Truth at the Frontiers of Science

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We discover technical truths about the world through science and technology. High-energy physics, molecular biology, astronomy ? sophisticated science makes God?s creation intelligible. Scientific data help cure disease and enrich civilization. And now a dazzling new world is breaking open around the convergence of nanotechnology, biotechnology, cognitive science, and information technology. Before the scientific age, our explanations centred on dark forces, mystery, the gods. Today we have truth tested by laboratory research and electronic instruments.

Science is territorial. It does not give us truth about the whole of reality. Its data are awesome in their complexity and scope, but this is technical truth only. Science cannot deal with every type of reality. In fact, science, with its own logic and structure, does not even give us ultimate truth about those realities with which it deals. Our knowing is saturated with intention and belief. Michael Polanyi (1966) called it tacit thought. For Thomas Kuhn (1970), science is a complex mixture of assumptions about the world, politics, intuition, and creativity. The most celebrated scientists recognize that the part does not equal the whole. The scientific method yields empirical knowledge, but social values and political-economic resources are crucial for the whole truth as well.

People of faith welcome the truth. In the Christian tradition, knowing the truth will set us free (John 8: 32). The fundamental norm of Arab-Islamic communication is truthfulness. In Hinduism, truth is the highest dharma and the source of all other virtues. In the powerful wheel imagery of the Buddhist tradition, truth is the immovable axle. Zen meditation seeks truth in experience.

And as the religious community contributes to debates about the new directions in science and technology, it needs scientific facts. It knows this kind of truth to be narrow, but finds it indispensable. The mature do not only want their mosques, temples, synagogues and churches to prosper, but they support research universities and promote scientific problem-solving. They encourage the long tradition of their talented youth choosing science, medicine, engineering, and mathematics.

But the religious worldview recognizes a formidable challenge in coming to grips with science and technology these days: This generation seeks to know the truth on scientific matters while living in a technological order. Both technical and conceptual truth are constrained by technicism. Societies that are highly technological tend to worship science and its instruments; and to the degree they sacralize it, they preclude a human-centred, sustainable, long-term understanding that is rich in moral discernment. The ethics of convergent technology confronts us with the deeper and long-term issue of normlessness in a technological age.

The technological order

This argument about today?s technological order can be made in various ways, but one prominent trajectory is that of Jacques Ellul, professor at the University of Bordeaux until his death in 1994. In addition to his classics ? The Technological Society, Propaganda, and The Political Illusion ? Ellul wrote widely in theology. His faith commitment sharpens our analysis of the issues at hand.

For Ellul, the transition to a technological society is more fundamental than anything the human race has encountered for thousands of years. Originally human life was organized around nature. Over history, our thinking at first was rooted in nature. In the Western experience, the Presocratics ? Thales, Anaximander, and Anaximenes ? debated earth, air, fire and water as origins of one another, until Socrates made human beings the centrepiece. From the garden of paradise to farming, human beings tuned their existence into the seasons, weather, the soil. Then for 6000 years, our orientation was the human world ? social institutions, community, laws, and inter-dependence.

Now, Ellul argues, we are going through a gigantic shift in which technology is our primary reference. Streets, buildings, machines, automobiles, and computers organize our lives and perceptions. The technological world is effacing the previous orders. Nature and society have become secondary environments. They are subordinate and not basic. They exist, but have little power.

The dominating milieu in which we live is a technical artifice. The everyday has a mechanical cadence. As Ellul puts it, ?The technological environment is progressively effacing the other two. Of course, nature and society still exist. But they are without power. They no longer decide our future? (Ellul, 1989, p. 134).

Obviously, there have been technologies over history. Pharoah?s chariots chased after Israel. The Romans ruled the world through highways and sophisticated armies. The wheel, hoe, water buckets ? technologies always among humans. But now we live in a technocratic regime.

For Ellul, technology must be understood in terms of Engel?s law ? as quantity increases, quality changes. A town of 1,000 is not simply on a numerical continuum to a city of 1 million. A qualitative shift occurs as numbers increase, with a village of 250 on one end fundamentally different from an urban centre on the other. While technologies have always been used, the 20th century saw a quantum shift to a different order. Ellul?s law in terms of Engel?s: From technical products to a technological system. From tools to a technological commonwealth.

In Ellul?s best known book, The Technological Society, the infrastructure conforms to la technique, the spirit of machineness. The problem for industrial nations is not technological products per se, but the mystique of efficiency that underlies them. Like heatness in red hot iron, la technique permeates everywhere. The world of means expands in size and speed. We are engineering wizards. Human ends shrivel and become mysterious. Technology confronts our philosophy of life. The technological order has become so pervasive, so overwhelming in its ubiquity, that we can contain its reach no longer.

Machineness, efficiency, the mystique of technique eat into our deepest being ? our worldviews. An unending list of short-term crises demand our attention also. But here I worry long-term about the machine as allegory ? about our attenuated philosophy of life. As an analogue of people in the technological age, grandmother?s bread is changed for today?s ovens. The instrumentalist worldview invades our spirit. The instrumentalism driving the technological age subverts our ability to make moral judgments.

True to the character of machineness, the values of productivity, power, and efficiency direct the technological process. Thus the principle of self-augmentation begins to rule, pushing technologies toward greater complexity and larger size, marginalizing small-scale activities and taking on a life of their own, no longer subject to human control. Ellul (1964) identifies a process of ever-expanding means until the very character of technology changes. Traditionally, people used a lever to move a stone. However, the prevailing paradigm at this stage in history is not humans using tools to cultivate nature and build civilization, but a technological order that engulfs us, a technocratic artifice that isolates everyday life from the natural and social realms.

To establish a systematic analysis of technology, the instrumentalist worldview must be turned on its head and inside out. The whole phenomenon ought to be called into question, and not just some of its features. New technologies that are created, produced, and used within a culture of la technique reflect its instrumentalism. Transforming the big picture enables holistic alternatives to emerge where ethics is as vital as technical prowess.

Amorality

In a technological order, where human ends and goals are squeezed out, the moral life loses its relevance. In an age enamoured of machines, life becomes amoral, without moral bearings,

devoid of moral categories. La technique and moral judgment are mutually exclusive. La technique is a guillotine, decapitating moral values. As ?in ancient days they put out the eyes of nightingales in order to make them sing better,? we skewer commitments and ethics for the machine-like imperative of efficiency (Ellul, 1976, p. 75). A calculus of averages and probabilities replaces ends, the common good, and holistic truth ? the technological order reconstituting the moral order in terms of technique.

There is immorality for sure, and specific acts are blameworthy: murder, cheating, cruelty. But amorality is even deeper; the moral life becomes alien. Moral vocabulary is not heard or understood. Not immorality per se as the primary challenge, but amorality. Not just outrage over evil, but lament that moral distinctions have no meaning. In a technocratic age, we face a crisis ? not the violation of norms first of all, but the vacuum of normlessness. Rose bushes do not grow at the North Pole and the morality of human dignity has no root in emptiness.

The United States is one example of how amorality expresses itself in advanced technological societies. The Bush Administration and U.S. Congress are currently embroiled in specific charges of corruption by high level officials ? pay off scandals to lobbyists, false testimony to grand juries, leaked information against political opponents.

Immorality is rampant, in other words, and those specific unethical behaviours are being dealt with in various ways. But the evidence of amorality in government is even more devastating and problematic long-term.

Surveillance of the public since September 11, 2001 in the name of national security is undertaken and defended in technocentric terms. The massive electronic system necessary for communication and governance in today?s world is calculated in engineering categories only. The ethical issues are buried under management techniques and bureaucratic efficiency. Technical means, procedures, decisions are made within a vast horizontal network oblivious to good and evil. The vocabulary of right and wrong disappears into data-gathering functions and mechanical imperatives.

The technological fix is a sign of amorality too. Computers in every classroom are considered a revolution, and President Bush?s ?No Child Left Behind? initiative squeezes education into a statistical grid. What Arnold Pacey (1983) calls ?virtuosity values? dominate ? speed, productivity, cost benefit ratios ? rather than dependability for human use. In fact, technology as the solution to social issues becomes a powerful heuristic, motivating scientists and freeing up economic resources. The age of technicism and amorality digitizes life. The technical knowledge of codes, signals, and matrices, DNA models, and the human genome project become our fundamental understanding of the human.

In a culture of amorality, ethical issues about the new technologies are not confronted adequately. Convergent technology presumes the total constructability of nature and human beings. Nanotechnology?s aspiration to control everything molecular is converging with information technology?s ability to quantify all data electronically. Together with biotechnology and cognitive science, they make possible a codified human world that can be engineered by scientists and robots. In an amoral society, this dehumanization is a fear around the margins, but not taken seriously on all levels, including within scientific research itself.

Ethical issues themselves are considered external to the scientific process and technological innovation: the unjust divide between technologically advanced and traditional cultures, converging technologies for battlefield domination, deskilling production and design rather than improving the quality of the workforce. When amorality prevails, concepts of good and evil disappear, and there is no resistance to the delegation of human responsibility to automated machines nor an insistence on human accountability.

Technological development is a necessity for a modern planet. But as technological systems

expand in size, speed, and power, their normative base is being undermined though needed now more than ever. Thus a conundrum: Whatever is gained in function is lost in ethics. In the process of fabricating expert mechanical systems, the world is sanitized of the moral dimension. Efficiency and morality are a contradiction in terms. As we articulate standards of accountability, we make our way in a technical environment where moral claims have little relevance.

Emeth and Aletheia

Amorality is inconsistent with a religious worldview. Religion is humanocentric instead. To think straight about path-breaking science in a technological age, we need a different platform than technical truth and technological amorality. While zealously learning about convergent technologies, faith communities contribute by resuscitating truth in our public life as a whole. And this mandate means truth of a particular kind.

Truth is not accuracy or precise data first of all, but emeth and aletheia ? disclosing the authentic, seeing beneath the surface. For emeth in the Hebrew scriptures, the true is genuine and trustworthy. For aletheia in the New Testament, to speak the truth is to open up the inside, to disclose the heart of the matter.

Truth means to penetrate through to the issues, to go beyond the technical dimension and illuminate the fundamentals. ?Truth means to strike gold, to get at the core, the essence, the nub, the heart of the matter? (Pippert, 1989, p. 11). For Augustine in the fourth century, Professor of Rhetoric at Milan and later Bishop of Hippo, truth is not fact alone, but the truth shows moral discernment. Truth is not value neutral, but motivates us to believe. Truth is not algorithms or the facts only, but includes their context of meaning.

The truth as disclosure ? emeth and aletheia ? cuts through today?s technological phenomenon to the basic issues underneath. Thus Ellul understands the technological order in terms of the instrumentalism it represents. The values underlying the technological enterprise need to be identified. We are truthful when we disclose the instrumental worldview, that is, the engineering prowess, technical efficiency, and the expertise that underlie specific technologies. We not only speak the truth about technology as an instrument, but disclose authentically what worldview it presumes.

Technology in Ellul?s alternative model is an ontological issue. Humans do not stand in external relation to technology as the West has assumed since Aristotle, but it is intertwined with being. Its character can be understood only by coming to terms with the human species. The traditional view equates technology with tools as artefacts, with products. In Ellul?s tradition, technology is not a noun, but a verb, a cultural process through which human existence is established.

Technology and people stir through one another like a giant food mixer. Technology is not merely the application of science, but an artistic mode of social construction. Technological practice is a creative process similar to poetry or sculpture. The meaning is not rooted in satisfying basic needs, but in the human concern to stake out existence.

Conclusion

Speaking the truth, getting to the heart of the issue, is enormously difficult in a technocratic age. Penetrating beneath the technical is hard under any circumstances, and especially with sophisticated technologies such as the new ones converging today. The overwhelming power of instrumentalism tends to trap technologies within its efficiency, insisting that we be satisfied with means rather than ends.

Our task in response is prophetic witness. In Abraham Heschel?s (1969-71) monumental study, Hebrew prophets are not doomsayers or self-righteous moralizers. History is not a derelict arena where a lonely species struggles for survival. Evil has no independent life of its own; it is a

parasite living off a good creation. Prophets cut through the surface to the issue underneath, but always with a constructive ambience. Their purpose is empowerment through disclosing the truth, not flagellation for its own sake.

There are precious few oases for truth in a technoculture of inauthenticity. The best we can manage is ongoing struggle with no guarantee of success. Our only credible mission is prophetic appeals for authentic disclosure. Through the truth we respond to the human yearning for a lever long enough to move the earth.

The truth as emeth and aletheia is our common task on every level. Among people of faith, and in everyday conversation in communities everywhere, truth as authentic disclosure will either flourish or wither. As we enable truth to prosper, we will do our scientific research and make decisions about genetic defects, hydrogen networks, nerve cells, and brain implants in a way that honours God and humanity. Our challenge is nurturing a non-instrumentalist worldview, so that ethics will flourish within science at the frontiers.

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