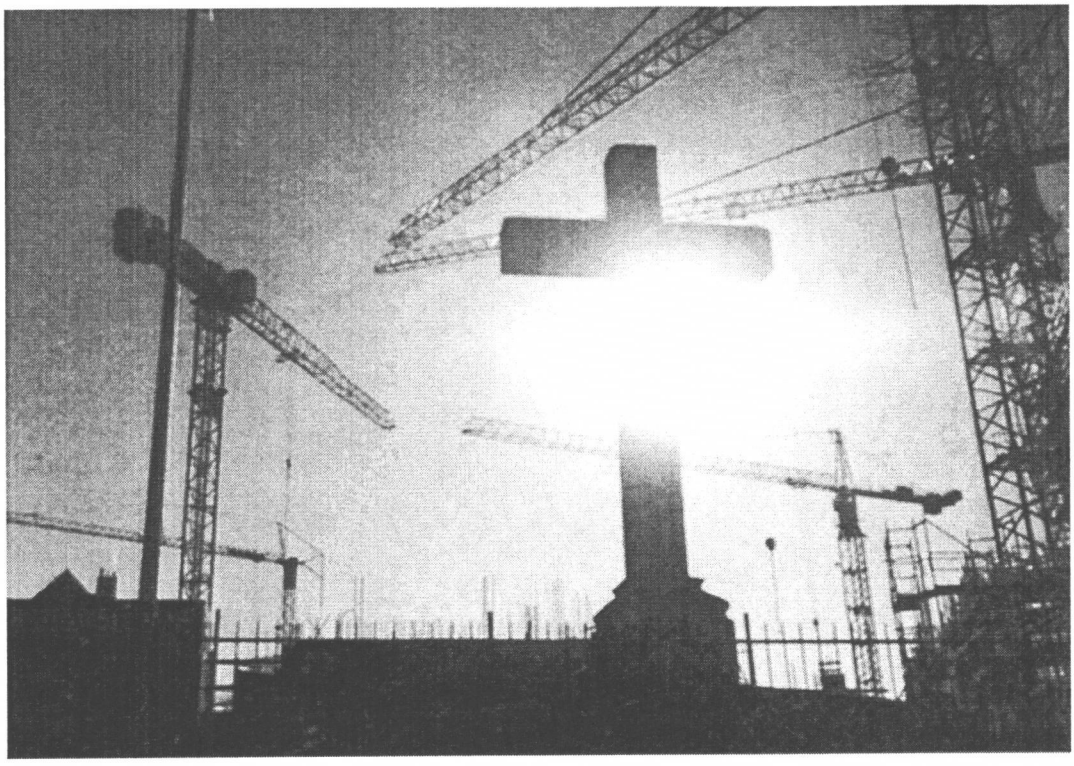
Survey

B

n alternative concept of science and technology

In the first chapter we will seek to answer the question of how it has come about that what we understand as 'Science and Technology' exists at all. We will attempt to define both of these

terms and to indicate their relationship to 'Faith'. But then the question will necessarily arise: how can Science and Technology result not only in good things but also have negative consequences? This fact shows that a fresh assessment is necessary. In the second chapter we will list some elements that can lead to a new understanding of science and technology: we shall speak of the end of naive blind faith in science, of the fears and expectations we have of technology, and we shall point out that there is more to nature than what can be measured.



There is no corner of this planet which remains untouched by technology.

In the third chapter we shall address the Christian understanding of creation. We encounter in nature not only the traces of God's handiwork but also everywhere the works of human beings. Therefore, we must learn to understand the Biblical Story of Creation in a new way so that its interpretation will do justice to revelation as well as to the results of modern science.

It is an eternal struggle between the knowledge we have gained from the natural sciences and technology, and theology. The point of view that the Church holds today should help to lessen the friction.

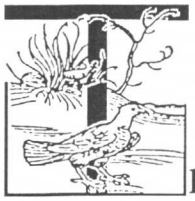
In the fourth chapter we shall address the Franciscan aspects: the attitude of Francis towards science; and his understanding of nature, creation, and work. Then we will pose the question: Given these preconditions, what would a 'Natural Science' be like that understands itself as 'Franciscan'?

In the fifth and final chapter we shall draw some conclusions for an alternative concept of science and technology. Both must serve life and they must always be pursued in the interests of the poor and from the perspective of the poor.

We encounter in nature the traces of God's handiwork and the works of human beings.

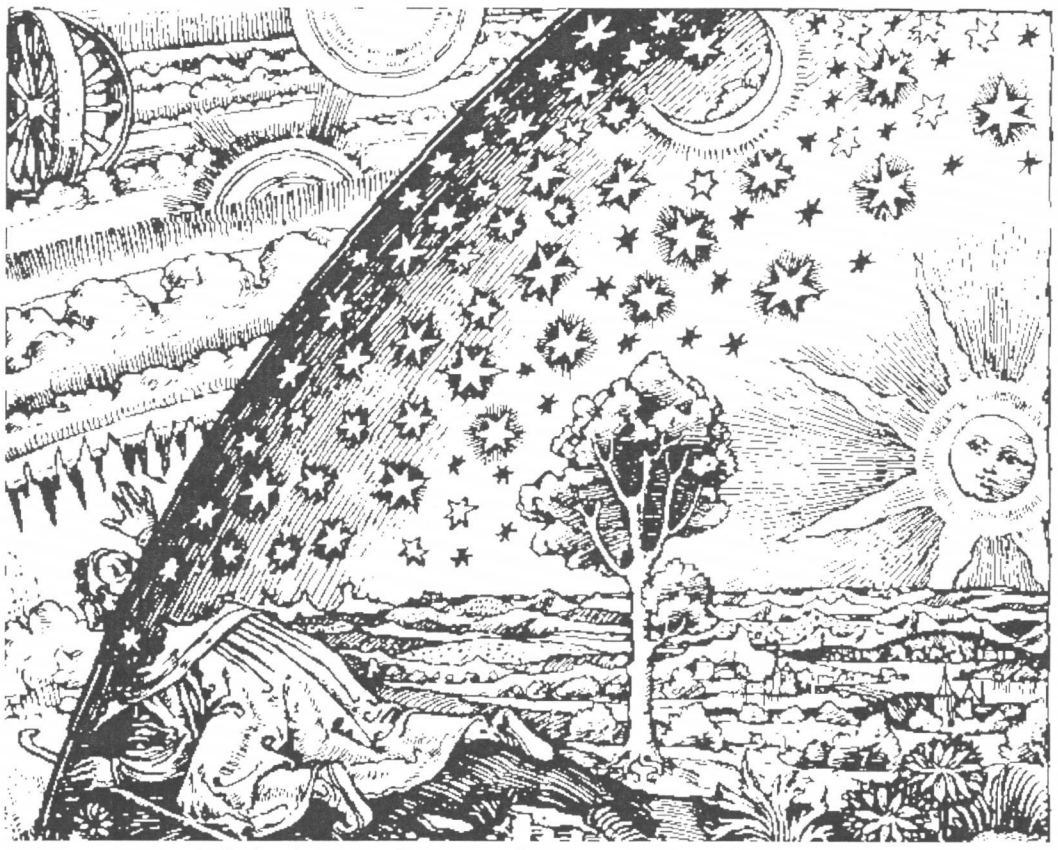
Information

C



1. The two Faces of Science and Technology

1.1 From child-like wonder and questioning to science



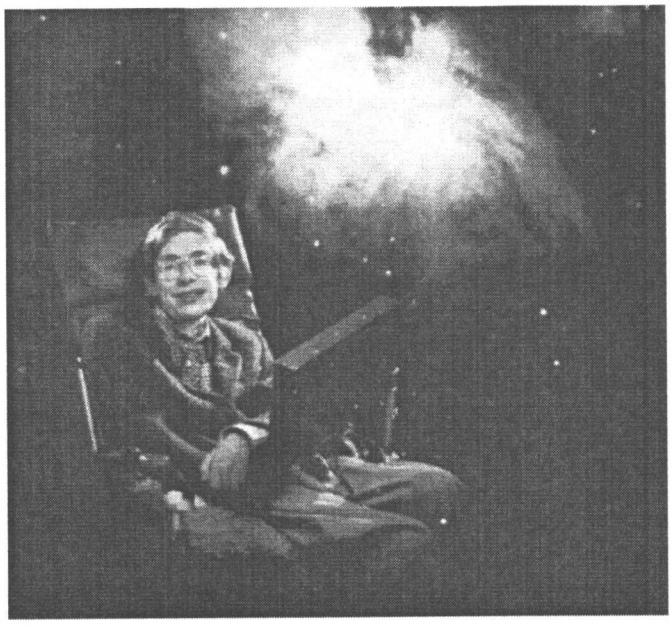
Today's science is re-discovering the mysterious aspect of our universe.

As creatures endowed with reason, human beings have always tried to find out the nature of things and to discover connections between things. The young child already shows the awakening of independent thought when it starts asking *why*? Adults, in their way, pose much the same question.

Thus, over thousands of years, laws have been discovered in nature, in the interaction of human beings and in their own Self: these insights have been preserved as general knowledge and passed on to future generations. We speak of *science* when such questioning is done systematically and with appropriate methods.

People with faith see behind the laws of nature that have discovered the Divine Will and the Divine Creative Force. This was true of the past and is equally true of the great scientists of our time. Albert Einstein said: *"I cannot imagine any true scientist that does not have a deep faith... science without religion is lame, religion without science is blind."* Similarly open to a religious view were leading nuclear scientists and Nobel Prize winners such as Niels Bohr, Werner Heisenberg and Erwin Schrödinger. The relationship between science and faith has been expressly dealt with by Friedrich Dessauer in his book: *The Case of Galilei and We* and by Carl Friedrich von Weizsäcker in his book *Humanity in their History.* In this book the author reaches the conclusion that we need both: science and revelation.

On the other hand, scientists such as Stephen Hawking deny the existence of God and allow no other approach than the scientific one (cf. Michael White/John Gribbin, *Stephen Hawking: A life in science*, Penguin 1992). It is exactly this "purely scientific approach" that the physicist and Nobel prize winner Gerd Binnig finds too short-sighted. He demands the necessary contribution of philosophy to science, and he states in view of religion: *"So far, no scientist has been able to prove the non-existence of God."* Even though religions give widely differing accounts of the origins of life and the evolution of human beings, that in itself need not necessarily lead to a conflict between religion and the natural sciences. For, he states, *"religions address more profound levels of our fractional intelligence, than the sciences can do. But what we designate as 'the irrational' is an important part of the 'rational' part of our being and needs just as much nurturing"* (G. Binnig).



Some Scientists such as Stephen Hawking deny the existence of God and allow no other approach than the scientific one.

According to Matthew Fox, the pioneer of a creation-cosmos-related spirituality and Director of the *Institute in Culture and Creation Spirituality* in Oakland, California, USA, science has already carried out a paradigm shift. Today's science is re-discovering the mysterious aspect of our universe and is developing a new history of creation. Other scientists do not say anything about the metaphysical[1] questions in nature, that is enquiring into what is beyond the measurable in nature. They limit themselves to the recognisable laws, the predictability and consistency of natural phenomena. *Why* these exist and *who* has written these laws into creation, are questions not asked, at least not in public.

[1] FromGreek *meta* = going beyond ; *phyis* = nature.

Without science - as it has been so intensively practised in the last three centuries – progress in knowledge and consequently in technology would not have been possible.

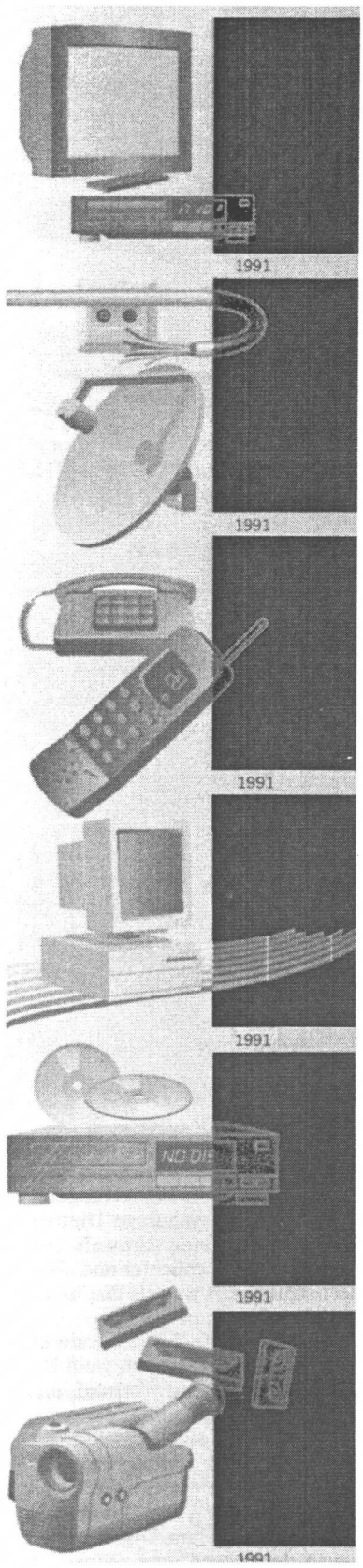
An example: Science recognises that sounds, and that includes human speech, consist physically of varying sound waves, and that light, too, consists of waves. This is the precondition for technological inventions that make possible our world-wide communication.

We give such technical aids artificial scientific names mostly with the help of the 'dead' languages, e.g., Classical Greek and Latin. Our *telephone*[2] is a Greek word, *television*[3] is a Greek-Latin compound, so, too, is *automobile*[4].

With the help of the telephone we can speak to people who live thousands of kilometres away from us, and thanks to the television screens in their homes, millions of people were able to witness the first step of humankind on the moon. Meanwhile, the content of whole libraries can be tapped at our desks through the Internet.

Technology is the application of knowledge which we have gained through science. Science chiefly continues to follow its own paths, mostly unobserved, remaining professional knowledge among experts, while technology affects directly our daily lives. There is no corner of this planet which remains untouched by technology.

Thanks to the achievements of science and to its practical application in technology, our life has been made much easier.



Technology like TV, Telephone, Computer and Internet directly affect our daily lives.

[2] From the Greek word *telephoné* = *tele-* (= far, distant) + *phoné* (= voice).

[3] From the Greek particle *telé* (= far; distant) + the Latin noun *visio* (= sight; seeing).

[4] From the Greek word *autós* (= self) and the Latin word *mobilis* (= mobile, moveable).

We notice that science and technology can also have negative consequences, which people are slowly becoming aware of even in the industrialised countries.

Labour Market

We see these consequences in their worst form in the job-market. Over one hundred years ago, Pope Leo XIII, in his Encyclical *Rerum Novarum*, had deplored the wide chasm that exists in a two-class society between an excessively wealthy party that completely dominates both industry and the market and, on the other side, the masses, namely, those whose worth lies only in how much their working power can be used to achieve maximum profits (cf. RN 47).

In retrospect on the occasion of the anniversary of *Rerum Novarum*, Pope John Paul II summarises in his memorial Encyclical Letter Pope Leo XIII's analysis of the situation thus:

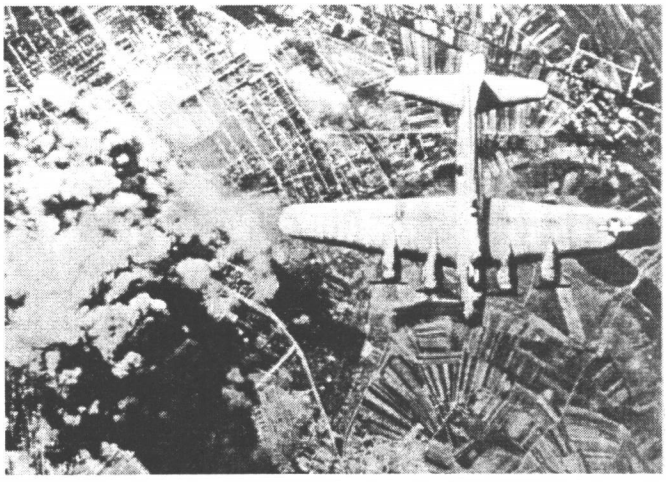
A new form of 'property' had appeared - 'capital' and a new form of labour -'labour for wages', characterised by high rates of production and a lack regarding sex, age or family situation, and were determined solely by efficiency, with a view to increasing profits.

In this way labour became a commodity to be freely bought and sold on the market, its price determined by the law of supply and demand, without taking into account the bare minimum required for the support of the individual and his family. Moreover, the worker was not even sure of being able to sell his own commodity, continually threatened as he was by unemployment, which, in the absence of any kind of social security, meant the spectre of death by starvation (Centesimus annus, 1991, 4).

John Paul II further notes that nothing has changed in regard to this lamentable situation, especially in the countries of the South. Meanwhile this applies increasingly to the industrialised countries *"where the constant transformation of the methods of production and consumption devalues certain acquired skills and professional expertise, and thus requires a continual effort of re-training and updating"* (ibid. 33). This makes the working men and women redundant after they had been enticed to move to places of industrial production. A return to a traditional way of life and work is denied them. People now remain dependent upon the regimented work-places that assure them of their survival from one day to another. This inevitably leads, however, to a severe struggle for a job, without which it is almost impossible, in our present society to lead a dignified human life. This negative development, up to the present-day, has been restricted to some few industrialised countries, but with increasing industrialisation it is extending to more countries around the globe.

War: "the Father of all Things"

In addition to this, we are forced to acknowledge that even useful technologies have often been researched, invented, and then applied for military purposes. Two and a half thousand years ago, out of a similar experience, the Greek philosopher Pindar named war as the 'Father of all Things', that is to say, the epitome of all that we call progress. Even today knowledge is often gained under pressure from the armament lobbies and solely for the purpose of war, the physical destruction of life and resources of progress.



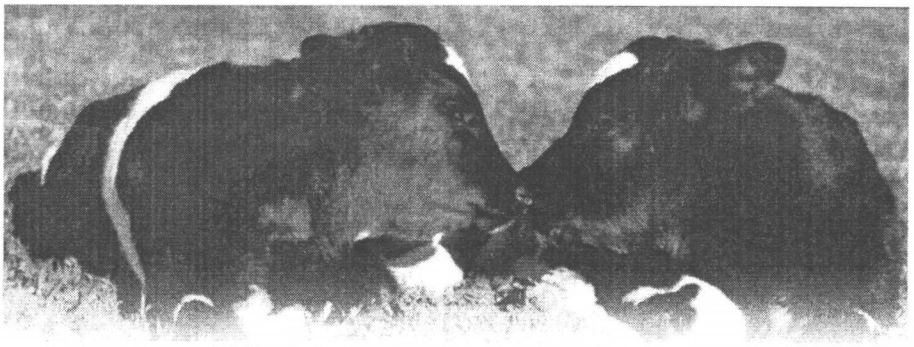
Air-raid in World War II.
Knowledge is often gained solely for the purpose of war.

This is also true, for example, for the first practical use of aeroplanes as well as for the modern long distance airliners that now link continents and therefore also people. Not until this rapid network of connections had been established was today's globalisation possible. It is nowadays a matter of indifference where, or in which country, on which continent, goods can be produced or where they can be marketed. And this has resulted in the free market adopting, so to speak, belligerent characteristics. It is no longer a case of merely exchanging goods, but of physically excluding competitors, of extending and consolidating monopolies of power, all for the purpose of profit. By this form of unbridled capitalism, as the Latin-American bishops have called it, out of the painful experiences of their peoples, human dignity, human happiness, and even human lives are sacrificed without any scrupulousness (cf. LU 21, Part 1).

The scientific knowledge of the atomic elements of matter was first used in the construction of the nuclear bombs. It is only much later that the attempt was made to use nuclear energy for peaceful purposes. The Chernobyl disaster has forced us to recognise the danger of even the peaceful use of nuclear energy. Had this power-station been destroyed in war-time, with even more catastrophic consequences for people, animals and nature, it would have been celebrated by the aggressors as a great success.

Gene technology

Research into the fundamental elements that make up life and the development of gene technology give rise to anxiety; after all, it is a legitimate cause for concern that in using this technology we may not only be helping to protect our crops from harmful insects, and possibly help to eradicate diseases such as malaria, cancer and AIDS and avoid the development of defective life-forms; but at the same time, research and development in this field has also given rise to a totally new form of exploitation and sheer robbery. The nature of this robbery consists in looking for plants, insects and animals that have special qualities suitable for gene technology, and, once discovered, to treat this discovery as a patent, that is to say, to patent life itself as if it were merely a question of patenting a technological invention. The so-called 'Harvard-Mouse', which had a 'foreign' gene implanted into its own genetic pathway has been patented in the USA in 1988, the first time in the history of humankind that a mammal has been patented.



Early in the year 1998, North American researchers reported their success in taking the greatest step so far towards breeding animals that serve as a bank of source material for the production of medicaments. They cloned the calves 'George' and 'Charlie', whose genes they had artificially altered. Theoretically, therefore, it is then possible to use these cows as living 'bio-reactors'.

One decade later, not only had plants been cloned[5], but also the first large mammal, a sheep named Dolly was cloned, in the United Kingdom, and an ape in the USA. In the meantime plants and domestic animals are being cloned quite as a matter of fact.

Already voices are being heard to say that with the help of this new possibility humankind can be blessed with a second edition of what have been unique geniuses up to now. Some are even dreaming of reproducing scientists, or political or sporting celebrities, others are looking at the possibility of producing the perfect human being. The pleas of some desperate parents who

[5] The Greek word *klón* = shoot, branch, twig. Originally, it was used for asexual reproduction. Today, in science, it means the production of identical beings.

have lost their child and are now expecting scientists to present them with a second version of their child with the help of cloning techniques in use are common.

To produce two or more editions of one and the same human being in the near future can only be achieved by professionals. The prohibition of cloning world-wide is a welcome move. However, this will not prevent the cloning of human beings any more than similar sanctions, even capital punishment, prevent criminal activity. We shall soon have to coexist, therefore, with beings that are the products of science and technology. Ambitious scientists and gene technologists will take care of that, just as much as the potentates and the smug personalities in our world.

The new possibilities of identifying the gender of an unborn child at an early stage, of planning whether a child should be masculine or feminine, above all, the diagnosing of genetic defects, all these place the parents concerned, and also society as a whole, in a situation of hitherto unknown responsibility.

Market at Abidjan, Ivory Coast.

Exploitation

The deeper knowledge of the human psyche that science has brought, doubtlessly helps us to cope better with life, but at the same time this knowledge is being misused to manipulate the political opinions of people and their habits of consumption to the advantage of those in positions of power and in the business of making money. This is a world-wide phenomenon. In addition to this, for most of the people in the Southern hemisphere the vast majority have scarcely any access to the blessings of technology. They have experienced technological progress as a curse and little else: they have experienced at first hand the plundering of their natural resources by the industrialised nations, who deposit their toxic waste and who establish dangerous and health-endangering production sites in their countries. That all this takes place in agreement with the central governments without regard for their own local population is not a concern.

People who experience progress, usually thought to be synonymous with science and technology, as something that is to their disadvantage and even harmful, become suspicious. All too often they are forced to recognise that both, science and technology, are subordinate to the interests of the ruling political class, and not to the people, certainly not to the millions of impoverished people. Over and above this, the life experience of the poor and the accumulated and cherished centuries-old arts of survival, their wisdom, all are dismissed contemptuously as backward. They are looked down upon as underdeveloped, as the Third World. But it needs to be stated here that their accustomed modest way of life, perhaps even their poverty, has only now, as a result of the influx of technology into their sphere of life and work, led to an utter dependence and consequently to destitution and misery.

Need for a new view of science and technology

1.5.

In spite of the negative experiences in connection with science and technology, many people in countries of the South also regard them with fascination, as if science and technology were the new agents of the salvation of humankind, to whom, as a matter of fact, one has to offer sacrifices like to the gods of old. Such worldwide experiences and insights force us to reflect anew on science and technology. The future of humankind will depend on whether we shall succeed in subordinating science and technology to the service of people and of creation.

Franciscans of all kinds, lay and religious, have an attitude to the world that allows an independent view of what science and technology are. This attitude can also serve as a fundamental Christian orientation. It is our task now to decide, whether and to what degree the pressing needs, the 'There-is-no-alternative' of the politicians, the scientists and the technologists can be allowed to determine the way people live.

Many people in the South regard science and technology as new agents of salvation.

2.

On the Way to a Holistic Knowledge

The end of a naive belief in science

2.1.

First of all we can state that based on the experiences mentioned before that the age of blind faith in science is over. In the course of the last three centuries science enjoyed an ever-growing respect that was scarcely put in doubt.

The word *scientific* was not only a seal of approval, it meant as much as definitive. "It has been scientifically proved" was the statement that brooked no contradiction, allowed no doubt.

With its claim to be final and definitive all other areas of intellectual life became increasingly subject to scientific attack. This was true of philosophy, ethics, and psychology as well as pedagogy and religion.

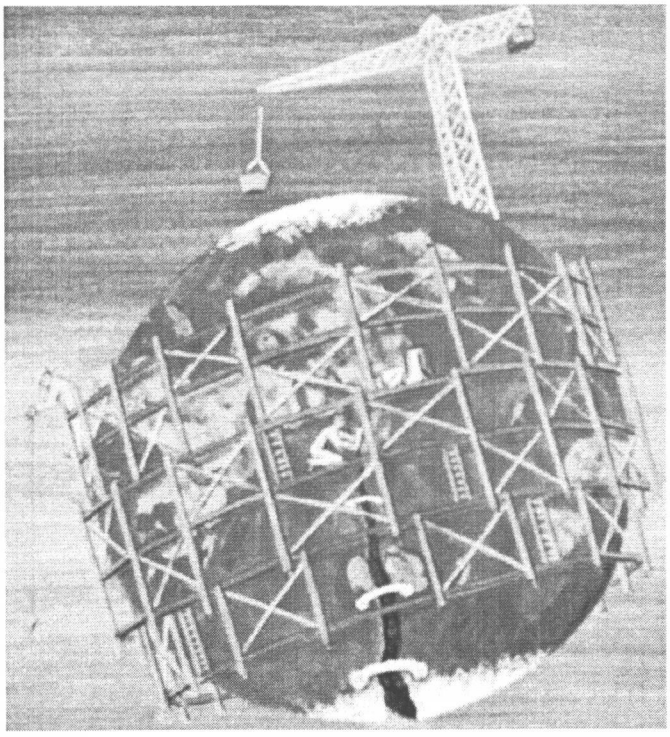
Outside of what was, up to then, the methodologically and critically comprehensible and comprehended, there seemed to exist nothing but intellectual blindness and superstition.

Scientists of today have become more cautious. They know full well from the history of their own fields of research that what has often been held to be scientifically and finally proved for all time, turns out to be provisional and temporary, or even false. Whoever uses the trial-and-error method, knows his or her limitations and the relative validity of his or her limited knowledge.

Presented with the atomic menace and environmental pollution, the threatening collapse of the natural systems on our planet and the increasing social problems, even lay people are beginning to have doubts about the finality and infallibility of scientific proofs, above all of the way they are applied in technology.

More than just a few scientists themselves are beginning to wonder how this kind of scientific thinking could come about, but most of all this frighteningly massive irresponsibility of some scientists in face of the consequences of their research.

So the perception is growing that the individual scientific discipline gains knowledge only within a limited section, and that it needs to be complemented, that it often works on provisional assumptions, and, above all, that it is subject to



The individual scientific discipline needs complementation.

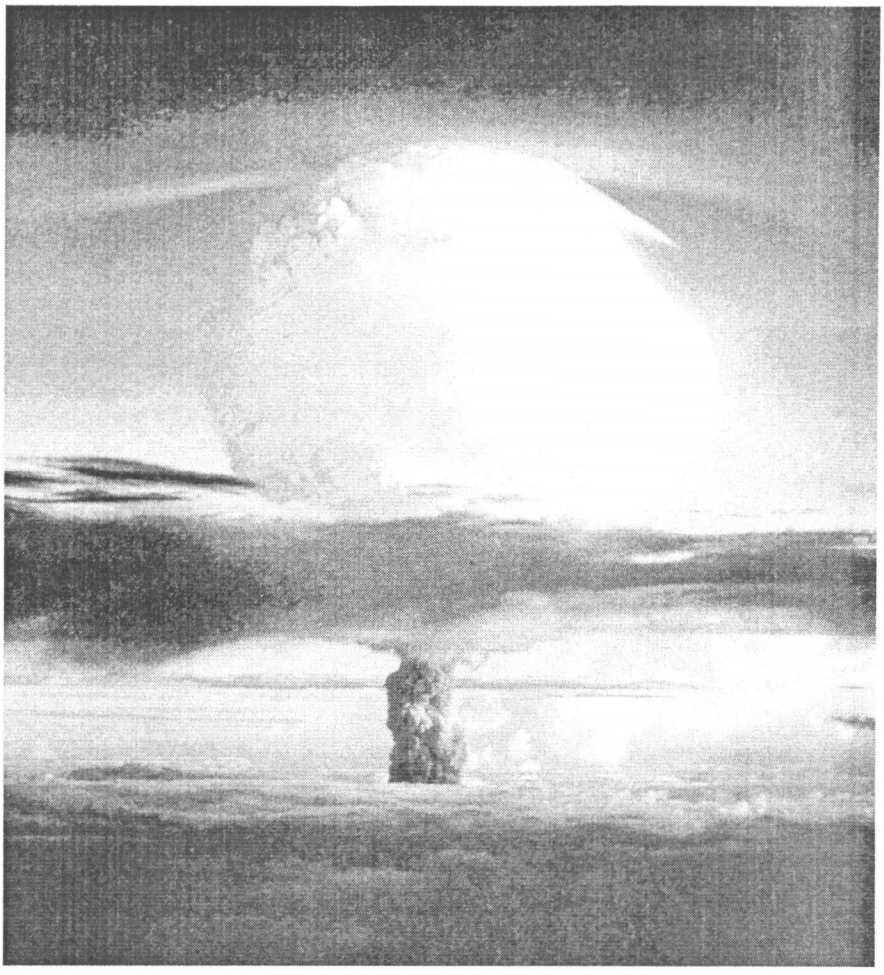
research-leading interests. This can be ascribed to the personal ambition of the scientists or then again to their employers. Experience teaches us that it is not a matter of indifference whether a research programme is being financed by politicians, or by the economy or industry or the military. Often all these interested parties mentioned above, have a collective interest in the same scientific result, each for its own purposes. Thus there is a need for a general all-embracing overview that does not lose sight of the whole of reality, the human person and creation, which is the basis for life. For this intellectual networking is required in all fields.

Technology: expectations and fears 2.2.

As we have already seen, it is only the practical application of science in technology that has ensured its deep influence on our life. The discovery of the Law of Gravity in itself did not make the burden of heavy manual labour any lighter. It was only when this knowledge was applied in the manufacture of helpful machinery that the physical strength of an individual was multiplied by far. On the other hand, technology offers to science necessary tools and possibilities for research without which none of the modern sciences could be conceivable. Yet, science is ready to shift the responsibility for the consequences of its researches on to the shoul-

ders of technology, as if there was no direct connection between atomic research and the atomic bomb, or between genetic research and gene manipulation.

The ever deeper penetration into the mysteries of creation and of life has led scientists not only to wonder at creation and its Creator, but also has tempted them to play at being the 'Creator' themselves, to improve on nature. For example, scientists created light before which the stars themselves pale into insignificance; scientists engender heat that rivals that of the sun, and to create life itself or to 'correct' it so that it can be used for new purposes. To think that such schemes, once they have been realised, may be in the hands of weak humans who continually give way to the temptation of power and the temptation of abusing this power, causes us to search for ethics that are binding for all.



Nuclear explosion over Hiroshima in 1945.

Nature is more than what can be measured

2.3.

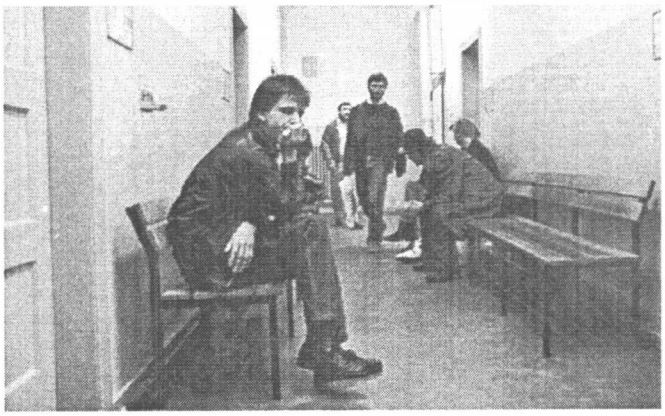
Science and technology have necessarily developed their own world of concepts, language and methods. But what they state remains just as limited as the methods they use.

As an example let us take human affection. We experience this, among other things, as a physical well-being, that can be recorded scientifically, as measurable changes in our body. However, trying to explain sympathy or antipathy exclusively by assuming the 'chemistry' between two people works or doesn't work does not do justice to those who experience such sympathy or antipathy. That this kind of expression has already found its way into technologically orientated professional groups indicates a questionable development. Human behaviour towards one another will not be associated anymore with qualities of character or personal maturity or ethics, but with chemical processes following the laws of nature.

Science cannot express what a glass of fresh water actually means for a thirsty person, a crust of bread for a hungry person, a word of consolation or sympathy for some one who is suffering,

or what a look or the touch of a hand means for someone in love. Nor can it grasp the value of one's own work, or the worry about being jobless. The amenities that technology offers also endanger the environment and very often hinder the creative activity of individuals.

These insights do not deny science and technology their role or their value, but they firmly stress their limitations and dangers and make their subordination under a comprehensive view of humanity and creation necessary.



Science cannot express, e.g. the worry of someone about being jobless.

3. The Christian Understanding of Creation

3.1. Works of the creative Spirit

Common knowledge and common experience have the same origin as science and technology: the human being, his/her intelligence, his/her will to create, and ultimately God Who created man and woman in His own image and likeness and thus implanted in His image the capacity for knowledge and the will to create. With the aid of science and technology, the human spirit and its powers of creation have succeeded in achieving magnificent results, as a look into the cultural history of peoples proves. Apart from that, however, human acts of creation have succeeded and very recently with the interference into the genetic code of life which to many appear to be a violation of nature or a blasphemy. Perhaps the words of Pope John XXIII drawn from his encyclical of 1963 *Pacem in Terris* (PT) will help us: *"But what emerges first and foremost from the progress of scientific knowledge and the inventions of technology is the infinite greatness of God Himself, who created both man and the universe"* (PT § 3).

> ***I cannot imagine any true scientist that does not have a deep faith... Science without religion is lame, religion without science is blind.***
>
> **Albert Einstein**

If we read the first lines of the Book of Genesis, the priestly story of creation, with close attention, we will find it striking that God first makes the earth inhabitable with these words: *"Let it be ; Let there be ...; Let the water be gathered"*. But then He starts again in a solemn way: *"Let us make man in our own image, after our likeness"* (Gen 1:26).

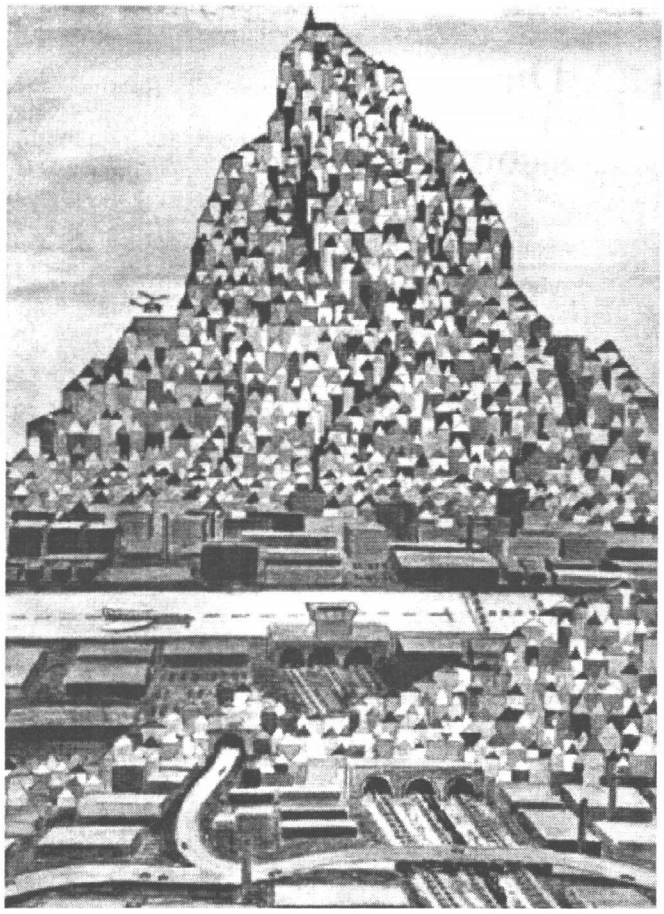
So God created man in his image; in the divine image he created him; male and female he created them. God blessed them, saying to them: *"Be fertile and multiply; fill the earth and subdue it"* (Gen 1:28).

Until the triumphal march of the natural sciences, which began some three hundred years ago, the Biblical entrustment to *subdue* the earth was understood in exactly the same way as at the time when the Story of Creation was written

"Subdue the earth" meant to harvest food from the land, to build houses and found cities, on occasion to construct aqueducts for the supply of water, to erect ramparts for defence and build bridges and lay down roads for trade and transport.

It was only when the natural sciences and their application in technology developed that this Biblical quotation was to be understood in a different way. Instead of the building and the preserving with which man was commissioned in the words of the second account of the Creation (Gen 2:15), it is now seen as a forcible dominating and subduing of the earth. Making the earth servile to man's needs is understood as the triumph of the human spirit over nature.

As long as the partly catastrophic consequences of technological progress had not yet been recognised or had not yet been sufficiently recognised, the scripture passage – subdue the earth - was interpreted as being an obligation for progress and the Christian faith was praised as the religion of the future, because by its very nature, it made progress possible, or was even its precondition. Theologians tried hard to assess the value of a religion in terms of its readiness to embrace progress.



God is the one who defeats chaos,
He wants all disorder brought into harmony.

We know now that these words of Holy Scripture originally did not mean this thoughtless and unintentional destruction, this irreverent exploitation and deliberate abuse of creation.

Modern Biblical scholarship has shown, rather, that the creation account is intended to explain and set right the chaotic conditions that have been caused by human failure. In this interpretation, the meaning of *"subdue the earth"* is as follows: *"God is the one who defeats chaos"*, He wants all disorder brought into harmony. Humankind should bring back order into the world. Like Moses was to liberate the enslaved people by leading them out of a situation of injustice and oppression, humankind is now responsible for creation. Therefore we are in need of a theology of creation that does justice to the acquired insights of science as well as to revelation.

The Struggle: theology versus science and technology

Even far into modern times theology was regarded indisputably as the mother and judge of all science. For after all, it was the generally held conviction that theology was based on the eternal truth of Revelation, and not, like the other sciences, on fallible and defective human reason.

As long as the cosmic vision of the pre-modern world was in force, then God could allow His sun to rise and shine upon the just and the unjust without this fact being disputed. And, remaining with this example the theme of the Biblical expression, was not and is not the course of the sun in the universe, but it is about the goodness of God, his patience, his mercy, which does not want the death of the sinner, and finally, God's justice which is so fundamentally different from our concept of justice.

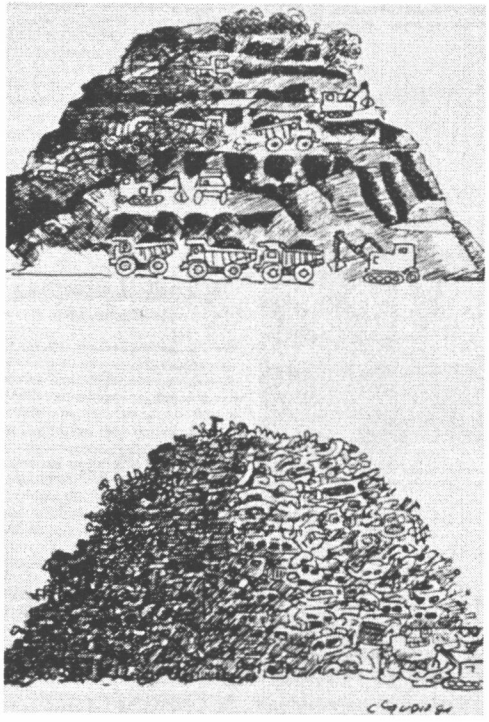
The tragic error into which the theologians fell in their debate dealing with the growing knowledge of nature and the beginning of the natural sciences is that they understood the apparent rising of the sun also as a revealed truth, and instead of accepting the intellectual challenge, they used their position of power to fight against the insights and knowledge of reason and scientific logic. The case of Galileo Galilei (1564-1642) serves as a case in point: right up to the present day his trial and condemnation is flaunted as a proof of the hostile attitude of the Church towards science.

The researcher Galilei had found out, based on his mathematical calculations, that it was absolutely sure: the earth orbits the sun. Scientifically speaking, the sun does not rise or set to give us day and night; but it is the earth that rotates upon its axis in relation to the source of its illumination, the sun. For Galilei the sun was still an immovable celestial body and the centre of the universe. On account of the assumed irreconcilability of his mathematical calculations with the revealed truth of the Word of God, the researcher and scientist was condemned and forced to recant. Today we know that the pioneering discovery of a Galilei was but a first step compared to our present state of knowledge. The problem that lies at the root of the case of Galilei, caused Pope John Paul II to set up a commission of enquiry. He himself dealt with the problem in an address to the Papal Academy of the Sciences on the occasion of the hundredth anniversary of Einstein's birth (October 31,1992). The title and theme of this address was "Science and Revelation" with reference to the case of Galilei. In his lecture the Pope comes to the conclusion that in the future, too, the possibility cannot be excluded that a similar conflict situation between science and theology may well arise if either science or theology are not consciously aware of their limitations, not only in their special fields but also in general, if they do not know the limits of their competence (cf. *Acta Apostolicae Sedis*, 1993).

Vatican Council II has shown us the way to understand creation theology for our time.

Title page of Galilei's "Dialogue on the Systems of the Universe."

The Second Vatican Council has put a great deal of trust in human reason and in its creative powers, basing this trust on the Biblical heritage (cf. *Gaudium et spes*, 4). The Council sees in science and technology two human activities that are growing closer and closer together, are determining more and more strongly our present life and at the same time cause fears for the future (cf. GS 5). As a consequence of the interplay of science and technology as it happens today, the Council specifically names changes in the social order combined with a changed spiritual attitude to life which cannot remain without influence on the psychological, moral and religious notions. False expectations and hopes that cannot be fulfilled lead to a disturbance of balance in practically all fields. This applies to the individual person, the family, and to whole population groups and to nations. The Council Fathers found the modern world to be *"at once powerful and weak, capable of the noblest deeds or the foulest; before it lies the path to freedom or slavery, to progress or retreat, to brotherhood or hatred. Moreover, man is becoming aware that it is his responsibility to guide aright the forces which he has released and which can enslave him or minister to him"* (GS 9).



All human actions are capable of the noblest deeds or the foulest.

So the Council has stated clearly the fundamental ambiguity of all human actions. This applies also to science and technology. Yet we must also call to mind that the Council has underlined the autonomy of the human and social spheres and also of the sciences. The task of scientists and technologists who are Christians would be, therefore, to take into account what standard the Bible has set and to draw attention to it, so that-over all the detailed knowledge and the specialised expertise one does not lose sight of the whole of reality, namely the well-being of humankind and the integrity of Creation. In the opinion of the Fourth General Assembly of the Latin American bishops in Santo Domingo (1992), Christians have failed in their duty here. *"As a consequence, the world of work, politics, the economy, literature and the mass media do no longer take their orientation from the values of the Gospel"* (SD 96).

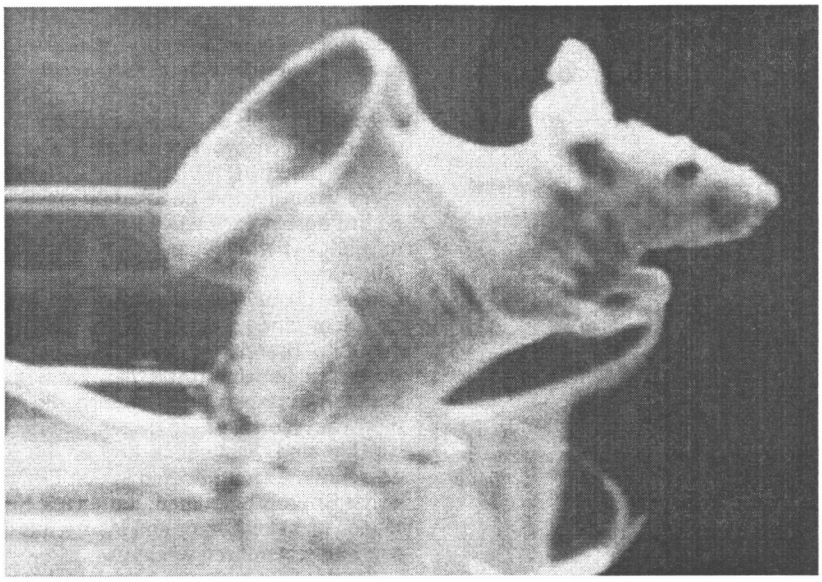
Another chapter of science, much harder to cope with than Vatican Council II could even have imagined, is one the Church has still to come to terms with, and this is the chapter of **gene technology**. It is the dilemma of dealing responsibly with the basic building blocks of life itself, genetic research and genetic technology.

For thousands of years humankind has been modifying Nature through selective breeding. Out of wild plants and grasses we have developed rice, maize, wheat and millet. We have tamed wild cattle, horses and camels and by cross-breeding them we have made them serve our purposes. We needed an animal that combined the donkey's quality of being satisfied with little, and the strength of a horse, and so by cross-breeding the two we got the mule, which is unable to procreate, and so each time we have to pair horse and donkey anew. However, it is in the breeding of dogs that humankind has gone to extremes. It is almost beyond imagining that a full-grown miniature poodle, hardly greater than a wolf-cub, is actually a descendant of the wolf.

So we have always, in accordance with our re-

spective knowledge and possibilities, tried to make animals and plants serve our concept of utility.

But now research has reached another level. It can insert into the genetic code of one living creature the genetic characteristics of another, with such precision that these now become inheritable and are passed on to the next generation. Up to now inherited, partly undesirable characteristics, had to be outwitted by laborious breeding programmes. The aberrations that this urge for research brings in its wake could not be better expressed than by the picture of the so-called *gene-mouse* published world-wide in the media. An oversized ear, taken out of the genetic blueprint of another creature and inserted into the genetic code of the mouse is growing out of its back. This mouse would be able to pass on its new form to the next generation, but outside the laboratory it has no chance of survival. Even ordinary people who are not scientists can guess what an enormous responsibility is weighing on humankind already now and will be even more so in future.



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Franciscan Aspects

Francis and science

Francis did not know modern science nor its technology. What was understood as *science* in Francis' time would be ranked today under philosophy and theology. Both disciplines sought to explore the questions about the value of the human person, his/her earthly and eternal destiny, and to gain insight into his relationship to creation with the help of reason and the insights of revelation.

In a society where even the most basic of rudimentary schooling was a rarity the scholars considered themselves to be the élite in their society and looked down upon the common people. Obviously, that was the personal experience of Brother Francis and the reason why he rejected science. Not until Brother Anthony, the later St. Anthony of Padua, showed that one could lead a form of life in which scholarship, piety and modesty were not incompatible, was Francis prepared to give it room in his Brotherhood.

The universe, work, and knowledge are the elements in which the creative spirit of Francis – in the light of Christ and the Gospel – could gain impressive insights. For him the universe was a sort of stairway on which one could climb directly up to the Creator (LMj IX:8). This intuition has contributed to make his *Canticle of the Sun* a classic, not only as poetry but also as theology and prayer. The whole universe, the cosmos, "derives its significance from Thee, O Almighty God" (CtC 4; cf. 1C 80 f.; LP 83; MP 119).

Nature, understood and loved as it was by him, revealed to him traces of the love, the wisdom, and the omnipotence of Him to Whom it owed its origin (cf. LMj VIII:6). He spoke to his fellow-creatures, convinced that they understood his speech full of wonder for God, praise of God, and gratitude to God. He called them by name, served them and treated them with respect.

Nature revealed to Francis traces of the love, the wisdom, and the omnipotence of God.

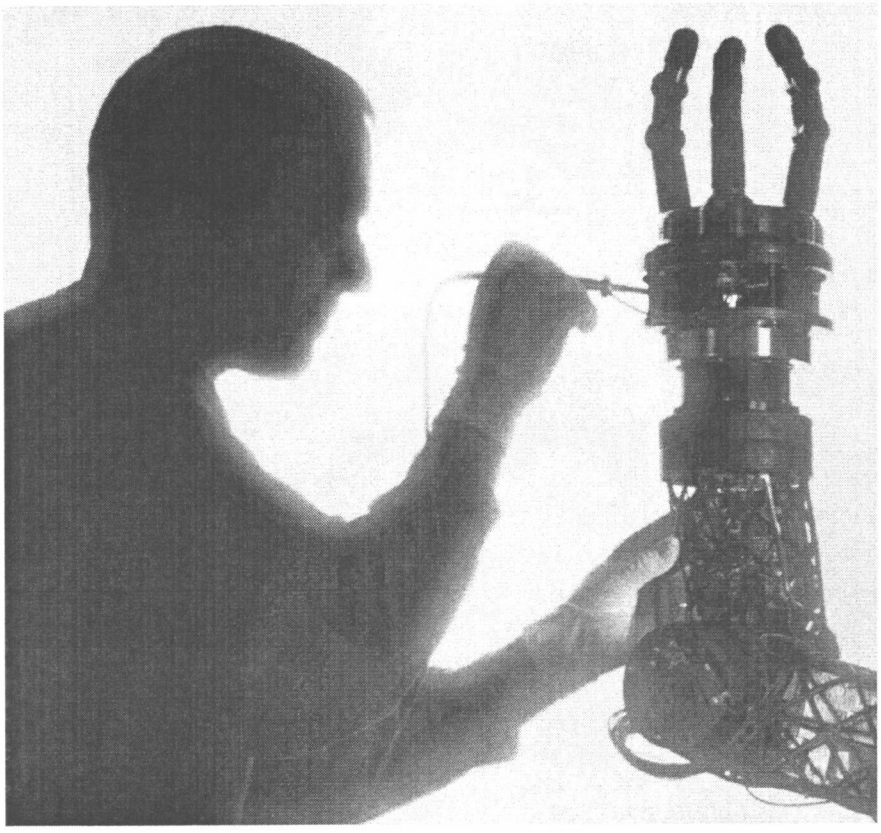
His way of looking at creation was inspired by faith and was all-embracing. He did not see it merely as a way of gaining access to a vague, distant Creator or Great Architect of the universe, but to God, the Father of Jesus Christ: "He used to embrace more warmly and to observe more gladly anything in which he found an allegorical likeness to the Son of God" (1C 77).

From this understanding of nature, the following helpful indicators can be derived:

- Nature is the way, the road, the route of the journey, the ascending pathway to God.
- Material things are not given to us that we should possess or dominate, but that we may love and understand them, serve and respect them; that we may discover their dignity and beauty, speak to them and through them come to God in prayer.
- Creation was entrusted to us so that we may be its faithful stewards, care for it and by our work awaken in it hitherto unknown possibilities.
- Protecting and caring for creation is not a passive attitude, but on the contrary it is something very active, for thus it will be freed (cf. Rom 8:22) from the ambiguous state into which it is held in captivity; so that out of it the glorious liberty of the children of God (cf. Rom 8:21) can become manifest.
- Each creature will be transformed and given back to God, each creature will be enabled to express love, wisdom and power (cf. ER 17:7; 2C 213, 217; MP 100, 123).

Francis is a living witness for us that the relationship between mankind and creation must be inspired by a dynamic balance, in which nature is respected and supported until it has reached its full potential (cf. LU 12). With Francis there is not a trace of a domineering spirit that would exploit and destroy nature. The very opposite is true: for him, creation is a gift of God for all humankind, intended to bring forth life and to maintain it; and in its beauty and grandeur, it inspires us to praise God.

Francis put intellectual activity under the same conditions as manual work. Neither should extinguish the spirit of devotion and of prayer. Today, this insight is gradually breaking through again; we can see a change of thought.



The recognition that work is also a grace highlights the variety of gifts and talents that exists.

In 1747, the French philosopher, Julien de la Mettie, formulated succinctly: 'Man is a machine' ("L'homme machine"). Since that time, the idea of a steerable and permanently improvable machine has been haunting our brains.

According to this concept, the universe, nature and humankind all function like machines. The most perfect way that conforms to the basic principle underlying creation is operating the machine by the human machine. This human machine is basically interchangeable and can be easily replaced without damage, because it can't be improved substantially. Work, in this interpretation, will be treated merely as a function and as something that can be bought. It is emancipated and disconnected from the human beings who are performing it.

The most recent insights of physical science, on the other hand, are based on the recognition of the common origin of all beings. Modern physicists understand the whole universe as an organism that is in a state of continual development. If human beings also understand themselves as being part of this universal organism, their working will become part of the customary creative activity of the universe (cf. Matthew Fox). For, as the new blueprint that has arisen from modern physics has it, even the cosmos does not obey slavishly an iron rule of law, but it is more a fertile chaos that is determined by freedom and spontaneity. This view recommends itself the more one observes, for example, climate and solar systems. Knowledge no longer is discovered in the way it has been ever since the times of Isaac Newton (+1727) by impartial observation from outside, but it is seen as a participation by both the observer and the observed (cf. Matthew Fox).

Before such a spiritual background, therefore, work loses the merely mechanical evaluation mentioned above. It gains for the human persons and for their self-esteem an almost mystical significance, as was the case with Francis of Assisi. To him people were creatures closely linked to the universe, endowed with dignity and destined for a special task in life. This dignity finds its expression in the human capacity of being able to recognise and to love not just an arbitrary reality but God, the Supreme Good. In other words, intelligence, wisdom, freedom, strength and love are in this marvellous *synthe-*

sis of the universe that finds expression in the human being. They are derived from man's condition as a creature, the image and likeness of God, but above all from his elevation and call by the grace of God, to participate in the work of creation.

In the Later Rule, Francis writes: "Those Brothers to whom the Lord has given the grace of working may work faithfully and devotedly..." (LR 5:1). The recognition that work is also a grace highlights the variety of gifts and talents that exists. It illustrates the high responsibility we have to devote ourselves to work for the benefit of others. Thus work should not necessarily be linked to reward. On the subject of the work of the first Friars Minor it was said: "During the day those who knew how worked with their own hands, staying in the houses of lepers or other suitable places, serving everyone, humbly and devotedly. They did not want to take any job that might give rise to scandal, but rather always doing what was holy and just, honest and useful, they inspired all they dealt with to follow their example of humility and patience" (1C 39).

Those to whom the Lord has given the grace of working may work faithfully and devotedly... (LR 5:1).

Work without recompense is also, among other things, to work for peace, or for the poor, that is, for those people who, as Christ said, are not in the position to pay anything back in return (cf. Lk 6:27–38). In that case, work does not have as its primary aim the material well-being of the person, but his or her spiritual growth, the devotion which is not lost through work but is in fact strengthened by it (cf. LR 5). For all these reasons work has a liberating aspect: "Their numbers increased daily and quickly reached even to the ends of the earth. Holy Poverty, which was all they had to meet their expenses, made them prompt for every obedience, robust for work, and free to travel. And since they had nothing earthly; they loved nothing, and feared losing nothing. They were safe wherever they went, held back by no fear, distracted by no cares; they lived with untroubled minds, and without any anxiety, looked forward to the morrow and to finding a lodging for the night" (LMj IV:7).

Science in a Franciscan perspective 4.4.

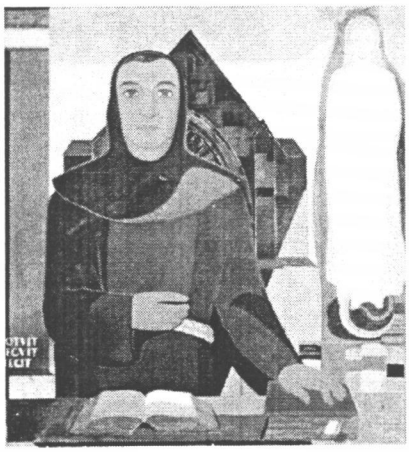
Science, as it was understood by Francis, refers above all to Divine reality. It comprises the yearnings of the heart, the employment of the will, the daily effort to advance and not an abstract and intellectual possession which is to be preserved and to be increased.

After his death, among his followers, a form of scholarship developed whose aim was wisdom. This was understood to be a savouring reflection on the creation and the traces of God in it. "To know many things and not to savour them, to what good is that?" **St. Bonaventure** once asked.

It was said of St. Bonaventure, the founder of the first Franciscan School, that he had tried to express in a scientific language what Francis had lived.

The English Franciscan Roger Bacon (1214-1294) paved the way for scientific thought.

Duns Scotus, the founder of the second Franciscan School, attempted to think of the creatures, whom Francis summons to praise God in the *Canticle of the Sun*, as a "net of love" at whose centre Jesus of Nazareth stands. In the 15th century, the Franciscans turned even more expressly to the world of created things. They were seeking to fathom the concrete and the unique, and so they became the philosophical pioneers of the later natural sciences (cf. W. Ockham).

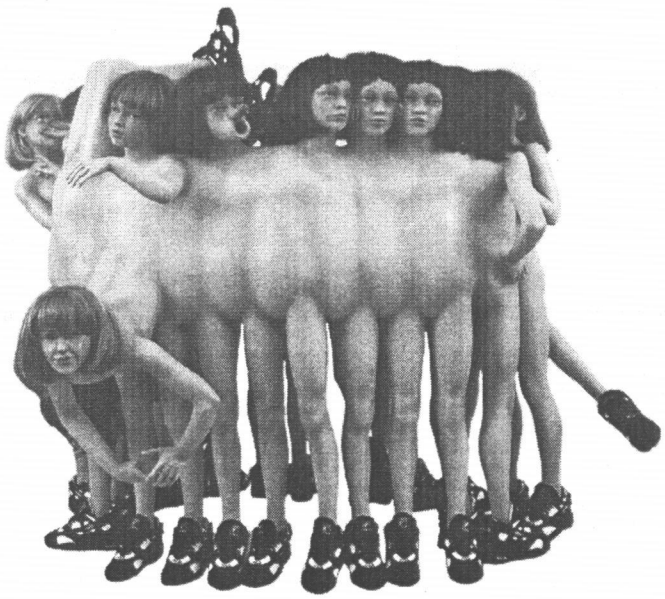


Franciscan scientific scholarship can therefore gladly subscribe to both of the fundamental statements of Vatican Council II. The first runs thus: *"Individual and collective activity, that monumental effort of man through the centuries to improve the circumstances of the world, presents no problem to believers; considered in itself, it corresponds to the plan of God"* (GS 34). The second statement says: *"Far from considering the conquests of man's genius and courage as opposed to God's power as if he set himself up as a rival to the creator, Christians ought to be convinced that the achievements of the human race are a sign of God's greatness and the fulfilment of His mysterious design"* (GS 34).

That must also be true for such momentous discoveries as DNA[6]. Its application in gene technology is understood as *"the sum of all methods which deal with the isolating, characterisation, multiplication and new combinations of genes including transgenic techniques. Under the term gene technology we are also to understand the isolating of a gene from one organism and its multiplication in another"*. This has become possible, because in all organisms the building plan is contained in the DNA of the cell nucleus because of the base sequence.

[6] DNA: a nucleic acid molecule in the form of a twisted double strand that is the major component of chromosomes and carries genetic information. DNA, which is found in all living organisms except some viruses, is self replicating and is responsible for passing along hereditary characteristics from one generation to the next. Full form: deoxyribonucleic acid.

Not only is the chemical structure of the gene the same in all organisms but so too is the genetic code[7]. It is not that the same *alphabet* is used, which is shared with many *languages*, but everywhere the same language is written and understood. This fact, which is expressed by the phrase "the universality of the genetic code", is the "most convincing proof for the common origin of all living organisms" (cf. K. F. Fischbach). Research has made one further discovery, every cell of a living creature has all the genetic memory within it. For this reason cloning is possible, that is to say the one and the same living organism with the same genetic features can be reproduced indefinitely from a single cell. What dangers lie in this capability has been already been indicated in the introduction to this section.



Gene technicians are the creative spirits of our age, because they exceed all the expectations of what a creative artist can achieve. A vision of two English artists, Dinos and Jake Chapman, entitled: Zygotic acceleration biogenetic, subliminated libidinal model.

Probably for the first time in the history of humankind, in face of immense responsibility, scientists gathered to study together ethical questions and problems that have arisen in the course of their work. They have set limits for themselves. That doesn't mean that the danger of abuse has been removed altogether, but it has been essentially lessened (cf. The Asilomar Conference of 1975).

What Brother Francis recognised intuitively and practised in his life, to see in each and every creature, in the flower, in the worm and in the wolf, his brothers and sisters, has been confirmed by science, at a different level and in its own way. He would probably see himself scientifically justified in his creation theology and its mysticism.

5. An alternative Concept of Science and Technology

Francis knew that all branches of human knowledge, even the science of God, theology, are exposed to the danger that they can be misused. Therefore he took another path. He tried to make love the starting point for knowledge and science. In other words, science must serve humanity. The same applies to trade and commerce: the right use of material things, the correct use, cannot be achieved while we mercilessly, exploit these things by exercising power over them, but

[7] *Code*, an English word that means encrypted, yet at the same time there is a set order in a system.

when we respect their dignity as creatures of God. Both of these statements are significant also for today, if we want humankind to have a future. This attitude towards creation demands a radical conversion of each and every person and each community: a complete turn-about of institutions as well as the preconditions that one has to take into account world-wide. Science and technology are two indispensable and extra-ordinarily powerful, effective instruments to reach this goal.

An alternative project of technology

5.1.

In general it is often overlooked that science has much more to do with assumptions than with sure results; that it is more subjective than objective; more based on provisional views than final laws, and is more devoted to ideology than to truth. Science is more often than not the cause of the problems rather than their solution, as it has no access to the fullness of reality at one and the same time.

Today, this deficiency is acknowledged by the scientists themselves. It is a striking fact that it is those involved with natural science who are now seeking a complementation in philosophy or meditation, e.g. the nuclear physicist Albert Einstein, and others. The idea that Francis should be declared the Patron Saint of the Environment arose from among circles of natural scientists. The age of the Universal Scholar has come to an end. Scientists today are well aware of the relativity of their own knowledge and achievement.

Therefore more than ever before, they seek cooperation with other disciplines, not least with the humanities: philosophy, ethics, religion and art. Theology will surely have an important role to play in providing a connecting network.

Technology is not neutral

5.2.

Like science, technology also reflects the values of the society in which it developed. Wherever the principle "Time is money" rules, the bothersome time factor will be reduced as much as possible with the aid of science which helps develop the corresponding technology to save time. There too , where this kind of technology has been introduced, the traditional customs and habits, and with them, the scale of values which underlie that group, will change.

That is true of all spheres of life: the technologies of production, communication and transport, just as much as for the preparation and consumption of food. Cooking that uses up so much time has been reduced to a matter of a few minutes with the help of a whole collection of technical gadgets. A whole series of industries serves to satisfy the demand for fast food, quickly cooked and quickly eaten. The first link in this process is the agrarian industry in which domestic animals and food-crops are produced through factory-farming techniques. Here the factor *time*, that is to say, the natural growth period will be drastically shortened with the help of chemical additives and hormone injections. The most recent development is direct intervention and manipulation of the gene, which serves the same purpose. Meat-factories, monocultures, machines for the conservation of vegetables and a correspondingly well-stocked market - a super-

market – is the logical outcome of such a way of thinking. The problems of intensive factory-farming are common knowledge; and to name but a few examples: new kinds of animal diseases to which human beings are now becoming more and more susceptible, residues of hormones and antibiotics in foodstuffs of animal origin. Finally, food for human consumption is fed to animals, valuable arable farmland is diverted to large-scale stock-farming or, for example, the fragile eco-system of the tropical and temperate rainforests is irreparably destroyed for a short-term exploitation. And all this happens, not to fight hunger, but, taken from a global perspective, to satisfy the special wishes of the minority.

Local resources, both in material and technology, are to be preferred to expensive, imported goods and high-technology machinery.

In the industrialised countries, agricultural machines were developed to make it possible for one worker to replace 10 to 20 agricultural workers that were needed before. This progress was, at first, a kind of emergency measure, as many farm labourers had gone to work in industry. The export of such machinery to many countries, on the other hand, deprives many of the local people of their livelihood, and serves only to enrich even further the big landowners and serves the interests of the agro-industry. In short, technology is more than technology. It is important to pay close attention to what purpose it is intended to serve. In the last analysis, is it for people or for the market? The demand for adjusted technology, so often voiced today, is usually made with the southern hemisphere in mind, and focuses on the idea of supplying easily operable machinery. Technology must be adjusted and regulated by the real needs of people.

To define this need would be the task of the people on the spot so that they should bear the responsibility and consequences of their own decision-making and not to have to suffer the consequences of others' decisions.

"Help them to help themselves", another fundamental principle, presupposes that the local people work for and pursue the objective responsibly. This is valid for the people of the southern hemisphere just as it is for those in the industrial nations of the north. It is quite obvious that they are being seduced to adopt new, superfluous and even harmful technologies. A responsible usage of technology, has to be aware of the following criteria.

- The natural, cultural and social environment determines what kind of technology is required and what kind of technology must still be developed.
- The only acceptable form of technology to be used is that which carries the relatively least risk.
- The technology must be adjusted to contribute to the removal of unjust social imbalances and not to increase them.
- Local resources, both in material and technology, are to be preferred to expensive, imported goods and high-technology machinery.

These four criteria listed above, stand, of course, in contrast to a way of thinking that sees the application and development of technology exclusively in the light of commercial competition and market shares. In such a mental attitude also lies the danger to think that for all the problems that a technological civilisation creates there will be an exclusively technological solution at hand or promised.

Guided by these criteria unrealistic would-be solutions will be avoided while self-confidence and

the will for self-support and self-reliance are growing. Technological progress for market purposes creating immediate needs only leads to a humiliating state of dependency.

The fate of the poor was near the heart of St. Francis. The slogan: "Produce more, produce better!", often proclaimed as *the* antidote to misery and destitution, would be unmasked by St. Francis as nothing more than a call to self-enslavement.

Pope John Paul II has warned the peoples of Africa (Abidjan, Ivory Coast in 1980):

It is very dangerous to imitate or to want to import what has been made elsewhere, for no other reason that it comes from 'developed' countries. Developed they are, but in which direction?

The exodus out of slavery, inhuman conditions and exploitation will only be successful when, God is on the side of the enslaved People and goes ahead of them as in the time of the first Covenant. That is to say, if the People of God does not cry anymore for 'the flesh-pots of Egypt', and abjures the old idols in order to become the People of God in whom the love of God and the love of one's neighbour will become the pillars also of the political society.

Documents of the Church and Franciscan Sources

Scripture:	Gen 1:26.28; 2:15; Lk 6:27-38; Rom 8:21 f.
Documents of the Church:	CA 4, 33; RN 47; GS 4, 5, 9, 34; PT 2; SD 96; EV
Franciscan Sources:	1C 39; 77; 80; 2C 195; 213; 217; ER 17:17; LR 5; 10:7-9; Adm 7:1-4; LMj IV:7; VIII:6; IX:8; CtC 4; LP 7; 83; MP 100; 119; 123.
Inter-Franciscan Documents:	
OFM, OFMCap, OFMConv	
Poor Clares	
Third Order Regular:	
Secular Franciscans	
Supplements	

Note: The participants may add the sources or documents of their Order/Congregation to this list.

Exercises

D

Exercise

Francis writes

- ***In the Later Rule:***

At the same time, I admonish and exhort the brothers in the Lord Jesus Christ that they beware of all pride, vainglory, envy, avarice (cf. Lk 12:15), *cares and worries of this world* (cf. Mt 13:22), *detraction and complaint. And those who are illiterate should not be eager to learn. Instead let them pursue what they must desire above all things: to have the Spirit of the Lord and His holy manner of working, to pray always to Him with a pure heart and to have humility, patience in persecution and weakness, and to love those who persecute us, find fault with us or rebuke us, ...* (LR X:7 ff.).

- ***In Admonition 7, "Good works must follow knowledge":***

The Apostle says: the letter kills, but the spirit gives life (2 Cor 3:6). *Those are killed by the letter who merely wish to know the words alone, so that they may be esteemed as wiser than others and be able to acquire great riches to give to their relatives and friends. In a similar way, those religious are killed by the letter who do not wish to follow the spirit of Sacred Scripture, but only wish to know what the words are and how to interpret them to others. And those are given life by the spirit of Sacred Scripture who do not refer to themselves any text which they know or seek to know, but, by word and example, return everything to the most high Lord God to Whom every good belongs* (Adm 7:1-4).

Questions:

1. **Look for reasons that could have moved Francis to write these sentences.**
2. **Which understanding of knowledge can you find in these texts?**
3. **How would you formulate these texts today?**

2.

Exercise

The Manufacturer of Heavy Oxygen, **M. Thürkauf** has been busy for many years working in the field of atomic research (isotope separation) and enjoyed the highest reputation un-

til he broke out of the rigid system of thought current among modern scientists. He wrote a book: *"Technomania, the Deadly Disease of Materialism. Causes and Consequences of the Technological Excesses in our Time."* The following quotation is taken from this work:

The criticism expressed in this book is drawn in hard lines. It is the critical judgement after a forty-year long love of Natural Science, which today is being abused through an excessive, exploitative application of its achievements by a technomaniac profit-obsessed industry. Decades of experience both in research laboratories as well as in industry underlie these observations that are published here. My work in the field of the production of nuclear energy, isotope separation and thermodynamics have led me to that kind of "Damascus experience" that made me to distance myself from the materialistic type of research of Nature, to that critical standpoint expressed in this book. For the reader it may well be of interest to know that my own profound 'conversion' induced a change in the opinion of the interested circles in the industry: The acknowledged specialist and expert Thürkauf became a crackpot who understands nothing about producing atomic energy. This could be illuminating for the lay people, who hear time and again from governmental sources that a distinction must be drawn between scientists who understand something about nuclear energy, and those who don't.. I am not putting Natural Science on trial: it is after all the mistress of my heart, but I am taking issue with those with inside knowledge who ought to know better and who are misusing it to construct materialistic ideologies and to plunder the earth by means of a form of technological megalomania.

Questions:

1. **What criticism does Thürkauf level at modern science?**
2. **Do you know of any similar statements from scientists of your region?**

3. Exercise

You encounter Science and/or Technology in your own private and professional life.

Questions:

1. **Where has something changed fundamentally?**
2. **Where did you have to adjust?**
3. **Where have you been overrun from developments?**
4. **Which conclusions do you draw from this?**

Exercise

Read the following texts:

- *From Africa*

Aimé Césaire, the poet of *négritude* is not far from the Franciscan mentality in his poems:

Blessed be those who have never invented anything
who never did researches
and who never tamed anything,
but, themselves enraptured,
openly devote themselves to the essence of things,
who seized by the vibrations of things
disregard the external
and, indifferent to power, delight in the play of the world;
truly the first-born among the children of the world,
who, aware of every breath of life
who fraternise with each and every respiration,
in which the currents of the world
mingle without straying aside,
in whom the spark of the sacred fire of the world glows,
corporeal limbs of this world
through whose veins flows
from the heart-throb of the earth
life-blood.

- *From Asia*

Martin Buber had already collected, by 1910, *The Words and Parables of Chouang-Tse* in order to make the Taoist doctrines of China accessible to the West. We have taken the following extract from the *"Parable of the Gardener"*:

Once upon a time, Tse-Kung was returning from Thschu on the way to Tsin, passing by a place north of the river Han. There he saw an old man, who was cutting an irrigation ditch to link his garden with a spring. He was scooping water out of the spring with a bucket and was pouring it into the ditch – a laborious task with little obvious success.

'If you had an engine here,' called out Tse-Kung to him, 'you could irrigate your land in one day a hundred times over with very little effort. Wouldn't you like to have one?'

'What is it?' asked the gardener.

'It is a lever made of wood,' answered Tse-Kung, which is heavy behind and light in front. It draws water out of the well, just as you do with your hands now, but in a constant overflowing steam of water.'

The gardener looked at him with irritation, laughed and said:

'I have heard this from my teacher: those who have cunning advice, are cunning in their business transactions, they have cunning in their hearts, and those who have cunning in their hearts cannot remain pure and unspoilt, and those who are not pure and unspoilt are distracted and restless in spirit, and those who are restless in spirit cannot offer hospitality to Tao. Not that I would not know these things, but I would be ashamed to use them.

Tse-Kung was embarrassed, bowed his head and said nothing.

After a while the Gardener asked him: 'Who are you?'

'I am a disciple of Khung-Tse,' answered Tse-Khung.

'So, said the gardener', you are one of those who increase their knowledge in order to appear wise, who boast in order to set themselves above the crowd, who lonely sing

melancholy songs in order to increase their reputation.
If you could forget all the powers of your mind and rid yourself of your gestures, then you would be near.
You cannot rule yourself and want to rule the world? Go your way and disturb my work no more'.

Questions:

1. **In what way do these texts relate to St. Francis of Assisi?**
2. **Look for texts in the writings of St. Francis with a similar attitude towards nature and creation, and write them down or read them aloud.**
3. **What is valid today about this 'naive' attitude of mind towards creation?**

Exercise

To live like Brother Francis?

They had come into the country from Europe as aid-workers, the two young people. In reality, the agronomist and the ethnologist had met in the middle of Africa while fleeing Europe.

For a long time they searched for the wisdom of the Ancients. Even during their university days they went on meditation courses with enthusiasm, sat several times at the feet of an Indian guru, and were committed to the struggle for human rights. It was through the ecology movement that they finally met Francis. The Poor Man of Assisi seemed to offer them direction, the rediscovery of the simple life, harmonious living together in community with people from other cultures and faiths, and respecting creation. This was important for them, knowing themselves to be at one with the universe.

When they were knitting a pair of socks or a pullover in the evening, these two, now a couple, in front of their African hut and enjoying the evening of the day, they were being strengthened in their conviction that they had found the right way of life. Of course, they had no electric light or telephone, no refrigerator and not even a television set but with lots of time for each other and for the people they were to *develop*, according to the words of their contract. They had time for a Palaver, which lasted hours until everyone had an opportunity to have his or her say, and which would last even longer until a decision was reached with which everyone had made a responsible contribution to the final decision. During such discussions, it was the two relief workers who were assigned the role of prudent counsellors, but both of them came from lands that had known the shadowy side of development. Last but not least, the agronomist had turned into a warning voice against too much technology under the gentle intuition of his wife.

And so the years passed, years of a committed, alternative life - until the moment when the great disaster struck the village and changed the life of everyone in it forever. A long period of exceptionally hard drought was followed by day-long rains and floods. Then one night the hill, on whose slopes the settlement had been founded for as long as people could remember, began to move. Forewarned by suspicious noises the grown-ups could scarcely get any sleep. When suddenly there was a deafening noise, they seized their children and ran out without a moment's hesitation, screaming, into the pitch-black night, running for dear life. Several huts were fully buried in the liquid mud, others were

crushed flat like matchboxes. Aimlessly, and with their bare hands some tried to dig for those buried underneath. They could not stop, not even when daylight revealed to them the full hopelessness of the situation. It was a miracle that no one had been killed. Many were injured, some even gravely, the majority were chilled and were running temperatures. Even the house of the relief-workers was destroyed. They found refuge, like all the rest, in a neighbouring village after a two hours' walk in pouring rain, soaked through to the skin and frozen. When they had recovered from the first shock the next day, then came the tormenting questions: 'Have we failed? If we had a telephone, would the soldiers in the next town have been able to help? The frightened, injured and sick people would have been spared the long trek at least, and the children would have got some dry clothing and at the same time a warm meal. And they wondered whether they had been right to warn the people against technological progress so enthusiastically. On the following afternoon help arrived at last. A doctor and many nurses busied themselves tending to the injured and especially those children who already had a high temperature. Those seriously injured were taken to the nearest hospital by an all-terrain military truck. There were blankets, hot tea, and for everyone a warm meal from the military field-kitchen.

The relief workers saw that their dreamed-of paradise had been destroyed once and for all, but human lives had been saved. The following evenings were spent trying to come to terms with science and re-thinking their relationship with technology. More and more often they asked themselves how Brother Francis would think and live today (Othmar Noggler, OFMCap).

Questions and Tasks:

Read this story:

1. **Enter into the role of the protagonists in this story and try to *feel* their pain: ask yourself why this apparently well-intentioned experiment failed?**
2. **Discuss among yourselves how Brother Francis would deal with this sort of situation today.**

6. Exercise

The Structures of Consumption.

The supermarket – a world of soup-tin walls, palisades of milk-cartons, mountains of fruit and the 'pings' of the check-out bells. It is a world that always persuades us to buy more than we need, to buy something we did not intend to, and to remain longer there than planned.

Every supermarket begins from the right. Most people are right-handed, they drive on the right, and when they look they always look to the right Immediately inside the entrance the tomatoes shine, the apples gleam and the lettuce is freshly picked from the farm, green and glistening. After the fruit and vegetable section, the shopper dives into the supermarket's labyrinth of aisles. On the right-hand side the humming of the metre-long deep-cooled shelves of the dairy-products section: with yoghurt, cottage cheese and milk. Unconsciously, the customer's mind will be thinking about the course of the day involuntarily: breakfast milk must be bought, but

it would also be quite nice to have some kefir and soft cheese. And because the milk is at the other end, the eye of the customer must first sweep along the long rows of other dairy-products. Quite by 'accident', on the left–hand side, filter paper for coffee, tins of tea and pots of marmalade sparkle.

The psychologists arrange the sequence of goods offered according to the inner map and clock of the customer: after the morning, midday, - so meat, fish, herbs and spices and tinned vegetables. Then came the evening section: wine, beer, spirits, savoury biscuits and chocolate. This is the principle behind all merchandise groupings.

After 15 minutes, on average, with a fully loaded supermarket trolley, the customer arrives at the check-out point, where there is most of the stress in every supermarket, with waiting and querulous children. Many supermarkets hope to catch the little customers here and place shelves with chewing gum, chocolate, and even toys. The exhausted mothers – and even more, the fathers in the queues – turn on their heels and soon a pair of sweet tranquillisers land in the trolley.

At the exit, when the customer has already once more packed the trolley with more than planned, then this thought may be worth remembering what has been known for a long time by market researchers: According to a scientifically based test, 20% to 35% of the contents of a refrigerator land, untouched, on the rubbish dump (C. Haag).

Questions:

1. **What has this 'essay' got to do with Science and Technology?**
2. **What experiences have you had in this respect?**
3. **What consequences can you draw from it?**

Application

E

Application

Read the following comments by people coming from five continents, on the **consequences of science and technology imported from industrially developed countries.**

a) Voices coming from Africa:

In Africa, science is still far from renouncing its pretension of being able to give absolute certitude, not to be put into question. For this reason, it is being used by dictatorial regimes, above all by revolutionary ones, who – in the name of science – oppose themselves to local traditions and culture and even to the church, denouncing them as being "erroneous visions of reality".

The radical ambiguity of all human achievements, including the scientific ones, is systematically denied and contradicted by the powerful. The call upon science in order to consolidate their absolute authority over the ignorant people.

Therefore, "scientific socialism" is said to be infallible this has become the official designation of the Marxist-Leninist ideologies which have been implanted into several African countries.

Technology has also been introduced massively, encouraged by industrial superpowers, interested in an outlet for their merchandise. Furthermore, it exerts real fascination on ingenuous leaders and on the local rich. A false idea of „under-development", thought to be identical with technological backwardness, presents itself as an efficacious means to extend a market in Africa for the products overproduced in the „developed countries".

The simple and deprived people look up to science and technology, as something of great prestige they would never dare to question. They admire whatever it offers them. Even a bottle of Coca-Cola becomes a status symbol.

So people are being manipulated till they become docile consumers of products which – more often than not – are detrimental to them, from an economic as well as an ethical point of view.

Francois-Marie Lufuluabo (Zaire),
Bishop Afonso Nteka OFMCap (Angola)

b) From Asia:

Reawakening ecological awareness aiming at respect for nature and against destruction of natural resource and contexts is being largely approved of in Asian Countries. Asians are attached to the soil.

There is even a kind of 'mystic' of nature. Unfortunately it is coming under attack and is being eroded by a materialistic mentality, which has its roots both in Marxism and in Capitalism.

Sr. Grace Chu FMM (Hong Kong),
Ambrose Nguyen Van Si OFM (Vietnam)

c) From Latin America:

Scientifically schooled people, the military and the wealthy, doctors and lawyers, priests and academically trained professionals are respected and obeyed with fear by the lower classes.

The desire to imitate the developed countries and to import their standards of living unconditionally is being fostered. Up to the point where it resembles a real kind of bondage.

Feelings of inferiority, depression and dependence crop up when one finds out that simple imitation and transplantation of foreign achievements is impossible.

It can even happen in Franciscan fraternities that social differences appear, derived from scientific or technical advantages that some know how to explore. They become detrimental to community life.

Guillermo Mesa OFM (Colombia),
Gilda del C. Salinas Jimenez FMM (Chile)

d) From Europe and North America:

Western Technology has not only forced a dependence on the Third World. Its effects have been equally debilitating on First and Second World countries who are more and more addicted to artificially created needs.

The real motives of such a consumer addiction and craving lie well hidden on purpose, but need exposure just as critical as Third World dependence. A message of reverse-mission crying for a preacher!

Lucian Mulhern OFM (USA),
Noel O'Dwyer OFM (England)

Task:

Point out in detail the similarities and the differences of these statements.

Application

Some well-known examples of **devastating consequences caused by products of modern technology.**

a) From Africa:

In 1960, the greatest African venture in engineering was undertaken in Upper Egypt; the **Assuan**

Dam. The Soviet Union supplied the financing and the realisation of the project. The dam was to be 111 meters high, 3.8 kms long, and about 1 km broad at its base. It was supposed to guarantee Egypt an idyllic future:

- No more droughts or floods;
- Two to three harvests a year;
- Increase of the arable acreage by 750.000 hectares;
- Electricity for the whole country by an immediate twofold increase of the power supply;
- New industrial plants in Upper Egypt;
- More jobs for more people.

However, 25 years after the project was undertaken and 14 years after its completion, it is now evident that the ecological balance of the country has been disastrously upset by the Assuan Dam:

- As the Dam – like a gigantic filter – is retaining mud and slime, rich in potash, from the river Nile, the fields of the Fellahin no longer receive their natural fertiliser. So Egypt is forced to become one of the greatest importers of artificial fertilisers.
- As the Nile no longer washes its mud into the Mediterranean, the waters, formerly abounding in fish, can no longer guarantee the livelihood of the fishermen.
- Every year about ten thousand hectares of fertile soil are lost because the Fellahin continue to build their houses with bricks made out of the mud of the Nile. However, this mud is no longer replaced annually, but is deposited behind the Assuan Dam in great Lake Nasser, which covers 5000 square km. If nothing is done against such wasteful exploitation, there will be no arable acreage left in ten years' time. Only about 4% of Egypt's soil is fertile.
- The Nile, rid of its mud and slime, runs faster, is harder and starts to undermine bridges and small weirs.
- The fast flowing Nile is eroding its own banks and the Mediterranean coastline. The delta of the Nile is filling with silt.
- The increased use of artificial fertiliser is the cause of dangerously large salt deposits in the soil.
- Useless waterweeds are clogging the stream.
- The ground-water level of the Nile is rising, a menace to ancient temples and houses on its banks.
- Bold projects of new industrial plants, expected to develop in Upper Egypt, did not materialise. Up to this day the electricity produced at Assuan has to be transported for over 1000 km to the Nile delta. About 20% of the electricity is lost en route.
- A couple of fissures have appeared in the dam, in consequence of some mild earthquakes. Nobody is sure what could happen if more serious earthquakes occurred.

On August 31st, 1984, the Egyptian geologist Fouad Ibrahima declared at an international congress in Otsu, Japan, that the Assuan Dam has proved to be such an ecological disaster that it would probably be better to use existing means to demolish it instead of using the money for endless repairs.

b) From Latin America:

The Amazon basin covers about 2/5 of Latin America, i.e. 7 ½ million square kms.

The Amazon jungle is said to be "the lung of the world" the most important source of oxygen on the earth, as it furnishes about 1/3 of existing woodland, being the greatest continuous wooden area on the globe.

However, for ten years now this role has been jeopardised as the exploitation of the area advances rapidly. Enormous highways, for example the famous Transamazonica and the Perimetral Norte in Brazil, cut deep into the jungle. Along their margins colonists try to settle, burning the forest in order to clear it for their plantations.

Further exploitation of the forests are caused by the commercialisation of precious timber that cannot be substituted, as well as by paper factories. The factory of the American billionaire Ludwig has become notorious.

The search for oil and other mineral resources has further impaired and diminished the existing jungle. As the humus soil on the forest floor is only about 1½ meter deep, it is being washed away by erosion in areas that have already been

deforested and a kind of prairie takes over.

If this evolution continues, heavy regular downpours in the rainy seasons will diminish. The whole globe will have to suffer the consequences, as 25% of fresh water is being produced here. To preserve and protect the Amazon basin, with its jungles and rivers, would be a work done for the better interests of the whole world.

Questions:

1. **Who has the responsibility of guaranteeing that no new drawbacks arise and mistakes are avoided?**
2. **Where are the limits of personal and corporate competence and responsibility?**
3. **Can we leave the responsibility to governments, parliaments or the business enterprises alone?**

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Cover/P. 5 St. Francis. Detail from a stainedglass window in the church of Koenigsfelden, Switzerland, about 1330 AD.

P. 3 Miniature. National Library, Paris, 14th century.

P. 7 From: Frankfurter Hefte, 3/97.

P. 8 Woodcut, 16th century.

P. 9 From: Der Spiegel (Magazine), 1/98. Photo: M. Zucht.

P. 10 From: Der Spiegel, 48/97.

P. 11 From: Der Spiegel, 3/98. Photo: J. Piekalkiewicz.

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P. 15/18 From: Das Zeichen, 10/93. Cartoon by Fernand Rausser.

P. 17 From: Kontraste, 1/93.

P. 20 Sketch by C. Cedeno. From: Franziskanermission, 3/94.

P. 22 Canticle of Brother Sun. Drawing by Demostenes Dumont Vargas Filho, Brazil.

P. 23 From: Adveniat, Continent of Hope: Guyanas, 1993.

P. 24/26 From: Süddeutsche Zeitung, Magazine, 45/97.

P. 25 **(Left)** Duns Scotus. Painting by Peter Hecker, Cologne, 1933.

(Right) Etching, 16th century.

P. 28 From: Focus, 2/98.

P. 29 From: North-South Manual, Association for the promotion of political development initiatives and co-operation in Lower Saxony, Germany.