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SOME ETHICAL AND PUBLIC POLICY IMPLICATIONS OF TECHNOLOGICAL

DEPENDENCY WITH REFERENCE TO INNIS, MCLUHAN AND GRANT

A Thesis

Presented to

The Faculty of Graduate Studies

of

The University of Guelph

by

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In partial fulfilment of requirements

for the degree of

Doctor of Philosophy

January 1999

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Canada

ABSTRACT

SOME ETHICAL AND PUBLIC POLICY IMPLICATIONS OF

TECHNOLOGICAL DEPENDENCY

WITH PARTICULAR REFERENCE TO THE WORKS OF

HAROLD ADAMS INNIS, MARSHALL MCLUHAN AND GEORGE GRANT

James B. Gerrie   Advisor:
University of Guelph   Professor J. Newman

This thesis is an investigation of an alternative
interpretation of certain aspects of the intellectual legacy of
three influential Canadian academics: Harold Innis, Marshall
McLuhan, and George Grant. Arthur Kroker's seminal work on these
three figures emphasizes the dissimilarities of their positions
on the ethical and public policy implications of technology.
According to Kroker McLuhan is a more optimistic herald of the
new information age, Grant is a dark prophet of technological
society, and Innis a practical-minded intermediary between these
two possible visions of technological society. This
investigation, in contrast, argues that a greater fundamental
unity can be found in their varied responses to the ethical
challenge of technological dependency, and that their responses
are significantly more critical of technological development than
Kroker acknowledges.

This inquiry focuses on the issue of technological
dependency. According to Innis, McLuhan and Grant an adequate

ethical approach to technology must be capable of dealing with the bias towards technological practice that our dependence on technological practice helps set up. Without awareness of this kind of technologically induced bias any ethical approach to technology, including those which seek to be critical of technological development, can actually help support unquestioned technological expansion. Although Innis, McLuhan and Grant are unique in their individual expressions of the nature of technological bias, each warn that a bias towards technological practice can even threaten philosophical attempts to properly address the issue of technological dependency.

Taken together what emerges from their varied insights into the nature of technological dependency is a unique approach to the ethical control of technology. This approach seeks to bridge the divide between pro- and anti-technological attitudes towards technology. This dissertation seeks to clarify this ethical approach and explore its implications for contemporary public policy analysis.

ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. Jay Newman, for his critical insight, patience, and wisdom in guiding me through this dissertation and for his thoughtful encouragement and humour, which always came at the right time. I would like to thank Dr. William Hughes for being a mentor to me for all my years at the University of Guelph. I would also like to thank my friends, Dr. Adam Dodd and Dr. Steven Haller for being so willing to discuss technology over and over again. Finally, I would like to thank my wife, Patty and my parents for never wavering in their support.

Fool, and the heart and spirit in him could

not understand how the glorious gifts of the

gods are not easily broken by mortal men, how

such gifts will not give way before them.

Homer, _The Iliad_ 20:265.

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INTRODUCTION

The purpose of this study is to clarify certain aspects of
the relation between public policy making and technology. One of
the most important questions at the heart of this relation is the
ethical question of how technology should be controlled. There
have been many philosophical attempts to answer this question.
The focus of this inquiry is the point of connection between
providing a theoretical answer to this question and putting such
theory into action. When it comes to the practical application
of theory for guiding public policy about the control of
technology new questions emerge: In a technological culture,
will not the practical applications of ethical theory about the
control of technology tend to take technological form such as new
methods, institutions, predictive techniques and administrative
modifications? If this is the case, is one not forced to
conclude that the practical technological applications that
emerge from the theories about the control of technology will
have to be subject to the same criteria of assessment and
restriction that are laid down in these theories?

This predicament makes the task of fashioning public policy
based on ethical theories about technology more difficult. For

example, if a practical recommendation that emerges from one's theory is that some institution for assessing proposed technologies should be created, will not this institution itself have to undergo the process of assessment? But if one's theory has been what has led to the recommendation for such an institution, can this theory be trusted for the assessment of its own recommendations? Will not the recursive implications of this whole situation, added to the already complex interconnections of the vast array of technologies, make the process of fashioning unbiased political mechanisms for addressing technology a futile task? Is such a project even what is most called for by our times? As Langdon Winner describes what he feels is most distinctive about life in the modern world:

> To be commanded technology must first be obeyed. But the opportunity to command seems forever to escape modern man. Perhaps more than anything else, this is the distinctly modern frustration.[1]

In a technologically dynamic culture, any ethical theory about controlling technology which does not consider the issue of our dependence on technology risks succumbing to this dependency.

This investigation will focus primarily on the theoretical approaches to technology's relation to public policy explored by Harold Adams Innis, Marshall McLuhan and George Grant. The issue of technological dependency was for them a central philosophical

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[1]Langdon Winner, Autonomous Technology: Technics-Out-of-Control as a Theme in Political Thought (Cambridge: The MIT Press, 1977), 262.

issue of their long and distinguished academic careers and a
certain ethical approach to this issue can be extrapolated from
their work. It is my belief that this approach might be helpful
in addressing the issue of technological dependency. I am not
alone in my belief that these three figures taken together have
something useful to say about the challenge of technology.
Arthur Kroker has written:

> But if, <u>considered separately</u>, the brilliant
> perspectives of Innis, McLuhan and Grant provide
> privileged accounts of different dimensions of the
> technological experience, then, <u>taken together</u>, these
> viewpoints represent the major positions which might be
> adopted today on the question of technology. The
> discourse on technology, as expressed by the clash of
> perspectives among Grant, McLuhan and Innis, has an
> intellectual, and political, significance which extends
> well beyond the Canadian circumstance.[2]

However, unlike the position developed by Kroker in his seminal
work on Innis, McLuhan and Grant, this inquiry seeks to emphasize
certain points of similarity in their approaches to technology.
This inquiry is therefore partially expository in nature. Part
of my purpose will be to adequately interpret the insights about
technological dependency shared by these three thinkers and to
argue for the soundness of this interpretation. However, the

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[2]Arthur Kroker, <u>Technology and the Canadian Mind:</u>
<u>Innis/McLuhan/Grant</u> (Montreal: New World Perspectives, 1984), 18.

primary purpose will be to make a preliminary exploration and defence of the approach we will derive from this interpretation. This will include exploring supporting arguments which can also be extrapolated from the work of Innis, McLuhan and Grant.

Our three guides share a belief that technology pervades every aspect of our lives. Their works are also peppered with images of dependence to describe technology's influence; for example, McLuhan sees technologies as "environments" which can "massage" us, Grant says that "In each living moment of our waking and sleeping, we are technological civilization," and Innis writes of "monopolies of thought" and the "bias of communication" and the central role technological factors play in shaping entire civilizations.[3] My hypothesis is that a seminal concept that emerges from their discussions is that the ethical challenge of technology is not just about working out theoretical difficulties for the making of ethical choices about specific technologies, but also overcoming our practical dependence on technology as a whole to an extent that such theoretical discrimination can properly take place. Leslie Armour has argued that the issue of overcoming bias is at the core of the thought

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[3]Marshall McLuhan, Understanding Media: The Extensions of Man (New York: McGraw-Hill, 1964), viii.

Marshall McLuhan, The Medium is the Massage, with Quentin Fiore and produced by Jerome Agel (New York: Touchstone Books, 1989)

George Grant, Technology and Justice (Toronto: House of Anansi Press, 1986), 11.

Harold Adams Innis, The Bias of Communication, with introduction by Marshall McLuhan (Toronto: University of Toronto Press, 1964), 34.

of Innis:

> This was the problem which so greatly exercised Harold
> Adams Innis in his last years, and the problem which
> threatens to checkmate any social theory: for, if
> knowledge itself is conceived in such a way as to play
> into the hands of the existing social structure, no
> increase in knowledge can bring with it the possibility
> of reform.[4]

The interpretation being argued here is that for these three thinkers the issue of bias was not simply an issue of theoretical concern. Innis, McLuhan and Grant all indicate that the process of making ethical decisions about technology in any highly technological culture must involve overcoming practical as well as theoretical biases. Clarifying our theoretical ethical intentions might not be enough if we do not also challenge dominant modes of technological behaviour. However, our three guides also all present reasons to hope such bias can be adequately redressed. A distinctive ethical approach is called for by the thought of Innis, McLuhan and Grant which takes into account the typical character of action in a dynamic technological civilization. It will be our ultimate task to understand this approach.

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[4]Leslie Armour, The Idea of Canada (Ottawa: Steel Rail Publishing, 1981), 76.

Technological Dependency and The Impasse

Yet, this task is itself problematic because, as our three guides also suggest, the technological currents of our society can run so deep they can even tempt us to seek technological solutions to the problem of the technological bias of our society. Grant in particular argues that such willingness is the greatest threat to public policy making. Commentators have noted that Grant, like Jacques Ellul, appeared to view technology as a "comprehensive destiny", or "tight circle" from which there was no possibility of escape.[5] Dennis Lee called Grant's response to the apparent inescapability of technological thought and action, "Grant's Impasse."[6] What Grant means by a tight circle of technology seems to have some similarity to Marshall McLuhan's emphasis on the extreme difficulty of maintaining critical awareness of the technologies we use because they are such intimate extensions of who we are, almost like parts of our own body. Further, it seems similar to Innis' claim that new

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[5]Ian Box, "George Grant and the Embrace of Technology" Canadian Journal of Political Science 15 (September 1982): 503-515.
Also See:
    William Mathie, "The Technological Regime" in George Grant in Process: Essays and Conversations, ed. Larry Schmidt (Toronto: House of Anansi Press Ltd, 1978), 86.
    John Badertscher, "George P. Grant and Jacques Ellul On Freedom in Technological Society" in George Grant in Process, 86.
    Peter C. Emberley, "Values and Technology: George Grant and Our Present Possibilities," Canadian Journal of Political Science 21, 3 (1988): 466.

[6]Dennis Lee, "Grant's Impasse," in By Loving Our Own: George Grant and the Legacy of Lament for a Nation, ed. Peter C. Emberley (Ottawa: Carleton University Press, 1990), 11-42.

technologies always create monopolies of thought which are extremely difficult to break down. The central question of Grant's analysis of technology is that, considering the emphasis placed in Western societies on technological problem solving, how can one make judgements about technology which are not unduly biased by this emphasis? Or as Hans Jonas has said, "If nothing succeeds like success, nothing also entraps like success."[7] If our ethical judgments are to be authentic, they must address the issue of technological bias.

The unquestioned acceptance of technological change is the core of the dilemma of technological dependency. In a recent article in Maclean's magazine, for example, one finds the following statement: "The fast pace of technological change makes it imperative that employees continue to learn throughout their careers."[8] Instead of people determining the shape of technological change, Western civilization seems to have reached a point where it is taken for granted that technological change should determine the shape of people's lives. Immense prestige is granted to technological innovation in modern Western culture. As Ursula Franklin has pointed out, "Today the values of technology have so permeated the public mind that all too frequently what is efficient is seen as the right thing to do."[9]

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[7] Hans Jonas, The Imperative of Responsibility: In Search of an Ethics for the Technological Age (Chicago: University of Chicago Press, 1984), 9.

[8] Barbara Wickens, "Doing What It Takes," Maclean's Magazine, 27 June 1994, 33.

[9] Ursula Franklin, The Real World of Technology (Toronto: CBC Enterprises, 1990), 123.

In such a situation, how can one be expected to adopt courses of action that will be critical of technological development?

In the examination that follows we will explore, with the aid of our three primary guides and others, the claim that we can become prey to an attitude which leads to an unconscious privileging of a technological approach to the technological challenges we face. The result is that when an issue like global warming is politically addressed the main response will inevitably be something like the promotion of electric cars.[10] Or when public concern grows about declining literacy, something which may be in no small part due to television and movies becoming, as McLuhan puts it, our "new literature,"[11] the main response of educational establishments will inevitably be to create remedial literacy programmes, often involving new media, created and managed by legions of experts.

Only infrequently in contemporary Canadian society does one see critical inquiry into the role that technology has played in creating problems. Our times are not unique in this respect. The dearth of examples in Western history as a whole of the reconsideration of technological actions leads Marshall McLuhan to remark:

> It is one of the ironies of Western man that he has
> never felt any concern about invention as a threat to

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[10] Dieter Zetsche, "The Automobile: Clean and Customized," Scientific American 273, 3 (September 1995): 102-106.

[11] Electronic Learning, (May/June 1992): 22-25. "School Reform: Why You Need Technology to Get There."

his way of life. The fact is that, from alphabet to the motorcar, Western man has been steadily refashioned in a slow technological explosion that has extended over 2500 years.[12]

Therefore, according to McLuhan, from an historical perspective Western civilization exhibits all the characteristics of having a "drug habit."[13] Relief from the various symptoms of the addiction are dealt with by the abuse of ever more potent doses, until the patient either spirals into oblivion or kicks the habit.

However, as we will see, it is neither the position of McLuhan, nor that of Innis and Grant, that technology itself should be "kicked." As Grant says:

> Modern human beings since their beginning have been moved by the faith that the mastery of nature would lead to the overcoming of hunger and labour, disease and war on so widespread a scale that at last we could build the world-wide society of free and equal people. One must never think about technological destiny without looking squarely at the justice in those hopes. Let none of us who live in the well-cushioned west speak with an aesthetic tiredness about our 'worldliness'.[14]

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[12]McLuhan, Understanding Media, 270.

[13]Ibid., 66.

[14]Grant, Technology and Justice, 15.

In the discussion that follows we will consider whether there is an unconscious bias for Western people to overlook possibilities for the critical examination of technologies. We can catch sight of such a focus in Grant's observation that technological civilization is trapped in a tight circle or destiny, in McLuhan's warnings against focusing on the messages sent by the media while ignoring the personal and social effects of our use of the media itself, and Innis' well known attacks on various monopolies of knowledge.[15]

A central question addressed by all three of our primary guides is: If Western civilization has become so thoroughly technological in outlook, what can and should be done to address this situation which does not simply conform to this outlook? In distinctive ways they each warn us that even if we were to gain some awareness that technological action was overemphasized by oneself and others, the most natural response to this situation might still be a technological response. Like an addict, one could always hide from the effects of recognition of the problem of one's addiction by using more of what one was addicted to. What then can be done to address this situation? This last question is the question at the core of the dilemma that we will call the Impasse, borrowing the term coined by Dennis Lee to describe this conundrum as faced by Grant. Even thinkers as dedicated to the investigation of technology as Innis, McLuhan

[15]Mel Watkins, "The Intellectual Journey of Harold Innis," Innis Research Bulletin 1 (May 1994): 8-9.

and Grant were uncertain about what an effective unbiased
response to our cultural predicament might be like. They were
not alone in such uncertainty. As Herbert Marcuse, a member of
the Frankfurt School, describes what he felt was the central
dilemma of the modern age: "How can the people who have been the
object of effective productive domination by themselves create
the conditions of freedom?"[16]

Such a dilemma is especially frightening because the human
species might be quickly reaching a point where the reflective
consideration of technological practices will simply cease to be
an option; for instance, the human population of the planet may
reach a point where we could no longer even consider changing
environmentally damaging ways of producing food without having to
face catastrophic food shortages. And yet, as Mario Bunge states,
"overpopulation is the effect of sharply increased food
production and the spread of modern health care facilities."[17]
This is only one of a growing number of complex dilemmas that
certain technological practices have helped set up which can seem
solvable only by the expansion of technological power. And yet
many are also reaching a point where they are beginning to
question the expansion of technological power. The human race is
in a quandary, from which neither blind technological optimism

[16]Herbert Marcuse, One Dimensional Man: Studies in the
Ideology of Advanced Industrial Society (Boston: Beacon Press,
1964), 6.

[17]Mario Bunge, "Can Science and Technology Be Held
Responsible For Our Current Ills?" Research in Philosophy and
Technology 7 (1984): 21-22.

nor a nostalgic yearning for a simpler past would seem adequate responses.

Other philosophical critics of technology, however, are more optimistic about the challenges facing our civilization. They see most of the criticism of technology and technological civilization as arising from either nostalgia or a fear of change. What these more pro-technological thinkers feel is most required is to bend one's efforts more diligently to the task of seeking novel means to control the negative effects of technological development. Those who take this perspective generally "are convinced that all technologies are merely neutral tools and that the only valid question that an intelligent, honourable person could debate is that of wise and unwise use."[18] Their outlook is that people should simply get on with the job of putting technologies to good use.

Each of our guides warns that such a pragmatic and constructive approach is fraught with danger. Extrapolating from their insights into technological dependency, the argument that will be made is that an essential supplementary task to that of making ethical discernments about technologies is to understand the nature of one's dependence on technology. The challenge of technology should not be looked upon only as a matter of picking the right instruments to achieve desired ends, because one must never fail to be aware of the role that technology plays in shaping one's perception of ends. We will examine the arguments

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[18]Winner, Autonomous Technology, 225.

that the perspective of the technological pragmatist, without

such an awareness, can actually contribute to the uncritical

acceptance of the growth of technological power. An analysis of

the varied thoughts on the matter of technological dependency of

our three primary guides will reveal that we need a better

philosophical understanding of the connection between technology

and culture and the "interweaving of technique and ethical

action."[19]

Avoiding the Impasse

In this investigation I will seek to develop a general

philosophical framework for approaching the ethical consideration

of technology based primarily on an examination of the works of

Innis, McLuhan and Grant. Our society has tended to adopt a

narrow approach to dealing with the ethical issues emerging from

the use of specific technologies. The general expectation is

that philosophers and policy analysts should act as a sort of

ethical fire brigade which can be called out after certain

problems get out of hand. The expectation is that such experts

should write papers and suggest courses of action only after a

specific technology has been developed and implemented, and

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[19]Ian H. Angus, George Grant's Platonic Rejoinder to
Heidegger: Contemporary Political Philosophy and the Question of
Technology, Symposium Series Vol. 23 (Lewiston: Edward Mellen
Press, 1987), 108.

glaring problems have arisen.[20] But if the ecological crisis is as encompassing as is claimed, then such a piecemeal and belated approach clearly is inadequate. And, in fact, such an approach would itself fall under the general pattern of technological dependency we will be examining. Such a perspective involves relying on experts to solve one's problems instead of oneself.

The stance which will become clear in this investigation is that there are certain ethical considerations that must be taken into account when engaging in practical efforts to ethically address and control technology. Innis, McLuhan and Grant, however, do not outline specific programmes for the guidance of our ethical choices about technology. Nor do they lay down particular public policy guidelines for the assessment and use of technologies. Rather, they each point to a general predicament of which every member of technological civilization should be aware when trying to think critically about technology. So although the expression "public policy" appears in the title of this study, this study is not itself a work of public policy analysis but rather a study of certain aspects of technology which have implications for ethics and public policy making.

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[20] "People searching for answers to ethical questions are turning to professional 'ethicists.' It's a booming field because there is a renewed interest in an old idea—doing the right thing. In a world spinning so fast that it has shaken loose the ties that bind—religion and politics—recognizing the right thing is not as easy as it once was."
Mike Blanchfield, "In Good Conscience: Ethicists Help Balance Technology with the Right Thing to Do," Kitchener-Waterloo Record, 15 October 1996, F1.

The approach we will extrapolate from the work of Innis, McLuhan and Grant involves becoming acutely conscious of one's participation in technological action. This approach draws on certain aspects of their writings which have largely been ignored by other commentators. With the help of others we will show how this approach to ethics and public policy making can avoid the pitfalls of technological dependency. We will see that the approach avoids these pitfalls because it is not itself a technological approach. It is simply the reflective exploration of what it means to be a technological being and consideration of the exercise of ethical self-limitation of technological power in the light of this exploration. We will see how reflecting on the biases of technological civilization and what we have called the Impasse can lead one to include a search for ways of acting which are not technological in nature in one's response to the challenges of technological civilization.

CHAPTER 1: THE CHALLENGE OF TECHNOLOGY

The Challenge of Technology

While many contemporary social issues are tied up with technology, the exact role that technology plays in many of these issues can sometimes be a contentious issue in itself. Some philosophers argue that technologies are merely neutral instruments which play only a subsidiary role in the problems facing the world today.[1] However, this view has increasingly come under attack. Most contemporary philosophers of technology now agree that technology is so intimately connected with human practice that its role in issues of social concern must be addressed.[2]

The issues of social concern dealt with in the field of philosophy of technology can be divided into two broad categories. The first category involves concern over technology's negative environmental consequences. The second category involves concern over technology's negative social or personal consequences. Most philosophers of technology base their ethical critiques of technology in one or the other of

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[1]"Now science and technology are not persons. Hence they are neither praise-worthy nor blameworthy."
    Mario Bunge, "Can Science and Technology Be Held Responsible For Our Current Ills?" Research in Philosophy and Technology 7 (1984): 19.

[2]See: Eric Higgs, "Musings at the Confluence of the Rivers Techné and Oikos," Research in Philosophy and Technology 12 (1992): 243-258.

these types of concern.[3] Innis, McLuhan and Grant, however, point beyond concerns with consequences to a concern with the nature of technological activity itself. For them, technology must be understood and controlled not primarily because of its negative effects but because of the role it plays in the process of defining goals for ourselves as individuals.

To put the distinction another way, the most important question for these three thinkers is not how we should control technology or particular technologies but what place technology should have in one's life. Innis in his "plea for time" argues that the struggle to achieve balance between the technological forces shaping society is ultimately not only a political but also a personal struggle.[4] There is for him no belief, such as that of Ivan Illich, that some ultimate criteria such as "conviviality" can be found for the formal judgement of

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[3]Hans Achterhuis recounts how Hannah Arendt's analysis of the threat of technology changed between 1958 and 1975, which provides a good example of how the scope of contemporary philosophical concern about technology has expanded in the last half century. Achterhuis recounts: "[For Arendt in 1958] 'The World' which she talks about, is the human artifice which is an enclave within nature. To her sustainability is concerned with the permanence of that world which is being damaged, and not with the sustainable carrying capacity of nature. . . . Not until 1975, faced with the symptoms of the environmental crisis becoming continually more clear, did she recognize that the modern economy was destroying and consuming not only the human world, but also nature."
Hans Achterhuis, "The Lie of Sustainability," in Ecology, Technology and Culture, ed. Wim Zweers and Jan J. Boersema, translated by Miriam Hall (Cambridge: The White Horse Press, 1994), 200.

[4]Quoting Wyndham Lewis, Innis asks, "And is there a valuable reality which is not concrete and individual?"
Innis, The Bias of Communication, 90.

technologies.   Illich describes such a plan as follows:

> As an alternative to technocratic disaster, I propose
> the vision of a convivial society. A convivial society
> would be the result of social arrangements that
> guarantee for each member the most ample and free
> access to the tools of the community and limit this
> freedom only in favour of another member's equal
> freedom.[5]

In contrast, for Innis there is only an enduring struggle for

individuals to maintain some form of balance between constructive

and destructive technological forces in the context of an ever

changing cultural setting created by new forms of technological

practice. The question of interest for Innis is why people

shrink from this task; why so many tend not to judge their

participation in certain practices to the point that these

practices become "monopolies of knowledge"--narrow and familiar

channels of thought and action. Unfortunately, as one

commentator notes about Innis' legacy, "[his] claims that science

and technology themselves eventually might become a social

problem were largely discounted."[6]

Such interest in technology itself, as opposed to effects,

is also a characteristic of the thought of McLuhan and Grant.

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[5]Ivan Illich, _Tools For Conviviality_ (London: Harper & Row,
1973), 12.

[6]David Crowley, "Harold Innis and the Modern Perspective of
Communications," in _Culture Communication and Dependency: The
Tradition of H.A. Innis_, ed. William Melody, Liorar Salter, Paul
Heyer (Norwood: Ablex Publishing Corp., 1981), 242.

McLuhan is remembered for his attempt to make people aware of the ways their technological actions shape themselves as well as whole societies. As McLuhan puts it, punning on his famous catch phrase, "the medium is the _massage_."[7] As noted by a number of commentators, after the publication of his first book his interest was not in elucidating a theory for guiding ethical choices about technologies but in making people aware of their technological commitments.[8] And also for Grant, the interesting question concerning technology was not how to judge but why people tend not to judge. He contrasts the attitude of Robert Oppenheimer's statement, "when you see something that is technically sweet, you go ahead with it," with the attitude of the old Latin adage "_a posse ad esse non valet consequentia_," just because something can be done does not mean it should be done.[9] Grant takes Oppenheimer's statement as being

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[7]Marshall McLuhan and Fiore Quentin, The Medium is the Massage (New York: Bantam Books, 1967) [My emphasis]

[8]"It is easy to understand why the new McLuhan would have felt uncomfortable with the product of the old, for the Mechanical Bride takes an explicit moral stance which the author with minor exceptions was never to take again."
Dennis Duffy, Marshall McLuhan (Toronto: McClelland and Stewart, 1969), 12.
"He was soon to discover that the automatism portrayed in The Mechanical Bride was yielding to a new tribalism. The study of this new tribalism would strip the last traces of moral earnestness from his prose and immerse him completely in the role of explorer, the relentless seeker of insights unhindered by the striking of moral attitudes. . . . He had instead discovered Technology."
Philip Marchand, Marshall McLuhan: The Medium and The Messenger (Toronto: Vintage Books Edition, 1990), 110-111.

[9]Grant, Technology and Justice, 33-34.

representative of the attitude that most people have towards
technology.

Philosophers and social scientists have been exploring the
topic of technology for some time now. However, instead of
finding increasing consensus about technology, one finds instead
"a growing collection of conflicting interpretations."[10] Even
Bertrand Russell, generally an ardent supporter of social
progress, could express some ambivalence about technology:

> Life is a brief, small, and transitory thing. . . . But
>
> it is all monkish and futile--so scientific man will
>
> say--to dwell on such cold and unpractical thoughts.
>
> Let us get on with the job of fertilizing the desert,
>
> melting Arctic ice and killing each other with
>
> perpetually improving technique. Some of our
>
> activities will do good, some harm, but all alike will
>
> show our power.[11]

Faith in technological progress has come under severe attack in
this century. An increasing number of thinkers now point to the
dangers that emerge from the power of modern technology and few
would deny that technological change is intensifying in most

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[10]Guy V. Beckwith, "Science, Technology, and Society:
Considerations of Method," Science, Technology and Human Values
14 (Autumn 1989): 325.
    Also See: Joseph Margolis, "Three Conceptions of Technology:
Satanic, Titanic, Human," Research in Philosophy and Technology 7
(1984): 145-158.
    Don Ihde, "Technology, Utopia and Dystopia," Research in
Philosophy and Technology 6 (1983): 107-125.

[11]Robert E. Egner, ed., Bertrand Russell's Best: Silhouettes
in Satire (New York: Unwin Books, 1975), 145.

societies. Some people have begun to wonder if technology can continue to contribute to the improvement of the human condition without potentially prohibitive costs in terms of human freedom and the integrity of the natural environment. Again and again, these two types of concern emerge in the critical literature on technological civilization.

Examples of the first type of concern include worries about unemployment caused by automation, the distortion of truth in the communications media, privacy, alienation, urban blight, stress, bureaucratization, the destruction of minority cultures, and the ethical dilemmas raised by developments in medicine and biotechnology. Newspapers and magazines are filled with stories relating the impact of technology on our society. The following extract from an article in Maclean's magazine is typical:

> The star workers of a modern auto assembly line are not
> human. They are machines. Strong robotic arms
> tirelessly swing body panels into position. Relentless
> robot fingers dart out to weld joints, never missing,
> never flailing helplessly in the empty air. And
> machines are almost as smart as they are brawny.
> Computers run the assembly line, making sure that at
> each of the hundreds of stops, precisely the right
> parts arrive just in time to meet up with the auto for
> which they are intended as it wends its way to the end

of the line.[12]

The impact of the application of automation technology has a broad range of devastating effects on people's lives.[13] We are all familiar with euphemisms such as "re-engineering" and "restructuring" which describe the ongoing impact of automation. And automation is only one of an almost immeasurable range of technological changes affecting the structure of our society. As Elting E. Morison has expressed his concern in this area,

> We are well on the way in our timeless effort to bring
> the natural environment under control, to replacing it
> by an artificial environment of our own contriving.
> This special environment has a structure, a set of
> tempos, and a series of dynamic reactions that are not
> always nicely scaled to human responses. The
> interesting thing seems to be whether man, having
> succeeded after all these years in bringing so much of
> the natural environment under his control, can now
> manage the imposing system he has created for the
> specific purpose of enabling him to manage his natural
> environment.[14]

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[12]Brenda Dalglish, "Looking for Work," Maclean's Magazine, 23 January 1995, 11.

[13]See chapter five of Emile Durkheim's, Suicide, for a discussion of the influence of economic displacement on suicide rates, and James E. Coté and Anton L. Allahar's Generation on Hold: Coming of Age in the Late Twentieth Century for a discussion of automation's effect on the process of growing up.

[14]Elting E. Morison, Men, Machines and Modern Times (Cambridge: The MIT Press, 1966), 16.

At the core of the first category of concern is the direct effect of technological change on people's lives.

In the second category of concern are all of the problems related to the degradation of the natural environment. It is becoming increasingly clear that technology plays an important role in the global environmental crisis. As Don Ihde puts it, "The amplifying/magnifying power of technologies, in the late twentieth century, has brought to the fore the human-technological power of a geological force."[15] The depletion of the ozone layer, global warming, air pollution, soil degradation, and the disposal of nuclear waste are all examples of environmental problems related to the use of technologies. The "environmental crisis" is the phrase most often used to describe this area of concern.

Responses to the Challenges of Technology

Two dominant strains of thought in the field of philosophy of technology which deal with the challenges of technology can be grouped under the titles: appropriate technology and technology assessment.[16] In these two approaches the primary focus is on dealing with the negative effects of technologies. As Juan Rada

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[15]Don Ihde, Philosophy of Technology: An Introduction (New York: Paragon House, 1993), 51.

[16]See: Paul T. Durbin and Friedrich Rapp, eds., Philosophy and Technology. Boston: D. Reidel Publishing Company, 1983.
    Over one quarter of the articles in this compendium of philosophy of technology research are dedicated to the discussion of technology assessment and appropriate technology.

expresses such a focus in reference to the impact of information
technology on society,

> Information technology is a reality, and a rapidly
> expanding one. Therefore, the question is how to
> master the changes and deal with the issues it raises
> to the best advantage for development strategies. It
> will be necessary to learn how to harness current
> changes, while avoiding the undesirable effects of the
> technology. Microelectronics-based innovations can be
> of great benefit, if properly applied.[17]

Or as Henry Wiseman more generally describes the understanding of
the challenge of technology that guides technology assessment,
"Shall we trust our future to a drifting interplay of forces, to
the genius of technological invention and mechanistic social
design, or will society chart the course so that technologies
will truly serve the needs of humanity at large?"[18] The
challenge of technology for those who support technology
assessment is, at its most basic, according to Stanley R.
Carpenter, "a search for strategies for mitigating unwanted side
effects."[19]

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[17]Juan Rada, "A Third World Perspective," in <u>Microchips With
Everything: The Consequences of Information Technology</u>, ed. Paul
Sieghart (London: Comedia Publishing Group, 1982), 45.

[18]Henry Wiseman, forward to <u>Ethics and Technology</u>, ed. Jorge
Nef, Jokelee Vanderkop, and Henry Wiseman (Toronto: Wall and
Thompson, 1989), vii.

[19]Stanley R. Carpenter "Technoaxiology: Appropriate Norms
for Technology Assessment," in <u>Philosophy and Technology</u>, ed.
Paul T. Durbin and Friedrich Rapp, 115.

Appropriate Technology

According to those who endorse an appropriate technology approach the main challenge of technology is determining and implementing proper ethical guidelines for technological development. Appropriate technologists are generally concerned with ensuring that all relevant value considerations are taken into account in the process of technological development. Writers such as E.F. Schumacher, Ivan Illich, Ursula Franklin, and Don Ihde all contend that the reason many technological developments fail is because relevant value considerations have been excluded from the development process.

According to the appropriate technologist, negative environmental and social impacts emerge when technological development is guided by inappropriate values. Ivan Illich's book Tools for Conviviality and Schumacher's Small is Beautiful are two well known presentations of such a case. Each of these thinkers gives a different characterization of what is wrong with the dominant values behind most technological development. For Schumacher, the negative side effects are a function of an inappropriate sense of scale that guides the design of many technologies in Western culture. His advice is to design technologies to fit needs rather than wants. For Illich, the negative side effects are a function of the "non-convivial" character of the values that guide the design of many technologies. According to Illich,

There are two ranges in the growth of tools: the range

within which machines are used to extend human

capability and the range in which they are used to

contract, eliminate, or replace human functions. . . .

Survival depends on establishing procedures which

permit ordinary people to recognize these ranges and to

opt for survival in freedom, to evaluate the structures

built into tools and institutions so they can exclude

those which are destructive, and control those which

are useful.[20]

An important goal for appropriate technologists is to develop

procedures that will ensure that people have access to the

process of technological development. The idea is to make sure

that the values of those affected by technological developments

are properly accounted for.

Although what is perceived to be inappropriate technological

development varies among appropriate technologists, the common

concern is with ensuring that people besides technicians have

access to the development process. As Don Ihde puts it, "the

place and position for generally helping change is at a much more

basic level--it is at the level of development itself,

particularly of technological development. Here few philosophers

dare tread."[21] Ihde suggests that Hubert Dreyfus' book, What

Computers Can't Do (1972), is a rare but insightful example of a

philosopher having a positive impact on technological development

[20]Illich, Tools for Conviviality, 92.

[21]Ihde, Philosophy of Technology, 140.

when "a new generation of designers began to take his critique—
and his implicit alternative models—seriously."[22] Dreyfus'
critique of the attempts at developing artificial intelligence
(AI) spurred designers to embark on new and fruitful avenues of
inquiry. According to the appropriate technologist, procedures
can be developed that allow for the influencing of technicians
and developers so as to prevent technologies with negative
impacts from being developed in the first place. The
technologies that would emerge from such an improved process of
technological development would be appropriate technologies
because their creation would be guided by the relevant values of
all involved and not just the criteria of technicians.

Technology Assessment

The emphasis in technology assessment is not on influencing
the design process but on properly understanding the effects of
the products of this process. Much that has been written about
the assessment of technologies assumes that the development of
the technology under assessment has already occurred. As we can
see from examples of the practical applications of the technology
assessment approach, such as environmental impact studies, the
emphasis tends to be on understanding and assessing the potential
impact of the implementation of well-established types of
technology, such as hydro-electric dams. This emphasis has led
to the criticism that technology assessment does not go far

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[22]Ibid., 141.

enough because "technology assessors seem inclined to treat contemporary industrial technology as a fait accompli."[23] However, there are technology assessors who believe that an assessment process can also be applied at the earliest stages of development. As Friedrich Rapp points out,

> the lesson of history is that once the first step has been taken, development cannot be stopped; global scientific, technological, and economic systems of exchange and competition guarantee that whatever has become standard will very soon spread all over the world. For this reason, it is easier and safer to stop before getting started than it is to slow development already in progress.[24]

Rapp's argument is that it might be necessary for technologies to be assessed at the earliest conceptual stage. According to him the actual technology does not need to developed to be assessed. Only the projected function of the desired technology must be understood. Once the general function is known, one can begin the process of projecting and assessing the potential impacts so that better decisions can be made. In technology assessment the focus is on assisting and improving the process of technological

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[23]Stanley R. Carpenter, "Technoaxiology: Appropriate Norms for Technology Assessment" in Philosophy and Technology, ed Paul T. Durbin and Friedrich Rapp, 115.

[24]Friedrich Rapp, introduction to Philosophy of Technology: Practical, Historical and Other Dimensions, ed. Paul T. Durbin, xx.

decision making.[25]

The Silence of Innis, McLuhan and Grant

Innis, McLuhan and Grant are generally acknowledged as being three of Canada's most prominent critics of our technological civilization. Unlike some intellectuals, none of them avoided involvement in public life. Innis sat on Royal Commissions.[26] McLuhan played the role of public intellectual.[27] Grant wrote books for a wide public audience, such as Lament For a Nation.[28] They were no shrinking violets, yet in all of their writings there is a strange silence about the matter of practical

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[25]A good example of the TA approach can be found in the American Technology Assessment Act and its accompanying Office of Technology Assessment whose purpose is "'disentangling knotty technical issues' with the aim of making Congressional debate on such complex matters more informed and rational."

Robert E. McGinn, Science Technology, and Society (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1991), 246.

[26]"Although he served on a few royal commissions himself, he tended to be scornful of those academics who were eager to serve governments at every opportunity. Scholars should teach and research, not be policy makers, Innis believed."

H. Graham Rawlinson and J.L. Granatstein, "Harold Innis," in The Canadian 100: The Hundred Most Influential Canadians of the Twentieth Century (Toronto: Little Brown and Company Ltd., 1997), 96.

[27]"He was a worldwide celebrity by the late 1960s, an overnight sensation created by the same forces that his work described."

H. Graham Rawlinson and J.L. Granatstein, "Marshall McLuhan," in The Canadian 100, 231.

[28]"For a time, Grant's influence on the public and the politicians was immense. Even today in a much more integrated North America, Grant's lament continues to rally the nationalist tories, the left-Liberals, and the social democrats."

H. Graham Rawlinson and J.L. Granatstein, "George Grant," in The Canadian 100, 188.

advice for the better guidance of technological development.

With Innis, for example, the silence is noticeable early in his career as a political economist teaching at the University of Toronto. As one biographer points out about a book of essays that Innis co-edited in 1934, The Canadian Economy and its Problems, "the articles underlined Canada's traditional dependence on staple exports and foreign capital, and described the situation in which Canadians found themselves rather than ways they might change it."[29] The biographer continues to identify this characteristic approach which Innis maintained throughout his life,

> For reformers, Innis appeared to dwell excessively on what men could not do. His political economy, in its recognition and preoccupation with deterministic features of economic life, had an anti-reformist bias.[30]

And,

> Innis often seemed more impressed--one might almost say overwhelmed--with the intractability of the forces at work than with the prospects for precise solutions.[31]

And the same characteristic was also attributed to Marshall McLuhan.

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[29]Carl Berger, The Writing of Canadian History (Toronto: Oxford University Press, 1976), 103.

[30]Ibid., 103.

[31]Ibid., 103.

A biographer notes that one of the persistent forms of criticism levelled at McLuhan was "that he was complacent about the phenomena he described and indifferent to matters of social justice."[32] Such criticism was not completely fair, in my view, but difficult to avoid. Even a sympathetic commentator could make observations like the following:

> He did call for a greater conscious awareness of the subtle 'wrap-around' effects of the new media of communication and the hypnotic changes they created in our lives. His 'global village' united the sweep of cosmic otherness with the magnified intimacies of the self. Man could gaze in wonderment at these great replications of his self and know through some small voice that something had been fatefully altered and lost. But the march of modernity in seven league boots to some imminent global unity was equally mesmerizing. In that sense, McLuhan shared something of the cosmic vision of Teilhard de Chardin--a promise of a scientific future that would be fulfilled without alienation. But he offers no systematic social or philosophical critique beyond a present critical vigilance and a future benign anticipation.[33]

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[32]Philip Marchand, Marshall McLuhan: The Medium and The Messenger (Toronto: Vintage Books Edition, 1990), 191.

[33]Abraham Rotstein, "Technology and Alienation," Keynote Address Presented at the Opening Session of the Third Biennial Meeting of the Institute for Ultimate Reality and Meaning in

McLuhan is held by many to have been one of this country's most provocative thinkers about the issues surrounding modern technologies. His book War and Peace in the Global Village, for example, explores the immense and potentially dangerous changes technology was bringing about in the world community. And yet no practical programme for dealing with the effects of technologies emerges from the man who dedicated his life to the study of technology in all its forms. Some have suggested that this lacuna in McLuhan's work could be attributed to his health. As Northrop Frye notes,

> I thought that McLuhan was being praised to the skies
> for the wrong reasons and then, after the vogue had
> passed, being ignored for the wrong reasons. I think
> there's a great permanent value in McLuhan's insights,
> and I had a great sympathy with what he was trying to
> do. Unfortunately, he had such rotten luck with his
> health that he was never able really to complete what
> he had to say. That's why he has come down as a kind
> of half-thinker who never worked out the other part of
> what he was really talking about.[34]

Frye gives voice to a feeling shared by many commentators that for all of McLuhan's voluminous work, something important

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[33](...continued)
Toronto, August 23, 1985, Medical Sciences Building, University of Toronto.

[34]Northrop Frye, "Technology and Society," interview by David Cayley in Northrop Frye In Conversation (Concord: House of Anansi Press, 1992), 161.

remained unsaid.

It has also been noted of Grant that while he was a severe critic of technological civilization he was largely silent about practical responses to the problems of this civilization. As one commentator notes, "Specifically, he offers little in the way of <u>systematic</u> criticism of technological civilization, and no constructive alternatives to our present disorder are put forward for consideration."[35] Others have also noted a certain reticence in Grant to discuss solutions to the problems of modernity, as we can see in titles of articles such as "George Grant's Anguished Conservatism" by John Muggeridge, and "George Grant and the Terrifying Darkness" by William Christian.[36]

Why should three of Canada's most notable intellectuals of this century, who were generally not reticent about publicly expressing their views on other issues, have been silent when it came to making practical suggestions about a subject which came to occupy such a central role in their academic work? While each was known for having misgivings about certain aspects of

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[35] Ian Box, "George Grant and the Embrace of Technology," <u>Canadian Journal of Political Science</u> 15 (1982): 504. [My emphasis]

[36] John Muggeridge, "George Grant's Anguished Conservatism," in <u>George Grant in Progress</u>, ed. Larry Schmidt, 40-48.
William Christian, "George Grant and the Terrifying Darkness," Ibid., 167-178.
<u>Also See:</u> Edwin and David Heaven, "Some Influences of Simone Weil on George Grant's Silence," Ibid., 68-78.
William Mathie, "The Technological Regime: George Grant's Analysis of Modernity," Ibid., 157-166.
Dennis Lee, "Grant's Impasse," in <u>By Loving Our Own</u>, ed. Peter C. Emberley, 11-42.

technological civilization none of them laid down anything in the way of a systematic programme in response to the challenges of technology. Their silence in this regard is a mystery worth considering.

It could be suggested that they were simply detached academics who were more interested in questions of theory than in saying anything constructive to address the problems of our civilization. My contention is that for them the challenge of technology is located in the very nature of one's participation in the process of technological change itself and that this perspective is the reason behind their refusal to be advocates for any programmatic response to the challenge of technology. I will argue that there are valuable lessons to be learned from understanding the possible reasons for their silence.

The Technological Impasses of Innis, McLuhan, and Grant

At the core of the silence of Innis, McLuhan, and Grant is their expansive understanding of technology. They share an understanding of technology as a pervasive form of practice. In chapter four we will examine in more detail how this understanding leads to the possibility that we may be engaging in this form of practice without any proper sense of limit. Each of our three primary guides focuses on the idea of bias as the essential core to answering this question. Another possible shared characteristic we will examine further is their apparent rejection of a search for a systematic and unified approach for

meeting the challenge of technology because such an approach

would itself be a reiteration of the very kind of bias they

wished to question. Each dealt with this realization in a

different way: Innis with his refusal to serve governments as a

policy consultant; McLuhan with his refusal to make ethical

pronouncements about technologies; and Grant with his refusal to

act as apologist for the political programmes of either the left

or the right.[37]

For our three guides the challenge of technology is not only

to deal with its social or environmental effects, but also to

understand its influence on one's life. Others share such a view

of the challenge of technology. As Ursula Franklin describes one

of the difficulties presented by technology: "The strength, deep

rootedness and invisibility of technological infrastructures may

offer some explanation as to why the tasks of protecting or

restoring the natural environment are so very difficult."[38]

What is interesting about the work of Innis, McLuhan and Grant,

is the implication that this difficulty is not incidental to the

challenge of technology, but is central to it.

We can see this emphasis in Innis' paper, "A Critical

Review," presented to the Conference of Commonwealth Universities

at Oxford University in 1948. Innis comments on how the

organizers assumed fragmentation in the perspectives of various

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[37]James Reimer, "George Grant: Liberal, Socialist, or
Conservative?" in George Grant in Process, ed. Larry Schmidt, 49-
60.

[38]Franklin, The Real World of Technology, 70.

academic disciplines:

> I propose to adhere rather closely to the terms of the
> subject of this discussion, namely, "a critical review,
> from the points of view of an historian, a philosopher
> and a sociologist, of the structural and moral changes
> produced in modern society by scientific and
> technological advance." I ask you to try to understand
> what that means. In the first place, the phrasing of
> the subject reflects the limitations of Western
> civilization. An interest in economics implies neglect
> of the work of professional historians, philosophers,
> and sociologists. Knowledge has been divided to the
> extent that it is apparently hopeless to expect a
> common point of view. In following the directions of
> those responsible for the wording of the title, I
> propose to ask why Western civilization has reached the
> point that a conference largely composed of university
> administrators should unconsciously assume division in
> points of view in the field of learning and why this
> conference, representing the universities of the
> British Commonwealth, should have been so far concerned
> with political representation as to forget the problem
> of unity in Western civilization, or, to put it in a
> general way, why all of us here together seem to be
> what is wrong with Western civilization.[39]

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[39] Innis, The Bias of Communication, 190-191.

For Innis, this assumption about the necessity of academic specialization is a manifestation of an ingrained technological attitude towards academic inquiry.[40] The influence technology has on the way that one approaches a problem, such as how a conference should be organized, is central to Innis' understanding of technology. In this case Innis notes the irony that the organizers of a conference on the critical review of the effects of technological change should find it so difficult to overlook the artificial boundaries of the academic division of labour.

Common to our three scholars is an understanding of the extreme difficulty in deliberating on technology because it plays such a formative role in one's life, as in the case of the insistence that academic work be broken down by way of disciplinary category. As Grant puts it so bluntly, "We are technique."[41] These views lead them to take issue with the common understanding of technology as something inert and

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[40] "[The university] has become synonymous with specialization and departmentalization; with a professionalised university we have succumbed to the very pressures that Innis had worked so hard to oppose."
William Westfall, "The Ambivalent Verdict: Harold Innis and Canadian History," in Culture Communication and Dependency, ed. Melody, Salter, Heyer, 45.
"The sad truth is that the continuing struggle he waged against specialization in the social sciences and for an authentically indigenous school of scholarship has largely been lost since his death."
A. John Watson, "Harold Innis and Classical Scholarship," Journal of Canadian Studies 12, 5 (Winter 1977): 45.

[41] George Grant, Technology and Empire: Perspectives on North America (Toronto: House of Anansi, 1969), 137.

external and the conclusion that can be drawn from this view that

technology is rather unworthy of critical philosophical

examination and ethical judgement. Their concern is with

habitual technological response.[42] As McLuhan writes: "Man is

not only a robot in his private reflexes but in his civilized

behaviour and in all his responses to the extensions of his body,

which we call technology."[43] They each look past the obvious

failures of technology to the ways of thinking and acting that

give rise to technology. They each attempt to lead their readers

to a point where they might see that the process of addressing

the challenge of technology should be more than just a search for

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[42]"The subject matter which Innis retained for social
science was habit or bias. . . . Innis was suggesting that while
some human activity is consciously and spontaneously directed
much of it appears to be the result of unreflective and ingrained
behaviour."
    Leslie A. Pal, "Scholarship and the Later Innis," Journal of
Canadian Studies 12, 5 (Winter 1977): 33.
    "[Grant] became a spectator, waiting and listening to the
speeches, rituals, and strivings of a society dominated by
technique."
    Philip J. Hanson, "George Grant: A Negative Theologian On
Technology," Research on Technology and Philosophy 1 (1987): 308.
    "Grant: I think that fundamentally, we don't quite know what
has happened to us. What I try to say in my book is that we must
try to think what it is to live in modern North America. We who
have walked the streets of the great metropolis, and seen the
giant wars of this century, and lived in highly organized
institutions which determine us more than we determine them, must
feel the need not only to live but to know, to think our living--
otherwise we are at the mercy of it. And it seems to me at the
moment that we are at the mercy of the technological machine we
have built, and every time anything difficult happens, we add to
that machine."
    George Grant, "A Conversation on Technology and Man," with
Gad Horowitz, Journal of Canadian Studies 4, 4 (August 1969): 3.

[43]Marshall McLuhan, War and Peace in the Global Village,
with Quentin Fiore and produced by Jerome Agel (New York:
Touchstone Books, 1989), 19.

novel means to guide technological development.

The Challenge of Technological Dependency

It is my belief that Innis, McLuhan and Grant each saw a need to develop a radical process in which the character of one's action as a member of a technological civilization is consciously examined. However, this cannot be a straightforward task because, as each of these thinkers also suggest, the deep-rootedness of technological bias in our culture can also potentially lead to a tendency to seek technological solutions to the problem of technological bias. As Innis seems to present this dilemma:

Mankind is continually being caught in his own traps--
[once specialist] language and systems [are] developed
[they become] difficult to break down . . . . [The
ancient] Greeks had the advantage of debating without
control but the development of a written tradition
[further strengthened the power of specialist language
and systems. A political emphasis on] control [by way]
of systems followed--[the legal code] used by [the]
Romans [being one example]. [Early written]
communication [was] limited to a small number--
[resulting in a] hierarchy of philosophy [i.e. a
narrowing of public discourse to a specialist class.]--
[Mankind's] egoism makes it more difficult to secure
relief [from the tyranny of specialist language and

systems because]--mankind's belief in his own

contrivances [prevents him from questioning his

commitment to these contrivances].[44]

McLuhan describes how the intensity of the process of

technological change can "numb" one's sensitivity to this

process.[45] This condition seems to be McLuhan's way of

describing what Grant calls the tight circle.

Further, as Innis points out, dependency is also supported

by the fact that a technology is always a source of power for

someone. For Innis, any new form of technological capability

creates a group of people concerned with application of that

capability. These "elites", as Innis calls them, have a vested

interest in maintaining a situation conducive to the development

and continued use of the technologies which are the source of

their power.[46] Innis uses the term "monopoly or oligopoly of

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[44]Harold Adams Innis, The Idea File of Harold Adams Innis, ed. William Christian (Toronto: University of Toronto Press, 1980), 6.50.

[45]McLuhan, Understanding Media, 41.

[46]Innis' idea of technological elite should be taken in an extremely broad sense of referring to any select group of individuals having some vested interest in the continuation of reliance on a particular technology. It is probably not meant to be taken as carrying any notion that such groups will necessarily be privileged minorities. Since not everyone can have a vested interest in the continuation of every technological practice technologies must inevitably set up distinct groups, whether large or small, and hence new possibilities for political conflict. Whole nations/linguistic groups, for example, can be said by Innis to have emerged because of their commitment to certain lexigraphical conventions, or so he seems to claim when he states "The Dutch language had an existence separate from Germany because it was fixed early in writing."
Innis, The Bias of Communication, 125.

knowledge" to describe such a situation.[47] New technologies

unleash changes in societies which challenge existing elites.

The rigidity of the knowledge monopolies contributes to further

disequilibrium in a society. As new realities arise and elites

fail to adjust, new technologies and new elites must arise to

address the new realities. These new elites, however, must

inevitably support the creation of new knowledge monopolies,

which help give rise to new forms of rigidity and disequilibrium,

and so on.[48]

Innis also points out how mastering the tool of

technological change can also be source of power. As he notes,

"constant change in capitalist society--compels administration to

keep constantly alert to protect themselves against and to take

advantage of any particular change."[49] Professional innovators

and facilitators of innovation can be considered to constitute

their own distinctive kind of technological elite with a vested

interest in encouraging technological change in general.[50]

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[47]Innis, The Bias of Communication, 4.

[48]"But I have tried to show that Innis' later work was
concerned with an examination of how a different dialectic, the
dialectic of power and knowledge, was played out in human history
using communications systems as a focus for analysis of this
process. . . . The effect which Innis predicted was a tendency
away from critical thinking and towards following orders on a
mass scale."
Watson, "Harold Innis and Classical Scholarship," 58.

[49]Innis, The Idea File, 5.20.

[50]Also see: Neil Postman, Technopoly: The Surrender of
Culture to Technology (New York: Vintage Books, 1993) pp. 40-55.
    "The knowledge workers are a diverse group united by their

Such a broad conception of technology's influence obviously puts the ability to think freely about technology at an extreme premium in Innis' analysis. Innis felt that the university could be a place in which the understanding of our biases could be a focus and that from such understanding authentic social criticism could emerge. As he puts it: "Place of learned class [and] universities [is] to prevent domination of various groups -- church, army, state -- [universities should foster] appreciation of [the] necessity of limit[ing the] power of groups."[51] This belief in the university as special haven for critical inquiry is perhaps why "some of his choicest epigrams of dispraise were reserved for those academics who, far from retaining a tentativeness about their subject bred of an awareness of limits, proceeded to expound final solutions."[52] Innis knew how tempting it was for social scientists, in particular, to apply themselves to the achievement of practical ends to the detriment of the unending pursuit of understanding the nature and implication of such actions.[53]

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[50](...continued)
use of state-of-the-art information technology to identify, process, and solve problems."
  Jeremy Rifkin, The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era (Toronto: Putnam, 1995), 174.

[51]Innis, The Idea File, 2.17.

[52]Berger, The Writing of Canadian History, 106.

[53]"The basic tragedy of Innis' work is that he did not find a solution to the conundrum of linking his critique of imperialism to a social actor with sufficient strength and
(continued...)

The tight circle involves the question posed most explicitly by Grant of how one can make judgements about technology that are not biased by one's dependence on particular technologies and the process of technological problem solving itself.[54] He examines the comment of a computer scientist that "the computer does not impose on us the ways it should be used."[55] Grant points out that computer use is dependent on there being investment-heavy machines which require large commercial institutions for their production and hence, "At the simplest factual level, computers can be built only in societies in which there are large corporations."[56] Also, computers have fundamental operating restraints, one of these being the need to classify data. And as Grant points out, "It is the very nature of any classifying to homogenise."[57] He concludes that contrary to what the computer scientist would have one believe, computer technology does impose on its users how it should be used because it imposes a certain "destiny" on any society in which that technology is used. One cannot have computers without having a certain kind of industrial

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[53](...continued)
interest to find the force necessary to reformulate the imperial project of the West. . . . In fact his most powerful statements on the human condition were made in full recognition of the impasses that had been reached in his own thought."
    Watson, "Harold Innis and Classical Scholarship," 60.

[54]Grant, Technology and Empire, 31-32.

[55]Grant, Technology and Justice, 19.

[56]Ibid., 25.

[57]Ibid., 23.

development and one will, in using computers, necessarily become involved in actions of classification. The computer scientist's remark that the computer does not impose implies that any problems arising from use of the computer can be dealt with without ever having to question any of the uses of the computer or its attendant technologies. In this, the computer scientist's remark illustrates an unwillingness to question a belief that technological action is sufficient for dealing with all the ethical challenges of technological change. But if one's judgments about technological change are to be authentic, they must include the ability to question one's faith in technology.

However, according to Grant, technology is a "package deal" because it is a process in which all people participate. He questions how one can expect to make judgments about this process if one is continuously engaged in it. As he expresses the dilemma:

> The result of this is that when we are deliberating in any practical situation our judgement acts rather like a mirror, which throws back the very metaphysic of the technology which we are supposed to be deliberating about in detail. The outcome is inevitably a decision for further technological development.[58]

What practical action can one undertake to face the challenge of technology that will not simply increase one's reliance on technology in some new way?

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[58] Ibid., 33.

This last question is the source of the dilemma of the tight circle. In the process of making decisions about technology, according to Grant, one can too easily fall into the form of behaviour that one ought to be putting in question. Winner points out that Ellul presents a superficially similar conception in The Technological Society. According to Winner, Ellul held that "a certain mode of thought and action, a particular way of defining problems and responding to them, was adopted by society and then became the dominant pattern that governed universally from that time forward" and that "this response pattern strongly and automatically repulses any alternative mode of activity."[59] Winner goes on to encapsulate the Impasse as follows:

> The profound depth of this tendency is, I believe, best
>
> illustrated by the fact that even those who now
>
> acknowledge a problem in man's relations with nature
>
> often move from that insight to become unreconstructed
>
> technological systems builders on a potentially
>
> colossal scale.[60]

But if it is a socially endorsed "mode of thought and action" that has come to dominate society then the solution seems clear-- one simply has to find ways to challenge this mode of thought and undermine the social mechanisms that support it.[61] But this is

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[59]Winner, Autonomous Technology, 126.

[60]Ibid., 129.

[61]See: Jacques Ellul, Propaganda: The Formation of Men's Attitudes, translated by Konrad Kellen and Jean Lerner and with an introduction by Konrad Kellen (New York: Knopf, 1965)

where the consideration of our three guides diverges from
Winner's analysis. They too see that a generally positive
attitude towards technological change has come to dominate in
Western societies. As Innis puts it,

> The form of mind from Plato to Kant which hallowed
> existence beyond change is proclaimed decedent. This
> contemporary attitude leads to the discouragement of
> all exercise of the will or the belief in individual
> power.[62]

Or more epigrammatically,

> In art classical man was in love with plastic whereas
> Faustian man is in love with music. Sculpture has been
> sacrificed to music.[63]

But none of our three guides tries to outline some programmatic
way to overthrow this attitude. They propose self-awareness
rather than revolution.[64] As one commentator notes, Innis'
approach to communications studies encompasses this proposal.

> The fact that one studies bias does not make one immune
> from it. Consequently, Innis incorporated into his
> analysis of bias a study of the specific context in
> which the observer existed and in which scientific

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[62]Innis, The Bias of Communication, 90.

[63]Ibid., 90.

[64]"When the communist manifesto proclaims, 'workers of the
world unite, you have nothing to lose but your chains!' in those
words it forged new chains."
Ibid., 31.

analysis took place.[65]

For Innis, McLuhan, and Grant the challenge of technology is not external to us, in the form of a mode of thought and action that can "adopted" by a society. The challenge is _intrinsic_ to the nature of mundane technological action. As Grant puts it, "technique is ourselves."[66] Technological action inherently involves a bias away from other forms of action simply in virtue of the fact that it is a distinctive form of action. As Arthur and Marilouise Kroker put it, "In technology as in life, every opening is also a closing."[67] According to our three guides one must be capable of sometimes transcending one's reliance on technological action if one is to avoid becoming a slave to the ongoing process of technological problem solving. As McLuhan comments, "We are all robots when uncritically involved with our technologies."[68] Even if all the negative side-effects of technology were to be solved, so long as one was unable to break free of ingrained patterns of technological behaviour one will not have met the full challenge of technology. Our three guides could agree with Winner that technological action is a form of

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[65]Westfall, "The Ambivalent Verdict: Harold Innis and Canadian History," in _Culture, Communication and Dependency_, ed. Melody, Salter, Heyer, 44.

[66]Grant, _Technology and Empire_, 137.

[67]Arthur and Marilouise Kroker, _Hacking the Future: Stories for the Flesh-Eating 90s_ (Montreal: New World Perspectives, 1996), 36.

[68]McLuhan, _War and Peace in the Global Village_, 18.

behaviour that can "repulse" other forms of behaviour.[69] But they would not have us agree with him that the challenge of technology is about overcoming some recently adopted mode of social behaviour. The challenge of technology exists for human beings whenever they engage in technological action.

The Impasse, therefore, occurs on two levels. The first level involves becoming aware of potential bias in one's practical deliberations about participation in specific technological actions. A recent occurrence at the University of Guelph might provide an example of such a bias. In response to the breakdown of financial support for post secondary education the University of Guelph implemented a two-way television teaching system with McMaster University. A campus magazine reported: "An extension of the tried and proven three-year old interactive classroom link between Waterloo and Guelph, the McMaster link should improve the cash starved universities' ability to stretch resources."[70] The University's response to the problem of being cash strapped was to expend funds on the implementation of a novel instrument rather than on seeking to understand and question the causes of the funding crisis. What

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[69]"The drive to the planetary technical future is in any case inevitable; but those who would try to divert, to limit, or even simply stand in fear before some of its applications find themselves defenceless, because of the disappearance of any speech by which the continual changes involved that drive could ever be thought as deprivals."
Grant, Technology and Empire, 139.

[70]"Guelph-Waterloo Classroom Link Brings McMaster Students On-Line," At Guelph, 26 October 1994, 3.

we have here might be an example of this kind of response in which a problem is attacked directly instead of at its source. Philip Marchand encapsulates McLuhan's ideas about the contrast between these two fundamentally different kinds of approach:

> Most people are trained not to look for the ground in any situation. They focus on one part and ignore the rest. If people consider the motorcar, for example, they focus on the car itself, rarely perceiving the network of gas stations, highways, neon signs, parking lots, and all the altered habits and perceptions that arise out of the existence of the car.[71]

According to McLuhan, people should seek to examine the full range of the implications of their technological actions but most seem disinclined to do so, preferring instead to respond with new technological activity.

The above illustration represents the first level of the Impasse, which is to take note of the pervasiveness of the tendency of people to approach new challenges in a technological way. This inclination has been well discussed by thinkers in the field of philosophy of technology.[72] However, the three thinkers

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[71]Marchand, Marshall McLuhan, 248.

[72]"As a civilization we are plainly infatuated and at the same time perplexed by technique and technology."
H. T. Wilson, "Technology and/as/or Future." Philosophy of the Social Sciences 15 (1985): 350.
"Step by step, by the method of trial and error, politicians and experts [believe they] will be able to tackle each and every problem within society."
Ingemar Nordin, "State, Technology, and Planning,"

upon whom we are focusing each try to lead one to an awareness of an even greater depth to which this tendency can run. The depth of the bias can extend even to the level of the theoretical consideration of the problem of technological bias itself. The impasse is the challenge of responding to the "technical mentality"[73] without falling prey to this mentality. What is born of facing such a challenge is the awareness of the importance of bias as a central factor in the struggle to overcome technology as a so called "monolithic force in modern life."[74]

According to appropriate technologists and technology assessors, the central challenge we face is to create proper policy mechanisms for the guidance of technological development. According to our three primary guides, the central challenge is to gain awareness of one's habitual technological responses to problems, including such responses as seeking proper policy mechanisms, that can prevent one from bringing habitual forms of technological response under conscious scrutiny and judgement.

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[72](...continued)
Philosophy of the Social Sciences 21, 4 (1991): 458.
    "'blood of the dog that bit you' approach"
    Eric Higgs, "Musings at the Confluence of the Rivers Techné and Oikos," Research in Philosophy and Technology 12 (1992): 248. Also See:
    Alan R. Drengson, "The Sacred and The Limits of the Technological Fix," Zygon 19 (September 1984): 259-275.
    Andrew Freenberg, "The Technocracy Thesis Revisited: On the Critique of Power," Inquiry 37 (1994): 85-102.

[73]Winner, Autonomous Technology, 130.

[74]Ibid., 130.

This view of the challenge also includes questioning the response of seeking to deal programmatically with the problem of technological bias. As Grant expresses his view of the challenge,

> The difficulty then of those who seek substantive values by which to judge particular techniques is that they must generally think of such values within the massive assumptions of modern thought. Indeed even to think 'values' at all is to be within such assumptions. But the goal of modern moral striving--the building of free and equal human beings--leads inevitably back to a trust in the expansion of that very technology we are attempting to judge. The unfolding of modern society has not only required the criticism of all older standards of human excellence, but has also at its heart that trust in the overcoming of chance which leads us back to judge every human situation as being solvable in terms of technology. As moderns we have no standards by which to judge particular techniques, except standards welling up with our faith in technical expansion.[75]

The challenge of overcoming the impasse manifests itself at the level of one's practical deliberations about particular technological activities and also at the level of one's deliberations about addressing the technological character of

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[75]Grant, _Technology and Empire_, 34.

society as a whole. The Impasse occurs at the societal level because even if there were an increase in popular awareness of the depth of technological dependency, the dominant public response to such awareness might be to deal with the problem with more technology. But how is one to fight against such "an enfolding destiny that increasingly threatens even our ability to see it for what it is, let alone to do anything about it"?[76]

I contend that Innis, McLuhan, and Grant were largely silent on the question of how to fashion public policy for the control of technology because their understandings of technology involve seeing the unquestioned willingness to promulgate programmatic solutions as a manifestation of the central challenge of technology--overcoming the habit of responding to problems technologically. That they remained largely silent about how to respond to technology's challenge indicates the extent to which one must go in seeking to avoid this habit. One can also find in their silences a demonstration of an approach that is not technological. It is a case of the medium being the message. The message of their silences is that a search for a programmatic response, such as a procedure, institution, or ethical theory for the guidance of public or private action, might just be a technological way of avoiding making difficult ethical judgments

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[76]Ian Box, "George Grant and the Embrace of Technology," Canadian Journal of Political Science XV, 3 (1992)

about technological actions.[77] Their apparent rejections of

such a quest seem to indicate a shared belief that the critical

rejection of technological action can be an appropriate ethical

alternative to technological action.

Therefore, the primary ethical question concerning

technology is not, for them, by what means technologies should be

controlled. The primary ethical question they point to is how to

include in one's life ways of approaching problems which are not

technological. Other questions they point to are how can one

maintain awareness of one's technological action and to what

extent should one leaven such action with action that is not

technological. One cannot meet this understanding of the

challenge of technology by only dealing with technologies and

their effects; one must also deal with oneself.[78]

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[77]When I use the expression "programmatic response" I have
in mind a programme like that proposed by Andrew Freenberg in his
Critical Theory of Technology following his recommendation that
"we must invent a politics of technological transformation."
      Andrew Freenberg, Critical Theory of Technology (Toronto:
Oxford University Press, 1991), 13.

[78]Their positions are perhaps a reiteration of a strain of
thought in the tradition of North American pastoralism going back
to Henry David Thoreau. As Thoreau writes: "Most men, even in
this comparatively free country, through mere ignorance and
mistake, are so occupied with the factitious cares and
superfluously coarse labors of life that its finer fruits cannot
be plucked by them. . . . He has no time to be anything but a
machine. How can he remember well his ignorance—which his
growth requires—who has so often to use his knowledge."
      Henry David Thoreau, Walden or, Life in the Woods
(Scarborough: New American Library Canada, 1960), 9.

CHAPTER 2: THE UNDERSTANDING OF TECHNOLOGY

All three of our primary guides had important insights into technology but they were also deeply perplexed by it. This chapter attempts to bring together their most pertinent insights about the nature of technology, and with the help of others in the field of the philosophy of technology, to examine the still perplexing questions about the nature of technology they first explored.

Unfortunately, unlike most analytic philosophers of technology, none of our three guides laid down a simple and straightforward definition for their use of the term "technology." McLuhan and Innis both tended to use the terms "media" and "medium of communication" to indicate their main interest and only occasionally used the term "technology." Grant wrote explicitly on the topic of technology and its place in contemporary Western culture, but while he was aware of various definitions, and in his 1959 publication of <u>Philosophy in the Mass Age</u> even endorsed a definition of Jacques Ellul, his endorsement of this definition was not without qualification.[1]

However, the following approach to the term "technology" is meant to explore an expansive understanding of technology that I think can be found through a comprehensive analysis of the writings of Innis, McLuhan and Grant. The chapter is divided

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[1]John Badertscher, "George P. Grant and Jacques Ellul On Freedom in Technological Society," in <u>George Grant in Process,</u> ed. Larry Schmidt, 79-89.

into three main sections. The first section presents a definition of the term "technology" which attempts to capture this expansive understanding. The second section argues that this perspective is distinguishable from other understandings common in the field of the philosophy of technology. The third section attempts to deal with possible criticisms of the expansive understanding of technology. The primary purpose of this chapter is not to present and defend a definitive definition of technology but to present the expansive understanding of technology that can be seen to underlie the works of our three primary guides. The secondary purpose is to clarify key terms that will be used in subsequent chapters of this inquiry.

Philosophical Definitions of Technology

Innis, McLuhan, and Grant are united in an understanding of technology that rejects seeing it primarily in terms of artifacts, but rather focuses on its relation to the whole range of human activities involved in the application of knowledge and reason. The difference in this perspective from other perspectives is the difference between viewing technology as process rather than product. Another way of putting this point is to say that, for them, technology is an essential part of the ongoing cultural life of the human species.

However, definitions which view technology most fundamentally in terms of artifacts are highly pervasive. Don Ihde is an influential American philosopher of technology in the

continental tradition. In his introduction to the field he

presents this part of an introductory definition: "First, we

shall insist that a technology must have some concrete component,

some material element, to count as a technology."[2] Friedrich

Rapp, an analytic philosopher of technology, has defined

technology as "the reshaping of the physical world for human

purposes . . . [when] this reshaping results in concrete

technological systems and processes."[3] Carl Mitcham, one of the

most influential philosophers of technology of recent years,

defines technology as "the making and using of artifacts."[4]

There are definitions which view technology more in terms of

process. In the introduction to his highly influential book, The

Technological Society, Jacques Ellul defines what he calls "la

technique" as "the totality of methods rationally arrived at and

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[2]Ihde, Philosophy of Technology, 47.

[3]Friedrich Rapp, introduction to Philosophy of Technology, ed. Paul T. Durbin (Boston: Kluwer Academic Publishers, 1989), xxiii.
    "Technology proper takes as its object the material or physical world."
    Robert Grant, "Values, Means and Ends," Philosophy and Technology, Royal Institute of Philosophy Supplement: 38, ed. Roger Fellows (Cambridge: Cambridge University Press, 1995), 179.

[4]Carl Mitcham, Thinking Through Technology: The Path Between Engineering and Philosophy (Chicago: University of Chicago Press, 1994), 1, quoted in Jay Newman, Religion and Technology: A Study in the Philosophy of Culture (Westport, Conn.: Praeger Publishers, 1997), 41.
    "However important our empty hands are, and have been in the history of our race, for manipulating the environment to our ends, it would be wise to resist a definition of technology that includes empty hands as technological implements."
    Frederick Ferré, Philosophy of Technology (Athens, Georgia: The University of Georgia Press, 1995), 23.

having absolute efficiency (for a given stage of development) in
every field of human activity."[5]   But elsewhere in that same
book he speaks of technique as

> the translation into action of man's concern to master
> things by means of reason, to account for what is
> subconscious, make quantitative what is qualitative,
> make clear and precise the outlines of nature, take
> hold of chaos and put order into it.[6]

In a similar vein Winner says about technology, "What appear to
be nothing more than useful instruments are from another point of
view, enduring frameworks of social and political action."[7]
Gabriel Marcel makes these comments about technology:

> It is a group of procedures, methodically elaborated,
> and consequently capable of being taught and
> reproduced, and when these procedures are put into
> operation they assure the achievement of some definite
> concrete purpose.[8]

Each of the above, while capturing important elements of
technology as process also includes or leaves out certain

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[5]Jacques Ellul, The Technological Society, with an
introduction by Robert K. Merton (New York: Vintage Books, 1964),
xxv.

[6]Ibid., 43.

[7]Langdon Winner, The Whale and the Reactor: A Search for
Limits in an Age of High Technology (Chicago: University of
Chicago Press, 1986), x.

[8]Gabriel Marcel, Man Against Mass Society (Chicago: Henry
Regnery Company, 1952), 82.

elements and points of emphasis which are essential to an adequate inquiry into the issue of technological dependency.

Dictionary Definitions of Technology

In the seventh edition of the Concise Oxford Dictionary, technology is defined as the "(science of) practical or industrial art(s); ethnological study of development of such arts; application of science; hence technological." The ninth edition of the Concise Oxford dictionary defines technology as "the study or use of the mechanical arts and applied sciences." Referring to the ethnological study of the arts by the term "technology" is not a part of common contemporary use of the term. The second reference to the application of science captures a common use of the term. For many technology is intimately connected with the advances in modern science. The ninth edition reference also highlights the connection between science and technology, but it adds a reference to the mechanical arts. The association with things mechanical represents another common understanding of the term. The Funk and Wagnalls' Standard College Dictionary (1986) adds the alternative interpretation of technology as "The technical language of an art, science, etc. The means by which material things are produced, as in a particular civilization." Using the term "technology" to refer to a technical language is another example of archaic usage. The second reference is more representative of a common way of using the term. In this case the term

"technology" refers to the body of the material culture of a particular civilization, as in the phrase "ancient Greek technology."

Innis', McLuhan's and Grant's Use of the Term

The Oxford dictionary definition is not satisfactory for capturing the expansive understanding of technology of the three thinkers we are examining because the use of the term "science" can too easily narrow one's understanding of technology. Science can too easily be thought to refer only to modern science, the guiding methodologies of which have been discussed by thinkers such as Popper and Kuhn. Therefore, the Oxford definition might lead one to exclude from the list of technologies any instruments created before the appearance of modern science. Both Innis and McLuhan, however, were immensely interested in humanity's oldest forms of communication including such things as parchment, the phonetic alphabet, and the printing press, and both used the term "technology" or "technique" to describe these innovations.[9] If the Oxford definition is to capture the understanding of our three guides the term "science" must be taken in its original Latin sense as referring to knowledge or knowing of a more general kind, and not only to knowledge which has emerged since

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[9]"Dependence on clay in the valleys of the Euphrates and the Tigris involved a special technique in writing and a special type of instrument, the reed stylus."
Innis, The Bias of Communication, 6.
"The phonetic alphabet is a unique technology."
McLuhan, Understanding Media, 86.

the application of the more formalized approaches of modern science.[10] The Oxford definition is unsatisfactory because it is open to such confusion.

The Funk and Wagnalls' definition and the philosophical definitions are also unsatisfactory. All of these definitions fail in one of three ways to meet three key requirements of Innis, McLuhan and Grant which we will discuss in more depth later: 1) Ihde's definition insists that technologies must have a material component, which can too easily lead to the assumption that only artifacts can be technologies; 2) both Rapp and the Funk and Wagnalls' definition view technology as being directed toward the material world or the world of material things, which might have us exclude technologies which are directed toward the control of ourselves, other people, and various aspects of our social environment; 3) Ellul's first definition and Winner and Marcel's definitions leave the impression that technology, as a totality, framework, or group is somehow separable from ordinary human activity, or to use Winner's terminology, technology is something which can become autonomous. Or, under Ellul's first

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[10]"Etymologically, science simply means 'knowledge,' for it comes via old French science from Latin scientia, a noun formed from the present participle of the verb scire 'know.' It early on passed via 'knowledge gained by study' to a 'particular branch of study,' but its modern connotations of technical, mathematical, or broadly 'non-arts' studies did not begin to emerge until the 18th century."
    John Ayto, Dictionary of Word Origins. 1st. ed. (New York: Arcade Publishing, 1990), 461.

definition, technique can be seen to be blind.[11] These two
definitions of technology might lead us to ignore the fact that
technology emerges through mundane human action by leading us to
a view which can see technology as an essentially alien reality.
Technology can become as Winner puts it, "an elaborate hall of
mirrors, deliberately designed to leave no passage out."[12]

Technology under these definitions is either, "out there and
really independent of us"[13] or a system of means available only
for the manipulation of the material world or a collection of
"concrete components." All of these definitions, except Ellul's
second definition, obscure the idea that technology is made real
only through ordinary human action. None of our three chosen
guides describe technology as something which can be separated
from ourselves or made the special purview of only certain kinds
of people.[14] For them, all human beings are technocrats and

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[11]Robert K. Merton, introduction to The Technological
Society by Ellul, xviii.

[12]Winner, Autonomous Technology, 177.

[13]McLuhan, Understanding Media, 68.

[14]The general lack of any kind of "us/them" talk in regard
to technology is an important shared characteristic of the work
of Innis, McLuhan and Grant. Theodore Roszak makes such
distinctions when he discusses two fundamental technological
groups under the terms "Reversionaries" and "Technophiles" and
suggests that McLuhan helped contribute to a strange attempt at
synthesizing these contradictory positions that emerges in the
cyber-punk movement. Roszak remarks: "At times, this wished for
synthesis of rustic savvy and advanced technology seemed to stem
from nothing more than some very slippery metaphors. Thus
McLuhan's conception of the urbanized mass media, pressed to
extreme, becomes a 'village.'"[+] The suggestion being made in
this dissertation is that McLuhan, and Innis and Grant, are open

all are part of the technological system through their engagement

in everyday useful practices. All these definitions, therefore,

are inadequate for capturing their position because they might

lead us to believe, as Ursula Franklin says, "that technology is

the icing on the cake" and not that "technology is part of the

cake itself."[15]

The position we will be examining in greater detail in this

chapter is that any definition which does not make clear the

relation between technology and ordinary human practice is not a

definition which Grant, Innis, or McLuhan could commend. Ellul's

second definition, therefore, is by far the closest that would be

acceptable to our three primary guides. However, even it lacks

one essential aspect, which is a reference to the character of

technology as medium so important to Innis and McLuhan. The

definition that follows attempts to include the understanding

that technology always involves something that stands between one

and the world as it would be otherwise experienced.

A Definition Which Captures Their Use of the Term

An expansive understanding of technology which can be seen

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[14](...continued)

to such seemingly contradictory interpretations because their
positions seek to transcend the "all or nothing," "us or them,"
"pro or con" type dichotomies that seem so often to characterize
the ethical discussion of technology.

Theodore Roszak, The Cult of Information: The Folklore of
Computers and the True Art of Thinking (New York: Pantheon Books,
1986), 149.

[15]Franklin, The Real World of Technology, 17.

to emerge from the work of Innis, McLuhan and Grant can be captured by the definition of technology as the application of knowledge and reason to the creation of instruments that extend the realm of human capability and the application of these instruments to the solution of practical problems. Technology, therefore, is the entire process that allows one to overcome a problem by way of an instrument. Technology is something people do. It is not a set of inert artifacts.

Also, the term "instrument" must be interpreted broadly to include not only material instruments like hammers and microwave ovens but also non-material methods of addressing problems such as procedures, skills, routines, policies, techniques, systems of organization such as institutions, or any other kinds of mental constructs that structure activity to the better achievement of practical ends. As Grant puts it, "The word 'instrument' is not confined simply to external objects such as machines or drugs or hydro power, but includes such development of systems or organization and communication as bureaucracies and factories."[16] Technological instruments therefore can be purely mental constructs which are embodied only through our actions or they can be material constructs combined with mental constructs.[17]

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[16]Grant, Technology and Justice, 19.

[17]"All of man's artefacts--whether language, or laws, or ideas and hypotheses, or tools, or clothing, or computers--are extensions of the physical body or the mind."
McLuhan, Laws of Media in Essential McLuhan, ed. Frank

Every tool is always combined with a method. For example,
the hammer requires some kind of hammer-using method. However,
not every method necessarily involves the use of an artifact.
The factory, for instance, is a method of production in which
workers come together in a situation where labour is divided.
Although many might tend to associate factories with factory
buildings, enclosed factories are a development on the basic
method of the factory. Frederick W. Taylor's scientific
management and Henry Ford's production line methods are examples
of further methodological refinements to the factory.[18] A
great deal of the power of physical tools must often await the
development of attendant methodological advances, as the
following example from the field of military technology
illustrates,

> If blitzkrieg describes a revolution in military
> affairs, this revolution had at its heart the combined-
> arms panzer division operating with close support from
> the Luftwaffe; it was not a product of the tank--or
> even generically of the armoured fighting vehicle

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[17](...continued)
Zingrone and Eric McLuhan (Concord: House of Anansi Press, 1995),
374.

Reprinted from Laws of Media: The New Science, Marshall
McLuhan and Eric McLuhan (Toronto: University of Toronto Press,
1988)

[18]"Taylor's inventions were not embodied in steel and
rubber: they were simply carefully revised patterns for workers
to spend their energies differently."
Ferré, Philosophy of Technology, 15.

alone.[19]

Military leaders have learned, again and again, that advanced

military hardware by itself is worthless if backed up by inept or

outdated military practice. Along with all the novel items of

military hardware that made up blitzkrieg were human beings

acting in new ways. Without the development of the techniques of

combined-arms warfare there would be no blitzkrieg. These new

forms of practice were the essential foundation for the new forms

of military effectiveness that came to be epitomized by new forms

of hardware like the tank. Therefore, if one wishes to insist

that all technologies must have a material component one could

say that method-technologies are simply technologies in which

specially trained human beings are the material component.[20]

Other examples of method-technologies are cardiopulmonary

resuscitation, basic sanitation practices, double entry

bookkeeping, sentry posting, selective animal breeding, crop

rotation, pruning, and the ancient Greek phalanx military

formation to name just a few.[21] In the same way that in

addition to the computer itself various types of computer

software can be called technologies (desk top publishing, CAD-

CAM, E-Mail, etc.) while not being material artifacts as such,

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[19]Colin S. Gray, "Three Visions of Future War," Queen's
Quarterly 103, 1 (Spring 1996): 39.

[20]For and interesting synopsis of the debate about the
question of the embodiment of technologies See: Ferré, Philosophy
of Technology, 15-16.

[21]Ferré, Philosophy of Technology, 15.

human beings can direct their own activities by adopting certain methods. Method-technologies are somewhat similar to software-technologies because they cannot be understood only in terms of their material components but must involve some understanding of the meaning of the processes they encode.

Under such an interpretation of technology drinking water from a cup is an instance of technology. The method of drinking from a cup is a technological method. The method of drinking water from a cup is an example of a very old method-technology allied with a changing tool-technology of the cup. Both must be combined to respond to the problem of getting water conveniently and efficiently to the mouth. The tool and the method are both essential for the goal to be met. This broadness of the definition is one area of potential criticism of the approach I will be extrapolating from our three primary guides. Some might feel ill at ease talking of a familiar activity like drinking from a cup as an instance of technology. I will address this concern further in chapter three.

Another point about technology, upon which McLuhan placed special emphasis, is that technological instruments are always things which stand between one and the world. It must also be understood that the idea of world here refers as much to the world of social interaction and the self, as it does to the natural environment. Technology can be directed not only at the manipulation of nature but also human nature, such as is the case with the technologies involved in advertising, propaganda,

government, management, and personal fulfilment.

The Understanding of Technology as Process

This definition incorporates important aspects of the understanding of technology of the three thinkers upon whom we are focusing. For Grant, the most noteworthy aspect of technology is the increasingly prominent role that it has come to play in Western political life. He sees this characteristic as a phenomenon warranting our deepest consideration. For Innis, the most noteworthy aspect of technology is its impact on the intellectual life of societies, especially historical empires. McLuhan is primarily interested in the ability of technologies to slip into the background of human awareness. Despite the differences among these preoccupations we can detect a deep similarity in their perspectives on technology. Each is concerned with how technology can influence the way people interact with their world.

Innis

Harold Adams Innis was an economic historian who turned only late in his career to examining the role of communication technologies in society. He is not well remembered for having anything particularly profound to say about technology as such. His close friend, Arthur Lower, considered his major academic contribution to rest on his earlier and more purely historical

work on the fur trade and cod fisheries.[22] And yet, even in these early works in economic history there is a distinctive concern for an historian not only with recounting the events of a trade but also with its fundamental mechanics and import. As Lower recounts, Innis was concerned with "the vast place which the staple commodity--wool, wheat, wood, sugar, tobacco, fur, fish, cotton and a dozen others--has occupied in the sphere of trade. Its ramification into politics, empire building, the growth of civilizations and culture [all] provide [for Innis] material for endless writing."[23] For Innis, what was most noteworthy about changes in the means of communications and trade was the impact these changes brought about in societies, and most importantly for him, the influence such changes had on the rise and fall of historical empires.[24] The primary concern of his work on communication is the problem of how empires can maintain control over the space they occupy and how they can endure through time. Innis argues that in any society the media of communication greatly influence the forms of social organization set up to achieve these ends and, therefore, understanding the media of communication is one way of understanding the expansion

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[22]Arthur Lower, "Harold Innis," Journal of Canadian Studies 20, 4 (Winter 1985-86): 10.

[23]Ibid., 10-11.

[24]"If we assume the viewpoint of either the staples theorist or communication theorist commentators on the later work of Innis then the media and their characteristics are the determining factor."
John A. Watson, "Harold Innis and Classical Scholarship," Journal of Canadian Studies 12, 5 (Winter 1977): 59.

and eventual demise of empires.

Innis' later work focused on the roles that different media of communication play in the drama of the rise and fall of civilizations. As he states:

> We can perhaps assume that the use of a medium of communication over a long period will to some extent determine the character of knowledge to be communicated and suggest that its pervasive influence will eventually create a civilization in which life and flexibility will become exceedingly difficult to maintain and that the advantages of a new medium will become such as to lead to the emergence of a new civilization.[25]

And elsewhere:

> I have attempted to trace the implications of the media of communication for the character of knowledge and to suggest that a monopoly or an oligopoly of knowledge is built up to the point that equilibrium is disturbed.[26]

In these quotations we find two points of importance to Innis. The first is the same point later popularized by McLuhan that the medium is the message, technologies of communication are not simply neutral instruments. They not only influence what is communicated but they change the society in which they are used.

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[25]Innis, The Bias of Communication, 34.

[26]Ibid., 4.

The second point is that the creation and use of a medium always
sets up a distinct group, or "oligopoly" as Innis puts it, whose
power is rooted in the application of that particular medium.

However, while Innis was most interested in the effects on
empires of the dominant technologies of communication, he was
also interested in other types of technologies.[27] Another
cause of the fall of empires is "technological change which has
taken place in marginal regions which have escaped the influence
of the monopoly of knowledge."[28] For example, in The Bias of
Communication, Innis gives the following illustration of change
brought about in a civilization through the application of the
techniques of cross-breeding and mounted warfare:

> William Ridgeway has shown the significance of the
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> crossing of the light Libyan horse with the stocky
>
> Asiatic horse in the development of an animal
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> sufficiently strong to carry armed men, and in turn, of
>
> the cavalry. Charles Oman has described the defeat of

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[27] "As we know, Innis used a broad definition of a medium of
communication, never confining himself to a limited set list of
media when examining the so-called bias of space versus the bias
of time. Thus transportation routes (rivers, oceans, canals,
etc) were media reflecting a bias of space, while long-standing
institutions (churches, priesthood, political forms) were media
displaying a bias of time."
Jane Jenson, "From Silence to Communication? What Innisians
Might Learn from Analyzing Gender Relations," paper presented for
Harold Innis and Intellectual Practice for a New Century,
Condordia University, Montreal (October 13-15, 1994), 13.
Also see: Graeme Patterson, History and Communications:
Harold Innis, Marshall McLuhan, and the Interpretation of History
(Toronto: University of Toronto Press, 1990), 3-4.

[28] Innis, The Bias of Communication, 4.

the Emperor Valens at Adrianople in 378 A.D. by heavy
Gothic cavalry, the reorganization of the armies of the
Byzantine Empire, the defeat of the barbarians
following that reorganization, and the movement of the
barbarians, successfully resisted in the East, to the
conquest of the west.[29]

In this densely packed passage we can distinguish four
characteristics of technology: 1) Technological innovation tends
to be carried out by people on the fringe, whose practices are
not so formalized and entrenched in some regard that
experimentation is discouraged. As Innis also put this point,
"Technology tends to have impact first in frontier areas and to
push inward to break up conservative factors."[30] 2) Technology
is the application of knowledge that is not necessarily
scientific, in this case knowledge of horses and cross-breeding
and the application of this knowledge to the creation of a new
breed and technique of mounted warfare. 3) It results in the
emergence of a knowledge elite or oligopoly, in this case the
heavy cavalry. 4) The resultant technology expands human
capabilities. By developing heavy cavalry the Goths were able to
do something they could not do before, which was to defeat the
armies of a technologically advanced empire.

The characteristic of technology as a creative activity was
most often described by Innis by the term "invention." This

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[29]Ibid., 15.

[30]Innis, The Idea File, 2.1.

activity was not something that Innis dealt with very directly in his writing. As Joel Persky points out, "the principles of communication and cultural change are rarely articulated explicitly in Innis' work, but are implied in the examples of cultural change he cites."[31]

In the preface to The Bias of Communication, Innis describes his writings in the following way: "They emphasize the importance of communication in determining 'things to which we attend' and suggest also that changes in communication will follow changes in 'the things to which we attend.'"[32] For Innis, human life is not completely determined by technological factors. Human beings endeavour to create new means of communication because of certain concerns. Cultural development is directed toward the satisfaction of certain goals which, although influenced by technological factors, also involves human choice. Innis notes, for example, "Hydro-electric power is less mobile and flexible than petroleum. Distance from power site has been an important factor but the handicap has decreased with inventions and new materials."[33] Innis' point is that the goals of cultural development we choose are influenced by the means of communication and other technologies upon which we rely. For example, "On the one hand the skyscraper and increasing

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[31]Joel Persky, "The 'Innescence' of Marshall McLuhan," Journal of Canadian Culture 1, 2 (Fall, 1984): 4.

[32]Innis, The Bias of Communication, xvii.

[33]Harold Adams Innis, Essays in Canadian Economic History (Toronto: University of Toronto Press, 1958), 262.

compactness of population in large apartment houses have been encouraged by developments in electrical equipment, and on the other hand population has spread out over wide areas as a result of the automobile and metalled roads."[34]

Much of Innis' later work was directed towards the examination of the historical effects of the introduction of new technologies. An emerging concern with technology as a form of human activity with far reaching effects can be found, for example, in his critique of the effects of innovation on the role of universities in contemporary society. According to Innis, universities in this century were increasingly becoming institutions dominated by a process he describes as the "mechanization of knowledge"[35] in which the activity of teaching becomes increasingly reliant on "text-books, visual aids, administration," and the "examination system."[36] As a result, the role of the scholar changes. Academic work becomes increasingly directed towards the use of "matter-of-fact knowledge."[37] And one can also hear his concern with the effects of innovation in more general criticisms about contemporary Western civilization that he made in his later writings. In the period following the Second World War, Innis was disturbed by the claims made by some of his colleagues in the

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[34] Ibid., 263.

[35] Innis, The Bias of Communication, 190.

[36] Ibid., 194.

[37] Ibid., 85-86.

social sciences about the usefulness of their disciplines and a

certain infatuation with social innovation that these claims

seemed meant to support. As Innis put it, "In the words of one

of them: 'Great will be our good fortune if the lesson in human

engineering which the war has taught us is carried over, directly

and effectively, into our civil institutions and

activities.'"[38]

Innis was concerned that innovation was increasingly coming

to dominate other forms of academic activity, such as reflection,

disinterested research, and criticism. He felt that academics

were increasingly expected to be able to apply their knowledge to

the achievement of practical purposes in society. However,

unlike Grant or McLuhan, Innis did not live long enough to

pinpoint as explicitly in his writings the issue at the core of

what troubled him so much about his more pragmatic colleagues in

the social sciences. In chapter four we will discuss further why

the term "technology " is perhaps the best description for what

was of concern to Innis in his later writings.[39]

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[38]Ibid., 90.

[39]For a discussion of Innis' transition from working in the
field of economic history to the field of communications studies
see: A. John Watson, "Harold Innis and Classical Scholarship,"
Journal of Canadian Studies 12, 5 (Winter 1977): 45-61.
    Watson's discussion of this transition is very suggestive in
regards to Innis' interest in technology. As Watson writes:
"Innis' work [in communications] was not just concerned with the
succession of media of communications in human society but with
the broader question of the interplay of power and intelligence
in human affairs."(53-53)

McLuhan

McLuhan's primary interest was with media, that is, things that stand between human beings and the world. McLuhan also was interested in the effects of media on people and the ability of media and their effects to slip into the background of consciousness. McLuhan is popularly known as a communications theorist, but when he uses the phrase "the extensions of man" as alternative description of media it begins to become clear that his interest is in technologies in general and not simply in technologies of communication. For example, his Understanding Media includes clocks, houses, light bulbs, bicycles, airplanes, games, weapons, and automation in its list of media.

Throughout McLuhan's work there is an overarching concern with the process of technological change itself. As he says, "Constant change, for its own sake, threatens everybody."[40] The central aim of Understanding Media is the attempt to explore the nature of the process of technological change. In exploring this process McLuhan comes to the conclusion that technologies are not mere artifacts, but actions by which we "amplify and extend ourselves."[41] Part of this process, according to McLuhan, is the act of "autoamputation" in which a part of ourselves is "thrust out in the form of new invention."[42] The

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[40] Marshall McLuhan, The Global Village: Transformations in World Life and Media in the 21st Century, with Bruce Powers (New York: Oxford University Press, 1989), 98.

[41] McLuhan, Understanding Media, 64.

[42] Ibid., 66.

reasons behind the action of extension are cultural; "it is the accumulation of group pressures and irritations that prompt invention and innovation as counter-irritants."[43] The drive to develop new instruments is often prompted by the unrecognized changes in a culture of previously developed instruments because "physiologically, man in the normal use of technology (or his variously extended body) is perpetually modified by it and in turn finds ever new ways of modifying his technology."[44]

According to McLuhan the process of irritation and counterirritation proceeds largely in an unconscious fashion, prompting him to comment:

> Man becomes, as it were, the sex organs of the machine
> world [the world of technologies], as the bee of the
> plant world, enabling it to fecundate and to evolve
> ever new forms. The machine world reciprocates man's
> love by expediting his wishes and desires, namely, in

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[43]Ibid., 46.

[44]Ibid., 46.
A recent example from the world of computers provides an interesting example of the phenomenon of irritation. The advent of electronic mail has brought with it an increase in the ability to communicate, but the nature of computer networks means that one is also open to a large number of unsolicited messages from anyone on the vast network. The magnitude of this deluge of information has led to the creation of computer programs sometimes referred to as "Bozo filters" to screen one's messages. Such programs allow one to create a list of names of senders from whom one does not wish to receive messages. The result has been the development by the unsolicited senders of methods of obscuring their network names in order to slip past the Bozo filter programs.
Clifford Stoll, Silicon Snake Oil: Second Thoughts on the Information Highway (Toronto: Doubleday, 1995), 97.

providing him with wealth.[45]

His main point is that technologies, as the extensions of man, are not neutral instruments; they are responses keyed to an environment largely set up by the employment of other instruments. At some points in his writing McLuhan expresses the hope that the increasing pace of change would allow for a new awareness of this process, as in the following:

> Today technologies and their consequent environments
> succeed each other so rapidly that one environment
> makes us aware of the next. Technologies begin to
> perform the function of art in making us aware of the
> psychic and social consequences of technology.[46]

However, in general McLuhan is sceptical about the ability of people to be fully aware of the implications of their technological actions. For McLuhan the development of a technology always brings about the creation of a new technological environment. His points about the effects of media on culture, and the tendency of these effects to slip into the background of consciousness, are all based on the awareness that human beings are continuously engaged in the activity of responding to and creating new environments and that "the environment that man creates becomes his medium for defining his role in it."[47] This last point gives voice to the fact that

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[45]McLuhan, Understanding Media, 46.

[46]Ibid., viii.

[47]McLuhan, The Medium is the Massage, 157.

McLuhan does not see technology as dealing exclusively with the "machine world."

Grant

In his essay "Thinking about Technology," Grant tries to make his readers aware that technology, rather than being simply "the whole apparatus of instruments made by man and placed at his disposal for his choice and purposes," is also a distinct way of approaching the world.[48] This understanding of technology which emphasizes it dynamic nature is revealed in the following description Grant gives of modern life:

> In the novelties of our hourly existing, it is easy
> enough to recognize how much we have encompassed
> ourselves within technology. We sweep along super-
> highways to work in factories, or in the bureaucracy of
> some corporation; our needs are tended to in
> supermarkets and health complexes. We can cook, light,
> heat, refrigerate, be entertained at home through
> energy which has been produced and stored in quite new
> ways. If we have even a slight knowledge of the past
> we are aware that we can make happen what has never
> happened before, and we can have done to us what has
> never before been possible.[49]

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[48]Grant, Technology and Justice, 19.

[49]Ibid., 14-15.
"I never forget returning home to Toronto after many years

Technology is not something which encompasses us, that is

something external to ourselves, but rather it is something we

encompass ourselves within. Grant means by the term "technology"

the "endeavour which summons forth everything (both human and

non-human) to give its reasons, and through the summoning forth

of those reasons turns the world into potential raw material, at

the disposal of our 'creative' wills."[50] Technology involves a

certain attitude to the world, an attitude of control.

For Grant, technology results from the bringing together of

two broad types of human activity, knowing and making, in which

"both activities are changed by their co-penetration."[51]

According to Grant, in ancient societies a strong distinction was

drawn between practical knowledge and the kind of theoretical

knowledge necessary for understanding the good. This distinction

helped protect and preserve the integrity and distinctiveness of

both types of activity. However, Grant argues for modern people

the idea of theory often encompasses only the kind of

instrumental reasoning necessary for technological activity and

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[49](...continued)
in Halifax. Driving in from the airport, I remember being
gripped in the sheer presence of the booming, pulsating place
which had arisen since 1945. What did it mean? Where was it
going? What had made it? How could there be any stop to its
dynamism without disaster, and yet, without stop, how could there
not be disaster?"
    George Grant, "Conversation with George Grant" in George
Grant in Process, ed. Larry Schmidt, 86.

[50]George Grant, English Speaking Justice (Sackville: Mount
Allison University, 1974), 88.

[51]Grant, Technology and Justice, 13.

not the kind of contemplative knowing necessary for understanding the good.[52] Therefore, the union of knowing and making that technology represents changes both activities because within technological practice instrumental knowing is all that is required. Edwin and David Heaven argue that Grant's view of technology is that "reason as calculation has replaced thought in the classical sense as 'steadfast attention to the whole.'"[53] For Grant, this opens the possibility that contemplative knowing of the good can be excluded from a life dominated by technological practice and that the exercise of human creativity can thus become limited to the wilful manipulation of the world.

Grant argues that the tendency in modern civilization is toward an increasing expectation that all knowers should focus on seeking knowledge that is directly applicable to the creation and application of useful instruments rather than on seeking to apprehend the whole. It is not only natural scientists who are looked to for the knowledge necessary for technological activity. As Grant points out:

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[52]"It may perhaps be said negatively that what has been absent for us [as moderns] is the affirmation of a possible apprehension of the world beyond that as a field of objects considered as pragmata—an apprehension present not only in its height as 'theory' but as the undergirding of our loves and friendships, of our arts and reverences, and indeed as the setting for our dealing with the objects of the human and non-human world."
Grant, Technology and Empire, 35.
Also See: Grant, "Knowing and Making," in the Royal Society of Canada Transactions, 4th series (1974): 59-67.

[53]Edwin B. Heaven and David R. Heaven, "Some Influences of Simone Weil on Grant's Silence" in George Grant in Process, ed. Larry Schmidt, 69.

Much of the new technology upon which we are going to

depend to meet the crisis in the 'developed' world is

technology turned towards human beings . . . so that we

can be shaped to live consonantly with the demands of

mass society.[54]

This broadness of the understanding of technology is one of the

central aspects of the working definition; the knowledge involved

in technology need not be restricted to the knowledge of non-

human nature of natural science but can also include knowledge of

human nature that emerges from the social sciences and

humanities.[55] According to Grant, in technological activity

there is no distinction between sources of knowledge and no

distinction between the types of objects to which this knowledge

can be applied.

Grant's reasons for looking at technology as a distinctive

type of activity are rooted in his concern that it can supplant

other forms of ethical knowing and acting. As Grant puts it,

"The pursuit of technological advance is what constitutes human

excellence in our age and therefore it is our morality."[56] In

fact, Grant felt that technology in some ways was even beginning

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[54]Grant, _Technology and Justice_, 16.

[55]"In North America we have divided our institutions of
higher learning into faculties of natural science, social science
and humanities, depending on the object which is being
researched. But the project of reason is largely the same, to
summons different things to questioning."
Ibid., 37.

[56]George Grant, _Philosophy in the Mass Age_ (Toronto: The
Copp Clark Publishing Company, 1966), iv.

to take on the role of a religious world view in the form of a faith in progress, the aim of which was "the domination of man over nature through knowledge and its application."[57] He felt this faith was as easily embraced by religious and non-religious alike.[58]

Therefore, we can see that ultimately Grant regards technology as an expression of human freedom and creativity through the activity of seeking to control one's environment through the application of knowledge. Technology as a form of activity can be contrasted with other activities, such as contemplation, reflection, and recollection, but it can also influence these activities through the imparting of a guiding attitude of control. Therefore, for Grant, technology can also be viewed as "a mode of being."[59] That is, he sees technology as an approach whose guiding attitude can replace the attitudes of other ways of approaching the world and in so doing to transform these activities into technological activity. According to Grant, such a characteristic is an aspect of the

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[57] Ibid., 4.

[58] "The young who come to the multiversity from some tired [religious] tradition may not be much concerned with any discussion of 'faith and the multiversity'. They can accept the dominant paradigm with open arms because it is their ticket to professionalism and that is the name of the game."
    Grant, Technology and Justice, 68.
    "Moreover, as far as philosophy goes, it is almost impossible for anybody to try to apprehend the whole except in terms of the modern assumptions."
    Grant, "Conversation with George Grant" in George Grant in Process: Essays and Conversations, ed. Larry Schmidt, 86.

[59] Grant, Technology and Justice, 17.

very genesis of technology, which is the co-penetration of knowing and making--theoretical reflection and formal practice. Technology is a type of making which involves taking on the attitude that through the application of knowledge and reason human beings can create a world better fitted to human purposes. To use Grant's terms, technology implicitly involves some degree of faith "that all human problems will be solved by unlimited technological development."[60]

To put Grant's position most simply, one could say that for him technology is a type of problem solving.[61] Problem solving in general is the attempt to overcome an aspect of the world that is not to one's liking, but technology involves the improvement of the ability of people to deal with general types of problems. Grant argues, therefore, that technology embodies an "account of knowledge which is homogenising in its very nature."[62] Technological products are the result of the application of knowledge and reason and therefore they can never be idiosyncratic solutions. According to Grant technology is the ongoing quest to provide the one best means for solving a

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[60]Grant, Philosophy in the Mass Age, viii.

[61]"Every society has a regime of truth. Ours, Grant reminds us, is sustained by the account of knowledge where a wilful subject confronts a material and metaphysically neutral environment which can be represented as 'resource' or as a 'problem.' Such a confrontation is one where knowing and making co-penetrate to secure the object."
Peter C. Emberley, "Values and Technology: George Grant and Our Present Possibilities," 472.

[62]Grant, Technology and Justice, 24.

problem, or as Albert Borgmann puts it, "technology comes about when the rules of the arts and crafts are grounded in the scientifically articulated lawfulness of reality."[63] Homogenization threatens when such action consistently replaces contemplation and deliberation about what our ends should be. According to Grant heterogeneity can only be maintained when ends are deliberated and contested, for if they remain unchallenged the continued pursuit of optimal solutions to the problems our ends entail leads to non-idiosyncratic solutions and ultimately to the social order of the "universal homogeneous state" as foretold by Hegel and expounded upon by Alexandre Kojève.[64]

Because technology is for Grant a form of activity it is intimately related to the will.[65] Choosing to put an instrument to use involves ceasing the search for understanding about the problem which that instrument is meant to address and choosing to act on one's knowledge. Technology always involves one in practice. Consequently, technology is not for Grant an activity which can itself encompass contemplation and deliberation about the ends of practice because it is the formal endeavour to satisfy these ends. It can be coupled with the

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[63]Albert Borgmann, "Freedom and Determinism in a Technological Setting," Research in Philosophy and Technology 2 (1979): 79.

[64]Grant, Technology and Empire, 86.

[65]"We are confronted with three primals [in Grant's thought]: contemplation, love, and will."
Bernard Zylstra, "Philosophy, Revelation, Modernity," in George Grant in Process, ed. Larry Schmidt, 155.

activity of discerning and assessing ends, but it need not.[66]

The working definition is meant to address the three aspects of technology which Grant found most significant. 1) While technology can supplant contemplation or deliberation about ends, technological action always involves seeking to satisfy given desires or ends and, therefore, cannot be said to be value neutral or separable from human evaluation. 2) Technology cannot be limited to the material world or the world of material objects, and therefore any understanding of it must allow for the inclusion of technologies which are directed toward the control or self-control of human beings and the social world and technologies which are embodied through formal activity. 3) Technology is guided by an attitude of control that can influence the way that one engages in other types of human activity such as contemplation and deliberation about ends.

Defending the Definition

To defend any definition one has two tasks. First, one must show that the definition allows for a clearer understanding and proper use of the term in specific contexts, such as that of making policy decisions, and second, one must show that the

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[66] "Perhaps [as moderns] we are lacking the recognition that our response to the whole should not most deeply be that of doing . . . but that of wondering or marvelling at what is, being amazed or astonished by it, or perhaps best, in a discarded English usage, admiring it; and that such a stance . . . is the only source from which purposes may be manifest to us for our necessary calculating [i.e. technological activity]."
Grant, Technology and Empire, 35.

definition is neither too broad nor too narrow.

The only narrowness that might appear relates to the question of animal technology. The definition is not meant to exclude animal technology. If animals have reason and knowledge which can be exercised to create instruments that expand their species' capabilities then these instruments can be quite reasonably considered technologies according to our working definition.

The primary reason one should use such a broad definition of technology when considering policy issues is that any definition which restricts technologies to material objects obscures an important range of method-technologies which a philosophical investigation of technology should require. Not to include them would be to draw a distinction that could only be based on an assumption that human beings are incapable of treating themselves or others as objects. Holding such an assumption would force one to say that when human beings modify material to solve a problem (as in the case of the light-bulb) the result is obviously a technology--but when human beings modify the ways they act in order to solve a problem (such as the case of mouth-to-mouth resuscitation or military formations) the result is not a technology. Such an assumption seems arbitrary. As C.S. Lewis points out, "It is in man's power to treat himself as a mere 'natural object' and his own values and judgements of value as

raw material for scientific manipulation to alter at will."[67]
If one does not accept the assumption that the material of which
we are constituted is somehow ontologically distinct from the
rest of the matter in the universe then the most one would be
justified in doing is drawing a purely linguistic distinction to
show that one is talking about technologies that are instantiated
through human action. The term "technique" is often used to this
effect.

Contrary to what Don Ihde suggests in his definition of
technology, method-technologies cannot always be addressed by way
of reference to some tool-technology. As Mario Bunge points out,
"a theory of airways management does not deal with planes but
with certain operations of the personnel."[68] Understanding of
technology must make room for things like book keeping, driving
conventions, pedagogical methods, management plans, advertising
schemes, and military techniques. The introduction of such
structured forms of human activity can affect a culture in much
the same ways as the introduction of artifacts. Techniques
expand the range of human capability and involve the application
of knowledge and reason in their development. The only
difference between them and tool-technologies is that they happen

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[67]C.S. Lewis, "The Abolition of Man," in Philosophy and
Technology, ed. Carl Mitcham and Robert Mackey (New York:
Collier-Macmillan Ltd, 1972), 147.
    From C. S. Lewis, The Abolition of Man (New York: The
Macmillan Company, 1947)

[68]M. Bunge, "Technology as Applied Science," in
Contributions to a Philosophy of Technology, ed.
Friedrich Rapp (Boston: D. Reidel Publishing Co., 1974), 21.

to be physically made up of human beings.

My final arguments in support of the working definition are based largely on its ability to help clear up certain linguistic confusions. For instance, if we reflect on a common statement such as, "Technology will continue to transform the workplace,"[69] then the inadequacy of defining technology primarily in terms of an array of artifacts at our disposal becomes apparent. Artifacts can do nothing. However, if we think of technology as the activity of creating and using instruments then the meaning of the sentence is more clear. Its meaning is as follows: "The creation and use of new instruments will continue to transform the workplace." Technology is no longer some amorphous external reality that forces us to change the way we work. We change the way we work when we change the tools and methods we use. If one develops a method of using a computer to file memos instead of using a filing cabinet this is an instance of technology.

Shifting our understanding to seeing technology as a distinctive form of activity also helps to clarify certain claims commonly made about technology, such as that of Jorge Nef that "What we often forget in doom analysis is that technology is a human product."[70] The surface meaning of this sentence is fairly clear. Technologies are human products, and human beings

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[69] Elaine Bernard, "Technology and Labour," in Ethics and Technology, ed. Jorge Nef, Jokelee Vanderkop, and Henry Wiseman (Toronto: Wall and Thompson, 1989), 103.

[70] Ibid., 46.

can decide whether to use these products for good or ill purposes. Therefore, if there is some ethical problem to be addressed regarding technology, it is a problem with human beings and not a problem with the technologies involved. Nef would seem to want us believe that technologies are merely neutral instruments. What we end up with is another rendition of the cliche that guns don't kill people, people kill people. The difficulty with seeing this as Nef's point is how one is to reconcile it with the title of his article "Technology is About People," which is presented in a book with the title Ethics and Technology: Ethical Choices in the Age of Pervasive Technology. Why write about technology and ethics? Why not just write about ethics, if technologies are merely ethically neutral products, as Nef's very typical use of the term can lead one to believe? The understanding of technology as primarily an array of neutral artifacts is not very helpful if one is trying to think about how one should ethically respond to technology.

If, on the other hand, one takes technology as a form of activity the phrase conveys the following: "What we often forget in doom analysis is that . . . technology, as the activity of creating and using instruments which expand the realm of human capability . . . is a human product." This modification of Nef's sentence clearly does not work, but it does signal that we must return to Nef's starting point, which is that technology is about people. If we look at technology not as a human product but a kind of activity his point can be rephrased as, "What we forget

in doom analysis is that technology is a way of acting and human beings can control their actions." The understanding of technology as process leaves room for the discussion of ethical questions about the use of specific technological products, **and ethical questions about participation in technological action as such.**

Thus, in seeing technology as a type of activity it becomes possible to draw a distinction between ethical questions about specific technological actions and ethical questions about technological action as such. The distinction between these two types of question is what distinguishes the approaches of Appropriate Technology and Technology Assessment from the type of approach suggested by our three primary guides.

The approach they seem to suggest, which can be called "technology critique," focuses not on technologies, but on the technological process as a whole. Questions this approach raise concern the nature of technological activity and whether there should be limits to one's involvement in the technological process. In noting the difference between these approaches my intention is not to argue at this point for one or the other, but merely to point out that there is an important distinction that our working definition allows us to draw. The first approach seeks to improve the quality of our technological actions; the second approach seeks to understand the ethical limits to technological action as such.

The major distinguishing feature of the working definition

is that it defines technology in terms of activity which does not exclude the soft-technologies of structured human action. In short, the contention is that our three principle guides warn us that the word "technology" is not a synonym for the word "technologies" nor is it a mysterious external force that impinges on people's lives from the outside.

In setting out this definition our goal is not to provide a definitive definition. In common parlance the word "technology" often simply refers to the general array of devices. However, as Innis, McLuhan, and Grant make us aware, the concept of technology can also encompass much more. It can be seen to encompass the entire process required for putting these things to use. In considering the implications of the perspectives of Innis, McLuhan and Grant on technology it will be necessary to distinguish clearly between these aspects of possible uses of the word "technology." Therefore, in the rest of this examination we will generally use the term "technology" or the phrase "technological activity" when referring to the process of creating and utilizing useful instruments and the phrase "the array of technologies" when referring to the general group of instruments which are involved in technological activity.

CHAPTER 3: THE SCOPE OF TECHNOLOGY

Arising from the previous chapter is a question which must
be addressed further. How we can distinguish between what
technology is and what it is not? The understanding of
technology developed in chapter two encompasses many things not
commonly regarded as technologies. It emphasizes a view of
technology as a process in which we all participate continuously.
Perhaps the most common way of understanding technology is to
equate it with a vast array of material instruments. But this
common view is beginning to be questioned by others besides our
three primary guides. For example, commenting on technology in
the workplace, Elaine Bernard describes some reservations she has
with the "device paradigm"[1] understanding of technology:

> Generally in the workplace, we tend to use "technology"
> simply to refer to machines. But technology is a lot
> more than just machines. It is the means and process
> through which we as a society produce the substance of
> our existence. It is fundamentally a human process,
> with people at the centre.[2]

Embracing an understanding of technology that equates it more
with process than product leaves us with a problem of

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[1] Eric Higgs attributes the expression "device paradigm" to
Albert Borgmann.
    Higgs, "Musings at the Confluence of the Rivers Techné and
Oikos," 252.

[2] Elaine Bernard, "Technology and Labour" in Ethics and
Technology, ed. Jorge Nef, 98.

distinguishing the technological from the non-technological in the whole spectrum of human activity. Consideration of this question will help contribute to a better understanding of the broad conceptions of technology underlying the work of our three primary guides which in turn will help support the contention of the next chapter that it is their broad conceptions which prevent them from espousing programmatic responses to the challenge of technology. We will also consider the work of others who espouse broad conceptions of technology.

The first section of this chapter focuses on explicating the understanding of technology as process discussed in the previous chapter. This task will involve analyzing the technological process to gain a better understanding of the complex amalgam of human activities which make it up. Understanding the components which make up the process will help us to distinguish technological activity from other forms of human activity and technological products from other types of products. The next three sections contain discussions of the intimate relation between three major areas of human activity and the technological process. An examination will be made of scientific, artistic, and moral activity, with the goal of locating the shared and distinguishing features of these types of activity and technological activity. The last section analyses the relationship between the technological process and the cultural process as a whole.

In the course of the discussion it should become clear what

an overwhelming role technology plays in the three areas of
cultural activity and in the cultural process as a whole.
Chapter four will argue that being aware of the distinction
between technological and non-technological activity is of
absolute importance to ethics and public policy consideration
because technological activity can supplant other types of human
action, particularly certain kinds of ethical and political
action to limit technological power. It can do this because of
the overwhelming role it plays in human life.

Technology as Process

A major difficulty in attempting to define technology is
rooted in its heterogeneous nature. To borrow a phrase used by
Ernst Cassirer to describe language, but just as applicable here,
technology is not "a simple and uniform phenomenon."[3] As Grant
suggests in his contemplation of the ancient Greek root terms
"techné" and "logos," technology can be seen to involve the
interaction of at least two broad categories of activity, viz,
knowing and making.[4] Such broad concepts of activity clearly
can be broken into more specific categories of activity.
Sociologist Robert E. McGinn, for example, divides the
technological process into the following phases:

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[3]Ernst Cassirer, An Essay on Man (New Haven: Yale University Press, 1972), 29.

[4]See also David Roochnik, "Socrates' Use of the Techne-Analogy." In Essays on the Philosophy of Socrates, ed. Hugh H. Benson (New York: Oxford University Press, 1992), 185-197.

1. Identification of a specific need, desire, or opportunity to be met, satisfied, or exploited by means of a projected technic (or related construct);

2. A design phase, however rudimentary;

3. A production phase, however simple or crude; and, usually,

4. A use phase, however ephemeral.[5]

McGinn's outline of the technological process shares with the understanding of our three guides an awareness of the importance of emphasizing the connection between technology and action. Technology is a phenomenon that emerges through discrete activities like identification, design, production, and use.

Another aspect that McGinn's outline has in common with the understanding of technology presented in chapter two is the idea that technology is not simply the purview of the technician or expert. All the different types of activity he mentions need not be engaged in by specialists. As Langdon Winner points out,

In the complex, large scale systems that characterize our time, it is seldom the case that any single individual or group has access to a technological process along the whole of its conception, operation, and result. More common is a situation in which persons have the opportunity to enter into the process at one point only. The most common of roles in this

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[5]Robert E. McGinn, Science, Technology and Society (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1991), 18.

regard is that of consumer who enjoys the end products

of the technology.[6]

If one's role in the technological process is merely to engage in

the activity of putting an instrument into use, it is

understandable that one might not view one's actions as being

particularly technological in nature. However, Grant's point

about the co-penetration of knowing and making warns that such a

view would be ill-founded. McGinn's outline makes it even

clearer how technology can touch the lives of all individuals.

Technology is not just about invention but includes the

entire sequence of activities leading to and including the use of

inventions. Unlike McGinn, who adds the word "usually" before

the fourth stage, the understanding of technology developed in

the previous chapter considers the use phase as an essential part

of technology. If one simply isolates a problem and imagines a

solution, makes the instrument, but then does not use it to solve

a practical problem, one does not have an instance of a

technological process. As Gabriel Marcel puts it, "[technology]

amounts to nothing more than a specific instance of our general

application of our gift or reason to reality."[7] One only has a

complete technological process when an instrument is actually

used to affect the real world and not just one's imagination.

For our three guides technology becomes interesting only when it

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[6]Winner, Autonomous Technology, 228.

[7]Marcel, Man Against Mass Society, 82. [My emphasis]

comes to fruition in practice.[8] Or as Winner suggests,

technologies become technologies only after they leave the

laboratory and become "forms of life."[9]

However, the technological process is not just the use

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[8]"Long before the French Philosopher, Michel Foucault, said
that power is the locus of the modern century, Innis in his
studies of neotechnical capitalism had already revealed exactly
how the power system works: by investing the body through
capillaries of diet, lifestyle, and housing."
        Kroker, Technology and the Canadian Mind, 120.
        "It may be because he tried to show to what extent we might
be creatures of our own artifacts that McLuhan began to appear to
some as a liberating force and to others as a threat."
        Derrick de Kerckhove, "Understanding McLuhan," Canadian
Forum (May 1981): 9.
        "Grant has taught us that technology is not merely an
ensemble of machines, skills, techniques and organizational
methods, constituting a neutral instrument for use in the
direction of the purposes we legislate. Instead technology (as
the background or context of our existence) constitutes us in our
practices and skills, our self interpretations and moral choices,
our desires and our expectations."
        Peter C. Emberley, "Values and Technology: George Grant and
our Present Possibilities," Canadian Journal of Political Science
XXI, 3 (September 1988): 475.

        [9]Langdon Winner "Technologies as Forms of Life," in
Epistemology, Methodology, And Social Science, edited by Robert
S. Cohen and Marx W. Wartofsky (Dordrecht, The Netherlands: D.
Reidel, 1983): 249-264.
        In using the phrase "forms of life" Winner is drawing on the
work of Ludwig Wittgenstein. Wittgenstein's analysis of language
makes use of examples of people engaged in what are, according to
the understanding being developed here, technological enterprises
such as construction involving "slabs." One of Wittgenstein's
points is that language is "part of an activity, or a form of
life."(11e) "Think of the tools in a tool-box: there is a
hammer, pliers, a saw, a screw driver, a rule, a glue-pot, glue,
nails and screws. -- The functions of words are as diverse as the
functions of these objects. (And in both cases there are
similarities.) Of course, what confuses us in the uniform
appearance of words when we hear them spoken or meet them in
script and print. For their application is not presented to us
so clearly. Especially when we are doing philosophy!".
        Ludwig Wittgenstein, Philosophical Investigations (New York:
Macmillan Publishing Co., Inc., 1968), 6e.

phase. The activity of the final stage of a technological

process can, perhaps, be better described by the expression

"technical process,"[10] which is often used to refer to specific

activities involved in the use of certain methods and tools. It

is a contention of this inquiry that our three guides lead their

readers to an understanding of technology which encompasses the

entire process leading to and including the practice of specific

technical processes.

Therefore, an instance of a technological process is not

actualized until the final stage in which a solution is put to

use. People engaged in envisioning, design and production phases

of technologies are not necessarily involved in a technological

process but in a potential technological process. For example,

the adhesive used to create the famous "Post-It" note was

invented by a scientist at the 3M corporation some time before

someone else thought of a practical use for adhesive which did

not stick.[11] Therefore, it is only at the use phase that one

can know with certainty that one is engaging in a technological

as opposed to purely inventive process. It is easiest,

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[10]"This social heritage is the key concept of cultural
anthropology. It is usually called culture. . . . Culture
comprises inherited artifacts, goods, technical processes, ideas,
habits, and values."
   B. Malinowski, "Culture" in Encyclopedia of the Social
Sciences, 4 (New York, 1931), 621; quoted in Culture: A Critical
Review of Concepts and Definitions, ed. A. L. Kroeber and Clyde
Kluckhohn, with the assistance of Wayne Untereiner and appendices
by Alfred G. Meyer (New York: Vintage Books, 1963), 90.

[11]Valérie-Anne Giscard d'Estaing and Mark Young, eds.,
Inventions and Discoveries 1993: What's Happened, What's Coming,
What's That? (New York: Facts On File, Inc., 1993), 111.

therefore, to recognize that one is doing something technological in phase four, when one actually uses an instrument to solve a problem. It is more difficult to recognize that one is involved in a technological process in the first three phases outlined by McGinn, because, as Grant might have put it, one cannot know whether the co-penetration of knowing and making will lead to offspring.[12]

It can be very difficult conceive of the entirety of a technological process. Imagine the leadership of a company deciding to restructure operations in order increase the competitiveness of the company. For example, Jeremy Rifkin discusses the way many Japanese companies have come to structure their production in the post war years:

[They] have found that by including everyone in at the design stage, crucial bottom-line costs can be held to a minimum. The notion of continual improvement is called kaizen and is considered the key to success of Japanese production methods. Unlike the older American model, in which innovations are made infrequently and often in a single changeover, the Japanese production system is set up to encourage continued change and improvement as part of its day-to-day operations. To achieve kaizen, management harnesses the collective experience of all its workers and places value on joint

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[12]Grant, Technology and Justice, 13.

problem solving.[13]

According to the understanding of technology developed in the previous chapter, kaizen would be an example of a method-technology, and the decisions and actions leading to its implementation in a workplace would represent instances of technological activity. The decision to implement involves the restructuring of the institution with the aim of improving its performance. Not only is there a completion of a technological process when the company puts kaizen into use, but also when the workers use the methods and tools that are involved in the kaizen method. Under the expansive understanding of technology people who are members of institutions can be considered parts of technologies. It is not unusual to talk of people as "cogs" in machines. However, unlike mechanical parts, people can change their relation to the machine; for example, people can creatively conceive and implement modifications to the institutions of which they are a part. This basic human ability is, in fact, precisely the ability that the technology of kaizen seeks to harness to enhance production processes.

In relation to the above scenario, it should also be noticed that the technological process of Kaizen would change the corporation. The customers or clients of the corporation could also, therefore, be said to be engaging in the technological process of Kaizen when they make use of the goods or services of the "new and improved" corporation. This might seem an immensely

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[13]Rifkin, The End of Work, 98.

complex and confusing way to conceive of technology, but complexity is a common characteristic of technology, even if conceived of only as artifact. Many technologies are actually complex amalgams of component technologies; for example, the average car contains over 14,000 individual parts.[14] The parts of a technology can be the products of a technological process even while the whole is also a product of a technological process. As one commentator on the history of the computer notes, "What may not be surprising, but can be heartening, is that the computer appears to be the result of many people trying to solve many problems in many fields--as a natural consequence of getting on with the business of life in general."[15]

The example cited above is meant to help illustrate something of the immensity of one's potential involvement in technological processes and the burden this involvement must place on one's ability to maintain awareness of one's involvement. The immensity of this involvement should become even clearer in the following examination of morality, science, and art, as we examine the relation of these three important areas of human cultural activity to the technological process. This analysis will also provide an opportunity to consider more closely the first three phases of the technological process as outlined by McGinn, because the roles played by morality, science

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[14]McGinn, Science, Technology, And Society, 32.

[15]Glen Fleck, ed., A Computer Perspective (Cambridge: Harvard University Press, 1973), 161.

and art in the technological process roughly correspond to these phases. The final section of the chapter deals with the ultimate arena of human activity, culture. Even here a parallel holds with the scheme outlined by McGinn. The final phase of his breakdown of the technological process is the use phase when technologies become "forms of life."

Technology and Morality

Gabriel Marcel writes, "It is obvious that there is no technical process which is not either actually or potentially at the service of some human desire or fear."[16] Grant argues that human desires, including those guided by ethical considerations, are what give rise to technological processes and these desires, therefore, are essential parts of these processes. As he puts it, "instruments and standards of justice are bound together."[17] Desires are what help to demarcate the problems which a technology addresses. Technological processes, therefore, can serve as indicators of the values of the individuals involved in these processes and thus can help indicate the values of a society. Innis' description of the development of writing gives some indication of his understanding of the role that values play in guiding technological development. According to Innis, Semitic peoples adapted elements of the complicated and bulky forms of Egyptian and

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[16]Marcel, Man Against Mass Society, 89.

[17]Grant, Technology and Justice, 28.

Summerian writing to their own strong oral traditions. The result was a more flexible form of writing better suited to the religious and cultural interests of these peoples.[18] Innis remarks: "Semitic people borrowed the Summerian system of writing but retained their language and in turn improved the system of writing through contacts with the Egyptians. The Phoenicians as a marginal Semitic people with an interest in communication and trade on the Mediterranean improved the alphabet to the point that separate consonants were isolated in relation to sounds."[19] Both Grant's and Innis' comments imply that values of various sorts play essential roles in technological processes.

Technological processes begin with the identification of a problem, taken in the sense of an obstacle from the ancient Greek root word "problema" meaning "anything placed in front of me."[20] One's values, moral or otherwise, can play an important part in the identification of problems. If one believes that all people should have enough food to eat, and some people in one's community are starving, then it can be assumed that finding an instrument which would help increase the food supply or aid in the distribution of existing supplies would be something worthy of consideration and effort.

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[18]See: Innis, The Bias of Communication, 6-8. Also See: Ronald Keast, "'It Is Written -- But I say Unto You': Innis on Religion," Journal of Canadian Studies 20 (Winter 1985-86): 14-20.

[19]Innis, The Bias of Communication, 7

[20]Marcel, Man Against Mass Society, 89.

Ethical consideration can also play a role in the refinement of technologies. The use of technologies that result in situations which clearly fall below moral expectations can lead to the identification of new problems, which can be addressed by efforts to refine or modify these technologies. Michel Foucault has examined the prison as reformatory and the historical process of development which leads to modern penal systems. This process, according to Foucault, has involved a continual struggle towards an ideal. As one commentator notes:

> What Foucault illustrates . . . is a curious anti-functionality of the norm: the failure of prisons to fulfil their planned function as reformatories, far from precipitating their breakdown acts instead as the impulse for a perpetual effort to reform the prison which continually reinvokes the model of its original aborted programme.[21]

If ethical ideals help direct one to problems which can be dealt with only by the refinement of instruments, these ideals have played an essential part in these processes of technological refinement.

What might be called "negative value commitments" can also conceivably play a part in motivating technological processes, as might be the case with certain instruments of torture. However, what is more often the case is that a degree of ambiguity

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[21]Michel Foucault, _Power/Knowledge: Selected Interviews and Other Writings_, edited by Colin Gordon (New York: Pantheon Books, 1980), 250.

characterizes the creation of instruments, even what might appear to be the most horrendous technological creations. For instance, many of the scientists who encouraged the United States government to develop the atomic bomb appear to have thought of their actions in ethical terms. Eugene Wigner, one of the group of scientists who urged the United States government to develop the bomb, has said:

> Although none of us spoke much about it to the authorities--they considered us dreamers enough as it was--we did hope for another effect of the development of atomic weapons in addition to the warding off of imminent disaster. We realised that, should atomic weapons be developed, no two nations would be able to live in peace with each other unless their military forces were controlled by a common higher authority. We expected that these controls, if they were effective enough to abolish atomic warfare, would be effective enough to abolish also all other forms of war. This hope was almost as strong a spur to our endeavour as was our fear of becoming the victims of the enemy's atomic bombings.[22]

To fully understand the Manhattan project one must understand the ethical dimension of the scientists' motivation.

From the standpoint of the understanding of technology as

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[22]Richard Rhodes, The Making of the Atomic Bomb (New York: Simon and Schuster, Inc., 1986), 308.

process it makes little difference what kind of ethical theory one holds when it comes to the role that ethics can play in providing motivation for participation in technological processes. As Frank Hurnik and Hugh Lehman point out about recent efforts of agriculturists to increase outputs and reduce the drudgery of farm work:

> To the extent that these goals have been achieved, an increasing number of people have led longer, and probably, happier lives. If one looks at this result within the perspective of a teleological ethical theory, this is clearly an improvement. The accomplishment of these goals is also justified on deontological grounds. In the industrialised world, since the end of World War II, we have moved closer to the ideal of treating every person as a free moral being capable of directing his or her own life. Without the abundance made possible in part by modern agriculture, it is unlikely that we would have achieved as much.[23]

Any moral theory will provide certain ideals and expectations by which to contrast existing conditions with hoped for conditions. Such a contrast can serve to highlight problems which can be responded to with technological activity.

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[23]Frank Hurnik and Hugh Lehman, "Technology and Choice in Agriculture," in Ethics and Technology: Ethical Choices in the Age of Pervasive Technology, edited by Jorge Nef, Jokelee Vanderkop, and Henry Wiseman, 73.

However, moral life is also about the limitation of actions and, considering the scope of technology, this will clearly include technological actions. Consider the recent protests in Brightlingsea England. The aim of these protest was to call on English livestock producers not to ship calves to the continent where they would be housed in veal crates, which Britain banned in 1990.[24] However, it is easier to find examples of ethical ideals fostering technological activity. One need only think of the vast number of charitable organizations patronizing research for cures of various diseases.

The philosophical discussion of justice, beneficence, autonomy, and other moral principles in relation to specific circumstances can play an important role in encouraging and directing technological activities. A moral philosopher arguing for the permission of physician-assisted suicide is calling for the implementation of a new form of human capability to deal with a certain type of problem. He or she might also make suggestions about the form this capability should take, such as guidelines for the practice, and suggestions for the types of equipment or drugs to be used. Ethical philosophers can also play a part in refining technologies. If a philosopher argues that a technology should not be put into production because it is not safe, or effective, or efficient, such criticisms can spur efforts to

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[24]Catherine Ens, "Moral wrong righted by people of Brightlingsea", The St. Catharines Standard, 5 October 1996, A8.
    Also see: Stephen R. L. Clark, "Riots at Brightlingsea," Journal of Applied Philosophy 13, 1 (1996)

modify or replace the technology.

As Grant puts it, technology is about knowing that merges with making and part of this knowing can be certain kinds of ethical knowing; for example, knowing that cancer is a great evil. But if some consideration of a moral obligation leads one to reject some form of making, or to encourage others to do so as in the Brightlingsea case, this obligation could be said to have played a part in a process that is the logical opposite of a technological process.[25]

An ethical question in response to a problem is, "What should be done?" This is also a technological question. However, another kind of ethical question is, "What should not be done?" This kind of ethical question cannot be translated directly into a technological question. For instance, in the case of global warming the first kind of question can be addressed through action meant to facilitate the adoption of new fuel sources such as wind, solar, or tidal forms of power. The second kind of question can be addressed through action which involves considering the rejection of some form of activity

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[25] Grant's Technology Theorem: technology = knowing and making ($k \cdot m$).
1. $\sim(k \cdot m)$ Negation of Grant's Technology Theorem
2. $\sim k \vee \sim m$ From 1 by De Morgan's Theorem
3. $k \supset \sim m$
According to Grant's theory, if one wishes to set limits to technology one can either renounce knowing or renounce making (2). If one cannot or does not wish to renounce knowing then one must renounce making in order to limit technology, or in other words, if one knows how to do something but does not do it, one is engaged in action that is the logical negation of technological action.(3)

relating to the application of fossil fuel. But one can always substitute a superficially positive ethical question for the negative kind of questioning, for example, the consideration of whether a law should be passed to make people modify their use of fossil fuels. Here, however, the emphasis has shifted from consideration of the rejection of some particular use of fossil fuel to the consideration of appropriate interference in people's lives. Or one can simply substitute the positive ethical question for the negative one and consider what should be done instead, such as in the case of seeking cleaner substitutes for fossil fuels. In this case one can avoid completely consideration of the negative kind of ethical question. As Innis remarks: "Much of what is called progress has lain in the discovery of substitutes."[26]

The ability of every ethical concern to be turned into some kind of technological project leads to the question of whether all ethical issues should be resolved by technological action, as opposed to action which is not technological. The strong commitment to technological problem solving throughout Canadian society seems to indicate that the popular answer to this question is yes. If this is the right answer then ethical life need only involve getting on with the job of creating novel means for achieving one's ethical ideals. However, the non-technological ethical stance we will be examining in the next chapter questions whether this is an adequate ethical stance.

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[26]Innis, The Idea File, 27.100.

Our three primary guides all point to a possibility that we can technologically pursue our ethical ideals to an ethically questionable extreme. As Innis notes, quoting Samuel Butler: "All progress is based upon the universal innate desire on the part of every organism to live beyond its income."[27]

Technology and Science

What is the relation of technology to science? According to Grant, in modern technology the "separation between science and making is increasingly overcome."[28] For Grant, science obviously plays an important role in the technological process. It can provide knowledge by which problems can be identified and solutions entertained in the form of instruments. On an extremely simple level science can be looked upon as a body of knowledge which can feed the technological process.

Not only does science feed the technological process with knowledge, but scientists also make extensive use of technologies in their pursuit of knowledge. Perhaps the most important of these technologies is the scientific method itself as an "instrument of thought".[29] Francis Bacon writes:

There remains but one course for the recovery of a sound and healthy condition,--namely, that the entire

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[27]Innis, The Bias of Communication, 140.

[28]George Grant, "Knowing and Making," Royal Society of Canada Transactions, 4th series (1974): 61.

[29]Cassirer, Essay on Man, 13.

work of understanding be commenced afresh, and the mind
itself be from the very outset not left to take its own
course, but guided at every step; and the business be
done as if by machinery.[30]

The practice of modern science is characterised by the increasing
application of expensive instruments and complex methods. The
increasingly complex and expensive technological aspects of
science have led to the idea that has become known as "big
science", referring to the vast scientific establishments with
multi-million dollar budgets supported by the state or big
business.[31] Nicholas Rescher argues that technological advance
is necessary for scientific progress. As he puts it, "In natural
science we do the easy things first. The very structure of
scientific enquiry, like an arms race, forces us into a constant
technological escalation where the frontier equipment of today's
research becomes the museum piece of tomorrow under the
relentless grip of technical obsolescence."[32] Rescher is not
alone in emphasizing the essential role technology plays in
scientific activity. As Michael Smithurst writes: "It is not so
much that technology evidences [scientific] theories, as sets the

[30]Francis Bacon, Novum Organum: Book I in The World's Great
Thinkers: Man and the Universe: The Philosophers of Science, ed.
Saxe Commins and Robert N. Linscott (New York: Random House,
1947), 74.

[31]D.J. de Solla Price, Little Science, Big Science (New
York: Columbia University Press, 1963)

[32]Nicholas Rescher, "Scientific Progress and the 'Limits of
Growth." Chap. in Unpopular Essays on Technological Progress
(Pittsburgh: University of Pittsburgh Press, 1980), 93.

conditions under which they can truly be scientific theories at all."[33]

Not all scientific knowledge is knowledge that can serve technological processes, nor is all scientific research directed towards finding useful knowledge. However, any form of knowledge that can be used in the creation of instruments that allow people to solve practical problems and therefore control their world better can contribute to technological processes. One might ask whether scientific theories are technologies because they enable people to understand the world better. This possibility is certainly alluded to by Kuhn in his discussion of the role played by paradigms in the practice of normal science.[34] In the guise of scientific paradigms, theories are essential guides to scientific activity; for example, the theory of evolution can be considered an essential instrument for guiding biological research in fruitful directions. And the question of the truth of scientific theories is no barrier to these theories being put to use technologically. As one commentator on the social sciences notes:

We have witnessed, particularly in the last century, an

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[33]Michael Smithurst, "Do Successes of Technology Evidence the Truth of Theories?" Philosophy and Technology, Royal Institute of Philosophy Supplement: 38, ed. Roger Fellows (Cambridge: Cambridge University Press, 1995), 27.

[34]Thomas S. Kuhn. The Structure of Scientific Revolutions (Chicago: University of Chicago Press, 1962), 43-51.
"The scientific community is a supremely efficient instrument for maximizing the number and precision of the problem solved through paradigm change."
Ibid., 166.

impressive growth in the practical application of social science. Its underlying principles are only precariously established, but this has not deterred thoughtful and active men from developing methods that have been increasingly well adapted to the answering and resolving of practical problems.[35]

There is also the well known cases of many medical advances which have preceded scientific verification. For example, "The use of certain biochemicals in the practice of medicine antedates the development of science."[36] Even the informal understanding of gases was enough to provide a basis for the development of the first steam engines.[37]

Modern science is increasingly reliant on technological instruments for achieving new results. However, there also appears to be a trend for science to focus on precisely those projects that will provide for practical technological pay-offs.

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[35] John Madge, The Tools of Social Science: An Analytical Description of Social Science Techniques (Garden City, New York: Doubleday and Company, Inc., 1965), xv.

[36] James K. Feibleman, "Pure Science, Applied Science, and Technology," in Philosophy and Technology: Readings in the Philosophical Problems of Technology, ed. Carl Mitcham and Robert Mackey (New York: The Free Press, 1972), 36.

[37] F. M. Scherer, "Invention and Innovation in the Watt-Boulton Steam-Engine Venture," in Technology and Culture, ed. Melvin Kranzberg and William H. Davenport (Scarborough: The New American Library of Canada Ltd., 1975), 293-317.
"Whenever production can be improved without it, technology can perfectly well dispense with theory."
Robert Grant, "Values, Means and Ends," Philosophy and Technology, Royal Institute of Philosophy Supplement: 38, ed. Roger Fellows (Cambridge: Cambridge University Press, 1995), 180.

This trend is the attempt by scientists and other academics to increase their participation in technological processes. As Innis notes, "There must be few university subjects which . . . refrain from pleading that their courses are useful for some reason or other."[38] According to the understanding of technology as process any research programme directed toward the creation of useful products—whether tool, method, or institution—could also be called a technological research programme. Concerns voiced about the performance of Canadian students in scientific fields when compared with students of other nations, with the attendant calls for improvements in science education, give witness to the desire to increase student performance in those disciplines perceived to be more useful in supporting technological development. As McGinn notes, such emphasis has led to an increasing number of scientists in society.[39]

However, it is perhaps understandable that some scientists might not conceive of what they do as being particularly technological. As the discussion of the technological process makes clear, scientific discovery is only a potential contribution to technological processes. To the extent that scientific knowledge is sought only to satisfy curiosity and is

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[38]Innis, The Bias of Communication, 85.

[39]"Ratio of Scientists and engineers in American Society in America in 1900 was 1 to 1,087. Ratio of Scientists and engineers in America in 1988 was 1 to 45."
McGinn, Science, Technology and Society, 43.

not put to use, scientists can rightly claim to be engaged in what is sometimes called "pure research." However, to the extent that they participate in the building and application of instruments, either for their own research, or as a result of their research, scientists do participate in technological processes.

Edwin Levy has drawn attention to what he calls "mandated science"[40] which is the increasing role that scientists are called to play in the process of fashioning public policy. As Grant also notes, "Many scientists are now, above all, planners and central members of the ruling class."[41] Such participation of scientists in making public policy seems to fall into two categories. Many scientists participate in the creation and application of various public policy instruments. For example, many are employed by institutions such as the Canadian Radio and Telecommunications Commission or the Atomic Energy Commission, or the Office of Technology Assessment in the United States. But as well, some scientists act as critics of certain technological activities and bring to bear their research and knowledge to help support their position, such as the scientists of the Pugwash Conference who oppose the proliferation of nuclear weapons. Scientific research and knowledge can play a role in motivating

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[40] Edwin Levy, "Judgement and Policy: The Two Step In Mandated Science and Technology," in Philosophy of Technology: Practical, Historical and Other Dimensions 6, Paul T. Durbin, ed. (New York: Norwell Kluwer, 1989), 41-55.

[41] Grant, Technology and Justice, 16.

action which is not technological in orientation. But such scientific research can often face serious opposition in a society more inclined towards seeking novel technological capabilities which can emerge from science.

Scientific knowledge as such only increases the potential to control the world, it does not actually increase control of the world. This does not mean scientists are any less participants in a technological process if they are personally uninterested in the practical benefits of their research. Like other people they can be participants in technological processes without being fully aware of their participation.

Technology and Art

There is an advertising jingle which captures a popular conception of the difference between technology and art: "The 'mag lite' flashlight is a work of art, that works." According to this understanding what distinguishes works of art from works of technology is the ability of technologies to solve practical problems. A contemporary assumption is that works of art are not designed to solve practical problems but to carry out other functions. As Milovan Djilas argues: "The best, the most genuine art never pretends to change anything. It is an incomplete, never ending narrative of human pains and disappointments, of the world as man experiences it."[42] According to this

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[42]Milovan Djilas, "Toward an Imperfect World," in Living Philosophies, ed. Clifton Fadiman (Toronto: Doubleday, 1990),

understanding one of the essential functions of art is to be open

to interpretation, but this understanding is not universal. For

example, as Anthony O'Hare points out, "Plato, in common with his

fellow Athenians of the fifth century BC, put painters in the

same category as shipwrights, builders and 'other

craftsmen'."[43] Despite the stark distinction commonly drawn

today between art and technology there are still certain

relatively uncontentious points that can be made about the

intimate relation between the two.

If works of fine art are not commonly perceived as

technologies one can still say that they can function within

technological processes, such as when they are used for the

purpose of decoration. In this case these works of art

contribute to technological processes directed at creating

certain desired mental states relating to living spaces. And

there are other kinds of artwork aimed at creating other desired

mental states. In Scotland after the Rising of 1745, for

example, "The playing of the pipes was forbidden, because the

Duke of Cumberland had correctly observed that they were 'an

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[42](...continued)
191.
    "A work of art is produced by a human being in order to
express some vision and set of intentions its creator has in
making it. As such, a work of art is of interest for what it
reveals about the human world, the world in which intentions,
institutions and traditions introduce meaning into an otherwise
meaningfully empty universe."
    Anthony O'Hare, "Art and Technology: An Old Tension"
Philosophy and Technology, ed. Roger Fellows, 147.

[43]Anthony O'Hare, "Art and Technology: An Old Tension"
Philosophy and Technology, ed. Roger Fellows, 146.

instrument of war'."[44] Artwork, of course, can also be used in advertising, and it can also serve the sole purpose to entertain as "the agreeable occupation of our attention--in the sense of what we like to happen."[45] In these instances works of art can be seen as being parts of technological processes aimed at the manipulation of people's minds.

Artists must also use technologies in what they do. Painters use brushes, pigments, and methods of capturing perspective. Dancers use special shoes, exercises and techniques of dance. These technologies are the media which aid in the expression of some work of art. Like scientists, artists sometimes can inadvertently develop technologies through their work. Painters, for instance, developed new kinds of oil paints which were later used in the first printing presses. Artists can be technologists in addition to being artists. And there have always been those arts, such as architecture, "which have been at the intersection of art and technology."[46]

The artistic process clearly involves the use of technologies. Artistic works can be necessary components of other technological processes. Sometimes the artistic process can even lead to the invention of technologies. But many would still argue that the artistic process is totally distinct from

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[44]Caroline Bingham, The Land of Scots: A Short History (Glasgow: Fontana Paperbacks, 1983), 157.

[45]Grant, Technology and Justice, 45.

[46]Kristin Leutwyler, "Nicholas Negroponte: The Guru of Cyberspace," Scientific American 273, 3 (September 1995), 50.

the technological process. From this point of view the goal of the artistic process is not the creation of a useful instrument, but something else. So art and technology can share much but the ultimate ends of these processes can still differ. The end of the artistic process has been described as the stimulation of human consciousness, awe, sensitivity, or awareness--not an increase of the capability of human beings to control their environment. Margaret Laurence once described her writing as the attempt to show how extraordinary the so-called ordinary is.

Clearly the artist shares with the technologist some desire to create. As Grant argues, the technological process always involves some kind of making. Some artifact must be constructed, some system assembled, or some routine performed. In this creative respect, technology and art strongly overlap. It is only the ultimate end of each process that can be said to differ. For the technician, the end is increased human capability, for the artist, the end is something else, such as human wonder or beauty. But there seems to be nothing intrinsic to these two processes that would indicate that they cannot be engaged in at the same time.

Artists can seek new instruments to solve problems. Many artists enjoy exploring new media in the quest for finding new ways of artistic expression. To the extent that artists master new instruments, we can say that artists are involved in technological processes; for instance, there are artists today

mastering the new field of virtual reality.[47] The works that

they produce may not be technologies, but all the efforts of such

artistic explorers in mastering new media, according to our three

guides, can be described as technological.

Technology and Culture

One sometimes hears complaints about the conflict between

technology and culture, as in a recent issue title of a journal,

"Culture's Battles Against Technology."[48] The understanding of

technology as process rejects such suggestions that technology

can be separated from culture. Technologies are always also

cultural products, and therefore it is reasonable to assume that

the technological process is an essential part of the cultural

process. However, as Umberto Eco notes, "despite decades and

decades of cultural anthropology (which has taught us that even

defecatory positions are part of a community's material culture),

we still tend to speak of culture only with reference to 'high'

culture (literature, philosophy, classical music, gallery art,

and stage theatre)."[49] The understanding of technology as

process overlooks normative interpretations of culture and

distinctions between so-called high and low culture, but it

[47]Derrick De Kerckhove, "Cyberdesign: Virtual Reality,"
chap. in The Skin of Culture: Investigating the New Electronic
Reality (Toronto: Somerville House, 1995), 89-98.

[48]The Literary Review of Canada: A Review of Books on
Culture, Politics and Society 4, 10 (1985): 1.

[49]Umberto Eco, Travels in Hyper Reality, trans. William
Weaver (New York: Harcourt Brace Jovanovich, 1986), 152.

does not compel one to reject such understandings.[50] In

general, though, the understanding of technology as process

should lead one to a perspective where "the concept of technology

merges completely with the concept of material culture."[51] Or

as science fiction writer William Gibson puts it:

> Technology isn't just little bits in boxes that come
>
> from California and Japan. It's the sum total of our
>
> material civilization. All that is technology, and to
>
> a very real extent that is what we are.[52]

McLuhan's research led him to see "media of communication as both

form and vehicle of the flux of human cultures."[53] Ernst

Cassirer maintains that at the core of culture is "symbolic

thought" which gives human beings a "new ability, the ability

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[50]Horkheimer provides a good example of a normative interpretation of culture when he laments: "Such displays of barbarity would be far less typical if the school-system, up to and including the university, did not necessarily have among its personnel ever fewer educators with the ability to transmit not only factual material and useful or useless data and methods but the something more that used to be called education or culture." Horkheimer, Critique of Instrumental Reason, 96.

[51]L. Tondl, "On the Concepts of 'Technology' and 'Technological Sciences'," in Contributions to a Philosophy of Technology, ed. Friedrich Rapp (Boston: D. Reidel Publishing Company, 1974), 4.

[52]Mark Harrison ed., "Visions of Heaven and Hell," broadcast on the Vision Television Network, January 1996.

[53]Marshall McLuhan, "Joyce, Mallarmé, and the Press" in Essential McLuhan, ed. Frank Zingrone and Eric McLuhan (Concord: House of Anansi Press, 1995), 61.
Reprinted from The Interior Landscape: The Literary Criticism of Marshall McLuhan, ed. Eugene McNamara (1969)
Essay originally appeared in the Sewanee Review, 1953.

constantly to reshape his human universe."[54] The technological

process can be looked upon as the process by which "new kinds of

practice continue to be added to the arsenal of contemporary

[society]."[55] From this standpoint particular technological

processes would make up the bulk of what is meant by the idea of

material culture.

Some critics, however, have suggested that even

acknowledging the essential relation between technology and

culture the two realms can still somehow be at odds. As Nicholas

Berdyaev puts it:

> We are confronted by a fundamental paradox: without
>
> technique culture is impossible, its very growth is
>
> dependent upon it, yet a final victory of technique,
>
> the advent of the technical age, brings the destruction
>
> of culture.[56]

The understanding of the scope of technology developed in this

chapter, however, suggests that any conflict between culture and

technology is really a tension within culture, perhaps as a

result of technology taking on an unjustifiably predominant role

in the cultural process or technological forces in a society

coming into conflict.

McLuhan's catch phrase that the medium is the message tells

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[54]Cassirer, An Essay on Man, 62.

[55]McGinn, Science Technology and Society, 31.

[56]Nicholas Berdyaev, "Man and Machine," in Philosophy and Technology, ed. Mitcham and MacKey, 204.

us that the media used by a society can tell us much about that society even if little is known about the messages conveyed by these media. McLuhan's catch phrase, however, does not suggest that the media express everything there is to know about a society. According to some thinkers culture is not simply composed of means but also ends—the normative understanding of culture and society. Or as Innis says, "cultural values, or the way in which or reasons why people of a culture think about themselves, are part of the culture."[57] Archaeologists and historians can decipher much of the character of an ancient civilization by examining artifacts and records of the practices, but they cannot completely understand a civilization by examining these things. As one historian has noted, "not all of man's thoughts, social, political, and religious, give rise to physical testimony."[58] In Nicholas Berdyaev's words, "There can be no technical ends of life, only technical means: the ends of life belong to another sphere, to that of the spirit."[59]

Still, technologies can give some indication of the ideals of a culture. Anthropologists have always been keenly aware of this link: "Tools have been called 'frozen behaviour' and proposals about their manufacture and use have many behavioral

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[57]Innis, The Bias of Communication, 132.

[58]Chester G. Starr, A History of the Ancient World (New York: Oxford University Press, 1965), 24.

[59]Nicholas Berdyaev, "Man and Machine," in Philosophy and Technology, ed. Mitcham and MacKey, 203.

and cultural implications."[60] The ideals of a culture can determine the shape of the technological matrix but, if one does not have direct access to these ideals, examination of technologies can still tell something about a people's motivations. Such an anthropological and archaeological perspective was a central component of Innis' method, as McLuhan points out with typical overstatement: "Once Innis had ascertained the dominant technology of a culture he could be sure that this was the cause and shaping force of the entire structure."[61] A similar method of inquiry has also been employed by Foucault, with a particular emphasis on modern societies. He shares with our three gudies an emphasis on the cultural importance of the technological actions of individuals.[62]

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[60]Steve Parker, The Dawn of Man (London: New Burlington Books, 1992), 71.

[61]Marshall McLuhan, introduction to The Bias of Communication, by Innis, xii.

[62]A distinction between modern and post-modern thought can, perhaps, be drawn along the line between the acceptance of a narrow or broad understanding of technology. Using such a distinction, however, would mean having to include Innis, McLuhan and Grant in the pantheon of post-modernist thinkers. That such an inclusion would find wide acceptance by academics seems unlikely. For example, in his book Travels in Hyper Reality Umberto Eco comments favourably on "new criticisms of the idea of power,"(175) such as the Foucauldian conception that "every top-level power is supported by a network of molecular consensus."(176) Foucault's ideas about how individual actions can unintentionally create coercive power structures seems very similar to McLuhan's idea that technological extension is too often engaged habitually and without proper regard to its personal and wider social effects. But later in the book when Eco comments on McLuhan, the idea that technological actions have
(continued...)

The understanding of technology developed in chapter two
encompasses not only tools and methods, but also human
institutions. For our three guides all extensions of human
ability are technologies. A fax machine extends one's power to
communicate but so does an institution like the post office.
This correspondence between institutions and tool technologies
should not surprise us. The only difference is, perhaps, the
degree to which these means involve the structured activities of
human beings.

Institutional development is critical to the development of
civilizations. As Innis points out about Western civilization's
debt to ancient Greek civilization:

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[62](...continued)
meaning beyond the narrow purpose of the action itself is
suddenly a mere platitude:

> Unifying these various phenomena in his formula [the
> medium is the message], McLuhan no longer tells us
> anything useful. In fact, to discover that the advent
> of the typewriter, bringing women into business firms
> as secretaries, created a crisis for the manufacturers
> of spittoons, simply means repeating the obvious
> principle that every new technology imposes changes in
> the social body.(235)

Eco's reasons for discounting McLuhan's expression of the idea of
the diffuseness of technological power, while praising
Foucault's, are puzzling.

"This is merely to say that the personal and social
consequences of any medium--that is, of any extension of
ourselves--result from the new scale that is introduced into our
affairs by each extension of ourselves, or by any new
technology."

McLuhan, Understanding Media, 23.

See: Freenberg, "Marcuse and Foucault," in Critical Theory
of Technology, 65-68.

Foucault draws such a broad conception of technology that
the individual becomes almost completely a predicate of its
technological extensions: "The individual . . . is not the vis-a-
vis of power; it is, I believe, one of its prime effects."

Foucault, Power Knowledge, 98.

The power of the oral tradition was reflected in the
institution of machinery designed to permit continuous
adjustment. The constitution of the judicial courts
out of the whole people was the secret of democracy
which Solon discovered. It is his title to fame in the
history of the growth of popular government in
Europe.[63]

The understanding of technology as something which extends beyond
"little bits in boxes that come from California and Japan" is an
idea which some scholars seem reluctant to embrace. One can
still hear the subtle distinction between technological
development and institutional development, for example, in Daniel
J. Boorstin's remark that "Political revolutions are made by men
who urge known remedies for known evils, technological
revolutions by men finding unexpected answers to unimagined
questions."[64] Boorstin's remark gives the impression that
political innovation is somehow outside the realm of
technological innovation, whereas for Innis political innovations
are spoken of in similar terms as other forms of technological
change.

The cultural process is in part the "passing along", as in
the original sense of the word "tradition", of technologies to
the next generation who must be taught how to use the means

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[63]Innis, Empire and Communication, 71.

[64]Daniel J. Boorstin, Republic of Technology (New York:
Harper and Row Publishers, Inc., 1978.), 27.

necessary for the continued existence of their community. In the case of tool-technologies, the passing along involves literally passing along physical objects in addition to the knowledge of how to use these objects. In the case of method-technologies, passing along means learning various methods. Some of these methods will involve various types of structured activities which give rise to institutions. Knowing how to access the power of these institutions to achieve desired ends is also something technological that must be passed along. But as Innis and others argue, the process of education involves more than just the process of passing along technologies. It is also the passing along of ideals and attitudes--the recounting of experience, jokes, customs, tastes, and visions of justice. One can also try to pass on a metaphysical perspective, some picture of the universe. Whether such things also can be considered technologies is an open question. In some instances it might be useful to view some of these things as instruments as well.[65]

At this point in our analysis of culture and technology little is left which is not in some way technological, which brings us to a final question of whether or not human language is a technology. McLuhan includes speech in the technologies he examines in Understanding Media. However, this question is very difficult to answer as knowledge about the origins of human language is limited. It is clear to many linguists that much of

[65]See: Jay Newman, Religion and Technology: A Study in the Philosophy of Culture (Westport, Conn.: Praeger Publishers, 1997)

language is not a product of human invention but rather the process of evolution.[66] But technologies are always inventions and so it is an open question to what extent language can be said to be technological rather than natural. Languages are most certainly technological to some extent.[67] However, other linguists such as Noam Chomsky argue that the "deep grammar" rules of language are innate. Some claim that language is technological to the extent that we consciously formalize new linguistic conventions and extend language in new ways that allow us to communicate more effectively. So, as Rothenberg says:

> Language is the primary technique of the abstract. Its
> rules and structure become detached from what it wants
> to represent as soon as they are set in place. Words
> are a step back from, but do not deny, the immediate.
> Call the technical part of language the aspect which is
> governed by rule. The most technological of languages
> are those which are completely regimented, wherein the
> information transmitted can hardly be misinterpreted.
> Computer languages offer instructions designed for
> machines.[68]

And some argue that a significant part of language is simply the

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[66]Dan Isaac Slobin, _Psycholinguistics_, 2d ed. (Oakland, N.J.: Scott, Foresman and Company, 1979), 74.

[67]James K. Feibleman, "Languages As Artifacts," chap. in _Technology and Reality_ (Boston: Martinus Nijhoff Publishers, 1982), 141-145.

[68]Rothenberg, _Hand's End_, 37.

natural expression of feeling. As Rothenberg also writes: "But real community-consisting languages are always also carriers of raw emotion, feeling, and wonder, so they are never only technological."[69] The feminist critique of sexist terminology seems to involve the assumption that on some level words are tools and that these tools can and should be open to judgment.

No one would deny that it is primarily by way of language that each generation receives instruction in, and has the opportunity to reflect upon and change, the technologies that have come before. As Ernst Cassirer points out, at the centre of human culture is the symbol. Without communication there would be no ability to transfer technology to the next generation, but without the symbol, that is the ability to think abstractly, there also would be no ability to improve on the technologies one may stumble upon.[70]

Animals can certainly communicate feeling, and such communication might be enough for the transference to succeeding generations of simple tools and techniques to occur. But what animals seem to lack is the ability to think symbolically, to hold in their minds the representations and to connect these

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[69]Ibid., 37.

[70]"And as early hominids grew smarter, they developed better tools. Imagination may have been born when our ancestors developed the ability to think about a tool they needed and then create it, says Kathy Schick, a stone-tool specialist at Indiana University. 'Experimenting with different shapes of tools represents the earliest form of science,' she adds."
    Rick Gore, "The Dawn of Humans: The first Steps," National Geographic 191, 2 (February 1997): 96.

objects in new and interesting ways. The human situation is much different because of the power of language. The result is a complex and changing cultural life of immense variety, including an immense variety of technologies.

A great deal of the difference between cultures is precisely differences in technologies, or as Mario Bunge suggests, "the differences among cultures are largely differences among systems of rules."[71] Chinese culture is distinguishable from European culture, in part, by the distinctive tools and techniques it uses. Ti'Chi is an example of a distinctive technique for relieving stress and creating social bonds. Canadian society is different partly because of its more preponderant reliance on alcohol to achieve these ends. Ask Canadians what distinguishes them from Americans and a common response will be that we have a socialized medical system. Having at our beginning the rejection of the blandishments of the American revolutionary experiment, Canadians are generally aware that a people is determined as much by the technologies they preserve as by those they embrace.

A society's cultural character is determined by the technologies used by the people of that society, but it can also be said to be determined by the technologies those people avoid. The problem of controlling technology, therefore, is a problem of culture. It is about achieving a distinctive balance in a society between innovation and restraint of innovation. In light

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[71]Mario Bunge, "Toward a Philosophy of Technology" in Philosophy and Technology, ed. Mitcham and Mackey, 68.

of the understanding of technology as process, describing a
particular culture as being in any way "threatened" by technology
could only mean that people in a culture were somehow unable to
make choices about the technological activities in which they
engage.

Innis, McLuhan, and Grant explore how civilizations of
dynamic technological change can also be civilizations that are,
in a certain sense, immensely conservative. A culture can be
conservative while being technologically dynamic when the
problems which emerge from technological actions are routinely
taken as starting points for technological action rather than as
opportunities for the ethical reconsideration of technological
actions. As Grant observes:

> What must be emphasised here is that the new
> technologies of both human and non-human nature have
> been the dominant responses to the crises caused by
> technology itself. This illustrates how 'technology'
> is the pervasive mode of being in our political and
> social lives.[72]

All too often in political discourse involving the criticism of a
technological process one hears those who favour engaging in the
technological process castigate opponents for not being creative,
innovative, or open to change--"If you're not a part of the
solution, you're a part of the problem." Although such a stance
may seem radical, it can be viewed as conservative if the

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[72]Grant, Technology and Justice, 17.

technological response is the customary response to difficulties. This idea will be examined further in the following chapter.

CHAPTER 4: THE NON-TECHNOLOGICAL APPROACH TO THE CHALLENGE OF
TECHNOLOGY

Non-technological Action

In chapter three we examined the scope of human involvement
in technological activity. We noted how ethical concerns can
turn into technological endeavours; the close relationship
between science and the technological process; how the drive to
create can animate both artistic and technological activity; and
the role technology plays in cultural transmission. According to
the understanding of technology as process, technologies are
favoured methods, often combined with tools, which are passed on
from generation to generation. But what if the technological
process itself becomes a favoured method for dealing with the
world? We will now examine the arguments made by Innis, McLuhan
and Grant that involvement in technological practice can
reinforce one's dependence on the technological approach.

The contention we are considering is that the ethical
challenge of technology is not simply to make ethical choices
from among various methods and artifacts, an idea which is
advanced by many philosophical critics of technology[1], but also
to judge one's continuing participation in technological activity

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[1]Albert Borgmann makes an interesting examination of the
difficulties of making an ethical choice between using musical
instruments to make one's own music and using stereo equipment.
See: Albert Borgmann, "The Moral Significance of the Material
Culture," Inquiry: An Interdisciplinary Journal of Philosophy 35
(1992): 291-299.

in order to allow space for such judgment take place. Actually
making and acting on ethical judgements about one's technological
commitments is harder than it may appear. In facing any issue
there are innumerable opportunities to become sidetracked from
making judgements about technological actions because of
participation in technological processes.

Let us consider how this might happen. The negative effects
of pesticides on the environment is an issue of concern for an
increasing number of people. Such concern might lead individuals
to inquire more deeply into the issue and we can hypothesize
about different activities that might flow from such inquiry. A
scientist might begin to do research into the possibility of
finding benign alternatives to pesticides. A teacher might take
his class on a trip to the "Eco deck" at the CN Tower. A student
might do a computer project on ecological websites. A farmer
might call on universities to do more research into pesticide
use. A consumer group might call on government for clearer
labelling guidelines on consumer products. A citizen group might
recommend the adoption of a subsidy programme to encourage
organic farming. An investor might start doing marketing
research into the desire for organic products. A public servant
might recommend the creation of a new organization to oversee the
licensing of pesticides. An ordinary citizen might ignore the
issue entirely because she believes that it is the responsibility
of government to deal with such issues.

Non-technological actions might take the following forms:

A scientist might cancel or refuse to do research applicable to pesticides and decide instead to pursue other research. A teacher might refuse to participate in a school fund raising campaign involving the sale of pesticide treated citrus fruit. A student might plant, tend, harvest and preserve his own fruit at home instead of buying it from a store. A farmer might stop using a certain pesticide. A member of a consumer group might change where she shops and the types of foods that she buys. A citizen group might hold a fund-raising dinner in which all the produce is grown without herbicides or pesticides. An investor might divest her portfolio of stocks in pesticide companies. A public servant might reject a non-organic food supplier for a government food contract. An ordinary citizen might stop using a herbicide on his lawn.

Clearly, the different actions under these two categories are not all mutually exclusive. In some cases they might even be highly complementary as in the case of better labelling and changing one's food purchasing habits. Each course of action will encompass a host of actions and practical difficulties to overcome; for example, the investor considering divesting might have to do some painstaking research into her stock holdings, something made potentially more complex if she owns mutual funds. The politician will have to iron out the many legal details involved in a new regulatory agency and consider strategy for gaining the necessary political support. The teacher who takes his class to the Eco deck will have to spend time organizing the

field trip. The student planting and preserving his own food might have to learn how to do so. In a life already crowded with technological commitments choices will have to be made, and one of these choices is to what degree one's actions will be technological rather than not. If one's choices fall predominantly into the technological category then one will have postponed making any ethical judgments about technological actions relating to the issue of pesticides. Deciding to go to the "Eco deck" is not a judgment of any such actions. Deciding to plan a new regulatory agency is not a judgment of any such actions. Some of the technological actions above might be very good actions to pursue but this does not change the fact that they do no involve making discriminations about technological actions.

Therefore, an additional level of discrimination can be involved in one's inquiry into and response to any ethical issue involving technology, which is choosing to what degree one's choices for action will be technological. And the degree to which they are technological represents the degree to which one is reliant on technology. And the degree to which they are not represents the degree to which one is able to question such reliance.

Non-technological action is not the renunciation of all technological action, but only the rejection of particular technological actions in an effort to strike a proper balance in one's life between technological and non-technological action.

But this raises the question of whether non-action represents a kind of action. This is a difficult logical question, but from a practical standpoint, it is normal to talk of non-action in active terms. The verbs "to eschew", "to renounce", "to forgo", "to avoid" and "to abstain" are but a few examples of the terms which capture a sense of non-action as being itself a kind of action.

The life of renowned architectural critic, city planner, and environmentalist Jane Jacobs provides a good example of a life in which non-technological action seems to have taken a prominent place.[2] Jacobs is perhaps more renowned for the actions she has rejected than those which she has endorsed. She was "instrumental in preventing the wholesale devastation of neighbourhoods [in Toronto] by various misguided crosstown expressway proposals," such as the Spadina Expressway.[3] One commentator notes that she "rejected the prevailing credo of wide highways, big [housing] projects and single-purpose zoning."[4]

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[2] See her: The Death and Life of Great American Cities (1961), The Economy of Cities (1969), Cities and the Wealth of Nations (1984).

[3] Doug Saunders, "Citizen Jane," Globe and Mail, 11 October 1997, C20.
McLuhan worked with Jacobs in the resistance to the expressway, which Jacobs recounts in:
Barrington Nevitt, Who Was Marshall McLuhan?: Exploring a Mosaic of Impressions, with Maurice McLuhan, ed. Frank Zingrone, Wayne Constantineau, and Eric McLuhan (Toronto: Comprehensivist Publications, 1994), 101-102.

[4] Christopher Hume, "The city that Jane helped build," Toronto Star, 12 October 1997, F1.

As she herself recounts "When David Crombie was mayor he
consulted me about getting housing downtown. . . . One of the
biggest problems we had to deal with was old bylaws."[5] She also
has commented "If the car has become a source of evil, it is
because it has been made to fill too many niches." And she
recounts: "I was born and raised in a suburb, when I went to New
York at the age of 18 I was enchanted. I've never been tempted
to go back to live in a suburb."[6] Her theories champion the
break-up of Ontario Hydro and also "the elimination of
agricultural subsidies and marketing boards and deposit
insurance, the reduction of transfer payments to poor regions."[7]
Her impact has been in rejecting certain kinds of technological
practice and in arguing with others why they should do likewise.
As one commentator puts it "Jane was never prescriptive. There
were no formulas, no 'how-to' books."[8] Her life exhibits a
particular balance between technological action and some
prominent examples of her critical rejection of certain kinds of
technological action.[9]

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[5]Ibid, F5.

[6]Ibid, F5.

[7]Ibid., C20.

[8]Alan Littlewood, a Toronto City planner, in Chistopher
Hume, "The city that Jane helped build," F5.

[9]I was struck by a comment made about Jacobs at a recent
conference. Sally Goerner, a computer scientist and psychologist
who runs the Centre for the Study of Advanced Systems at Duke
University is quoted as saying: "I wouldn't be at all surprised
if future historians look back and say she was really one of the

Therefore, in the same way that one can choose between tools according to ethical principles one can choose between technological and non-technological approaches according to ethical principles. The analysis we have done of the outlooks of Innis, McLuhan and Grant on technology leads to an awareness that criticism of technological action can get lost in the rush to technological action. Unlike the view of the ethical challenge of technology put forward by supporters of technology assessment and appropriate technology, an equally important part of the ethical challenge of technology is to recognize the possibility that one might be biased towards the technological approach so that a conscious effort can be made to redress this bias.

And as our three guides suggest, such a bias could find further support in the perspective that views technology primarily as an array of inert artifacts. This perspective can obscure the possibility of viewing technology as a form of action which can and should itself be controlled. A type of behaviour is something worthy of ethical restraint, whereas an inert body of things is not.

As our three guides also suggest, ignoring the disjunction

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[9](...continued)
first positive, useful postmodernists."[+] This dissertation hopefully shows that Innis, McLuhan, and Grant are also worthy of such an honour. Not such a strange idea--Lance Strate discusses Marshall McLuhan's philosophical impact on the thought of Neil Postman and argues that Postman is a postmodern thinker with something constructive to say.
[+]Doug Saunders, "Citizen Jane," Globe and Mail, 11 October 1997, C1.
Lance Strate, "Post(Modern)man, or Neil Postman as a Postmodernist," Et Cetera (Summer 1994): 159-169.

between mundane technological practice and the process of

innovation is another way to fail to fully explore the ethical

possibilities for controlling technology.[10] If the nature of

technology as both instrument use and innovative endeavour is not

recognized, one's efforts to address critically problems

associated with technology can be continuously diverted into one

or the other of these modes of technological action. Before one

can judge a tool one must first set it down and the most favoured

of tools is the technological process as a whole.

Arguments for the Non-Technological Approach

Why should one consider the route of reconsideration and

restraint of technology through avoiding particular technological

actions? The three scholars on whom we are focusing argue for

the ethical limitation of technology based mainly on an

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[10]Technology as Process Theorem: technological action = tool
use or innovative endeavour (t v i).
1. $\lnot(t \lor i)$ Negation of Technology as Process Theorem
2. $\lnot t \cdot \lnot i$ From 1 by De Morgan's Theorem
3. $\lnot t$ From 2 by Simplification
4. $\lnot i$ From 2 by Simplification
5. $\lnot t \lor \lnot i$ From 3,4 by Addition
6. $t \supset \lnot i$ From 5 by Material Implication
7. $i \supset \lnot t$ From 6 by Transposition
If one wishes to limit one's participation in technological
activity this implies eschewal of both tool using actions and
innovative endeavour (1). To be non-technological, an action
must involve the eschewal of an instrument and if one still
wishes to address the general problem, limiting one's response to
existing technologies (2). Or, if one does engage in an
innovative endeavour, this should not prevent one from also
considering the possibility of still rejecting the use of an
instrument. In other words, innovative endeavour should never be
allowed to become an excuse for not considering limits to one's
tool using actions (7).

ethical ideal of human agency and not on the consideration of

practical benefits. Grant writes:

> Equality should be the central principle of society
>
> since all persons, whatever their condition, must
>
> freely choose to live by what is right or wrong. This
>
> act of choosing is the ultimate human act and is open
>
> to all.[11]

In Innis we find the vision expressed through a citation of Cyrus

Redding: "Education is apt to become 'merely the art of reading

and writing, without training minds to principle of any kind, and

destitute of regard for virtue and even decency.'"[12] One

commentator has suggested that, "Innis tried to understand the

extent of bias so that he might understand the areas of

freedom."[13] McLuhan writes: "Technological enlargement is a

process toward excess. As part of his spiritual health, man

should make as his first object the recognition of pattern [the

pattern of technological enlargement] as a means to avoid excess

and achieve equilibrium. . . . [Equilibrium] is accomplished by

conscious choice."[14]

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[11]George Grant, "An Ethic of Community," Social Purpose for Canada, ed. Michael Olive (Toronto: University of Toronto Press, 1961), 20.

[12]Cyrus Redding, Fifty Years' Recollections (London, 1858), III, 316; quoted in Innis, The Bias of Communication, 194.

[13]Westfall, "The Ambivalent Verdict: Harold Innis and Canadian History," in Culture, Communication and Dependency, ed. Melody, Salter, Heyer, 43.

[14]McLuhan, Global Village, 12.

However, instead of seeking balance between actions to extend and actions to curb technological power, one could instead simply seek to extend technological power in response to problems. Such an approach would seem an essential part of the faith in progress. As Innis puts this point in a note from the Idea File, "Belief in prosperity cult [is an integral] part of increased advertising--[the] emphasis [of this cult is] on [seeking a] better world and avoidance of problem[s]."[15] As discussed in the previous chapter, one could be guided in the process of perceiving problems by certain moral ideals, and to this extent, be said to be leading a moral life. However, when it came to technological activity itself, as problem solving activity, one would be incapable of exercising moral restraint, self-sacrifice, self-limitation, or any ideal of "balance and proportion."[16] Someone who was incapable of allowing for the exercise of such virtues in regard to his or her technological activity would lead an arbitrarily circumscribed life.[17]

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[15]Innis, The Idea File, 2.3.

[16]Innis, The Bias of Communication, 140.

[17]Simone Weil gives better expression to this idea. As she states: "True liberty is not defined by a relationship between desire and its satisfaction but by a relationship between thought and action; the absolutely free man would be he whose every action proceeded from a preliminary judgement concerning the end which he sets himself and the sequence of means suitable for attaining that end."
Simone Weil, Oppression and Liberty, trans. A. Wills and J. Petrie, intro F.C. Fuller (Amherst: University of Massachusetts Press, 1973), 85; quoted in Lawrence A. Blum and Victor J. Seidler, A Truer Liberty: Simone Weil and Marxism, Critical Social Thought Series, ed. Michael W. Apple (London: Routledge,
(continued...)

However, there is also a prudent line of reasoning for considering the restraint of technological activity that is also implied by the analyses of our three primary guides. Any technology, if it is to be worthy of the name "technology," must increase capability in some way. Hans Sachsse observes, "In every case, technology is a means to make some goal more easily attainable."[18] However, as noted earlier, while technological

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[17](...continued)
David Heaven, "Some Influences of Simone Weil on George Grant's Silence," in George Grant in Process, ed. Larry Schmidt, 68-78.
    John Kirby and Louis Greenspan, "Grant, Natural Law, and Simone Weil," in By Loving Our Own, ed. Peter Emberley, 153-160.

[18]Hans Sachsse, "Comment: What is Alternative Technology? A Reply to Professor Stanley Carpenter," in Philosophy and Technology, ed. Paul T. Durbin and Friedrich Rapp, 138.
    That all technologies expand capability or make "some goal more easily attainable" is only another way of saying that all technologies increase the freedom of their users. This characteristic is probably what underlies Grant's criticism of contemporary liberalism. His position is that contemporary liberalism, as the doctrine of the maximization of individual freedom, can contribute little to help one in the judgement of a technology when, by definition, technology can only help in maximizing individual freedom. Only a non-liberal principle is capable of justifying the rejection of a freedom. Even to consider a threat posed to the freedom of others is to invoke some ideal of fraternity, solidarity or responsibility, rather than freedom as such. Hence, contemporary liberalism is incapable by itself of addressing the challenge of the ethical limitation of technology.
    Some commentators on Grant, such as Louis Greenspan, sometimes leave the impression that Grant's position on abortion can be separated from his position on technology and its relation to liberalism. This seems the case when Greenspan says of Grant: "He has argued that these issues--the realities of widespread abortion, the proliferation of technology, and the existence of a mechanistic, scientific outlook--cannot be treated as an issue that liberalism might meet by great and unprecedented efforts of thought and action."(Louis Greenspan, "The Unravelling of Liberalism" in George Grant and the Subversion of Modernity, ed. Arthur Davis, 218.) However, I would argue that Grant's examination of the issue of abortion is rooted in his

processes may be guided by ethical aspirations one aspiration

such processes can never fully encompass is the ethical

limitation of human capability. If a technology did this, it

would be unworthy of the designation technology because although

this process might involve circumscribing certain capabilities

this could only be done in order to augment human capability in

some other way. However, some philosophical critics of

technology have begun to argue that some of the greatest problems

facing the world today are simply a result of a surfeit of

capability. As Friedrich Rapp puts this point, "It is a paradox

that many of the problems raised by modern technology arise not

from failures but from too much success."[19] Barry Commoner

writes that "the ecological failure of modern technology is due

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[18](...continued)
understanding of technology.

   Grant's inclusion of the essay on abortion in Technology and Justice is not an accident. Grant seems to take abortion as an indicator of the general attitude North Americans towards technology. Although the freedoms this procedure promise are obvious--sexual liberation, women's liberation, freedom from the burdens of unwanted pregnancy--the price is clearly for Grant something that anyone should consider as too high. He takes the fact that the majority of people do not agree as symptomatic of a general unwillingness to ethically reject technologies because if so many are unwilling to reject a type of technological action for which the ethical costs are so clear it is unlikely they will be willing to make ethical discriminations at the even more ambiguous level of everyday technological practice. As Grant puts it, "technological destiny has its own dynamic conveniences, which easily sweep away our tradition of justice, if the latter gets in the way."(Grant, English Speaking Justice, 88.)

[19]Friedrich Rapp, introduction to Philosophy of Technology ed. Paul Durbin, xix.

to its success in accomplishing what it sets out to do.[20]

But, whenever one chooses the technological response to a

problem, one implicitly endorses a position that the problem is

not a result of too much technological power but also of too

little. If one suspects that some problems might simply be a

result of the exercise of too much technological power, then one

has some grounds for also suspecting that some technological

activities should simply be rejected. But if one must always

rely on technologies and novel technological efforts to

facilitate restraint this means that these technological actions

will be off-limits for reconsideration. And further, the

possibility exists that one's novel technological efforts might

be ineffective and thus keep one from more productive purely non-

technological efforts. We will explore this more practical line

of reasoning further in chapter six using a specific public

policy issue as a focus.

It is necessary to explore further the argument based in the

ethical vision of human agency explored by Innis, McLuhan and

Grant. This argument suggests that the two lines of reasoning

for a non-technological approach, ethical and prudential, are

actually closely connected and that the full consideration of the

first line of reasoning reveals a persistent threat to the proper

consideration of the second.

Implications for public policy rising from the thought of

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[20]Barry Commoner, The Closing Circle: Nature, Man, and
Technology (New York: Knopf, 1971), 184.

Innis, McLuhan and Grant lead to what we can regard as a non-technological approach. The expression "non-technological approach" is appropriate for two reasons. The first reason is that their perspectives entail no new political programme. In fact their perspectives seem to discourage seeking such programmes. In this characteristic their approaches are similar to the later thought of the Frankfurt School in which "critical theory is represented as being purely critical, incapable of formulating any positive conceptions at all (for example, a positive alternative to the existing society)."[21] The second reason is that their only positive ethical recommendation about technology is for ongoing consideration of the critical rejection of some technological activities, including involvement in new technological processes. The position that emerges from their thought is perhaps an example of what Ellul has called "an ethics of non-power."[22]

The Non-Technological Approach And The Impasse

The idea of "non-power" brings us back to the issue we have called the "Impasse." Growing public concern over the environmental and social impact of technology has led some to consider limits to technological power. The question of "the how" of such limits is the general focus of much discussion in

[21] Tom Bottomore, The Frankfurt School, Key Sociologists Series (New York: Tavistock Publications, 1984), 31.

[22] Jacques Ellul, "The Search for Ethics in a Technicist Society," Research in Philosophy and Technology 9 (1989): 31.

the field of philosophy of technology. Hans Jonas poses it when
he talks of the "ethical vacuum" which modern technology has
created: "the new nature of our acting then calls for a new
ethics of long-range responsibility, coextensive with the range
of our power."[23] Heightened public awareness of technology's
negative impact on nature and society has led in recent decades
to the creation of a profusion of ecological and social movements
ranging from groups concerned with industrial pollution to groups
concerned about the effects of television violence. As Langdon
Winner notes:

> One of the most remarkable aspects of contemporary
> social criticism is the frequency with which technology
> has been isolated as a crucial problem. In far
> reaching debate in both academic circles and the public
> media, the various faces of modern technology have been
> continually scrutinized to discover what new promises
> or difficulties, blessings or nightmares they hold in
> store.[24]

Winner also notes that growing concern with technology has yet to
result in any significant change in the generally positive
attitudes towards technology in Western societies:

> Unfortunately, much of this discussion has already
> burned itself to a cinder leaving little positive

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[23]Hans Jonas, The Imperative of Responsibility, 22. [My emphasis]

[24]Langdon Winner, "On Criticizing Technology," in Technology and Man's Future, ed. A.H. Teich, 355.

result. Two technology-oriented popular ideologies of
the [1960s and 1970s]--McLuhanism and the counter
culture--seem to have evolved in fulfilment of the idea
that there is no source of opposition which the
technological society cannot neutralize and transform
to its purposes.[25]

I will try to show how the lack of real challenges to
technological expansion can be partially explained by an
examination of the factors leading to the Impasse.

The Impasse is rooted in the cycle of technological
development and what Grant has called a tight circle of
technology. The more one engages in technological processes, the
more potential problems that emerge which can be responded to by
further participation in technological processes. Or as McLuhan
describes this cycle:

> Response to the increased power and speed of our own
> extended bodies is one which engenders new extensions.
> Every technology creates new stresses and needs in
> human beings who have engendered it. The new need and
> the new technological response are born of our embrace
> of the already existing technology--a ceaseless
> process.[26]

This cycle is at the core of Grant's vision of the tight circle,
in which "our present forms of existence have sapped the ability

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[25]Ibid., 355.

[26]McLuhan, Understanding Media, 183.

to think about standards of excellence and yet at the same time
have imposed on us a standard in terms of which the human good is
monolithically asserted."[27] This new standard, according to
Grant, is increasing technological power in the guise of the
ideals of modern liberalism. Grant defines modern liberalism as
"a set of beliefs which proceed from the central assumption that
man's essence is his freedom and therefore that what chiefly
concerns man in this life is to change the world as we want
it."[28]

At the beginning of human existence the technological
process was no doubt directed at solving basic human needs.
Later the process was also directed at solving problems caused by
earlier technological processes. Today some are beginning to
consider the possibility that the technological process itself
can become problematic when undertaken without limit. According
to understanding of technology as process the only activity which
can be said to truly limit the process is to limit one's
participation in the specific technological processes. However,
our three primary guides suggest that such choosing, as a form of
activity distinguishable from technological activity, can become
marginalized if one is, instead, preoccupied with technological

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[27]George Grant, "Wisdom in the Universities: Part Two" This
Magazine Is About Schools 2, 5 (Winter 1968):59.

[28]Grant, Technology and Empire, 114n.
Also see: Tom Darby and Jon Alexander, "The Technological Cycle"
in Sojourns in the New World: Reflections on Technology (Ottawa:
Carleton University Press, 1986), 91-94.

activity.[29]   As Innis notes about writing, "Absorption of

energies in mastering the technique of writing left little

possibility for considering implications of the technique."[30]

The use of technologies involves people deeply in methodical

practice and methodical practice can inhibit the ability to

reflect critically about what one is doing, which is perhaps why

Innis describes the result as a monopoly of knowledge.

Methodical practice can get in the way of awareness, which is

why, as one commentator on Innis notes, "The freedom to think

without constraints of any sort, was to him the necessary

condition for true scholarly effort."[31]

Pierre Bourdieu highlights the connection between technology

and habit through his use of the term "habitus" to describe the

"system of cognitive and motivating structures . . . procedures

to follow, paths to take--and of objects endowed with a

'permanent teleological character', in Husserl's phrase, tools or

institutions."[32]   According to Bourdieu, the world of the

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[29]"The inability to escape the demands of industrialism on
time weakens the possibility of appraisal of limitations of space
[i.e the factors which support material existence]. Constant
changes in technology, particularly as they affect communication
. . . increase the difficulties of recognizing balance let alone
achieving it."
Innis, The Bias of Communication, 140.

[30]Innis, The Bias of Communication, 9.

[31]S.D. Clark, "The Contribution of H.A. Innis to Canadian
Scholarship," in Culture Communication and Dependency, ed.
Melody, Salter, Heyer, 24.

[32]Pierre Bourdieu, "Structures, Habitus, Practices" in
Rethinking the Subject: An Anthology of Contemporary European

habitus "is a world of already realized ends."[33] According to

the understanding of technology as process technologies are

standard responses for achieving given ends. As Don Ihde

observes, "Take the automobile as an example. Most of us are so

accustomed to driving that it is a kind of second nature--indeed,

we pay little attention to the action."[34] Driving can be

engaged in without contemplating the meaning of what one is

doing.

The importance of method in human life has deep roots in

human pre-history and is not just a characteristic of modern

technological practice. As Ernst Cassirer notes:

> Every magical art needs the highest attention. If it
>
> is not performed in the right order and according to
>
> the same invariable rules it fails of its effect. In
>
> this regard magic may be said to be the first school
>
> through which primitive man had to pass.[35]

Like magical practice, technological practice involves the strict

repetition of certain actions. Therefore, as Edward Tenner

argues, the price of ever increasing technological prowess is

that it inevitably "imposes an ever-increasing burden of

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[32](...continued)
Thought, ed. James D. Faubion (San Francisco: Westview Press,
1995), 33.

[33]Ibid., 33.

[34]Don Ihde, "Technology and Cultural Variations," Research
in Philosophy and Technology 8 (1985): 29.

[35]Cassirer, Essay on Man, 92.

attention."[36] It is the nature of technologies to occupy

awareness which leads McLuhan to a faith in the artist as

potential creator of "anti-environments," which might somehow

throw largely unconscious technological practices into sharp

relief.[37]

Recent years have brought an increasing emphasis in schools,

and society in general, on "problem solving," which has promoted

one political commentator to state: "It has become so

fashionable to talk of problems and 'problem solving' that it is

not recognized often enough that some supposed problems are not

problems at all, they are really predicaments."[38] According to

Homer Dixon of the Centre for Peace and Security Studies at the

University of Toronto, the world faces an "ingenuity gap" which

threatens global security. Therefore, according to Dixon, the

developed world should focus its efforts on improving the world's

"ingenuity supply."[39] The emphasis on problem solving and

ingenuity are for the most part different attempts at encouraging

the use of the technological process. When children or people

from the developing world are encouraged to be innovative and

creative problem solvers, technology itself begins to become its

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[36]Edward Tenner, Why Things Bite Back: Technology and the Revenge of Unintended Consequences (New York: Alfred A. Knopf, 1996), 254.

[37]Marchand, Marshall McLuhan, 224.

[38]Michael Bradley, Crisis of Clarity: The NDP and the Quest for the Holy Grail (Toronto: Summerhill Press, Ltd., 1985), 33

[39]Broadcast of "Studio 2", on TVO, 12 August 1996.

own explicit kind of method for dealing with one's environment,

and even oneself.[40] In the same way that the technological

process leads to new instruments that solve specific problems,

this process can lead to the ultimate instrument for the general

solution of problems, itself, as the universal tool.[41]

But if technology can become a method it also can become a

form of habitual practice. The exercise of this habit would add

to the technological irritants calling for further exercise of

this habit.[42] And, if as our three guides suggest, habitual

practice can get in the way of critical self-awareness of such

practice, this means that one's involvement in the technological

process itself can slip into the background of consciousness in

the same way as involvement in particular technological

activities. One's ability to engage in critical reconsideration

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[40]See: Michel Foucault, "Discipline" in Rethinking the
Subject, ed. James D. Faubion, 32-33.
     "'Discipline may be identified neither with an institution
nor with an apparatus; it is a type of power, a modality for its
exercise, comprising a whole set of instruments, techniques,
procedures, levels of application, targets; it is a 'physics' or
'anatomy' of power, a technology."

[41]McLuhan in particular emphasizes this point. He cites in
at least four places Alfred North Whitehead's statement: "The
greatest invention of the nineteenth century was the invention of
the method of invention."
     McLuhan, The Gutenberg Galaxy, 45, 176.
     McLuhan, The Laws of Media in Essential McLuhan, ed. Frank
Zingrone and Eric McLuhan, 383.
     McLuhan, "Is it Natural That One Medium Should Appropriate
and Exploit Another?" in Essential McLuhan, 187; Reprinted from
McLuhan: Hot an Cool, ed. Gerald E. Stearn (New York: New
American Library, Signet Books, 1967)

[42]"We have already discovered the futility of changing our
goals as often as we change our technologies."
     McLuhan, Understanding Media, xi.

of technological activity, therefore, will be weakened in an increasing relation to the intensity of general engagement in such activity. Innis felt that even the university, as a place for free inquiry, was succumbing to such a trend. As he put it, "Student and teacher are loaded down with information and prejudice. The capacity to break down prejudice and maintain an open mind has been seriously weakened."[43] One can hear a complaint against habitual practice also in McLuhan, who so often says that "the only form of response that people in general ever make to anything is a numb, somnambulist response."[44] Concern about the increasing influence of habitual practice may lie behind Ellul's ideas about the autonomy of technology, and also views like those of Marcuse and other late Frankfurt School thinkers in which "technological rationality or rationalization are depicted as abstract forces shaping society which are beyond human control."[45] Or as Winner puts it, "Through decades of successful practice, what emerged is 'the technical phenomenon'-- a condition in which the consciousness of all became exclusively oriented to technical solutions."[46] The increasing tendency to rely on the technological approach helps clarify Grant's view of technology as an "enfolding destiny that increasingly threatens even our ability to see it for what it is, let alone to do

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[43] Innis, The Bias of Communication, 208.

[44] Marchand, Marshal McLuhan, 229.

[45] Bottomore, The Frankfurt School, 36.

[46] Winner, Autonomous Technology, 127.

anything about it."[47] It also helps clarify his idea of

technology as a "package deal:"

> To put the matter crudely: when we represent technology
> to ourselves through its own common sense we think of
> ourselves as picking and choosing in a supermarket,
> rather than within the analogy of the package deal. We
> have bought a package deal of far more fundamental
> novelness than simply a set of instruments under our
> control. . . . Unless we comprehend the package deal we
> obscure from ourselves the central difficulty in our
> present destiny: we apprehend our destiny by forms of
> thought which are themselves the very core of that
> destiny.[48]

For Grant, however, unlike Ellul or the Frankfurt School

thinkers, the problem of technology is not that human freedom is

thwarted by technology but, rather, as one commentator on Grant

suggests, the increasing reliance on technology leads to a

"perversion" of human freedom.[49] Through habitual reliance on

technological activity, many people, including philosophically

reflective people, can increasingly lose the ability to consider

the alternative to participation in technological activity

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[47]Ian Box, "George Grant and the Embrace of Technology,"
Canadian Journal of Political Science 15 (1982): 503.

[48]Grant, Technology and Justice, 32

[49]John Badertscher, "George P. Grant and Jacques Ellul On
Freedom in Technological Society," in George Grant in Process,
86.

because they are increasingly engrossed in technological

activities or easily side-tracked into technological

processes.[50]

Technology and Non-Technology

The non-technological way of approaching the world is not

easily grasped. In trying to develop a critical approach to

technology one can very easily slip into the technological way of

approaching problems. Emmanuel G. Mesthene is an insightful

observer of some of the problems of technological civilization

but his final analysis results in a call for "innovation in our

political institutions and attitudes."[51] The reflections of

Alvin M. Weinberg on the evils of social engineering elicit the

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[50]It is not that technology becomes a dominant ideology[*] nor
is it that people have come to accept some monolithic conception
of reason.[+] Technological hegemony, if there is such a thing, is
constructed unintentionally through the accretion of individual
unquestioned technological acts. It is not imposed from within
or without. It is not a "creature of ruling-class
interests."(Nielsen, 145). By its nature technological practice
bypasses conscious awareness working instead at the level of
habitual practice. Therefore, it can only be challenged, or so
our three guides seem to suggest, by bringing this kind of
practice under conscious scrutiny, including the practice of
responding to problems with novel technological efforts. This
task, of course, requires that one must be very clear about what
constitutes technological practice and what does not.
    See: Kai Nielsen, "Technology as Ideology," Research in
Philosophy and Technology 1 (1978): 131-147.
    See: Max Horkheimer, Critique of Instrumental Reason,
trans. Matthew J. O'Donnell (New York: Continuum, 1994)

[51]Emmanuel G. Mesthene, Technological Change: Its Impact on
Man and Society (Toronto: The New American Library, 1970), 76.

hopeful question: "Can Technology Replace Social Engineering?"[52] In each of these instances we find an apparently arbitrary distinction between technology and the theorist's own recommendations for practical action.

The reflections of Langdon Winner on the ethical criticism of technology show how easily this shift can happen in the thought of even the most careful of philosophical critics. Like our three guides, Winner rejects the approach of criticizing technology solely in terms of its use and misuse. As he puts it, such an approach "obfuscates technology's systematic (rather than incidental) effects on the world at large."[53] Therefore, instead of adopting this approach he urges that "the entire structure of the technological order be subject of critical inquiry."[54] He then goes on to conclude that the problem of technology "is not that technology is misused, but that in a fundamental sense it is badly made."[55] And it is in this conclusion that our three guides would have us part ways with Winner. As Grant writes, "It would be presumptuous to end by proposing some particular therapy by which we might escape from the tight circle of the modern fate."[56] When Winner proposes

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[52]Alvin M. Weinberg, "Can Technology Replace Social Engineering?" in Technology and Man's Future, ed. Albert H. Teich, 2d ed. (New York: St. Martin's Press, 1977), 22.

[53]Winner, Autonomous Technology, 127.

[54]Ibid., 226.

[55]Ibid., 226.

[56]Grant, Technology and Empire, 132.

that the challenge of technology is that it is "badly made," this
unfortunate phrasing opens the way for movement into the
technological process. His proposal seems to indicate that the
challenge of technology is fundamentally rooted in some
deficiency in human capability.

However, Winner is too careful a thinker to let himself be
waylaid in this direction for long. John Ralston Saul, on the
other hand, is much less careful. In his book The Unconscious
Civilization he tries to challenge the power of multinational
corporations and what he describes as the ideology of
"corporatism." He pours out scorn on the managerial mindset of
the ruling class of these institutions:

> The technocratic management, produced mainly by
> business schools and departments of economics, is most
> comfortable functioning in large management structures.
> Today the most obvious vessel in which to release their
> desires is the transnational or very large national
> corporation. Their training and these structures have
> very little to do with capitalism or risk. They are
> reincarnations of the seventeenth-century royal
> monopolies.[57]

However, when he later presents his response to the ravages of
global corporations the solution seems quite simple and does not
appear to require any fundamental questioning of these apparently

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[57]John Ralston Saul, The Unconscious Civilization (Concord,
ON: House of Anansi Press, Ltd., 1995), 120.

soul destroying institutions: "A series of international binding trade agreements of great complexity have been signed over the past few years. Absolutely nothing prevents the negotiation of matching agreements on job equity and social standards."[58]   So even though Saul heaps scorn on "technocratic management" and technocratic specialization he can still make helpful suggestions for refining the international trading system in which global technocratic corporations operate.[59]

According to Saul, the rise of corporatism has brought with it the cooptation of the educational establishment in furnishing skilled workers for the corporate system. As Saul notes, this process of cooptation has gone quite far:

Look at the eagerness with which liberal and social democratic governments are embracing the idea that general schooling should be restructured to act as a direct conduit to the managerial economy. You will find this idea popping up throughout the West. The new Italian centre-left coalition is the latest example. They all say: "We must be practical. We must produce citizens who can find jobs." But these changes will

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[58]Ibid., 178.

[59]According to Saul one of the chief failings of the technocratic specialists behind the hegemony of "technocratic management" is their fear of technological innovation. "All statistics show that these big joint stock companies, managed rather than owned in any meaningful way, are poor long-term investors and poor investors in research and development. Creativity frightens the administrative mind." Ibid., 120.

not help individuals in the work place. They will,

however, prepare the young to accept the structures of

corporatism.[60]

Still, in his conclusions Saul seems just as eager as the

technocrats he criticizes to furnish social structures to mould

the lives of the citizen. For instance, "by simply formalizing

the citizen's participation--that is, by setting aside a certain

number of hours a week through our structuring of the official

activities of the individual--we should be able to launch large

numbers of people into public activity."[61] His recommendation

for solving the problem of youth unemployment also promises to be

highly intrusive in the life of citizens: "We now have long

periods of free time at the end of our lives which if transferred

to the early stages could be devoted to public service."[62]

Still, Saul does harbour some scepticism of technology's

place in contemporary society: "Of course a great deal of

technology does facilitate our actions. But it is rarely about

more than form."[63] But all his scepticism simply results in

another technological recommendation:

The only controls we have on new technology relate to

various aspects of safety. But the addition of a

public-interest component to those safety-oriented

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[60]Ibid., 163.

[61]Ibid., 168.

[62]Ibid., 177.

[63]Ibid., 137.

licensing agencies would bring a much calmer, more responsible attitude to technological change.[64]

Saul is a widely read public intellectual in Canada. He is a self-proclaimed sceptic and challenger of the status quo and yet when it comes to suggestions for action his thought narrows to recommendations for novel social engineering projects and institutional modifications. Reconsideration of any established practices, institutions, and "structures" remains largely absent.

Joseph Weizenbaum was the inventor of a very famous artificial intelligence computer program called "Eliza." However, through his research into artificial intelligence Weizenbaum grew concerned about the faith that many people around him were putting in technology or, as he refers to it, "instrumental reason." In his book <u>Computer Power and Human Reason</u> he voices his concerns:

> When instrumental reason is the sole guide to action,
> the acts it justifies are robbed of their internal
> meanings and thus exist in an ethical vacuum. I
> recently heard an officer of a great university
> publicly defend an important policy decision he had
> made, one that many of the university's students and
> faculty opposed on moral grounds, with the words: "We
> could have taken a moral stand, but what good would
> that have done?" But the good of a moral act inheres
> in the act itself. That is why an act can itself

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[64]Ibid., 179.

ennoble or corrupt the person who performs it. The

victory of instrumental reason in our time has brought

about the virtual disappearance of this insight and

thus perforce the delegitimation of the very idea of

nobility.[65]

Weizenbaum believes there is a struggle going on in Western

hearts and minds between the technological way and what he

describes as a way of nobility. He also indicates that part of

what this way should encompass is the ability to ethically reject

certain kinds of technological activity. As he puts it:

The contestants on one side are those who, briefly

stated, believe computers can, should, and will do

everything, and on the other side those who, like

myself, believe there are limits to what computers

ought to be put to do.[66]

Unfortunately, Weizenbaum does not go on to discuss to any great

length what these ethical limits are. Rather, he goes on to

state:

But just as I have no license to dictate the actions of

others, neither do the constructors of the world in

which I must live have a right to unconditionally

impose their visions on me. Scientists and

technologists have, because of their power, an

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[65]Joseph Weizenbaum, Computer Power and Human Reason (San
Francisco: W.H. Freeman and Company, 1976), 276.

[66]Ibid., 11.

especially heavy responsibility, one that is not to be
sloughed off behind a facade of slogans such as that of
technological inevitability. . . . Men could instead
choose to have truly safe automobiles, decent
television, decent housing for everyone, or
comfortable, safe, and widely distributed mass
transportation.[67]

These concluding lines of exhortation indicate a subtle shift
back into the technological approach. His initial point of
departure is that some things dealing with computers simply
should not be done. But what these things are we are not told.
Instead, Weizenbaum's consternation turns to some technological
projects that he thinks should be taken more seriously.

These examples are meant to show how even philosophers and
cultural critics can be easily sidtracked into novel
technological processes. But if even those who have the
opportunity for careful and measured consideration of issues can
be prone to technological bias what is the likelihood of avoiding
bias for those leading busy lives with little opportunity for
philosophical reflection? In trying to even imagine the full
range of one's typical daily involvement in technological
processes it is possible only to scratch the surface. One sleeps
on a technology inside a technology that is safely monitored and
protected by innumerable social technologies. One may be wakened
by a technology, relieve oneself in a technology, and dress in a

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[67]Ibid., 272.

technology composed of technologies. One might browse a technology while sipping a warm technology. One might then leave through a technology after giving an affectionate technology on the cheek to that special someone to whom one has technologically bounded oneself. One might walk on a technology to a technology which one drives to work at a technological system. On the way one must pay attention to numerous technologies to facilitate a safe journey, while passing the time listening to a technology. At work, one might employ various techniques in a technological process that is monitored by various technologies, while communicating with others via a technology, in order to produce a technology that is an integral part of some other technology. Upon returning home at a technologically appointed hour, one might heat technology in a technology composed of technologies made available through and certified by numerous technological methods and systems. The meal would be eaten off a technology, with several technologies, at a technology, using teeth that are still in one's head because of technology. The rest of the evening might be spent being entertained by technologies in a technologically controlled environment. One might then refer to a technology, switch off a technology, and finally fall asleep with the help of some technologies taken with water after offering up a devotional technology to that "greatest product of ancient Jewish technology."[68]

And it is not just individuals who make use of technologies.

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[68]Newman, Religion and Technology, 150.

Communities can also corporately participate in technological

processes, the greatest of which is no doubt the state itself as

"collective instrument of power."[69]   Governments are no less

capable of engagement in technological processes than

individuals--especially governments which can take guidance from

reports like the following.   I cite the introduction to the

report in full because it is such a wonderfully detailed

expression of an intention make technology itself a tool:

> The Canadian economy is faced with a serious
> crisis which is manifest in high unemployment,
> persistent trade imbalances, and a falling currency.
> These immediate problems reflect a deeper crisis in the
> structure of Canadian industry, and in particular,
> manufacturing, which precedes the recent recession in
> the Western economies.
>
> High levels of technological and managerial
> truncation, and relative technological backwardness
> have placed Canadian industry at a particular
> disadvantage in light of the substantial changes taking
> place in world economies.   The advanced industrial
> nations are moving into more technologically advanced
> forms of production--the "new" industrial revolution.
> This trend threatens to outpace the innovative capacity
> of Canadian industry to such an extent that our

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[69]Jacques Ellul, "from The Technological Society," in
Technology and Man's Future, ed. Albert H. Teich, 127.

manufactured products will no longer be competitive with those of our principal trading partners. Further, a number of developing countries with lower labour costs are moving into many of the conventional areas of industrial activity (e.g., assembly manufacturing operations), thus threatening to displace a significant number of Canada's traditional manufacturing activities through increased price competition. To maintain a high wage, high employment economy in the face of growing foreign competition, it is vital that Canada overcome the structural and technological weaknesses of its industry, quickly and effectively. A rebuilding of Canada's industrial structure as well as improving its technological capability is required.

The Science Council believes that these objectives can be met most effectively if Canada implements an industrial strategy based on the principle of technological sovereignty: a strategy stressing the development of a technological capability in Canadian industry which would enable full participation in the "new" industrial revolution. Implementation of such an industrial strategy would require four initial policy objectives: 1) increase the demand for Canadian technology within the industrial system; 2) expand Canadian industry's potential to develop technology; 3) strengthen the capacity for the absorption of

technology at the level of the firm; 4) increase the
ability of Canadian firms to import technology under
conditions favourable to Canada. The adoption of these
objectives, in conjunction with those measures
necessary to improve the business climate in Canada,
would be a positive step toward rebuilding the Canadian
economy.[70]

In the call made by the Science Council one can see how the
technological process can be turned on itself. Instruments can
be sought which are meant to improve people's inclination and
ability to seek instruments. And so in the proposal of the
council one can see the beginning of a technological process
directed toward the end of fostering not only specific
technological processes but the technological process itself.

There is little sign that growing public interest in the
technological process as universal tool has abated much since the
Science Council made its remarks in the late 1970s. John Manley,
while a federal cabinet minister, recently commented on
television that we should begin to see universities as "engines
of growth" and, therefore, do whatever it takes to make them
better "business incubators."[71] Such statements can only mean
that universities should be restructured to become better

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[70]Science Council of Canada, Forging the Links: A Technology
Policy for Canada, Report 29, February 1979, 7.

[71]Broadcast of "Federal Science and Technology Review: 5
Regional Conferences" on the Canadian Parliamentary Access
Channel (CPAC), 28 December 1995.

institutions for turning out more and better technological problem solvers. His exhortation at the end of his speech for "accelerated innovation" drew tremendous applause.[72]

But if technology encompasses all action relating to the pursuit and use of instruments what kind of action can be considered non-technological? What are we to make of a suggestion like that of Gary Madison that, "technology is but one way of coming to grips with existence, one particular value system among others, and that for this very reason, it cannot claim to be the only way of dealing with the world"?[73] The only conclusion we can draw from the understanding of technology we have developed is that non-technological action encompasses all action not relating to the pursuit or use of instruments. If a non-technological approach to the world is an approach that does not involve the search for instruments then it must involve the ethical judgement of instruments that are already on hand. Non-technological action, therefore, is action that follows directly from the critical ethical rejection of some instrument. Non-technological action is about the conscious eschewal of technologies while remaining within the context of available means.

I have argued in chapter two that our three primary guides lead us to an understanding of technology as not just a set of

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[72]Ibid.

[73]G.B. Madison, Understanding: A Phenomenological-Pragmatic Analysis (Westport, Conn: Greenwood Press, 1982), 11.

instruments under our control. Rather, it is any instance of the process of seeking and using inherently problematic means to overcome practical difficulties. This understanding of technology leads to the conclusion that the technological process creates its own means of propulsion, and so like a perpetual motion machine, can go on forever in a self-sustaining process. What this understanding also suggests is that this process can proceed with an increasingly worn set of brakes because by continuously augmenting the amount of inherently problematic habitual practice and by becoming a habitual practice itself, it can increasingly divert people from the consideration of ethical limits to specific technological practices and therefore divert them from the consideration of ethical limits to technological practice in general.

At this point in our inquiry into the issue of technological dependency one begins to approach the impasse in thought that our three guides also seem to have reached as an implication of their broad conceptions of technology, for at this point one can still ask whether there is possibly a means to solve the challenge of the tightening circle of technological dependence we have been discussing. Perhaps there is some institutional modification to address the tight circle or some innovative ethical approach for guiding practice that could ensure that one never failed to take proper account of technological dependency. Perhaps there is some political mechanism for promoting awareness of technological activity and preempting the habitual technological response to

new problems perpetually thrown up by the technological change, such as a bureau of technology assessment. Perhaps it is simply a question of adopting the right political ideology. As Grant comments, "In our era, many believe that the great question about technology is whether the ways it is used will be determined by the standards of justice in one or other of the dominant political philosophies."[74] Others argue that what is most needed is some form of spiritual renewal to meet a "spiritual crisis" at the core of Western civilization.[75]

However, such questioning, in light of the discussion thus far, can only be interpreted as the first step back into a new round of the technological process. One can respond to the consideration of the problem of the lack of limits to engagement in the technological process by reengaging in the technological process. In this instance, one encounters the absurdity of relying on the technological process to solve the problem of its own lack of internal limit. One also witnesses the ability of technology to divert one from awareness of this fact. The technological approach is an approach one can adopt in response to any situation, or as McLuhan puts it, technology is

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[74]Grant, Technology and Justice, 26.

[75]For an influential example of such a case see: Lynn White, Jr., "The Historical Roots of Our Ecological Crisis," in Philosophy and Technology, ed. Carl Mitcham and Robert Mackey (New York: Collier-Macmillan Ltd, 1972), 259-265.
From Lynn White, Jr., "The Historical Roots of Our Ecological Crisis," Science CLV (10 March 1967)

"environmental."[76] An approach directed toward solving the problem of technology or some aspect of it by seeking novel guides for action is the technological approach and pursuing it could only further technological power. Any successful novel ethical, political, or theological programme capable of systematically addressing the problem of technological dependency would likely be the greatest technological endeavour ever conceived.

At this point one is faced with a choice either to continue to depend on the technological approach and the belief that new means of controlling technological development should be developed, or one can consider the possibility that the problem of technology might be in part this very reliance on technology in place of choosing to explore limits to this reliance by seeking to make choices about one's use of instruments. In the case of the Impasse, the instrument one would put into question is the technological process itself as universal tool of choice. As one commentator has noted of Innis, "Innis tried to solve the problem of bias by making the problem itself into a part of the solution."[77] The Impasse is the point of coming to an understanding that, rather than only the unintended negative effects of technology, another important facet of the challenge of technology might be the inherent ability of technological

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[76]McLuhan, Understanding Media, ix.

[77]Westfall, "The Ambivalent Verdict: Harold Innis and Canadian History," in Culture Communication and Dependency, ed. Melody, Salter, Heyer, 43.

practice to distract one from making reflective judgments about one's reliance on technology and technologies.

This situation is aptly called an impasse because the dilemmas of our times seem to demand creative responses, but if the tendency towards trying to come up with such responses becomes suspect, it can appear that one has little left to do but accept the status quo. What can a person concerned about technology and the negative effects of technology do that is not itself supportive of the technological status quo if the way of technological creativity becomes suspect? Or, as William Barrett puts the conundrum, "If we cannot will to be will-less, at least there should be something we can do about our wilful condition. Otherwise we are left helpless prisoners of our own perverse will to power."[78]

The key to breaking the Impasse is simply to begin seeking a proper balance between one's technological actions and one's efforts at the critical assessment of technological actions. Or as Innis seems to describe such an endeavour, "Civilization [is] a struggle between those who know their limitations and those who do not."[79] Therefore, the first thing that must be done is to question whether the predicament of living in a technological civilization really does call for, as so many philosophical critics of technology suggest, innovative ways of doing things, new ethical theories to guide action, etc. Do we really need new

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[78]Barrett, The Illusion of Technique, 263.

[79]Innis, The Idea File, 5.33.

institutions or institutional modifications, new tools, new

ethical systems, or as Ursula Franklin suggests "changes required

to provide a truly different concept of justice and fairness for

decision making"?[80]   Perhaps, as she also suggests, we might do

just as well simply to consider making "principled objections" to

some kinds of "established social practice."[81]   As she says:

> There have been profound changes in the past. Slavery
>
> was abolished, as was child labour. The status of
>
> women has changed quite drastically. All these changes
>
> occurred, I would suggest, because a point in time came
>
> when the general sense of justice and fairness was
>
> affronted by, for instance, the owning of people by
>
> other people or the exploitation of children, women, or
>
> minorities.[82]

Reaching the Impasse forces one to consider the possibility that

adopting a constructive perspective to the ethical challenge of

technology might actually be a part of the problem if it involves

avoiding actually making judgements about technological practices

because one is involved instead in seeking novel ways to improve

the guidance of such judgements. Reaching the Impasse means

coming to an awareness that perhaps what might be most lacking is

nothing more than what out three primary guides point to through

their refusals to engage in certain actions, a willingness to

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[80]Franklin, The Real World of Technology, 122.

[81]Ibid., 123.

[82]Ibid., 122.

contemplate the possibility of repudiating some activities using
"ethical tools" already on hand.

The Impasse also helps clarify why one should consider
adopting the non-technological approach. One should consider it
not because it is an innovative means to solve the problem of
technological dependency, but simply because one has become aware
of a bias in one's outlook. This point has been made by other
philosophical critics of technology. As Ellul observes, but with
a characteristic note of pessimism, "fundamentally, human beings
are alienated in the technical system that has substituted a
fatality of technique for a fatality of nature."[83] However,
our examination of the relevant views of Innis, McLuhan, and
Grant leads to a clearer understanding of how the appearance of
human helplessness in the face of technological change comes
about. It comes about when people become biased toward
technological activity and the very nature of this bias helps
prevent awareness of this bias. Habitual technological practice
can prevent the development of a critical awareness of one's
reliance on specific technologies including one's reliance on
technological problem solving. Unlike Ellul, the three thinkers
know a way out. As McLuhan puts it, with far greater optimism
than Ellul, "There is no inevitability, however, where there is a
willingness to pay attention."[84]

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[83]Jacques Ellul, "The Search for Ethics in a Technicist
Society," Research in Philosophy and Technology 9 (1989): 33.

[84]McLuhan, War and Peace in the Global Village, 12.

Reaching the Impasse, therefore, throws into sharp contrast two fundamentally different alternatives for seeking to overcome challenges: either technologically or by way of attentive ethical judgement and self-limitation of one's use of technologies-- including the technology of the technological process itself. One can employ a method or leave a space in which the critical ethical contemplation of a method can take place. In reaching the Impasse an important facet of the challenge of technology is thrown into stark relief. Even technological actions motivated by the best of ethical intentions can help distract one from fulfilling one's duty to ethically judge technological actions.

That "the context of ethics is defined and altered by technology" is an issue that many commentators have noted calls for clarification.[85] The understanding of technology developed in previous chapters, culminating in our discussion of the Impasse in this chapter, addresses this question. Ethics can be seen to apply internally in the form of the goals pursued within technological processes, but it can also apply externally in the ethical choices one makes between engagement in such processes versus non-technological processes. When faced with any problem, including the problem of technological dependency, one can choose between engaging or not engaging in the technological process to respond to that problem. By choosing the technological process one chooses not to address a problem by judging one's

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[85]Angus, <u>George Grant's Platonic Rejoinder to Heidegger</u>, 108.

participation in technological processes. Technological action therefore can allow one to pursue ostensibly ethical ends while avoiding ethical responsibilities.

The non-technological approach seeks a way to avoid the possibility of a such an oversight of moral duty. However, in laying out "a way" this approach becomes open to the criticism that it too is simply a technological response. This criticism is not as telling as it might first appear. There is nothing in the non-technological approach that should inhibit one from acknowledging this, although, it might be more accurate to describe this approach as an admonition rather than an instrument. It does not lay out any methods for making decisions or guidelines for action beyond the recommendation that one should not let participation in technological action prevent one from also considering non-technological action. Also, its purpose is not to increase human capability, which according to our definition is an essential characteristic of technology. Rather, it is the attempt to ascertain and live within ethical limits to human capability. Such a capability is hardly anything new so even if the non-technological approach can be called a technology, it is not an innovative one. It is a tool we already have on hand.

Therefore, to borrow a piece of Kantian terminology, we may say that our reasons for adopting the approach are not "heteronomous" to the approach itself. In the same way that the non-technological approach recommends that one always also

consider ethical limits to the use of certain instruments within
the context of available means, one chooses this available means
rather than a novel technological process out of a sense of moral
limit to one's reliance on the technological process. The non-
technological approach is, as such, simply the suspension of
one's reliance on the technological process in favour of an
alternative existing means--the human ability to make principled
objections to participation in certain activities.[86] An effect
of considering this approach might be a more stable, better
integrated civilization, but this is not guaranteed because the
approach provides no specific answers to the question of how to
make ethical choices about technologies. It simply indicates how
such judging differs from being technological and in this
provides a distinction by which one can become aware whether one

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[86]A environmental activist handbook from the 1970s captures
well the subtle distinction between technological and non-
technological approaches. Its introduction opens with the
following quotation of John W. Gardner: "We have plenty of
debaters, blamers, provocateurs. We don't have plenty of
problem-solvers. A relevant call to action would address itself
to that complacent lump of Americans who fatten on the yield of
this society but never bestir themselves to solve its problems,
to powerful men who rest complacently with outworn institutions,
and to Americans still uncommitted to the values we profess to
cherish as a people." But the introduction ends with the
admonition, "Say no to superhighways. Say no to the plastic
bottles and the aluminum cans. Say no to the shopping centers.
Say no to the new industry which will pollute the air and befoul
the water. Say no to the housing development. Say no to the oil
tanker shoving through the arctic ice and the oil pipeline
threatening destruction to the most fragile ecosystem on earth.
Say no to the new plastic furniture, the new detergent, the new
speed hungry cars. Say no to the power company's wail that they
must have a nuclear reactor over the hill from you."
    Ruth Adams, Say No! The New Pioneers' Guide to Action to
Save Our Environment (Emmaus Pa.: Rodale Press, 1971.), vii, ix.

is improperly privileging one of these types of action over the other.

Judging technological bias will involve judging the account one can give about the relative emphasis one has given to both types of action. Therefore, in addition to being aware of one's technological actions it is essential to ethical life to be aware of the technological actions to which one has said a principled no. Further, it is essential to the task of judging ethical theories to know not only how they would have us guide our technological efforts but also some understanding of their ability to guide the renunciation of technologies.

In his concluding discussion of technology and politics in Autonomous Technology, Winner remarks with irony that "technology is now a kind of conduit such that no matter which aims or purposes one decides to put in, a particular kind of product inevitably comes out."[87] The understanding of technology we have developed here gives new sense to this observation. It clarifies why the results of the technological process are inevitably the same. The insight that emerges from reaching the Impasse is obvious, but even someone as astute as Winner seems surprised by it—a technological process can only have one kind of outcome—the growth of technological power. A technological process cannot have the outcome of the limitation of technological power and still be worthy of the name "technology." The only kind of action that can limit technology is a human

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[87]Winner, Autonomous Technology, 278.

decision not to apply some otherwise useful instrument.

What Innis, McLuhan and Grant's expansive understandings of technology make clear is that there is really only a yes or no choice when it comes to the limitation of technological power. One can address a problem technologically by creating or availing oneself of some form of technological capability or one can address the technological causes of that problem by not availing oneself of some form of technological capability. When seeking to solve practical problems involving technology the choice is always between innovation or discrimination about innovation. Still, it is possible to believe that one can somehow end up limiting technological power by overcoming problems technologically, which is what some efforts to address certain social issues, such as re-cycling, seem to claim.

The indiscriminate expansion of technological power would not be problematic if all problems were a result of a lack of power, but reaching the Impasse suggests that this is not the case in at least one situation. The unrestrained pursuit of technological power can itself be considered a problem based on a vision of human agency that includes the expression of "freedom through self-limitation."[88] This moral problem is not something which can be addressed by an unrestrained pursuit of technological power, but only through the ethical restraint of such power. As Samuel Ajzenstat notes of Grant, "The deep anti-

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[88] David Cayley in the Canadian Broadcasting Corporation Radio Broadcast, "The Age of Ecology," Ideas, 18-29 June 1994. Transcript, 3.

liberal streak in Grant was his moving, and I think convincing, argument that human justice and liberty are ultimately impossible without an experience of love that limits our manipulative activism and for which progressivist liberalism consequently makes no room."[89] One can either view every obstacle in life, including the challenge of technological dependence, merely as something to be addressed with new technological striving, or one can also view such problems as signs that technological action may have surpassed ethical limits. It is a question of emphasis and perspective--the perspective one adopts to the world from moment to moment.

The mistake of many philosophical critics of technology is to leave the impression that, rather than ethical discrimination about technological actions, what is most needed is improvement of technological capability, whether in the form of the development of some kind of improved "moral capability" or more strictly technical capability. Even some of our most astute contemporary philosophical critics can sometimes leave such an impression. Ursula Franklin, for example, seems to make such an allusion when she writes that while "the reality of economic underdevelopment was perceived by the scholars; the reality of moral underdevelopment was rarely mentioned."[90] Hans Jonas expresses a similar perspective when he states that "the altered

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[89]Samuel Ajzenstat, "The Place of Abortion in George Grant's Thought" in George Grant and the Future of Canada, ed. Yusuf K Umar (Calgary: University of Calgary Press, 1992), 83.

[90]Franklin, The Real World of Technology, 91.

nature of human action, with the magnitude and novelty of its

works and their impact on man's global future, raises moral

issues for which past ethics, geared to direct dealings of man

with his fellow men within narrow horizons of space and time, has

left us unprepared."[91] The non-technological approach,

however, suggests that the problem might not necessarily be a

result of an inadequacy of ethical theory. It might at least

partially be a result of an improper balance in the emphasis on

technological over non-technological action. People may be

prevented from exercising ethical restraint over technology

because they simply are too busy addressing problems

technologically. This may involve abrogating responsibility to

technological instruments, such as legal systems, safety

standards associations, government bureaus, universities, think

tanks, the state, or even "ethical experts" such as philosophical

critics of technology. As Michael Zimmerman laments: "[In the

technological culture] there are technical experts assigned to

deal rationally with every conceivable problem, except the

problem of the nature of the culture itself."[92]

Concepts like the "design science revolution" recommended by

R. Buckminster Fuller, the "ingenuity gap" of Homer Dixon, the

"moral underdevelopment" mentioned by Franklin, or the "ethical

vacuum" alluded to by Hans Jonas are all ideas which can give the

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[91]Jonas, The Imperative of Responsibility, ix-x.

[92]Michael Zimmerman, "Technological Culture and the End of
Philosophy," Research in Philosophy and Technology 2 (1979): 143.

impression that innovation is really what is most required to address the challenge of technology.[93] What Innis, McLuhan, and Grant suggest through their silence is that one might already be equipped well enough with ethical tools to meet the challenge of technology. What may be lacking is simply a willingness to put appropriate emphasis on using these tools to restrain technological power.

Perhaps this emphasis on the potential of tradition is why many commentators have considered Innis, McLuhan and Grant to be impractical when it comes to saying something to address the dilemmas of out age. "Innis never believed in an easy dissolution of such biases, especially as he perceived more clearly their operation in our own time, nor did he advance any special vision of the future."[94] "What McLuhan never saw from looking at television was what he once knew perfectly well . . . the mechanical bride marries us to the power of the state and its industrial economy. But McLuhan preferred not to lift the veil [of power]."[95] According to such commentators one should expect some kind of innovative theoretical approach to the ethical challenges of technology from such reputedly insightful critics of our technological age.

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[93]R. Buckminster Fuller, Critical Path (New York: St. Martins's Press, 1981), xxxvii.

[94]Crowley, "Harold Innis and the Modern Perspective of Communication," in Culture Communication and Dependency, ed., Melody, Salter, Heyer, 240-241.

[95]John O'Neill, "McLuhan's Loss of Innis-Sense," Canadian Forum (May 1981): 13.

That no such novel approaches were proffered has puzzled such commentators, but the silences of Innis, McLuhan and Grant, in light of our consideration of the Impasse and the non-technological approach, begin to make some sense. Part of their message might be that we should be cautious towards experts and novel theories, avoid the unending search for better approaches, think for ourselves and feel we can actually make choices about technologies. As Arthur Kroker has pointed out about McLuhan, "Over and again in his writings, McLuhan returned to the theme that only a sharpening and refocussing of human perception could provide a way out of the labyrinth of the technostructure."[96] Our three guides point not to some new way of acting, but to the reanimation of a very old way of thinking and not acting, akin to the idea expressed by the UN World Commission on Environment and Development:

> Traditional social systems recognized some aspects of
> this interdependence [between technology and the
> environment] and enforced community control over
> agricultural practices and traditional rights relating
> to water, forests, and land. This enforcement of the
> 'common interest' did not necessarily impede growth and
> expansion, though it may have limited the acceptance
> and diffusion of technical innovations.[97]

[96]Arthur Kroker, Technology and the Canadian Mind: Innis/McLuhan/Grant (Montreal: New World Perspectives, 1984), 64.

[97]World Commission on Environment and Development, Our Common Future (New York: Oxford University Press, 1987), 47.

The non-technological approach, therefore, leaves ample room for the influence of tradition. As Grant puts it, "those of us who at certain times look to grasp something beyond history must search for it as the remembering of a negated tradition."[98] Innis writes:

> It is to be expected that you will ask for cures and
> for some improvement from the state of chaos and strife
> in which we find ourselves in this century. There is
> no cure except the appeal to reason and an emphasis on
> long-run considerations—on the future and on the
> past.[99]

The implication of the non-technological approach is that one should not avoid exercising responsibility because one is waiting for the development of better ethical or policy tools to save the world from technology.

This idea is exemplified in the lives of Innis, McLuhan, and Grant. They practised what they preached. As one commentator notes of Innis:

> His own bias, as he so often stated, valued a culture
> characterized by balance, order, and the oral
> tradition. His analysis of the problem and his
> attachment to these human, non-technological values set

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[98] George Grant, Time as History (Toronto: The Hunter Rose Company, 1969), 49.

[99] Harold Adams Innis, "This Has Killed That," Journal of Canadian Studies 12, 5 (Winter 1977): 5.

a course that a number of Canadian nationalists would
follow. He beheld the decline and fall of a meaningful
culture, and he was bitter as he faced defeat. One can
hear the echoes of his lamentations in the work of
George Grant, Donald Creighton and Dennis Lee.[100]

Innis could make comments like the following because his position
towards technology encourages not only innovation but also the
possibility of the critical rejection of innovation:

> Mass production and standardization are the enemies of
> the West. The limitations of mechanization of the
> printed and spoken word must be emphasized, and
> determined efforts to recapture the vitality of the
> oral tradition must be made.[101]

It is possible to see in Innis' work strains of determinism, and
therefore, the rejection of any possibility of actively seeking a
balance between the various technological forces which allow for
the stability of empires.[102] It is also possible to see in his
work a call to create new forms of media in an attempt to achieve
the type of balance he felt could be found in Byzantine

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[100]Westfall, "The Ambivalent Verdict: Harold Innis and
Canadian History," in Culture Communication and Dependency, ed.,
Melody, Salter, Heyer, 47.

[101]Innis, Empire and Communications, 168.

[102]"Innis' writings abound with a sense of determinism--such
and such a factor came to be, and therefore, and so on."
Dennis Duffy, "Harold Adams Innis," chap. in Marshall
McLuhan, Canadian Writers Series, ed. W. David Godfrey (Toronto:
McClelland and Stewart Ltd., 1969), 16.

civilization.[103]   However, both these perspectives fail to fully

capture Innis' position because his position also encompasses the

possibility for the critical rejection of certain technologies in

favour of other existing technologies, such as the rejection of

print in favour of face-to-face discourse, in the attempt to

maintain balance.[104]

McLuhan was also willing to consider the possibility of the

critical rejection of instruments. For instance, he states: "The

technology of the photo is an extension of our own being and can

be withdrawn from circulation like any other technology if we

decide that it is virulent." [105] Stopping the use of a

technology does not mean rejecting the use of all technology.

When one decides not to use a particular technology, such as a

dishwasher, the dishes must still be done and one must switch to

washing dishes by hand and restructure one's life accordingly.

As McLuhan says, "amputation of such extensions calls for as much

knowledge and skill as are prerequisite to any other physical

amputation."[106] Rejecting a technology may mean filling the

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[103]"A bureaucracy built up in relation to papyrus and the
alphabet was supplemented by a hierarchy built up in relation to
parchment. The consequent stability was evident in the
continuity of the Byzantine Empire to 1453."
Innis, The Bias of Communication, 117.

[104]"His own bias, he proclaimed, was for the oral tradition,
which he saw involving 'personal contact and a consideration for
the feelings of others.'"
Duffy, "Harold Adams Innis," chap. in Marshall McLuhan, 16.

[105]McLuhan, Understanding Media, 193.

[106]Ibid., 193.

space left in one's capabilities with another existing technology
of lesser capability, as in the case of the dishwasher, or it may
mean simply choosing to do different things altogether. "To
resist TV," McLuhan writes, "one must acquire the antidote of
related media like print."[107] According to the understanding
of technology as process human beings can never entirely stop
being technological. As Grant says "In each lived moment of our
waking and sleeping, we are technological civilization."[108]
Non-technological action must inevitably be intermingled with
technological action.

There is a desperate quality to the writings of McLuhan near
the end of his life, well documented by biographers. As Philip
Marchand characterized this state, in his last years McLuhan
resigned himself to the "grim role of the seer who is sometimes
derided, sometimes petted, but never heeded."[109] But this
desperation did not stop McLuhan from engaging in forms of action
to fight those aspects of modernity he disliked: "He publicly
opposed increased congestion in the heart of the city, whether in
the form of new expressways or high-rise apartment buildings,
which he particularly despised."[110] It is well known of
McLuhan that he could sometimes present himself as an apologist

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[107]Marchand, Marshall McLuhan, 170.

[108]Grant, Technology and Justice, 11.

[109]Marchand, Marshall McLuhan, 228.

[110]Ibid., 228.

for technological change.[111] However, as Marchand notes, "he
was also in the habit of defending his intellectual flank by
frequently insisting that his outlining the features of the new
media ought to have inspired everyone with sufficient revulsion
to avoid them."[112] The apparent espousal of technological
change has brought some of McLuhan's followers to the conclusion
that McLuhan favoured unrestricted experimentation with new
technology. Derrick de Kerckhove, for example, interprets
McLuhan as championing the form of techno-fetishism that McLuhan
himself called the "narcosis of Narcissus:"

> Where other cultural observers might have cited forces
> of marketing, McLuhan saw in this phenomenon a purely
> psychological pattern of narcissistic identification
> with the power of our toys. I [de Kerckhove] see it as
> proof that we are indeed becoming cyborgs, and that, as
> each technology extends one of our faculties and
> transcends our physical limitations, we are inspired to
> acquire the very best extension of our own body. When
> we buy our home video system, we want it to perform
> every possible editing function, not because we will
> ever use them, but because we would feel handicapped
> and inadequate without them.

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[111]Ibid., 169.

[112]Ibid., 170.

This is probably a healthy approach.[113]

However, we have seen that the position of McLuhan is perhaps more akin to old fashioned moralism than de Kerckhove is willing to acknowledge.[114]

The non-technological approach, therefore, means taking seriously McLuhan's statement that "We can if we choose, think things out before we put them out."[115] It means considering the possibility, as Philip Marchand recommends, that some of McLuhan's positive statements about technological change were meant more as rhetorical overstatements aimed at eliciting one's scepticism.[116] And it also means taking some of his seemingly more extreme negative suggestions, like the following made to the

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[113]Derrick de Kerckhove, The Skin of Culture: Investigating the New Electronic Reality (Toronto: Somerville House, 1995), 3.

[114]"He told one reviewer that he was a conservative and hated all change, but given that change was inevitable he was damned if he was going to let it role over him."
   Sam Solecki "Marshall McLuhan (1911-1980)," Canadian Forum (May 1981): 4.
   "At Heart Innis was a moralist whose hatred of oppressive social institutions led him to examine the manner of their subversion."
   William Christian, Introduction to The Idea File of Harold Adams Innis, vi.

[115]McLuhan, Understanding Media, 49.

[116]Marchand, Marshall McLuhan, 169.
   "Another tactic of defence [used by McLuhan] consisted in reminding his audience that 'all (his) work (was) satire.' In true rhetorical fashion, probe and satire have in common that they are grounded in the audience or the public and not the orator. The purpose of the satirical goad was to prod the reader or the listener out of his stock responses and categories into a combative stance."
   Derrick de Kerckhove, "Understanding McLuhan," Canadian Forum (May 1981): 33.

Governor of California, not so completely in jest:

> McLuhan flew to Sacramento and spent three and a half
> hours with [Jerry] Brown and his cabinet, discoursing
> on satellite information systems, discarnate man, the
> dyslexic television child, Christianity, and the twin
> hemispheres of the brain. As it turned out, McLuhan
> felt no rapport whatsoever with Brown, who barely got a
> word in edgewise, but he was happy to take on the part,
> contrary to his popular reputation, of the champion of
> literacy. After the meeting he wrote Brown to suggest
> a rationing of television for the population in
> general. Brown's assistant superintendent of education
> replied to McLuhan, gently suggesting that such
> rationing was somewhat unrealistic, politically
> speaking.[117]

The suggestion here is that McLuhan, like Innis and Grant, held a
position which discouraged him from laying out an ethical
programme for overcoming the challenge of technology. If their
positions leave them open to accusations of vagueness and
impracticability, this may be intended, for their positions seem
to lead to the Impasse, which leads to the realization that
offering a novel "ethical programme" is probably the last thing
one should do in a society in which many seem hooked on seeking
novel programmes.

    If one believes that people have unwisely come increasingly

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[117]Marchand, _Marshall McLuhan_, 262.

to rely on technological solutions and less on their own critical

moral judgement, one cannot in good conscience deal with this

problem by seeking to lay down a technological solution, such as

a novel ethical theory or a political ideology for guiding

action. In the case of our three primary guides one must instead

look to what they did, or more precisely, what they refused to

do, to get some idea of what they had in mind for dealing with

the challenge of technology.

We can see the non-technological approach in Grant's

critical positions on abortion and the takeover in the humanities

of the scientific paradigm of research,[118] and in his call for

the recovery of ancient political philosophy.[119] For Innis,

the non-technological approach can be seen in his scepticism

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[118]Grant's refusal to use a certain text book, as opposed to
Plato's Republic, was a central reason behind his resignation
from York University: "Key to his decision was the practical need
to use Marcus Long's textbook, which, contrary to its claim of
objectivity, he believed really took the side of nineteenth-
century philosophy against classical philosophy. More than that,
this book was not a work of philosophy; it was a work about
philosophy."
    William Christian, George Grant: A Biography (Toronto:
University of Toronto Press, 1993), 202.
    For a discussion of Grant's resignation from McMaster over
issues of university curriculum see: Joan O'Donovan, George Grant
and the Twilight of Justice (Toronto: University of Toronto
Press, 1984), 133-34.

[119]"[For Leo Strauss and Grant] philosophy in our age can
and must detach itself from the prevailing tradition of political
philosophy and the sentiments of the modern public in order to
rethink past thought and confront afresh the possibility of its
truth."
    Joan O'Donovan, George Grant and the Twilight of Justice,
73.

about the expansion of "the price system"[120] and his battles

against the "mechanization" of knowledge and the increasing

tendency of economists to become consultants to governments and

business. Innis often criticized social scientists for being too

enamoured with "elaborate calculating machines" and "refinements

in mathematical techniques."[121] He was sceptical about

whether the new media of communication would contribute to

improving human awareness and understanding, as can be heard in

the following cryptic note from the Idea File: "Improved

communication smothers ideas and restricts concentration and

development of major ideas. Mechanization and sterility of

knowledge [result]."[122]

Two Practical Ways of Approaching Problems

All three of our primary guides have to varying degrees

anti-reformist facets to their approaches to technology. How

else can one make sense of a comment of Innis such as this:

"Belief in [a] prosperity cult [is a] part of increased

advertising--[the] emphasis [is always] on [seeking a] better

world and [the] avoidance of problem[s]."[123] The fundamental

point each guide makes through his programmatic silence is that

honest efforts at ameliorating the effects of technology can help

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[120]Kroker, Technology and the Canadian Mind, 118-121.

[121]Innis, The Bias of Communication, 86.

[122]Innis, The Idea File, 2.7.

[123]Innis, The Idea File, 2.3.

strengthen one's dependence on technology.

It is perhaps in the view of technology behind the cliche
that one should seek to "embrace change" that the distinction can
best be drawn between the approach we have been developing and a
position which sees technology's challenge primarily as a
technological challenge. Joseph F. Coates gives expression to
this latter position:

> In this background of pervasive concern over the
> negative effects of technology, people must seek ways
> of controlling the effects of technology on their
> lives.[124]

Or as Emmanuel G. Mesthene suggests,

> technology, economic affluence, and increasing
> population combine to multiply both the opportunities
> and problems that society faces and to accelerate the
> changes with which it must come to terms. This means
> that allowing political change to come gradually and of
> its own accord may no longer be a viable strategy for
> contemporary society. . . . Instead, we face the
> problem of deliberately restructuring our political
> institutions and decision making mechanisms--including
> the system of economic decision making--to make them
> adequate to the enhanced social role of the public

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[124]Joseph F. Coates, "Technology Assessment," in Technology
and Man's Future, ed. Teich, 252.

sphere.[125]

The understanding of the challenge of technology that sees it as preeminently calling for greater innovative efforts contrasts with that of Ursula Franklin. When asked about the Internet and its ability to "recommunitize" people she suggests: "I think it's the substitution of quote unquote communication for action. I mean, how much do you have to communicate. You have to <u>do</u> something."[126] Heather Menzies has written about various struggles that have been mounted against technological change.[127] She considers the resistance of Midland telephone operators to automated telephone switching as a valid response to technological change. As she puts it,

> [the Midland operators] had their own discourse on
> technology -- one based on real life, not on an
> abstract model of life in which the future can always
> be fine-tuned to fit certain preplanned priorities.
> I'm convinced that this is an essential starting place
> for all of us who want to resist the adjustment to
> restructuring agenda, in which you either scramble up
> the retraining ladder and compete in the brave new

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[125] Emmanuel G Mesthene, <u>Technological Change: Its Impact on Man and Society</u> (Toronto: The New American Library, 1970), 69-70.

[126] Ursula Franklin, "Ursula Major," interview in <u>This Magazine</u> 29, 8 (May/June 1996): 39.

[127] See: Heather Menzies, "Escaping the Black Box of Technology," chap. in <u>Fastforward and Out of Control: How technology is Changing Your Life</u> (Toronto: MacMillan of Canada, 1989)

world of digitalized work or, as one techno-guru put it, "You're toast."[128]

Coates and Mesthene feel that technological activity is the best response to the effects of technological change, whereas for Franklin and Menzies, the critical rejection of certain technological activities is just as valid a response. The question of technology posed by the non-technological approach is not, as it seems for Coates and Mesthene, what is the best way to effectively manage the negative effects of technology. The question is why do most people, unlike the Midland operators, seem so unwilling to consider standing-up to technological change. Thus, according to Menzies, "The issue, then, is not that everyone might be controlled by robots, but that we will all come to think like robots, and not be disturbed by that at all."[129] This is a very different view of the challenge of technology than that presented by commentators, like Coates and Mesthene, who suggest that the problem of technology is essentially rooted in a lack of creativity in the narrow sense of technological innovation.

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[128]Heather Menzies, "The Midland Operators," This Magazine 29, 8 (May/June 1996): 32-33.
    Also see: Desmond Morton, "Technology and the Future of Unions," Canadian Forum (March 1982): 12-13.
    "An obvious, straightforward and thoroughly precedented response from the labour movement is hostility and resistance to change."(Morton, 13)

[129]Menzies, Fastforward and Out of Control, 37.

Technological Problem Solving

We are all familiar with technological problem solving. It is everyday news in Canada. Regarding the problem of youth unemployment, one solution offered is "Making job information available on the Internet and making sure young people know how to find it."[130] To help solve the garbage problem some municipalities have recently implemented systems of user payment for trash bags left on the curb.[131] Increasing environmental pressures of wide-scale computer use has lead the United States government to require that optional energy saving features be installed in computer monitors.[132] Regarding the lack of environmental awareness, people are encouraged to surf the Net and visit Environment Canada's "award winning" web page.[133]

Non-technological Problem Solving

Non-technological problem solving, on the other hand, starts by reconsidering everyday technological activities which are implicated in a problem that one is seeking to address.[134] It

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[130]"Ottawa Outlines Strategy for Youth: Report Encourages Internship Programs," The Globe and Mail, 17 July 1996, A5.

[131]Doug Draper, "Trash Bag Ban in Works," The St. Catharines Standard, 26 July 1996, B1.

[132]Tony Durham, "Birth of the Eco-Computer," New Scientist, 30 October 1993, 30-33.

[133]Internet universal resource locater address (URL): http:/www.ceaa.gc.ca/english.

[134]There are no non-technological "solutions" to problems in which no technology can be implicated. That is, unless ceasing to see a problem as a problem can be considered a solution.

asks the following question: Are there technological activities that have contributed to the problem that I am seeking to address which should be ethically reconsidered and possibly rejected? This line of questioning can still be turned into technological questioning to be answered by the search for new instruments to overcome any ethical concerns that arise from one's non-technological questioning. But the non-technological approach includes engagement in the technological process itself as a form of technological action that must also always be open to ethical question. Therefore, the non-technological approach also asks the above question of any decisions to engage in novel technological processes that arise from one's non-technological questioning. The question in such cases is whether one's switch into technological consideration is justified or simply a way of avoiding difficult questions about the ethical status of other technological processes.

This two-pronged approach represents a thorough and not just partial questioning of one's faith in technology. If such two-pronged questioning is sincerely pursued, the result should be the occasional repudiation of some forms of technological activity, assuming that it is not untenable to claim that not all technological actions can be ethically justified. Because one questions not only specific technological practices but also participation in the technological process, one can overcome the tendency for the first line of questioning to be uncritically translated into novel technological endeavours rather than

thorough questioning about the ethical limits to technological power.

Some examples of non-technological action might help. One comes from a newspaper article entitled "Farmers, Bugs Live in Harmony: Indonesian Farmers Learn Pest Control is More Effective Without Chemicals":

> Mr. Sadeli wants to learn what his parents always knew about farming. He wants to learn how to live with pests. . . . At first, the technological approach helped Indonesia achieve self-sufficiency in rice production. Then the brown plant hopper returned with a stunning resistance to spraying. In 1985, the plant hoppers destroyed enough rice to feed three million people, and threatened to undermine Indonesia's rural revolution. . . . The government no longer tells Mr. Sadeli to spray.[135]

A second example comes from the editorial page of the <u>Globe and Mail</u>:

> It's dreary, it's cold, and they just killed our cable . . . . At first my family thought it would be a disaster. Then we played games. Now, six months later, we don't even miss it. The dictator is dead.

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[135] John Stackhouse, "Farmers, Bugs Live in Harmony: Indonesian Farmers Learn Pest Control is More Effective Without Chemicals," <u>The Globe and Mail</u>, 12 August 1996.

Long live the survivors.[136]

A third example is from an article published in the journal Et

Cetera entitled "The Fast Food Franchise as Metaphor":

> The franchise is this little system, which functions
>
> predictably, and gives us something to eat which we are
>
> familiar with. . . . The system is so "smart", there
>
> are no special skills needed, so "labor" can be low-
>
> paid and unskilled. . . . I'd rather wait a little
>
> longer for my food or my oil change, and know that the
>
> people involved were well-paid, skilled, and able to
>
> make adjustments to fit the needs of someone who might
>
> not fit perfectly into their almost-perfect
>
> system.[137]

A final example is from, The Downtowner, a publication focusing

on urban revitalization in the city of St. Catharines. This

article calls for the reconsideration of a whole host of

technological trends of the latter half of this century:

> In the mid 1950s something revolutionary happened--the
>
> first enclosed mall was erected in Niagara. . . . The
>
> die was cast. Decentralization became the "policy"
>
> . . . . We brought shopping, churches, recreation,
>
> entertainment and business services closer to "the
>
> people". The value was "convenience". . . . Our minds

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[136]Kenneth J. Harvey, editorial in The Globe and Mail, 29
July 1996.

[137]Raymond Gozzi, "The Fast Food Franchise as Metaphor," Et
Cetera 53, 3 (Fall 1996): 322-325.

have been so enchanted with home convenience services

of audio/visual technologies, that we cocooned, for

decades now, in self-centredness. Some spirits are now

awakening to look around and to say--"what is so

convenient about technology, if the expense is person

to person interaction?"[138]

Each of these examples involves people reconsidering certain

technological actions in order to deal with certain problems

instead of considering novel technological actions to deal with

these problems.

The ultimate goal of the non-technological approach is to

break the habit of responding to problems technologically.

Therefore, it tries to take all instances in which one can use a

technology to solve a problem also as opportunities to consider

the causes of the problem in an attempt to avoid becoming like

Madame Vauquer in Balzac's Old Goriot: "Like all narrow-minded

persons, Madame Vauquer was not accustomed to consider why events

happened; she concentrated her attention on the events

themselves."[139] The non-technological approach means

consciously seeking to linger over everyday technological choices

to ensure that one's choices are justified and not just habitual.

Such consideration can lead the consideration of the

possibility of returning to former levels of capability, such as

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[138]Thomas J. Salter, "The Spirit of Niagara," The
Downtowner, September/October 1996, 7.

[139]Honoré de Balzac, Old Goriot. Trans. Marion Ayton
Crawford (Markham: Penguin Books Canada Ltd.), 48.

traditional organic farming methods, self-made entertainment, slower food or car services, or higher density cities. It is only by painstakingly disentangling those forms of technological capability which are essential from those which may have undone more good than they have produced that an actual ratcheting down of technological power can be achieved, which is perhaps what Grant means when he says, "Only in listening for intimations of deprival can we live critically in the dynamo."[140]

But the option always exists to respond to problems in which technologies are implicated through novel technological action. For example, biotechnology is an area of growing concern to many Canadians.[141] The approach being developed here would suggest that one's ethical considerations should not be limited to creatively addressing the novel ethical questions posed by these new practices, such as whether there should be improvements to labelling regulations concerning transgenic foods.[142] One's ethical inquiry must include consideration of the technological reasons behind the pursuit of these practices. This shift in focus might lead one to the reconsideration of technologies that have helped cause the negative environmental factors biotechnologies are meant to address, such as the use of

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[140]Grant, Technology and Empire, 141.

[141]Jill Eisen, Alison Moss, Liz Nagy, and Gail Brownell, Canadian Broadcasting Corporation radio broadcast "Biotechnology's Harvest" Ideas, 15-22 March 1994. Transcript.

[142]Lorraine Johnson, "Naked Lunch: Canada's Dismal Biotechnology Regulations Are as Full of Holes as Swiss Cheese," This Magazine 29, 8 (May/June 1996): 34-43.

pesticides.[143] Or one might even engage in a reconsideration

of the role of government in funding agricultural research and

development or of certain forms of agribusiness. These are just

two examples of the types of issues that could be considered in

addition to addressing the novel ethical issues posed by the new

biotechnologies. In this shift of focus from novel ethical

questions to ethical questions about the causes of certain

technological activities--from figure to ground as McLuhan would

say--we have a third reason for using the phrase non-

technological to describe the approach we are developing. One

must always be prepared to shift one's focus away from particular

technologies and the intriguing ethical problems they pose to

focus instead on the causes of technological activity.[144]

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[143] "None the less, even though these 'organic methods' are alternatives to current practices, we might still be inclined to think that we cannot change those practices. There seems so much inertia involved in our current ways of doing things, that we are almost overwhelmed when we think about altering them. But these practices, we must remind ourselves, are not our jailers. They are the result of custom and habit."
    Alan R. Drengson, Introduction to "Part V: Community," in The Philosophy of Society, ed. Rodger Beehler and Alan R. Drengson (London: Methuen, 1978), 351.

[144] As McLuhan comments: "Without [understanding] the cause[s of technological change], counteraction is impossible and [one] can merely ride the wave of change like a surf boarder. He may look very graceful and skilful but the wave remains quite independent of him."
    McLuhan, War and Peace in the Global Village, 136. [My emphasis]

Public Policy Analysis Involving Technology

The non-technological approach suggests asking whether one's technological activity is directed at solving a problem which is in some way a result of a failure to live within ethical limits to other technological activities. The non-technological approach by its nature, therefore, favours working within the confines of established political institutions to achieve the limitation of technological practices.

The non-technological approach suggests that some proposals for political reform can be mere public relations exercises meant to obscure possible non-technological action through the proposal of less contentious or less difficult technological action. Innis suggests that the rise of modern media encourages such a tactic. As he puts it: "[Modern politics is characterized by a] necessity of stressing continuous political and legal change as device for dominating news."[145] Some political reforms can be little more than attempts at raising political profile while avoiding political controversy.

Even guided by the best intentions, some political reforms can have the unforseen consequence of reinforcing technological dependency by mitigating negative consequences enough to defuse public pressure for the reexamination of technological practices. And if one's political actions are always technological in nature, no matter how creative or effective, they will help support technological dependency. What is required is that in

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[145] Innis, The Idea File, 5.24.

addition to creating innovative political programmes politicians must also consider the possibility of eschewing certain communally undertaken technological actions.

From the perspective being developed in this inquiry, public policy consideration should always include consideration of the possibility of the ethical limitation of technological activity. In addition to being politically creative we must also be open to non-technological action. As McLuhan expresses this dual ethical task: "What we seek today is either a means of controlling these shifts in the sense ratios of the psychic and social outlook [brought on by technological change], or a means of avoiding them altogether."[146] Dealing with technology ethically should not just involve seeking to control its negative effects technologically.

The rationale for seeking to control technological activity in this dualistic way arises from a vision of human agency shared by our three guides. This vision sees human individuals as being responsible for determining the standards for technological success and failure. As Grant maintains: "Our moral choices matter absolutely in the scheme of things. Any social order must then try to constitute itself within the recognition of this basic fact of moral personality which all equally possess."[147] Accepting this vision of human ethical responsibility means inferences like the following about the "Green Revolution" cannot

[146]McLuhan, Understanding Media, 70.

[147]Grant, "An Ethic of Community," 21.

be drawn:

> The unexpected [negative] social side effects do not
> imply that the technology of the green revolution was
> unsuccessful. They do imply that the social side
> effects must be anticipated and forestalled before the
> large-scale introduction of a new technology.[148]

The understanding of success in this comment is impossible to
understand from the standpoint of the non-technological approach
because negative effects are never just goads for further
involvement in the technological process. They are always also
opportunities for the reconsideration of technological
commitments. It is only through such reconsideration that one
can truly understand what constitutes success.

However, in the political forum adopting the technological
approach can easily allow one to roar like a lion while being a
lamb. An action which threatens oil and gas production, for
example, is likely to be highly contentious, whereas creating a
new institution like an environmental assessment agency, which
has only an advisory capacity, is likely to be less so.
Leadership which consists entirely of engagement in technological
activity allows for the image of political daring it does not
have because, instead of seriously confronting technological
elites, it simply creates new ones. The non-technological
approach to politics, on the other hand, can only be a highly

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[148]Donella H. Meadows, "Technology and the Limits to
Growth," in Technology and Man's Future, ed. Teich, 77. [My
emphasis]

confrontational politics in which technological elites are challenged directly at the source of their power--specific technological practices. In the next chapter we will consider the extent to which such an approach is present in a particular contemporary public policy debate.

CHAPTER 5: APPLICATION OF THE NON-TECHNOLOGICAL APPROACH TO
CURRENT PUBLIC POLICY ANALYSIS OF THE EMPLOYMENT CRISIS

Introduction

In this chapter we will apply the non-technological
approach to a specific public policy issue. The practical
example upon which we will focus is the problem of unemployment.
However, the approach should be applicable to other public policy
issues in which technology plays a role.

According to the understanding of technology developed in
preceding chapters any public policy issue can be perceived as a
technological problem. In a technological civilization the
predominant response will be to approach issues in this way and
to avoid seeing them as opportunities to bring into question
established technological practices. In other words, the
tendency will be to deal with the problem through what Alan
Drengson calls a "technological fix."[1] In this chapter, through
an examination of various policy studies of the problem of
unemployment, we will try to show how this tendency manifests
itself. A comment made about the environmental movement captures
the bias we will be examining: "What once had begun as a call for

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[1] "I call this attempt to repair the harm of a technology by
modification, a technological fix. If, on the other hand, we
question the very purpose and intent behind the technology (e.g.
of insecticides) and thereby develop alternative approaches that
might require modifying our values and goals, then we recognize
the limits of the technological fix."
    Alan R. Drengson, "The Sacred and The Limits of the
Technological Fix." Zygon 19 (September 1984): 260.

new public virtues is now about to be turned into a call for a new set of managerial strategies."[2] It is this process of ethical criticism of technological activity shifting into engagement into novel technological activity that is the focus of this chapter.

What might the interpretation of technology proposed in the preceding chapters suggest one should expect of public policy analysis of the issue of unemployment? It would suggest one should expect to find efforts at conceiving new institutions or improvements to institutions aimed at either increasing the ability of society to create employment or to deal with the consequences of unemployment. The interpretation also suggests that one will notice what we will call "blind spots" in public policy consideration when it comes to the effects of technological practices. The analyst will overlook the obvious role that technological practices have played in helping to create the problem in favour of describing the problem in terms of some deficiency in technological capability. As well, the analyst's technological habit might be so great that one finds instances when technological recommendations are made even in the face of acknowledged counter evidence to the possible effectiveness of such recommendations. For our purposes here we will refer to such instances as "hiccups." And finally, one can even expect to find instances when analysts will make recommendations that support technological processes which they

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[2]Cayley, "The Age of Ecology", 1. Transcript.

clearly acknowledge have contributed to the very problem they are trying to address. For our purposes here we will refer to such instances as "pitfalls."

At the end of the twentieth century the nature of the challenge of employment is clear. Not only must Western and other societies solve the growing problems of unemployment and underemployment, but they must do so while dealing with problems of environmental degradation and the dehumanizing character of many forms of labour. From the increasing instances of conflict surrounding many development projects and growing awareness about the negative effects of some forms of work it seems that public opinion is somewhat less favourable towards job creation at any price either to the environment or the well-being of individuals. This latter line of criticism not only takes the form of traditional leftist criticism of the alienating character of capitalist labour, but also a growing awareness about negative health effects, such as stress and repetitive strain injuries, which attend certain forms of labour. There is also continuing concern about the growing gap between rich and poor.

In selecting the studies my most important criterion was that they should be contemporary. I have also tried to represent a selection of views from across the political spectrum as well as looking to studies from outside Canada. The examples are not comprehensive but it is my hope to demonstrate how an adequate inductive argument can be made for supporting a claim that a technological bias does exist in public policy analysis. As for

any inductive claim there is always the possibility of finding additional supporting or countering cases. I must rely on the reader to explore further the possibilities of this type of analysis.

Some Public Policy Studies of Unemployment

In this section we will examine eight recent policy studies of unemployment. In all of these studies one finds blind spots, hiccups and pitfalls. One also finds a preponderance of suggestions for technological innovation and a dearth of ethical criticism of technological practices. In each study suggestions are made for improvements and additions to public institutions to address the jobs crisis through seeking new capabilities in the areas of job creation, job training, and employment transition.

In Vanishing Jobs: Canada's Changing Workplaces, Lars Osberg, Fred Wein and Jan Grude summarize their key concern with unemployment as follows: "Our focus throughout this book has been on the question, 'What has happened to the sort of jobs that high school graduates used to get?'"[3] The three authors of the Social Sciences and Humanities Research Council study are concerned about a change in Canadian society that has affected the ability of people with an average education to find work because, as they go on to point out, "when jobs are scarce, the more educated 'bump' many of the less educated down the job

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[3]Lars Osberg, Fred Wein, Jan Grude, Vanishing Jobs: Canada's Changing Workplaces (Toronto: James Lorimer and Company, 1995), 179.

hierarchy and into unemployment."[4] Their ultimate conclusion is that decreased economic growth is the primary cause of the employment crisis.

In chapter seven, when they draw their final conclusions, the commentators note that technology has played a key role in the process of transformation in the workplace that is affecting the ability of people with an average education to find work. As they put it,

> In this increasingly competitive world, our research
> has given us a new appreciation of the role and
> complexity of 'technological change.' The impact of
> technological change on job creation is complex and
> subtle, because there is both a technology of things
> and a technology of people. Throughout this book, we
> have tried to underscore the interdependence between
> the hard technology of capital equipment and cognitive
> skills, and the soft technology of organizational
> structure and motivation.[5]

Strangely, only a few paragraphs later the discussion of soft technology seems forgotten. Osberg, Wein and Grude seem baffled about what lies behind the pressures driving employers to greater lengths to achieve higher labour productivity. As they state:

> In the public sector, there is a relentless pressure to
> restructure, reform, and do more with less. Whatever

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[4]Ibid., 161.

[5]Ibid., 200.

the reason for these new pressures on employers in both

public and private sectors, employers are trying to get

the most output possible from their labour force.[6]

But in the discussion which follows it seems quite clear what is
driving employers:

> Employers are becoming very analytical about the soft
>
> technology they use. Many are using the new
>
> information technology to plot very carefully their
>
> peaks of labour usage, in order to restructure their
>
> labour force into a core group of permanent employees
>
> and a contingent group of part-time or short-term
>
> workers who are called in only when necessary to meet
>
> surges in production. Employers are also examining
>
> carefully the roles of middle managers, and (even if
>
> reality often falls short of the rhetoric) there is a
>
> new push to decentralize decision-making and team
>
> building.[7]

Jobs are going, partly as a result of a soft technological
change.

Yet when Osberg, Wein and Grude make their policy

recommendations they ultimately endorse the very type of change

that earlier they point to as such an important cause of job

loss: "In many areas, the public sector has much to learn from

the new-private-sector models of delayering, decentralization,

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[6]Ibid., 200.

[7]Ibid., 200.

and team building."[8] So in the same chapter one finds the authors reluctantly indicating that soft technologies play a key role in creating new contingent and short term work patterns. The authors acknowledge that jobs are disappearing because of the success achieved by firms and governments in rationalizing their labour processes so as to maintain output with fewer workers and fewer layers of management personnel. And yet, the ultimate conclusion of their analysis is that a lack of economic growth is the primary cause of growing unemployment.

This reluctance to acknowledge any negative consequences of technological change results in several strange hiccups in the authors' reasoning. They seem so dedicated to the idea of the inevitable good of technological change that they take every negative repercussion of technology only as an opportunity to galvanize reform. An example of such a hiccup is when they conclude a discussion of the role of education in combating growing unemployment by asserting, "we do not believe that the short-run problems of the Canadian economy are due to the failures of the educational system, or that educational reform can, in a few years, solve those problems."[9] And yet only a few pages later,

> Our conclusion is that the community college system
> needs more attention, more resources and a more
> responsive plan of governance and accountability. . . . .

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[8]Ibid., 202.

[9]Ibid., 176.

But the issue for community colleges is not just to
provide enough training space to meet student demand,
but also to continuously adapt those courses to the
needs of business.[10]

Osberg, Wein and Grude state that the education system is
adequate and not to blame for job loss, but then shift to the
making of recommendations for overhauling that system. We find
another such hiccup later in the book:

> In the current reality of labour markets, firms are not
> limited in production by the lack of workers with high-
> level cognitive and social skills--as long as they
> choose carefully from the queue of the unemployed.
>
> . . . The danger is, therefore, that governments--
> despite their rhetorical commitments to training and
> equal opportunity--will not in fact want to pay the
> costs of improving the skills of all Canadians.[11]

There is not a general lack of skilled employees but they
recommend the redoubling of government efforts to improve the
skills of Canadians.

In the end, the process of ongoing rationalization of the
workplace, which the three authors reluctantly grant is a force
that allows businesses and governments to shed workers and
increase the pace of the remaining work, is in no way seen as
part of the problem. Rather, supporting this process is seen as

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[10]Ibid., 179.

[11]Ibid., 206.

the solution; schools must be reorganized to more effectively support this process and governments must take advantage of these very techniques. As we will find in the studies which follow, overlooking the role that technological change has played in bringing about negative repercussion is not restricted to Canadian public policy analysis.

In the American policy analysis The Disposable Work Force: Worker Displacement and Employment Instability in America, Thomas S. Moore concludes that, "The factor that appears to have the greatest impact upon unemployment levels is the loss of high paying jobs."[12] Almost half way through the book, the most important factor responsible for the disappearance of high wage jobs in the U.S. economy is an unnamed factor. As Moore admits, "the terms of the trade-off between unemployment and inflation change for reasons that are not well understood."[13] This lack of understanding, however, does not in any way inhibit Moore from making technological recommendations for solving the problem of unemployment.

According to Moore, the most important cause for increasing levels of unemployment is that the workers who lose high wage jobs to the unnamed factor generally have a difficult time lowering their wage expectations and thus enter into protracted periods of transitional unemployment. Therefore, Moore

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[12]Thomas S. Moore, The Disposable Work Force: Worker Displacement and Employment Instability in America (New York: Aldine de Gruyter, 1996), 98.

[13]Ibid., 92.

concludes:

> The most effective way to reduce unemployment is to
> minimize the loss of high-wage jobs in the first place
> and to offset the loss that does occur with comparable
> employment opportunities. Unfortunately, the U.S.
> economy has been more successful of late at generating
> low-wage jobs than it has been at preventing the loss
> of high-wage employment.[14]

Rather than consider the possibility that technological change
might play some role in increasing unemployment, Moore largely
skirts the issue.

Moore acknowledges that some job loss has been a result of
foreign competition. He notes, "Technological advances in
transportation and communication have opened the world to trade
and domestic markets to foreign producers."[15] But he also
notes:

> Following the recession [1980-82], demand picked up and
> output increased while manufacturing employment
> remained flat. Yet as long as manufacturing output
> represents a constant share of an expanding economy,
> the absence of employment growth must be the result of
> rapid productivity gains.[16]

In this last instance Moore implicitly acknowledges the

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[14]Ibid., 98.

[15]Ibid., 67.

[16]Ibid., 65.

possibility that the traditional economic formula, that
increasing labour efficiency must lead inexorably to increases in
the number of jobs, may no longer hold true. When businesses
restructure their operations, expanded production may not be the
goal but simply maintenance of profits through technologically
achieved productivity gains.[17] As he goes on to point out,

> The management effort to restructure organizations
> around their core functions is being driven by the need
> to make their employees more productive. It is an
> attempt to create less hierarchical organizations that
> employ fewer people. . . . Outsourcing thus results in
> widespread displacement and contributes to the
> mushrooming growth of both temporary help agencies and
> the contingent workforce. It raises productivity of
> some employees at the expense of others.[18]

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[17]"A store can't make money unless its sales are rising.
'We're trying to break that growth law--to make money when sales
aren't growing,' notes Peter Woolford, senior vice president of
policy at the Retail Council of Canada, the industry trade
association. This has heralded the recent raft of belt-
tightening, squeezing every last nickel of expense from
distribution systems, a gambit those of the Wal-Mart/Home Depot
ilk have raised to a fine art. But it is a rarely mastered
trick."

Kenneth Kidd, "Consumers: An Endangered Species," Report on
Business, December 1996, 40.

"[British trade unionist and author Barrie Sherman has]
warned that much of the investment being made in micro-electronic
applications is 'capital deepening' as opposed to 'capital
widening.' This means that investment is being used to reduce
production costs of existing products and processes rather than
to create entirely new products or processes."

Ray Hainsworth, "Micro-Electronics and the Canadian Labour
Movement," Canadian Forum (March 1982): 8.

[18]Moore, The Disposable Work Force, 68.

Clearly technological advance in the form of improvements in the
techniques used by workers as well as better management
techniques and reorganization of production processes all
contribute to increased productivity. Could these processes be
the unnamed factor causing the loss of high paying jobs? Moore's
discussion of the U.S. trade deficit suggests that the answer
might be yes.

> As much as anything else, the trade deficit is
> symptomatic of the way in which U.S. firms are choosing
> to compete. In the best of cases, firms respond to
> heightened competition with technological and
> organizational innovations that yield labor-saving
> productivity gains. They maintain their domestic
> output at the expense of domestic employment. . . . The
> more successful firms are at moving production offshore
> and at curbing domestic wage growth, the less incentive
> they have to invest in labor-saving technology, worker
> training, and new forms of work organization.[19]

According to Moore's analysis, technological innovation in the
workplace does appear to be a major contributor to the
displacement of workers from high-paying jobs. However, such
innovation in the workplace is also seen by Moore to be the way
that high-paying jobs can best be preserved. His suggestion for
addressing the employment crisis is to call for increased
innovation in workplace productivity technologies and to promote

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[19]Ibid., 66.

job training to facilitate increased investment in the reorganization of the workplace. Ultimately, as he puts it, "ending the stagnation in earning growth in the near future means improving [workers'] productivity."[20] And elsewhere he writes: "To foster innovation and learning, the workplace must be reorganized."[21] Moore recommends a type of technological activity to deal with the problem of unemployment which he points out elsewhere is a leading cause of growing unemployment.

The third study that we will examine is also from the United States. Called Rethinking Employment Policy, it is an anthology of writings of various economists and public policy analysts of the Urban Institute of Washington. All the contributors seem uncertain about the prospects of dealing with unemployment in any meaningful way. As the first contributor expresses such uncertainty in her introduction to the issue, "employment and training programs are largely powerless to combat high levels of cyclical unemployment."[22] In the chapter on training Burt S. Barnow demonstrates a similar degree of scepticism about his own suggestions:

> While it is unrealistic to expect that in the near
> future government training programs can be relied upon
> to play the major role in reducing unemployment and

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[20]Ibid., 103.

[21]Ibid., 68.

[22]Isabel V. Sawhill, "Rethinking Employment Policy," in Rethinking Employment Policy, ed. D. Lee Bawden and Felicity Skidmore (Washington: The Urban Institute Press, 1989), 18.

poverty, the government can take actions to both raise the average level of performance and reduce uncertainty about the program's impact.[23]

In another chapter, also on the topic of organized labour, Ronald G. Ehrenberg makes arguments for a strong slate of changes to American labour protection legislation. However he concludes with the observation,

> Unionized workers, both directly and indirectly through the collective bargaining process and often indirectly through winning wage differentials to compensate them for unfavourable job characteristics, appear to have much more protection in many areas than do non-union employees. The major beneficiaries of legislation in these areas often would be non-union workers. While strong protective labour legislation and strong unions coexist overseas, one wonders if the growth of protective labor legislation in the United States would decrease the demand for unions and further reduce the share of the work force that is organized.[24]

Why not simply endorse unions if they are effective and one's suggestions risk undermining them? One suspects that Ehrenberg is simply going through the motions in making his innovative

[23]Burt S. Barnow, "Government Training as a Means of Reducing Unemployment," in <u>Rethinking Employment Policy</u>, 127.

[24]Ronald G. Ehrenberg, "Worker's Rights: Rethinking Protective Labor Legislation," in <u>Rethinking Employment Policy</u>, 164.

public policy suggestions.

In the chapter on international competition Ray Marshall begins by noting that during the postwar period the United States supported the expansion of global trade through the creation and extension of what has became known as the Bretton Woods system, consisting of the General Agreement on Tariffs and Trades (GATT), the International Monetary Fund (IMF), the World Bank, Organization of Economic Cooperation and Development (OECD) and other subsidiary international organizations. Underlying the system was the idea of "comparative advantage--holding that the welfare of the whole world was enlarged through a competitive, free trade, open market system in which each country concentrated on producing those things for which it had the greatest advantage or the least disadvantage."[25] The author observes that the implications of this system for workers in the United States has been clear: "The consequences of these changes for the United States and other high-wage industrialized countries is that jobs can, in fact, be lost, and wages and working conditions can be reduced by international competition."[26] Yet after a lengthy discussion of the negative consequences of the expansion of the international system Marshall does feel any compulsion to

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[25]Ray Marshall, "Implications of Internationalization of Labor Market Institutions and Industrial Relations Systems," in Rethinking Employment Policy, 206.

[26]Ibid., 211.

criticize this system.[27]   Instead he simply states, regarding

the question of unemployment: "The right answer is to promote an

open and expanding trading system within the framework of

internationally acceptable and enforceable rules, policies and

institutions."[28] This recommendation is made after an analysis

of the expansion of the international trading system that leads

him also to conclude that "the Bretton Woods system is no longer

adequate to ensure that international trade benefits people in

most countries."[29]   The only conclusion that a reader is left

to draw is that all that is needed is to improve or augment the

Bretton Woods system in some unspecified way. Although Marshall

suggests that growing unemployment can be addressed by making

some changes to the rules and institutions of Bretton Woods, he

does not discuss these. Instead, he finishes his contribution by

outlining some "reforms to the industrial [labour] relations

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[27] I am not alone in thinking this system worthy of question,
especially since the addition of floating exchange rates. As
William Greider recounts: "One authoritative judgment along
these lines came from a private assembly of forty-seven
international financial experts called the Bretton Woods
Commission, whose chairman was Paul Volcker, the much admired
former chairman of the Federal Reserve. In 1994, this group
reported its conclusions on the impact of unregulated currency
markets: 'Since the early 1970's, long-term growth in the
industrial countries has been cut in half, from 5 percent a year
to about 2.5 percent a year. Although many factors contributed
to this decline in different countries at different times, low
growth has been an international problem, and the loss of
exchange rate discipline has played a part.'"
      William Greider, One World, Ready or Not: The Manic Logic of
Global Capitalism (New York: Simon and Shuster, 1997), 250.

[28] Ray Marshall in Rethinking Employment Policy, 217.

[29] Ibid., 217.

system" of the U.S. that "will make it better suited to [the] global economy."[30]

In the next section on "International Competition and American Jobs," Daniel Burton also makes a commitment to Bretton Woods. International competition has pressured American companies to become more ingenious in their use of labour; for example, the author notes, "One of the most important developments in the effort to maximize flexibility is the increased use of temporary and part-time workers."[31] Still, Burton concludes with a similar set of policy recommendations as Marshall: "The United States should work with other countries to achieve greater international macroeconomic policy coordination."[32] As well, he recommends that, "States should pass legislation to allow companies to establish short-time unemployment compensation. Short-time unemployment compensation gives individual firms the opportunity to reduce the work schedule of their overall work force instead of laying off a group of workers altogether."[33] The increased use of short term labour is not seen as a negative consequence of increased international competition; rather, it is seen as a field in which to engage in technological refinement of the unemployment

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[30]Ibid., 217.

[31]Daniel Burton, "International Competition and American Jobs," in Rethinking Employment Policy, 230.

[32]Ibid., 247.

[33]Ibid., 245.

insurance system. In the end the author seeks public policy that would support the very technological process he indicates earlier is a cause of growing unemployment.

The concluding chapter begins with a pessimistic statement about the prospects of the suggestions made in the preceding chapters. The final contributor writes, "As previous chapters have made clear, employment in fact has become less secure in the last decade, and the things that we must do to gain and hold jobs are becoming more difficult."[34] Still, the following recommendations emerge: "Finally, if despite their best efforts, some individuals cannot find employment at a decent wage public service jobs would be offered" and "the capabilities of the Employment Service should be upgraded or private firms should be offered head hunter fees for placing the long-term unemployed."[35] "Many approaches are possible. Greater tax incentives to employers or regulations mandating retraining of employees about to be terminated. . . . A revolving loan fund, retaining vouchers, or a direct grant program."[36] The barrage of suggestions lend an almost desperate tone to the final essay. As a previous contributor, George E. Johnson, more explicitly voices his frustration over the issue of growing unemployment, "The problem is that we can only hope that some of the programs

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[34]Forrest Chisman, "Effective Employment Policy: The Missing Middle," in Rethinking Employment Policy, 251.

[35]Ibid., 255-256.

[36]Ibid., 256.

turn out to be effective long-term measures."[37]   It seems

almost as if the contributors are simply going through the

motions--strangely compelled to make suggestions for

technological changes even in the face of immense scepticism

about the possible effectiveness of these changes.

It might be easy to suspect that the pattern of initial

scepticism about technological change switching into acceptance

and even endorsement of such change is to be expected of

professional economists and policy analysts. After all, they

have a professional interest in making sure their recommendations

are practical within the confines of the existing economic

system.   Therefore, let us examine an analysis that claims to

take a more radical approach to the problem of unemployment.

Jeremy Rifkin's recent book The End of Work has gained much

recent public attention.[38] Unlike the previous three studies

Rifkin is not quite so willing to accept the idea that

technological change is always good. Rifkin spends the first

chapter, entitled "The Two Faces of Technology", describing in

detail how technological change is responsible for the current

crisis in unemployment. He is quite clear that recent

technological change is the primary factor at the source of the

problem:

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[37]George E. Johnson, "Do We Know Enough about the Unemployment Problem to Know What, If Anything, Will Help?" in Rethinking Employment Policy, 54.

[38]See: Murray Campbell, "Jobs: Experts disagree on benefits of technology," The Globe and Mail, 3 January 1997, Al.

The point that needs to be emphasized is that, even
allowing for short-term dips in the unemployment rate,
the long-term trend is toward ever higher rates of
unemployment. The introduction of more sophisticated
technologies, with the accompanying gains in
productivity, means that the global economy can produce
more and more goods and services employing an ever
smaller percentage of the available workforce.[39]

His criticism of technology is not limited to its contribution to
the problem of unemployment. Rifkin is also of the opinion that
technology is at the source of many environmental problems:

The rapid conversion of the earth's resources into a
cornucopia of goods and services has led to global
warming, ozone depletion, mass deforestation, spreading
deserts, the wholesale extinction of species, and the
destabilization of the biosphere. The over
exploitation of the earth's chemical and biological
riches has left developing nations resource-poor and
their populations without adequate means to sustain
their growing numbers.[40]

And yet even Rifkin, for all his criticism of technology, cannot
allow himself to question whether some technological practices
should be rejected. His recommendations for dealing with the
problems of unemployment fall in line with those of the previous

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[39] Jeremy Rifkin, The End of Work, 11.

[40] Ibid., 246.

studies. His recommendations are to "re-engineer" the work week through job-sharing and shortening the standard work week and a system of mandatory service in voluntary associations for those on social assistance. He writes.

> Providing a social wage—as an alternative to welfare—
> for millions of the nation's poor, in return for
> working in the non-profit sector, would help not only
> recipients but also the communities in which their
> labor is put to use. Forging new bonds of trust and a
> sense of shared commitment to the welfare of others and
> the interests of the neighbourhoods in which they serve
> is what is so desperately needed if we are to rebuild
> communities and create the foundation for a caring
> society.[41]

The last quotation highlights a sub-theme in Rifkin's book, which is that technological change lies behind many issues of social breakdown and the disintegration of a sense of community in the United States and other Western countries. For Rifkin, the effects of certain technological changes in the patterns of consumer culture and suburban development have been devastating to community, as in his chapter devoted to the discussion of the effects on the African-American community of automation and the abandonment of urban centres by white Americans flocking to the

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[41]Ibid., 258.

suburbs.[42] Still, for all the discussion of the negative impact of certain technological activities, at no point does Rifkin challenge the commitment to any of these activities. Technological change is accepted as an unquestionable context that must be ameliorated through the development of novel public policy instruments and experiments in social engineering.

It could be argued that the policy studies considered so far are all essentially liberal in character. Therefore let us turn to the recent "alternative federal government budget" sponsored by a Canadian coalition of labour and other social action groups.[43] This publication outlines "five strategies for job creation."[44] The first strategy proposes using the Bank of Canada to manipulate interest rates to promote economic growth through increased consumer spending. The second strategy suggests creating a government sponsored investment programme with priority given to projects like "waste reduction and recycling . . . the installation of computers in public libraries . . . social housing, elder care centres . . . home care and services to assist victims of violence and abuse."[45] Under

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[42]For another interesting discussion of the effects of suburbanization in the United States see: James Howard Kunstler, The Geography of Nowhere: The Rise and Decline of America's Man-Made Landscape (Toronto: Simon and Schuster Inc., 1994)

[43]"Alternative Budget Sparks National Debate," CAUT Bulletin, 3 March 1997, 7.

[44]Canadian Centre for Policy Alternatives, Alternative Federal Budget Papers 1997 (Ottawa: Canadian Centre for Policy Alternatives, 1997), 13.

[45]Ibid., 13-14.

this strategy the alternative budget would also increase funding to "federal investment in research, conservation and innovative technology."[46] The third strategy considers various proposals to create new public economic structures to support local economic development. As the alternative budget states, "We are committed to developing alternative tools to help democratize local and national economic development."[47] Also in section three, the alternative budget suggests the introduction of "public sector procurement councils to give Canadian companies a bigger share of purchases in the health and computer fields."[48] This last suggestion seems potentially counter productive considering the next strategy, which is to make a commitment to increasing employment in the public service which is described as an "essentially labour-intensive sector of the economy."[49] Strategy five suggests readjustment of the standard work week to 36 hours, limits to overtime hours, changes to the labour code to encourage flexible work hours and increased leave time, and changes to the tax laws to encourage educational leave.[50]

In another left wing analysis of the problem of unemployment entitled "The Future of Jobs" by Andrew Jackson, there is a straightforward acknowledgment that technological change has

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[46]Ibid., 14.

[47]Ibid., 14.

[48]Ibid., 15.

[49]Ibid., 16.

[50]Ibid., 16.

contributed to growing unemployment. As Jackson writes,
"technological change, in combination with structural shifts in
the economy and international competition, must be held partially
responsible for rising unemployment, and has certainly been a
driving force behind increased polarization of the labour
market."[51] However, Jackson attributes the major part of
responsibility for the problem of unemployment to globalization
and government macroeconomic policy.

One of Jackson's first recommendations is to favour strong
job creation in the public service. This seems potentially non-
technological in orientation, but it is unclear whether the
public service is to be increased simply through hiring more
people to provide existing services or through the creation of
completely new public services. It is also unclear whether the
option of hiring more people would or could involve the
renunciation of any labour saving technologies to justify the
additional staff. Instead of giving specifics Jackson simply
invokes the Western European economic model: "it is clear from
continental European experience, at least to date, that strong
trade unions and government regulation of the labour market—
together with a bias towards job creation in the public rather
than private services—can strongly counter structural trends
towards polarisation and the growth of very precarious and low

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[51]Andrew Jackson, The Future of Jobs (Ottawa: Canadian
Centre for Policy Alternatives, 1997), 21.

quality employment."[52]   However, this preference for the

European economic model seems strange considering earlier

comments Jackson makes about the European employment situation.

As he observes,

> The striking phrase--'the two thirds of society'--has
>
> been widely used to describe a European social reality
>
> in which a large proportion of the population,
>
> including a high and rising proportion of young people
>
> and older people, have been marginalized through very
>
> long-term unemployment . . . and social programs are
>
> very much under attack, as in France and Italy today,
>
> because of the fiscal pressures which inevitably arise
>
> from continuing very high rates of unemployment.[53]

According to Jackson similar forces to those leading to delaying

and downsizing in North America have already been at work in

Europe for some time.[54]   Jackson insist, contrary to what many

liberal economic critics suggest, in Europe strong trade unions

and high levels of education and training have combined with new

techniques of workplace organization to create a situation

conducive to high efficiency.   As Jackson states, "The core

argument is that production is a social process which requires

high levels of co-operation and involvement on the part of

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[52]Ibid., 40.

[53]Ibid., 12.

[54]Ibid., 32-34.

workers if maximum efficiency and quality are to be obtained."[55] This more cooperative environment has allowed for the development of what some European labour commentators call "Diversified Quality Production", in which highly skilled and flexible workers are given greater responsibility in the work process. The result is that a much lower ratio of managers to workers is required. As Jackson points out, "In the US, 13% of employment is accounted for by administration and managerial employees compared to 4% in Germany and 2.6% in Sweden (Data for 1989)."[56] Jackson acknowledges a connection between this European management trend and the U.S. trend towards "'delayering' and 'downsizing' of managerial hierarchies"[57], but although he pinpoints this U.S. trend as one of the factors contributing to the North American jobs crisis,[58] in its European guise it is a trend he believes we should seek to emulate.

In order to recover some of the lost power of national governments to influence macroeconomic conditions, Jackson also argues for actions that would limit the flow of highly mobile capital and lessen the influence of global money markets. He suggests that "The key assumption of neo-liberal structural adjustment programs and 'free trade' agreements such as NAFTA--

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[55]Ibid., 33.

[56]Ibid., 33.

[57]Ibid., 33.

[58]Ibid., 20-21.

that growth is promoted best through a maximum opening to global markets and investment flows--is highly questionable".[59] However, instead of arguing for the rejection of the North American Free Trade Agreement (NAFTA), Jackson's first suggestion is that a "small transaction tax on foreign exchange dealing would make exchange rate movements less volatile and unpredictable, and much less vulnerable to purely speculative transactions."[60] He makes the potentially non-technological sounding suggestion to, "turn back the clock" on the deregulation of the international financial sector by "restoring and increasing national controls on capital outflows (e.g. by limiting foreign investment of pension and mutual fund assets; by imposing higher taxes on foreign portfolio investment income.)"[61] But it is unclear whether "increasing national controls" would involve the creation of new controls and whether any of these actions would necessarily entail the rejection of NAFTA. Finally, he argues that "states could and should move much more decisively to regulate international banks and international financial markets through international bodies such as the IMF and the Bank for International Settlements."[62]

Although Jackson cites both globalization and technological change as causes of unemployment, he sees room for the promotion

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[59] Ibid., 42.

[60] Ibid., 42.

[61] Ibid., 42.

[62] Ibid., 42.

of these processes. As he states, "To facilitate and promote
positive adjustment to globalization and technological change, it
is crucially important that countries, individually and
collectively, regulate the labour market in order to choke off
the 'low road' to corporate international competitiveness."[63]
What does this actually mean in terms of new regulation? Jackson
offers the suggestion that "It is reasonable for example, to
require advanced notifications of production shutdowns and
negotiation of adjustment plans covering those effected, as is
the case in some European countries."[64] Another suggestion is
for the Western industrial powers to change the World Trade
Organization's constitution to include a "social clause"
concerning respect for basic labour rights by all signatory
nations. Sanctions could then be used to against nations in non-
compliance.[65] However, Jackson's main suggestion for avoiding
the "low road" of untrammelled international competition for jobs
is to follow the "high road" of increased competitiveness through
strong government support of research and development, education
and training, and investment in infrastructure.

In line with many of the other studies, a recommendation is
also made for the consideration of the reduction and
redistribution of working time as part of a more "comprehensive

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[63]Ibid., 43.

[64]Ibid., 44.

[65]Ibid., 41.

jobs strategy."[66] Finally, the "logic of investment decision-

making in a globalized capitalist economy" must be "blunted."[67]

This will be achieved through the creation of "strong state

support for positive restructuring of our inherited economic base

through new investments and the development of new

capacities."[68] Such support requires not only public provision

of "hard and soft infrastructure" such as "high levels of public

investment in Research and Development," but also the creation of

new means for working people to gain access to investment

capital: "The CLC [Canadian Labour Congress] has proposed that a

national investment fund—financed by a set aside of the assets

of the financial sector—should be established to support sector

development banks, community economic development funds, worker

co-ops and so on."[69] Jackson's hope is that this more

comprehensive approach aligned with the "high road" approach

would do much to help solve the problem of growing unemployment.

His concluding remarks are largely directed at criticizing

the historically poor performance of the Canadian economy in the

areas of innovation and publicly supported research and

development. As jackson notes, "Innovation and quality

production require high levels of public and private investment

in not only hard infrastructures such as transportation and

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[66] Ibid., 44.

[67] Ibid., 45.

[68] Ibid., 46.

[69] Ibid., 46.

communications systems, but also in the soft infrastructures of
education and training systems and national systems of innovation
centred research institutes, joint public-private research
consortia and so on."[70] The shift to the encouragement of
innovation seems strange as earlier in the analysis Jackson makes
critical remarks about the effects of rapid innovation in the
workplace: "Most workers develop and expand their skills at work,
and prolonged periods of unemployment will result in rapid skills
obsolescence if the workplaces from which the unemployed have
been unemployed are changing rapidly."[71] He also acknowledges
that "it is questionable whether 'high road' firms can restore
anything resembling full employment in the advanced industrial
countries given the inescapable fact that such a strategy is
explicitly based upon the expansion of intrinsically high
productivity sectors of the economy."[72] One wonders why
Jackson lays such emphasis on the "high road" approach when its
benefits are potentially so small and in his own analysis there
are potential negative effects of rapid ongoing technological
change, such as increased difficulties in retraining workers.

By far, though, Jackson's analysis is the most potentially
non-technological of the studies. With its straightforward
acknowledgment of technology's negative impact and suggestion to
at least reconsider some institutions, it indicates a certain

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[70]Ibid., 44.

[71]Ibid., 25.

[72]Ibid., 44.

openness to the criticism of certain technological practices and institutions. Yet the emphasis is still strongly on innovation.

Analysis of the Policy Studies of Unemployment

The understanding of technology as process suggests that what we can expect to find in analyzing the array of responses to any public policy issue is a preponderance of technological solutions. What will be missing is fundamental questioning about the commitment to any existing technological practices. In the previous studies of unemployment, we find that these expectations are indeed met. What the majority of the suggestions of these studies have in common from the perspective of the interpretation of technology as process, is that they are technological suggestions. They involve recommendations to create or improve public policy instruments to deal with the problem of unemployment. For the most part, none of them involves the ethical questioning of technological practices.

In the first three policy studies one does not find a single occasion in which the simple rejection or circumscription of some technological activity is considered as a way of addressing the problem of unemployment. In these studies automation is considered an unquestionable good because it increases productivity. As well, in these first three studies the global free trade system is seen as an absolute necessity because it will encourage more rational and efficient production as countries compete and exploit their comparative advantages. New

ways of organizing workers for greater efficiency are seen as

representing a useful trend in business which should be supported

through reforms to education and training systems. Most of the

analysts also see wide scope for encouraging businesses and

public institutions to become even more innovative in their

reorganization of the workplace for greater efficiency.

In the last three studies, although technological forces are

identified much more clearly as contributing to the problem of

unemployment, ultimately these forces are not brought into

question either. Rather, in these studies, response to the

negative impact of technological change is limited to new

technological action in the form of recommendations for novel

public policy mechanisms and proposals for experiments in social

engineering.

For all the confidence in the technological process evident

in the different studies, at various points the authors are

forced to qualify their endorsement of their own technological

recommendations. For instance, Thomas Moore takes a whole

chapter exploring work-sharing as a method to overcome temporary

lay-offs and as a general strategy for combatting unemployment.

Although he endorses it, he also seems to suggest that work-

sharing fails to address the core causes of unemployment and that

it is really only a way of assuaging people's fears of economic

displacement: "Work sharing will not eliminate unemployment, but

it does represent a collective response to the risk of

displacement and to the pervasive sense of economic insecurity.•[73]

In all the works examined a pattern emerges, namely switching from some level of awareness of the negative impact of certain technological actions to the making of novel technological suggestion which involve the acceptance of the inevitability of these actions and impacts. In Rethinking Employment Policy George E. Johnson seems to recognize this pattern when he says:

> much of the political motivation for introducing and expanding labor market programs is the desire to appear to 'do something' when unemployment is unusually high—that is, at or just before the occurrence of cyclical troughs. In my judgment there is no effective potential role of employment policy in a countercyclical context.[74]

The idea of technology as habit also suggests that the desire to engage in technological processes will have such force that even in the face of strong evidence that a solution to the problem might lie, at least partially, outside the scope of technological activity, some will feel compelled nonetheless to engage in such activity.

For all his discussion of the devastating effects of technology, even Rifkin cannot seem to bring himself to consider

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[73]Thomas S. Moore, The Disposable Work Force, xxi.

[74]Johnson in Rethinking Employment Policy, 39.

the possibility of rejecting certain technological activities. This unwillingness leaves one to wonder if he really believes that the problem of growing unemployment can be addressed, for as he points out:

> With current surveys showing that less than 5 percent of companies around the world have even begun to make the transition to the new machine culture, massive unemployment of a kind never before experienced seems all but inevitable in the coming decades.[75]

Without questioning the commitment to certain technologies and unlimited technological change it would seem that actions like shortening of the work week will have to be engaged in endlessly until there is no longer a work week left for anyone, including potentially those involved in the "third sector." Whether this ultimate scenario is possible, however, is not the interesting question. The interesting question is why Rifkin and the other commentators seem so reluctant to consider, in addition to all their technological options for approaching the problem, the option of considering the rejection of some of the negative technological processes they discuss.

The implication of the understanding of technology developed in preceding chapters is that one should consider making ethical judgments about technological action, including judgment about engagement in the technological process itself and not just confine the role of ethics to that of furnishing goals for novel

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[75]Jeremy Rifkin, The End of Work, 5.

technological effort. This position assumes that one accepts that leading an ethical life must include accepting some limits to one's technological actions. The central claim of this thesis is that if one does not understand technology in the expansive way, ethical criticism of technology leading to the possibility of the acceptance of ethical limits to technological action will tend not occur because one can become so preoccupied by technological action without knowing it.

The lack of ethical choices about technological actions that would begin to demarcate ethical limits to technology is not a surprising characteristic of the studies considering the understanding of technological dependency developed in chapter four. In these studies it seems that all opportunities to consider limits to technological actions are looked at almost exclusively as invitations to begin engagement in novel technological processes. In this dependence on technology one can see clearly how technological activity can substitute for the contemplation of ethical limits to technological activity.

CHAPTER 6: PRACTICAL ARGUMENTS FOR THE NON-TECHNOLOGICAL APPROACH

Implications of the Non-Technological Approach to Unemployment

In this chapter we will conclude our inquiry into technological dependency and the thoughts of Innis, McLuhan and Grant on this issue by considering the implications of our examination of the public policy studies of the problem of unemployment. We will also consider in detail what a non-technological approach to the problem of unemployment might be like, and by using this example, explore some practical arguments for adopting a non-technological approach. Chapter four examined the argument that consideration of the possibility of non-technological action is essential for the full expression of human ethical responsibility. This ethical argument emerges directly from the thought of Innis, McLuhan and Grant. However, it might be helpful also to examine some of the potential practical benefits of ensuring that consideration is given to a non-technological approach in public policy decision making.

Many critics of technology believe that technology has come to dominate Western civilization. As Ellul expresses this position, "there is no more project, nor value, nor reason, nor divine law to oppose technique from outside."[1] However, many of these critics are not particularly clear about what the source of

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[1] Ellul, "The Search for Ethics in a Technicist Society," 31. Also see: John Kenneth Galbraith, The New Industrial State, 2d ed., Revised (Scarborough: New American Library of Canada Ltd., 1972)

this "domination" is. Our examination of unemployment provides some insight into the perception of technology as an autonomous force in human affairs. Through our examination of policy studies of this issue we found little if any emphasis on the possibility of making ethical judgments about technological practices and a strong emphasis on consideration of novel technological action. As our examination of the policy studies suggests, if one is so busy trying to "do something," one is going to be less busy making informed ethical judgments about what not to do. Such a tendency, if it were pervasive enough, could leave the impression that technology, in general, is beyond the control of human beings.

There are other facets of such a tendency that could further reinforce such an impression. As discussed in chapter four, one could avoid having to come to grips with the negative effects of such a persistent form of ethical oversight by engaging in novel technological processes directed towards ostensibly ethical ends. As the analysis of unemployment policy indicates, any criticism that important ethical questions about technology are being overlooked can be deflected by the honest claim that one's actions are directed at trying to make a positive contribution to solving a problem. In the studies reviewed in chapter five, all the authors appear committed to making suggestions they feel will help alleviate unemployment, even to the point of what we have called hiccups and pitfalls. But as the non-technological approach to these studies shows, all the authors seem to avoid

any consideration of the possibility of rejecting technological

practices. The distinction between the ethical limitation of

technological action and novel technological action can perhaps

be seen more clearly in many environmental issues, when

environmentalists call for the cessation or prohibition of

certain technological activities and businesses and governments

respond by claiming they are engaged in environmental remediation

activities. However, in examining an issue like unemployment one

can see how such a contrast can also apply to issues outside

those concerning preservation of the natural environment.

In noting this distinction between two fundamentally

different approaches to public policy issues one can see why

critics of technology like Ellul are not helpful when they

describe technology as an autonomous force. From the standpoint

of the non-technological approach technology only appears to be

autonomous because it has become a habit. By putting the

challenge primarily in terms of the concept of "domination" even

such a strenuous critic of technology as Ellul opens the

possibility for approaching the problem in technological terms,

as he attempts to conceive of new means to regain control, rather

than an attempt to question a habit.[2] The understanding of

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[2]Kai Nielsen, in his discussion of Habermas' theory that
technology has come to function as an ideology which can "impede
making the foundations of society the object of thought and
reflection," also outlines a superficially similar position to
the one we have been developing. However, Nielsen can draw from
Habermas' position the conclusion: "Marx sought, as Habermas
himself seeks, to show how it is possible for people to bring
under rational control structural changes in society and indeed

technology as process, therefore, suggests that even if
scepticism of the technological bias were to appear in a society
that was prone to such bias, it still would very likely find
expression in greater technological efforts rather than serious
questioning about the limits of technological activity. For
instance, as one commentator on contemporary Japanese culture has
noted,

> postwar Japan has largely managed to avoid--until now--
> the corrupting attitudes to technology engendered by
> militarism, large scale technological disasters, and
> overt misuse. And the industrial establishment has
> been careful to ensure that these do not emerge. It is
> no coincidence that simplification and humanization of
> technology are important topics in Japan today and that
> corporate slogans--the "Sociotech" of Mitsubishi, the
> "Humanisation" of Hitachi, and the "Human Electronics"
> of Matsushita--are designed to soften the harder edges
> of a high-tech society.[3]

The understanding of technological dependency we have developed

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[2](...continued)
of society. This is a central element in what it is to have a
critical theory of society." This comment indicates a shift
into seeing the challenge of technology as fundamentally a
technological problem to be solved by gaining control, through
some undefined means, of the entire process of technological
change.
Nielsen, "Technology as Ideology," 140-141.

[3]Frederik L. Schodt, Inside the Robot Kingdom: Japan,
Mechatonics, and the Coming Robotopia (New York: Harper & Row
Publishers Inc., 1988), 236.

in this inquiry is meant to show not only why technologies must be criticised, but also why the form of criticism must be criticised. As argued in chapter two, novel technological activity always starts with criticism about some state of affairs. However, to consider properly the ethical limits of technology one must avoid always letting one's criticism take the form of efforts at technological reform like that of the Japanese conglomerates mentioned above. One must consider whether the problems one pinpoints through critical analysis should also be addressed by setting limits to any of one's capabilities.

Thus, if one rejects the idea that all problems should be approached through innovative activity, the pronounced lack of an alternative to such activity that we found in our examination of the policy studies of unemployment should be disturbing. If one rejects the idea that technology is the answer to every problem, this belief should entail the consideration of the possibility that the problem of unemployment might not only be about the failure or lack of macro and microeconomic policy instruments and government programmes, but also about the ill-considered engagement in technological activities by oneself and others.

The apparent oversight of the analysts seems especially baffling when one considers the long tradition of criticism of the capitalist economic system. It has long been argued that not only does the capitalist system allow, and even require, unemployment, but further that the kind of work that it tends to create is often alienating and stultifying, and also of such a

scale and type that it must inevitably lead to serious damage to the environment. For many social commentators the issue of employment is threefold. It is not just about finding enough properly remunerative work for those whom the economy does not require, but occupations that are also redeeming and environmentally sustainable. Can these wider goals be achieved without any consideration of the possibility of limiting certain technological activities? It is beyond the scope of this enquiry to mount a case that this would be impossible, either theoretically or practically, but certain points about the understanding of technology as process give some grounds for greater scepticism about the prospects of success than is evident from the studies in chapter five.

The understanding of technology as process indicates that some problems cannot be completely solved by technology alone because technology lies at the very core of the problem. There is no possibility for unemployment, whether frictional, structural, or cyclical, unless there is the possibility of having the technological means for obtaining the necessities of human life with the participation of fewer people. Frictional unemployment represents "individuals [who] quit jobs to look for better positions or to 'retool' for more attractive occupations."[4] Without technologies which provide a surplus of goods to allow for movement and an abundance of technological

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[4]William J. Baumol, Alan S. Blinder, William M. Scarth, Economics Principles and Policy, Canadian ed. (Toronto: Academic Press Canada, 1985), 90.

activities to choose from, frictional unemployment would

impossible. Structural unemployment is clearly a technological

byproduct. It arises when "jobs are eliminated by changes in the

structure of the economy, such as automation or permanent changes

in demand."[5] Cyclical unemployment results from an overall

downturn in economic activity, but even here we could not talk of

unemployment without technology. Such downturns presuppose a

highly specialized division of labour. In an "economy" made up

of complete generalists, any downturn in economic activity would

result in individuals doing without the basic necessities of

life.

However, technology is also clearly a way of approaching the

problem of unemployment. If a certain technological change in a

society eliminates jobs, some other technological change might

also open up new possibilities for new kinds of work. The

disappearance of occupations forcing people to find new things to

do is an ongoing tension in human societies. As long as the two

kinds of technological change are in balance, and people are

willing and able to work, the problem of unemployment will not

exist.

But in such a process there can be no solution to

unemployment as long as the type of technological change that

ceases to employ people is allowed to continue un-checked.

Unemployment will exist for however long it takes to address job

loss via job-creating technological activity. Needless to say,

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[5]Ibid., 37.

the higher the pace of technological change that eliminates jobs, the greater the pace of technological change that will be needed to redress the balance. We live in an age of intense technological change, hence the strong emphasis of governments on fostering innovation and entrepreneurship to try to offset the negative effects of change, especially change specifically aimed at increasing labour efficiency.

Achieving a balance between the two technological forces of job creation and job destruction has not always been recognized as a social problem.

It was not until the turn of the century that unemployment began to be perceived as a problem in its own right. The popular view in the nineteenth century was that unemployment was just one of several factors connected with family poverty along with intemperance, bad housing, lack of education, and so on. By and large unemployment was regarded as a manifestation of personal inadequacy, which in turn was caused by unsatisfactory social conditions. But as social conditions improved unemployment did not disappear.[6]

Throughout this century average levels of unemployment in Western industrial nations have been steadily climbing. The Globe and Mail reports "the average unemployment rate for each decade has steadily crept up, from 2.7 per cent in the 1940s to 9.4 per cent

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[6]Mark Casson, Economics of Unemployment: A Historical Perspective (Cambridge Mass. The MIT Press, 1984), 38.

in the 1980s."[7] And large scale unemployment also affects the

developing world.[8] It is simply no longer possible to view

unemployment primarily in terms of personal inadequacy. This

century is a time in which the pace of technological change that

lessens the need for human labour seems to be slowly outpacing

the type of technological change that creates new things for

people to do.

Many, such as Rifkin, argue for state-centred solutions like

shorter work weeks or job sharing to address the problem. The

dynamic that exists between technological change and unemployment

reveals that such solutions, although they might help seek

balance, could never ultimately solve the problem of unemployment

and they would undoubtedly create new problems that would need

technological action.[9] Even if we were able to reduce the need

for productive labour "ultimately to the vanishing point", an

ideal shared by many socialists and capitalists, the problem of

unemployment would not be solved.[10] All people would be out of

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[7]"No one has found solutions for tumult of current change,"
Globe and Mail, 28 December 1996, A8.

[8]See: William Greider, One World, Ready or Not, 70.
Also: Jeremy Rifkin, The End of Work, xv.

[9]"With work-sharing would have to come income sharing, which
many could not afford. How to accommodate the reality that the
longest hours are commonly worked by the most productive
individuals, whose efforts then create jobs and incomes for
others?"
Richard Gwyn, "Only a new look at work will halt slide into
disorder," Toronto Star, 10 April 1996, A21.

[10]Charles Taylor, "The Agony of Economic Man" in Essays on
The Left: Essays in Honour of T.C. Douglas, eds. Laurier

work until technological change of the sort that creates jobs happened. At that point hour shortening or job sharing activity could be recommenced to make sure that the new hours were shared out or new technological activity of the job destroying sort could be commenced. This picture of the technology-employment dynamic shows how the only solution would be to stop any technological change that eliminates jobs at precisely the point that all had work. Such a solution would probably necessitate the repudiation of all technological change. This is clearly not a practical solution. The reality is that some level of unemployment is an inevitable product of the technological dynamic.

However, the portrayal of the dynamic between technological change and unemployment also suggests another way that balance can be sought besides seeking new forms of job creating or job destroying technological activity. In response to the situation of job loss one could avoid technological actions of the sort that destroy jobs. One need not participate only in novel technological action in order to create new types of work. If one felt that some efficiency gained in terms of human labour was not worth the sacrifice of other values one could reject this efficiency and turn to other existing technological processes that require the labour of more people. In the case of questionable collectively orchestrated technological actions one

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[10](...continued)
LaPierre, Jack McLeod, Charles Taylor, Walter Young (Toronto: McClelland and Stewart, Ltd., 1971), 229.

could seek to challenge others in their commitment to these actions. Unless one believes that all technological change is good there is nothing in principle that should prevent one from considering these possibilities. Because engaging in non-technological action is an alternative to novel technological action, opting for it decreases the need to rely so heavily on technology to create new types of work. As argued in chapter four, technology as a whole can only be limited through the limitation of specific technological activities. The ability of non-technological action to provide an alternative to technological action brings us to the first practical reason for considering the non-technological approach.

Practical Arguments for the Non-technological Approach

The primary practical reason for making sure one at least considers the non-technological approach is that it increases the array of possible actions. If non-technological options are not considered, the job of trying to maintain equilibrium in the dynamic situations created by technological change will be more difficult than may be necessary because one must work from a more limited set of ways to respond. The only reason for never considering the non-technological approach would be the belief that all technological change is inherently good and should always be maintained or pursued. As argued in chapter one, such a belief highly questionable, and as argued in chapter four, such a belief can be considered an affront to human freedom. But in

the light of the persistence and growth of a problem like
unemployment it could be argued that it is also simply imprudent.

In the face of a problem like unemployment it would seem
that the many of the solutions tried since the turn of the
century have not been as effective as was hoped by their
proponents. Average levels of unemployment have continued to
climb. Many of the proposed solutions are variations on themes
which have been around since at least the Great Depression and
some stretch back even farther to the early social welfare
reforms of Bismarck. Other solutions are more novel but involve
much greater uncertainty. The problem of unemployment remains a
serious challenge for many societies. The non-technological
approach would help expand the range of options for approaching
the problem. But if this form of approach is habitually
discounted by most people many potentially helpful ways of
addressing problems will be discounted arbitrarily. In other
words, an age of intensive technological change like our own is
probably not the best time to begin ignoring such a vast array of
possibilities for helping to maintain the balance between
positive and negative technological forces.

A second set of closely related practical reasons for
considering the non-technological approach has to do with risk
and mass participation. Innis and McLuhan show how technological
solutions by their nature always start as the affairs of experts.
It takes time for new technologies to disseminate throughout
societies and many technologies are so complex that they can only

be mastered by experts. Many of the great social issues of today, such as unemployment, environmental issues, and issues of urban decay, etc., seem to call for mass participation and not just the participation of experts for their solution.[11] The problem of unemployment in Canada, for instance, involves finding jobs for millions of people, and this objective does not even take into consideration the wider issue of creating employment that is environmentally sustainable and self-fulfilling. However, only a few can participate in the creation of novel training schemes or incentive programmes for innovation and entrepreneurship and of these many will not succeed.[12] Not every field of work is amenable to job sharing schemes or shrinking full-time hours. Not everyone can initially play a role in helping such technological actions, but everyone can play a role in non-technological action right now. To be able to make non-technological decisions for oneself does not require anything beyond a free will. Making such decisions at a political level does not require anything beyond the credentials necessary for democratic citizenship.

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[11]"Probably, radical changes in our system of producing and consuming will be necessary, that is to say, changes in the nature of our social market economy, industry, traffic and agriculture; in short, in our entire way of life."
Wouter Achterberg, "Can Liberal Democracy Survive?" in Ecology, Technology and Culture, ed. Wim Zweers and Jan J. Boersema, trans. Miriam Hall (Cambridge: The White Horse Press, 1994), 136.

[12]"Small firms not job dynamos, study says," Toronto Star, 29 November 1996, E8.
Article on a Statistics Canada study published in its November 1996 issue of The Canadian Economic Observer.

Besides rare instances in which special techniques might

need to be developed to deal with the dangers of forgoing a

technology, such as in the case of nuclear power, saying no to a

technological activity will not require the development of novel

technologies. Sometimes it will not even require complicated

retraining, as in the case of rejecting the use of a gas powered

lawn-mower and using a push-mower instead.[13] Non-technological

activity is not activity which simply intends to aid processes

for limiting technological power. For instance, research focused

on creating new means to achieve higher crop yields by using

biotechnological controls instead of pesticides will not, in and

of itself, involve the rejection of certain farming practices

such as the use of pesticides. Non-technological action

concerning pesticide use, on the other hand, involves a

willingness to accept a limitation to technological benefits,

such as lower crop yields, in order to seek another end, such as

soil preservation. As ecologist David Ehrenfeld writes,

paraphrasing his fellow ecologist Wendell Berry, "we have to all

learn to live a little bit poorer. We have to learn to live

without ruining, and that is going to mean that there are things

we cannot do any more that we seem to want to do."[14] Being

able to live within limits to technological capability should not

require the development of specialized technologies, unless, like

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[13]Bill Richards, "Push mowers reach the pinnacle of backyard chic," Globe and Mail, 9 August 1997, D1.

[14]Cayley, "The Age of Ecology," 9. Transcript.

nuclear power, they have been developed with no thought concerning how to dispose of the technology and its waste products.[15]

Therefore, because non-technological action generally involves only the eschewal of technological activity it can more easily harness the power of everyone. One can also know with a greater degree of certainty than with novel technological activity what the effects of one's actions will be. When one embarks on a novel technological process there are never guarantees that the instrument being sought will work, or work as expected. Novelist Umberto Eco recounts how some publishers have responded to the wide scale photocopying of textbooks by raising the prices of text books. This trend, in turn, has led some student radicals to advocate unrestricted photocopying as a means to undermine the power of big publishers, thus prompting Eco to comment, "This example serves to demonstrate that the capacity of the big systems for healing their wounds is considerable. And that, indeed, big systems and subversive groups are often twins, and one produces the other."[16] However, when one eschews a technological practice in order to address some issue, switches to other existing practices and returns to former levels of capability, these other practices and their effects are better

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[15]"The problems of [nuclear] waste disposal with assured safety for survival and health have not been solved; but new wastes pile up at an accelerating rate at temporary sites." Ferré, Philosophy of Technology, 91.

[16]Umberto Eco, Travels in Hyper Reality, trans. William Weaver (New York: Harcourt Brace Jovanovich, 1986), 178.

understood for the simple reason that they have existed before.

Another way of discussing the practical reasons for reconsideration of technological activity is Innis' point about monopolies that build up to the point where flexibility is lost. Innis' felt that Byzantium, which relied on more than one major medium of communication, provided a unique example of an empire in which a fruitful balance was achieved between competing knowledge monopolies.[17] By not depending on one means of communication the Byzantine Empire was more flexible than the old Roman Empire with its exclusive reliance on Egyptian papyrus. If one relies on only one way of solving a problem and this way breaks down one's ability to readjust to new situations is lessened.[18] In the case of the technological process itself one's ability to maintain equilibrium between the technological forces that shape society is lessened if this process is the only type of response upon which one can rely.[19]

Let us examine what Innis was thinking about in the case of

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[17]William Christian, "Harold Innis as Political Theorist" Canadian Journal of Political Science X, 1 (March 1997): 37.

[18]"Innis did not like monopolies in any form. He saw that they bred violent reactions."
Marshall McLuhan, introduction to The Bias of Communication, by Innis, xiii.

[19]"Innis always eschewed the dramatic polarities of tragedy and utopia, or, what is the same, the veneration of either 'margin'[where innovation occurs] or 'centre'[where monopolies of knowledge hold sway], in favour of focusing his efforts on the development of a strategy of survival, first for Canada and then for Western civilization as a whole."
Arthur Kroker, Technology and the Canadian Mind: Innis/McLuhan/Grant (Montreal: New World Perspectives, 1984), 99.

Byzantium more closely because it might seem that his position

represents an unreserved endorsement of openness to technological

innovation.[20] As Innis enigmatically states, "What has been

called 'the nemesis of creativity' is precisely a blindness to

the effects of one's most significant form of invention."[21] Is

creativity or critical perception more important to Innis?

Innis' preference for Byzantium throws some light on this

question. Both parchment and papyrus were very old technologies

by the time of the flowering of the Byzantine civilization so he

could not feel balance was best achieved through innovation.

What is distinctive about the example of Byzantium is the

Byzantine persistence in using two media when standardization

might have made more sense. Also, we know that Innis himself

favoured preservation of ancient technologies such as oral public

debate. Although Innis' discussion of technological monopolies

can leave the impression that he favours innovation, what Innis

really seems to have disliked most was the lack of the ability to

embrace plurality in thought and action. He disliked thought and

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[20]"Monopoly, for Innis, is always ultimately fatal to
civilization because it generates an illusion of self
sufficiency; and that illusion cuts the centres of empire off
from the sources of variation, innovation, and renewal on which
their continued vitality depends."
  "A living culture required continuous revision."
Comments by David Cayley, Canadian Broadcasting Corporation radio
broadcast "The Legacy of Harold Innis," Ideas 6,13,20 December
1994. Transcript, 13, 19.

[21]Innis, The Bias of Communication, xii.

action falling into particular "grooves".[22] It seems

reasonable to assume that Innis used the term monopoly, and not

the term conservatism, because what he disliked most was the

inability to embrace diversity in the approach to problems and

not simply the inability to embrace novelty.

Unemployment and the Non-technological Approach

The idea we have been developing here, working from the

thoughts of three key Canadian technology theorists and others,

is that the problem of technology is not that people too often

make poor choices about technology, but that they are predisposed

not to make such choices at all because they tend rather to be

preoccupied by technological actions and novel technological

endeavours. This proclivity is what Grant means by the tight

circle. Technological activity can always act as a substitute

for reflective ethical criticism of technological activity.

Based on an ethical vision of human freedom, our three guides

suggest that it is this habit that must be resisted, not

technology as such.

As discussed in chapter four, the non-technological approach

involves seeking to make judgments about one's use of

technologies. Informed ethical judgment is judgment made in the

light of consideration of the negative effects, benefits, and

character of technologies and, of course not a simplistic kind of

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[22]David Cayley, Canadian Broadcasting Corporation radio
broadcast "The Legacy of Harold Innis." *Ideas* 6,13,20 December
1994. Transcript, 9, 16, 25.

anti-technological moralism. All three of our guides suggest
that such reconsideration is best done in the context of open
dialogue in which others are free to contest one's ideas. As
McLuhan notes, "You could begin a quite violent discussion of the
motor car as the destroyer of the family, if you started at that
point."[23] The point is not just to make pronouncements about
one's opinions about technology. Instead, one must be prepared
to listen to and work with others in deliberating about
technological processes.

In the case of unemployment, the non-technological approach
would involve seeking to make decisions about technological
actions which reduce the need for human labour and which promote
forms of labour which are dehumanizing or environmentally
destructive. One example of such consideration can be seen in
the National Film Board's short film, "Logging with Patience--The
story of a teenage girl who works in the forest with her father,
selectively logging trees with a team of horses."[24] This short
film portrays an attempt to reject modern logging practices and
to return to a form of work which is more labour intensive,
environmentally stable, and self-fulfilling. Non-technological
consideration involves engaging in serious debate over questions
about one's use of and participation in technologies--questions

[23]Barrington Nevitt, Who Was Marshall McLuhan?: Exploring A
Mosaic of Impressions, with Maurice McLuhan (Toronto:
Comprehensivist Publications, 1995), 45.

[24]Protecting Our Planet: An International Series for
Environmental Education, Vol. 1, Produced by Julie Stanfel.
National Film Board, Order Number c 9192 080, Videocassette.

like the following: Is shopping at a big box retail outlet worth denying one's patronage to more local and numerous smaller scale merchants?[25] Are the jobs created worth continuing to support this kind of retail development in city planning? Are the benefits of fast food franchises worth denying one's support to Mom and Pop diners? Is a job with one of these franchises worth the wage?[26] Is one's concern about high taxes or the debt worth supporting governments that will introduce centralized long distance automated phone-mail systems and then close local offices? Are the high returns of high-tech stocks and mutual funds worth supporting investment in the automation of jobs? Is one's desire to do scientific research worth doing research that could be used to destroy a profession? The list of possible critical questions about technological actions is as endless as technological creativity itself.

It should be clear by now that one of the notions the non-technological approach puts into question is a state-centred approach that focuses on technological improvements and additions to the arrangements of government as a primary means for addressing social issues. After all, the state can be looked on as an instrument that should also be questioned. In line with

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[25]Bill Reno, "Supermarket Technology," Canadian Forum (March 1982): 10-11, 13.

[26]See: Raymond Gozzi, "The Fast Food Franchise as Metaphor" Et Cetera 53, 3 (Fall 1996): 322-325.
    And: Martin Vander Wyer, "One Flexible Economy Coming Up" The Spectator, 11 May 1996, 8-10.

the idea of non-technological activity the theory calls primarily on individuals to take ethical responsibility for the specific technological choices they make every day, whether as private individuals or political representatives. If one is concerned about unemployment, then this should play a role in all of one's technological choices.

The focus of this investigation, however, is not only on the level of the choices of the individual but the choices of the community, which is the level of public policy. Since the non-technological approach cannot include endeavours to create or improve political mechanisms to solve problems its application to public policy is somewhat limited. For example, one cannot rely on the law, as a collective instrument for influencing people's behaviour, to actuate non-technological decisions for others. This might seem a severe restriction on the application of the non-technological approach to public policy.

However, the spirit of the non-technological approach would commend making communal decisions, through existing political means, about specific actions undertaken by the community. Non-technological activity could take the form of the rejection of certain development projects such as the building of highways, bridges, mines, and other public works. It might involve communal decisions to dismantle programmes, departments, corporations, and other government institutions. It might also involve the attempt to persuade others to change their minds about their participation in technological practices through

exisiting forms of political discourse. It might involve

reestablishing older forms of community technological activity

because of the rejection of some kind of practice, such as the

recent decision by the City of Toronto to reopen the Spadina

streetcar line.[27] The reestablishment of streetcar service on

Spadina is not itself a non-technological action but it is an

indication of the rejection by city councillors and bureaucrats

of car-centred road engineering practice. Other non-

technological action might take the form of decisions about the

methods, proceedures, policies, or tools used in the internal

operations of government itself, such as the campaign pledge of

Toronto mayor Mel Lastman to remove the voice mail system from

Toronto City Hall.[28] And of course, the non-technological

approach would countenance the repealing of laws.

The issue of unemployment provides wide scope for the non-

technological approach. On the subject of job creation "The

Prime Minister makes occasional noises about the private sector

not living up to its obligations."[29] However, the Federal

Government seems to have just as strong an appetite for

reengineering, downsizing, and other forms of novel technological

activity. Last year the Auditor General reported that the

federal government "currently lists 25 systems to be completed

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[27]Nicholas Keung, "Streetcar named Spadina a hit," The Toronto Star, 28 July 1997, Al.

[28]Juliet O'Neill, "Mega Mel," The St. Catharines Standard, 22 November 1997, B9.

[29]Peter C. Newman, Maclean's Magazine, 18 March 1996, 54.

over the next five to 10 years, at a total budgeted cost of $2.1 billion."[30] As well, "we estimate over $5 billion in information technology projects under way or planned."[31] The report was somewhat dubious about the effectiveness of many of these efforts. Some of the new technologies have turned out to be much more expensive than anticipated, with much smaller improvements in terms of service delivery: "Government must be realistic about what systems will actually cost and what they can deliver."[32] The report notes a trend towards greater reliance on phone services:

> Telephone services are a significant and growing method of contact between Canadians and the government--with more than 30 million calls answered per year in the six operations we examined. However, the quality of government telephone services needs attention. In one department we found that during peak periods as many as 19 out of 20 calls receive a busy signal.[33]

As far back as the mid 1980s, "Among the seven major components of program spending, two of them--operations of government and payments to crown corporations--recorded absolute declines in

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[30] Report of the Auditor General of Canada - November 1995: Matters of Special Importance 1995 (Ottawa: The Queen's Printer, 1995), 12.

[31] Ibid., 12.

[32] Ibid., 12.

[33] Report of the Auditor General of Canada - September 1996: Chapter 14 (Ottawa: The Queen's Printer, 1995), 8.

spending."[34] And yet since that time governments of all levels

have continued the assault on public employment to the tune of

almost 200,000 public employees in all levels of government

across Canada.[35] The enthusiasm for technological fixes to

crises like the deficit remain strong. No governing parties have

promised reductions in public services but simply the finding of

efficiencies in government operations and most political parties

advocate continued efforts at rationalizing government. For all

the concern expressed in the media about downsizing in the

private sector, there still seems to be broad public support for

ongoing efforts at rationalizing government services.

The public also seems unconcerned about exploring the

negative impact of technological change in the workplace, as

indicated by the lack of public outcry over the cancelation by

the current Ontario government of research into the issue.[36]

Instead, successful research programmes into the impact of

technological change seem to be those that adopt a more

innovative stance towards the problems of technological change;

for instance the University of Guelph and the University of

Waterloo are cooperating on a $100,000 two year research and

teaching programme that "will conduct applied research on

[34]Department of Finance, Where Your Tax Dollars Go (Ottawa:
The Queen's Printer, 1989), 22.

[35]Canadian Broadcasting Corporation television broadcast,
Sunday Report, 6 April 1997.

[36]"Union bid for arbitration over cancelled program denied,"
Globe and Mail, 16 November 1996, A11.

societal aspects of technological change and develop public communications guidelines to explain research and development activity and associated technological innovation."[37] The Ontario government recently reported that its primary and secondary education reforms include 75 different technology programs in Ontario schools.[38] Public support seems to favour governments that promote research which might result in the development of novel technologies than critical research into the negative impact of technological change.

Conclusion

The point of the previous chapter was not to disparage the technological suggestions presented in the various public policy studies of unemployment. The understanding of ethical responsibility regarding technology that we have developed here does not suggest that novel technological action should ever be rejected simply out of hand. Rather, this approach suggests that when technology seems the only approach to problems one is capable of adopting, one should begin to question whether one's technological considerations have prevented one from asking ethical questions that could lead to the eschewal of any technological practices. Once one has explored the technological

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[37]"Addressing the ethics of new technologies," Guelph Alumnus Magazine, May 1996, 6.

[38]Ministry of Education and Training, Putting Students First: Ontario's Plan for Education Reform (Toronto: The Queen's Printer for Ontario, 1987), 4.

possibilities for responding to some issue one's ethical work is
not done.

Therefore, the non-technological approach only warns of the
possibility that well-intentioned technological actions can be
ethically questionable when they are part of the habitual
obstruction of technological criticism and reconsideration of
technological practice. In other words, a technological practice
would be ethically questionable when it is part of a recognizable
and persistent pattern of behaviour which helps thwart any
possibility of making judgments about established technological
actions. No one has an unlimited capacity to engage in ethical
consideration, but we have seen how ethical consideration can
play a key role in directing technological activity. Non-
technological ethical consideration must compete for time in
one's life with technological ethical consideration. Therefore,
it is everyone's responsibility to seek a proper balance between
these two types of ethical endeavour. A technological action
must not be judged only on its own merits but on its place in the
wider scope of one's general pattern of practice.

The understanding of technology as process shows what little
light is shed on the challenge of technology by casting its
central tension as a debate between pro- and anti-technologists.
Most reflective philosophical commentators on technology would
agree that some technologies should be rejected. The real
question is why, in comparison to technological judgments, so
little effort seems to go into making such judgments. Innis,

McLuhan and Grant all show how the technological process can continue regardless of such ethical consideration. What happens in its absence is not a suspension of the technological process. One simply gets the process without ethical limitation, although perhaps driven in part by ethical ideals. When the technological process proceeds without limit it does not indicate that the participants are necessarily pro-technology. Nor does it indicate that the technological process is autonomous. Instead, it indicates that being anti- or pro-technology in temperament can have little or no relevance when such sentiments cannot translate into critical ethical decision making about technological actions because one is so easily side-tracked into technological action. What is needed is to seek a proper balance between anti- and pro-technological action, but before such balance can be sought one must understand precisely what must be balanced. Michael Zimmerman, an anti-technological cultural critic, suggests that Western societies are in dire need of a type of cultural criticism that does not simply flatter the ends of technological society.[39] He argues for cultural criticism that is "a kind of philosophical activity which aims to discover the way to a better world by demonstrating how the present world obstructs the achievement of full humanity on the part of its citizens."[40] From the standpoint of the non-technological

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[39]Michael Zimmerman, "Technological Culture and the End of Philosophy," Research in Philosophy and Technology 2 (1979): 137-145.

[40]Ibid., 143.

approach one sees how such an understanding of cultural criticism can just as easily endorse the uncontrolled expansion of technological power as its limitation.[41] It shows how even anti-technological cultural criticism can be turned to technological ends when it is unclear about the distinction between technological and non-technological action. The approach to technology which we have discussed shows how the process of making critical ethical decisions about the limitation of technological actions is more complicated and exacting than is assumed by technology assessors, appropriate technologists and even anti-technological cultural critics like Zimmerman.

Through their understandings of technology as process, our three primary guides lead us to a better understanding of what a truly critical process of ethical decision making about technology might be like and some of the pitfalls that await anyone seeking to engage in such a process. This process begins by becoming conscious of one's technological actions, including those made in response to the problem of technological dependency, and considering the ethical implications of these

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[41]Ian G. Barbour is another example of cultural critic who does not wish to flatter the ends of technological society but who risks doing so because his work harbours an ambiguity about the distinction between technological and non-technological action. As he describes his project: "I point out that catastrophes alone, without alternative visions, may simply lead to reliance on technical fixes or authoritarian measures. . . . I take vision to be an imaginative portrayal of an alternative pattern of life capable of at least partial realization within the limitations of human nature and history."
Ian G. Barbour, "Response to Critiques of Ethics in an Age of Technology," Zygon: Journal of Religion and Science 31, 1 (March 1996): 111.

actions. But since the technological process itself can become a tool, one must always be prepared to contemplate one's response to such ethical consideration. If this response is to engage in technological action or to embark on novel technological processes then one must also consider whether adopting this approach is ethically appropriate or simply a way of avoiding the ethical reconsideration of any technological actions. It is only by recognizing how easily that the technological process itself can become a familiar tool that a true ethical critique of technology can ever emerge.

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