

SCIENCE FOR SANE SOCIETIES

Reflections on Faith, Science and the Future
in the Indian Context

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INTRODUCTION

In the history of modern Christian social thought, the World Conference on Faith, Science and the Future, organized by the World Council of Churches, at the Massachusetts Institute of Technology, Cambridge, Mass., U.S.A. from July 12-24, 1979 marks an important milestone.

About a thousand people, many of them scientists, some of them theologians and church leaders, participated in various capacities. Modern science and the Christian faith met in an atmosphere, not of mutual confrontation, but of genuine search for orientations towards a more just, participatory and sustainable future for humanity.

I was privileged to be the Moderator of this Conference, as well as of its Preparatory Committee. As an Eastern Christian theologian deeply concerned about what is happening to humanity in consequence of the impact of modern science and technology, I learnt much from this conference and its preparatory work.

On several issues, e.g. the use of nuclear energy for peaceful use, the Conference brought new clarity. On several issues, e.g. the relation between God, humanity and world, or the role played in human development by economics as a science, the Conference did not manage to go beyond the preparatory consultations on these subjects. On other issues like the relation between science and faith, neither the preparatory process nor the Conference itself succeeded even in sorting out the issues clearly.

In this modest work, I have sought to put down something of what I learnt from the Conference, and to do further work on some of the issues as I see them.

Needless to say I am obliged to so many people for whatever there is of value in what follows. It will be tedious to list the names of all from whom I have learned. But my gratitude to each of them is indeed great.

From my present perspective the main questions which emerge from the Conference are the following :

- (1) What are the principles for integrating faith-knowledge and science-knowledge into a coherent, provisional, open whole ?
- (2) What new orientations could science and technology take in order better to serve a humanity with peace, justice and dignity for all ?
- (3) How do we weave together a General Christian Theory of Human Existence that takes care of the physical universe, the biosphere in the universe, the whole human race, as well as the realm of transcendence as Christians understand it today, keeping in mind that whatever theory we create, its purpose is only to serve us at present for orienting us for the future, and not as a dogmatic system ?
- (4) What fresh analysis of principles do we need to bring to bear on the questions of personal and social decision-making ;

These are questions to which no final answers can be given in this book. If the debate on these subjects which started already at MIT could be advanced one step further, the author would be grateful to God.

Château du Bossey
September 1979

PAULOS MAR GREGORIOS

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CHAPTER I

ON THE EATING HABITS OF SCIENCE AND FAITH

Ours was certainly not a professional conference. We were not there to discuss academic questions with our fellow-academicians. For that you go to the International Biochemistry Association or International Geophysics Society or other similar professional organization.

Some of our scientists spoke as if we were in a professional conference. They showed irritation when their highly technical remarks were criticized in non-technical language by non-experts.

Prof. Rubem Alves of Brazil set the tone for this common man's critique of science and technology, with his impassioned parable: 'On the Eating Habits of Science'. Seeing scientists-technologists as wolves and ordinary people as lambs (are not parables always not to be taken too literally?) Alves made the following points:

'First lesson: if you want to learn about wolves, do not ask them to say what they are . . . Most of the explanations that science proposes about itself are not only untrue, they are dangerous . . .'

'Second lesson: lambs know more about wolves than wolves do. A wolf is, to a lamb, what the wolf *does* to the lamb and not what the wolf thinks he is doing . . . These accounts, most of the time, hide its eating habits. These habits, say the philosophers, do not belong to the *essence* of science'.

What if some of the voices of the 'Two-Third World' were strident, irrational, emotion-packed? Rational persuasiveness was never the distinguishing mark of the prophetic voice.

' We denounce science and technology : protected by the ideology of objectivity and value-free pursuit of truth, they have been at the service of military and economic interests which have brought about great sufferings to the peoples of the Third World.

We denounce science and technology : protected by the ideology of objectivity and value-free pursuit of truth, they have developed the most sinister instruments of death and total annihilation. We call for a halt in this situation '

Thus spoke the statement from a group of representatives from Africa, Asia, Latin America and the Pacific, which was approved by the Conference with some amendments.

Behind the irritating rhetoric of Two-Third World participants one could listen to a fundamental criticism of scientists and technologists which could be summarized along the following lines :

- (a) Science's claims to objectivity and value-free pursuit of knowledge could be interpreted as an alibi offered by scientists to free themselves from their sense of guilt about the damage done to people by science-technology.
- (b) Scientists and technologists are guilty of having lent their services to war-establishments and quick-profit oriented, exploiting transnational corporations and other business enterprises.
- (c) Scientists and technologists in general have not developed any ethical commitment to the welfare of humanity and the emancipation of the oppressed and exploited. Christians in science and technology have pursued success and glory and money for themselves, not the way of the Son of Man who lived and died to serve the poor.
- (d) Many scientists and technologists are quasi-illiterate and unreflective when it comes to the economic and political implications of their work, and even about the nature of science and technology itself.

The Two-Third World prophets were accused of inconsistency in not distinguishing between science/technology¹) in itself, and its utilization by society. The point was, however, precisely that there could be no such distinction ; that science and society are inextricably related to each other ; that science and technology were born and grew up in a particular culture and a particular socio-economic structure, to the desires and aspirations of which it catered and by which it was sponsored and supported.

The separation between 'pure science' and its application was itself understood as a way of seeking some kind of absolution for science from all its sense of guilt.

This was the point many scientists in the Conference were unwilling to concede. An exception was Prof. Jerome Ravetz of the University of Leeds, whose biting criticism of science, 'both research and application, in the total, unified system on which our daily lives depend' enraged many scientists, a few of whom seem to have left the Conference in disgust. For Ravetz 'the image of the "scientist" as dedicated lone researcher, analogous to a saintly hermit, is now dangerously obsolete'. Ravetz was indeed harsh :

'The idea of a scientist being a deceiver, or corrupt, is very nearly a contradiction in terms. How can a searcher after knowledge be a party to its distortion or suppression? If you are thus bewildered, take it as a warning that your concepts are now obsolete'.

Ravetz spoke of three weaknesses in the scientific enterprise as we have it today : 'first, ignorance in scientific research ; second, incompetence in science-based technology ; and finally, corruption in science policy'.

The scientist was inclined to concentrate all the blame on science policy alone. For example, Prof. Hanbury Brown, to whose thoughtful paper on 'The Nature of Science', Prof. Alves' parable was a response, took account of

¹ The phrase science/technology is used to denote the complex system in which pure science and applied science interpenetrate and operate as a single phenomenon in present society.

'the fact that in the past few decades science has been industrialized and has allied itself with power. In changing the world, it has changed itself, so that the manifest, dominant activity of science is no longer the disinterested pursuit of knowledge but the pursuit of knowledge for industry and other social purposes, such as defence, agriculture, health and so on. I won't weary you with statistics, but less than five per cent of the world's expenditure on science is now devoted to fundamental science. The vast majority of scientists are busy applying science to reach material and social goals and their work is largely controlled by governmental agencies serving national, military and civil interests and by large industrial firms serving the market'.

The 'Two-Third World' argument was that this is not a mere incidental aspect of the scientific enterprise, and that the character and orientation of science are determined by the nature of the political economy within which science develops and operates.

The question was not adequately raised in the Conference whether these charges could be made also against the faith enterprise—especially the Christian faith. The character and orientation of the life and practice of the Christian Church have also been determined to a large extent by the political economies in which the churches flourished. Church establishments have all too often been guilty of lending support to the socio-economic establishment in which Christians lived. Fundamental and radical protest against the political economy has been seen in but a few creative pockets within the Christian community and only at certain periods of history. Churches have a longer and a more shameful record than science, of supporting slavery and bondage, oppression and exploitation, war and greed. Our theologies of work, of property, of military service, of peace and war, of the role of women, of race, and of the state have too often drawn more from the values of the establishment than from the insights of the Gospel.

Christians cannot level an accusing finger at the scientific enterprise, without repenting and beginning to put their own

house in order. This point was strongly made by two women speakers, Rosemary Reuther and Karen Lebacqz, from the feminist perspective. Rosemary's criticism was primarily levelled at the scientific enterprise, but they could be applied as well to the practices of the Church. In fact, she began, as is proper, with a feminist critique of Christian theology, which according to her 'was fashioned by a fusion of these two traditions: Hebrew patriarchalism and Greek dualism'. In 'the religious tradition of what comes to be dominant Christianity, women can be imaged in two ways: (a) as the feminine; that is to say, as submissive, docile, receptive and sublimated (unsexual) body totally at the disposal of divine male demands, or (b) as the female: that is to say, as carnal, revolting, demonic body, which is the antithesis of the male quest for redemption through denial of his roots in the mother (mater), in matter, infinitude and in mortality'.

Rosemary suggested that science follows the same basic pattern. 'We see that a new god has been put in place of the old one, or, to put it another way, a new clerical caste in service of the political powers is replacing the old one. This new priestly class is the scientists and the technologists, (see Comte and St. Simon in the early 19th century) and their god is the god of scientific reason. Like the old god, the god of scientific reason situates itself outside of matter, independent of it, sovereign over it (or her), knowing, dominating her from outside'.

The most stimulating vision of Rosemary Reuther remained largely unheeded and unassimilated by the Conference in general. Owing to difficulties of accent and speed of delivery, many were unable to follow the train of thought in the speech. But even after a manuscript version of the comments was provided, it does not seem to have been picked up in any of the sections, and therefore remains unreflected in the outcome of the Conference.

From my perspective the comments of Reuben Alves and Rosemary Reuther together reflect the dilemma of the Conference, and in some ways the measure in which these two brief ten minute comments in the first major session of the Conference

went unheeded is the measure of its failure to come to grips with the issues confronting both the Conference and humanity in general.

Let me try to put Rosemary's comments in my own language. You can make allowance for my own male chauvinist prejudices in interpreting her vision.

Rosemary charges that both western theology's notion of a god outside nature dominating and controlling it in accordance with his own sovereign will, and modern science-technology's fundamental attitude of standing outside nature seeking to know it, dominate it and use it for one's own sovereignly chosen ends, are reflections of the attitudes of the dominant middle class male in western society.

It is not the case, according to her, that the Judaeo-Christian tradition proposed *dominum terrae* as the basic attitude of man to nature, and that then this notion allowed western man to develop science and technology in order to realize that dominion over the earth. Both the so-called Judaeo-Christian notion of *dominum terrae* as well as the Judaeo-Christian sovereign dominant god are themselves creations of a white male elite ruling class in the west, insensitive to the needs and aspirations of the rest of humanity and the rest of nature. Science-technology simply inherits and puts to work this notion in a secular context.

'Historically speaking, this kind of scientific consciousness', she said, 'has been the tool of a white western ruling class male elite, which has used its knowledge through technology to exploit the material resources and labour of the rest of the world (human and non-human) for the power and profit of the colonizers. This is the *key* (italics hers, P.G.) to the rapacious use of technology. The rest of the world has been dealt with as resources (material resources and labour) for the profit of the few, not as fellow beings who are to share equally in the development and benefits of the new power'.

Rosemary was not arguing for 'the romantic anti-scientific and anti-technological primitivism' of 'back-to-nature' environmentalists. Nor would she concede that more of 'conser-

vationism' and 'responsible stewardship of nature' can do the trick, for those are merely 'the educated western male response to his own self-alienation' and which would amount to 'the freezing of the present system of injustice'.

On the contrary, she advocated 'a thorough-going conversion of the world system' in which women should take active and equal part 'in solidarity with all those who belong to the world of exploited labour'. This conversion is to the new humanity in Christ, God incarnate in the flesh, the logos or mind incarnate in matter. This means God not outside the visible world, but as the divine matrix of all existents, real or potential, 'the inexhaustible font of potential being, through which we come to be, and are continually renewed', and reason or mind 'as the thinking dimension of all being... which should bind us together'—male and female, human, animal, plant, earth, air and water.

Rubem Alves' point was at least understood by the Conference, though resented and contested. Rosemary Reuther's point was not even understood by most. Many simply rejected her comments, in typical male chauvinist fashion, as a mere 'women's lib' protest, irrelevant to the matter in hand. Even the second of the ten sections of the Conference, the section which had a specific mandate to deal with the inter-relationship God-world-humanity, failed to come to terms adequately with her comments.

The discussion in Section II saw history differently from Rosemary Reuther. The report of that section (C. 4) sees the early history of humanity as one in which nature (e.g. flood, fire and brimstone) was threatening to overpower and destroy humanity. Now science and technology has reversed the power relations. Humanity has secularized nature, and has power over it in such a way that humanity 'is now able to destroy its own species and perhaps even all life on the earth'.

The Section commended 'the planners of this Conference for bringing together natural and social scientists with theologians' and wanted the World Council of Churches to 'promote the continuation of these discussions'. It also wanted to involve our neighbours of other faiths in these discussions.

But it failed to come to grips adequately with the conceptual problem which underlies the crisis of our civilization. It took a characteristically western track, that of ethics, rather than that of deep conceptual reflection.

This tendency itself seems, to the present writer, to be part of the sickness than its possible cure. We live in a secular civilization which is either allergic to or incapable of more than pragmatic ethical reflection. It avoids conceptual reflection for fear that this might lead to arid and unprofitable speculation. Our secular civilization is capable of coming to terms with Rubem Alves' point about the socio-economic context of the problem of science-technology ; but it still remains unwilling to heed Rosemary Reuther's point.

From the present writer's perspective, the task ahead is that of finding a conceptual and programmatic framework in which both Alves and Reuther are given serious attention. To me it seems that a concerted effort on the part of social scientists, natural scientists, philosophers of science, philosophers of religion of all religions and philosophers of Marxist and other ideological persuasions, have to sit down together for some days, keeping in mind both the cry of the hungry, and the cry of womankind and others marginalized.

Such a joint effort must also take into serious account the eating habits of wolves—both of the science-technology breed and of the faith-religion breed.

The main point can be put already at the end of this first chapter. Science-technology as we have it today is more than something neutral which can be *used* for good or evil. It is the fruit of a certain socio-political economy with its particular aspirations and specific conceptual framework of perception. It is not sufficient merely to explore the ethical aspects of science-technology as it is practised in our world today. We need to go back to the conceptual framework, the basic perception in which the aspirations of a society are rooted. Perhaps the largest single failure of the Conference was the failure to examine those structures adequately.

We shall deal with these conceptual questions after a preliminary examination of some of the ethical issues.

CHAPTER II

ENERGY

For Whom? What Kind?

At What Cost? What For?

The energy debate was one for which the Conference had done adequate homework. Besides, the issue was topical at the time of the Conference (July 1979), especially in the U.S.A. President Carter's energy policy had led to a major Cabinet reshuffle. His major address to the nation on energy had to be postponed for a day or so, due to lack of agreement among the experts.

Three separate but interrelated issues were taken up by the Conference—future energy needs, the problems of nuclear energy for peaceful use, and the need for nuclear disarmament.

A. Energy Needs of the Future

How do we compute our energy needs of the future? Usually experts do it by extrapolating from the trends of the past into the future. We presume that industrial growth will continue at the present rate.

The International Development Strategy (IDS) of the U.N. Second Development Decade (1971–80) set a target of 6% per annum overall growth in the gross domestic product of developing countries and about 4.5% per annum for the industrially developed countries.

Assuming this trend, by 1980, we will have to produce 10×10^{16} Kilojoules¹ of energy from non-fossil (other than petrol, gas and coal) sources. This is about a third of the total need. By 2025 it is estimated that the non-fossil energy need

¹ The basic unit for energy measurement is a joule or one watt-second; a kilojoule would be 1000 watt-seconds; a watt-hour would be 3.6 kilojoules or 3600 joules.

will be five times that much— 50×10^{16} kj, because fossil fuels by then will be able to supply only half what they are producing now.

Another estimate says that the OPEC countries will produce 35 million barrels of crude oil per day in 1985 ; without higher development of non-fossil energy, we will be 9.9 m barrels daily short.

What alternatives are available? Today 90% of world energy needs are met from fossil fuels. In the U.S.A. only 4% of the energy needs are met from hydro-electric power plants and about 12% from nuclear power plants ; coal supplies 15%, gas is about 30%, oil supplies 39%.

In India 40% of our electricity comes from hydro plants, 56% from fossil fuels, about 3.2% from nuclear power plants.

The U.S.A. is the giant consumer of fossil fuels, despite operating some 70 nuclear reactors. And fossil fuel supply is finite. Especially world gas and oil resources are being too rapidly depleted for comfort. We have no precise estimate of how much oil there is in the earth available to us. Prof. David Rose gave an estimate of 2000 billion barrels. If we use up 60 million barrels a day, the total supply, including all those to be discovered will last us 90 years (at 22,000 million barrels a year).

But we are actually increasing our daily consumption of oil, at the rate of about 6% per year (1968-76 rate of growth). Presently available resources of oil is only one-third of the potential total need i.e. 640 billion barrels. If the present trend of oil use continues, we will have finished all the presently known stock by about 1995 A.D. The whole potential stock of the earth if discovered and exploited, will be gone in 30 years from now !

OPEC countries are doing us a service by dramatically raising prices—whatever be their own motive. We must drastically reduce oil consumption. There is no alternative to that. The situation of natural gas is similar. Only about 2500 trillion cubic feet of gas are known to exist. That is the equivalent of

420 billion gallons of oil.² Oil and gas are rare commodities. Their price must continue to increase, and we must look for alternatives.

Coal we have in greater abundance. But its mining destroys the environment and increases prevalence of cancer. Fossil fuels in general increase pollution and raise the carbon dioxide level in the atmosphere, which can seriously disrupt the biosphere of the earth in the long run.

What are the major non-fossil sources? Generally speaking they are (a) nuclear fission or fusion, (b) solar³, (c) hydrogen, (d) wind and wave, (e) bio-gas, (f) tidal and geo-thermal.

The bias in the industrialized countries, where most of the fundamental research and development goes on, has been to prefer nuclear to solar. Post-world-war research has concentrated on the nuclear fission technology developed during the war; it had no great interest in solar. If the fundamental R & D had paid more attention to solar in the fifties and sixties, we would not have been in our present predicament.

We are in a post-oil era already. Whether nuclear or solar will dominate in this era is a question largely determined by

² Reference cited: *Oil and Gas Journal*, December 25, 1978; *Science*, April 14, 1978.

³ Solar energy can be used in three major ways:

- (a) space-heating.
- (b) water-heating.
- (c) electricity-generation.

A fairly big home of western standards with 30 sq. metres of mirrors or collectors can manage 30 to 70% of its space-heater needs depending on location in non-tropical zones. The market for space-heating is now \$50-100 million. By 2000 A.D. it is to be 5 billion.

Water-heating for average American house needs 5 sq. metres of mirrors. Capital cost \$1000-\$1500, to be added to the construction costs of a house, is only less than 5% additional.

Electricity is more difficult. Thermal conversion by focusing sunlight on water, to produce steam to run a turbine needs 100 sq. metres of mirrors to produce about 10 kw. This is very expensive. A 300 metre high tower with 5 sq. km of mirrors will be necessary for small towns. Electricity is needed to pump water that high. System cannot work when sun is down... Photovoltaic cells now cost \$15.00 a watt at noon on a sunny day. Synchronous orbit satellites, more difficult. The technology is yet to be perfected. People expect something by 2025 A.D. If more money is put into research a more economical technology may emerge by 1980.

the research of twenty years ago. Unless governments are prepared to put in enormous amounts of money into solar energy technology, we are almost bound to move into a nuclear energy era. To the problems of this nuclear technology the Conference paid some attention—resulting in the most controversial action of the conference, the demand for a five-year moratorium on further development of nuclear power plants.

B. Nuclear Energy

1. *Types of Nuclear Technologies*

First, we should distinguish between various technologies which produce nuclear energy.

(a) *Fission and Fusion*: Fission technology is what we have developed, following the development of the atomic bomb in the forties. In fission energy is released by splitting a heavy nucleus of an element (e.g. uranium) into two smaller nuclei of other elements.

Fusion is the process in reverse—the formation of a heavier nucleus from the fusion of two lighter ones (e.g. deuterium and tritium). Here the technology has lagged behind. We still have not got around to creating the necessary high temperature under controlled conditions to produce fusion in such a way that the energy can be constructively used. We have done much better in the use of fusion in nuclear weapons and warheads like the hydrogen bomb. Fusion technology is safer and cleaner they say, i.e. it has less of the hazards of radioactive wastes, fuel storage, fuel hijacking, etc. But it is still a long way off. The Tokamak Laboratory at Princeton achieved 5 million degree celsius temperature in 1970, 25 million in 1977 and 60 million in October 1978. But we need 100 million to produce fusion.⁴

⁴ According to the experts the entire energy needs of the U.S.A. can be met by fusing 10 kg of deuterium per hour. They expect that the first experimental fusion reactor will be operative by 2005 A.D., and the first commercial reactor by 2025 A.D. There are other technical problems to be resolved, beyond the production under controlled conditions of a hundred million degree hot plasma—new materials to withstand constant high energy neutron bombardment, maintenance and repairs, as well as the handling and recovery of tritium. These problems are soluble. But then yet unseen problems may very well arise.

(b) *Burners and Breeders* : A burner reactor uses the fuel only once, producing some fissionable material, but consumes more fuel than it produces. A breeder reactor produces more fissionable fuel than it consumes ; the new fuel can be used in a continuous process. Since uranium supply is limited, breeder reactors are preferred by most nations. A *Light-Water Reactor* (LWR) which uses ordinary water as a coolant to moderate the heat generator, is distinguished from a *Gas-Cooled Reactor* (GCR) which uses gas (often generated from graphite) as the coolant ; it is also distinguished from a *Heavy Water Reactor* (HWR), which by using water containing more deuterium (the heavier part of hydrogen) as the coolant, slows down neutrons and permits use of unenriched natural uranium.

The *Liquid Metal Fast Breeder Reactor* (LMFBR) can use either the uranium cycle or the thorium cycle. Uranium 238 and thorium 232 are rather abundant on our earth. The U.S.A. has at least 3·7 million tons of known natural uranium deposits, while western Europe, having only less than half a million tons is at a disadvantage. Australia has one-fifth of the total known world reserve. Other deposits are in the Soviet Union, in Namibia, South Africa and Greenland. Uranium technology is more developed than the technology of the thorium cycle, partly because thorium is more abundant in developing countries, while uranium deposits seem to favour developed countries and their colonies like Namibia and South Africa. Thorium cycle technology serves the interests of the Two-Third World, but they have less money to invest in research.

Natural uranium (U^{238}) is fairly stable. It yields about 1% of the fissionable isotope U^{235} . An *enrichment plant* will raise that yield to about 3% to 4% for reactor fuel, but can use almost 90% of U^{238} for making bombs. A *reprocessing plant* makes plutonium, the man-made fissionable element. A few thousandths of a gram of plutonium inhaled causes fibrosis of the lungs leading to death, and plutonium can continue to be radioactive for 24,000 years (some say half a million years). Brazil, for example, has a contract with West Germany to build eight reactors, one enrichment plant and a reprocessing plant—total cost five billion dollars.

Forty-four countries out of the world's 150 nations are now committed to developing nuclear energy. The U.S.A. leads the list with some 65 reactors⁵ and the U.K. had 32. West Germany will have about 30 by 1985. The U.S.S.R. has less than 30. Japan has already 13, and France 11 or 12. World total is about 220 nuclear reactors, operating in 22 countries.

Supplying nuclear technology is big business, and transnational corporations are right into it. Even Taiwan and South Korea now have a nuclear reactor. And many more developing countries are buying.

2. *Some Technical and Ethical Issues in Nuclear Technology*

(1) *Pollution.* Some of the nuclear power facilities (reactors and reprocessing plants) emit even normally very high levels of carbon-14, tritium (H_3), krypton-85, iodine-129, and perhaps also cesium-137 and strontium-90. These elements have 'half-lives' or high radioactive periods of ten years to several million years. Some of them accumulate in the food chain and cause serious damage to people. Plutonium 239 has a half-life of 24,400 years, and will be still emitting alpha radiation after 250,000 years.

(2) *Waste Management.* Used reactor fuel is highly radioactive and goes on being active for thousands or hundreds of thousands of years. Wherever we store it, it is difficult to make sure that it will not pose major radiation hazards for the present*

⁵ From 1971 to 1973, in just three years, American utilities ordered exactly 100 new reactors.

* There are those who think that there is no great problem here. For example, Prof. David Rose of MIT who is a learned and thoughtful advocate of the peaceful use of nuclear energy told us:

'The technology for disposal of nuclear wastes is in relatively good shape. For example, the Swedish proposal to encase them in lead and titanium jackets (and copper, if the spent fuel is to be entombed directly without any reprocessing) and then to emplace them in geologically stable granite formations with bentonite packing looks good. Eventually, disposal in the seabed may be even better; the North Pacific Plate appears to be exceptionally stable and geographically predictable'.

The problem however is that people do not always trust the experts. They suspect that the experts are also human beings, and despite extreme care and responsibility, are susceptible to make the mistake of leaving out or not being aware of certain factors. There is some basis for this suspicion in the record of past performance.

or future generations. But safer technology for this is now emerging. A typical large reactor produces 30 to 40 tons spent fuel a year. All reactors produce some plutonium.

(3) *Fuel Transportation.* Nuclear fuel is expensive, dangerous. Accidents can occur during transportation posing threats of radiation for unsuspecting people. It can be hijacked and used for subversive activities.

(4) *Plant Accidents.* The Three Mile Island (near Harrisburg, Pennsylvania, U.S.A.) accident has put everyone on guard. It could have been a catastrophe—a melt-down which could imperil life on the whole planet. Human mistakes were largely responsible. Significant quantities of cesium 137 and strontium 90 had been released into the air and water around the plant. These are deadly poisons. People are understandably averse to such risks of exposure to radiation and poison. There have been several such accidents already.

(5) *Proliferation of Nuclear Weapons.* The acquisition of technology for developing nuclear energy for peaceful purposes also gives access to nuclear technology for warfare. Already more than 40 nations are committed to developing nuclear reactors for peaceful use. It will be difficult to keep them from developing nuclear weapons also.

(6) *Security Requirements.* Since nuclear fuel and technology are easy to misuse, especially in the hands of anti-social or revolutionary groups, nuclear plants require extra security measures and greater surveillance of people working with nuclear fuel and technology. This augments the 'police state' character of our modern societies.

(7) *The Future of our Industrial Civilization.* The central ethical issue of nuclear energy for peaceful use lies in the domain of the kind of future civilization that we should choose to have. As Prof. Jean Rossel of Switzerland put it in the Conference :

‘ Whether we like it or not, nuclear energy and its industrial organization along with space exploration and its excesses, have become a sort of extreme expression of our

simultaneously arrogant and fragile technological society. Rightly or wrongly, the nuclear industry now represents, in the eyes of the ordinary man who is still sensitive to traditional values, the quintessence of risks and dangers, both short and long term, difficult to assess, and therefore all the more distressing'.

In other words, the exploitation of nuclear energy is another symbol of the trend towards gigantism and centralization in the structure of our economies. Technology as a source of unlimited power for man should not grow too far ahead of human capacity to keep that power under control. But in our industrial civilization, technology seems to have acquired a momentum which seems to be already out of human control. Many young activists in the anti-nuclear campaign therefore argue that their opposition to nuclear energy is in fact an invitation to call a halt to this uncontrolled development of technology, in order to have a little breathing space to consider and evolve alternate styles of living a civilized human life. These young people do not always simply advocate a return to pre-civilized existence. They are arguing for a society in which there is less consumption of manufactured commodities, and more consideration for the environment which is necessary for the survival of life on our planet ; for the development of new forms of science and technology to promote a better quality of human life and society, and for finding ways of living together with each other and with the rest of creation which would foster rather than hinder the growth of human dignity and freedom, justice and peace, love and joy.

This view sometimes uses dubious arguments, mostly in order to attract attention. For example, Prof. Rossel invoked a paper read in 1958 in a Radiation Symposium in Switzerland, which argued that the disappearance of the giant Saurians of the Mesozoic era was caused by a slight rise in natural radio-activity on our planet which became fatal to the delicate biological equilibrium of the bulky bodies of these prehistoric giant creatures. The associated thought is that large-scale exploitation of nuclear energy and the consequent increase in radiation may cause a similar imbalance in the human bio-system which could spell the end of the human species. Such argu-

ments may not carry conviction with scientists, but can invoke highly irrational anxieties and fears in the minds of ordinary persons.

On the other hand, the protagonists of nuclear energy also use dubious arguments. For example they argue that non-nuclear energy sources are not commercially viable. All this means probably, is that while the large-scale development of scientific technological research for nuclear energy for peaceful use is already more than 30 years old (after Hiroshima-Nagasaki, after the Second World War), an equally large-scale research effort for solar energy development has not yet begun. And it usually takes 20 to 30 years before such research produces something commercially viable.

The other argument uses comparative statistics on deaths caused by nuclear energy, and by other forms of technological activity like the mining and burning of coal and other fossil fuels, or by the driving of automobiles. Prof. Rose provided statistics from the U.S.A. to show that out of 8270 cancer deaths in the U.S.A. in 1977, 3960 were caused by ambient exposures like cosmic radiation, 2960 by medical and dental X-rays, 660 by radio-pharmaceuticals, 600 by technologically enhanced natural radiation from fossil fuel powered plants and inactive uranium mines, 80 from fall-out, and only 9 from the uranium fuel cycle. Nine out of 8270 is just about 1/10 of one per cent. Clearly we should be more worried about dental and medical X-rays and fossil fuel burning power plants than about nuclear reactors.

Dr. Rose would argue that the burning of fossil fuels may have more catastrophic consequences for the biosphere than the development of nuclear reactors. There must be a certain truth in the argument that carbon-dioxide levels in the atmosphere are greatly on the increase due to large scale burning of hydrocarbons in our industrial civilization. This may cause, through the famous 'greenhouse-effect' (carbon-dioxide and water-vapour in the atmosphere absorb the heat re-radiated from the earth, and provide a warm envelope to keep the heat close to the earth's surface), serious climate dislocations which can have ruinous consequences.

But this cannot be an argument for nuclear energy. It is an argument for radically slashing down our fossil fuel consumption, even if the industrial system has to be fundamentally reconstructed at great cost, in order to make this slashing down possible.

We have as a civilization become quite used to the fact that at least 100,000 people die each year in our world from automobile accidents. Yet we do not give up the automobile. Even with a thousand nuclear reactors in operation, the annual death rate from nuclear radiator-related accidents is unlikely to approach the automobile-related accident death rate. It is then not the possible death-rate that is the heart of the nuclear energy debate.

When I decide to drive an automobile, I know I am exposing myself, my fellow-passengers, and others on the road or in other cars to the risk of an accident. There are some differences, however, between the risk of driving an automobile and that of building a nuclear reactor. What are these differences? We might mention three :

(a) *The magnitude of the risk* : I am better able to imagine the possible extent of damage I can cause to myself or to others in my driving a car. The risk of a reactor accident or fuel disposal hazard is more difficult to assess beforehand. The failure of one human being or one action of nuclear waste disposal is much more difficult to imagine or assess beforehand. People feel much more vulnerable or defenceless against a nuclear accident in plant or waste disposal. There is a general feeling, whether justified or not, that my freedom to exist is much more radically threatened by a nuclear reactor than by a host of automobiles, or by coal-mining.

(b) *The range of the risk* : The hazards of nuclear energy constitute a threat not only to me or to the present generation, but also to future generations. But one could also say that the carbon-dioxide increase phenomenon caused by excessive burning of fossil fuels can be just as threatening to future generations. Here the objections to nuclear energy could apply equally to the burning of fossil fuels.

(c) *The risk of the reinforcement of present patterns of industrial civilization*: This is perhaps the key argument, and perhaps the most potent one, against the use of nuclear energy. By opting for large-scale investment in nuclear energy, we are opting for a reinforcement of the present problematic pattern of industrial civilization. We will find it much more difficult to change course once we have invested a great deal in nuclear energy. But certainly not opting for nuclear energy will not automatically change the course of our industrial civilization. At the present moment we have not found effective means for changing that course. This may only mean that we must set our hearts and minds to a more resolute programme to effect such change; and should not render that task more difficult by large-scale investment in nuclear energy. The central issue then is not nuclear energy but the development of an alternate civilization.

C. Alternate Sources

Whatever may be the decisions about nuclear energy by individual nations, no nation will choose to depend entirely on nuclear reactors for its energy needs. It will have to be a package, containing possibly fossil, solar, hydro, and others. Hence we must look at alternate sources of energy—both renewable and non-renewable.

Fossil fuels are non-renewable; other sources like wind, sun and wave are renewable, i.e. in constant supply. Nuclear energy produced by breeder reactors can be placed in an intermediate category, since more fuel is produced than consumed.

In view of the limited supply of fossil fuels, everyone thinks that we must put all our efforts into the renewable sources, especially the most abundant source, solar energy. The dispute is now between nuclear and solar, but the debate needs a lot of further clarification—especially between nuclear energy and solar energy produced by profit-minded commercial corporations in a market economy, and genuinely people-based and properly administered socialist state production of nuclear energy and solar energy. Many of the problems encountered in a market economy structure are not faced or felt in the same way in a socialist economy.

Today all of us are victims of lobbies in the market economy world, parties interested in promoting either nuclear or solar energy for the sake of the corporations' profit. And we are gradually learning to take 'expert estimates' of costs and consequences of either type of energy with a grain of salt. We suspect that behind each expert there may be an interest lobby; though the experts themselves may not be directly linked to such a lobby, the publicity and promotion given to his views are likely to be lobby-limited.

It is clear that solar energy is more abundant in the tropics; but it is there that energy for space and water heating is less in demand. Solar for space and water heating will become big business in the temperate climates, where most of the affluent societies are now located. For most of the developing countries, electricity for industrial and domestic needs is the first priority; here a great deal more money will have to be invested to bring research to the point of commercial viability for solar energy. Fundamental research will have to be undertaken in the realm of Technical Co-operation Among Developing Countries (TCDC) if this is not to become another means of exploitation of the developing countries by the developed.

D. The Moratorium Issue

The Conference debate did not focus on this issue, mainly because the controversial proposal for a five-year moratorium on new nuclear plants occupied the centre of the energy debate. It was somewhat disconcerting to many nuclear experts that the Conference recommended that governments should:

'Immediately introduce a moratorium on the construction of all nuclear power plants for a period of five years. The purpose of this moratorium is to encourage and enable wide participation in a public debate on the risks, costs and benefits of nuclear energy in all countries directly concerned'.

Even if the moratorium itself is not imposed by the governments, the recommendation would have served some purpose if a public debate with wide participation could now be initiated in many countries.

The Conference adopted other equally significant recommendations in the energy field. To mention only a few :

- (1) In the interests of energy conservation, a ' Fuel Pledge ' to be internationally introduced, which would say something like ' I pledge myself to save fuel and electricity at home, at work and at leisure, and to help to make available more for those whose basic needs are not being met '.
- (2) That we ' identify ethical criteria by which the social impacts of energy technologies must be assessed and insist that in setting energy policy, such criteria be given equal weight alongside technical and economic factors '.
- (3) That the ' pollution of the environment by an excess of carbon-dioxide, radioactivity and other products of the extraction and combustion of fuel be substantially researched and kept to the minimum that is technically feasible '.

The moratorium issue was clearly one of the most controversial in the Conference. Two questions can be briefly considered here :

- (1) What purpose does such a moratorium demand/serve ?
- (2) Is the position taken by the Conference fundamentally different from the position taken by the Central Committee of the WCC ?

1. *Purpose of Moratorium Demand.* It is unlikely that governments will respond to such a demand from the WCC, despite the wide publicity generated by the Conference debate. The demand, after all, is only for a limited time (five years) moratorium. Its purpose is clearly stated as that of promoting a real public debate with wider participation of experts and non-experts. It is likely that more people will take an interest in the on-going debate as a result of the Conference debate, whichever side they may have voted in the Conference.

2. *The WCC Position.* Two basic elements in the WCC position taken by the Central Committee (Jamaica, January 1979) remain unaltered: (a) that nuclear energy is a conditional good, i.e. that it can serve a purpose beneficial to humanity provided the necessary safeguards are developed and enforced; and (b) that, for the present at least, all energy options are to be kept open and therefore that nuclear energy cannot be unconditionally rejected as evil in itself. The future debate should focus on both the questions, i.e. adequate safeguards and what the development of nuclear energy does to the shaping of future society.

CHAPTER III

BIO-ETHICS¹

*Genetic Manipulation—Social Biology—Bacterial
Research—Social Control of Science and Technology*

A. Bio-Ethics in General

The Conference did not attempt to deal with the whole spectrum of issues in medical and biological ethics. It focused instead on 'Theological and Ethical Issues in the Biological Manipulation of Life'. More specifically it dealt with :

- (a) genetic manipulation or engineering ;
- (b) behaviour control ;
- (c) prolongation of life of terminally ill patients ;
- (d) psychological manipulation through media, advertising etc. ;
- (e) experimentation on animals.

All these issues raise important theological questions for which no clear and undisputed answers are readily available. The Conference section concerned with these questions took a more pragmatic rather than conceptual or theological approach to these questions. There was general agreement that the industrially developed nations faced these questions with greater urgency than the developing countries, where the major point of interest was the more just and equitable distribution of

¹ For further study of the issues involved in bio-ethics, the following books are useful :

Beauchamp and Walker *Contemporary Issues in Bio-Ethics*, Encino, Cali, 1978 Dickenson Press ;
Fletcher, Joseph F., *The Ethics of Genetic Control*, New York, Anchor, 1974 ; Ramsey, Paul *Ethics at the Edges of Life*, New Haven, Yale, 1978 ;
Fabricated Man, The Ethics of Genetic Control, Yale, 1970 ; Reich, Warren T. Ed. *Encyclopaedia of Bio-Ethics*, 4 Vols. Macmillan, 1978 ;
Shannon, T. A. Ed. *Bio-ethics*, New York, Paulist Press, 1976.

scarce medical resources. The present writer's experience in India shows that in developing countries while the medical profession shows some interest in these questions, the educated general public is hardly aware of them. The reasons for this lack of interest should be investigated some time.

The section approached these questions from the perspective of criteria for decision-making, but ultimately they had to recognize that the criteria were integrally related to certain theological-anthropological commitments of which people are insufficiently aware.

The sub-titles of books on such issues are often revealing. To take just two examples, Mary Shelley's work on Dr. Frankenstein is sub-titled 'The New Prometheus', while Joseph Fletcher's *The Ethics of Genetic Control* (Anchor, 1974) has the sub-title 'Ending Reproductive Roulette'. The popular image of the scientist in general and the genetic researcher in particular, as a Dr. Frankenstein who plays God by trying to create monsters, is opposed to the Fletcher view of biological research as part of humanity's fulfilment of its God-given vocation to be a co-creator with God in shaping humanity as God's image.

Theologically, the questions could be put thus: (a) should we accept humanity's genetic and biological endowment as given, or should we try to 'improve' it by artificial means? and (b) if we accept the second alternative, what norms and criteria should be set up to control the orientation of this 'improvement'?

The Conference generally took the view that we are both creatures of God and co-creators with him, and therefore have a responsibility, within the limits of the possible and the desirable, to 'improve' the biological and genetic endowment. But the Conference was also careful to point out that such 'improvement' should not overlook the necessary sensitivity to the life of each human person.

Some other theological issues that underlie the debate are :

- (a) Is alleviation of suffering the highest criterion for decision-making?

- (b) What is meant by a 'defective' human being, or genetic 'defects' in an embryo?
- (c) Do we take normal decisions about pre-natal abortion of 'defective' embryos in terms of a cost-benefit analysis?
- (d) Do embryos have rights—e.g. the right to life? Are these rights adjudicable or merely moral? When they come in conflict with the 'rights' of parents, how do we make decisions?
- (e) Do mentally retarded or otherwise genetically 'defective' people have a right to progeny?

The idea of 'defect' in a human being is hard to determine. One could say that blindness is a defect, but we do not deny the blind man's right to live or his full dignity. A mentally retarded person is still a human person, and only Hitlers advocate the extermination of all mentally retarded persons.

The alleviation of suffering is a good thing. But is it in accordance with Christian teaching to say that a mother can opt for the annihilation of an embryo that is likely to cause her pain and suffering? Does not the biblical understanding of suffering go deeper than the question of alleviating it?

The Conference did not deal with all these questions. On some issues it gave clear and unambiguous answers. On others it merely left the issue to be discussed by the churches.

1. *Artificial insemination.* The section report clearly stated: 'the practice of artificial insemination with husband's sperm... is morally unobjectionable'. It however stated also the fact that many Christians object to artificial insemination by a *donor's* sperm on the ground that it is a violation of the marriage bond; but the section document holds that 'others do not now share this position'. The section report goes on to point out the need to regulate by law the growing institution of semen banks which have to maintain certain standards. The section did not however question the whole institution of frozen semen banks. It was concerned about the legal protection of the social standing and inheritance rights of children produced

by Artificial Insemination Donor. It took a clear stand against AID for unmarried women.

2. *Abortion.* The section document was predictably non-committal on the question of pre-natal abortion of embryos. It recommended the setting up of a commission to go into the issues like :

- (a) Is there any moral difference between abortion and infanticide ?
- (b) If abortion of genetically defective embryos (detected by amniocentesis) is more widely accepted, what would be the long-term effect on the moral values of society ?
- (c) How do we pastorally help Christian parents who do believe that all human life is a gift of God and yet opt for abortion in their own case ?

3. *In vitro fertilization of human embryos.* The Conference document did not question the moral rightness of *in vitro* (in a glass) fertilization of human embryos formed of parents who cannot otherwise have children. It did question it on the ground that *in vitro* fertilization is enormously expensive and therefore violates the principle of equitable distribution of scarce medical resources and skills.

4. *Cloning.* The gap between scientific knowledge and technical feasibility has become very narrow in the case of cloning of human beings and other animals. Exact replicas of a given individual or of a fertilized ovum can be made, though it is rather expensive to do so. Again, the moral issues raised by possibilities of cloning were not analyzed in detail. The crucial issue of monosexual reproduction by cloning and its ethical justification does not appear in the documents.

B. Genetic Engineering

This is of course the dramatic new possibility. Things are moving so fast that ethical reflection is hardly able to catch up with the new possibilities. Only 26 years ago Watson and Crick analyzed the chemical structure of the compounds of DNA, the

master molecule in most genes. In 1975 Her Gobind Khorana, an Indian origin Nobel Laureate created a biologically active synthetic gene. On November 7, 1977 we had news that a team of California scientists 'created' five milligrams of somatostatin an important human brain hormone, through combining three synthetic genomes and creating thus a new artificial gene.

It is no longer idle to talk about humanity taking over from nature the job of business manager of the process of biological evolution. Recombinant DNA technology now enables humanity to radically alter the genetic endowment of a person, as well as possibly to create new 'species' not found in 'nature'.

And the pace quickens. Prof. Jonathan King of MIT told us that the 1978 budget for bio-medical research in the U.S.A. is about 3 billion dollars—1000 times the federal expenditure on bio-medical research in 1948. The achievement so far is phenomenal and impressively fast.

We now know and understand :

- (a) the chemical structure of the key genetic component DNA ;
- (b) the organization of the genetic material in linear segments, or the genes ;
- (c) that genes constitute blueprints for the structure of protein molecules, the key components of living cells ;
- (d) the role played by the thin membranes which divide the cells into compartments ;
- (e) the organization and functions of the complex ribosomes or factories for assembling new proteins according to the instruction of the genes ;
- (f) the technique for incorporating segments of DNA derived from one organism into the cells of another organism ;
- (g) the technique for cloning these synthetic genes ;
- (h) the technology for creating new strains of plants and micro-organisms ;

- (i) the technology to correct inherited blood diseases like sickle cell anaemia by removing bone marrow cells and replacing them with healthier cells.

The above is only a partial list. What ethical questions do these possibilities raise ?

It is clearly recognized that they do offer man very effective tools for preventing and curing disease, increasing agricultural production, for generating new energy (bio-mass), and so on. But the negative possibilities are somewhat frightening, for example :

- (a) inadvertent or intentional creation of pathogenic bacteria strains ; their possible escape or release from the laboratory ;
- (b) the increased possibilities of biological warfare, climatological or environment-disruptive warfare, use of pathogenic bacteria for blackmail, hijacking, etc.
- (c) genetic engineering on criminals, prisoners, revolutionaries, etc. which may be ethically unacceptable even if prior consent of the person is obtained.

Even more problematic is the fact that in market economy systems like the U.S.A., the corporations are moving into this field with all deliberate speed. Prof. King mentioned International Nickel, Standard Oil, Imperial Chemical Industries, and the Eli-Lilly Corporation. They are investing substantial sums to exploit the new technologies for commercial purposes. Some of these are clearly beneficial—e.g. the creation of more productive strains of cereals like rice or wheat, and developing strains of blue-green algae which fix nitrogen for fertilizing rice paddies.

But companies are now moving in to establish patents on some of these technologies and by claiming royalties, seek to exploit the populations of developing countries. A company which funded the scientific research that resulted in a particular technology may claim that the knowledge yielded by the research is its private property. Should not all technical

knowledge be the property of humanity rather than of particular individuals, groups or corporations? This is a major ethical issue.

Even more complicated is the question: what principles should regulate the orientation of research itself? Can we say that all knowledge is valuable in itself and that no restrictions at all should be placed on scientific research? Should the scientist be allowed to do research which might cause damage to society—e.g. the development of new bacterial strains?

Are there some things that we value about man and nature which set limits to what is normally permitted in scientific investigation? What are the criteria?

Dr. James Gustafson, formerly of Yale, put it thus:

'A scientist has no right to intervene in the natural processes in such a way that he might alter what men believe to be, and value as the most distinctive human characteristics . . . A scientist has the right to intervene in the courses of human development in such a way that the uses of his knowledge foster growth in those distinctive qualities of life that humans value most highly, and remove those qualities that are deleterious to what is valued'.²

One can agree with his general principle; but the problems of actual implementation are enormous. Humans do not agree on what is to be valued, and on what are the most distinctive human characteristics. Sight, for example, is something human beings value very highly. Some forms of blindness may be hereditary. By sterilizing people who are congenitally blind, we may improve the sight capacity of the race as a whole. But this would be at the cost of certain other values which human beings value very highly—for example, the right to have children of one's own. The same principle applies to those with other genetic defects (e.g. mongolism) or congenital criminal tendencies (e.g. the X-Y-Y syndrome in chromosome structure).

² Prestron N. Williams, Ed. *Ethical Issues in Biology and Medicine*, Cambridge, Mass., 1969, p. 12.

The ethical choice is not between right and wrong, clearly defined, as Karen Lebacqz quite clearly pointed out at the MIT Conference. The choice is between two sets of values, values cherished by the same person, or by different persons, or by society and individual, or by society and a group of individuals, etc.

We have not yet come to the point of giving clear criteria for making decisions in the light of conflicting values. Perhaps we may never get to that point. The problems of the methodology of decision-making will be dealt with in a later chapter.

C. Social Biology

The issues around social biology stirred up considerable debate in the MIT Conference. Social biology, associated with the names of E.O. Wilson, Konrad Lorenz, and Desmond Morris (*The Naked Ape*) seeks to understand human social behaviour in terms of the genetic heritage common to all primates and even all animals.

Critics of the socio-biologist view were charged, by the advocates of that view, of misrepresentation. The moral problem, however, related to the question of human responsibility for human behaviour. If certain behaviour patterns like aggression or escape are genetically determined by the circumstances of our evolutionary heritage, then how can people be held accountable for what they cannot but do? Granted that human beings are naturally endowed with aggressive or fugitive tendencies, do we still not have some responsibility for controlling some of our natural tendencies in the social interest? If this were not so, no sexually attractive woman (or these days even men) could walk safely on our streets.

The interesting questions that emerge are (a) the extent to which human beings are responsible for their social behaviour, (b) to what extent we can use chemical alteration of our natural endowments, (c) what criteria are available for orienting such alteration, and (d) what means are to be used. There are certain means which have been traditionally used, like

fasting for example, to bring certain 'natural' drives under control. Some societies have used drugs like Peyote for altering consciousness and experiencing other aspects of reality perception. Many societies approve the use of alcohol for overcoming inhibitions, for inducing temporary states of euphoria, and for promoting greater socialability. Where is the dividing line between the use of temporary stimulants and narcotics like coffee, tobacco or alcohol, and other drugs like marijuana or LSD? As the document of Section IV puts it:

'A South American revolutionary and an Indian committed to non-violence might both share the same kind of genes for aggressiveness, but the behavioural consequences of these would be totally different. The notion, therefore, that there are genetical determinants of human personality which socio-biology might progressively reveal is seriously misleading'.

Granting that conclusion, the fact remains that more detailed knowledge of our biological and evolutionary heritage may help rather than hinder the process of bringing human social behaviour under more conscious control. The difficulty remains, however, that the theories of socio-biology remain far from scientifically demonstrated. While the tendency to explain all human social behaviour through an analysis of our evolutionary heritage may be seriously misdirected, there can be little justification to forbid deeper studies of our socio-biological heritage.

D. Should Science be controlled?

The question of social control of Science arises mainly in non-socialist societies. In socialist societies, at least in principle, the Party, on behalf of the people controls the development of science by laying down policy, by controlling funds, and by strict supervision of academic institutions.

In Marxist thought science and technology are part of a system; science-technology-economy-Man. The whole socio-economic process is centrally controlled and science and technology constitute important but never independent units in social production. Man himself is seen as integrally related to

the system of social production, in which again science-technology is an integral part. Man created science-technology, but it feeds back to shape man.

But man is not simply a passive object to be shaped by science-technology or by social production. He is a conscious and free agent who can reconstitute himself by re-structuring science/technology. The Research and Development sphere is where this restructuring has to be more consciously applied.

Science Policy as well as its implementation is thus centrally controlled by the Party on behalf of the people. We know very well that this system is subject to serious abuse, precisely where the party loses touch with the people and no longer represents their best interests or fail to keep themselves answerable to the people.

Socialist countries are now resorting to a systems analysis type of social control. Dr. Lech Zacher, Head of the Section for the Scientific and Technological Revolution in the Polish Academy of Sciences, puts it this way :

'From the point of view of the necessity to control the process of the scientific and technological revolution, civilizational potential may be regarded as a system ; and the spheres of Science and Technology, Economy, and the Sphere of Man's activity can be treated as its sub-systems. . . . The sphere of Science can serve as an example of a sub-system which stops being sub-ordinate and turns into one of domination . . . For the needs of controlling of the processes of the scientific and technological revolution it is indispensable to define (by means of various parameters) the nature and energy of mutual impact of the sub-systems on one another, as well as to specify the means and methods of conscious human actions performed within the frames of individual sub-systems '.*

The real difficulty with this cybernetic control of society is that it becomes so much the more impersonal and out of the reach of the common people to understand, monitor, or control.

* In 'On controlling the Scientific and Technological Revolution' in *Dialectics and Humanism*. Spring 1979, Vol. VI, No : 2, p. 90.

Besides, the programming of the network of Science-Technology-Economics-Man inter-relationships into the system is not at all easy. Socialist societies have not anywhere near achieved such a systemic control system, though they have conceived it.

The situation is quite different in non-socialist countries. There are government agencies in many countries which monitor food and drug manufactures, pollution control, and various other scientific activities, but any overall control of scientific R and D seems practically impossible in the developed economies, where private interests have so much stake and say in matters of scientific research. The thinking citizen in non-socialist countries begins to develop a measure of insecurity in the absence of any reliable agency to defend people against exploitative or harmful use of science and technology by individuals, corporations or governments. In socialist countries governments seem to be the main source of potential misuse of science and technology against the people.

We will certainly need, even in a country like India, rather strict control of Research and Development in certain sectors—primarily nuclear technology and genetic technology. But in a vast and varied land like ours the implementation of such control is bound to prove difficult, especially as corporations and individuals acquire the know-how and resources necessary for fundamental R & D in these fields. It is perhaps harmful to try to control all forms of scientific R & D. Science should be free. But people should be free also, at least from being seriously damaged by science and technology. Nothing short of peoples' vigilance can be effective in this area, when combined with the necessary legislation and an effective implementation machinery.

CHAPTER IV

HUMAN EXISTENCE IN DANGER?

The Sustainability of the Environment

Human Impact on the Environment

The human impact on the environment in which humanity lives can be measured in terms of mainly the following features :

1. density and rate of growth of population ;
2. the rate at which they consume the finite resources ;
3. the rate at which they pollute air, water, soil, etc.
4. the degree of ecological upsetting that they cause (deforestation, carbon-dioxide increase, etc.)
5. the degree to which they increase the threat of a nuclear war.

Each of these factors as they increase, adversely affect the sustainability of our planet. We have come to a stage where the biosphere which humanity has inherited and the technosphere which humanity has created are not only out of balance, but dangerously in conflict with each other. This is the simplest understanding of the sustainability problem. It is also the ecology problem. The word ecology comes from the Greek *oikologia* which means the science of human habitation. How humanity transforms the environment by living on it and from it is the key question.

Quite often we forget the fact that the biosphere,— this layer of the surface of the earth, where the conditions for plant, animal and human life are available — is a fragile film which can be easily damaged. People in the Two-Third World are often tempted to dismiss this problem as no problem at all. To the present writer this is a reflection of both our arrogance and our ignorance or laziness.

A. Pollution

Take the problem of pollution first, since it is perhaps the most easily manageable—one of these instances in which technology can solve the problems created by technology.

Today most sensible industrial enterprises are reckoning with a cost of 2 to 4% of capital outlay for pollution abatement. That is, of course, an enormous cost. There are some kinds of pollution for which no adequate commercial abaters are found as yet—e.g. sulphur, nitrogen oxide, hydro-carbons and carbon monoxide. But most other particulate air pollutants are now manageable at some cost. We are still looking for abaters for pesticides, agricultural pollutants and for radioactive waste.

The problem here is that governments are not yet sufficiently free, especially in market economy countries, from the lobbying pressure of corporations, to impose and enforce adequate pollution-abatement measures.

Our lake and river waters are badly polluted. But with determination and sufficient financial investment these can be cleaned up and the pollution rate significantly reduced if we can find alternate means of our human and industrial waste disposal.

Automobiles are a major source of pollution as every school girl knows. But it is a manageable problem provided there is sufficient public demand.

B. Resources

Pollution and resources have some inter-connections. For example, if the water of rivers and lakes is badly polluted, the food supply can be seriously affected by damage to aquatic life. Clean water is not just a natural resource, it is also a commodity which people consume more or less directly.

Food is perhaps the most important resource, along with air and water, for human survival. With available technology, the productivity of land in cattle and crops can be increased upto 300% by the year 2000—especially in developing countries. 60 to 100% increase is possible even in developed countries.

Provided sufficient funds and technology are invested, at least 229 million acres more of land can be made arable—this is 30% of the arable land in 1970. The cereal potential of land is about 8 tons per acre per year. But most land in Asia is still producing about 2 to 2½ tons per acre. The food problem is not as insoluble as people think. Sometimes too much of a rumpus is made about food scarcity in the world, merely to justify an inordinate increase in food prices.

Mineral resources pose the most difficult problems.

If present rates of industrial growth continue, and it has to continue for at least three quarters of the world, the following increases in mineral demands can be anticipated by 2000 A.D. :

Copper	580%
Lead	630%
Iron ore	570%
Nickel	520%
Petroleum	620%
Gas	550%
Coal	600%

With the development of recycling technology the problem will be abated to a very small extent. Our coal and iron ore supply situation is not too bad. But lead and zinc, very necessary for electric batteries (even solar photovoltaic cells need lead and cadmium) and other industrial uses will run out by the end of the century. Tin, tungsten, asbestos, fluorine, mercury, phosphorous—all these may be in very short supply. Even with new discoveries of deposits and new technologies for consuming less, we are likely to run into serious trouble by the end of the century.

C. Population

Population control is the most well-known issue. Especially in the developed countries there has been much concern about the excessive growth rate of population in the developing countries. As far as resource consumption is concerned, it is the population of the developed countries which constitutes the bigger problem.

It is now generally recognized that there is an inverse correlation between population and standard of living. An increase in standard of living in the developing countries at first leads to a fall in the death rate and consequently to an increase in population. But as standards rise, the birth rate begins to fall, at least in the second stage. It is therefore hoped that while governments in developing countries should invest a great deal of money in population control, eventually it is the assurance of a dignified standard of living to the poor of the world which will be a more effective factor in controlling the birth rate and consequently population increase.

But till 2000 A.D. the present overall rate of growth in population is likely to continue. Only by 2000, the Leontieff Report says, some stability will be achieved in the overall world population growth rate, provided the standard of living continues to rise at an appreciably higher rate in the developing countries.

Unfortunately the situation in many developing countries remains tragic. The overall growth in agricultural and industrial output of developing economies is more than offset by the population growth, so that there is no appreciable increase in the per capita consumption. The plight of the poor is made even worse by the fact that the overall increase is largely absorbed by the growing middle class, with the result that, in a country like India 60% of the people have experienced little tangible improvement in their sub-human living conditions.

Population regulation is a major factor in assuring the sustainability of the human habitat, but it is certainly not the only important factor.

The section report rightly emphasizes the fact that 'social sustainability' is more important than mere regulation of numbers :

'In seeking that goal of ecological sustainability, the goal of social sustainability must be sought with equal fervour if the beneficial population levels are to be achieved within the framework of a just, participatory and sustainable society. This would include such goals as sustaining a life of dignity, meaning and human worth....'

D. Eco-balance

The section report of the Conference paid considerably more attention to the rural-agricultural aspect of sustainability than to the industrial-urban aspects. This may have been because they thought that the threat to eco-balance from industrial and military technology was adequately known. The section called for a new land ethic, and quoted from Lester Brown's World Watch Paper No. 24 (October 1978) :

' The times call for a new land ethic, a new reverence for land, and for a better understanding of our dependence on a resource that is too often taken for granted '.

Since most of the world's people still live in rural areas, this emphasis on land, forest and water is perhaps justified. Mindless irrigation leads to erosion of land ; thoughtless deforestation leads to changes of climate and to desertification ; unplanned cropping systems lead to impoverishment of land ; by the end of the century, it is feared, only 2% of the earth's surface will be useful for sustaining the needs of six billion people, since more than 70,000 square kilometres of agricultural land is lost every year. The section report gives some alarming figures indeed :

' In historical times, more than half of the earth's arable soil resources have been lost. Annually half a ton of top soil is irrevocably lost for every man, woman and child now living. Thirty per cent of the remaining half of our soil deposits is predicted to be lost by the end of this century....during a time when human populations will increase by this same percentage '.

The figures were taken from U.N. Environment Programme (UNEP) Secretary General Tolba's State of the Environment Report of March 1978, and other U.N. reports. Christians should devote some attention to these reports and study papers.

The disruption of the atmosphere, so vital to the biosphere, by pollutants calls for vigilance on our part. As the section report put it :

' It is both prudent and ethically necessary carefully to monitor the effects of discharging large amounts of gaseous, solid and radioactive materials into the atmosphere. Whether the pollu-

tion is from industrial plants, power stations, automobiles, dust from agriculture, fertilizers, aircraft or other sources, it threatens the protective ozone layer, the thermal balance of the earth's climate, and affects all forms of life on earth'.

The section therefore questioned the ethics of valuing industrialization more than human health.

The Antarctic region received special attention from the section. The Antarctic continent and all the islands south of 60 degrees latitude have a key place in the regulation of the world's climate and ocean current circulation.

Thirteen nations have now signed an Antarctic Treaty, for jointly exploiting the immense mineral and marine resources of the area. The Treaty very nobly stipulates that the Antarctic area should be used only for peaceful purposes. But such exploitation for the benefit of a few technologically advanced nations can have disastrous consequences for the whole of humanity and is a matter of international concern. Christians ought to get their hands on the relevant material and begin to help raise the conscience of humanity about the need for international control of these explorations and exploitations.

Space is another source of worry. There is so much bric-a-brac floating around in space, and the skylab has only partially aroused public interest in the consequences of our space exploration without adequate safeguards. A great deal of stuff going around us in space is military and espionage junk floated by the two leading military powers. Again there is the possibility of damage to the ozone layer which is yet to be computed. Only the big powers can do the computing of the damage and they may not be interested in telling us the whole story.

Space, atmosphere, the Antarctic, ocean and seabed technically constitute the common possession of humanity—areas where the notion of private property has not yet encroached. But only technically. In effect, it is only those who can afford the technology and the investment who have access to most of the World Commons, and how can the global human community have any say on what a few could do to the World Commons ?

Can we keep these as our common property, have a common control of it, and make sure that some who have technical access to it do not unduly exploit it or disrupt its contribution to the eco-balance ?

We have already mentioned a number of other problems related to eco-balance like carbon dioxide increase in the atmosphere with the accompanying greenhouse effect which raises the surface temperature of the earth and thereby threatens climate and the biosphere itself.

The issue of climate change through carbon dioxide increase has been fairly thoroughly studied by a group of more than 100 experts summoned by the World Meteorological Organization (WMO) for the World Climate Conference held in February 1979, in Geneva. Their declaration puts their conclusions in somewhat guarded language :

‘ We can say with some confidence that the burning of fossil fuels, deforestation, and changes of land use have increased the amount of carbon dioxide in the atmosphere . . . and it appears plausible that (this) can contribute to a gradual warming of the lower atmosphere, especially at high latitudes . . . It is possible that some effects on a regional and global scale may . . . become significant before the middle of the next century ’.

That is a cautious conclusion and the Meteorological Conference has drawn up a World Climate Programme to offset the effects of carbon dioxide increase. The biosphere, that thin and fragile layer around our planet that sustains life, has to be carefully conserved, if life is not to perish from the face of the earth. The biosphere is not even the common ‘ property ’ of the whole of humanity alone. It belongs to all life on this planet. But it is now within the power of man to destroy it or to conserve it. It is humanity, and not other life that threatens the existence of the biosphere.

Our industrial civilization is now the threat, not only to humanity’s survival, but to the survival of life itself. Only when this is fully realized by humanity, can a concerted effort be made to alter the course of our industrial civilization, in such a way that the

biosphere is repaired, healed and maintained in its ecological equilibrium.

E. Military Technology and the Nuclear Peril

We live in a time when frenzied war hysteria is being mindlessly provoked and aroused. One hears so much about national security, European security and other localized securities. We have every reason today to be concerned more about world security than about national security. This is a point at which Christians face a special challenge to overcome our narrow parochial loyalties and to seek global solutions.

It was fitting, in this context, that the WCC Conference spontaneously gave rise to a Resolution on 'Science for Peace'. The planners of the Conference had not put the armaments issue on the agenda for purely domestic house-keeping reasons, like for example the fact that while this Conference was organized by the Church and Society sub-unit of the WCC, there were other sub-units like the Commission of the Churches on International Affairs, and the Study Programme on Militarism, who were more directly concerned with questions of the arms race and disarmament.

It was a signed request from several of the scientists present that led to a special plenary on the issues of disarmament. There were a number of presentations—from the American, Western and Eastern European as well as Asian, African and Latin American perspectives. The perspectives were nearly all in forms of universal disarmament, but no one expected an agreement between the various perspectives. A small committee composed of representatives of the various points of view was appointed with the task of bringing forward a common resolution. Anglican Bishop Habgood of Durham was appointed the Convener of this committee. It is a testimony to his brilliant convenership and drafting ability that the resolution brought forward at a later session was passed *unanimously*, without a single negative vote or abstention. It was the only resolution adopted without negative votes in the whole Conference.

The tone of the resolution is sober but unsparing. Scientists who know well about what they are talking, appealed to all people

everywhere 'to prepare local and national programmes for the conversion to civilian use of laboratories and factories related to military research and production, and to provide for the retraining and re-employment of those who work in them', and 'to resolve never again¹ to allow science and technology to threaten the destruction of human life, and to accept the God-given task of using SCIENCE FOR PEACE'.

F. Science for Peace

(A Resolution on Nuclear Disarmament)

(Adopted by the Conference on Faith, Science and the Future, Cambridge, Mass, USA, July 23, 1979)

We, scientists, engineers, theologians and members of Christian churches from all parts of the world, participants in the WCC Conference on Faith, Science and the Future, now meeting at the Massachusetts Institute of Technology, acknowledge with penitence the part played by science in the development of weapons of mass destruction and the failure of the churches to oppose it, and now plead with the nations of the world for the reduction and eventual abolition of such weapons.

WHEREAS :

- the arsenals of tens of thousands of nuclear weapons already constitute a grave peril to humankind ;
- sharp changes by the super-powers towards a counterforce strategy are so destabilizing that sober scientists estimate a nuclear holocaust is probable before the end of the century ;
- there is widespread ignorance of the horrible experience of Hiroshima and Nagasaki, and the even greater implications of limited or global nuclear war with current and projected nuclear weapons ;
- we are profoundly disturbed by the willingness of some scientists, engineers and corporations, with the backing

¹ Note : this is the wording of the resolution actually adopted ; if there are changes, they may have occurred in the editorial process.

- of governments, to pursue profit and prestige in weapons development at the risk of an unparalleled destruction of human life ;
- the waste of the increasingly scarce materials and energy resources of the world on the instruments of war means further deprivation of the poor whom we are commanded to serve ;
 - we grieve that so many of the most able scientists, especially the young ones, are seduced away from the nobler aspirations of science into the unwitting service of mutual destruction ;
 - in a time of radical re-adjustment of the world economy the intolerable burden of the nuclear arms race creates world-wide economic problems ;

AND BECAUSE WE BELIEVE :

- that God made us and all creation ;
- that He requires us to seek peace, justice and freedom, creating a world where none need fear and every life is sacred ;
- that with His grace no work of faith, hope and love need seem too hard for those who trust Him ;

WE NOW CALL UPON :

- all member communions of the WCC and all sister churches sending official observers, and through them each individual church and congregation ;
- our fellow religionists and believers in other cultures, whether Hindu, Jewish, Buddhist or Moslem, and our Marxist colleagues ;
- the science and engineering community, especially those engaged in research and development, together with professional scientific associations and trade unions ;
- the governments of all nations and especially the Nuclear Powers ;
- all concerned citizens of the world ;

TO EMBARK IMMEDIATELY ON THE FOLLOWING TASKS :

- to support and implement the WCC Programme on Disarmament and against Militarism and the Arms Race, and give special emphasis to issues related to military technology and its conversion to peaceful uses ;
- to welcome and give practical support to the initiatives by the UN and its special agencies on disarmament, which affirm the right of all nations to participate in the effort to solve these global problems ;
- to press for the full implementation of SALT II, to work without delay for the reduction of nuclear weapons through SALT III, and to complete at long last a Comprehensive Test Ban, all of which are urgent and necessary steps in making the Non-Proliferation Treaty effective ;
- to stop the development and production of new forms and systems of nuclear weapons ;
- while welcoming the exchange of scientific and technical information made possible through the Pugwash Conferences, other international scientific conferences, and the SALT process, to press for further exchanges of information as a means of reducing international mistrust ;
- to educate and raise the consciousness of every constituency to the realities of nuclear war in such a way that people cease to avoid it as an issue too big to handle ; in particular we recommend the formation of local study groups on the dangers of nuclear war and approaches to disarmament ;
- to use every available means to restore confidence in the sisterhood and brotherhood of all, to remove fear and suspicion, to oppose hate-mongering and militarism, and to undo the policies of any with a vested interest in war ;
- to prepare local and national programmes for the conversion to civilian use of laboratories and factories related to military research and production, and to provide for the retraining and re-employment of those who work in them ;

- to resolve never to allow science and technology to threaten the destruction of human life, and to accept the God-given task of using SCIENCE FOR PEACE.

What emerges as a basic question for the churches is this : Have we, as Christians, paid sufficient attention to what our human race is doing to our planet and its biosphere? Have Christians been too preoccupied with personal morality and social ethics in a rather limited way, ignoring the global dimension of the human impact on the environment? Humanity must grow in all three interrelated dimensions, *i.e.*, each person must grow (in community) into God's image in holiness and righteousness; each society and all societies must become just and participatory both within each and among themselves; but also each person and each society must become aware of the global impact of humanity upon the biosphere, and must seek justice or righteousness at the level of our relations with our environment also.

And our worship and community and spirituality have to be re-oriented to be faithful to all three dimensions of our existence.

SCIENCE AND POLITICAL ECONOMICS

A. Economic Theory as Product of Particular Cultures

Modern science and the technology based on it did not fall from heaven. Neither did it spring up in a vacuum. It was born in a particular cultural and socio-economic milieu in western Europe. It grew and developed in a specific pattern of European dominance in the world. These facts have left their marks on science technology and constitute in part their present character.

The western science of economics also developed with in that pattern of European colonialism and world domination, and our prevailing economic theory, whether neo-Keynesian or neo-classical, not only bears the marks of that pattern, but often consciously or unconsciously seeks to justify that pattern.

It was this fact to which Reuben Alves was referring when he enunciated his parable of the wolves and the lambs. Also Prof. C. T. Kurien, a leading economist from India, lashed out against pretentious western talk about the sustainable society :

‘ It is a small affluent minority of the world’s population that whips up a hysteria about the finite resources of the world and pleads for a conservationist ethic in the interests of those yet to be born ; it is the same group that makes an organized effort to prevent those who now happen to be outside the gates of their affluence from coming to have even a tolerable level of living. It does not call for a divine’s (sic) insight to see what the real intentions are ’.

In other words both Alves and Kurien were pleading for more attention to the immediate and crying need for national and international socio-economic justice. The affluent nations of the world cannot discuss the problems of over-consumption of resources and disruption of the environment without showing some interest in putting an end to the injustice in the present world order.

B. An Ecumenical Critique of Current Non-Marxist Economic Theory :

Current economic theory as prevailing in most non-Marxist countries, seems to be a smoke-screen or an ideological cover to hide the pattern of injustice. The section reaffirmed the view of the Zurich Consultation on Political Economy, Ethics and Theology (June 1978), that 'the current paradigm of political economy prevailing in western industrialized societies, and influential in many others' was to be criticized for :

- (a) its partial perception of the humanity-nature relationship ;
- (b) its bias towards the interests of a minority of the world's people ;
- (c) its emphasis on accumulation and growth as the primary answers to unemployment ;
- (d) its undue reliance on market mechanisms for problem-solving and thus for achieving the greatest good of the greatest number ;
- (e) its assumption that consumer demand depends on consumer sovereignty ;
- (f) its insufficient attention to the critical real world adjustment problems ;
- (g) its lack of moral judgement about what is produced and who consumes how much ;
- (h) its self-imposed limitations on its ability to contain the effects on economic activity of key social and political ingredients such as the role of institutions, concentrations of power and the existence of class structures.

That is the abstract language of the theoretical economist, language which covers a lot of ground. Let me try to put it in ordinary language.

When the Zurich document speaks of current economic theory's partial perception of the man-nature relationship, several points are implied. Economic theory regards individual human beings as producers, consumers and exchangers, and 'nature' as a source of or resource for, commodity production. Rarely does non-Marxist

economic theory take account of the fact that humanity is part of what we call nature, is integrally and inescapably related to it, and becomes human only in the process of inter-acting with 'nature' in a social context. It regards society as composed of equally endowed and equally powerful individuals and makes little allowance for the great inequalities with which people start life, the completely lopsided concentrations of power in a few people, and the excessive power of corporations to influence the consumer's will and choice.

In the 19th century it was at least recognized that choices were often social, and that the economy should pursue goals other than the profit of the entrepreneur. It was in our time that an unrealistic ideology of (rugged) individualism and free enterprise spread in American society in order to cover up the guilt of a few individuals and groups who had 'made it good'. Current economic theory assumes that the consumers as well as the producers are 'sovereign and free' to make decisions. It assumes that the unseen hand guiding the market mechanism will create an equilibrium between supply and demand and that just distribution will take care of itself without any other social mechanism to regulate it. While it has recognized the power of government to introduce certain regulations in the patterns of production and distribution, it does not take sufficient account of the fact that this government itself can be controlled and manipulated by the corporations and other vested interests. It assumes that if overall production keeps growing, the problems of unemployment and inflation will take care of themselves. It does not take into account the power of corporations to exploit the labour and resources of other countries and to impoverish them. It does not recognize that international banking and financing are themselves means of exploitation and oppression. It does not recognize the power of corporations, farming lobbies, and their money to influence public policy not only in the developed countries, but also in the less developed countries. It does not acknowledge the fact that its mechanisms are calculated to assure the welfare of a few at the cost of the many.

But these are not its only defects. It contains subtle ideological elements which corrupt the lives and values of people in all countries. It assumes that more is better and seldom recognizes that

enough is enough. It contains no stipulation for deciding what commodities shall be produced and who shall consume it. It too easily identifies need with demand, and does not recognize that even need can be created by propaganda and pandering. It does not always distinguish between the basic needs of all and the luxury demands of the pampered few.

Worst of all, it creates an ideology for worldwide consumption in which the affluent society sets itself up as a model for others to emulate and imitate and catch up with. By creating distinctions like rich and poor nations, economic theory lays it down with great subtlety and deceptiveness that the task of the poor is to become rich, the task of the less developed is to become more developed; thus economic theory, posing as science, becomes a major tool of mental as well as economic enslavement. A worldwide pattern of dependence is created in which the affluent regard themselves as the centre and the 'less developed' nations as the periphery—the developed First World and the Third World which looks up to it for intellectual guidance, financial aid, technological assistance and cultural norms, so that it can 'catch up' with the 'developed' world. It is this pattern of mental, spiritual, cultural and economic enslavement that is re-informed with the aid of western economic theory masquerading as 'science', and which the gullible intellectuals of the Two-Third World so readily swallow from western textbooks and institutions of higher learning and propagate it in their own societies.

C. Western Economic Theory—A Lay Comment

Even the physical sciences are marked by the culture in which they rose, as we will see in a later chapter. The social sciences are bound to be more so. Whether it is the economic theories of Aristotle in pre-Christian Greece, or of Kautilya or Chanakya in Ancient India, the values and norms are largely taken from current society as well as from the models chosen in terms of which one explains economic activity.

What now passes for scientific economic theory has its origins in colonial England. All the three main lines of economic thought—the classical theories of Adam Smith, David Ricardo and John Stuart Mill, the counter-theories of Marxists thought, and the

'volcanic eruption' of John Maynard Keynes, can be traced back to an imperialist Britain in the theories of the Industrial Revolution. Of course there have been many footnotes—the neo-classicism which is still in vogue, the neo-Keynesianism which seeks to wed classical economics to the critique of Keynes, and the neo-colonialist economic theories of Walt Rostow and Daniel Bell, but these are only footnotes and readjustments in the light of the interplay between the three sets of theories and the anomalies of economic reality today.

The task of economic theory is always a twofold one (a) that of creating models or simplified paradigms of relationships between calculable or measurable variables considered most important in the analysis of economic activity as we observe it, including their empirical verification in relation to the realities of history; and (b) the concomitant process of setting up norms, laws and orientations for what needs to be done in order to keep the economy healthy, and for deciding on the mechanisms needed to guide the economy in the desired direction.

Economics, as a science, then is both descriptive and normative. The descriptive element seeks to articulate the 'laws' of demonstrable regularities and recurrences of economic events; the normative element gives direction to governments, corporations, trade unions and the general public in matters of taxation, wage and price control, and the fostering of institutions and processes.

The descriptive element in classical economics saw the elements of production as threefold—land, capital and labour. This theory arose in the midst of conflict between the interests of a landed aristocracy and a new class of traders and entrepreneurs, competing for a larger share in the fruits of the exploitation of the agricultural and industrial working class both at home and abroad in the colonies.

The entrepreneur class was interested in the development of science and technology both as a means of increasing production and therefore profit, and as a way to reduce the dependence on human labour which was becoming more and more expensive as wages and standards of living kept rising. Machinery and labour, according to Ricardo, are in constant competition, and the develop-

ment of machinery through science-technology would be the defense of the capitalist class against the spectre of rising wages and the strident demands of the working class.

But the development of machinery requires the accumulation of capital, which can be done only by keeping back some of the fruits of labour from the labourer. The labourer needs to be maintained at a certain minimum level of health, nutrition and basic need satisfaction, and the closer to the minimum his wages are, the more would be the profit margin, which can then be used for further capital development in terms of machinery of production. And the more capital there is, the greater becomes the productivity of the labourer, and he can thus be given a slightly higher wage, keeping in mind the need for the maximization of profit and the expansion of capital equipment, which along with land (source of raw materials) and labour constitutes the main elements of an economy.

The development of science and technology was thus from the beginning wedded to the need for the capitalist to increase his profit margin, though it also paid dividends to the labour class. The trade unions sought to maximize these dividends, while it was in the interest of the capitalist to minimize the labourer's dividends and to maximize his own profit margin.

Both the development of science and technology and the development of economic theory took place in the context of this conflict of class interests.

The capitalist class had to fight it out on both fronts. On the one hand there was the feudal or landowning class, who remaining idle and unproductive, collected rents and prices for the raw materials produced by the land. As wages and prices arose in consequence of the increase in capital equipment and its qualitative improvement through science/technology, the landlord reaped a portion of the benefits by collecting higher land rents¹ and raw material prices. This means that they were taking away from the profit margin which would otherwise accrue to the capitalist. Thus

¹ The increase in population also led to pressure on land, hence to higher rents, hence to higher wages.

the feudal aristocracy and the industrial labouring class clamouring for higher wages were inimical to the interests of the new class of entrepreneurs.

Even Marxist thought grew up in this milieu, representing the aspirations of the agricultural and industrial labourers. Karl Marx developed the two related theories of 'value' as created by labour alone, and capital as 'surplus value' kept away from the workers. According to Marx labour was the single source of value. Marx did not mean that the value of each commodity was the amount of labour that went into it. That may have been what the classical economists thought. Adam Smith, for example, held that two things requiring the same amount of manufacturing time would have the same value and should sell for the same price.

For Marx however it was the sum total of socially organized labour in a given community that created value. All the goods and services produced by a community together constitute the fruit of the labour of the total community. Each commodity is the materialization of a given portion of that total labour, and that portion constitutes its real value, irrespective of what anybody pays for it. Its exchange value in the market, as well as the wage paid to the labourer, can both be different from its real value in terms of the portion of social labour that has gone into it.

Now for Marx, the community that produces the commodities has at its disposal many other things—resources, land, machinery, technological know-how, and so on. And the community labour uses all these things to produce commodities, but it is labour that constitutes value. Given all the other elements, it is labour that makes them into commodities for use. And the whole value of the commodities belongs to the community that created them. In the capitalist economy, says Marx, only a part of the value created is paid back to the worker as wages, the remainder, or the surplus value being held back by the capitalist as his profit.

Mathematically expressed the total value of the social product (SP) is equal to the sum of three variables $CC + VC + SV$. CC stands for constant capital expenditure (*i.e.*, depreciation of equipment, consumed raw materials, energy, etc.); VC stands for variable capital and means primarily the sum total of wages paid

to the labourer ; SV stands for the surplus value appropriated by the capitalist. And if MP stands for market price, we can say ;

$$SP = CC + VC + SV$$

$$\text{but } SV = MP - (CC + VC)$$

$$\text{and the profit rate} = \frac{SV}{CC + VC}$$

But this profit rate has to be multiplied by the speed of turnover of capital. The faster the turnover the higher the rate of profit. So the capitalist's interest is (a) to increase the surplus value and (b) to quicken the pace of turnover of capital.

Now part of the surplus value is utilized by the capitalist for his own consumption and what remains goes into capital accumulation and improvement of the efficiency of production. The ratio between wages paid and capital expenditure is important. If by employing the same amount of labour but using more efficient capital equipment the social product can be increased, then, for each unit produced there is more profit. If further the total amount of wages paid is less, again the surplus value increases. So the capitalist has two interests : (a) make the capital equipment technically more and more efficient, and (b) reduce as much as possible the amount of total wages paid for labour (by reducing the number of employees).

On account of (a) the capitalist is interested in the development of science and technology in so far as these can help him to produce more goods per unit of capital invested and labour used. But on account of (b) too, the entrepreneur is interested in science and technology in so far as they can reduce his dependence on human labour by relying more on mechanical automation.

One of the main sources for funding scientific—technological research is of course the large corporations. Their interest however is largely in science/technology for a particular purpose—increasing cost-efficiency, margin of profit and dependence on human labour. This means science technology receives an impetus in a market-economy society towards the development of production machinery. It may slightly improve also the quality of the product

the consumer receives. But by and large the benefits of science and technology of this kind ensues to the entrepreneur or the corporation, rather than to the consumer or the labourer.

The other major source of funding for research is in the military establishment. Here again the direction of development in science and technology is clearly anti-human, in the sense that the ingenuity of man and the resources of the earth are used up not for augmentation of the quality of human life, but for mutual destruction and inhumanity. The UN Conference on Science and Technology for Development, Vienna, 1979 pointed out that 50% of present science and technology is now in the service of military establishments, and that half a million of the world's scientists and technicians are on military pay.

Who makes these decisions about how our human and natural resources are to be utilized? Clearly the people do not want their energies and resources wasted on war. What unseen hands and heads are responsible for these decisions which everyone recognizes as partly irrational and partly mad? Can economic theory also deal with such questions? Does the one man one vote principle ensure equality in decision-making power?

In the non-socialist countries, political science and economics are taught as separate discipline so that the influence of politics in economic decisions and of economic interests in political decisions are not very clear even to the political scientist and the economist. Even in India we have so few real political economist involved in our planning and policy-making structures. The result is that whatever economic development there is in our country works more in favour of the already privileged.

If the people's awareness of these issues is to be heightened, there has to be a radical change in the teaching of economics in our universities. At present economics as science seems to be distorted and used against the interests of the under-privileged. Can it still be called science is a question economic and political theoreticians and philosophers should urgently take up.

D. Towards a New Scientific Political Economics

Economics or rather political economics, is the basic science which should deal with ensuring the human dignity and human

worth of all in all human societies, regionally, nationally and globally. Its concern cannot be limited to the mere production and distribution of commodities.

Political economic theory must provide for the following elements to be adequately dealt with :

- (a) it must constantly formulate, reflect upon and reformulate, on the basis of a social consensus, a set of values or social goals for which production is organized ;
- (b) it must formulate and constantly reflect upon the principles of socio-political organization for production, distribution and decision-making with a view to enhance justice, freedom and human dignity for all ;
- (c) it must provide for full participation of all sectors of society in the decision-making structures of the politico-economic organization at all stages: planning, execution; and evaluation ;
- (d) it must deal effectively with the questions raised by the human impact on our environment and on the biosphere ;
- (e) it must provide for the conservation and augmentation of the best in all cultures, and for their greater development in a more humane direction, including the development of religious faiths and institutions ;
- (f) it must provide for inter-regional, inter-cultural and international relations which promote unity, mutual understanding, justice and peace in the whole of humanity.

This means that a new science of political economics should also deal with the cultural and religious heritages of humanity which have, *pace* Marxists, been often more decisive for human development than merely the social relations of production and distribution. In the 19th century when Karl Marx and Friedrich Engels wrote, religion was regarded as a reactionary force retarding the growth and development of humanity and supporting the vested interests of the establishment. This judgement of 19th century European religion may or may not have been valid. But there is no reason to take that judgement, limited to one particular time and space in the history of global human development, as a universal principle.

The western scientific ethos is secular, and it shies away from dealing with religion as an integral part of the political economy. But does science have to be necessarily set in a secular framework? True, the secular frame provided for the free growth of western science, unfettered by the shackles of ecclesiastical authority. But has not science today sufficiently come of age to declare its own independence from the secular bind which is by no means essential to it?

Christians have a responsibility to pioneer here. The MIT Conference showed very clearly that there is no essential conflict between modern science and the Christian faith, or for that matter between science and other religions. It is possible, not only to accommodate all the valid insights and discoveries of modern science within a religious perspective, but even to give new and more creative orientations to science and technology by integrating them into a conceptual framework of creation-incarnation-eschatological fulfilment.

A Christian scientific political economics is not a contradiction in terms. Its basic structure can be delineated only after some of the philosophical issues relating to science and to our human relationship to creator and creation have been more adequately set forth.

CHAPTER VI

SCIENCE AND PHILOSOPHY

The characteristic feature of western academic knowledge today could be seen as a mixture of extreme specialization on the one hand and the desire for inter-disciplinary and integrative studies on the other.

The integration and interrelating of the various sciences still remains a fairly impossible task, primarily due to the recent explosion in the quantum of available knowledge. No human mind can assimilate more than a small portion of the main aspects of knowledge available. In spite of great advances in cybernetics or in information storage and retrieval technology, we do not yet know how to programme any real integrative techniques into the computer.

We have no reason to be impatient with science. After all in its present form it is less than two centuries old. The first university degree in science in the USA was granted only in 1865.¹ And 90% of all modern scientists who ever lived since the beginning of mankind are living now.

For example we have a million chemists alone in our world today ; every year we produce some three million scientific papers. Modern science is still in its youth, rather prodigious in its energies, though perhaps still far away from emotional and integrative maturity.

Science, because it is so young and so vigorous, so impressive in its performance, gets invested in our culture with a sort of guarded mystique. Nobody openly says science is omnipotent, but underneath many people assume it is. It is the 'open sesame'

¹ At the College of Notre Dam du Lac , in 1965 the present Notre Dame University celebrated a 'centennial of science' in commemoration of that event. See F. J. Crosson, Ed. *Science and Contemporary Society*, University of Notre Dame Press, 1967.

to all knowledge, the magic password for entry to the human or other planetary spheres or into the depths of the atom.

A. Modern Science—Assumptions and Images

But every culturally conditioned variety of science such as ours has its own unscientific assumptions, many of them somewhat unexamined. Just to mention a few, it has a cosmology or world view—a picture or mathematical equation of how the universe is constituted, what processes, mechanisms and structures govern its functioning, etc. Some very learned books like Weinberg's *The First Three Minutes*, describe the whole process of creation as it emerged in the first three minutes of its existence in a manner that makes you believe that this reputed scientist is simply describing reality as it happened, not extrapolating from our present sketchy knowledge of the structure of our universe, to what must have happened 'in the beginning'.

Modern science also implies many unexamined assumptions about the nature of man. The scientist in general, and not merely the biologist or the anthropologist, works with certain conceptions of what human possibilities, functions and faculties are. In that process he manages to ignore a vast amount of data which point to other human possibilities and functions—the paranormal phenomena of ESP and so on, the religious experience, the drug experience, the experiences of love and joy, and the fear of the Lord.

Modern science has also a set of value assumptions drawn largely from the culture in which it grows up—e.g., that knowledge can be made into a commodity, stored, traded in, copyrighted, made into the property of an individual or a group; or that knowledge is good in itself; that the knower is distinct and separable from the known; that the world open to our senses exists 'out there', independently of our perception.²

Modern science entertains also a set of epistemological assumptions—about the knowability of the world, the homogeneity of

² For example, Prof. Hanbury Brown in his address at the MIT Conference on The Nature of Science, cited the conventional description of science: 'Science, viewed as a process, is a social activity in which we seek to discover and understand the natural world, not as we would prefer or imagine it to be, but as it really is'.

nature, about the subject-object dichotomy and so on ; that errors can be tested and overcome by experimentation and rational reflection.

(a) *The Platonic Image of Science* : Its basic inspiration seems to be the platonic one—the assumption that some specially gifted and trained people can, by the deductive method based on experience and dialogical reflection :

- (1) know the truth ;
- (2) restructure the world in perception with reference to the real and unchanging ideas or natural laws ;
- (3) overcome errors in perception or theory by rational reflection and rational action, undertaken and led by the disciplined modern philosopher-kings or scientists.*

Despite the anti-platonic and pro-Aristotelian bias of much of modern science, there is still much truth in Prof. A. N. Whitehead's dictum that most of western civilization is but a series of footnotes to Plato.

(b) *The Pathology Image of Science* : But the scars of the battle between the rational enlightenment and ecclesiastical authority in modern times are still visible in western culture—and not only among religious fundamentalists who distrust scholarship and rational reflection. Jacques Maritain, the famous neo-Thomist philosopher of our times, spoke about the 'Pathology Image' of modern science in our culture. Modern science could be conceived as a 'deadly disease' alienating man from reality, eroding human faith in moral absolutes, inimical to the cherished values of the so-called Judaeo-Christian faith which people claim as the foundation of western civilization.⁴

* For an interesting treatment of the various images of science in the West, please refer to Carl Hamburg, 'Science and Institutional Change' in K. H. Silvert, Ed. *The Social Reality of Scientific Myth*, American Universities Field Staff, Inc. New York, 1969. The present writer is indebted to Dr. Hamburg's article.

⁴ One of the earliest works of Maritain was entitled *Anti-modern* (Paris, 1922). In the preface to his more mature work on *Science and Wisdom* (London, 1940), he takes the view that 'science is in itself good and noble' (p. 6), but only 'in the sense in which one perfection is inferior to another perfection'.

(c) *The Model Image of Science*: In the Anglo-Saxon world, however, the philosophical understanding of science has moved from its earlier positivistic assumptions to a more modest 'Model' Image of science. Science is a machine, a tool, which enables us to do certain things which we otherwise could not; no ultimate truths can be deduced from science that is not its function. As Prof. Mary Hesse of Cambridge expounds it, science can be understood on the model of a teaching machine with feed-back control. Out of our present culture and language we develop theories which we think will fit 'nature', and also empirical experiments which are theory testors. The result of the experiment helps us to correct our theories, and newer and more apt hypotheses are then put to the appropriate new experiments or theory testors. By constant feed-back, theories are constantly improved, and the process yields us operationally useful knowledge, and some of the regularities observed may also be indications of a truth that goes beyond the operational.

This pragmatic, operational view of scientific knowledge is indeed a far cry from the positivistic claims of an Auguste Comte or an earlier crop of Vienna circle philosophers and scientists. They no longer talk of the 'laws of nature', but only of 'law-like statements' which are operationally useful. The 'model' image is a modest image.

(d) *The Symbolic Form Image*: What is becoming increasingly fashionable in western philosophy of science seems to be the neo-Kantian symbolic form image. Ernst Cassirer and his disciple Susan Langer introduced these concepts long before the philosophers of science got hold of it.

Immanuel Kant (1724-1804) had already proposed that the human mind is not a passive *tabula rasa* which receives impressions from the outside world through sense experience, but is an active co-creator of knowledge or concepts, through the forms and categories supplied by the structure of the mind itself for the formation and interpretation of experience.

Kant's error was perhaps in attributing to the universal human mind the characteristic structure of the 18th century German mind putting into that structure Newtonian mechanics, Euclidean geometry, and Aristotelian notions like cause and substance, giving

these an *a priori* character. Some of that tendency is still seen in cognitive psychologists or 'generative grammarians' like Noam Chomsky, who for example argues for a 'fundamental grammar' or 'deep grammar' for the human mind, a grammar which is given, universal and rule-conforming.

But today many philosophers of science argue that modern science is but one of the possible ways of perceiving the world, other ways being for example that of art and poetry, or religion and mysticism.

B. Towards a Dominant Image where Domination is Not Central

Of the four images, the most popular among educated people is the optimistic platonic image, though many pious people do still retain alongside also the pathology image. There is a tendency among pious people even to question the adventures of science as the fruit of unlicensed human pride. We hear this every time there is a landing on the moon, a splitting of the atom, or the fertilization of a human embryo in a glass dish. The charge is that man in his pride is usurping the place of God, and would soon be chastised by a jealous God who does not want his special prerogatives to be taken over by man.

The co-existence in our cultures of the platonic image and the pathology image of science lies at the root of our ambivalence towards science—on the one hand coveting and desiring it as the means to the solution of all problems, and on the other mistrusting science as capable of bringing down the wrath of God upon us.

The model image is in a sense a modest pose claiming to make no value judgements about science except that it is operationally useful. It fits in very well with the pragmatic tempo of the Anglo-saxon world and its basic anti-philosophical, anti-metaphysical attitudes. But the Anglo-saxon thinkers give us little clue as to what science is all about. If it is only an operational tool, one among many others, then why does it come to have such influence in our societies, and rule so despotically in our academic communities? Why is it still true that the man in the white coat, operating the buttons of a computer still fills us with some kind of awe?

There must be some truth to the allegation that science/technology has replaced religion as the source of authority in our urban-

industrial culture, and the scientist in the white coat is now a surrogate of the priest in the black cassock. And it would not do therefore to dismiss the fundamental questions about scientific knowledge with the simple assertion that science/technology is but a tool and leave it at that.

If, as Rosemary Reuther claims, both our modern science and the theological matrix which produced it were creations of a male dominated culture to which the concept of domination is the key, we need then to ask ourselves the question whether we can develop another kind of science/technology, and another kind of theology in which love, joy, peace, compassion, and kindness, rather than domination and manipulation provide the central ethos.

Here, theology also needs to be radically reformed. For the element of domination-manipulation is still too central in theology. Even in supposedly anti-domination theologies like Black Theology, Feminine Theology and Liberation Theology, one can very well hear, if not the rumbling desire of the hitherto dominated group to dominate their dominators in retaliation, at least a basic lack of love and compassion, or an absence of joy and peace.

If the element of domination-manipulation seems thus common to both theology/social ethics and science/technology, then clearly it is a reflection of the way society itself is organized, and we are hardly likely to arrive at a theology/social ethics or a science/technology that is peaceful and joyful, until some necessary changes have taken place in the structure of society itself.

But the transformation of science and theology should mark the transition towards a peaceful and joyful human existence, with love and compassion. Here the conceptual must go hand in hand with the socio-cultural and politico-economic transformation. But what has to be resisted is the temptation to short-cut the passage to the socio-cultural and politico-economical, without going through the conceptual. To deal with only the ethical issues posed by science is to treat the symptoms without diagnosing the cause of the disease — a temptation to which Two-Third World thinkers also too often succumb. For they, too, are educated and formed by our pragmatically oriented, science-and-technology-based civilization. That is why we must do more work on the image or conceptual construct of science, as well as on the underlying perception

of reality itself, if we are to deal adequately with the ethical issues posed.

Here philosophy comes in as a necessary tool in analysis. Our academic communities, however as a result of the domination of science and technology in the university structure, have lost their capacity for cheaper philosophical reflection.

The integration of human knowledge, theoretically at least, remains the province of the academic community, which has access to that knowledge, even though in fragments. But the academic community is precisely the place where deeper philosophical reflection seems to be generally discouraged.

When philosophy fails to be faithful to its own true vocation, the integration of knowledge becomes an impossible task; we resign ourselves to a mere socio-economic or ethical analysis of our problems. In theology as well as in social ethics, we take the view that the problem is one of political economic analysis and reconstruction.

Philosophy, at least academic philosophy, has abdicated the task of integrating our vision of reality and providing a coherent interpretation of reality and of our relation to it. Today it is content with an analysis and criticism of received social, scientific and religious propositions, and the reconstruction of principles and categories regarded as indispensable to correct theories or sound policies of action.

We have then to proceed through an analysis of philosophy and theology, to see what their true function is, and how to make philosophy functionally effective. Before we do that, we should perhaps engage in some reflection on our ways of ethical decision-making. We may be in a better position after that to engage in further reflection of the present states of the philosophy of science, of philosophy in general, of Christian theology and perhaps of the religious approach to reality as distinct from the secular approach.

To find a science based on compassion, peace and joy, demands gigantic effort of the imagination. Herein lies the great task of the Church in re-orienting the development of science/technology away from domination to a compassionate service of humanity.

CHAPTER VII

HOW DOES ONE DECIDE?

The Nature of Ethical Reflection and Decision

The Christian churches need to ask themselves five questions:

(1) How in fact do people arrive at personal, family or social ethical decisions?

(2) How does faith contribute to ethical decisions? Does science contribute?

(3) When there are different theologies—can you still come to an ethical consensus?

(4) How does one translate theological ethics into secular ethics?

(5) Should the churches take the lead in promoting free enquiry or should they make up their minds and take partisan or advocacy roles? Should the churches legislate for their members on ethical questions?

A. The Process of Ethical Decision-Making

Prof. Karen Lebacqz of the Pacific School of Religion posed the question in a fresh and interesting way. She reviewed the contemporary methods of ethical reflection and pointed out the limitations in our present approach, which she characterized as too decision-oriented, too individualistic, too a-historical.

In decision oriented ethics there is the assumption that there is always one right thing to do in a particular case, and that this can be found out by a rational analysis of the issues and principles involved. For example, in the case of a mother told by her physician that her four-month old embryo in the womb is genetically deficient (say Down's syndrome or Mongoloid disease), should she agree to an abortion? One could argue that the child when born is going to suffer very much and cause suffering to others, and there-

fore that it is better to prevent the birth of such a child. Or one could calculate how much, it would cost to bring up such a child for the 20 to 25 years of its life and what contribution such a child or young person could make to family and society. In either case, the attempt is to decide the issue on the basis of the degree of suffering or happiness, or of economic costs and benefits. The more fundamental question whether one can justify the destruction of a four-month old human embryo is sometimes discussed, sometimes answered with the general principle that abortion of human embryos is justified under certain conditions.

There are other hidden assumptions behind such a process of ethical reflection. Some people seem to think that it is possible for human beings always to do the ethically right thing and thus be sinless and unguilty. Others would say that any human action is bound to be sinful and that one can only be justified by faith.

In all these considerations, one has a basically individualistic orientation. Especially in the developed countries such decisions are taken in the context of a physician-patient relationship, sometimes a religious leader or pastor joining in the discussion. Karen Lebacqz told the WCC Conference that the famous 'patient-physician relationship', *i.e.*, the luxury of having a family physician with whom one can discuss and decide on ethical issues, is available to less than 2% of the population in most of the countries of the world, and that this way of ethical reflection and decision is not one of the options that they have. In such countries, the facilitation of health delivery to all sectors of the population becomes the basic ethical issue and this is not something on which the individual can reflect and decide. But it remains a fact that particular individualistic ethical dilemmas are a luxury of the richer classes and do not carry much interest for the majority of the people of the world who are too poor to have any kind of medical assistance at all.

There is also the assumption that scientific data are totally value-free. If a doctor says to an expectant mother that there is a 50% chance that her child would be genetically defective, such a statement can be shown to be value-laden at several points. In the first place one could have also said that there is a 50% chance that the baby would be normal, which would be another way

of stating the same thing. Equally value-laden is the word 'defective' as we have already pointed out. The doctor could have stated the something in other less value-laden words.

Karen Lebacqz told us that the women's liberation movement is finding out better methods of ethical reflection and decision-taking. She suggested certain basic differences of emphasis in feminist theological-ethical reflection. For example, according to her, women prefer reflection about structures of society and patterns of meaning rather than rational analysis of personal ethical dilemmas. Most of us were not convinced that this was an either/or affair. Perhaps structural thinking may provide a framework for resolving ethical dilemmas; but perhaps they may not. It is more likely that we have to deal with social structures as well as with personal dilemmas in ethical reflection, and only in some cases would the two be clearly interrelated.

She also stated that in liberation theology the emphasis even in social ethics was changing. At one time the call was for a prophetic passion for social justice; today there is a shift to the apocalyptic, *i.e.*, the attempt is to get at the name and number of the beast (Babylon—666, in the biblical book of Revelation) which is behind all the abominations in society.

The women's movement, according to Ms Lebacqz, was making a major contribution in its insistence that it was not sufficient to analyze the *socio-political* structures but that one should go deeper into the *thought-structures* and patterns of meaning that underlie people's aspirations. Ethical questions cannot be resolved at the ethical level; they have to be transformed into theological and philosophical questions.

A clear example of this would be, in the Indian context, to ask the ethical question whether it is right to give alms to a hungry beggar. Sophisticated Indians would say that we cannot solve the problem by giving alms and that we should create the kind of society where there would be no beggars. Well and good, but what about the present hunger of the poor man? Can he live on the pleasant thought of a future society without beggars? Behind the typical sophisticated Indian's refusal to give alms to a hungry beggar, there may be several concealed thoughts:

(a) Perhaps this beggar has a bank account¹ and by giving him alms I am being reduced to a fool who contributes to somebody else's bank account ;

(b) If I give to this beggar, others may also approach me and I do not want to be the one taxed for being compassionate in one instance ;

(c) after all, I earn my money by hard work, why should I give any of that to this unproductive parasite on society ? ;

(d) I pay my taxes to the municipality. It is their job to do something about those beggars, both to provide for their living and working, and to make sure that they do not pester honest citizens ;

(e) charity is dehumanizing. What we need is justice ;

(f) What can I do by myself to solve this problem ? I do my duty by doing honest work. It is up to society to do something about it ;

(g) What I have is mine. Why should I give it to others ?

(h) begging is exploiting. I refuse to be exploited.

We will not attempt here to analyse these thoughts, but merely point out that there are thought structures behind the ethical decision not to give alms to a hungry beggar. It is the task of philosophy and theology to get behind the ethical issues and tackle the thought-structures of people and the values implied.

Karen Lebacqz told us that women's movements are resorting more and more to story-telling (her story rather than history) as a way of ethical reflection and decision. When confronted with the ethical dilemma of a woman facing the issue of whether to have an abortion or not, we should ask the question : What is the story of this woman ? What is her life situation ? In the Black liberation movement as well as in the women's liberation movement, life-stories of persons and groups have had a more telling impact on social action and ethical motivation, than cold and abstract analyses of social and economic structures.

¹ Many professional beggars in India have been found to have bank accounts or significant sums of money stored away otherwise.

Once again, it seems to the present writer that it is not a question of either/or. We need to do all these things :

(a) listen to the stories of the oppressed, the down-trodden and the marginalized, and re-tell these stories to others ;

(b) undertake adequate analyses of the socio-cultural and political economic structures which cause the oppression and exploitation ;

(c) go even further back to theological and philosophical analysis of the thought structures and patterns of meaning lying behind the socio-economic structures ;

(d) deal both with personal dilemmas and with what would constitute long-term solutions.

B. Faith and Science in Ethical Reflection

The role of science in Christian ethical reflection is easier to delineate than that of faith. For faith remains a nebulous concept, even after making the distinction customary in western circles between *fides quo* and *fides quas*, 'belief in' and 'believe that'. Faith is more than trust in a person or believing that certain things are true.

The WCC Conference's Section I was devoted to the Nature of Science and the Nature of Faith, with which topics we shall deal in a later chapter. The basic stance of that document is Western Protestant ; the Eastern Orthodox point of view is always expressed as a particular position—obviously drafted by an Eastern theologian and set inside a document which otherwise is mainly Protestant. In the case of Section X which works 'Towards a New Christian Social Ethic and New Social Policies for the Churches' even the courtesy of a separate statement of Orthodox position was not extended, obviously due to the rather hurried circumstances in which that document was drafted. But this latter document does set out the dilemma of western Protestant contextualist or 'biblical' ethics :

'We struggle to find an ethic more secure and authoritative than our feelings and our social location. If, for example we appeal to conscience, we find that our consciences are largely

determined by our societal experiences. If we search the Scriptures, we find that the parts that move us most powerfully are those that address us where we are, that the concepts by which we interpret the Scriptures are those that we have developed in a given historical context'.

Section X, defining faith as 'a response to God, a process, a directing of life, which influences the whole person and the Christian community', saw 'Christian behaviour' as 'rooted in the Christian love and understanding of God'. They took the line that the heart of this understanding is an anticipation and celebration of the 'new era for humanity which God inaugurated in Christ'.

Without basically disagreeing with that position, an Eastern Orthodox theologian would like to put together two concepts to amplify that view—the concepts of Baptism-Eucharist and Theosis, as the basic framework for Christian ethics. These framework concepts are both eschatological, *i.e.*, they involve participation in the new age as well as anticipation of its fulfilment beyond history.

Participation—not merely celebration and anticipation or a mere pointing to the messianic kingdom—is the key for Eastern Orthodox understanding of the new age. The new age is not a mere intellectual construct that provides insights; it is an actual living of the new life inaugurated in Christ's death and resurrection.

Baptism is the initiating mystery, by which through faith and the action of the Holy Spirit, Christians are incorporated into the reality of the new age through participation in the death and resurrection of Christ. One now becomes a member of the historical-transcendent community of faith that experiences the new life and grows in it. The Eucharist is the mystery through which Christ the High Priest, perpetually offers up himself along with his body, by the Holy Spirit to the Father. Baptism-Eucharist is thus the actual process of participation in the risen life of Christ the God-Man who unites the community of the Church with the community of the Holy Trinity.

This existence in the Church and in the Holy Trinity, is a process with marked 'ethical' consequences. The process is called in

Eastern Orthodox theology by the name *Theosis*. *Theosis* means the progressive separation from evil and advancement in the good ; humanity being created in the image of God, should be able to become more like the original, *i.e.*, God. Only the character of God as infinite good is the normative limit for growth in the good. And since that good is not finite, there can be no stopping in the good, there is no end point where one can stop growing. But man being finite, there is no risk that the addition of any amount of finite good will make him infinite like the original. There can be only approaching infinity, but never achieved infinity. But as you approach infinity, you also realize that there cannot be many infinities.

This process however takes place now in a world where sin is integrally woven into every form of good, and no form of good ever remains static if it is to remain good. Hence the struggle against sin is bound to be perpetual in history. There will be no dawn in history when sin and evil would have completely disappeared.

Hence the constant and unrelenting struggle against evil, both personal and social must remain an integral aspect of historical human existence. Only perpetual vigilance can keep the good from turning into evil... The Christian thus entertains no vision of a 'classless society' in history in which injustice, oppression and exploitation would have been permanently banished and people will live happily ever after. The separation from evil takes place only at the end of history, through death and resurrection, through the transformation of the body and its way of perceiving and dealing with reality. This does not mean that the body is responsible for the presence of evil. It merely means that the present body is the principle of historical existence, and so long as we are in this perishable body we will also be in historical reality, where the wheat and the tares always grow together.

This does not, however, mean an acceptance of the inevitability of evil. On the contrary, since evil has been in principle overcome in Christ, it is our job to continue that war without fearing the power of evil, to be vigilant and watchful for new forms in which evil will appear, and not to be fooled by evil appearing as good, or to be blind to its presence in ourselves and in groups and institutions with which we are identified.

The negative struggle against evil is only one side of the process of *theosis*. The other side, which has to be simultaneous, is growth in the good, creation of the good, promotion of the good, hungering and thirsting for righteousness and holiness, in oneself as well as in the whole of humanity. The gifts of the Holy Spirit are available to us in the community of the spirit precisely for this bearing fruit in love, joy, peace, self-control and heroically creative good. The growth in the good is also a community process, the centre of the process being participation by the community in the death and resurrection of Christ in the Eucharist, 'until I come', that is until the end of history. In the Eucharist, the Church offers up herself and vicariously the whole of humanity as well as the rest of creation, in Christ, by the Spirit, to the Father; and receives from the Holy Trinity, the divine life through the medium of the body and blood of Christ. It is this divine life which then has to be lived out in the midst of history, bearing fruit in creative good.

For the Eastern Orthodox, one cannot jump directly from the Bible or from the situation, into ethical issues; rational discussion and ethical decision-making form but part of the business of eucharistic existence. It is not what one thinks or does that provides the foundation, but one's consciousness and spontaneous creativity as they are formed through the process of *theosis*.

This perspective on how faith affects Christian ethics was hardly discussed in the WCC Conference and is one that still needs to be seriously explored in an ecumenical context.

As for science and its contribution to ethics, the report of Section X does mention two kinds of contribution: (a) the values inherent in the scientific enterprise itself, namely 'honesty, a humility before truth and a willingness to set aside prejudice and accept correction from evidence', and 'freedom to search for truth'. It recognizes that these values are not sufficient for the guiding of the scientific enterprise, and that humanistic values have to undergird science policy or the development and utilization of science and technology.

Scientific data in themselves do not yield a science policy. However 'given certain assumptions about values and purposes, the data may point to a policy'.

Technology is more closely related to ethics-making possible the cure of disease, the production of more food, swift communication, easier exploration of surrounding reality; but also invasion of privacy, greater exploitation and oppression, greater mutual destruction, quicker destruction of the biosphere and so on.

Technology is power, based on science as knowledge. And all power is ambiguous, capable of use in the service of good or evil. Technological advance thus creates the possibility of increasing the power of evil or increasing the power of the good. The fact that 50% of our scientific-technological power is now in the service of war and destruction, and a good portion of the other half in the service of quick profit or imperial expansion for the corporations is merely an indication of whom science and technology now serves. The ethical issue then becomes not merely that of dealing with personal moral dilemmas produced by new technological possibilities. The main issue is that of liberating science/technology from the bondage to evil and injustice and war.

Eastern Orthodox theology would go further. The Eastern patristic view is that man becomes fully human in learning to co-ordinate head and hand, both being controlled by the heart, which is the centre of one's being, which in turn is guided and directed by the spirit of God in community. Science-technology is a sort of head-hand co-ordination, and leads humanity to greater maturity, and complexity of personality and society, as well as conceivably human brain evolution. The actual failure of Eastern Orthodox theological reflection in recent centuries has been the failure to take this seriously. There have been but few Orthodox thinkers who have adequately studied the complexities of modern scientific technological civilization and then proceeded to write Orthodox theology.

In any case the Eastern patristic tradition would not be negative in its attitude to the development of science and technology, but would on the contrary, encourage science-technology as a necessary development in the growth of historical man in process of theosis. The assimilation and control of science and technology would be part of the way humanity grows—in Christ, no less.

If this be so, Eastern Orthodox theology cannot revert to any lazy romanticism which wants to back-track to a pre-technological era to find peace and tranquillity. We must go through this process of scientific technological development, but keeping two things in mind : (a) it is not a final stage, where the universe yields all its mystery to human curiosity through science-technology, but merely opens up one aspect of reality in such a way that the human capacity for creation of good and evil is enormously enhanced ; and (b) it is a knowledge and skill which have to be mastered and brought under control before they overwhelm us and destroy us.

In other words Eastern Orthodox theology would take a positive attitude towards science/technology without being over-impressed or mesmerized by it. It is one way of dealing with reality ; it provides immense possibilities for the creation of the good ; it is a head-hand coordination skill which we have to acquire in the process of the evolution of the human race ; it should be adequately brought under social control, so that it really becomes a tool for the creation of the good in the hands of the whole of humanity and not just a privileged few. But it should not be made the sole way of knowing, and it does not lead, in any case, to any ultimate verities. It enhances human power to create good or evil. Divorced from love and wisdom, science/technology becomes an enemy of humanity. Because it gives more power, it has to be carefully watched, so that the additional power does not serve the interests of injustice, oppression and exploitation. Head-hand coordination should be further coordinated with growth in the good. Thus both science and faith should be at the service of the good—power at the service of wisdom and love for increased creativity in the good.

C. The Problem of Different Theologies

The WCC Conference consciously planned to have more addresses by scientists than by theologians. And hence the problem of different theological starting points was not at the centre of the debate. There were theological addresses on The Nature of Faith (Gregorios), on Humanity, Nature and God (Birch, Liedtke, Borovoy), on The Christian Approach to Science and Technology (Falcke), and on Bio-ethics from a Liberation perspective (Lebacqz). The methodological problem of arriving at a

common ethics in a world of many theologies and ideologies remains still to be tackled. Our horizons were stretched by the addition of several addresses from the perspective of other religions [two Buddhists, two Muslims, and ideologies (Petric)].

With different starting points one can come to similar conclusions, we discovered. Quite often the different perspectives complemented and completed each other. The perspective was substantially affected also by the socio-economic situation from which the speaker came. For example, while a speaker from an industrially advanced country would tackle the problem of resources from the perspective of their being finite, a Two-third World speaker would concentrate on the injustice in their distribution and consumption. Each needs to listen to the other, but often they do not. Most of us, however, saw that it was not adequate to think from the perspective of one's own region or nation, but that all of us had to learn to think globally, and learn from each other's situations, cultural heritages and religious traditions. This is difficult but necessary.

The theological perspectives which dominated were those of western existentialist or process theologies. Roman Catholic theological approaches were rarely heard. The Eastern Orthodox perspective was often cited in the section documents as a special case, while the Protestant perspective was regarded as the more universal.

Ecumenical dialogue has still a long way to go in this matter of theological ethics, and of learning from other religions or secular perspectives—other than those of the west. There is sufficient evidence that such dialogue can lead to fundamental changes in the perspectives of all participants, though often it takes more time, effort and integrity than we care to invest. There is a certain fear to learn on the part of all who have found their identity and security in a limited perspective. New learning is feared or resisted, where identity is insecure or security of identity is falsely grounded.

We have three major points to make regarding the problem of proceeding from differing theological or ideological starting points towards an ethical consensus: (a) In some cases, consensus is possible even without reference to starting points—e. g. on human

dignity, justice in society, or even the unity of the human race. These three values, it seems to the present writer, have now matured in the modern world as fairly worthy of common acceptance, and should be so accepted. Each religious or ideological perspective should be free to expound and teach these values in its own context, going back to the theological and ideological perspectives in which the values can be rooted. (b) It is important however for each of us to understand the *conceptual framework* within which others hold their values, for these are important for the detailed exposition of the values and therefore for their content ; it is equally important to sympathetically understand the socio-economic and cultural-political *situation* from which others speak. This takes a lot of effort and openness. (c) There is real danger in the present pragmatic approach to values, seen sometimes even in Christians. Certain ethical principles, values or preferences may be deceptive. Quite often group self-interest underlies various apparently altruistic value preferences (e.g., aid to developing countries), and we should not shy away from a deeper conceptual framework analysis of all proposed value-systems. One has seen the great psychological tensions inside people trained in a rigorously ethical code of conduct, but whose perception of reality does not see the reason for that ethical conduct demanded either by the trained super-ego or by society. This creates a great rupture between what one is, and what one does. To me this seems to be the root of a great deal of the tension, unrest and psychic breakdown that one sees today in many industrialized societies.

The aversion of our contemporary civilizations to metaphysics and deep philosophical reflection is partly understandable in relation to the western experience where philosophy has often led people astray. Philosophy can be a source of deception and error and it often has been. But without philosophical-theological vision, people are reduced to a pragmatism wherein also people can be manipulated and misled.

I would therefore enter a strong plea to Christians that they should not abandon fundamental philosophical-theological reflection, and a constant and active willingness to learn from the traditions of others. I say this with deep gratitude for all I have—be it so imperfectly—learned through the years from so many cultures, European, American, African and Asian. The very diversity of

religions and cultures should not be taken in the sense that since no one of them can be exclusively right, therefore all of them must be equally wrong. The trans-conceptual apprehension of reality lies beyond all human religion and beyond all conceptual grasp; but one moves towards a richer transconceptual apprehension as one passes through a large variety of conceptual and symbolic apprehensions of reality. Plurality is a witness to the many-dimensioned splendour of reality.

D. Theological Ethics to Secular Ethics

The secular language and conceptual framework as it now exists is a contribution of modern science. It has now become a universal language. We can therefore use it in our universities, in our political assemblies, in our international bodies like the UN and its agencies. It is a great instrument of human communication across the globe.

Human beings can now speak to each other about common problems facing humanity, be they Buddhists from Thailand, Marxists from the Soviet Union, Muslims from Saudi Arabia, Protestants from Denmark, Catholics from Argentina or Agnostics from North America. This is already a great achievement for which one thanks God at every secular world conference.

Do we now have a language in which to appeal to the conscience of humanity on a global scale? We may think that we do, because we have now a global elite educated in modern secular universities. And it is this elite that gathers at world conferences. They do speak a common language. But this common language itself suffers from the limitations of present science. They can speak about resources, skills, personnel, production, distribution, organization, politics, economics, sociology, culture, psychology, physics, chemistry, biology and a host of other disciplines and effectively communicate with each other. They can even talk about values like human dignity and freedom, national and international justice, the unity of humanity and so on.

Yet, it is this very secular language that sometimes inhibits people from speaking effectively to each other about the meaning-structures that underlie our value choices. By meaning structures I mean the

implied conceptual or symbolic perception of reality and of goals towards which to advance. Here we have so far operated with two sets of secular systems—that of Marxist humanist ideology or of western liberal humanist ideology. In both of these, the adjective ‘humanist’ points to the fact that the central concern is humanity and is destiny. The nature of this humanity is conceived in both systems as the highest known product of the evolutionary process. The origin of the process itself is attributed in either system as inherent in ‘nature’ or matter energy in process of evolution. This is an unsatisfactory explanation, since it says that the process is due to the process itself. The process is assumed to be given, self-existent, autonomous.

Those who see the problem of explaining the origin of the process, resort to philosophical dogmas about the meaninglessness of the question since it cannot be answered by science. Even a reputed scientists like Steven Weinberg, who gives the impression in his *The First Three Minutes* that science can explain the origin of the process, resorts to devious ways of reasoning to cover up the fact that the question of the origin of the process of the universe is at present beyond the reach of science, due to limitations in method and framework of conceptualization. The Marxist on the other hand also starts with a quasi dogmatic assumption : ‘In the beginning was matter-energy, with the principle of dialectical contradiction contained within it’.

Neither can secular scientific thought, whether western liberal or Marxist dialectical, provide us with much of a clue as to the final destiny of humanity and the universe. Either can fix proximate goals like ‘a society of happy people’, or in the more precise WCC secular language ‘the just, participatory and sustainable society’, or in a Marxist language ‘a classless Communist Society’. But these are only proximate goals in history, and do not satisfy the deepest aspirations in man, which include some concern about a personal and common destiny beyond history, beyond death. Nor do they deal with the aspirations of those who want to enter a deeper level of the realization of self—as in the Far Eastern religions of Taoism, Buddhism and Hinduism. And especially because of this failure to respond to the deepest in humanity, our ideological conceptions of proximate corporate destiny in history fail to attract

the deepest loyalties—whether it be in western liberal humanism or in Marxist dialectical humanism.

Failure to deal fundamentally with origin and destiny has direct consequences for the present. Man constantly searches self-understanding and understanding of the good. These are the basic notions, even when conceptually unclear, which determine the value choices of persons and societies. Precisely because of its failure to deal with origin and destiny, not only does secular ethical reflection become superficial in its value choices; it is unable to draw out the deepest loyalty of man in the pursuit of these values.

The secular movements of modern times are directly rooted in the Renaissance and the Enlightenment, and in the enthronement of conscious and conceptual reason as the source of all enlightenment. Modern science is a child of the Enlightenment or perhaps they are sisters born from a common mother.

But there is no reason why science should be permanently committed to the secular. I believe that the liberation of science from the secular has already begun. I see indicators of this in several current phenomena:

(a) the frantic search of young people in industrially advanced societies for fulfilment in Eastern religious practices like yoga, meditation and even espousal of Hinduism and Buddhism in various new forms (e.g. Krishna Consciousness, Zen);

(b) the growing attention by scientists to psychic phenomena hitherto ignored by modern science (e.g. physical research, more in socialist countries than in the west; scientific studies on bio-feedback, altered states of consciousness, energy and force fields, meditation research, on dying and the mystical consciousness, etc.)

(c) the growing realization of ecological awareness moving towards an acceptance of the cosmic relations of humanity, i.e., that man is inextricably linked to the whole of reality and does not exist apart from the various fields that constitute the universe;

(d) the growing centrality of the fable, legend, the fantastic and the mythological in Soviet entertainment—in ballet and

opera the most popular ones today are those that have something to do with extra-human entities and forces.

These are all reasons why we should be circumspect about accepting the usual secular ethos of science as somehow indispensable. After all the very clarity of the concept secular is today in serious doubt. Usually it refers to a particular phenomenon of western history. After a period of domination of all thoughts, symbols, ideas and institutions by the dogmatism and clerical imperialism of the western Church, these thoughts, symbols, ideas and institutions developed sufficient momentum to break loose from the clerical yoke and sought to establish themselves on autonomous foundations. The very enthronement of conceptual reason was due to the need to fight against the confining yoke of the authority of dogma and tradition. The separation not only between Church and State, but also between Church and Socio-cultural institutions like those related to education and medicine as well as art and music, was a direct consequence of the revolt against ecclesiastical domination. The very notion of 'secular' in the modern sense was born in that revolt.

It has been a very fruitful revolt and has spawned many ideas and institutions which have now become the common property of many peoples everywhere (hospitals, schools, forms of democratic government). They probably would not have been so universally accepted had they been inseparably attached to the Christian Church and clerical domination.

But does this mean that humanity has to remain for ever under the new yoke—the yoke of the secular? After all, the secular is a concept very hard to define or defend philosophically. In essence it meant belonging to the *saeculum*, or time-space world and not to the Church, which was supposed to be concerned with the open world—that of *eternitas*. Later it was given the definition of time-relatedness, that is changing with the times, or constantly readjusting to temporal change. Still later it was given the meaning that it deals with reality in terms of this world and no other, which meaning was used for an attempt by theologians to interpret the meaning of even the Christian faith in purely this-world terms (Bishop Robinson's *Honest to God*, Paul van Buren's *The Secular*, Harvey Cox's *The Secular City*, Ted Van

Leeuwen's *Christianity in World History*, and the whole *Death of God* movement in theology, as well as many liberation theologies).

The secular movement is today to be criticized for precisely its unscientific assumptions like that this world can be understood in its own terms without reference to a beginning or source which remains inexplicable in science. The Christian Church having once controlled science, need not so kow-tow to science as to be afraid to question its unwarranted imposition of the secular frame on human consciousness. The Church must have confidence enough in its own thought-frame, which believes that this universe is not self-existent but created, that this universe is not autonomous but contingent, that this universe has a destiny that is set by God but in the shaping of which human beings are privileged to participate. It is at these points that the Church refuses to be intimidated by the secular tempo of science.

And yet, the secular language remains the only common language in which the peoples of the world can converse with each other and come to common understandings and purposes.

What shall the religious traditions then do? For some traditions like Buddhism and Taoism which are not conceptually theistic there seems to be no difficulty in adopting secular language. This, however, is an illusion. For all these religions are heavily dependent on tradition, and cannot establish themselves by pure conceptual reason, though many apologists have unsuccessfully attempted such defence in the past.

Tradition thus becomes a key concept in theological or religious ethics in dialogue with secular ethics. Today science itself begins to recognize the role of community and tradition in the maintenance and development of science. True, most of the formulations and theories of science are available in written form; but no scientist acquires all of his skill and knowledge from written books or articles; neither medicine nor surgery as scientific skill and knowledge can be wholly acquired from books. Nor do even the more abstract sciences like mathematics or astronomy become actually transmitted through books alone. There is a constant interaction between teacher and student, between scientist and scientist through which science becomes transmitted and developed in the

scientific community. Tradition of course generally includes written as well as unwritten elements.

There is a mistaken assumption among some theologians that ethics can be directly derived from the Scriptures; or from the Scriptures plus rational reflection. But when we analyze the process of ethical reflection we find that the ethicist also uses various exegetical traditions in choosing particular passages and in interpreting them. He may cite chapter and verse plus the authority of particular professors as Prof. Liedke did in the WCC Conference. It was clear to many of us that Liedke was himself heavily dependent on a particular geographical and confessional tradition in doing his exegesis. It seems an illusion that one can move from Scripture to ethics without going through tradition.

But the fact remains that one has still to resort to secular language if one is to carry conviction to those outside the particular religious tradition from which the ethicist speaks. This gives rise to what I call 'the principle of two languages' in ethical reflection on common social issues. One may arrive at a particular ethical choice starting from tradition which includes Scripture and its interpretation. Quite often, especially for the Eastern Orthodox theologian but not only for him, tradition is carried in symbols like the Eucharist, the meaning of which can never be exhaustively conceptualized. The language of tradition thus involves trans-conceptual experience, and can never be fully translated into secular language. It includes myths, images, and symbols. This is true also in science which is heavily dependent on paradigms and images—*e.g.*, waves, particles, fields, systems, spin, flow and so on.

The task of the Christian theologian is then to have two sets of languages—one, that of religious tradition, which he uses for discussion among his fellow-religionists and others interested, and another secular language which he uses for conversations with those who accept only the secular mode of reasoning. But the first cannot be exhaustively translated into the second. And quite often when new questions arise in the second, the theologian has to go back to the first in order to derive inspiration and guidance.

Even more significant is the fact that neither of them is static. The theological tradition when it refuses to learn from the new

insights of science and secular thought, becomes stale and irrelevant. A constant interaction between the two languages and the two modes of awareness seems essential for the vitality of both traditions. Science too needs to develop the two-language system, especially as each discipline becomes increasingly more complex, technical and incomprehensible to outsiders. There will be an inside language, a sort of shorthand which the disciplines use internally ; but then they must also learn to speak to those outside in a more general and less technical language.

Only as both theologians and scientist develop an adequate proficiency in such two-language structures can we hope to have communication and genuine interaction within the community. This does not mean that outsiders must be denied access to the technical language ; technical language should not be used by any group to prevent communication with the outside—the function of language is not to obstruct communication but to facilitate it.

There must be frequent passage between the two languages, both in theology and in the scientific disciplines.

E. Advocacy Ethics *Versus* Free Enquiry in Ethical Reflection

Here too we face a number of problems. Are there certain ethical values to which we cling without compromise, while in other areas the churches' role may be to promote and facilitate somewhat free enquiry ? It seems the ethical values to which we can cling are of a general nature—love, joy, peace, justice, human dignity, the unity and equality of work of all human beings etc. But there are so many other values which are furiously disputed in the churches—e.g., non-violence, reverence for all life, the conflict of rights between mother and embryo, the right to live, etc.

Clinging to a value like love or peace does not necessarily mean that one does not fight against injustice and evil. But should not the value of love or peace undergird even the fight against evil ? That is to say, adhering to a general value like love does not mean that there cannot be free discussion about what that value means in a particular instance or how it comes into conflict with other values.

People expect the churches to *stand* for certain values, not merely in the general sense of love, joy and peace, but in more specific terms like a clear position for or against abortion; for or against nuclear energy; for or against war. Many Christians want the churches to tell them what they should or should not do. This temptation to defend on authority itself needs to be carefully examined in ethical terms. The word of the Church cannot be yes and no *at the same time*. But neither can it always be *either* yes or no.

The Eastern Orthodox Church did develop a system of legalistic ethics at one time. Basil the Great (ca 329-379) who died exactly 1600 years ago, witnesses to an ancient tradition in the Church which forbade abortion and prescribed ten years of penance to a woman who procures abortion.

Nevertheless the Eastern Church puts its major emphasis not on sin and punishment, but rather on separation from evil and growth in the good. On an issue like abortion, the Eastern Church takes a firm stand against it. But on most issues, the Church does not legislate. Its task is to help people to overcome their proclivity to evil by discipline and where necessary, punishment. However, it seems more important to emphasize the overcoming of the desire to do evil, and not merely to avoid overt acts of evil-doing.

In Christian ethics too, the Eastern Orthodox would therefore emphasize the positive aspect of growing in the good, so that even if there were no law against a particular evil, he would not want to do it. The emphasis falls on growth in the good, in the capacity to discern what is good and what is evil, and being the kind of person who finds fulfilment in the doing of good—the accent is on *being* good rather than *doing* good which should spontaneously flow from a good being.

In that context, while on some clear and specific issues like murder, abortion, adultery, stealing, etc., the Church takes a clear advocacy role on most issues the important thing is to promote free enquiry which helps a person to rightly discern between good and evil, with full awareness of why something is evil or good.

One could thus say that ethics, which deals primarily with external actions, is not sufficient. One has to activate the power of

the Holy Spirit in the community of faith in order that persons may grow in the discernment of good and evil, and grow in being which separates itself from evil in mind and will and advances in the love of the good. Heroic acts of good are more important than the avoidance of evil, though the two have to go together.

Free enquiry and reflection on moral issues is thus not to culminate in moral legislation, but in helping people to develop their powers of discerning between good and evil and choosing the good by their own free will rather than by legislative compulsion.

SCIENCE AND FAITH

Towards A New Partnership

A. Towards a Universal Christian Humanism

In 1934 the famous Roman Catholic Professor Jacques Maritain delivered six lectures at the University of Santander on Integral Humanism.¹ Today this work (published in English in 1968)* stands as an almost singular recent instance of an integral Christian approach to the philosophy of human action. Nothing comparable has been attempted by Protestant or Orthodox theologians.

We are today in need of a fresh and ecumenical approach to such an integral Christian vision of reality and of our task in it. Here the best of science and the best of philosophy must integrate itself with the best of ecumenical theology to provide a coherent, provisional, dynamic vision.

Such a philosophical approach by necessity has to be speculative, as Maritain says :

‘ Practical philosophy remains philosophy, it remains a knowledge speculative in mode ; but unlike metaphysics and the philosophy of nature, it is ordered from the very beginning to an object which is action, and however great may be in it the role of verification of fact, whatever account it must take of historical conditionings and necessities, it is above all a science of freedom.’²

It is this ‘ science of freedom ’ that we need to develop in our time, not merely ‘ Christian social ethics ’ in the old categories of

¹ J. Maritain, *Integral Humanism, Temporal and Spiritual Problems of a New Christendom*, Tr. Joseph Evans, New York, Charles Scribner's Sons, 1968. It was originally published under the title *True Humanism*.

² *op. cit.*, p. iv.

context and principle and decision-making. Here science and faith have to enter into a new partnership with true philosophy *i.e.* the love of wisdom.

To put it in other words Humanism needs a new Christian basis, which takes into account not only science and philosophy as they have developed in the modern west, but also the wide range of other religions and cultures. It cannot be based on a mere critical liberalism which avows mainly a general scepticism, a refusal to accept the authority of tradition, an aversion to dogma and creed, a trust in the ability of reason and good sense to solve all our problems.

Such a Christian Humanism cannot be the blue print for a New Christendom which simply integrates into the Old Christendom the now ageing Western Liberal Humanism or even Western Socialist Humanism based on the metaphysics and philosophy of history of Marx and Engels. We must learn from all these but we must overcome the vain hope of a Christian imperialism, whether in ideas or in action.

Jacques Maritain proposes his *integral humanism* 'which would represent for them (*i.e.* Christians) a new Christendom no longer sacral but secular or lay...which has no standards in common with 'bourgeois' humanism because it does not worship man but really and effectively respects human dignity and does justice to the integral demands of the person as oriented towards socio-temporal realization of the Gospel's concern for human beings...and toward the ideal of a fraternal community.'

Jacques Maritain brings to bear upon his vision of the future and best in the western Judaeo-Christian tradition. Brought up as a liberal Protestant, married to a Russian Jewish intellectual, converted to Roman Catholicism, this outstanding modern student of St. Thomas Aquinas is without peer in providing a western Judaeo-Christian synthetic vision for the future of humanity.

But even for many western thinkers outside the Roman Catholic fold it does not provide an adequate frame for striking up a

new partnership between Science and Faith; for Maritain regarded a world wide network of Roman Catholics engaged in a new kind of 'Catholic action' as the means of redeeming the future.

We can here only seek to outline certain orientations for a new partnership between Faith, Science and Philosophy where all are at the service of humanity, but in doing so we need to go beyond the European faith, European science and European philosophy, which Maritain has not managed to do.

Such a universal Christian humanism must necessarily learn from other religions and faiths from other philosophies, and should provide new orientations for science other than the domination of 'nature'. And it must be rooted in the faith of the Church. It must, however, be formulated in such a way that no religion including the Christian Church would hold a privileged position in such a humanist society. It will permit various religious and non-religious perspectives to flourish side by side, but will not seek to impose the secular perspective by driving religions out of the universities and other institutions of society.

Such a humanism will need a dual statement—one that is directly related to Christian convictions and symbols and beliefs; the other stated in non-religious terms so that it can be acceptable to adherents of other religions or of none. The religious statement must be there; it must be public; it should be open to criticism by Christians and non-Christians alike; but its presence is a necessary safeguard to prevent the domination of an exclusively secular perspective which can always be enslaving.

B. Towards a More Universal Understanding of Faith

Faith, as well as Science, has its own paradigmatic assumptions. No analysis of faith can be independent of the paradigm of reality held by the believer. If, for example, you understand God, Man and World as three separate and disjoined realities, then you will have a particular conception of faith. If on the other hand you hold the view that Man and Universe are integral to each other and that the two together exist *in* God, then your view of faith as well as of science will be different.

Section II of the WCC Conference which dealt with the topic 'Humanity, Nature and God' was unable to enter into the depths of this problem. Section I, which dealt with the Nature of Science and the Nature of Faith, seems to have been biased in favour of the disjunct view of God, Humanity and Universe. Their definition of Christian Faith goes as follows:

'Christian faith involves an activity and receptivity of the self in relation to God, which it expresses in the value-laden images of the faithful community of the Church, whose origin and continuance are regarded as the work of God, and whose historical focus is the life, death and resurrection of Jesus Christ'.

The self acts and receives, as if standing outside God, from a God who is outside of oneself. This conceptual framework would naturally emphasize the 'encounter' aspect of faith—a personal encounter between one's person and the person of Christ, leading to repentance, faith and obedience to God.

In the non-disjunct paradigm, faith is seen as the activity of the Holy Spirit who removes the alienation between Man and God brought about by sin. The consequence is an experience which can be conceived, not as an encounter with someone outside or one's own self, but as a realization of one's true being as rooted and grounded in the Person of Jesus Christ and therefore in the Holy Trinity itself. In the same moment of realization one sees also that the rest of the universe does not exist apart from or outside of God. To be in the Holy Trinity is the only true possibility for the universe to be; for to be 'outside' the Holy Trinity is impossible for any being, since there is no 'outside' for a God who is in-finite, that is, without boundary. To be 'outside' would thus mean 'not to be'. In so far as the universe participates in being, it has to be within the creative *energeia* of God; that is the only place for the self also 'to be'. Thus Man and Universe, bound together in the same contingency of existence, find their true being only *in* God and not over against Him.

If faith thus means the new reality of experiencing one's own and the universe's rootedness and groundedness in Christ, a new perspective follows also on the activity of science as something

that takes place 'within God', a new luminescence and a new interaction within the package Man-Universe, grounded in and contingent upon God's Trinitarian dynamic being.

But there is an intrinsic difference between the Creator God's being and the created being of humanity and universe. This difference is expressed by the ancient patristic philosophy in the following terms :

He Who is

(Being of God)

The things that are

(Existence of Creation)

- | | |
|--|--|
| <p>(a) derived from itself ; not owing its being to any other entity or dependent upon anything else ; good in itself.</p> | <p>(a) has its source outside itself and is contingent upon that source ; apart from that source it has no being or existence, being and good only by participation.</p> |
| <p>(b) The is-ness of God is beyond human comprehension ; there are no conceptual categories with which to grasp the mode of God's being—neither analogy nor image.</p> | <p>(b) The existence of persons and beings in creation can be grasped at least in part conceptually — in terms of their time space location, their species and genera, their origin and function, relation and purpose, their intention etc.</p> |
| <p>(c) God wills what He is, and is what He wills. He thus has no need to <i>become</i> something else than what he <i>is</i> (This is quite contrary to Process Philosophy which regards it necessary for God to realize his potential being through becoming in time).</p> | <p>(c) In creation, all things are in the process of becoming, or going out of existence. Nothing remains unchanging. All beings come to be, become, and then either continue to become and grow, or begin to go out of existence. No created being is free from the need to become.</p> |

- (d) Neither temporal nor spatial extension belongs to the Being of God—hence no spatial distance between the Three Persons of that Being, nor temporal before and after.
- (d) All things in creation are extended in time and space though there may be different kinds of, or experiences of, time and space.

Science is an activity taking place within God, not outside of Him. But being 'inside' God does not necessarily mean 'in the bosom of God', or in the actual incomprehensible *ousia* (being) of God, but within that realm within God where His energies operate. Science does discover some of the regularities and predictabilities within that operation, under certain conditions.

Potentially, science has the capacity to explore many areas within the operative energies of God, though so far it has only touched the fringes—a little knowledge of how 'nature' operates on the macro-level, with less knowledge of the micro-level; including various aspects of physics, mathematics, astronomy, chemistry, biology, psychology, sociology, economics, politics etc. Such regularities and operationally useful predictabilities as science uncovers, belong to the realm of God's operative energies, but so do also the knowledge of them by man. It is God's *energeia* that is studied; it is the same *energeia* in man which studies it.

The problem with science however remains crucial, *i.e.*, though it takes place within the *energeia* of God, yet, so far as the subject-object dichotomy remains, there is an element of alienation in the knowledge produced by science—the knower, the known, and the knowledge remain somehow slightly disjunct and integrated only in an external way.

In faith, as understood by the Eastern Orthodox, there is an experience of a partial overcoming of this alienation. The true Christian believer experiences the uplifting, supporting, nourishing presence of God, not as something over against him, but as something on which he is established as on a rock.

Here the doctrine of the Holy Spirit is central to our understanding of faith itself. Equally important is the doctrine of the

Church. It is in the divine-human community of the Body of Christ that the Holy Spirit provides the experience of disalienation which is called faith.

For the Eastern Orthodox, faith is not an action of the self, but a divine-human action in the community of faith, an action in which the Holy Spirit makes it possible for human beings to be incorporated into the Body of Christ and thus to participate in the inseparably united divinity-humanity of Christ. It is not my personal act of a 'leap into the unknown' nor is it my 'believing against the understanding', not my 'subjective determination as Kierkegaard in much too individualistic and anthropogenic a fashion defined it. Faith may sometimes give rise to a 'passionate inwardness' holding fast to 'an objective uncertainty with the passion of the infinite'.⁴ But faith cannot be defined in those terms.

When a ten-week old child is incorporated into the Church by Baptism, the child's 'passionate inwardness' is related more to the temperature of the baptismal water than to any holding fast to an objective uncertainty. It is the Holy Spirit, operating through the faith and action of the community, that introduces the infant into the Body of Christ, there to participate in Christ, through Chrismation and the Eucharistic communion which immediately follow upon baptism.

Faith too is thus an activity of the Holy Spirit through the community of faith, though each person is free to grow in faith or to grow out of it. Neither faith nor science are primarily individual activities. They both take place in communities; the Holy Spirit of God is present in both communities though in different modes and operations.

C. Towards a wider and Deeper Understanding of the Holy Spirit in relation to Faith and Science

Since our apprehension of the Holy Spirit is very limited, and since the Spirit by nature does not draw much attention to itself, we can never draw an adequate conceptual apprehension of the Third Person of the Trinity. The best we can do is to make

⁴ Soren Kierkegaard, *Concluding Unscientific Postscript*. Eng. Text in Bretall (Ed.) *A Kierkegaard Anthology*, Princeton, 1951, p. 214.

ourselves aware of some of the Spirit's *operations*. The *Being* of the Holy Spirit remains incomprehensible, since it is the One Being of the Triune God.

Among the operations of God the Spirit, we can distinguish between two realms, traditionally distinguished as Creation and Redemption. It is best to see that operation as the creative *energeia* of god, but within that single operation which is the created order, we can distinguish two specificities—the *general* operation which brings the creation into being out of nothing and leads it to fulfilment, and the *ecclesial* operation which was initiated in the incarnation of the Lord Jesus Christ and in the special dispensation of Pentecost, and which continues in the community of faith. The two do not exist in two separate spheres; the incarnation occurs within the Created Order and is a new stage in the overall operation which brings the creation to its fulfilment. It is only for the sake of greater clarity that we make the distinction between the general operation and the ecclesial operation.

The danger in Christian thought is to confine the Spirit's work to the specifically 'religious' operation within the Christian Church, or in the inspiration of the Christian Scriptures, or in revelation, or in the individual consciousness of the believer. We can get certain glimpses of the general operation of the Spirit in the Old Testament. But it will be unwise to limit ourselves to a scientific exegesis of the Old Testament to understand that general operation. What we have in the Old Testament are merely certain pointers to that general operation.

The New Bible Dictionary, a conservative English reference book put out by the Intersarsity Fellowship enumerates five different aspects of the Work of the Spirit in the Created Order :

- (a) The Spirit brooding over the primeval waters (Gen. 1 : 2), and creating humanity (Gen. 2 : 7), sustains animal and plant life (Ps. 104 : 30) and gives humanity its whole psychic and physical powers.
- (b) The Spirit as the equipper for service by giving individual men special skills and powers (Ex. 31 : 3, Judges 3 : 10, 14 : 6 etc.)

- (c) The Spirit who inspires, operates and speaks through the prophets (e.g., Isaiah 63 : 10, 11).
- (d) The Spirit as creator of humility, repentance, a clean heart, constancy and joy in people (the Psalms, esp. 51, 139 etc.)
- (e) The Spirit as foretelling the coming of the Messiah (Is. 51 : 2-9 etc.)

In this work as well as in the modern Roman Catholic *Sacramentum Verbi*⁵ the Spirit of God is interpreted in a too narrow 'religious' setting, seeing it as 'that mysterious force which proceeds from God and takes powerful effect in the history of the covenant people' (*Sacramentum Verbi*), seeing the prophets as the 'bearers of the spirit of God *par excellence*'.

We need a wider understanding of the operation of the Holy Spirit, enriched by our insights from the Old and New Testaments, but going beyond to learn the new things which the Spirit has taught about its operations in the whole tradition of Christianity. As St. Gregory Nazianzen put it :

'The Old Testament proclaimed the Father openly and the Son more obscurely. The New manifested the Son, and suggested the deity of the Spirit. Now the Spirit Himself dwells among us, and supplies us with a clear demonstration of Himself'.⁶

And further along the same work, Gregory waxes eloquent about

'the Spirit of Wisdom, of understanding, of Counsel, of power, of knowledge, of Godliness, of the Fear of God. For He is the maker of all these, completing all with his being, holding all things together, fulfilling the cosmos in accordance with its being, yet incomprehensible to the world in terms of its dynamic power, good, straight-forward, Lord by nature and not by commission ; sanctifier, measurer not measurable ; participated in, but not participating in ; filler of all not needing to be filled ; containing (all) but not containable ; inherited (by us) ; glorified ;

⁵ *Sacramentum Verbi*—An Encyclopaedia of Biblical Theology, Ed. J. B. Bauer. Herder and Herder, 3 Vols. Vol. : 3, p. 869 ff.

⁶ *Fifth Theological Oration* : XXVI (Eng. Tr. The Nicene and Post-Nicene Fathers, Second Series, Vol : VII, p. 326).

connumerated (with the Father and the Son); the subject of serious warning (not to sin against); the Finger of God; Fire as God, to emphasize its consubstantiality with God it seems; the Spirit who made (all things), and creates anew by Baptism and the Resurrection; the Spirit who is knower of all things the teacher, the Wind who blows where it wishes and as much as it wants to; the Guide, the Speaker, the one who commissions and marks out boundaries; the wrathful whom people tempt; the Unveiler, Illuminator, Life-giver, rather is itself Light and Life, the Edifier of the Temple of God, the Deifier.....⁷

This is how the ancient fathers of the Church understood the Holy Spirit. It is the source of all knowledge and wisdom, all skill and power. Why should we place the human activity of science and technology as having a source outside the Holy Spirit? Of course science and technology can become demonic, just as faith can become demonic. But the source of all true knowledge and skill is the Holy Spirit, whether in the Created order in general or in the Church. All the gifts of the Spirit are however given in freedom and can be misused for destruction of oneself and others.

Once we recognize that science as well as faith come from God by the power of the Holy Spirit, we are on our way to a properly Christian integration of Science and Faith. We can make distinctions between the operation of the Holy Spirit in the created order and that in the Church; the operations can be differentiated, but the source is One.

In physics or politics, in economics or in biology, in the world or in the Church, all genuine and true illuminations and clarification comes from the Spirit. The ruler and the law-giver, the bishop and the scientist, the computer technologist and the spiritual counsellor, all get the right skill and knowledge from God the Holy Spirit. Art and science, philosophy and faith—all are from the operation of the Spirit.

⁷ *ibid.*, XXIX. *Patrologia Graeca* Vol: XXXVI: Cols. 166-68 (author's translation) NPNF, p. 327b.

the neuter pronoun is used, since the Spirit (*to pneuma*) is neuter in Greek; the personal element has to be read into the pronoun which is neither masculine nor feminine.

D. Science, Faith and Sin

One may find the idea that the power of science and technology is part of the work of the Holy Spirit within the created order a bit too optimistic and uncritical. The work of the Holy Spirit has to be seen, however, in the context of a greater apprehension of human freedom and sin, as well as of the Eastern Orthodox understanding of the principle of *synergeia*.

The concept of sin cannot be understood apart from the concept of freedom in the created order. And in understanding science as well as faith, freedom is the key category. Since the present author has dealt extensively with this topic in other works⁸ we will be brief here in recapitulating the main points.

- (a) Freedom is to be seen in both aspects, *i.e.*, freedom *from* and freedom *for*. Freedom *from* refers to liberation from external and internal constraint that prevents freedom *for*. But the removal of the constraints does not automatically generate freedom *for*. The latter depends on *creative power*, not only to choose something, but also to realize that which is chosen. Freedom *from* sin does not necessarily bring freedom *for* righteousness. All genuine freedom involves both movements—the freedom *from* external and internal constraints and the freedom *for* creating the good. Both these aspects of freedom have to be *won*, both as a gift of grace and as a consequence of disciplined struggle.
- (b) God alone is truly free in both aspects. He is not only free from all internal and external constraints, but has infinite power and wisdom to create what He chooses. In fact God is so free that His will and Word, which are always co-incident, immediately become reality. The created order is the manifestation of God's freedom. It is His will and Word, in the infinite freedom of creative power, that has given birth to the creation and sustains it in existence today.

⁸ See Paul Verghese, *The Joy of Freedom*, New York & London, 1967.
 See Paul Verghese, *The Freedom of Man*, Philadelphia, 1972.
 Paulos Gregorios, *The Human Presence*, W.C.C. Geneva, 1979.

- (c) When God creates humanity in His own image,⁹ the image becomes endowed with the same freedom ; though not in the same infinite manner like the original. Humanity was originally, as created, free except in one external constraint—not to taste the fruit of the Tree of the Knowledge of Good and Evil. But the restraint was only in the form of a command ; Adam and Eve were not physically restrained from eating the forbidden fruit; they were *free* to do so at the price of disobedience ; and they exercised that freedom to disobey and thereby lost most of the positive freedom they *had*—to create the good. Most if it — because they could still love and care for each other and create some limited good, though the evil of saying no to God, which they had created in their freedom, encroached upon even the good they did. From them come both Cain and Abel, both evil and good. They are however prisoners of evil and therefore of death ; even the limited good they create is soon invaded by evil.
- (d) Sin, the act of freedom, becomes an alien power that controls humanity, and enslaves humanity to the three-fold master : sin-law-death (Romans 5 : 8) But Christ frees humanity from the enslavement ; humanity is now free to overcome sin, law and death and to live in the freedom of creative good—by the power of the Holy Spirit working in and through humanity. Sin, however, continues to be active in the believer and in the unbeliever, and in the social structures in which both live together.
- (e) Sin creates alienation at various levels—between the human self and God, between the human self and other human selves, between the human self and the structures of social living, between the humanity and

⁹ One needs to make it clear that one does not speak about Creation, Sin, Fall etc., in clear, rational, scientific language. A mythic-language is indispensable for the discussion of such concepts. The reader should seek to see what symbolic sense he or she can get out of these myths, but not treat them analytically in a rational sense.

the rest of creation, and even between the human self and its own existence. This breaking-up of relations, this distance and lack of communication between existents, and this sense of threat or anxiety about the other encroaching upon one's territory—all these are manifestations of sin, or consequences of a fundamental rupture between existents and the source of their being. Sin creates the possibility of total fragmentation, and initiates a process of dissolution which ends up in non-being. But even the fallen creation has not lost all its links to the source of its being, for if it had, it would have been instantly reduced to nothing. History is a process when sin and righteousness co-exist, and human beings even in their sin hunger and thirst for righteousness. And even in generally decadent societies, occasional lamps of righteousness are lit, and heroes of the Spirit arise from time to time, keeping aloft in some form the ideal of righteousness.

- (f) But since the Incarnation, Death and Resurrection of Jesus Christ there is a totally new status for the created order, and especially for the fallen part of creation. God is now personally present in his very being in this fallen creation; the fallen creation is now in a new situation of freedom—to live in the new creation initiated by the incarnation of the Son of God, by the powers of the Spirit present in the fallen and redeemed creation, or to continue to live in the old decadent order and be subject to the powers of discord, death and dissolution.

The faith community as well as the science community exists in this new situation of freedom. Every choice for the good is a choice for the new; every act in the new situation of freedom, whether it be in the Church or in the world, inevitably involves such choice, either for the life-giving new or for the self-destroying old.

Faith is the way to a conscious participation in the new; but even those who do not profess the Christian faith do participate in the new by virtue of their choices for the good. For the new is not by any means limited to the Church.

What advantage then does faith give? One can enumerate a few in a very brief way:

- (a) Faith delivers persons from all fear of the future and worry about past guilt, from fear of death and anxiety about condemnation; establishing the person on the firm foundation of Christ and opening up channels to the powers of God available in the new.
- (b) Faith provides confidence that the future of all is safe in God's hands, that evil cannot finally triumph and that the good will be finally liberated from the mixture with evil. This gives one the courage to face the power of evil, to challenge it, and where necessary to accept martyrdom.
- (c) Faith gives deeper insights into the ways of God's working in the Universe and makes it easier to work with and not against the purposes of God.
- (d) Faith initiates one into the community where all the means exist for one's being edified or built up as a member of the Body of Christ, through a progressive separation from evil and growth in the good.
- (e) Faith provides persons and communities with the courage for integrity and self-sacrificing love, since the knowledge of the grace of God in Christ frees one from the need either to justify oneself or to seek one's own. This integrity and love manifest themselves in new ways of beneficent creativity.

The fact that many of these advantages and possibilities are not always appropriated and realized by persons in the community of faith points to the phenomenon of sin which invades also the community of faith and persons participating in it.

Faith, as well as Science, should provide the possibility for people to exercise their freedom in the fight against evil and in the creation of the good. The presence of sin in the structures of the fallen creation makes both faith and science vulnerable. Sin is allowed freedom to militate against our true freedom. This is the tragedy of both faith and science—the tragedy of failure to

exercise rightly the new freedom given in Christ for overcoming evil with the good. Science-technology is a new God-given arena of freedom, where new diabolical possibilities of evil and heroic possibilities of good co-exist.

The new partnership between faith and science has thus to be based on recognizing their common source in the operations of the *energeia* of God, and their common vulnerability to the power of non-being or sin or evil which continues to operate in history. Faith then no longer wants to control science ; nor does science claim to set limits for faith. The two learn from each other, correct each other, and respect each other. They also acknowledge their own limits, neither triumphantly claiming access to all knowledge and truth, nor wringing their hands in abject despair about human sin and fallibility. Within those limits, both science and faith can co-operate with other human endeavours like art and philosophy, music and literature love and mercy, efforts for peace and justice and so on, to show the way for shaping a world and a humanity that more faithfully reflects the glory of God, which is also the glory of Man.

This is the new challenge for both faith and science—not merely to co-exist in an uneasy truce, but genuinely to collaborate in creating greater visions of the good and working together to realize these visions.

NEW ORIENTATIONS IN FAITH AND SCIENCE

A. Challenges to Faith

Faith has often been too narrow-minded ; the biggest challenges before the Christian faith community today seem to be the following :

- (a) to overcome its cultural parochialism, by which it makes its expression in a particular culture, time and place universally normative ;
- (b) to overcome its tendency to totalitarianism, restricting the freedom and liberty of people to think or act differently ;
- (c) to overcome its pre-occupation with the salvation of individuals alone, and become concerned both with the building up of persons in the Body of Christ, as also with the rest of humanity and in fact with the whole creation ;
- (d) to open itself up to learning from other cultures, religions and ideologies, when necessary revising its own paradigmatic framework and understanding of reality.
- (e) to reinforce its true being with a better balancing of the symbolic-cultic, practical-ethical and intellectual-ideological expressions of the Christian faith in the light of its apprehension of how God's reality operates ;
- (f) to recognize the corrosive presence of sin within the faith community and continually to manifest repentance, self-criticism and a desire to make amends irrespective of the cost.
- (g) to discipline itself to be more open to the healing correcting, illuminating and creative powers of the Holy Spirit.

In order to do all this, the Christian community of faith will have radically to re-think some of the pernicious dichotomies which have plagued its thinking in the past, especially since Augustine of Hippo made some of these dichotomies somewhat respectable in the west.

(a) The false duality between the city of God and the city of the earth as two mutually opposed realities has perhaps done the greatest damage. The idea was that one has to take one's heart away from its love for the city of the earth in order to love the City of God. A good eschatological perspective should be able to see that elements of the City (Kingdom) of God can manifest themselves, though imperfectly, in the City of the Earth. The need is thus not to pluck your love away from the city of the Earth, but to love it in such a way that more and more elements of the City of God become manifest in the City of the Earth.

(b) The false dualism of matter and spirit may be of Indo-hellenic origin, but its equation with the evil-good dualism has done havoc to Christian thought. If Hegel saw Spirit as the Absolute, Marx and Engels saw Matter as the primordial Absolute. Today the Marxists as well as Christians have begun to see that matter and energy are interchangeable entities and that what we call spirit is nothing but matter-energy in a more evolved form. Matter is not an enemy of the spirit, but its less evolved form, its vehicle and form of manifestation to the senses, its instrument and medium. The Incarnation of Jesus Christ in a material body and the translation of that material body into the heavenly¹ realm through the Resurrection and Ascension of Christ should have taught us not to despise matter. Even the doctrines of the bodily resurrection and of the Eucharist did not help us to overcome our deeply ingrained Gnostic neo-Platonic distrust of matter. Even today we hypocritically curse and rail about materialism, as if matter had not been created by God and were somehow alien to Him.

(c) We have already overstressed word and concept, to the detriment of symbol and ritual. Humanity cannot grasp the transcendent truth in word and concept ; it must give expression

¹ The expression 'heaven' has been interpreted by the ancient fathers as that which lies beyond the horizon of our senses ; not as the top floor of a three-storied universe, or as space above the vault of the sky.

to its deepest perceptions through rituals, sacraments, community liturgies, through dance and music, painting and sculpture, architecture and literature, myth and legend. We have to overcome our over-cerebration by becoming more celebrative. Theology has too often claimed to capture the truth. The word and sermon have been polluted by over-use, and must regain their integrity through a period of more disciplined silence and more expressive action. To be exclusively word and concept oriented is a male middle class sickness, which has to be overcome by a balancing on story-telling, music and non-verbal expressions.

(d) Theology must overcome the false duality between 'vertical' and 'horizontal' — the assumption that there are some things which involve a one-to-one relation (vertical) with the God above, and others (horizontal) which involve relations to fellow-human beings without thereby involving God. If a proper non-disjunctive paradigm of God, humanity and universe is assimilated as the basic framework, then several false dualities can be overcome—vertical—horizontal, nature-grace, natural-supernatural, matter-spirit and so on. One's prayer (vertical) then becomes saturated with socio-economic concerns and the needs and interests of others (horizontal). There will not then remain one realm (nature) where man is master and another (grace-supernatural) saving and healing activity as coming from God, and the sacred-secular or sacred-profane distinction itself would lose its importance.

(e) This of course would mean the development of a doctrine of sin which deals with all aspects of alienation in the created order, not just with so-called personal sin or violation of some pre-conceived moral code. Sin affects person, society and cosmos ; redemption in Christ by the Spirit must also affect all three realms. This kind of a Christology-Pneumatology and the resulting ecclesiology still need to be worked out. If sin is personal, social and cosmic alienation, then salvation must mean dis-alienation or reconciliation in all three dimensions.

(f) This would also mean that our general notion that faith receives its challenges from naturalism, materialism and secularism will also have to be re-thought. These world views exist mainly because the Church in its institutional manifestations has failed to give an adequate basis for life—In its worship, practice

and thought. We do not need to fight naturalism, materialism, and secularism, but rather to correct our own mis-statements and malpractices which have led to the development of these systems. Naturalism, for example, is an offshoot of the kind of Deism that the Church propagated at one time. Materialism, so-called, is a reaction against the kind of ethereal spiritualism we preached. And secularism is a revolt against the arrogance of the Church in seeking to control and dominate all forms of human self-expression—science and art, ethics and philosophy, institutions and processes. A more free and honest approach to other people's ways of thinking, acting and worshipping will help purify society to a great extent through honest self-criticism by Christians as well as others.

Christianity, if it does any fighting at all, should wage war against deeply entrenched institutional, intellectual and spiritual sin in its own bosom. This war against its own alienation will be concurrent with a similar war against deeply entrenched institutional, intellectual and spiritual sin in society.

But faith fails when its criticism of either the Church or of society does not spring from love. Too often it is the desire of a small group to justify themselves or to feel superior which becomes the source of our criticism. All verbal criticism thus becomes spurious, when one's compassion and love for all fail to find some place in that criticism.

Faith receives its challenge from a recognition of its own failures, rather than from a mythical entity called the 'modern mind'. The mind of man will not necessarily always acknowledge or accept the truth, but sooner or later it seldom fails to recognize genuine and authentic love.

B. New Orientations for Science—Philosophy of Science

The present author, not being a practising scientist, is hardly qualified to say anything worthwhile about possible new orientations for science. Yet, as an amateur of both the human race and of science, one dares to state a few concerns.

One lesson which the author has learnt from his limited contacts with many outstanding scientists is that most scientists have not

had, as part of their training, much work on the nature of the scientific enterprise either from a sociological or from a philosophical perspective. At the WCC Conference, the lecture on 'The Nature of Science' made no reference to the discussions of that question in the German-speaking world or in Marxist academic circles.

If scientists, as part of their training, were to get some grounding in the philosophy and sociology of science, they may also get a better understanding of what in fact they are doing and how it fits into a society characterized by injustice and alienation. There are too many myths about science prevalent in society, e.g., that science provides objective, proved knowledge about all reality, that it is value-neutral, that the problems are connected only with how science is used and not with the nature of science itself and so on.

We need a generation of outstanding scientists who are also philosophers and sociologists of science at the same time. This is necessary for a re-orientation of scientific research by scientists themselves who have understood something about how science/technology affects human existence and predicament.

Deepening of the studies on the philosophy of science can lead to a large number of fruitful insights about our predicament. At present we have mainly three or four noticeably distinct trends of development in the philosophy of science :

1. *The English-Speaking School* : The Vienna circle of discussions (*Wienerkreis*), having landed in the English-speaking world during the rise of Nazism, gave birth to quite a crop of philosophical approaches ranging from logical positivism to linguistic analysis. Again, following a high infant mortality rate, the surviving schools of Empirical philosophy are seeking to come to a consensus, though debates like that between Popperians (following Sir Karl Popper) and Kuhnians (lesser tribe following Thomas Kuhn) go on still. Some of the fundamental questions posed in the debate bear witness to some basic ambiguities in scientific knowledge. David Hume had already posed it in the 18th century : 'Are we justified in reasoning from (repeated) instances of which we have experience to other instances (conclusions) of which we

have no experience' ?² Hume said no. But if that answer were right, Bertrand Russell's conclusion would logically follow :

'Every attempt to arrive at general scientific laws from particular observations is fallacious and Hume's scepticism is inescapable for an Empiricist'.³

Popper tried to qualify that brutal conclusion by suggesting that Hume meant something else—namely that people do have many non-rational ways of arriving at conclusions and though scientific theories are not strictly rational, they are still useful for survival and therefore justified.

British empiricism has now taken on a more modest pose about the validity or truth-value of the conclusions of science. The position once held by Gilbert Ryle that scientific laws are established and not conjectural, though it was still reflected at the WCC Conference in the address of Prof. Hanbury Brown on the nature of science, is no longer acceptable. Popper, for example, would contend that all scientific laws and theories are conjectural, but some conjectures are preferable to others, because they yield better results and stand up much better to logical refutation. 'The method of science is the method of bold conjectures and ingenious and severe attempt to refute them.'⁴

Popper's understanding of science is largely Darwinian, to the effect that human conjectures struggle with each other for survival, and that only the fittest or best adapted to survive ; the mere fact of having survived is evidence enough that it is closer to the truth than the ones that perished.

Scientific enquiry, according to Popper, does not begin despite popular myths, with experience or observation. It has its beginning in problems, which then find solutions which are found to be inadequate ; then follow struggles among various solutions, refu-

² The formulation of Hume's question is from Karl Popper's *Objective Knowledge—An Evolutionary Approach*, Oxford 1972, which was a response to Thomas Kuhn's *The Structure of Scientific Revolutions*, 3rd Ed. Chicago, 1970.

³ Bertrand Russell, *History of Western Philosophy*, London, 1946, pp. 698 ff.

⁴ *Objective Knowledge*, p. 81. See also Proper's *Conjectures and Refutations—The Growth of Scientific Knowledge*, Harper, New York, 1968. (Original edition N.Y. London, 1962).

tations, new conjectures—a whole bloody mess just as in natural selection ; finally one species emerges and still has to struggle with newer and better solutions.

‘ Problems of explanation are solved by proposing explanatory theories ; and an explanatory theory can be criticized by showing that it is either inconsistent in itself or incompatible with the facts, or incompatible with some other knowledge. ’⁵

This understanding of science is of course based on the three-fold theory of the truth-value of propositions—the truth of a proposition being judged by its correspondence with facts (correspondence theory of truth), its coherence within itself and with other beliefs and convictions and experiences (coherence theory of truth) and what is not quite clearly stated but implied in Popper’s definitions, the practical or operational value of a proposition (pragmatic theory of truth).

Popper would claim that the first (correspondence with facts) is the primary test of the truth-value of a proposition. But of course propositions and facts can correspond with each other only in a meta-language which has commensurable denotations for facts and propositions. This is the sense of truth held by Alfred Tarski. If I want to speak about statement S and fact F I must have a language which can speak about both S’s and F’s.⁶ And truth is an equivalence between S and F.

Thomas Kuhn in his *Structure of Scientific Revolutions*, thought this was too simplistic and wanted a basic distinction made between ‘normal science’—everyday scientific research firmly based on previous scientific achievements acknowledged by a particular scientific community, and a ‘scientific revolution’ which fundamentally alters the basic paradigm or framework within which scientific understanding takes place. At one time Newton’s *Principia* and *Oticks*, Franklin’s *Electricity*, or Lavoisier’s *Che-*

⁵ *Objective Knowledge*, p. 263. His contention is that Knowledge does not begin from nothing, but essentially that knowledge grows by modification of existing knowledge or mental predisposition.

⁶ A. Tarski, ‘Der Wahrheitsbegriff in den formalisierten Sprachen’ in *Studia Philosophica*, Vol : I, 1935, pp. 261ff. Eng. Tr. ‘The Concept of Truth in Formalized Languages’ in A. Tarski, *Logic, Semantics, Metamathematics*, 1956. Paper VIII, pp. 152 to 278.

mistry provided such an accepted paradigm. Within the Newtonian mechanistic paradigm of reality where everything is matter in motion according to the laws of mechanics, light was seen as composed of material corpuscles. Then somebody comes along in the early 19th century (Young and Fresnel) to suggest a new paradigm for the understanding of light—as a transverse wave motion. The corpuscular and undulatory paradigms compete, each being capable only of a partial explanation of the observed phenomena, until a revolution takes place with Max Planck, Albert Einstein and others—the quantum-mechanical paradigm which proposes the notion of photons or corpuscular entities which are undulatory. The change from one paradigm to another does not take place in normal science; paradigm change is scientific revolution. Science, according to Kuhn, does not progress as much by Darwinian evolution as by these revolutionary jumps which are quite frequent, and which unlike normal science, bring substantial amounts of new information.

The debate between Popper and Kuhn in the English-speaking world has proved to be productive of more heat than light. Paul Feyerabend contributes his mite by arguing *Against Method*; ⁷ he does not believe in law and order science, but advocates an anarchistic theory of knowledge. The imposing of methodological rules and regulations, Feyerabend claims, would stifle the creativity of science. Much of great science was achieved by violating the rules. If practising scientists listened to the philosophers of science, they would undergo the fate of Galileo and there would be no more progress in science.

All these and a few other divergent views about what actually happens in the scientific enterprise were put together in a British University Symposium and the results published.⁸ Prof. Lakatos, formerly of London University, one of the editors of the Symposium report, has made certain observations in his paper, which are yet to attract the attention of intelligent people:

⁷ *Against Method. Outline of an anarchistic theory of knowledge.* London, New Left Books, 1975—339 pp.

⁸ Lakatos, Imre and Musgrave, Alan (eds.) *Criticism and the Growth of Knowledge*, Cambridge Univ. Press., 1970 (reprinted 1976).

‘Now very few philosophers or scientists still think that scientific knowledge is, or can be, proven knowledge. . . . But few realize that with this the whole classical structure of intellectual values falls in ruins and has to be replaced’.⁹

Scientific theories are operational statements ; they can be neither proved nor disproved. They can be rejected, when the community decides that a ‘better’ one is available which has more predictive and explanatory power and is more elegant. There are some general indications on how to decide whether one theory is better than the other; but no rules can be laid down for making such decisions. The consensus in the community is decisive for the rejection of one theory and the acceptance of another.

So finally the consensus among philosophers of science in the English-speaking world is that no scientific theory is final ; it is the best so far, until something better arrives.¹⁰ Each theory ‘works’ only with a *ceteris paribus* clause, i.e., so long as other conditions remain constant. A scientific theory that works well within our solar system may not function inside a Black Hole or in another stellar system.

What has been even more destructive of our previous assumptions about objectivity, proof and so on is the discovery that at least at the sub-atomic level, the observer is part of the observed reality ; the structure of the reality observed is ‘changed’ by the introduction of the measuring equipment.

We should come back to some of the consequences of these new insights. But before we do that let us take a quick look on the understanding of science in the German speaking world and then in the Marxist world.

2. *The German language debate* : At least since the 19th century, German thought has taken history more seriously than have English speaking thinkers. Wilhelm Dilthey proposed that the historical method rather than the methodology of the physical

⁹ *op. cit.*, p. 92.

¹⁰ Popper provides some criteria for measuring the closeness to truth or verisimilitude of any given scientific theory in terms of its ‘truth-content’ and ‘falsity-content’, ‘content’ here being meant to stand for all the consequence statements entailed by that theory.

sciences should provide the basic framework for understanding reality, since all things exist in history and have their own history.

This is a fundamental issue in Western thought—the reconciliation between the methods of *Naturwissenschaften* and *Geisteswissenschaften* (natural sciences and human or 'spiritual' sciences). While the English Radicals¹¹ (Bentham, Ricardo, Malthus, Mill etc.) sought to make social science a rational science by reducing all social phenomena to laws (based on laws of human nature, both physical and psychological), the German effort has always been to unite everything by the historical method. Hegel's objective idealism and Kant's subjective idealism uneasily co-existed in the early 19th century. Kant had effected a divorce between science and metaphysics which Hegel had sought to keep together.¹²

The overcoming of this disjunction between science and metaphysics still remains the central problem of western thought and the root of its value-crisis. Kant tore apart theory and practice, logic and ethic, the empirical and the transcendental, in the interest of establishing distinct realms for mind, will and taste.

What Kant put apart Dilthey¹³ tried to put together again, through the historical method. Or to put it another way Hegel had sought to enclose reality in the single concept of Absolute Idea or objective idealism. Three reactions ensued and persist to this day :

(a) the subjectivist reaction in Kierkegaard and the Existentialists in general shared also by Freud and the Freudians ;

(b) the anti-contemplation reaction in Marx who wanted to keep action/contemplation or theory/practice in a unity and wanted to base it on matter rather than on idea ; and

¹¹ See Elie Halevy, *The Growth of Philosophic Radicalism* Eng. Tr. Mary Morris, Beacon Press, Boston, 1966, p. 433.

¹² It can be argued that what is characteristic of so-called modernity in philosophy is precisely this divorce between science and metaphysics, which then leads to the acceleration of secularization.

¹³ Dilthey's work was preceded by that of the philosopher-historian Droysen who tried to make a neat distinction between Explanation (*Erklärung*) and Understanding (*Verstehen*) the first being the task of the natural sciences and the second that of history.

(c) the Diltheyan reaction which brought the objective world of all cultures and religions within the unifying reality of the individual mind in the act of understanding (*Verstehen*) of experience (*Erlebnisse*).

Historical understanding as it takes place within the individual mind became thus for Dilthey the unifying framework for all knowledge ; for here the individual mind was participating in the Universal Mind (of Hegel) and gaining access to the dynamic spirit-world in its objective existence containing all realities.

While the Anglo-American world still hoped to make 'science' the all-embracing concept of knowledge, the Germanic world preferred to keep science itself as part of the historical understanding, the latter providing the all-embracing framework.

It is important to recognize the consequences of these two tempos in western thought. The Anglo-American tempo can be characterized as pragmatic, utilitarian, materialist-mechanical, working happily in the laboratory, interested in the physical sciences untouched by economic, political and philosophical problems ; it feels more secure dealing with matter, objects, not people. The other tempo, more characteristic of Germanic thought, is interested in remaking the world by making economics and politics central, and can be termed idealistic. The former concentrates on understanding the given—in order, of course, to use or change it ; the latter puts its emphasis on the possible and the ideal, of course in order to change the present towards the ideal future.

The subjective element is more accepted in Germanic thought ; while the Anglo-American way has a basic distrust of the subjective. Truth has to be objective.

For the Germans, at least, Heidegger played a large part in enhancing the respectability of the subjective in knowledge. He questioned our prejudice against the subjective. After all, the human *da-sein*, historically conditioned and finite, has to come to terms with the surrounding reality, and the subjective is the essential means for that. Human existence is by nature subjective ; there is no need to eliminate the subjective, in the interests of a false ideal of objectivity ; without the subjective element knowledge cannot become existentially real. Friedrich Schleiermacher

had earlier tried to put the religious element entirely within the subjective, in order to protect it from its cultured despisers who valued the objectivity of rational science. Heidegger made the subjective the locus of all knowledge and understanding, of all will and mind.

Science itself becomes thus respectably subjective ; but subjectivity cannot be arbitrary ; it has to be subject to critical criteria. This is where Hans-Georg Gadamer comes in with his notion of *pro-theoria*, the ancient patristic-hellenistic notion of foreknowledge as the basis of all knowledge. The art of understanding, of which science is part, is an act of projection of various possible understandings in order that one of these may find confirmation. Understanding is an anticipatory act, projective, seeking confirmation. All scientific theories are thus projections from previous knowledge on to a reality, in anticipation of confirmation by that reality. Such projection of a hypothesis is a tentative pre-judgement of what the object could be a *pre-judge* or in simple English, a prejudice. Gadamer puts it this way in his monumental work on *Truth and Method* :

‘ This recognition that all understanding inevitably involves some prejudice gives the heremeneutical problem its real thrust And there is one prejudice of the Enlightenment that is essential to it ; the fundamental prejudice of the Enlightenment is the prejudice against prejudice itself, which deprives the tradition of its power. ’¹⁴

Western ‘ rational ’ civilization likes to be unprejudiced, unbiased, without presuppositions, but alas, that is not possible, says Gadamer. Without prejudice, *pro-theoria*, there is neither science nor understanding. Not only is prejudice unavoidable but our very prejudice against prejudice comes from a particularly prejudiced tradition—the Enlightenment. The best that reason can do today is not to eliminate prejudice, but to seek critically to discriminate between better and worse prejudices.

A prejudice is not an unfounded judgement ; it is a tentative judgement based on previous experience which stands in need of

¹⁴ Hans-Georg Gadamer, *Wahrheit und Methode* J. C. B. Mohr, Tübingen, 1960, Eng. Tr. *Truth and Method*, Sheed and Ward, London, 1975, pp. 239-240.

confirmation in the light of further experience. Prejudices in this sense are the major instruments of the scientific enterprise. What science yields are better tested prejudices.

But how do we critically examine our prejudices in order to see if they are better or worse? Only by making the prejudices with which we operate themselves the object of critical understanding. This can however, be done only by projecting certain pre-judgements about what could be wrong with our normal prejudices.¹⁵ In other words, examination of prejudices is itself possible only through projecting other prejudices on to our prejudices. Critical rationality thus always involves the use of pre-judgement.

But Gadamer cannot shake himself entirely free of Kant; he suggests that if the process of understanding is based on pre-judgements shaped by the understanding person, then in order to understand this prejudices we must look at the historical horizon of that person. It is the structure of his experience which shapes the nature of his prejudices. He has an 'effective history', a *wirkungsgeschichte*, which shapes the horizon of his experience and prejudices. 'The horizon is the range of vision that includes everything that can be seen from a particular vantage point'. People's horizons can be narrow or wide and that affects the nature of their prejudices.

We do not have the space here to engage in a deeper analysis of Gadamer's methodological comments; we should proceed to one of Gadamer's critics,¹⁶ Jürgen Habermas, whose seminal work on *Knowledge and Human interests* develops Gadamer's work further to propose that there is not only *prejudice*, but also *interest* playing a great role in all knowledge.

Habermas reminds us that a central element in science is methodological doubt. Every conjecture in science must face a refuta-

¹⁵ Gadamer says that three things are necessary to examine a prejudice critically: (a) recognize it for what it is and that it exists; (b) objectify the prejudice, by stating its nature, so that we can look at it; and (c) find a good prejudice which will help us understand the prejudice we are examining.

¹⁶ For Habermas' critique of Gadamer's *Truth and Method* see Jürgen Habermas et. al (eds.) *Theorie—Diskussion, Hermeneutik und ideologiekritik* Suhrkamp Verlag, 1971, pp. 45-56 as well as *Philosophische Rundschau*, Beiheft 5, Tübingen, 1967.

tion. Nothing should be eagerly taken for granted, without subjecting it to the cold stare of skepticism. Radical doubt has thus become a basic epistemological category in modern critical theory.

The human consciousness which projects its prejudices and interests to external reality cannot be understood simply through the Kantian categories because when you apply methodological doubt to this category system, we have to ask the question: by what knowing process did Kant know the categories of knowing?

Habermas suggests that consciousness does not exist in isolation nor does it arise ready-made; it is itself the consequence of a social process. That process includes at least three elements, according to Hegel.

- (a) the universal history of mankind;
- (b) the socialization process of the individual;
- and (c) the three forms of the Absolute, *a la Hegel*, i.e., religion, art and science, through which human history moves.

It is this concept of consciousness that Marx radically criticized for being too 'spiritual and contemplative and for ignoring the fact that it is in the process of socially organized labour that the human consciousness takes shape. The process of labour and material exchange as it takes place in society's interaction with surrounding nature is itself a consciousness constitutive process and therefore has epistemological value. It is by labour socially organized that man negates what is given and creates something new, and in that process shapes himself and his consciousness.

Habermas criticizes Marx for reducing the meaning and value of reflection by assimilating it to a subsidiary role in socially organized labour. Habermas would insist that productive activity is not sufficient for self-generation; critical revolutionary activity based on correct theoretical reflection is also necessary for constituting oneself.

Here we come to one of the crucial problems of our scientific method. Schelling had already in 1802 fought against the reduction of all knowledge to practical knowledge. This abhorrence of theory and speculation is dangerous. *Theoria* for the Greeks,

meant movement from the manifold and the particular of things, to the unifying ideal of the Logos.

That kind of *theoria* may be difficult for us today. All we can hope to have today is critical theory, *i.e.*, the theory that constantly uses methodological doubt to examine all our accepted prejudices in order to see whether better ones cannot be conceived, to see what class interest shaped one particular prejudice at one particular time, and so on.

We should come back to some of these questions : before we do that, however, we should take a quick look at the Marxist perspective on science.

3. *Marxist Views of Science and Understanding* : The Marxist intellectual would criticize both the Anglo-American and the German discussions as being overly abstract and reflection-oriented. Gadamer can be definitely accused of assuming a framework of thinking which takes the consciousness of the individual and its relation to a world of objects as central. Habermas, as an ex-Marxist of the Frankfurt School saw this problem and sought to correct the individualist emphasis of Gadamer with an analysis of the class origins of each consciousness.

The debate between Frankfurt School thinkers like Adorno, Horkheimer and Habermas on the one hand and Orthodox Marxists on the other have to do with the importance given to (a) reflection over against socially organized labour, and (b) the function of the critical philosophy as methodological doubt of all received positions.

This has to do with one's conception of Truth. For the Marxist 'true knowledge must reveal the logic of the evolution of social being',¹⁷ not just one individual mind's perception of external

¹⁷ G. A. Kursanov, 'The Problem of Truth in the Philosophy of Marxism' in *Philosophy in the USSR, Problems of Dialectical Materialism*, Progress Publishers, Moscow, 1977, p. 203. Academician Kursanov defines truth as—'the process of the reflection in human consciousness of the inexhaustible essence of the infinite material world and the regularities of its development, which at the same time implies the process of man's creation of a scientific picture of the world emerging as the concrete historical result of cognition that is constantly developing on the basis of socio-historical practice which is its highest criterion' (*ibid.*, p. 205).

reality. But for the modern Soviet Academician, Truth is *both* a process in which the infinite material world with all its regularities is reflected in consciousness, *and* man's reshaping of that world through socio-historical practice.

In western liberal thought one sees both the tendency to make the individual primary and society secondary, and also to make reflection primary and practice secondary. Western liberal thought would thus be criticized by the Marxist as too individualistic and too psychological.

Marxist theory however holds on to the 'copy' or 'reflection' theory of the relation between the mental world and the external world. This view of truth as '*adequatio rei et intellectus*' which is common to Gadamer and the Marxists as well as the Thomists is one that needs fundamental questioning for it seems to be the key to a radical re-interpretation of reality.

The main difference between the Marxists and Gadamer would however, be in the realm of the definition of the *practice* which is necessary to confirm a conjecture. For the pragmatic Anglo-Saxon it is basically the 'experiment', the empirical ritual in the laboratory. For the Marxist

'practice is the socio-historical activity of people : activity in the sphere of material production, in the sphere of the class struggle and social relations, in the sphere of scientific observation and scientific experiments, which depend on the corresponding level of material technology'.¹⁸

For the Marxist what confirms knowledge is not mere laboratory experiment, but rather the social experiment, which includes laboratory experiments, but is more concerned with the struggle for constructing a new political economy.

While western scientists are now beginning to let go of their former claims to objectivity, the Marxist scientist still insists on 'the objective character of scientific knowledge, its reflection of an objective reality existing independently of the subject';¹⁹

¹⁸ Kursanov, *op. cit.*, p. 226.

¹⁹ V. A. Lektorsky, 'The Dialectic of Subject and Object, and some Problems of Methodology of Science', in *Philosophy in the USSR*, *op. cit.*, p. 109.

though this does not involve any denial of the role of subjectivity in knowledge.

One thing which is impressive in the Marxist philosophy of science is its effort to keep science and philosophy integrated.²⁰ The physical as well as the human sciences are seen in an openly philosophical context, and the conclusions of sciences constantly change philosophy and keep it growing. Western readers have been conditioned to see only the negative aspects of this ideological domination of science by ideology; they often cite Lysenko's genetics or Stalin's Linguistics as examples of the consequence of this domination.

In the west one makes an ideal of the independence of science from ideology. The net result, however, seems to be that science, by pretending to ignore the political economy within which it functions manages merely to reinforce and strengthen the structural anomalies and injustices in society. The Soviet Academician consciously accepts the relationship between science and philosophy.

'Under certain circumstances the natural sciences have an ideological function. There is no such thing as bourgeois (or communist) physics, chemistry, etc., but there are various ideological interpretations of the major discoveries made in the natural sciences.'²¹

This view of Academician Oizerman was only partly reflected at the WCC Conference, where Dean Arthur Peacocke of Claire College (Cambridge) kept insisting that there is no African physics or Asian chemistry, but drew the dubious conclusion therefrom that

²⁰ 'Philosophy investigates the same world that is investigated by the specialized sciences. But it cognises more general connections and relationships than the specialized sciences, which study certain particular spheres of phenomena . . . Every science investigates a qualitatively definite system of laws in the world—mechanical, physical, chemical, biological, economic etc. There is no specialized science, however, that studies laws common for the phenomenon of nature, the development of society and for human thought. It is these universal laws that form the subject-matter of philosophical cognition' Academy of Sciences, USSR, *The Fundamentals of Marxist Leninist Philosophy*, Progress Publishers, Moscow, 1974, pp. 32-33.

²¹ T. I. Oizerman: 'The Problems of the Scientific Philosophical World Outlook' in *Philosophy in the USSR*, p. 38. The western view of science's alleged independence of ideology, according to the Marxists, serves only to obscure the integral relationship of western science-technology to the capitalist ideology, and thus to keep S/T a servant of the market economy system.

cultural conditions were not decisive for the shape of scientific development. Peacocke's view was probably a fragment of the old positivistic view that in science there can be only one true view of any given set of facts. More common in the west is a sort of easy pluralism which says that between various possible interpretations of a given major discovery there is no need to choose. Not to choose is to choose the given.

Oizerman insists that to philosophize is to choose, and not to philosophize, even in science, is to philosophize wrongly, preceeding on the basis of unexamined assumptions. Not to philosophize about the meaning of science, is to fall victim to our oppressors and exploiters who do not want us to recognize the source of our oppression and exploitation.

Marx would say that the west still follows the philosophers who would explain the world but do not desire to change it. Science and technology, for the Marxist, exist in order to serve in the process of socially organized labour for the welfare of the people. Reality is not *theoria*, but *Praxis*; humanity using *theoria* to deal objectively with surrounding reality in order to transform reality and humanity itself in the process. We constitute the world and ourselves, not by thinking, but by inter-acting with the material world of which we are part. Reflection is not truth, but something necessary in the interaction between man and surrounding reality.

These processes of human inter-action within society and with nature have their own intrinsic laws—these are the laws with which the science of political economy deals. These laws, however, are not static or given. Marx acknowledges his indebtedness to Hegel for both of his key ideas—labour as constitutive of man, and knowledge as always dynamic and changing. As he stated in his *Critique of the Hegelian Dialectic and Philosophy as a whole* (1844);

'The outstanding achievement of Hegel's *Phaenomenologie* and of its final outcome, the dialectic of negativity as the moving and generating principle, is thus first that Hegel conceives the self-creation of man as a process....Hegel's standpoint is that of modern political economy. He grasps labour as the *essence* of man, as man's essence which stands the test'.²²

²² Karl Marx and Frederick Engels, *Collected Works*, Vol. : III, Progress Publishers, Moscow, 1975, p. 332-333.

But Marx would criticise Hegel for recognizing only abstract mental labour as labour constitutive of man. 'Labour is man's *coming-to-be for himself* with alienation, or as *alienated* man'.²³ Hegel made the mistake of taking alienated human labour, or the abstract thinking of alienated human beings as genuinely constitutive of humanity.

For Hegel man equals self-consciousness. It is in his consciousness that he has to overcome alienation. It is through labour that man re-enters into proper relationship with external objects, by seeing in one's consciousness their true nature. The labour that constitutes the human person in his authenticity however, is intellectual labour, and philosophy is the means of constituting oneself, for Hegel.

It is against this view that Marx has reacted. Hegel's view makes it possible only for the intellectual elite to become authentically human. Marx's contribution was to see theoretical reflection as integrally related to the praxis of socially organized labour, and meaningless without that integral relation.

Hegel saw the universal mind reflected in the individual mind. Marx would prefer to see it reflected in the corporate social mind. The intellectual, by himself, does not have access to truth; nor does science divorced from political economy. It is necessary to integrate the intellectual and the working class, as well as individual and society, but both these integrations have to take place in an ideological paradigm that combines science and philosophy, technology and political economy in a single framework.

Marxism alone, among contemporary philosophies, has such a framework or paradigm which can integrate the physical and the human sciences, science and philosophy, technology and ideology into a single integrated paradigm.

Neither the Christian faith, nor any of the other religious or secular non-Marxist ideologies, has, so far as I know, succeeded in providing such a framework. To these religious frameworks and their inadequacies we must now turn before we try to delineate the contour of a new paradigm.

²³ *Ibid.*

TOWARDS A NEW PARADIGM FOR REALITY

A paradigm is a framework, a *gestalt*, a pattern that we project upon reality in order to perceive it. Paradigms are always formed from previous experience and theoretical reflection. Paradigms may be consciously held or unconsciously assumed. Without a paradigm or pattern projected by the mind perception seems impossible.

From a Christian perspective, it may be stated that paradigm change is the key to spiritual growth. A spiritually mature person or community is one that is able to project a pattern that yields a good sense of reality, about what is good or evil for oneself as well as for others.

A. Critique of Existing Paradigms

Our commonly held paradigms may be described as theistic, atheistic, agnostic, deistic, secular-dialectical, secular-liberal and so on. This aspect, however, relates only to one dimension of the paradigm which has to do with the question of a description of how the whole cosmos hangs together.

The theistic perspective usually holds that God, who is distinct from the cosmos, is the Creator and sustainer of the universe. The atheistic paradigm boldly denies that there is such a God who created and now sustains the universe. The atheist would have to assume that the universe or matter is self-existent, self-caused and self-sustaining without any outside causation or control. These are exactly the assumptions that the theist makes about God as Creator.

The agnostic perspective modestly holds the view that the issue between theism and atheism cannot be resolved, and also that it is not necessary to resolve it. One can concentrate on how to live in the world rather than on origins and causes. This position

generally leads to a pragmatic paradigm which holds that reality is that which works sometimes to my advantage, sometimes not so.

The secular-liberal position is not so much agnostic as practically a cross between atheism and deism. It is not necessarily atheistic in the sense of a passionate opposition to belief in God. In fact it is permissive or pluralistic, *i.e.*, it holds the view that people may or may not believe in God but that in actual practice it makes no difference. Pluralism, often so lauded by liberalism, becomes a form of indifferentism—the view that differences do not matter. Some forms of the secular-liberal position claim to be religious. They would, for example, concede that God created the world, but then state that God has now left it to human being to shape it, by learning its laws and thereby controlling and directing its development. In effect this amounts to more or less the same as the Deist perspective which holds that God created the world, gave it certain ‘natural laws’ and left it to itself.

B. Religious Perspectives—West Asian and East Asian

It is an often unnoticed fact that all world religions come from Asia. West Asian religions are generally speaking based on a personal God, transcendent, Creator, distinct from the universe and man. East Asian religions generally conceive the universe as an emanation from God, an extension (body) of God, or identical with God, or in some cases, brackets the whole problem of God as irrelevant (Buddhism).

But none of these religions has given us an adequate and comprehensive paradigm within which to understand all reality. There is some basis to the claim that in general East Asian religion can be more easily compatible with science, and that there are some similarities between the cosmology of East Asian religions and that of modern physics. This has been rather impressively argued in Fritjof Capra's *The Tao of Physics*.

It seems clear that the West Asian religious perspective needs to be balanced by a deeper knowledge of East Asian philosophies and spiritualities. Judaism, Christianity and Islam have all glorious philosophical heritages, but these are largely neglected today, under the impacts of secularism and pragmatism. They

should themselves revive their own philosophical tradition, and then come into a three-cornered 'dialogue' among (a) West Asian religious philosophy, (b) East Asian religious heritage and (c) modern science/technology and philosophy of science.

In general, Buddhist philosophies, precisely because they do not presuppose any belief in God, appear to be more compatible with a secular cosmology. Among the many schools of Buddhist philosophy, Indian or Chinese, Japanese, Tibetan or Srilankan, the *Mādhyamika*¹ school is probably the most interesting. *Mādhyamika* philosophers generally agree in refuting the assumption that something really exists—either things or ideas or God. The *Svātantrikas* (a division of the *Mādhyamika* school) were prepared to concede that things existed as being-things, or as self-evident sense-impression creators, but this was not sufficient ground to assume their real existence. The other *Mādhyamika* school, the *Prāsangikas* embarked on a kind of Wittgensteinian language-game. They abandoned the temptation to explain reality. They pointed out, like the Sceptics among the Greeks, the inherent shakiness of every logical or verbal postulate. They would not accept any kind of reductionism, and developed a formidable repertory and technique of logical analysis by which they could refute any given postulate or proposition. But *Prāsangika* philosophy is more than a mere language game. Their thinkers were not concerned with developing a new speculative philosophy but were seeking some meaning for existence. This they did, however, by developing a highly sophisticated epistemology.

Denying the notion of an 'essence' of things, rejecting the view that things exist by virtue of a constitutive principle through which they are what they are (the *Svātantrika* view), the *Prāsangika-mādhyamikas* claimed that a judgement of perception about what is under consideration comes about in a person by epistemic conditions alone.

¹ Buddhist philosophy begins in India with the *Vaiśhāṣika* school with its realistic dualism. The *Saurāntikas* developed different epistemological theories, more or less on a phenomenalist line. This was followed by the *Yogācāra* school which regarded reality as 'experience-ability'. *Mādhyamika* was the fourth school, which criticized all the three previous ones. The *Mādhyamikas* later divided into *Svātantrikas* and *Prāsangikas*.

The *Prāsangikas* delight in demolishing other people's theories about essence and existence, function and causality, being and non-being substance and quality. They admit only relational existence and everything comes into being only in this relational way and not as discrete entities existing in themselves independent of such relation.

This notion of *Pratītya-samudpāda* or *Conditioned co-emergence* belongs to the heart of Buddhist philosophy and is worthy of further study by anyone interested in a modern cosmological paradigm. The originator of the Mādhyamika school, Nāgārjuna (2nd century A.D.) himself wrote a work called the *Heart of Pratītya-samutpāda*² and the very first invocatory śloka of his *Mādhyamika-Kārika* describe the concept of *pratītya-samudpāda* in terms of four pairs of negatives—neither coming to be nor ceasing to be ; neither permanence nor impermanence ; neither unity nor diversity ; neither coming-in nor going-out.³ Nāgārjuna does not say either that things exist or that they don't. Things have only an inter-related existence not each thing in itself. At the pragmatic level or *saṃvṛti* one can act as if things were real, but at the transcendental level or *paramārtha* there is only *śūnyata* or the Absolute as non-being.

Science at present deals only with *Samvṛti-satya* or pragmatic truth but already there are indications within it that the *saṃvṛti* level is but an initial level of apprehension of truth, always pointing to a transcendent level beyond. We have to pass through the *saṃvṛti* level to get to the *paramārtha* level.

The *pratītya-samutpāda* view that the cosmos has only a relational existence through conditioned co-emergence, is itself something that goes beyond the *saṃvṛti* level, but it refers to the reality apprehended at that level. Seen from the *paramārtha* level, this conditionally co-emerging universe is only *śūnyata* or the Absolute as non-being. The apprehension of this *śūnyata* or non-being is the ultimate experience or *nirvāṇa*.

² *Pratītyasamudpādahridayā*, See P. V. Bapat, Gen. Ed.: 2500 years of Buddhism. Government of India Publication, 1956, p. 425.

³ The eight negatives are difficult to translate exactly. *Anirōdham, anutpādam, anucchēdam, asaīvatam, anēkārtam, anānartham, anāgamam, anirgamam*—Mādhyamika-kārita.

The *Prāsangika* school branched out of the *Mādhyamika* school of Nāgārjuna (2nd century) and Aryadeva (3rd century) ; Buddha-pālita at the beginning of the 5th century AD gave birth to the *Prāsangika* school by developing sharp *reductio ad absurdum* arguments against all commonly accepted conceptual formulations of cosmology and epistemology.

The *Mādhyamika* school spread to China early and shaped its civilization for some eight centuries. Kumārajīva (fl 405 A.D.) was himself half central Asian (from Kuci beyond the Pamirs in Chinese Turkestan), studied in Kashmir and went back to Kuci. From there he was taken prisoner during a Chinese invasion of Kuci and carried to China as a trophy of war! There Kumārajīvā, with the patronage of the King, undertook a monumental translation project for producing Chinese versions of some 300 classical Indian Buddhist texts, mostly from the *Mādhyamika* School. He was equally expert in Sanskrit and Chinese. It was thanks to these Chinese translations that we still have access to much of Nāgārjuna's thought.

Kumārajīva (in Chinese Ciu-mo-lo-shi) Paramārtha (Po-lo-mo-tho) Dharmabōdhi (Ta-ma-phu-thi) and other Indian teachers spread the teaching of Mahayana Buddhism in China and central Asia including Tibet in the sixth century A.D. This philosophy needs today to be revived as a philosophical medium for enriching any comprehensive paradigm that we may wish to devise for advancing and integrating present scientific knowledge.

Several western scholars and scientists who set out on this path—Oppenheimer and Einstein are only two examples—have not been able to advance very far, and it seems like this creation of a new paradigm would require sustained inter-action between scientists and philosophers from East and West for quite some time. Some wealthy foundation or individual should set up a project to put together learned Chinese, Indian and Western scholars of philosophy and science to seek the contours of this new paradigm that can show us the way to the future.

C. Buddhism, Hinduism and Taoism

Buddhism though of Indian origin has today become universal, permeating the cultures of China, Japan, Korea, Kampuchea,

Laos, Vietnam, Sri Lanka, Burma, Thailand, Tibet, Ladakh, Mongolia, Nepal and Indonesia, as well as the Central Asian republics of the Soviet Union. It has recently spread to the west also.

Hinduism, on the other hand, had remained largely an Indian religion with some pockets in Indonesia ; in modern times it has gained many millions of adherents in the west and is becoming universal.

The Tao, Chinese in origin, is also becoming universal in our time, and has been fast winning converts in the west.

All these three religions have philosophies just as profound and as illuminating as the classical or modern philosophies of the west ; but the former do not carry much appeal to the literate people of our time. One can easily be regarded as a learned philosopher or theologian in either west or east without serious acquaintance with the texts of these religions.

Christianity has been largely responsible for this closing of doors to the full wealth of the heritage of humanity and for developing a civilization that is as parochial and arrogant as it is insular and uninformed.

There are two aspects to the religious philosophies of the East—the astute dialectic of their philosophical logic and the deep and satisfying wealth of their religious experience and perception. These two aspects can be easily separated, and that is the weakness of Oriental philosophy as now taught in universities in the West and in the East.

If science is to advance for the welfare of humanity, there must precede a genuine encounter between those philosophies and spiritualities of the East in their full spiritual-intellectual vigour, and the sophisticated though yet spiritually arid philosophies and science/technology of the West.

This encounter is unlikely to take place in a single mind. There are several people in India—several does not mean many—who have tried to achieve this synthesis. I can readily think of three people who are both philosophers and scientists, coming from three diffe-

rent religious traditions in India. First, I think of Dr. D. S. Kothari, formerly Chairman of the University Grants Commission in India, who writes with a deep knowledge of modern science, from the perspective of the Jain religious tradition of Mahāvīra. His passionate interest not only in science and the humanities but also in spirituality and personal character, has led him to undertake serious efforts to bring religion and science into a single perspective. His advanced age and failing health comes in the way of hoping that something really dramatic will come out of these heroic efforts.

A second person in the same field is Dr. Sampooran Singh, D.Sc., head of the Central Defence Laboratories in Rajasthan, who has already published several works in this field. His background is that of the Sikh religion of Guru Nanak and the later Gurus and the Granth Sahib. Once again, one sees how great the task is and how unable a single mind is to cope with the vast range of problems posed by science and the philosophy of science on the one hand and Eastern religious philosophies on the other.

A third person, much younger, a well-known scientist in his own right, is Prof. E. C. G. Sudarshan whose background seems indeed exotic. Born into an Oriental Orthodox Christian family (my own Church) he has become a convert to Hinduism and has acquired considerably deep perception in Hindu spirituality and philosophy. Prof. Sudarshan is attached both to the University of Texas and to the Indian Institute of Science in Bangalore, and is known for his contribution to modern physics in theorizing on tachyons or subatomic particles travelling faster than light, as well as on creating new equations which adapted the rigorous theory of partial coherence in classical optics (Emil Wolf) into a quantum framework.

In a country like India there should be many others who are in pursuit of the unifying paradigm that integrates the scientific perspective on reality with the religious one. There must be some also among the millions in China, Japan and other Asian countries.

What we need is a mechanism that will bring these different minds together for a concerted and sustained effort in search of a paradigm. I would like to insist that the East Asian religious perspective is one that we cannot afford to ignore. This perspective

has been grossly mis-represented in the West by even such well-known writers as Albert Schweitzer. For example when the Buddhist philosopher advances his *Śūnyatā-vāda* about reality, many western scholars misunderstand it as a contention that reality does not exist, as a kind of nihilism. One fails often to see the difference between 'no-reality' doctrine and 'no-doctrine about reality' doctrine as Professor T. R. V. Murti has shown.⁴ Neither do many realize that when Śāṅkara speaks of *Māya*, he is speaking of the conditioned nature of reality perception and not about the world being an illusion. The world is real, but not as it appears to us. Reality is veiled and knowledge has to unveil it, discover it as it is. When in the ultimate experience of knowing, reality thus unveils itself, one sees that Brahma, self and world are not three disjunct realities, but in fact one. Philosophy or perception of reality is then based on the experience of this supreme knowledge, not learned from books or propositions. True knowledge is beyond the subject-object kind of empirical knowledge where Brahman has nothing to do with the subject knowing the object and where all three remain distinct and distinguishable.

Both Hindu Vedānta and Buddhist Mādhyamika hold to the dialectical apprehension that all conceptually grasped truth in which there is consciousness as subject and consciousness of something as object, is originating in a conditioned mode, and is not the ultimate truth. This view has affinity with that of Kant and the neo-Kantians in the West, but is not the same. The concept and the world arise simultaneously under certain conditions which can be transcended.

Science is already at the door of this perception. We know now that while we can introduce independent standards for measuring and checking reality, it is not possible to eliminate the subjective in scientific perception. We have begun to see that all knowledge is relational and not absolute. We are beginning to see that the act of knowing is a constitutive act and shapes the knowledge yielded. We know also that the relationship of ego and consciousness is highly problematic as Kant and Sartre as well as Heidegger have adequately shown. We are beginning to see also that all reality is one inter-related system.

⁴ T. R. V. Murti, *The Central Philosophy of Buddhism*, London, George Allen & Unwin, Second edition 1960, p. 313.

If one takes seriously what has been said about faith as nurture and support rather than as encounter, then we can begin to see that transcending the subject-object dichotomy is necessary also for true faith. A proper philosophical-theological perspective should reveal to Christians also that they have been apprehending their faith intellectually on highly questionable philosophical grounds which separate God, Man and World as three disjunct realities. Christians can come to a deeper and philosophically more adequate grasp of their own faith through proper and profound study of Eastern religious philosophy in Hinduism, Buddhism and Taoism.

And since Christianity is still a pervasive influence in inhibiting western thought, the liberation of Christian theology from the shackles of doubtful metaphysical assumptions which obscure the very nature of Christianity and from the endemic reluctance in Christianity since the middle ages to philosophize deeply, could lead to a liberation for western civilization as such. Here both science and the Eastern religions as well as the perspective of Oriental semitic Christianity have a large role to play.

The inhibitions of the west in this regard are best exemplified in the failure to extend recognition to C. G. Jung, the Swiss psychologist who is one of the few in the west to begin to penetrate the heritage of East Asian religions. He saw clearly the problem of *causality*, the central interpretative principle in modern science. His search for acausal interpretations of reality began with the study of East Asian religions. As he stated in the first chapter of his work on *Synchronicity*, 'the connection of events may in certain circumstances be other than causal, and requires another principle of explanation'⁵. Usually we resort to the lazy method of ascribing to chance what we cannot explain in terms of causality. Jung, exploring further a view opened up by Schopenhauer (who was also an ardent though not quite successful student of East Asian religion), was dissatisfied with chance as an explanation for the causally inexplicable.

Jung turned to China and Taoism and found principles in the *I Ching* 'for grasping a situation as a whole and thus placing the

⁵ C. G. Jung, *Synchronicity. An Acausal Connecting Principle*. Eng. Tr. R. F. C. Hull, London, Routledge & Kegan Paul, 1972, p. 7.

details against a cosmic background—the interplay of *Yin* and *Yang*⁶. It is precisely Jung's interest in astrology and *I Ching* that scared many pious westerners and turned them off from even listening to Jung. But Jung found in Taoism a psychological approach to reality that was just as illuminating as the western principle of breaking up everything into cause and effect in a series and not wholistically.

For Lao-Tzu, the Taoist philosopher, Tao is also the Absolute as non-being. Non-being does not mean the absence of something, but rather like the empty space inside a vessel or within the frame of a door, the emptiness is the most meaningful and useful. As the Tao Teh Ching puts it :

‘ Unmeasurable, impalpable
Yet latent in it are all forms ;
Impalpable, unmeasurable
Yet within it are all entities ;
Unclear it is and dim ’.

Ch : XXI

The central point of Tao is again the over-coming of the subject-object dichotomy and seeing their unity within the whole. The problem as well as the point of modern science is the attention it pays to the empirical and to the detail. Our way of thinking helps us to see the shape of the vessel or the elegance of the door-frame, but not the meaning of the space contained in each. Modern science has taught the west to forget what Philo and Hippocrates and Pico della Mirandola taught them about the unity of all ; but it is precisely that science, yes, modern physics, which now tells us that all things are interconnected, and nothing really exists as discreet and separate. But the integrating paradigm has yet to emerge.

D. A Critique of Secular Paradigms

We have mainly two general sets of paradigms in western culture—the pluralistic, liberal secular western scientific paradigms with their market economy system on the one hand, and the more closely integrated Marxist paradigm with its supposedly socialist system on the other.

⁶ *op. cit.* p. 49.

The liberal paradigms are in a framework which is basically anti-dogmatic and anti-philosophical in tempo ; practice and use are its more immediate concerns—individual use, family use, use of corporations and states. This framework is satisfied with the thought that an integrating framework is not only not possible but also not quite necessary. There are some who still strive for a general theory of relativity (GTR), but to most scientists, a little mechanistic a paradigm, a little quantum-mechanical paradigm, and a little special theory of relativity paradigm together meet the main needs.

As for an ideology the west would pretend to be content with a critical liberalism—an aversion to all dogmatism and tradition ; a need to question every assumption and every opinion except those whose questioning would upset one's interests, a broad tolerance that lets a hundred flowers blossom ; a general view that ' you may be right, he may be right, and I may be right ; it does not matter too much so long as he or you do not threaten my security, my comfort and my conflictless respectability '.

Liberalism has little positive content. It is quite happy to acknowledge a few general principles like the personal freedom of the individual, the dignity of the person, the need for justice, and a broad tolerance of dissent.

Liberalism reveals its weakness when confronted either with a more resolute and self-confident ideology or with catastrophe on a large scale. In fact it is so confronted at this time—both by the self-confident power of Marxism and by the fundamental sense of catastrophe today endemic inside industrial-capitalist civilization. So liberalism itself becomes intolerant. It is well-known how difficult it is today for a Marxist party or Marxist individuals to survive and function within the so-called ' free ' societies of the developed market economy system. Even in those countries like France and Italy with strong Communist parties, there is a thick wall of separation dividing the Marxists and the liberals, so that it is difficult to find full social acceptance for a committed communist in non-Marxist circles. It is industrially advanced liberal society that is most prone to the doomsday psychology of fearing impending catastrophe either in the form of a nuclear holocaust or the outbreak of a Third World War or even one caused

by the melt-down of several peace-time nuclear power plants. It is in these countries that one sees more of the fear of ecological catastrophe—resulting from air and water pollution, from climatic change due to the greenhouse effect produced by excess of carbon-dioxide in the atmosphere, or from total disruption of the ecosystem through upsetting of the eco-balance that maintains life on our planet.

Liberalism as an ideology seems unable to cope with the big issues ; neither does it seem capable of providing integrative paradigms. Critical rationality remains a highly useful tool in the hands of humanity ; but it shows signs of not being able to stand on its own feet. It can be more fruitful within a more integrative paradigm, but it cannot itself produce that paradigm.

The bigger problem with Liberalism is that it seems to be so integral to the World Market Economy System, to a critique of which system we must now turn.

E. The Liberal Ideology's Major Product—the Market Economy System—A Critical Comment

The market economy system has been able to achieve a considerable enlargement of the middle class, multiply the numbers of millionnaires by several thousands, and bring a tolerable (from the perspective of the Two-third World) level of income to the working class. It has also brought some dignity to labour in the industrially developed countries ; and the poor who had been formerly regarded as the scum of the earth can today have good clothes, cars, houses and so on.

But the problem of gross inequalities of income and frighteningly high rates of unemployment remain the endemic problem of all market economy societies, whether industrially advanced or backward. And these societies do not seem to have any real plan to overcome these two problems, both of which are of primary interest to the poor. The poor and the oppressed of the world should not then be blamed of being foolish or unwise if many of them have a greater sympathy for those economies where these two problems have been resolutely handled.

But there are other reasons why not only the poor, but all friends of justice prefer the socialist economic system to the so-called liberal-democratic or market-economy ideological pluralism. The reasons may be stated as follows :

- (1) The industrialized market economy countries, including ostensibly non-colonialist nations like Sweden and Switzerland have inherited and benefit from the unequal and exploitative economic system built up by American, European and Japanese colonialism and imperialism—built up through the last several hundreds of years. They still regard this unjust and cruel system as a framework for international economic relations in which they can continue to have major benefits at the expense of the poor of the world. To be committed to such a system is to be committed to the perpetuation of injustice.
- (2) Some of the more powerful industrialized market economy countries often openly seek to prevent the less developed countries from solving their own problems by refusing to help them with the technological know-how and the capital assistance needed to start certain key basic industries like steel or nuclear power. India, for example, was cold-shouldered by the U.S.A., the U.K. and West Germany when she first sought assistance, soon after national independence, to build steel mills. It was only after India began constructing steel mills with the assistance of the Soviet Union that these nations also began to offer assistance for the construction of steel mills. The chaos and catastrophe caused at the Tarapur nuclear plant by the refusal of the U.S. Government to fulfil its contract obligations in the matter of supplying enriched Uranium also illustrate the tendency of the industrially advanced market economy countries to keep the less developed countries technically and industrially backward and heavily dependent. One could give scores of other examples like the intrigues against developing oil refineries in the Middle East, the dirty tricks in oil prospecting in Asian and African countries,

and so on. To be committed to such a system is to be committed to dis-honesty, oppression and exploitation.

- (3) It is also true that the general policy of the industrially advanced market economy countries is to keep the Two-third World firmly anchored to the world market economy system, and they use every trick in the bag and all forms of force to prevent any of the less developed countries from breaking out of the system. By ideological brainwashing of the intelligentsia, through newspapers, news agencies and all media-related activities as well as through dirty destabilization tricks, and even through 'best-seller' literature, the powerful neo-colonialist market economy system seeks to keep the minds of the Two-third World enchained to itself, and to keep control not only of the economic process but also of all intellectual development. To be committed to such a system is to be committed to the prolongation of our spiritual and intellectual enslavement.
- (4) One of the means of keeping the Two-third World enslaved is to attempt maximum possible stimulation of market economy private enterprises in the Two-third World through financial agencies like the World Bank and the International Monetary Fund and through the World Banking System. These agencies maintain, propagate and often enforce a negative attitude towards the state sector, or where this is not possible, co-opt the state sector in order to make it serve the private sector, as is largely the case in India today, where sub-contracts given to private enterprises neutralize all the good that the state sector could do for the common people. The State Sector now becomes another fat cow to be milked by the entrepreneurs or at times even the catalyst that stimulates private enterprise. In this manner this market economy system and ideology co-opt what is known as the 'Public sector' into a major instrument for serving private interest. Its financial power is almost always used to reinforce itself, and to be committed to this system is to be committed to the vested interests of the privileged few.

- (5) The world market economy system effects a steady decline in the Two-third World's share in international trade, squeezing out the 60% of world population from any major share in the so-called benefits of the market economy system.³¹ This they achieve through a more 'rational' use of science and technology, through greater integration of the economic life of the leading market economy countries, and through artificial increase of consumption in the already affluent countries, along with stringent restrictions against the import of goods into these new markets from the less developed countries, and a policy of agricultural and raw material protectionism which aims at reducing affluent country dependence on the less developed countries. To be committed to such a system is to be committed to the greater impoverishment of the poor.

The world market economy system which the liberal ideology has created becomes a major instrument of oppression and exploitation also through unfair trade terms. While the costs of spiralling inflation in the advanced industrial countries of the market economy world are charged to the less developed countries in terms of the highly increased prices they have to pay for what they import, they receive no major increase in price for the goods (except oil) they supply to the affluent. This has been the case even before the present two-digit inflationary spiral began. In absolute terms the purchasing power of the less developed countries fell by at least \$ 6400 million between 1955 and 1970.

At the same time the income taken out by foreign investors directly from the less developed Two-third World grew enormously.³² Between 1960 and 1970 that increase was 136%. To be committed to such a system is to be committed to the plunder system established during the colonial era.

³¹ Between 1955 and 1972, in fifteen years the Two-third World share in world market economy exports fell from 28 to 19 per cent and by 1977 it has fallen further to 17 per cent. The trend is still downward.

³² From \$ 3600 million to \$ 8500 million.

- (6) The market economy system created by the liberal ideology has now institutionally entrenched itself through the system of Trans-National Corporations, by which capital from the advanced industrial countries can in league with local entrepreneurial interests, establish themselves in the Two-third World economic and intellectual development. These corporations appear to be useful in catalyzing industrial development, in increasing capital and know-how available to the Two-third World, and in advancing the development of science and technology in the less advanced countries. But in fact the income taken out of the Two-third World countries by these Corporations has been consistently higher than what-ever they have supposedly brought in. They have put the countries of the Two-third World into a deep trap of economical and technological dependence, shackled and burdened them with heavy chains and loads of foreign debt, and have intellectually and spiritually castrated the cultures of these countries. To be committed to such a system is to acquiesce in the strengthening of the shackles that bind us to our exploiter and oppressor.
- (7) Two major instruments by which the Market Economy System, instead of becoming more humane, seeks to strengthen its stranglehold on the Two-third World, are the phenomenal increase in the Arms Trade and the Know-how Trade.

The Two-third World accounted for only 4% of total world military expenditures (excluding China for which precise figures are not available) in 1957, according to the SIPRI Yearbook 1978. In 1977 the figure rose to 14% or in absolute terms from \$ 17,425 million in 1957 to \$ 70,300 million in 1977 at 1957 prices. The value of imports (at 1975 prices) of major weapons by Two-third World countries rose from \$ 1202 million in 1957 to 8161 million in 1977. This enormous expanding market is used not only to exploit the Two-third World, but to increase the military as well as economic control of the Two-third World by the developed countries. It also helps to reinforce the entrenched power of privileged and vested interests in the Two-third World.

The sale of technology is an equally-frightening development in the Market Economy System.

Daniel Bell in his description of the new 'Post Industrial Society' lists five aspects of this transition from Industrial to Post Industrial Society.

(a) In the economic sector, there is change of emphasis from producing *goods* to producing *services*.

(b) Occupationally, the post-Industrial society puts its premium on the professional and the technologist, thus stressing again knowledge and skill.

(c) In research, the axial principle of innovation emphasizes again the centrality of theoretical knowledge.

(d) In planning, the control of technology gets central place.

(e) Even in decision-making, it is the new intellectual technology of 'human engineering' that gets central place.

Small wonder then that out of the 2,978,204 scientists and engineers today engaged in fundamental research, only 26,891 or less than 1% of the total are in Africa, and only 39,603 or 1.33% are in Latin America. North America spent \$ 35,978,815 for Research and Development (1974 figures) and Western Europe spent \$ 24,212,659 the two together spending almost 60%. If one includes Japan and Oceania, the percentage comes to nearly 70. The developing countries' total share of total R and D expenditure was 2.6% while the Socialist countries spent 28.27% of the total.

One sees clearly that in this oppressive system science and technology become a major instrument of exploitation. Science and technology cannot come into their own, when 63% of the world's population has only a 2.6% share in the world's research and development funds. If science and technology is to develop for the benefit of man there is no other way except to reorganize the world economic structures into a more equitable and just system.

Science and technology first developed in the Market Economy System. The Socialists came in later, and have made considerable headway. Of the total number of about 3 million scientists and

engineers engaged in fundamental R and D the U.S.S.R. alone has 1,169,700, or 39.28% of the total, and other East European countries have 324,462 or 10.9% of the total. Between them they have 50% of the world's engineers and scientists.

Some people think that both the Socialist bloc and the market economy bloc are equally exploitative. This is far from the truth. It is true that often the market economy bloc technology is more advanced than that of the socialist bloc. But socialist technology can be made available mainly for the advancement of the lowest income sectors, while market economy bloc technology, operating through Trans-National Corporations works more to the benefit of the entrepreneurial and managerial classes, and becomes more clearly an instrument of exploitation and dependence creation.

Socialist technology also creates some dependence relations, but is definitely less exploitative. Socialism itself is not completely free from imperialist tendencies, and this constitutes one of its major weaknesses, which we in Asia know well. Yet it seems clear that science and technology for the benefit of humanity is more likely to grow within a socialist rather than in a market economy or in a mixed economy like ours in India.

F. A Critique of Current Socialist Ideologies

While between the Market Economy System and the Socialist system the choice falls unmistakably on the latter, the present reality of the socialist systems is itself not beyond criticism.

The brief critique here cannot deal with all aspects and all types of Marxist philosophy. We can only make oblique references to Euro-communism of Maoism as variations on the main theme, and have to direct our attention more to its official ideology in the most developed socialist country—the Soviet Union. We refrain also from the Gulag Archipelago type of criticism.

The fundamental question relates to the validity of knowledge or epistemology. How are concepts related to facts? How is Being related to consciousness? The Market Economy west plays with the Correspondence, Coherence and Pragmatic criteria for Truth. Taking it for granted that truth is propositional they can be too easily satisfied with quite unscientific and arbitrary definitions of

truth. Kant and the Phenomenologists at least saw the problem of the subjective-objective dialectic in all knowledge, the dialectic between being-in-consciousness and being-for-consciousness, between the *en-soi* and the *pour-soi*. But most empiricism in the west still tries to skirt the issue.

In Marxism, it was Lenin, very much as philosopher in his own right, who elaborated a simple 'copy' theory of the relation of mental percepts to external objects. Today the Marxist position is much more sophisticated. Lenin recognized that 'no natural science and no materialism can hold its own in the struggle against the onslaught of bourgeois ideas and the restoration of the bourgeois world outlook unless it stands on solid philosophical ground'³³. But Lenin himself was too heavily dependent on the Hegelian Dialectic turned upside down by Karl Marx. He saw only three alternatives—Materialism, idealism, or skepticism; and he wanted the dialectic of Hegel in a materialist framework; this was a clear choice for Lenin—both idealism and skepticism are reactionary; only materialism is progressive and scientific. Philosophy itself is scientific, not anything extraneous to science, according to Engels as well as Lenin.

Academician Fedoseyev, in a recent article on 'Scientific Cognition Today. Its specific features and problems' puts it thus:

'Dialectical-materialist philosophy does not deny the role of formal-logical methods of research; social factors and individual creative activity in the process of cognition. But it shows the significance of these factors in relation to what constitutes the real essence of human cognition—the interaction of the subject and object in the process of practical activity. This interaction is interpreted and explained in Marxist philosophy on the basis of acknowledgement of the materiality of nature and society, the dialectics of objective reality and the reflection of the latter in consciousness, on the basis of the principle of the social character of cognition. Both the thought and practical activity of man are determined by the laws of objective reality. Man's

³³ V. I. Lenin 'On the Significance of Militant Materialism' *Collected Works* Moscow Vol. : 33 p. 233. For the copy theory. See his 'The Theory of Knowledge' in *Collected Works* Vol. : 14 (1908) pp. 40-193. See esp p. 105.

subjective activity is not absolute and arbitrary ; in the final analysis it is determined by external reality, by objective dialectics. '34

This is a much more sophisticated position than the copy theory developed by Engels and Lenin. Engels, an outstanding philosopher, sometimes was quite simplistic on epistemology :

' Contrary to idealism, which asserts that only our mind really exists,³⁵ and that the material world, being Nature, exists only in our mind, in our sensations, ideas and perceptions, the Marxist materialist philosophy holds that matter, being, is an objective reality existing outside and independent of our mind ; that matter is primary, since it is the source of sensations, ideas, mind and that mind is secondary, derivative, since it is a reflection of matter, a reflection of being ' .³⁶

The expression ' copy theory ' gives place in later Marxist literature to the notion that external reality is reflected in the mind of man. As another Academy of Science Volume (*The Fundamentals of Marxist-Leninist Philosophy*)³⁷ puts it in less technical language :

' Materialism in the theory of knowledge proceeds from recognition of an objective reality independent of man's consciousness, and of the knowability of that reality. Recognition of objective reality, which forms part of the content of knowledge, is directly connected with the *concept of reflection*. Knowledge reflects the objects ; this means that the subject creates forms of thought that are ultimately determined by the nature, properties and laws of the given object, that is to say, the content of knowledge is objective. ' ³⁸

The writer distinguishes this view clearly from the idealist theory of knowledge which ' avoids the concept of reflection and attempts to substitute for it such terms as ' correspondence ' , presenting knowledge not as the image of objective reality but as a sign or

³⁴ *Philosophy in the USSR Problems of Dialectical Materialism* Progress Publishers, Moscow 1977 p. 15.

³⁵ Hegel e.g. never said that only our mind really exists.

³⁶ Cited in Loren R. Graham *Science and Philosophy in the Soviet Union* Vintage Books, N.Y. 1974 p. 40.

³⁷ Progress Publishers, Moscow 1974.

³⁸ *op. cit.* p. 204 italics present authors.

symbol replacing it.³⁹ Lenin would furiously protest against the idea that knowledge is a sign or symbol. For him it is a copy of objective reality, a reflection of it, a true image. The writer of the Academy volume cited (who remains anonymous) specifically mentions Ernst Cassirer, the neo-Kantian and his view of concepts as symbolic forms. He continues to argue that, even though modern 'knowledge is becoming increasingly symbolical in its expression, and scientific theory often appears in the form of a system of symbols'.... 'it is not the symbols themselves that are the result of knowledge, but their ideal meaning whose content is the things, processes, properties and laws studied by the given science.'⁴⁰

In other words, the language in which scientific knowledge is expressed may be symbolic, but the knowledge itself is not a symbol, but a reflected image. What then is knowledge itself?

'Knowledge is the spiritual assimilation of reality essential to practical activity. Theories and concepts are created in the process of this assimilation which has creative aims, actively reflects the phenomena, properties and laws of the objective world and has its real existence in the form of a linguistic system. (italics in the original)⁴¹

In entering a critique of this epistemology, one does not want to be misunderstood. When the Marxist insists that scientific knowledge is objective, he does not deny the subjective pole in all knowledge. He merely insists that objective reality exists independently of our consciousness of it, and that it is reliably, faithfully reflected in our consciousness. His fight is against the subjective idealist who would like to reduce the world to its subjective reflection and to deny the existence of any objective truth'. He also fights against the positivist view (e.g. Russell) which reduces the content of knowledge to that which can be objectively proved and verified.

The Marxist would also admit that present scientific knowledge may contain an element of error which will be revealed only by

³⁹ *ibid.*

⁴⁰ *op. cit.* pp. 207-208.

⁴¹ *op. cit.* pp. 209-210.

future experience in cognition and practice. In that sense the Marxist is not a positivist, and acknowledges the relative nature of all scientific knowledge. As V.I. Lenin put it in his refutation of Bogdanov, citing Engels, and J. Dietzgen.

'...for dialectical materialism there is no impassable boundary between relative and absolute truth. ...From the standpoint of modern materialism, i.e., Marxism, the *limits* of approximation of our knowledge to objective absolute truth are historically conditional, but the existence of such truth is *unconditional* and the fact that we are approaching nearer to it is also unconditional.' ⁴²

Lenin himself cites Hegel's view that Dialectics does contain an element of relativism, but cannot be reduced to relativism. There is nothing static thus in the Marxist theory of knowledge.

Marxist epistemology bears striking resemblance to our own Madhvacharya's theory of knowledge, where he regards perception as the flawless (*nirdosha*) contact of the sense-organs with their objects. The *Anuvyākhyāna* of Madhva insists that knowledge gained in perception and validated by the necessary checks yields unqualified reality. Mādhva does not accept the Advaita distinction between different degrees of validity e.g., between the *vyāvahārika* level and the *pāramārthika* level.

Lenin, already at the beginning of our century (1908) faced some of the problems posed by modern physics which today appear crucially relevant to any modern scientific-philosophical epistemology. More than 70 years ago, the questions raised by the British philosophers of science about the validity of empirical knowledge had been raised in a very sophisticated philosophical manner and V. I. Lenin was an active protagonist in the debate. Discussing Mach and Lorentz, Poincaré and Helmholtz, Maxwell and Kelvin, and the general view that in modern atomic physics 'matter has disappeared' into mere charges of electricity, Lenin gives a comprehensive survey of the discussion at the beginning of our century about this problem. Marxist epistemology has fully adjusted itself to this problem that the atom can be analyzed as organization

⁴² Lenin 'The Theory of Knowledge' in *Collected Works* Volume 14 (1908) Moscow 1972 p. 136.

of energy impulses. This does not lead to the conclusion that matter does not exist and therefore that materialism collapses. No, Marxist philosophy takes care of this problem today by affirming that it is matter-energy in motion according to the principles of dialectics that constitutes both the world out there and the knowing consciousness. At this point Marxist ontology-epistemology is in the least bit threatened.

Lenin said that in 1908 :

'The electron is to the atom as a full-stop in this book is to the size of a building 200 ft. long, 100 ft. broad and 50 ft. high (Lodge); it moves with a velocity as high as 270,000 km per second; its mass is a function of its velocity; it makes 500 trillion revolutions in a second—all this is much more complicated than the old mechanics; but it is nevertheless, movement of matter in space and time.'⁴⁸

Nature is not a creation of our minds. At this point Lenin leaves us in no doubt. And the modern Marxist goes further to qualify Lenin's copy theory to accept the fact that the reflection of the external world in our minds may not be a flawless image. The modern Marxist is surprisingly willing to accept Karl Popper's theory of science as composed by 'conjectures and refutations'.

'A hypothesis is knowledge based on a supposition. The substantiation and proof of a hypothesis presupposes a search for new facts, the devising of experiments, and analysis of any previous results that have been obtained. Sometimes several hypotheses that are 'tested' by various means are advanced to explain one and the same process. Such elements as simplicity and economy, which serve a supplementary means of determining the most authentic theoretical system, are also of importance in choosing a hypothesis. . . . Theory is not something absolute, it is a relatively complete system of knowledge that changes in the course of its development. A theory is changed by adding to it new facts and the concepts that express them, and by verifying (*sic*) principles. A time comes, however, when a contradiction is discovered in the framework of the existing principles. This

⁴⁸ V. I. Lenin 'The Recent Revolution in Natural Science' in *Collected Works* Vol. 14, p. 281.

crucial movement can be detected by concrete analysis. Its arrival heralds the transition to a new theory with different or more exact principles.' ⁴⁴

Now that is an admirable summary of the general conclusion of the British Symposium on *Criticism and The Growth of Knowledge*, incorporating the views of Popper, Kuhn and Lakatos, with a slight leaning towards the anti-Communist Popper over against the more liberal Kuhn.

Of course, Popper and Kuhn would be quite innocent of Marxist theory of socially organized labour as an epistemological category. But it is interesting to note that Marxist epistemology has come so close to the Anglo-Saxon pragmatist-analytic philosophical view.

What we have here to say in criticism of Marxist epistemology would apply therefore equally to western (philosophies of science whether of the English-speaking or of the German variety.

It seems to the present writer that Marxist epistemology takes it for granted that our ordinarily perceived reality, purified by theoretical catharsis, negated in its given state, 'objectified' in accordance with scientific laws and reconstituted through socially organized labour, is all the reality there can be. To quote Academician S.T. Melukhin :

'The consistent materialist world-outlook has always postulated that the whole world around us consists of moving matter in its manifold forms, eternal in time, infinite in space and is in constant law-governed self-development'. ⁴⁵

If this position is to be totally consistent it has to be based on some indubitable proposition and built up from it by clear and consistent methods of argument such as Descartes attempted in his *Discourse on Method*. It seems to me that the Marxist philosophical system is based on two propositions that they have taken as indubitable, but which turn out to be just as problematic as Descartes' *Cogito*, though however, the Marxist system is built up in a neater, larger and more commodious way than that of Descartes.

⁴⁴ *The fundamentals of Marxist-Leninist Philosophy*, Moscow, 1974 p. 244.

⁴⁵ 'Dialectics of Being and Consciousness,' in *Philosophy in the USSR* p. 43.

The indubitable propositions on which the Marxist dialectical system is built up are the following :

(a) Matter-energy in motion, developing according to the laws of dialectics, is all that exists ; this existent reality is eternal infinite, and self-existent.

(b) This sole existent reality includes the phenomenon of man who cannot only know that reality as it is given but also change it in a historically destined direction.

Granted these two propositions, the systems develops with an architechtonic beauty, coherence and comprehensiveness which far exceed these qualities in Descartes or in any other modern system. Its particular value is that it unites matter, nature, man, society, politics and economics all in one single unifying system of thought. It has no peer in this regard.

If the Marxist philosophical paradigm has weaknesses, they lie at the level of the two basic assumptions, rather than on the methodology by which the architechtonic is built up, though on this latter point there have been and still are impassioned and furious debates within Marxist circles.

In its fundamental assumptions, Marxism has made one fundamental change recently. Previously motion had been seen as a property of matter ; today mass and energy are seen as inter-dependent and interchangeable properties of matter. Einstein provided the two formulae for relating mass and energy,⁴⁶ and today the Marxist dialectic does not insist on matter as the only existent ; rather it prefers to say 'matter-energy' united as one, but with units interconnected by relations of motion, inter-action, and structure or system.

⁴⁶ Besides the well known $E = mc^2$ Einstein gave us the other formula for relating the mass of a body in motion to its mass at rest—viz.

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

where m is motion mass and m_0 is inert mass V is velocity of body and c is speed of light in a vacuum.

The Marxist would claim that matter is infinite and eternal, though our knowledge of it is finite. They know, as every informed person knows, that the range of our present knowledge of matter is limited to 10^{-14} cm to 10^{28} cm. The upper limit of 10^{22} cm works out to about 13,000 million light years. Now this is a prodigious range, but certainly the spectrum of reality extends infinitely far beyond ('infinitely' is accepted by the Marxists, but not by the present writer, who is a Christian).

To pass a judgement about a reality which one knows to be infinite, based on partial and finite knowledge, would always be hazardous. This is the hazard in the Marxist position. This is also the hazard in the Christian position, for the latter also has only very partial and finite knowledge and yet dares to make judgements about the Infinite God.

The Christian knowingly takes this risk in his faith in God. Without risk there is no faith. But he does not claim that his faith is scientific. The Marxist also takes a similar risk in affirming the infinity and eternity of matter and its ultimate knowability by a finite and mortal mind; yet he claims such knowledge to be scientific.

Let us not make any unfair accusations. The Marxist knows the risk he is taking. In the work frequently cited in this chapter, *Philosophy in the USSR*, Academician S.T. Melukhin makes the following four sets of statements :

First,

'The consistent materialistic world-outlook has always postulated that the whole world around us consists of moving matter in its manifold forms, eternal in time, infinite in space, and is in constant law-governed self-development. Nothing in the world exists that is not a certain state of matter, its property, form of motion, a product of its historical development, that is not ultimately conditioned by material causes.'⁴⁷

Second Statement,

'But it is important to remember that matter itself exists only in the shape of *concrete* formations and systems, of which

⁴⁷ *op. cit.* p. 43.

the world possesses an infinite variety. Matter does not exist in 'general', there is no 'matter as such' outside any definite concrete form.⁴⁸

Third Statement,

'There are no external causes of the existence of matter ; it is the cause of itself or, to be more exact, the concept of cause is not applicable to the existence of the material world as a whole. Its chains of cause and effect as infinite in space and time.'⁴⁹

and finally, fourth,

'But we must always remember that we know by no means all the universal properties and laws of existence of matter ; in fact we probably know only a small fraction of them. After all, matter is infinite, every given system may be an element of a bigger one, any process a fragment of a greater cycle of change.'⁵⁰

In the last quotation appears the basic weakness of the Marxist architectonic. The universe as we know it, says the Christian paradigm (the original Patristic, Eastern, classical paradigm) is a subsystem within a larger system about which we have no conceptual grasp or as yet no clear experimental evidence that can be publicly demonstrated. That larger system extends beyond the present range of scientific knowledge—i.e., from 10^{-14} cm to 10^{28} cm. That system is not in principle unknowable. Many people have known about it, bet their lives on it, and found unquestionable certainty in their convictions about it. But our present scientific methods have not yet been adapted to the knowledge of it. The contention of this book is precisely that science must advance in that direction, as far as it can go.

The universe, as a sub-system with the larger system, is itself regarded by the Marxist as infinite and therefore finally and exhaustively unknowable. He also does not at first accept any larger system beyond the universe open to our senses. We do know some finite limits in our universe—like the speed of light in a vacuum. All known parts of the universe have a finite span of time during

⁴⁸ *ibid.* p. 51.

⁴⁹ *ibid.* p. 52.

⁵⁰ *ibid.*, p. 58.

which it can exist. The distance between any two given objects is also finite, though it may possibly be infinitely increasing.

The Marxist would admit that his infinite universe cannot have any common absolute time⁵¹ 'no unified quantitative laws of genetic determinacy, no connection between past and future; which are present in all concrete systems', to quote Academician Melukhin. Melukhin admits that even the three laws of the dialectic operate only within a finite range :

'In infinity the content of nearly all our concepts and laws undergoes a qualitative change. We are immediately confronted with restrictions on the use of the concept of 'system'. The infinite universe or all matter may be treated as an infinite number of different interacting objects and systems only insofar as the objective laws of existence permit it to do so. Every system interacts with its near and far environment if its life-time and distance allow this.'⁵²

Here is a major admission—that whatever laws we may formulate as 'universal' they are unable to explain the whole 'infinite' system. Marxism's weakness lies precisely at this point—in its conceptual optimism about the universality of its science, an optimism which has little ground in science itself. If the universe is a system, this means that its parts are interacting; according to good Marxist theory today, such actions and interactions cannot exceed the speed of light. If this is so, then pace cannot be infinite, for actions in one corner of it cannot extend to the farthest 'limit' (which does not exist in infinity) or come back. A system needs interaction, and if the speed of light is the upper limit of action and interaction, this precludes any possibility of an interacting system which is also infinite.

If the universe then is a single inter-acting system,⁵³ then it cannot be spatially or temporally infinite, given the condition that all actions and interactions can operate only the propagation of material effects, which are limited by the speed of light. So

⁵¹ Melukhin, *op. cit.*, p. 60.

⁵² *op. cit.*, p. 60.

⁵³ The unity of all matter is an important axiom in Marxist ideology. So is the infinity and eternity of matter.

the only kind of infinity left to the Marxist is the numerical infinity of matter ; but if this matter is contained in a spatio-temporally finite universe, how then can it in principle be numerically infinite ?

The Christian would say that C or the velocity of light is not a limit, because material-spatial is not the only form of interaction between entities ; that thought and love are not bound by C . He would insist that the universe is spatio-temporally finite, and therefore matter can be neither infinite nor eternal. He would also state, though he cannot demonstrate it to the satisfaction of all, that this world open to our senses is only one facet of the Created Order.

The modern Marxist has seen the problem of the non-infinity of space and time. Once again Academician S. T. Melukhin gives us the latest view :

‘ Instead of the current (*Marxist*) phrase ; “ matter exists and moves *in* space ”, it would be more correct to say that some material objects or systems move in the spatial structures of other material systems (the Earth’s atmosphere, the solar system, the galaxy, the metagalaxy, etc.). Similarly, instead of the phrase “ matter exists and develops *in* time, one should say that time is the duration and sequence of changes in the state of matter. The measure of the duration of this existence of systems is a definite number of cyclical processes in the sub-structure of the subsystems of which they are constituted (molecules, atoms, etc.) or of larger systems (Earth, the solar system, the galaxy) ’⁵⁴.

In other words space and time are neither infinite, nor do they have independent existence except as aspects of the structure of matter. Even the four-dimensional space-time continuum is not an independent entity *inside* which matter exists. Melukhin points out the difficulties of a unified Field or General Theory of Relativity, uniting the gravitational, electro-magnetic and nuclear fields into one single law.

In this situation, how can one demonstrate the infinity and eternity of matter ? Melukhin is quite frank and open at this point :

⁵⁴ *op. cit.*, p. 63.

'What proof can be given of the infinity of the material world? Obviously there can be no complete and final proof because of the very nature of the problem and man's limited possibilities at every future stage of the development of science. Nonetheless even today there are arguments which suggest that the idea of infinity is not purely axiomatic or postulatory.'⁵⁵

Melukhin very guardedly admits the difficulty of *demonstrating* the infinity and eternity of matter. He too has to use the sort of dogmatic language used by the Christian. He moves from the notion of numerical or quantitative infinity to the idea of 'structural' infinity, which is more or less the possibility of an infinite number of sets of structural relationships. We have already seen quite new sets of structural relationships at the level of what we today call 'elementary particles'. We are already on the look-out for 'quarks' the bricks of which all 'particles' are supposedly made. We may have to go down to the scale of 10^{-33} cm,⁵⁶ but for the moment we lack the energy to do the breaking down of elementary particles into such micro-micro objects.

The infinity and eternity of matter, as well as its self-existence, can only remain dogmas in the ideology of Marxism, with some corroborative arguments in its favour, which are as old as the pre-socratics, and which cannot lead to any conclusive atheism. The Christian's position is not basically different. It is acknowledged that some of its fundamental assumptions are not logically or experimentally demonstrable.

Marxism still holds to an ancient Greek classical dogma the eternity of matter. Anaximander of Miletus (fl 560 BC) had already stated that the Non-limited (*apeiron*) is everlasting, immortal and indestructible.⁵⁷ So did Heracleitus of Ephesus who stated around 500 BC. :

'This ordered universe (cosmos) which is the same for all, was not created by any one of the Gods or of mankind, but it

⁵⁵ *op. cit.*, p. 66.

⁵⁶ a magnitude arrived at by combining the gravitational constant G with Planck's constant and the velocity of light.

⁵⁷ Diels, *Fragments*, Eng. Tr. in Kathleen Freeman, *Ancilla to the Pre-Socratic Philosophers*. Oxford, 1971, p.19.

was ever and is and shall be ever-living Fire, kindled in measure and quenched in measure'.⁵⁸

To sum up, the weakness of the Socialist or Marxist ideology can be located in its unexamined assumptions—such as the infinity, eternity and self-existence of matter, the sophisticated but unsatisfactory epistemology of the reliability of that which is reflected in the social consciousness of man, and the assumption about the destiny of humanity as a stage in history when society will have no classes or contradictions.

These are dogmatic assumptions. Marxism is partisan in its support of those who adhere to these assumptions and inhospitable to those who question them. Herein lies its inherent weakness.

Much of the propaganda against repression and denial of personal freedom in existing socialist societies have their origin in the Cold War tactics of the market economy world. But there is also genuine repression in Marxism, a great deal of which cannot be justified by the exigencies of the socialist situation surrounded and infiltrated by anti-socialist enemies. Socialism would have commended itself much more readily to all whose interests are not threatened by it, had it been less repressive, both physically and spiritually. One is not talking here of the Stalinist excesses which many socialists would join me in condemning; nor is one speaking about Prague 1968, or any of the decisive Soviet actions against a joint assault from within and without on the world socialist system. One is not even speaking of *Cancer Ward* or *One day in the Life of Ivan Denisovich* both of which give exaggerated and one-sided pictures. Neither is one speaking about Roger Garaudy or other revisionists, renegades and Euro-Communists. One is not speaking about the Maoist critique of super-power obsessions on the part of the USSR. One refuses to be trapped either by the naïve anti-Communism of the Americans or the more sophisticated anti-Sovietism of European and Asian socialists.

And yet the ideological weakness persists—the dogmas which cannot be discussed freely even among those genuinely committed

⁵⁸ *ibid.*, p. 26.

to socialism ; specifically the dogma of atheism, the dogma of the eternity and infinity of matter and its self-existence, the dogma of the validity of social reflection as an epistemological method ; and the dogmas about the destiny of humanity.

Despite these fundamental weaknesses, Marxist thought is still the closest hypothesis we have in interpreting current socio-politico-economic reality, Christians have provided no more scientifically convincing interpretation of the current world. We will never be able to arrive at a serious overall paradigm without fully utilizing the insights of Marxist ideology and integrated scientific theory of society.

G. The Gamut of Choices

Looking at the spectrum from the perspective of an Oriental Orthodox Christian, not too well trained in the ways of the west, with some knowledge of the Indian tradition, I would make the following observations :

(a) The western liberal tradition appeals to my temperament when its **breadth and freedom** ; **but it lacks both depth** and real content. It is a lazy tradition despite its enormous physical output and achievements. It has still no philosophical system which can serve as the basis for an integrative paradigm. Analytic philosophy is too pedestrian and averse even to asking the fundamental questions. Existentialism and Phenomenology put too much weight on the individual and the subjective ; Structuralism becomes a computer philosophy that seeks to recreate a new idealism which has no way of finding meaning for the whole until the total structural analysis of all reality has been laboriously and exhaustively completed ; this is likely never to happen, and many of us will have to pass on from the scene without being able to hear what they have to say about the meaning of the whole.

The liberal tradition's emphasis on critical rationality is something I respect ; but I know that critical rationality by itself is incapable of leading me to a paradigm that makes sense of the whole.

(b) As I look at the Marxist architechtonic, I am impressed with its coherence and beauty, and with the meaning it yields for

my action in the socio-politico-economic reality. I need it for my facing that reality. But I cannot accept its epistemology or its ontology, both of which strike me as being rather dogmatic. Nor can I accept its vision of the ultimate destiny of humankind, which also remains at present rather dogmatic in that system. I would like to see the critical rationality of liberalism play a larger and freer role within Marxist reflection. But even Marxism reformed through some application of critical rationality will not yield for me the main contours for an integrative paradigm. I wish that the western liberal tradition will shed some of its inhibitions and fears and open itself up more to the Marxist ideology. The western liberal system can only gain from a more fearless exposure to its own weaknesses. But liberalism touched up by Marxism will also not yield the contours of the needed paradigm.

(c) I could look at the problem first from the perspective of the Indian philosophical heritage—take Nāgārjuna, Śāṅkara and Madhva as illustrative of three different options in the Indian tradition.

Critical rationality has much in common with Nāgārjuna though the pyro-technics of logic seems applied to two totally different ends in the west and in Nāgārjuna. Nāgārjuna wants us to move away from pre-occupation with the conceptual, which is incapable of leading us to true enlightenment. In the west, critical rationality leads only to an indifferentism or to too much reliance on individual tastes and preferences.

The Nāgārjuna position is important for me precisely at the point where it coalesces with the position of Śāṅkara of Kaladi⁶⁹ and Gregory of Nyssa. All these sages were endowed with great powers of logical reflection such as is rather rare these days. Their power of reasoning was, however, strong enough to make them realize the severe limits of reason in getting to the ultimate realization of truth. Once one has an experience of realization one can use logic and reason to communicate the meaning of one's experience or to establish its validity.

⁶⁹ In Christian usage the preposition 'of' followed by a place-name means that the person named is, the *bishop* of that locality. In the case of Śāṅkara, Kāladi is simply his birth-place near Alwaye, in Kerala.

Gregory of Nyssa acknowledges three faculties of the mind—the world-observing or perceptive, the critical and the speculative. Western thought has in theory given too much prominence to the perceptive or conceptual, and has been more critical than speculative; when it has moved into the speculative, such as in Hegel, it acknowledged no clear criteria or specific tradition and therefore could not sustain any critical development within the speculative tradition established. The monumental character of Hegel's speculative system is witnessed by the fact that it generated two major negative reactions—the Marxian—materialistic and the Kierkegaardian-Existentialist. But the Hegelian system itself could not withstand the onslaught of critical rationality. Far worse, the failure of Hegelian idealism has also led to the discouragement of all forms of speculation in the west.

The Nāgārjuna tradition in India is also anti-speculative; but its use of critical rationality to destroy all affirmations is only a means to leading people to a transconceptual enlightenment such as that of Buddha. The western Enlightenment is an affirmation of rationality and a denial of tradition; the eastern Enlightenment (Buddha) is an *experience that reveals* the futility of every conceptual attempt to grasp the truth.

Nāgārjuna's *śūnyatāvāda* or 'doctrine of nothingness' is the opposite of the nihilism that results from the critical rationality of the west. By claiming that reality is *śūnyata* or the 'void', Nāgārjuna posits, on the basis of an experience, that reality can no more be grasped by the concept than water can be contained in a fishing net. In Asia Zen Buddhism still continues this tradition in a living way—that getting rid of the conceptual and enlightenment or illumination go together. In India J. Krishnamurthi insists that all illusion and all conflict arise from thought, concept and reason; and that ceasing from all conceptual thinking will put an end to all dualism and all desire, bringing genuine peace and enlightenment to all.

If one follows the Nāgārjuna tradition in India, an overall paradigm that holds scientific and other knowledge together in one single framework becomes totally pointless. From my recent hour-long conversation with J. Krishnamurthi I got the impression that a true Buddhist or Krishnamurthi disciple would also

abhor the idea of an overall paradigm as another step in the wrong direction, reinforcing the illusions created by conceptual thinking.

Most likely the Śankara tradition would eventually come to the same position—that energy spent on conceptual clarification of reality through science or through an integrative paradigm would be energy wasted on analysis of the *vyāvahārika* level of reality, an analysis which does not lead to the true unmediated experience which releases one from the bondage to *avidya* or nescience.

(d) It is here that my debt to Gregory of Nyssa becomes most obvious. He has a very relaxed view of the conceptual and the transconceptual which I find very congenial. In both epistemology and fundamental ontology Gregory of Nyssa provides us with categories that are still useful to Christians in constructing paradigms.

Human beings are endowed with *epinoia* or the faculty of conception, perception, imagination and critical evaluation. Every art and every science, according to Gregory of Nyssa is a product of this faculty. He specifically mentions, geometry, arithmetic, the physical sciences, technology, navigation, the art of making clocks, as well as ontology, as creation of the faculty of *epinoia*.⁶⁰

‘Have not all these benefits to human life been achieved by *epinoia*? For, according to my account of it, *epinoia* is the method by which we discover things that are unknown (*ephodos heuretikē tōn agnoeumenōn*) going on to further discoveries by means of what adjoins to and follows from our first perception with regard to the thing studied.’⁶¹

Gregory of Nyssa is different from both Śankara and Nāgārjuna in accepting the full validity and usefulness of the scientific enterprise; nay he insists that science and art are both from God. ‘Thus human life invented the Art of Healing, but nevertheless he would be right who should assert that Art to be a gift from God.’

⁶⁰ Gregory of Nyssa, *Answer to Eunomius' Second Book*, Jaeger ed. Vol. : I 275 ff. PG 45 : 969 ff. Eng. Tr. NPNF Series Two, Vol. : V, pp. 267 ff.

⁶¹ *ibid.*, I : 277, PG. 45 : 969c, NPNF V : 268.

But Gregory makes also the point that precisely because this gift is exercised in freedom, 'no one would deny that he who has learned to practise an art for right purposes can also abuse it for wrong ones, so we may say, that the faculty of thought and conception was implanted by God in human nature for good, but with those who abuse it as an instrument of discovery, it frequently becomes the hand-maid of pernicious inventions'. This potential double use, for good or evil, applies to all our faculties, according to Gregory. The fact that science has been misused is a witness says Gregory, to the opposite fact that it can be used for good purposes.

This is a slightly different position from that of Mādhva, for whom the concept of *sakṣin* (witness) is in some ways similar to that of Gregory's *epinoia* (conception). It is this inner witness within each of us that perceives sense-knowledge as well as other objects which cannot be perceived by the senses (abstract thought, imagination, speculation). It is this same inner witness within consciousness that also experiences certainty in knowledge.

The similarity and difference between Nāgārjuna and Śāṅkara on the one hand, and Mādhva or Gregory on the other, can be put thus : they are all pre-occupied with an ultimate experience of self-realization or of becoming what one is. But Śāṅkara and Nāgārjuna have a lower evaluation of the conceptual than Mādhva or Gregory. For the first two the conceptual is something to be overcome, for the latter two it is something to be transcended. None of the four would hold to the view often current in the west that truth is propositional. Truth is that which is, rather than that which is stated.

Gregory of Nyssa states clearly that concepts are human creations, that they can be good or bad, right or wrong, but also that words and concepts do not constitute truth. It is possible to call light darkness and darkness light (Isaiah 5 : 20) ; but Gregory says that that is a form of drunkenness. Science is made up of perceptions and conceptions based on theories or hypotheses which we have created as human beings.

These words, concepts, theories, hypotheses, which constitute science are necessary for the full growth of man, but that full

growth requires that he go beyond these. Śankara, Nāgārjuna and Krishnamurthi would seem to deny any point at all to these conceptual formulations, where as Mādhva and Gregory would think of them as legitimate and necessary processes through which humanity has to advance to something beyond.

Our paradigm must then do justice to science and yet leave us free to move beyond.

THE NEEDS OF A SANE SOCIETY

In order that Science may truly serve the needs of a sane society, new developments seem to be needed in three areas.

- (a) a more wise science policy in all nations and among nations ;
- (b) a scientific paradigm of reality that copes with the anomalies in present theory and gives us an integrated perspective for present action ;
- (c) a scientific breakthrough that goes beyond the present restraints of science to the precisely measurable and the experimentally demonstrable.

A. A Sane Science Policy

There is no doubt that the most urgent problem is greater justice in the distribution of the benefits of science and technology. Science/Technology today is the possession of the privileged and becomes the power of the oppressor and exploiter. The problem being as complex as it is, no ready-made solution can be offered here. But certain questions need to be raised urgently.

1. Studies should be made in a nation like India on the extent to which scientific and technological progress has benefited the weaker sections of the community—the low income groups, the rural poor etc. The causes for the mal-distribution should also be studied. It will be easy to say that certain section of the population do not have the capacity to absorb the benefits of available science/technology. A deeper analysis will reveal that so long as the socio-economic structure of society remains what it is, there can be little likelihood of the weak sectors benefiting from whatever S/T there is. Here it would be useful to make a study of societies like Cuba to see whether the performance there is better in terms of

equity of distribution. Again the causes will have to be analyzed.

2. Research projects should be initiated by government to apply modern science-technology-engineering to some priority areas for the benefit of the poor—e.g. low-cost housing, low-cost nutritive food, low-cost hygiene etc. More research could be initiated for providing low-cost utilization of solar and wind energy.

3. More money should be put into the scientific education of the community through interesting and innovative methods for relating science-technology to the daily needs of the common people.

4. There should be more laboratory work in elementary and secondary schools, so that children have a greater experimental grasp of scientific-technological reality.

5. A fresh investigation is perhaps not necessary to reveal that the main forces working against scientific progress in a country like India are the prevalence of large-scale nepotism and an inhumanly bureaucratic inability to recognize and encourage real talent. Even the schemes established to promote genuine scientific research soon fall victim to the manipulations of favour seekers and mis-users of influence. There is on the other hand much too much dependence on Government for the solution of all problems.

One comes to the conclusion, fairly early in the process of investigation, that it is totally impossible to ensure any kind of sane science policy so long as the socio-economic structure is insanely unjust. The structures will have to be changed if science/technology is to benefit the majority. The resources now wasted for fattening the upper castes of politicians, bureaucrats, and industrialists who dominate our economy can be released for more beneficial uses only when these castes are overthrown from power, and a new state, not alienated from the people, is set up in its place.

B. The Paradigm Problem

What we need today is not necessarily a General Theory of Relativity which brings the macro and the micro into a

coordinated and integrated perception, though such a GTR may be the next step in the progress of physical science.

We need something less than a theory or a strict paradigm ; or perhaps we need something else. It seems that we need also more than just inter-disciplinary discussion and research. We have not yet founded a proper Academy in India which brings together the physical, the biological and the social sciences as well as philosophy and ethics into one integral concern. The Indian Philosophical Congress could have been such a society; but it is infested with dirty politics and indolent incompetence. The government institutions set up for advanced study and research have also fallen victims to bureaucratism and political intrigues. Neither is the department of the Government that deals with these questions free from such machinations. Today we have in India a philosopher-historian in charge of the government's centre for scientific and industrial research ; but it may be too much to hope that even he can break through the barriers against setting up something really effective that can begin to **shape an integral vision of reality and a tentative orientation for our dealing with that reality today.**

In India especially, philosophy and integral reflection are at a very low ebb today. People make do with half-hatched and hap-hazard ideas and notions for making up their picture of reality. Even philosophy becomes aphoristic or imitative of the trends in the west.

To revive our own tremendously powerful Indian intellectual tradition, and to make at least some efforts for putting together an integrative framework for perceiving current reality cannot, however, be the task of philosophers alone. It is only in discussion with Physical and Life Scientists that philosophers can move towards an integrative paradigm for reality, that gives orientation for current action.

This is an elitist task ; it cannot be undertaken by the untrained ; but such a task would be utterly useless if the trained experts who undertake the task are too far removed from the perceptions and aspirations of the common people. It is at this point that our otherwise competent scientists and thinkers seldom manifest any real expertise.

It is at this point also that religion at its best can make some contribution. But alas, there are so few among religious thinkers who can easily break free from the shackles of their own traditions and face reality from a more universal and comprehensive perspective, integrating the insights not only of Indian thought, but also incorporating insights from the Chinese and western intellectual traditions. There are a few such in the world, perhaps ; but they have not been discovered and brought together. This is the sort of thing that India could undertake.

But the contribution of the religious insights should not be a substitute for hard scientific thought, and here the whole gamut of western philosophies of science, Anglo-saxon, Germanic and Marxist, should come to our aid in our perception of reality and in orienting the course of humanity towards its destiny.

We come to the greatest difficulty when we seek to integrate the human science of political economy into the framework. There the dividing line between science and prejudice (*a la* Gadamer) becomes very hazy. Our very prejudices about our socio-economic prejudices become highly suspect, because of the play of personal and collective self-interest in our thoughts and feelings.

It seems the main stumbling block is here. We have in India accepted a system of scientific reflection in which the progressive ideological alternatives are western critical materialism, and western Marxist dialectical materialism. At best we can fabricate a third way, mainly composed of elements from the one or the other taken at random. But this last, the mixed economy, in fact turns out to be a slightly modified version of the liberal capitalist model with a large State sector, which soon becomes controlled by powerful vested interests and only in a very limited way serves the interests of the poor, the exploited and the dispossessed. A large public sector does not mean socialism. It may mean nothing more than a huge chunk of the tax-payers' money set aside for manipulation and exploitation by bureaucrats and contractors and private enterprise. It could mean something different only in an economy more resolutely committed to socialism than ours.

The present writer is convinced that the Indian intellectual has not developed sufficient spiritual freedom to tackle the questions posed by dialectical materialism as such or by the political economics of Marx-Engels-Lenin, with any degree of objectivity or depth or originality, without either being swept away by it or becoming prejudiced and antagonistic.

Aristotle did speak about *technē* and *politeia* as the gifts of the gods to humankind; but neither he nor we have worked out adequately how to integrate *technē* and *politeia*. There are no scriptures in the world which will tell us how to do this job. It will have to be the consequence of many concerted human efforts. We in India have a role to play in this concert of human reflection. We should start now preparing to play this role.

What we need today is not a final overall paradigm, but a working one—one that can help us gain perspective and find our way forward. For this we need a new integral humanism, based in classical Indian thought, but facing the realities of modern science and technology and coping with the questions of political economics.

What we need then is a composite framework within which to perceive reality—something that brings three levels into mutual relationship—the physical sciences, the life sciences and the socio-politico-economic sciences. There is no use asking for a new Einstein who will give us a comprehensive scientific theory of general relativity; but we do need also some scientific philosophical reflection on topics like the following :

(1) How do we reconcile the fact that the laws time, space and motion appear to be different at the macro and micro levels? Which of these sets of law could be construed as basic?

(2) If the kind of time, space and motion observed at the macro level do not exist at the micro level, does this mean that the time-space-mechanical world of our everyday observation (at macro level) is not as basically real as we once assumed, and may be merely a construct of our social perception?

(3) If the observed-observer interlocking is as unavoidable as now observed at the micro level, is it legitimate to assume that the same is true at the macro level, and our assumed objectivity and givenness of scientific data should now be substantially qualified?

(4) If man's social being is in basic continuity with the world which he perceives and shapes, should we not think a little more deeply about the Marxist position that human social and individual personality is shaped in the process of organised social labour interacting with surrounding reality? Should we then not give particular attention to political economic systems as shapers of humanity and not merely as producers and distributors of commodities and services?

(5) Can the laws of life (including healing) be explained entirely in terms of physics, both micro and macro? Is life in some ways a negation of some of the laws of physics (e.g. of Carnot's Second Law of Thermo-dynamics)? How do we reconcile the physical and the life sciences?

These are only sample questions. There must be more profound anomalies and contradictions which would emerge in a proper inter-disciplinary discussion. What we need at the moment is the setting up of an inter-disciplinary (and possibly international, inter-cultural) group to seek to work out a more integrated and consistent perception of reality.

C. Breakthrough to New Avenues in Science

Our modern scientific effort is, after all, only a few centuries old. Modern Science is still young and vigorous. It should and could make some new breakthroughs. Centuries old habits, which have yielded magnificent results in the past, may have to be abandoned in the process.

There are two basic directions now seen, where we can expect some significant breakthroughs—one in western liberal scientific thought, and the other in Marxist dialectical humanistic scientific thought.

In the west, Abraham Maslow is the pioneer and fertile genius of a myriad ideas, none of which have as yet become

fully recognized or accepted by the scientific community. In his 1966 work on *The Psychology of Science*¹ he makes an interesting distinction between mechanistic science and humanistic science.

Abe Maslow saw clearly the damage that a mechanistic approach to the human psyche was doing to the infant science of psychology. He charged 'that the mainstream methodology in psychological research, modelled after the mechanomorphic tradition of the physical sciences, veils us from a fuller knowledge of human personality—a knowledge which we sorely need'.² Traditional psychology, Maslow accused, was misinterpreting human personality, as solely composed of features which we can measure or manipulate.

Now the problem raised by Maslow goes far beyond the discipline of psychology. It is an accusation against mainstream Science itself, which creates its own *Weltanschauung* and sub-culture, which in turn affect the perspectives of society as a whole. As Maslow puts it in the preface :

'In the broad sense, Science can be defined as powerful and inclusive enough to reclaim many of the cognitive problems from which it has had to abdicate because of its hidden but fatal weakness—its inability to deal impersonally with the personal, with the problems of value, of individuality, of consciousness, of beauty, of transcendence, of ethics'.³

Scientific experience itself has exposed the weaknesses of the mechanistic and fragmentary approach, and has pushed us on to the study of the human and the holistic. But this new science remains essentially 'underground' because of an oppressive ethos in the scientific community. Maslow's alternative was certainly not to freak out from the rigorous demands of experimental science and pursue a nebulous Zen or Tao with an unhealthy emphasis on personal experiences over against the

¹ Gateway Edition, Chicago, 1969. Maslow was Professor of Psychology at Brandeis, President of the American Psychological Association, and the founder of the Association for Humanist Psychology.

² *op. cit.* Foreword by Arthur Wirth, p. ix.

³ *op. cit.* p. xiv.

experimental ; nor did he stand for an impulsive whimsicality that becomes easy to laugh at or scorn.

To us at least, the psychology of science seems just as important as the philosophy of science and the two should be considered integral to each other, despite all the strictures about psychologism in philosophy or epistemology. Science itself needs psycho-analysis ; it is somewhat sick. Science has attained much by being careful and cautious, slow and patient, averse to accepting hearsay as evidence, insisting on clear and indubitable demonstration of everything before its being accepted as true. This creates a particular kind of personality—one that is a bit overcautious and smug at the same time, refusing to look except where its own limited light falls. It mechanizes and de-humanizes the scientific observer himself, as well as the reality he observes. To try to avoid the subjective, or to think that the subjective can be avoided in our dealing with reality, is a sort of sickness—one that has been useful, nevertheless.

This neutral-objective stance has been a false pose. It has distorted not only the perceived reality, but also the perceiver. Unscientific assumptions abound in this false pose and this self-deceiving commitment to 'objective truth'. Strict causality was once assumed as an axiom ; the man-made machine was once taken as a model for all reality. Today we know that these are false assumptions ; but we still operate too often on the basis of these. Abstraction and reduction, without which there can hardly be science, are too naively accepted as self-evidently valid.

A few of our contemporaries like Abc Maslow and Michael Polanyi tried to tell us that personal knowledge is radically different from nomo-thetic, axiological, 'objective' knowledge of things. But we are still finding it difficult to overcome the ingrained habits of two centuries of training, to explore the possibility of extending science beyond the measurable and nomo-thetic. The scientific community still has an ethos that is oppressively antagonistic to ways of thinking like that of Polanyi and Maslow. This ethos is loaded with a deep sense of insecurity and this is where the sickness lies—in Science's

inability to recognize its own basic insecurity. Maslow calls it the Fear of Knowing or Fear of Personal and Social Truth,⁴ which leads to a grand resistance even to attempts at knowing the truth.

We still have difficulty in recognizing that just as there are only three realities—self, world and God, there are only three ways of knowing which are inter-related but different. The way I know my own self and derivatively know other selves is basically different from the way I know things. And the way of ‘knowing God’ is unique. Why should science be limited just to the knowing of the world? Why should we insist that the way of knowing the world is also the way to know the self and God? Why cannot Science seek to find and develop reliable ways of knowing and dealing with persons, as well as with the meaning-structures of existence, i.e. the various ways in which people have found meaning in the past and discovered how to benefit from this knowledge for our own dealing with reality in the present day?

These seem to be the areas where Science should seek a new breakthrough. The breakthrough type of research still seems to work underground because of an unnecessarily oppressive ethos in the scientific community, which that community finds difficult to acknowledge.

Of course one does not want to be ungrateful to the many who have made positive contributions to the knowledge of persons and of meaning even within the framework of present science. I can think of the enormous wealth of cultural and ethnological information gathered, the experimental research of, say, a Jean Piaget in Child Psychology and so on.

But we have many fields of research which remain still basically disrespectful or unrespected, at least unrecognized and unappreciated—dream research, brain function research, research in bio-feedback training, altered states of consciousness, communication with plant life, Kirlian photography, studies on fire-walking, meditation, breathing suspension, psychic healing, paranormal phenomena and so on.

⁴ *op. cit.*, p. 16.

Of course, it is quite difficult to separate the wheat from the chaff in all the literature that comes up now in all these fields and besides also on the occult, on astrology, magic, U.F.O.'s and all the rest. But are we sure that the wheat therein is negligible? Perhaps as we remove the chaff, we may find more than wheat, perhaps precious gold and diamonds. Scientists themselves should read some of this literature before they reject it as total non-sense.

The breakthrough we look for in science is then the way to develop methodologies for gaining reliable and useful knowledge on the inter-personal, the social and the transcendent, without being bound by the methodologies of the 'lower' or physical sciences.

The socialist countries seem to be less insecure than the liberal west, about the reliability of science. They have more fearlessly entered into research on several of these 'underground science' topics like psychic healing, Kirlian photography and supersensory perception.⁵ When they see an unusual phenomenon like a psychic healer or a halo, they do not write it off as a freak, for fear that it will upset their general theories. On the contrary, precisely because of their confidence that reality is one and mutually coherent, they pick up freak instances as indicators of a realm of truth which is hid from our normal scientific perception. In pursuing the freak phenomenon they assume that whatever emerges as reliable knowledge in that sector can only enhance and improve the quality of the sum-total of our scientific knowledge—though when it comes to the matter of meaning structures they may also be inhibited and insecure.

They insist, however, quite clearly that 'the final object of all cognition is objective reality'; and add also that there is neither complete continuity nor total discontinuity between common sense knowledge and the various forms of scientific cognition. Science and common sense are in dialectic relation; both are in the process of dialectical transformation.

⁵ For a slightly out of date but still highly useful journalistic western study of this see, Ostrander, S., and Schroeder L, *Psychic Discoveries Behind the Iron Curtain*, Englewood Cliffs, N. J., Prentice-Hall, 1970.

But they i.e. the socialists of Eastern Europe firmly believe that Man is the sole creator of meaning or value or sense in this world. In a recent article in the Polish philosophical quarterly *Dialectics and Humanism* (Spring 1979), Prof. Janusz Kuczynski poses the question :

‘ Does Being, conceived as the whole of the objective reality, as the sum of what was and is, have any sense ’ ?⁶

The Marxist answer to the question is ‘ Being acquires sense for man when he becomes aware of its structures, its potentialities for development, its wholeness ’. I agree with the Marxist at this point, and I accuse western liberalism of dismal failure at this point of holistic awareness.

My disagreement with Marxism begins at the point of analysis of how this ‘ awareness of reality’s structure and potentialities ’ is to be undertaken. I can gladly and enthusiastically agree with my friend Prof. Kuczynski that this awareness cannot be wholly propositional, and that meaning and sense can be expressed also in symbols. In fact certain symbols are more powerful than any conceptual understanding to inspire action. History itself can be kept in our awareness much better by ancient buildings carefully conserved, by monuments and artefacts than by written texts.

But all meaning or sense is relation. Relation to what? To objective reality, past and present, says the Marxist. The Victoria memorial in Calcutta becomes a symbol of colonial oppression only when one realizes not only that it was built with the sweat-labour of the Indian people whom the British were exploiting, but also that it was built to humiliate the Indians who had built the Taj Mahal. Unless one sees the cultural history a little bit theoretically in terms of the ambitions of the colonial masters to subdue India’s millions by outdoing their architectural master-piece, the Victoria Memorial remains a large ugly building which carries no symbolic sense. An Englishman who seeks to justify British imperialism in India would see it in other terms ; it could be for him a symbol of the

⁶ Vol : VI No. 2. p. 137 in article on ‘ Man as the Unique Creator of Sense ’.

great and glorious times of the British Raj, without any reference to the Taj which it was supposed to outshine.

Thus, not only is man the creator of meaning or sense even in the use of symbols, but the very meaning-structure he creates is heavily influenced by his own interests and perceptions ; this leads to the same symbol having different and contradictory meanings, depending on where one stands and what one stands for, in the dynamic process of history. We also see how symbolic and propositional truth are intertwined, how they are complementary.

This relation between the sense-giver and the meaning-object (the signifier, the signifying and the signified, if one thinks in Structuralist terms) should become the object of scientific study ; but a study of this relation is of course dependent on our understanding of the meaning-giving subject and the meaning-giving object.

There are dozens of layers in both the subject and the object which need to be analyzed, in a manner that goes beyond a simplistic Structuralist Semiology. We must take seriously the Marxist charge that Augustinian or Thomistic or even Teilhardian ontology is also too simplistic—in attributing to God all three functions ; that God is the source of all meaning, that He is both the subject and object of all meaning and sense, that He is also the relation.

The consequence, as Kuczynski points out, of this simplistic Christian position is that man only *discovers* but does not *create* meaning ; that meaning is not relational but absolutely objective and given ; that man is merely a passive perceiver and appropriator of meaning. Perhaps the Marxist caricatures the (western) Christian position when he says :

‘ Thus God seems to mark out a limited ontological horizon and, by the same token, a clearly defined horizon of sense—from the point Alpha to the point Omega. It is of no importance in this case that the idea clearly points to a “ spatial ” and temporal end of all human endeavour. The important point is that human activity thus proves to be

demarcated *a priori*. The human being ceases to function as a creator while his role is limited to that of a mere executor of plans devised by God, the Creator'.⁷

The Polish Professor admits that in practice this limitation may have no negative influence on Christian activity. But the point he makes is worth heeding :

‘ Nevertheless any variety of the Christian religion and any religion where God is so unlike man, circumscribes the ontological and the temporal horizon ’.

The kind savant from the Polish Academy of Sciences even exempts ‘ those varieties of Christianity which try to overcome the pitfall of the “ opium of the masses ”—like the truly evangelical, Teilhardian and the communist (sic) Christianity ’ from this negative practical consequences. And I believe that in his term ‘ truly evangelical ’ he would include some forms of Eastern Christianity. Of course Prof. Kuczynski’s acquaintance with classical Eastern Patristics is understandably limited by his Polish background. Otherwise, he would have realized that the point of Eastern Classical Christianity is precisely the basic *similarity* between God and man—so much so that it is the Son of Man that now sits at the right hand of God and runs the universe. There is no idea of the ‘ immutability of human nature ’ in Eastern Christianity. Neither does the Eastern tradition, which emphasizes the freedom of humanity as its constitutive element, ascribe to God such sovereignty that the actions of humanity make no difference to God’s plans. God does not create ‘ meaning ’ in the aprioristic sense which Kuczynski attributes to Christian thought. Man is co-creator, not only of meaning, but also of reality itself. This is axiomatic in Eastern Patristic philosophy.

Prof. Kuczynski is a Marxist who is very kind to Christians, and recognizes the value of a deep level Marxist-Christian dialogue :

‘ Let me emphasize it with full force : the contribution of the Christians to the creation of the sense (meaning) of Being and history has recently increased considerably ’.⁸

⁷ Janus Kuczynski, *op. cit.*, p. 140.

⁸ *op. cit.*, p. 142.

He thinks that the problem with Christian thought is our aprioristic ontologism ; that our understanding of the meaning of Being as given a priori and not creatively formulated by persons in socio-economic evolution.

We would not agree with this statement about the Christian approach to meaning. Neither would I accept Prof. Kuczynski's position that 'the sense of Being depends, genetically speaking, entirely on man, the unique creator of sense', though I would agree with him that it is in the process of actively changing reality that humanity creates sense. I do not agree with him that all creativity is necessarily individual. Nor do I think that this is an essential axiom in Marxism. The individual's creativity can only be one manifestation of human society's creativity, and cannot be conceived independent of that society which gave birth to and shaped that individual.

The Marxist contention is that both values and meaning are human creations, and nothing more than human creations. Humanity, according to them is the demiurge of meaning, and through that meaning-creation, the demiurge of reality itself.

The Christian would say that all meaning, as far as we know, is perceived and appropriated by human beings, and that human beings can to a certain extent shape reality on the basis of their grasping or not grasping meaning. But we would also affirm that precisely in the process of grasping that meaning and transforming reality, man becomes aware of the loving and wise Power from whom comes not only both the self and the world but also the meaning itself. The Christian realizes that the language and categories or symbols in which man expresses the meaning of being are human creations. He would also insist that such human expression, whether in propositions or in symbols can never be exhaustive ; he would even admit that there may be basic differences within the Christian community itself, in the enunciation of that meaning, and therefore of the ways in which Christians seek to shape reality. But it is not possible for the Christian to argue either that man is the sole creator of meaning or that the meaning is so objectively given as to preclude all differences in the articulation of that meaning.

We come back to Professor Kuczynski's article as one of the clearest pieces of recent Marxist writing on the subject. Let us quote his own words :

' It is clear then that the sense of Being cannot be anything that is discovered or granted once for all, but rather that it must be something which is dialectically developed through evolutionary, quantitative growth, through scientific revolutions, through the drama of human cognition, and primarily through man's practical attitude towards the universe '.

The marxist's scientific interest in the meaning of Being is one that others should take note of. It is this quest that western science and philosophy have practically abandoned. One of the major pleas of this book is that Christians should pick up the challenge of integrating science and philosophy in a pattern that gives meaning to Being and orientation to existence. This indeed is what is meant by Christian Humanism. We too should have the strength to draw the general conclusions (tentatively) from our scientific knowledge, historical experience and the philosophical traditions of humanity, in order to create a meaning-giving pattern. Here the breakthrough is possible only if scientists, philosophers, historians and theologians can get together and work together in a disciplined manner, in a sort of Christian Academy where such integrative thinking can be undertaken in a systematic way. We could begin by making a survey of how humanity has sought to find meaning for Being in the past ; proceed then to contemporary efforts, implicit or explicit, to find meaning for the whole ; enter into dialogue between various cultures and ideologies on the same point.

The breakthrough will come, at first imperceptibly but soon more clearly, only through a trans-academic community that pioneers in new patterns of living and worshipping together and producing things and thoughts together and in that process shaping each other. The Christian Academy will probably be something which can be started right away if the money and the personnel were forth-coming, but the development of a systematic pattern or patterns of meaning is more likely to

emerge in actual communities where men and women can pioneer together to create a new style of life and a new way of living for others. The task of the Academy will be to generate such trans-academic communities and then to have their experience with life and its meaning fed back into the Academic community, for purposes of more systematic reflection and feed-back into the experimental communities.

The breakthrough in science will not come from one such Academy with feeder trans-academic communities alone. It will be a many-pronged and largely uncoordinated effort, occurring in various sectors of world society. The important thing is to put the search for meaning at the heart of the academic enterprise, to make sure that science, technology, schools, universities and research centres, history, philosophy and political economics all give a central place to the search for the meaning of Being.

Side by side, underground science will flourish. The underground science will seek at certain points to be holistic, as it now does, but without sufficient sensitivity to the diversity within the whole. For example the Association for Humanist Psychology is at present absolutely naive on matters of political economics or ideology. In the Soviet Union, where political economics is largely taken for granted, the new research into the para-normal remains unintegrated with the general perception of reality in Marxist ideology.

The Christian Church, with its conception of Catholicity as concern for the whole (*kata-holiké*) cannot run away from this task of holistic integration of knowledge and its transmutation into wisdom and love and power, in unity, for the welfare of the whole.

As Christians, we disagree with the Marxists in their assertion that the creation of a meaningful unity is a purely human task. We are convinced that the Holy Spirit is at work, drawing all things into unity in Christ, a unity to be made manifest beyond history, but one that seeks less and less imperfect manifestations within history. We do not even dare to conceive all the contours of this final unity ; but we seek partial percep-

tions of the whole, and partial transformations of the whole in the direction of its final perfection.

The point is that Science at present has not accepted its full responsibility in the carrying out of this task. Marxism is better off than Christianity at this point. The Marxist recognizes that the process of development is a gradual and dialectic process of personal and community development, a differentiated and integrated actualization of generic human powers and values achieved by interaction of humanity with the world through organized social labour⁹. This is to be advanced through science and technology, applied within a socialist political economy. Such a development builds the sub-structure for the basic needs of human existence in order that humanity may pursue the higher values of culture and meaning—‘such as truth, beauty, autonomy, friendship, love, justice, and the like’ as Prof. Parsons, citing Abe Maslow, puts it.

Marxist humanism at its best is committed to the utilization of science and technology for fulfilling the higher nature of man. Christians often caricature the Marxist approach as ‘materialist’ without realizing that most Marxists are more humanistic and less materialistic than most Christians. Christians have as yet to develop anything like an integral humanism to meet the complexity and sophistication of the Marxist perspective.

Christians have also yet to overcome the tendency to look at science as an enemy or a rival. But then neither do they need to be hypnotized by the achievements of science into believing that it is all-powerful. Science is a human creation which we can use for refurbishing our social and material as well as meaning-related existence. In order that Science may serve us in all three areas—material base of existence, socio-cultural shaping of it, and moulding it for meaning-perception and meaning-related existence, Science needs to make several breakthroughs.

⁹ See e.g. the American Marxist Howard Parsons’ article on ‘Science and Technology: Means to What End?’ in *Dialectics and Humanism*, Warsaw, Vol : VI, No : 2 Spring 1979, p. 73ff.

CONCLUSION

Sane Societies cannot be built up without Science and Technology. Science itself should however help us in the creation of societies that are really sane—sane in the literal sense of being healthy, vigorous and in possession of one's faculties.

Science for Sane Societies can develop only in an economy where a certain minimum of justice is assured, and where exploitation has been pushed back behind a certain threshold. In the kind of society that India has, for example, investing very large sums of money in scientific research will not produce the kind of science we need; the power and the benefits of science is bound to be unjustly distributed and therefore become contributory to increasing injustice.

This does not mean that we should wait till society is more just before we can invest in scientific research. We need to build the infra-structure even within a market economy system; but we should not expect that the necessary development of science-technology in our country can be achieved only by investing more money. The crucial thing is to realize that a science that truly serves our people can develop only in proportion to the development of our political economic structures including peoples' consciousness. Hence the struggle for scientific-technological development should be co-ordinated with the struggle for transfer of economic and political power to the people.

A Sane Science policy for India today is :

- (a) to disseminate science education among the people both through formal educational institutions and through the media and other informal educational structures at the grass-roots level ;
- (b) to take very strict measures against nepotism and bureaucratism in the science/technology institutions and structures ; to create effective measures to encourage real talent ;

- (c) to provide for interdisciplinary reflection and research, especially involving physical scientists, social scientists and philosophers ;
- (d) to promote integrated thinking on these issues among scientists, civil service leaders, political leaders and educators also ;
- (e) to put considerably larger sums of money into research in Science and Technology and to create the right ethos so as to attract the best Indian minds now abroad and to keep them working for our people.

The paradigm problem cannot be directly resolved by Government. The intellectual elite in this country should however be encouraged to take up this problem by sufficient grants from the Government or from Private Sector foundations at home and abroad.

So is the breakthrough problem beyond the coping of government now. Perhaps there too some foundation grants may be able to finance a project—not only to promote ‘under-ground science’ in this country ; but in fact to advance the search for meaning in a scientific context.

In the Indian context our priorities are not difficult to discern.

(1) First comes the over-all concern to restructure society on the basis of a scientific political economics, and to create a people-based infra-structure which would ensure a better, a more equitable and just distribution of the benefits of science and technology. Thinking people should devote a great deal of attention to the process by which the minds of our elite are shaped by pseudo-economics and pseudo-politics. This is a primary necessity before the problems of poverty and injustice in our society can be adequately tackled. The problem of political economics is basic, if science is to lead to Sane Societies.

(2) We are still in the midst of a scientific-technological revolution, but one which we lack adequate conceptual tools to analyse effectively. By scientific-technological revolution we

mean the substitution of one set of basic conceptions for another. This is a fairly universal process, in which each nation participates at its own pace or time-scale and degree of intensity. The revolution seems an endemic process, and no nation can manage to stop the process at its doors. Each nation, however, gives its own distinctive imprint to the common pattern of scientific revolution. This imprint depends on (a) cultural conditions, (b) socio-economic conditions, and (c) the accidents of history or choice like the source from which a nation 'acquires' its scientific technological revolution.

One has the feeling that we are not sufficiently critical in our attitudes towards this revolution; we still lack an adequate understanding of how this revolution affects not only our socio-economic structures, but perhaps more important, our conceptual structures.

We in India speak about self-reliance in science-technology and technology for rural development. We are rightly concerned about the fact that 95% of Scientific Technological R & D is in the hands of some 28% of the world's population. What seems not sufficiently discussed in our Science and Technology Policy statements is what S/T does to our total conceptual structure. This is fundamentally important in India today, precisely because we have claimed to have arrived at third rank in the world in terms of the bulk of trained manpower in science and technology. The Science Policy discussion, in its desire to be empirical and 'scientifically valid' ignores the conceptual problem, and concentrates one-sidedly on economic aspects. The conceptual problem is just as important as the socio-politico-economic aspect of Science.

This cannot at the moment be picked up at the level of a public discussion, though newspaper and periodical articles must ensure a wider participation in the debate than is possible for a few elite groups meeting in cloistered comfort. But the elite groups are also necessary to feed some of the issues and questions to our enlightened public.

These two concerns should go hand in hand: an acute and compelling concern for more participation, justice and sustainability in society and the gearing of science/technology to that

end on the one hand ; and on the other, the comparative study of the traditional conceptual structures of our Indian Philosophical, cultural and religious heritage with the new conceptual structures of science/technology.

(3) Then there is the third concern—that the Scientific Method itself should undergo a basic revolution, in order to begin to cope with other aspects of reality than the measurable and the repeatable or objectifiable. This too is a task that goes beyond the competence of individual scientists.

This third concern is the hardest perhaps to tackle. India has a heavy supply of pseudo-science ; but we do have in our universities, little pockets of good ‘ underground science ’ also. These will perhaps need encouragement if a new scientific methodological breakthrough is to emerge. Perhaps some university will have the courage to call together a consultation of these underground scientists who are dissatisfied about the basic approach of the modern scientific method, in order to work out some fresh approaches towards a more humanistic science.

The three concerns—for justice in the distribution of the benefits of science/technology, for the integrative paradigm that gives orientation to political and economic action for the people and the government, and for a breakthrough in the methods of science itself in order to use science as a tool in the search for meaning—all three concerns are likely to remain with us for a while. They are concerns for a science that serves to create sane societies ; but is society today sane enough even to become conscious of these concerns ? Are Christians sane enough to take up these concerns seriously ?

Science and Technology, if they are to serve the needs of humanity and to provide it with knowledge, power and wisdom, should face these issues. But so should others who are not engaged in professional science and technology. It seems to me for the debate to begin in India, that a saner society may emerge in our land.

BOOKS BY THE SAME AUTHOR

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