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SUMMARY

A concept such as <technology> is abstract; it is a meta-concept which has no real presence unless and until it is placed within a practical context. Ironically, an abstract concept contains various constructions, many disciplines, social relations, values and a wide range of applications. The question is whether or not this is actually the case with <technology>. In other words is <technology> a liberal concept or is it restricted to a limited number of values and social relations? In order for <technology> to reflect our human potential, it needs to be exposed to a wider gamut of experience in order to reflect diversity. The aim of this investigation is to find the social relations which could diversify our concept of <technology>, finding epistemologies out of our diverse potential in order to see <technology> in a new light. To see an object differently is to alter the object. <Technology>, once exposed to a wider range of social relations, could exhibit a tendency to diversify beyond its current constitution. If we see a concept such as <technology> as diverse, then the object will be correspondingly diverse. Diversity is in humanity; it is a resource which can be found if recognized. The recognition of the many social relations within humanity is the creation of epistemologies oriented toward seeing technology in new and distinct lights. Concepts affect how we think and act. Conceptual reorganization and expansion leads to new forms of thinking and acting. Reorganization comes from the use of social relations, values and perspectives; but the fuel for reorganization and expansion must be uncovered. The concept of <technology> can be challenged and diversified if we find additional sources or perspectives throughout society that can inspire conceptual reorganization and expansion. These perspectives are within social relations hitherto ignored, oppressed or not yet found. A particular social relation, with its expectations, interests, perspectives and values, contains the corresponding means for conceptual reconstruction.

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TERMS

1. Social relation-an object within experience which contains corresponding means of conceptual construction, values, expectations, perspectives and technological expressions. To identify a social relation is to recognize a potential resource put toward influencing <technology>.

2. Technology-the object of study.

3. <Technology>-the concept of technology as a result of our construction. It is open to change, but it is our only interface with the other. It is an interface which is weighted toward a certain group of social relations to the exclusion of the possibility of others.

4. Technological expression-the recognizable manifestation of social relations from anything including communication systems, artifacts, expectations, techniques and invisible technologies.

5. Project-a proactive application of certain social relations towards <technology> and perhaps technological expressions. It is calibrated toward certain ends through epistemological means.

6. Interface-that which is between the individual and the other. <Technology> is a label for our primary interface with the other.

INTRODUCTION

<Technology> as our primary interface with the other is limited; therefore, our experience is limited. If we can expand our understanding of <technology> then the result should be a broadended experience. Sources for such an expanded understanding of <technology> are within the many interests, values, perspectives, expectations and systems of punishment and reward (social relations) throughout society. Finding social relations is done by maximizing the angles from which an issue, in this case <technology>, is understood and approached. Maximizing angles also promotes critical reflection. This can be understood to be a method for the creation of epistemologies oriented toward seeing <technology> in different ways.

Angles are epistemologies that contain social relations consisting of a combination of elements, actions, expectations and the perspectives they generate. Maximizing angles is done by contextualizing <technology> from a variety of approaches: historical, as the Enlightenment project, determinism, a philosophical problem, soft-determinism and social constructivism. The purpose of the aforementioned epistemological contexts is to find perspectives and social relations by creating space, acknowledging new considerations and diversifying social relations. They highlight the angle, the path toward a new perspective on the issue. They show *that, where, when, by whom and how* the issue can be dissected to the point of creating novel perspectives on the issue of technology. Everything looks different from a different angle, and new ideas about the object emerge if only one would shift his/her line of sight.

Once angles are exposed through the epistemic vantage points mentioned above, these angles have been formally recognized as a space for challenging the foundations and conceptual elements of <technology>. Such a bonanza of perspectives would alter the conceptual construction of <technology>, and perhaps they could eventually affect

technological expressions in a positive way.

Once the epistemics have been formally recognized, a project geared toward fabricating the kind of <technology> we desire by what I will be referring to as a project which is a proactive movement calibrated toward challenging our current dialogue with technology. Change, whether it be social or technological, is a reaction responding to social, political or historical circumstances, all of which can be considered the aggregation of social relations in a given sets of contexts. Concepts are the key to change, expansion, innovation, etc. Concepts are universally understood while flexible enough for individual, subjective application. The Enlightenment was a project; the shift from trade to manufacturing was a project; but there are also more subtle projects that act on a much smaller scale. For example, Derrida's use of the idea of "hospitality", as opposed to any approach characterized as aggressive, when in contact with the other is a project. Based on this idea of "hospitality", action and thought take a corresponding form. Hospitality is a label for its corresponding set of social relations which take shape in society based on the foundations of the idea. Such a humane idea could, if encouraged by Academia, filter down and influence social relations on many levels, including the types of technology we aspire to and produce.

Projects in the past have been inspired by social, political and historical conditions; therefore, the process of revealing these social relations is likened to the recognition of their value as perspectives. A new perspective becomes an inspiration for broadening our concept of <technology> and perhaps altering technological expressions because humans are naturally reflective animals given that we are presented with the opportunity to compare. Critical reflection is the mechanism between <technology> as it is now and how it could be. Humans are not averse to choice, but the choices must be allowed to enter the competition. Again, this process of presenting choices is done by the joint effort of

Government, Industry and Academia, but it must begin with the last.

So, once the social relations are uncovered, we have the socio-politico and historical fuel to challenge and diversify <technology>. Social relations lead to new conceptual constructions that can help us expand or diversify the concept of technology. <Technology> is how we see and be in the world; therefore, at least an experiment with how this is realized is worth while. The experimentation with the social relations that constitute our concept of <technology> should be initiated in Academia because this aspect of society is aloof from practical obstacles or historical narratives that are, in reality, empirical trajectories with determinative qualities.

Due to the type and nature of rewards that are distributed throughout aspects of society characterized by un-coerced critical reflection, Academia is the appropriate realm of society to experiment with the type of world desired. Conceptual examination is an abstract endeavor by nature, and Academia is freer to choose a desirable form of experience without actually having to get its hands dirty. Once this is done, forces within Academia can construct epistemologies which reflect this way of seeing and being in the world. Epistemologies come from experience, but they can also be constructed out of various components of experience. This investigation is about finding the pieces of the epistemologies which can give us the type of experience desired. An epistemology determined what it is studying in that the object will reflect the epistemology. First, Academia experiments with the types of experiences, social relations, then it manufactures the epistemologies to be applied toward <technology> reflecting the goals of the project. In short, to see an object differently is to create a new object. In this case the object is <technology>.

I. THE CONCEPT OF <TECHNOLOGY>

    A.   <Technology> as an interface with the other

<Technology> is our primary interface with the other; it is that which lies between the individual and much of experience. <Technology> is a meta-concept formed by social relations; however, it has no real form unless and until it is vested with empirical conditions. <Technology> is comprised of lesser concepts, much like components of a system. The formation of concepts into a system or the construction of individual concepts is a process by which certain social relations are favored over others. Within social relations are technological expressions, interests, values, perspectives, expectations, etc. For example, capitalism is a large social relation built around the ideals of product competition, the free market and competition to name a few; many institutions, social organizations, expectations, etc. are so structured as a result of these ideals.

There is a cyclical relationship between our interface and experience. <Technology> is even between thoughts and their empirical representation. Concepts affect how we think and negotiate our experience. They are behind and before action, understanding and interpretation. Thoughts, however, are formed by social relations, and certain thoughts will generate concepts which determine action.

For practical purposes the meta-concept <technology> can be thought of as a tool or it can carry the connotation of self preservation. I am not at issue with either association; rather, I contend that we have certain forms of tools as well as specific means for self preservation to the exclusion of other forms and means. Both a tool and the desire for self preservation are also meta-concepts in that they have no legislative or universal form; they can manifest in any number of ways depending on the social relations that nurture them.

The problem is that <technology> exhibits a tendency not to reflect the totality of the human potential; therefore, our technological expressions limit experience and show

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favoritism towards certain sets of social relations over others. The question becomes: how can the concept of <technology> be sufficiently expanded or diversified in order to match our potential? One must explore the possibility of uncovering or creating new social relations which can be used as resources toward the process of conceptual expansion. There must also be an incentive to do this apart from the mere problem at hand: that <technology> does not reflect our entire human potential when it is our interface with the other. The motivations for the expansion of <technology> are very practical in that they are anchored in real world events. It is well known that we often learn things in hindsight or in reaction to a negative result, thus we become induced by a desire to repair a wrong that we have witnessed in society. For one, experience has taught us that violence is a tool commonly employed during social relations; therefore, it is worth looking into the possibility that we may evolve away from this tendency. Another inspiration for the broadening of <technology> is the depletion of our planet's resources which is a polemic worthy of addressing at a global scale.

The pursuit of the diversification of our interface with the other is what I call a project. A project is a collection of social relations oriented toward a specific action, a model or a paradigm. It is a proactive reorganization of how we characterize our experience. The initiation of a project is recognized by such questions as: who are we, how do we think and where are we going. A project would also require an incentive or system of reward for its implementation. We already have this: the absence of violence and planetary security. What remains is to actively seek the new social relations to be used as resources to expand the concept of <technology>.

Sociology is the field I have chosen to harbor my approach to the philosophy of technology not only because it incorporates many known perspectives but also because sociology's epistemic constitution favors the importation of new angles of approach toward

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the object of study. Sociology is the study of infinite interconnections of social relations. It is a colossal field of study; therefore all known epistemologies (hard, soft determinism, historical, social constructivism, etc) are required; but, in order to broaden <technology>, new perspectives must be generated since a new angle of approach creates innovative ways of thinking about the topic of study. An example will serve to explain how a certain concept can have a variety of interpretations and therefore resources for expansion.

<Self preservation> does not have to be selfish; however, it could reflect the self and all that the self is capable of and not just a few values or limited sets of social relations. The connotation of <self preservation> could exhibit a strong element of participation or harmony, for example, rather than something resembling a "dog eat dog world". We can find a participatory understanding of <self preservation> by actively pursuing social relations that favor this type of interpretation. Contact between distinct interpretations shows the potential for conceptual expansion. Historically we have many examples of conceptual cacophony: for instance, the disparaging interpretations of the idea of <ownership> between the European settlers and the natives of North America. These two perspectives were each backed by social relations that did not encourage their mutual presence within the concept <ownership>. If these points of view had been allowed to coexist, the result would have been that <ownership> would be a much more complex concept.

For <technology> to be the object of un-coerced critical reflection, it would need to be analyzed, ideally, in a context which is friendly to the importation of perspectives. This context is Academia. Academia is the space from which one can acknowledge the social relations which give rise to new perspectives that can then be considered part of the pool of resources acting upon <technology>. Such an abstract endeavor is in effect the creation of epistemologies applied toward the study of <technology>. Concepts affect how we think

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and act; but the construction of these concepts does not entail universal or legislative means and interests. Academia, then, would serve as the space whereby the conceptual construction of <technology> is considered and weighed based on the potential of humanity. The potential of humanity is a seamless web of social relations that need to be sifted through in order to arrive at the proper vehicle which helps us negotiate our experience in a favorable manner.

How we see something determines the object we are viewing. Theoretically, Academia can be the engine for first deciding the type of world we want through conceptual analysis and deconstruction then this realm can manufacture the epistemologies which reflect this world or means of experience. Since <technology> is our main interface with the other, then it would be the appropriate epistemological target of investigation, like killing two birds with one stone.

Finally, concepts can change based on circumstantial shifts within historical narratives which are also sets of multiple social relations. Over the years the concept of <slave> has evolved from a social class, to property and now, in some circumstances, a paradigm where we are only free to choose our master. Nevertheless, recognizing the social relations that gave rise to our current paradigm and labeling our relation to the world as a form of slavery are parts of the process of finding social relations which can challenge present conditions. As the concept of <slavery> has evolved so too have the types of social relations around this institution. Again, challenging a concept is done by finding the appropriate social relations which is asking us to be truly liberal in the sense that is analogous to the essence of the Enlightenment.

As our primary interface with the other, <technology> is understood to have the tendency to treat the other as an obstacle. Nevertheless, the meta-concept's values and interests could coincide with those of the other. For this to happen, the social relations

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which favor a system of cooperation, for example, over domination would need to be found, thus altering or expanding the conceptual constitution of technology. For <technology> to reflect the totality of the human potential, we must look to the totality of the human experience. This is done by cultivating the social relations that diversify and not perpetuate our current understanding of <technology>. Concepts affect how we think and act, and if a concept is sufficiently diverse then our experience will reflect such diversity.

B. Social relations are sources of our concept of <technology>

Social relations are the resources for the diversification of <technology>. For epistemological purposes, social relations are convenient labels for sets of expectations, interests, perspectives, values and means of negotiation one's or a group's experience.

To further demonstrate how conceptual constructions can affect how we think and act, it is now pertinent to expand by what I mean by "social relations". Just as there are distinct institutions and systems of behavior based on one concept of <ownership>, there are entirely different institutions and systems of behavior based on another. Each one generates unique social relations. In this sense social relations have determinative qualities. Concepts, rules, social conventions, ideas, patterns of behavior, values and types of technological expressions are preserved through corresponding social relations; but this is not to say that there is a one way circuit between them. This relationship is a two-way street in that concepts, technological expressions and the like reinforce and perpetuate their unifying social relation.

In *The Archaeology of Knowledge* Michel Foucault argues that it is not "objects" which are consistent and thus determinative over time; rather it is the "rules" which distinguish certain objects from others that have this capability. For our purposes we can make an analogy between Foucault's rules with my use of the term "social relation" which exists as an influence distributed throughout society and within our means of negotiating

with the world. Foucault also argues that there is an infinite range of choices that would result in other possible arrangements of the elements which constitute different objects (Foucault, 1971).

The objective of this investigation is to expose certain social relations which preclude the surfacing of others. Perhaps within newly emerged social relations there is new inspiration for technological expressions. Foucault feels that the social bonds which determine discourse are symbolic. We create symbols, and, in the process, we exclude others through the perpetuation of rules that lend sovereignty to those symbols. In other words symbols organize social relations by way of sharing certain values and expectations with them. This investigation is about expanding the scope of the concept of <technology> by looking for new or previously repressed social relations. In Foucault's words:

> we must question those ready-made syntheses, those groupings that we
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> normally accept before any examination, those links whose validity is
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> recognized from the outset; we must oust those forms and obscure forces by
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> which we usually link the discourse of one man with that of another...And
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> instead of according them unqualified, spontaneous value, we must accept, in
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> the name of methodological rigor, that, in the first instance, the concern only a
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> population of dispersed events (Foucault, 1971, p. 22).

Foucault's suggestion that the construction of the unities of discourse is accomplished by the grouping of dispersed events implies that the events can be organized in any manner necessary.

We can understand a social relation to be a discourse in that the latter, just as the former, orients its constitutional elements in a manner consistent with what distinguished this particular discourse from all others. What is lost in this process? What perspectives and means of social organization are left out? Foucault argues that we must first isolate the

means by which the components and elements of the discourse are organized in order to see

which formulations that it excludes—here is the opportunity or the inspiration for new

social relations. Such an approximation would enable us, "to grasp other forms of

regularity, other types of relations" (Foucault, 1971, p. 29). Discourses or social relations

are seen, not by the choices that constitute their ontology; rather they are recognized, "in

the dispersion of the points of choice that discourse leaves free" (Foucault, 1971, p. 36).

Here again are ranges of possibilities, other social relations, that can be applied toward new

discourses, new types of technological expressions, etc.

There are no, argues Foucault, necessary relations between elements that form

discourses, meaning that within the social construction of discourses there exists other

possible formulations. These formulations are like "unities" whose essences are perpetuated

throughout society through rules which emerge as institutions, technological expressions,

standards, etc. When unities are examined, "one is confronted with concepts that differ in

structure and in the rules governing their use, which ignore or exclude one another, and

which cannot enter the unity of a logical architecture...What one finds are rather various

strategic possibilities that permit the activation of incompatible themes, or, again, the

establishment of the same theme in different groups of statement" (Foucault, 1971, p. 37).

The question then becomes: why this formulation and not another? When we analyze what

is said or done, we are also acknowledging, by opposition, what is not said or done.

A certain social relation on the scale of, let's say, an entire civilization, not only

exhibits the power to influence numerous other social relations but it also belongs to a

system of like social relations which exclude other perspectives and arrangements of the

same object but are excluded due to their potential to vitiate the structure upon which the

established social relations are organized. Foucault's understanding of an object is a

sufficient analogy to how social relations operate invisible throughout society: in policies,

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social conventions and technological expressions. Foucault's object is a meta-social relation while its manifestations throughout experience are social relations which are consistent with the formulation of an object. The rules constituting the object are stable over time and they, through strict social convention, exhibit the power to influence future action and the paths of material production (Foucault, 1971). For instance, the idea of <private property>, as understood within the confines of Western imperialism and capitalism, is a social relation of such a magnitude. We make fences and create laws protecting private property, leading down the road, for example, to conflicting ideas of freedom (recall the 18th and 19th understanding of slavery), surveillance technology and intercontinental nuclear war heads.

A recursive theme in this investigation is how concepts affect how we think and act. A certain concept of the other, for example, will determine how we interact with the other. What about the concept of <technology>? Despite its association with Modernity, <technology> has not been treated with the normal degree of standardization typically associated with such grand narratives. In his article, "Three Ways of Being with Technology", Carl Mitcham explores how humanity has treated the idea of technology. A distinct idea of technology has corresponding sets of social relations. He takes a historical approach to show how civilization has swung back and forth between a distrust and faith in technology. For example the Enlightenment fomented the idea that all endeavors into technology were good whereas the Romanticism movement questioned the blind pursuit of any such technology without the proper degree of critical reflection. Romanticism was a project which asked for there to be alternative ways of negotiating our experience (Mitcham, 2005).

To decide what type of <technology> we have is a decision that should be first approached in Academia. Mitcham proposed that there have been different conceptual

angles to the issue. In any event, the point is that such movements as the Enlightenment and Romanticism are meta-social relations which determine many other social relations throughout experience. These movements are also projects which were directed toward the constructing how we see and be with technology. If there are three ways of being with technology, there are others as well.

The above relationship can also be understood in terms of Wittgenstein's language games. A language game, like Foucault's object, is the label for the conditions of a set of social relations. Within this set are expectations, actions, values and technological expressions. A language game is analogous to the context for a certain concept in that it determines experience. There is a reciprocal relationship between the elements of a game and its context. The forms of actions, meanings and interpretations crystallize by a process of autopeisis due to the conditions of the language game (Wittgenstein, 2003).

A language game is also a meta social relation. Academia can acknowledge the language game and its corresponding elements. Academia can appreciate it for its distinct social relations in terms of their value as the building blocks for a new epistemology for seeing and being in the world. Academia can also exchange elements for new ones in order to approach the ideal situation, something much harder in Government and Industry. Academia is more neutral than the previous two areas of society. It is an open system for experimentation.

By experimentation, I am talking about testing the elements with the type of results desired. Realistically, this degree of experimentation can only be done in Academia as practical considerations and narrative traditions would impede such abstract reflection in the areas of Government and Industry. For example, <technology> implies a type of efficiency which has served well in the areas of Government and Industry. To alter this form of efficiency would be impractical to do on the fly or from the hip. Conceptual

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experimentation is appropriately attempted in academia. Academia, through its role as a

vehicle for un-coerced critical reflection, can search for the type of world we want then

experiment with the elements of the game in order that <technology> and its expressions

reflect this type of world.

A type of world is seen through its conceptual construction. A slice of pizza

suggests the size and composition of the whole—the slice being a concept. Below, in the

prelude, I have provided an example of how certain concepts or particular interpretations of

ideas are social relations which can prevent the emergence of other interpretations of the

same ideas or concepts.

The purpose of this investigation is to explore the possibility of challenging and

diversifying our understanding of the concept of <technology>. Such an endeavor could be

achieved by uncovering new perspectives and angles to approach the issue of technology

with the hope that additional interpretations will result in more varied, better or more

favorable technological expressions. To enhance the concept of technology is almost to

create a parallel universe within our own which promotes the axiom of comparison.

Another way to look at the purpose is to ask <technology> and its expressions to

reflect more of our human potential and not just a limited number of social relations, values

and expectations. These additional aspects of society would create an expanded concept of

technology which would exist in conjunction with the <technology> and its expressions

that we already have. In sum, the more aspects of our experience that we encourage

technology to reflect the more diverse it will become thus promoting critical reflection. To

do this, it is necessary to uncover the social relations that are within society, though

ignored; or it becomes worthwhile to create the social relations in order to give us an

expanded ides of <technology>. This is accomplished by creating the epistemologies which

can prefabricate the form of the object. In this case the form of the object is experience and how we negotiate it. Our chief means of negotiating experience is <technology>.

C. Example: <ownership> and the social relations which surround it

This section can be understood as a prelude featuring the concept of <ownership> and the social relations which surround it. One idea of ownerships has a corresponding set of social relations that excludes another set based on a different understanding of the same concept.

Certain and distinct social relations form around their corresponding understanding of a concept. The concept of <ownership> was a critical factor in the contact between European colonists and the indigenous cultures of North America. A common misunderstanding is that the Native Americans had no idea of private property when, in fact, they just had a different understanding of it. Prior to the arrival of the Europeans, land for instance was something that could be owned in terms of respecting boundaries as space for the purposes of hunting. So there was, to some extent, a mutual correspondence between the Natives' concept of <ownership> and that of the colonists'; however, they were different to such a degree that the two civilizations were incompatible. One's conceptual interpretation leads to certain applications, technological expressions, while others lead to different expressions.

The colonists saw that the Natives did not use the land to its full potential as the European tradition had shown that it could be done. To the Europeans the conditions of a "thing owned" were guided by the social relations that transferred all benefit toward the satisfaction of the owner. The colonists' interpretation of the Native's negotiation of <ownership> was a source of consternation as an altered idea of the concept was confused with generosity, laziness, and even stupidity. The European idea of ownership is 100% possession, and the object being owned can be used toward whatever personal purpose

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he/she deems necessary. This sounds "liberal"; however, it is merely <ownership> as such. The thing is owned in a way that promotes the total use of the thing; it is merely a type of ownership.

The Natives' concept of ownership, on the other hand, was much more holistic, not narrowed to the idea of use. From the Natives' perspective a thing enjoyed a transcendental existence in that the object's relationship to the world was not limited to its use or to the user; rather, it had a role with its surroundings as it was an element within the totality. This was another type of ownership whereby a different set of social relations (actions, expectations, values) prevailed. The Europeans interpreted these social relations to be the manifestations of apathy or ignorance as the various tribes were not exploiting the land to its maximum capacity. Such were the justifications for violent intervention which subsequently quashed any sort of positive contact with a new perspective on <ownership>.

Positive contact could have resulted in an enhanced idea of ownership which then could have resulted in a more diverse experience with things in general. What if, at the time of the contact between the two civilizations, there had been a conscious effort to recognize the existence of a different idea of ownership in stead of the destruction of this culture and its perspective? We would have had a more complex concept of <ownership> as well as more diverse technological manifestations of <ownership> throughout our society. How do we encourage positive and mutually beneficial contact between two different systems of understanding?

As investigators we can retreat into Academia and critically reflect on the advantages or disadvantages of the two opposing concepts above. Once this has been done, we can construct concepts using the components of both, for example, or some from one and some from the other. In any event the choice would be based on a desirable means of

experience that would serves as a model for the construction of an epistemology designed to help us achieve this means of experience.

D. A project and the social relations which cradle it

For a project to be distinct from others, either from those of the past or those currently in effect, it must be considered like an epistemology that is constructed out of resources that have not been previously considered or these resources must be used in different ways.

A project is like a fog; it comes out of an obscure source, and it can penetrate society at many levels and in many different ways. A project is a nebulous entity proactively charged with changing some aspect or many aspects of our experience. In this case, the origins of a project are in Academia and from there the implications of the project will reverberate in Government and Industry until they can have a practical effect. Taking the above example, a project could develop around a harnessing of a different concept of <ownership>. There are social relations whose form is determined by this particular conceptual construction. Concepts affect how we think and act. The project could weigh certain aspects of the social relations, choosing only a few or all depending on the goal. If the goal is simply to have a different idea of ownership along side that of the dominant one, then perhaps all components of the set would be chosen for purposes of comparison and critical reflection.

Identifying the social relations and their components of expectations, values and conceptual constructions is about the process of finding human subjectivity. Radovan Richta refers to this process as actually creating human subjectivity (Richta, 1969). To create human subjectivity is to provide the means for the individual perspectives to rise to the surface and enjoy an active form of participation in experience. In the section titled, "Constructing Perspectives" of his book *Civilization at the Crossroads*, Richta provides us

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with the motif of a past project as well as a potential, future project. He draws from Saint Simon who proclaimed that the Industrial Revolution was a social movement which tied the future to the past, and the shape of the former was determined by the patterns of the latter. Man's role in this process, obviously, was very limited in that he was required to hone his skills toward the production of a future that is only bigger, let's say, than the past. The social relations involved in this project of industrialization would follow and correspond to the structure established by the application of subjectivity toward a limited goal (Richta, 1969).

Richta then goes on to suggest a new project where human powers are unleashed, and they have:

> a universal role as an independent factor introducing new dimensions into the future, dimensions that are not imposed by external necessity and do not prolong the past course of history—when the future and purposive begin to operate as genuine components of human and social interests and endeavors in the present. Then the present starts to dominate the past, and the future emerges as an independent value open to freedom of choice (Richta, 1969, p. 268).

Finding these social interests and components of humanity is the project. They are resources for the diversification, expansion, etc of <technology>. They are the foundations for new conceptual constructions, new values and expectations and ultimately new goals. To evaluate their value is to create new epistemologies that could show us different realities in terms of our experience and in terms of how we understand and utilize <technology>.

In order for Richta's project to be realized, he outlines the steps for its execution. First, he says the public must be acquainted with general problems, both seen and unforeseen in an open and participative manner. Then, experts in various fields must be called upon to make suggestions as to how to enhance the civilization base of human life.

This is basically to nurture and cultivate our individual potentials. Next, there must be a period open for a long term dialogue which is basically a time for critical reflection, feedback and negotiation among the various aspects of society (the fields of the experts) and humanity. Finally, a decision must be made which is a choice of alternatives that were arrived upon during the aforementioned steps (Richta, 1969, p. 272). The last part, I would suggest should overlap into the scope of Government and Industry, but all of the former should come within the gambit of Academia.

In any event, Richta's plan was to foment a civilization of socialism, but that is not the point. The idea is that he established a project based on the type of world he wanted, and then he established the means to accomplish it. Important here is that his process includes heavy participation on the part of humanity and its diverse components which are social relations and their sets of expectations and conceptual constructions. Then, we see that these social relations are encouraged to serve as a resource applied toward the kind of world desired. For my purposes, these aspects of humanity would be recognized for their distinct perspective then weighed for epistemological experimentation and reflection.

Concepts affect how we think and act; conceptual construction depends on the type of social relations beneath it.Social relations take shape around an idea, a concept or a project. In "Three Ways of Being-With Technology", Carl Mitcham demonstrates that a certain way of being with technology will result in corresponding actions and thoughts. Mitcham points out that in ancient times there was a trend of skepticism against technological innovation the result of which was a cultivation of aspects of society and humanity that had nothing to do with technology. The Enlightenment was a period of blind faith in technology which led to the uncontrolled investment in technology, unplugging of any means necessary for its production which ultimately lead to the industrial revolution. The Romanticism movement was characterized by a search for additional ways to be with

technology. Conceptually speaking, nature was the ideal of experience instead of the target of experience. "The romantic view takes nature as the key to artifice rather than artifice as the key to nature" (Mitcham, 2005, p. 501). Such a conceptual revolution would then serve as an influence on thought and action within which are new perspectives, expectations and values, sets of social relations in other words that can be applied as resources for <technology>. To see something differently is to reorganize its ontology. The purpose of this investigation is to expose novel social relations that could diversify how we think about <technology>.

E. The expansion of <technology>

Expanding the scope of <technology> is possible, or at least worth attempting since this concept influences how we negotiate experience, the other and much else. <Technology>, by way of its real life expressions, is our interface with the other; and if technology is involved in an exorbitant amount of our social relations then the former should be able to absorb added influence from contact with the latter. The mechanism between an expanded idea of <technology> and the myriad of social relations is a context heavily conditioned by the ideal of critical reflection. To accomplish this, it looks highly probable that society is able to promote the types of social relations that encourage the contact of the variety of perspectives that reflect our diverse needs. This contact is automatically characterized by critical reflection since the ideal of comparison would naturally crystallize due to the confrontation of multiple perspectives. From the moment of our birth, as we leave the dark and secure womb and enter the world of light and confusion, our perception is calibrated by this primordial process of comparison. Anthropologically speaking, our manner of thinking is constructed, if you will, around the axiom of comparison (Campbell, 1991). If we are given more objects with which to compare, then

our conceptual foundations would be more complex and our ideas of the same would be more complex as well.

Encouraging this kind of contact is accomplished by way of what I will be referring to as a "project". A project is proactive measure implemented on a large scale toward the creation of the kind of world we want. For our purposes, the target of the project is <technology> since it is through this concept that we negotiate our experience with the world. As an afterthought, such a broadening of <technology>, by way of contact with a variety of perspectives, could challenge technological expressions to correspond to our plurality of needs and potentials.

<Technology> and technological expressions reflect a limited aspect of humanity, so this investigation is about encouraging the many aspects of humanity to emerge as technological expressions. In addition, this investigation is concerned with forcing our total experience to permeate the very concept of <technology> to the point where it would include more aspects than the one we have now. So far the concept of <technology> exhibits a tendency to reflect limited aspects of humanity such as the ideas of domination, control, and instrumentalism. Is this the only way <technology> can be, or can <technology> exude other qualities in conjunction with the ones with which it is currently characterized? The attempt to accumulate more social relations, perspectives and ideas within the concept of <technology> is accomplished by way of social projects. Projects are possible. They have occurred and been very successful in the past, for better or worse. In contrast to the projects of the past, these social projects must be conceived to encourage critical reflection and contact among a variety of perspectives within a liberal idea of context. A liberal idea of context is characterized as a dialogue which promotes a variety of social relations.

Could creating an exhaustive and liberal dialogue with technology have a positive effect upon technological expressions? At the very least such a dialogue would show us the limitations of a <technology> formed by a determined type of social relations to the exclusion of others. We are like deaf speakers who can not hear ourselves talk if we are not aware of this limitation, but if we are made aware of these limitations then we can at least know what we sound like when we talk which could serve as inspiration for experimentation. *Relativizing* the concept of <technology> for a favorable dialogue and desirable technological expressions is beneficial and feasible because a closed concept guides technological production to the degree that it might hinder new forms of development. To find the paths to these new forms requires the cultivation of critical reflection. For this to occur, I am of the opinion that epistemologies need to be cultivated which can give us a fresh outlook on <technology>.

Is the concept of <technology> so narrow that it precludes critical reflection? Can it be expanded so as to include more social relations characterized as conducive toward critical reflection with the end of creating more favorable technological expressions? If this is not possible, is it feasible to work with the <technology> and technological expressions that we have in order to generate the social relations which could make it possible or is this the only way entirely?

In simple terms this investigation is about finding ways to encourage the positive influence of new social relations, perspectives, ideals and expectations with the end of having a broader understanding of the concept of technology and perhaps its expressions.

F. Questions concerning the topic of technology

What distinguishes humans from all other biological entities, what epitomizes our relationship to the universe and to the rest of humanity is our ability and desire to convert mental calculations into machines—technological expressions—either tangible or invisible.

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We are constantly making these calculations, but calculations need variables and factors that come from social relations—the aggregation of which would provide us with more mental resources for our formula with which we negotiate our environments—technology. We are technological animals, but is technology *per se* an accurate reflection of the totality of the human experience? To begin, I call our attention to Lewis Mumford who is of the opinion that it is our ability to make symbols which distinguishes us from animals (Mumford, 1983), but more importantly these symbols are elastic so that new interpretations and uses can be categorized under the same symbol to meet the new demands of experience.

        \<Technology\>, as a concept, is such an elastic symbol. The manifestations which constitute the construction of \<technology\> are varied in their form of expressions. They range from traditions and habit, a component which I will explore later in the thesis, to policies of government and business and finally to what we commonly think of when we hear the word technology.

        The development of humanity is characterized as an amplification of the environment in every sense of the word from our immediate physical surroundings to the process of our conceptual construction and interpretation of experience. Throughout the trajectory of this development, mankind has been involved in a struggle between elements of determinism and free will. These forces are both internally and externally impinging upon man, that is to say we are not bound by instinct; rather, we can choose the stimulus that drives experience; but there will always be limits to this choice. Our interface between these forces is \<technology\> (Marina, 2005).

        The dichotomy between determinism and free will reveals itself in many ways. One of them is seen as a struggle between the influences of a particular context of social relations determined by core, functional rules (determinism) and an active purpose or

project (free will or the type of world we want). By an "active purpose" I am referring to a choice of new or additional rules chosen to construct the kind of world desired. A context, however, is not concrete. It can change due to individual participation and contact with other elements. We can approach a certain environment with one project or another and each would alter the result. A project is the essence of the world that we want in the future. Projects are proactive approximations to the world, and the variety of projects is abundant. Each project unveils new possibilities and new worlds (Marina, 2005).

When there is contact among a variety of social relations, as a project, aspirations and needs crash with the world and a new level of complexity is revealed. Such complexity gives rise to new needs, but more importantly, it uncovers new potential which can be channeled toward a richer understanding of <technology>, thus making it a more legitimate interface with the world. Both things and the world assume different qualities when in contact with different projects which could produce a deeper concept of <technology>. Choosing a type of context in conjunction with proper a project is an exercise in creating the world we want, though there is no guarantee in wanting.

If it is a world that we want, then it does not necessarily follow a predetermined path. This investigation is about the possibility of arriving at a conceptual understanding of technology which reflects the totality of human experience. Would an increased contact among a variety of social relations (different perspectives) challenge <technology>? Then, could challenging the concept lead to better, different or simply more technological expressions?

Harnessing and encouraging all types of social relations that reflect the totality of human experience in order to enrich and validate our concept of <technology> is one way to answer the question above. This process would then provide us with a better understanding of technology that could result in better or additional forms of technological

expressions. On the other hand, another way to accomplish the same could be to increase our efforts through more intense production of technological expressions as they are now. The explosion of expressions might help the concept by some form of osmosis. This pattern seems to be the dominant one as things are today with production focusing on superlative changes and not changes in type. We focus on faster and not different, for example. If this is the only pattern of development then <technology> might be a concept with limited essential foundations, but this investigation, however, is an attempt to uncover social relations to arrive at a more holistic understanding of the concept for a better dialogue with technology.

The potential of <technology> as a concept stems from the exploitation of as many aspects of society as possible thereupon having a tangible effect upon technological expressions which I take to mean more than simple material production. Technological expressions are the result of turning humanity inside out—a process that is not in any way limited to production characterized by manufacture. The many components of society can also manifest as new "faces" of technology. These components are resources which could be uncovered to have a positive effect upon technology.

The following investigation is a philosophical approach to the association between technology and society which explores how this relationship constitutes the concept of technology, both in its actuality and in its potential. To put it simply, the way we see the concept of technology will affect its material manifestations. Essential to this study is the idea that humanity and technology are inextricably related, meaning that our concept of <technology> has a direct correlation to certain types of social relations which guide our technological development in such a way that reflects this relationship. An inspiration, which serves as a guiding thread, is that there is/are (a) specific type(s) of technolog(ies), and there is a hope that there could be more in addition to these. In simple terms, I want to

explore the extent to which <technology> is limited in meaning and understanding with the result that material production is also restricted to certain values and social relations to the exclusion of others. Perhaps by challenging the concept of technology, other forms of technology will be revealed.

Form, as applied to technological applications, is an intentionally vague term since it contains the suggestion that <technology> could take different shapes depending on the various contexts characterized as material, pragmatic or ideological. As it stands today, however, technology has a very standard and accepted interpretation; and, as such, this particular form is the definitive characteristic of our collective society. Our current understanding of technology is inspired by instrumental reason and the interpretation of nature as a pool of resources for our use. Such an interpretation manifests throughout many aspects of society. For instance, the idea of usufruct is a judicial technology created to favor the man who is making use of something over the man who owns it but has done nothing with it for a period of time.

Society and technology have become two sides of the same coin, the coin being technology as aforementioned. In fact, the distinction between the two is almost impossible to make due to the evolution from a faith in science to the widespread technological civilization whereby the objective and rational laws of science and technology serve as the mechanism for social engineering and have the power to merge one culture with the next.

One question that emerges as a result of such an understanding of the relationship between technology and society is how one can interpret the nature of the concept of <technology> when society is considered to be in large part technological. How much of society is being used to construct our understanding of <technology>? In other words, what aspects of society determine our understanding of technology and what aspects could be used to alter <technology> and its material manifestations? This particular philosophical

approach to the partnership between technology and society is a celebration of a social consciousness which is undeniably dependent upon technology, but it also keeps the possibility open that technology is not all that it could be in terms of material production and the needs that it addresses. A philosophical skepticism towards technology challenges us to reflect on what we take for granted, specifically, rational modernity and our tendency to consider material technology to follow a natural order. This sentiment can be considered a form of technological fatalism, but we must remember that technology is humanity's outward expression and interface with the other thus it is subject to the expansive variations of our total constitution which is why this investigation is called the project of technology. The following work is a look at the possibility of <technology> being able to reflect the totality of the human experience and not a few limited areas.

Appropriately technology is a privileged target for analysis since it is a fundamental fact that humans are a working animal who constantly transform nature or our interpretation of its ontological validity. The real possibility of the transformation of nature is something we inherited from the Enlightenment and has continued until now as Modernity. We are not an element within the world; we conquer the world and are therefore separate from it. For instance, the questions we put to nature and experience are not necessarily concerned with *what* things are but *how* they work and what they can *do* for us. <Purpose> seems to be *aporatic* in terms of our ontological construction of things. Such a consideration of <technology> in the above scenario is known as the instrumental approach which is the understanding that technology is value free and that humans simply put the thing to use. As such, the ends of our technological applications are not manifestations of knowledge per se; rather they promote a certain type of knowledge founded upon purpose which is fine, but could not other types of knowledge exist simultaneously? The trick is to find the fuel, as social relations, for the desire of other types of knowledge. Knowledge

does not have a self evident form; rather, it is the result of a process of the filtering of social relations.

We cannot abstract any universal properties from our experience with technology, nature and society because our goals are mixed up in social norms and cultural conventions; therefore, there is nothing legislative about technological manifestations in the sense that technology follows a determined path. This is largely the concern of the social constructivists, and I will go into this issue later. Nevertheless, the potential latitude that technological expressions could exhibit is limited by societal expectations suggesting that technological expression could be diversified by the diversification of social expectations. Expectation needs to be fertilized and cultivated which would thereby expand the concept of <technology> itself. Social constructivism is a methodology by which new causes and new perspectives are considered, and this epistemology could reveal new potential for expanding the scope of <technology> in order to change technology.

At the other end of the spectrum, we have the technological determinists who believe that technology is not humanly controlled; rather, it controls humans and shapes society. For example technology organizes society to the rationales of technology and progress, let's say. Technological determinists would have us believe that technology employs knowledge of the world to satisfy universal elements of human nature. Technological determinism is not to be confused with the *Substantive Theory* which is a form of pure determinism. Martin Heidegger is an advocate of substantivism in the sense that the essence of technology is separate from society which it shapes. Heidegger argued that modernity is categorized by the victory of technology over every other value (Feenberg, 2003). I will not go so far in this investigation as to promote the virtues of technological essentialism, but I do feel that there are aspects of technological determinism which are worthy to preserve for academic purposes. For example, that the instrumental

view of technology is tied to human agency is the purview of the social constructivists; but that we see the world as a resource to be changed by our instruments is an element of determinist ideology. In any event, the epistemology of the determinists could reveal new potentials for diversification of the concept of <technology>. It could also be argued that determinism is a worthy epistemology if we take into consideration that technological expressions are determined by certain social relations and values to the exclusion of others.

The foundation for this investigation rests with questions involving the nature of society's understanding of technology. Perhaps if we tap our social reserves, in terms of our collective understanding, then the meaning of <technology> could be expanded to inspire new applications in addition to the ones currently in existence. Specifically, I aim to explore the conceptual range of what we understand <technology> to be and what it could be with the rationale that technology is what we think it is. This study is an uncovering of the parts of "we" that have not been given due consideration which can be used to challenge the concept of technology. Technology is an interface between us and the problems of the world. There are still problems, and the 20th century should be enough of an inspiration to at least explore the expansion of technology. Were there no friction created by our experience with technology, then there would be no need to tempt <technology>.

G. Questions behind investigation

Is the concept of <technology> sufficiently diverse to meet the demands of our complex relation to the world and to match our diverse potential? Is the concept already sufficiently diverse to meet our expanding needs?

The postmodern world is classified as a world of disunity or heightened contextualization whereby *relativization* is the order of the day. The context of global capitalism has opened up competition in every sense of the word as there are no longer any

other narratives to serve as counter models. In a world characterized by competition, individuals become isolated from one another and each fights its way to the surface in an attempt at recognition. Technology encourages these selfish qualities of the individual. As a society we have moved from an experience characterized by competing movements for the future (modernism) to one understood as an adversarial setting between the individual and the globe whereby identity does not have multiple structural foundations. This means that the individual only has one narrative from which to use as a resource for identity creation (Anderson, 2006). Can technology step in and fulfill all our needs for identity creation?

Actually, technology can change our understanding of <identity> as a concept. We now have virtual identities. Plus, with the technologies of Blogs and WebPages, identity is considered something that one can finally obtain, though virtually and possibly spuriously, when in the past, identity was something we assumed everyone already had. This means that identity is now something accessible if we have the proper technology (Kischinevsky, 2007). This process is a combination of technological and social relations at work. Just as technological expressions affect our concept of identity, identity itself can be deconstructed in the realm of Academia so as to avoid any excess influence on the part of experience, which would of course include technological expressions.

There are no absolutes, and reason and free will are not considered to be the means to a unified existence. In such a scenario, the subject is continuously being reconstructed. He/she must redefine his/her identity and understanding in the face of concepts that are constantly changing. Rational thinking and behavior do not carry us to absolute existence, and technology further isolates us from one another in the sense that its values are selfish. They are geared toward domination, convenience and prediction. In our post modern age, technology has been given sublime status since technology is that which we have chosen to redefine ourselves. Technology is the vehicle for identity and expression, but technology is

the manifestation of selfish values, generally speaking. Does this have to be the case?

In some way or another, the way we understand <technology> has a determining affect on technological expressions, both material and invisible. In fact, <technology> can be understood as a general term used to categorize the particular nature of our expression upon the world, like a seal stamped into hot wax. The form of this stamp is the result of an interaction between the potential of humanity and the possibility of technology. Technology and humanity have grown up together such that our technological choices spring from needs generated within a social setting which is not to say that technology is the result of an entirely democratic process or that it answers all needs. Given that some needs are prioritized, either through power relations or questions of immediacy, not all aspects of society, human and non human, will find a technological voice. This raises certain questions: does technology have to be the way it is, and can it assume a different form? Provided the diversity of ideological backgrounds within the entirety of humanity and the complexity of social life, perhaps a positive answer to the above question deserves consideration. So how can we draw from the diversity of humanity in order to alter and diversify the construction of technological expressions? What are the conditions which would promote a more holistic relationship between technology and society?

It would seem to me that a logical place to begin would be with the concept itself. The aporia of <technology>, for practical purposes, reflects a tendency to think of it as a tool. This is fine and perhaps necessary; but, <tool> has limits. What if we were able to reduce the idea of technology to community, understanding, or even harmony in conjunction with its notion as a tool? If technology springs from the complexity of human development in relation to the environment and to others, then, theoretically <technology> could represent the many levels that comprise this relationship. Perhaps the idea of a tool, as we have come to understand it since the Scientific Revolution, is conceptually

insufficient to address the complexity of the human experience. The purpose of this investigation is to realize a conceptual experiment with <technology>, a challenge not only to its ontological features of efficiency, prediction and control, conversion, etc. but also to challenge the social, paradigmatic, or ideological foundations that influence the final, outward form of technological expressions.

The ideas of progress and usefulness will also be challenged in that their effects will be questioned. Progress, as we know it, is technological progress which is based on certain values; and, once these values are diversified, then both progress and technology will be inevitably altered. For example, there have been attempts to insert more political responsibility to our understanding of progress, making it amenable to various social groups and interests as well as to the practical needs of technicians and engineers (MacKinzie & Wajcman, 1999). I imagine that <usefulness> and <efficient> will continue to be purposive, but their implications will be different. For instance, within the concept of <useful> there might be an expansion of its basic ideas to include the ideas of harmonious and mutual understanding as well as its traditional foundations of manipulation and control; and this investigation is a similar exercise exploring the concept of <technology>.

By exploring the concept of <technology> I hope to uncover aspects of its ontology that are not immediately obvious in addition to exposing the concept to aspects of society as yet not considered. What else is within technology's potential ontology? Or better, what else resides in our experience which could have a positive effect on technology? This study is an experiment with how we understand our relationship to technology, but it is also a focus on how to challenge this relationship. Since the questions of how we know (epistemology), what we know (knowledge) and how we apply what we know (technology) have been around since the origins of Western Civilization, it is the appropriate place of the philosophy of technology to focus on the essential nature of things as they relate to society

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(Scharff & Dusek, 2005, p. 4). What is the essence of technology, or the study of how we apply what we know? Is it being completely fulfilled by our current pattern development, or is there more to its essence than a practical manifestation of instrumental reason? How long will instrumental reason continue to serve as the foundation for technological expression? If we doubt the longevity and predominance of the relevance of instrumental reason and, given that environmental and ideological concerns characterize the conflicts of the 21st century, I assume that we can at least question its privileged position, then we should look for new forms of reason to exist along side its more venerable understanding.

If the philosophy of technology is the study of how we apply what we know, then could the concept <technology> not, ideally, reflect all that we know? Can our perception of technology change sufficiently to incorporate other such characteristics that are not commonly included in the concept of <technology>? If so, can these new characteristics influence technology's outward expression? Can the social conditions be created that would make this new technology feasible? Could a better and more versatile <technology> result? Or could technology as we understand it not be any other way? Finally, does a deficient concept of technology create fiction within society?

By exploring our relationship to technology, including its ideals, values, and interests, I hope to gain insight into the complexity and diversity of this association in order to uncover a potential force that could have an effect on technological expressions in practice, conceptual interpretation, and material manifestations. This potential could reside within the highly complex interaction between society and technology, but it could also be found within the concept of technology itself. In order to do this, the concept must be exposed to new social relations. The following is a list of questions that were used as a guide to the investigation. They served to instigate possible ways that <technology> could be diversified.

H. Epistemological points of departures

1) One the aims of this investigation is to explore the extent to which we are approaching a homogeneity of experience and the effects of such; for example, meaning of experience becomes uniform with increased enlistment of technology as we currently know it. Another is to examine how diverse the concept of technology could actually be. This point refers to an opening up of the concept in order to reveal its diverse potential. Finally, the research has been organized and analyzed to demonstrate the potential of our diverse society that is in contact with technology to influence technology in terms of making it more conducive to a more harmonious existence.

I. The diversification of <technology>

The diversification of the concept could be done by finding all the possible variables that could have an influential effect upon <technology>. Finding can be understood to be archeological in the Foucault sense. It is a process of generating/revealing social relations that could affect technological expression by approaching the issue of technological choice from as many angles as possible.

The concept of technology can be diversified by a broadened understanding of the effects of technology, but what do I mean by effects? Effects are both the technological expressions as well as tangible contingencies within multiple empirical settings. To demonstrate how <technology> can be diversified we can look for these very contingencies in addition to obscure sources. For example, the presence of technology in our society is a force that exercises much influence on many aspects of our lives. So, part of the concept of technology is comprised of the effects that individual technologies have on our society as well as the recognizable characteristics that are attributed to them.

Social relations will determine much of what characteristics are attributed to the technologies, but some of these traits will come from <technology> itself. Critical

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reflection on technologies is one way to tempt variables to the surface thereby challenging the concept of technology itself. This might be more evident by way of examples. For instance, a sword exudes certain qualities while the technology of push-button warfare exhibits others. As to the technology influencing social relations, within the technology of the sword is the possibility of honor because one must face the enemy, demonstrating that one's convictions are simultaneous with one's actions. The use of the sword also allows for the possibility of a humane resolution as the opponents are looking at one another in the eye or the motions of the sword may be halted if the adversary yields. This could then lead to diplomacy on the battlefield. But within this particular society, there must have been a system of values which rewarded honor and diplomacy; so we see how social relations can also affect or sustain certain technological expressions.

On the other hand, within the technology of push-button warfare is the threat of an effacing respect for conscience. Guilt plays less of a part as one does not have to face the enemy. Should not we be as thoughtful as possible when we are executing a technological act, especially in war? So, technology can reflect certain social values, such as honor; but it can also embody certain effects, like the diminishing importance of social conscience. Society has created the conditions that have objectified the other. Technology owes much of its being to society, and technology is the result of social relations that promote certain technologies and suppress others. If part of technology is social, then perhaps technological development, change, and choice could be further influenced by society, though in a much more diverse way than has been previously considered. For example, there is guilt and accountability in society, so could these also be used to diversify technological expressions? I recall Oppenheimer's reaction to having seen the first atomic explosion when he said that Science had finally come to know sin. He was wondering what effects this would have on technological production.

It is appropriate for <technology> to reflect the myriad of values and social relations since it is our primary interface with the outside, the other. Also, <technology> as a concept with a limited foundation acts in a non neutral way. For instance, in the context of a war whereby the weapons reflect a technology within the contextual confines of instrumental reason and domination, the idea of <victory> confounds other concepts and social relations. Victory is total; there are no non-combatants; everyone and everything is associated with the enemy. Maintaining the conceptual distinction is important for critical reflection, and a broadened understanding of <technology> could preserve a respect for individual concepts since a blunt understanding of <technology> acts as a regulator or a common denominator putting all variables in the terms established by <technology>.

The effects of a limited understanding of <technology> can also be seen through very subtle means. For instance, the purpose or political intention behind certain technologies affects the expression in a non neutral way. In other words, the technology is the manifestation of the idea. The idea of "manifest destiny", as the dominant political ideology in the U.S. of the 19th century, had many long term effects on technology, society, and even the entire Western hemisphere. Could not another such ideology have different effects? Manifest destiny promoted the expansion of the railroad, the telegraph, arms production, etc., but it also led to the depletion of the North American forests, the genocide of the Native Americans, and numerous illegal military interventions. Ideas can become juggernauts if we let them, and we tend to blindly accept the results of these ideas since they can appear to be apart of a larger movement like, in this case, "manifest destiny". We don't question these ideas and their results because they seem natural, but the only natural connection lies in the passage from the idea to the result since the latter is the substance of the former. The idea itself, however, is far from naturally ordained. In another example the British preferred free trade over moral consistency in their opium trade with the Chinese.

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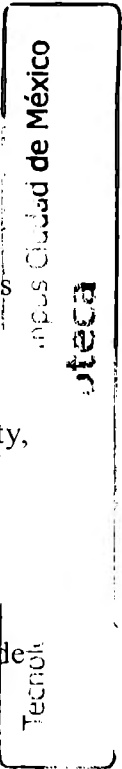
Basically the trade was opium for tea (Pacey, 1996, p. 147). These are arbitrary policies that could be enhanced with a more diverse concept of <technology>, and the execution of such ideas is what I will be referring to as a project.

Technology itself can serve as the inspiration for a project, and the mere nature of technology's widespread presence is a source of diversification. Each day technology becomes a more influential element in the life-equation that constitutes our existence within the world. Technology is the defining characteristic of our lives: socially, culturally and politically. Almost everything has a technological element to it. Technology cannot be ignored. It is that which determines our negotiation with the world which has become more and more the reflection of a technological reality. Everything, or almost everything, is tinged with a technological element such that the idea of <technology> itself is almost impossible to define. As an isolated, abstract term, technology is a logical attempt to interpret our world, and logical has come to be heavily influenced by the notions of domination and instrumentalism—instrumental reason. Does this have to be the case? In fact, such a rigid understanding of technology seems antiquated in the 21st century where the world is at least partly characterized by an international exchange of information.

A conceptual analysis of technology would involve its values and its relation to our lives at many levels. As a concept, technological expressions emerge as the result of values, expectations, and standards as well as artifacts and systems of production. These systems of production are increasingly interconnected and interdependent with unifying essential features such as rationality and efficiency. Again, this is technology as we know it, as it exists now; but one philosophical question that I aim to address involves the type of world we inhabit given the prevalence of the technological factor as opposed to other factors. To what extent have we been redefined in technological terms? Additionally, this analysis considers a choice of technology in terms of the type of <technology> we have. Can

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<technology> be reduced to other fundamental values besides efficiency and control? So, the basic issue becomes diversifying the essential inspirations of the concept of <technology> itself with the hope that we can open it up and expose it to additional values, resulting in more agreeable forms of material technologies.

I would like to contextualize technology by highlighting its presence in the modern world in terms of its growing influence on our lives as well as its participation with the myriad aspects of humanity and civilization. The aforementioned influence assumes many forms, both positive and negative; but it is the recognition of the contact with diversity that might have an enlightening effect on technology. Technology is the ability to make our lives easier; its purpose is also to increase our knowledge of the natural environment by diversifying our interaction with the world. Nevertheless, technological choice also causes unpredictable or undesirable effects, both immediately and in the distant future; therefore, it is appropriate to explore the possibilities of more diverse resources affecting technological expression.

<Technology> also has hegemonic properties since it has inadvertently emerged as the dominant option in problem solving. This may seem obvious as the only way to approach problems since technology is our primary interface with the outside; however, I would like to explore the range of possibilities of *how* <technology> can serve as our interface with the outside. Rather than remain uncritical toward the advantages of technology and its *synonymity* with control and progress, I feel that a more complex understanding of the "technological factor" would help us visualize its effects on a larger and more abstract scale, a perspective that seems appropriate in today's world. Perhaps by opening up the concept of technology, its ontology could be more appropriate to the realistic conditions of modern society with all its contradictions. Such a conceptual dissection of technology would have the ultimate purpose of providing one with a clearer

vision of our relation to the world so that we may have a better ability to choose between technological forms and adapt them better to society. Also, it would provide one with the insight that not all situations are best dealt with technologically. This last part is based on the assumption that we can distinguish between what is recognized to be the technological aspects of life and those that are not. This is another philosophical issue to be dealt within this investigation. Once these other aspects are uncovered, perhaps they could be applied toward technological expressions.

I intend to open the black box of the concept of <technology> as well as put more elements of society into this box in order that we may see more clearly what we gain by an increasingly technological world as well as to expose <technology> to other elements of society with the intention of diversifying material production. For instance, the idea of progress has been given a black eye with our blind pursuit of technology as it is now, so why shouldn't we explore an idea of technology that could meet the ironic challenge that progress has presented? The way we see technology in its conceptual state should have an effect on its final form which is a justification of social constructivism as a valuable perspective. If we believe that technology is the result of social negotiation, then a material technology can take any form possible within the parameters of social negotiation. <Technology> is valid only in so far as it is the result of a social agreement, but validation is a relative term whereby not all of society participates in the construction of this concept. The rationale follows that a concept is more valid with the more social components it has upon which to rely.

In opposition to this approach is an understanding of technology as an entity that has the ability to determine social conditions. The point here is not to apply agency to technology, but rather to remind us of its potential to organize social relations which then perpetuate a certain type of technology. "Technological determinism" provides us with

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insights to the effects of our technological choice upon our civilizational narrative, both unforeseen and intended. Effects are like links or lenses to hitherto unknown variables (resources), and a consideration of the very idea of determinism will reveal aspects of technology that act as connections to aspects of society that could have an effect upon technological expression. The acknowledgement of these effects is, figuratively speaking, a construction of a bridge between social influences and technological expression. Both the social constructivists and determinists schools are important in that the former highlights possible avenues for technological change and the latter keeps us aware of the effects it has on society.

Change is still a real option; however, I am not talking about change in any sort of superlative fashion. I am talking about true qualitative change. This reminds me of Fukuyama's widely lauded article "The End of History". We have reached a stage in history where liberal democracy has triumphed and we will be witnessing the continued cultivation of this form of government. We have arrived at an ideology that we are comfortable with. He writes that:

> this is not to say that there will no longer be events to fill the pages of *Foreign Affair's* yearly summaries of international relations, for the victory of liberalism has occurred primarily in the realm of ideas or consciousness and is as yet incomplete in. the real or material world. But there are powerful reasons for believing that it is the ideal that will govern the material world *in the long run.* To understand how this is so, we must first consider some theoretical issues concerning the nature of historical change (Fukuyama, 1992, para. 4).

How can we arrive at a world where the ideal governs the material? Such a reorientation of the ideal and the material calls us back to the Enlightenment and the subsequent revolutions

in America and France. An idea can be a meta-social relation to direct other social relations and technological production.

Historical change is directly tied to technological change, but there are many manners to approach this. In certain terms I am talking about technological change, both actual and potential. As things are now, the characteristics of technological change are quite fixed due its association with the ideas of modernity, scientific achievement, and the Enlightenment. Progress has come to mean technological progress, both materially and politically. As to the latter, I am referring to how technological values have come to dominate our social relations. To what extent is it possible to view technological change apart from progress as defined by the Enlightenment and its association with instrumental reason? Could technology incorporate other values besides the ones it already does? Are there alternative ways to view technology in the sense that technology can take different forms? In this sense, knowledge of technology would need to be converted to an awareness of the potential within technology itself.

To conceive of such awareness is quite logical since knowledge is merely our attempt to make sense of our experiences and it is not a representation of a truth that lies beyond experience. The concepts and relations are generated by us and our attempt to interpret the world; therefore, our conception of the world, and technology, should be the result of the totality of our social relations. The form that our relations take is not exhaustive, and it seems that only a fuller exploration of that potential would affect technology per se. Individuals have a responsibility to the world in that the world exists because of our relation to it. Simply put, one's concept of technology will affect the technological expression. Even in a view of radical constructivism there is room for a variety of alternatives (Von Glasersfeld, 1990, p. 237). It is the blindness to alternatives and to different, individual perspectives that are the inspiration of this investigation.

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J. Justification

<Technology> exhibits certain tendencies to the exclusion of others. It is conceptually non neutral and limited. This serves as a justification that we should realize and visualize our free will by challenging <technology> to be more than it is. The space where the influences of technology, social relations, may be analyzed is in Academia.

In order to accomplish this, I feel that it is important to revive the critical awareness and skepticism that technological determinism has established so that we may see technology for what it is—an entity around which social relations are constructed. I also feel that the social constructivists' perspective plays a key role in showing us how material technologies have come to be the way they are—perhaps they allude to new paths of change. We need to be critical of the overall affects of technological change. A critical attitude is a reflection of our free will; and, one can make the argument that if we don't criticize <technology> per se, as it is the defining element of our lives, then all decisions concerning our negotiation with the world are not free. Rather, they are made within a technological framework. Even though <technology> may not be autonomous, it is philosophically healthy to assume that it is in order to protect ourselves from our whims.

The danger is that our whims can be considered logical steps within the greater trajectory of progress as long as they are technological and based on needs generated by society and/or other technologies. I am not satisfied with this criterion because a progressive technology could spell disaster within such a framework. Progress as such could take us somewhere, fast. This is fine, but I am only asking if that "somewhere" is a place where we want to go, or if there are other places technology might be able to take us. Simply put, the question is: in what type of world do we want to live? The value of efficiency, due to its connection to the more rational and tangible world of exchange

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(economics) (capitalism) and to its material form through technology, has had an enormous influence on the world as we know it today. Efficiency is an unquestioned good.

K. <Efficiency> deconstructed

This section can be understood as a hypothetical experiment with its conceptual repercussions. The aporias of technological expressions as they are today show that the ideas of fast, quantified and objective are considered to be efficient, but why and how is this the case? Are we human tools, or can tools be more human to include other potentials within the tools themselves?

Let's look inside <technology>. The technological model has taught us to prioritize efficiency and other such values over others. These values and interests have permeated our experience to the extent that it is difficult to conceive of experience apart from the technological experience. Efficiency, for better or worse, is built on the idea of suppressing other forms of experiences. In fact, an activity would hardly be considered efficient if it generated the need for other activities apart from those immediately related to the goal. This is fine, but the fundamental issue is *why* we consider such a concept to be good. Do we consider it good because it has always been the case? I think the answer is yes, especially since our prioritization of efficiency is closely linked to our model of progress as provided by the Enlightenment and instrumental reason. In short, efficiency, or technology, is about the final goal, deemphasizing potential tangent effects generated in the process. What if these contingent experiences were somehow encouraged to flourish and we were inspired to think that the generation of these superfluous experiences would have a positive effect on society? What kind of technology would that be?

It is appropriate to consider such abstract questions as to technological choice. Choices about technology do not have to extend from technology as we know it. Why can't we initiate the debate at the very foundations of what technology is and what it could be?

As a species, we are selfish and single minded which is probably why the ideal of efficiency is so cherished, but the result of this is a limited perspective. Efficiency is about the goal, and the goal encourages us to focus primarily on its accomplishment. We apply efficiency to many aspects of our lives in order to get quick results. Efficiency then tends to push out other ideals, factors, contingencies and interests. Could not a refurbished idea of <technology> be encouraged to include these exiled ideals alongside of efficiency? Efficiency is goal specific. This is fine, but why do we consider this arrangement to be superior to others?

Efficiency or focusing on the goal is widely accepted in most situations like, for instance, in medical applications or military operations; however, in some applications we loose sight of the bigger picture. A goal oriented world is one of double isolation. In such a world predominated by efficiency we isolate ourselves and become selfish, cutting each other off from other realms of influence because we are focused on the goal in as far as it relates to us. If we were encouraged to focus on additional elements or effects in addition to the goal, then perhaps we could have a more harmonious existence with each other, the planet and even technology itself. This last part relates to a broadened definition of efficiency which could come from drawing upon a more holistic human experience, one that does not allow efficiency to overshadow other influences. Efficiency, as we know it, would have a much more diversified and inclusive connotation. The proper place for such conceptual consideration is Academia.

In some areas of our experience, however, a concentration on efficiency is not the best model. For instance, in the field of teaching, spoon feeding is efficient to administering information quickly and thoroughly; but it is not necessarily the best way to promote learning among the students, and the bigger picture of the student's overall development is ignored. In war, certain efficient technological applications remove potentially useful

values. Artillery and the bow are more efficient for killing whereas the sword changes the concept of war. As was mentioned earlier, the use of the sword requires one to face the enemy who is now a human—a biological entity like ourselves. We must behave honorably and we may even have the option of negotiation or surrender. Objectification of the enemy removes the human negotiation and it is a more technological and efficient approach to war, but in the end, is it really efficient to win a war with an atomic bomb? Perhaps, yes, but only if military victory were the only consideration. How was it an efficient victory and what ends were accomplished? An efficient nuclear victory could efficiently obfuscate other potential modes of victory. Other values and concepts could be efficiently removed from experience. How is this efficient?

The application of efficiency, understood one way, has a domino effect on other areas of our experience; therefore, the values of technology are coming to be the standard by which all activity is measured. In this sense, technology is non neutral; and it has a smothering effect on social relations that could positively influence technological expression. Sarcastically speaking, the use of conventional missiles or nuclear warheads efficiently removes other values as obstacles to the objective of total victory. Is this really efficient? Depending on how one understands efficiency, war can either be understood in terms of total victory and destruction or it can incorporate other human values such as honor and cultural understanding. Efficiency, as such, is a meta-social relation which directs other social components to follow.

In communication not all instances or social relations are best determined by efficiency. Certainly, efficiency should not be the dominant factor in a cross cultural dialogue when understanding takes precedence over the transmission of one's ideas. In such a setting, communication takes a technological form as languages and cultural baggage are forms of invisible technologies which limit understanding. This is further

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evidence that technological forms are by no means normative, giving rise to the possibility that <efficiency> itself is an arbitrary concept just like <ownership>, mentioned earlier. Perhaps communication in terms of an intercultural dialogue could be more liberal without the influence of an understanding of technology as based on efficiency or instrumental reason. Efficiency has both quantitative and qualitative elements to it. It is quantitative in production, for instance; but the effects of a particular form of production are measured in a qualitative sense (Aronowitz, 1988). An epistemology which capitalizes on the qualitative effects of technology would be a good start in generating social relations hitherto not considered in technological choice.

So, by challenging <technology> and its core values in this manner we maintain its concept open to possibilities, expansion and future diversification. In other words, from the myriad of experiences coupled with the many possible ways of understanding them we can explore ways of diversifying our understanding of technology and its material output. For example, social values can manifest in different realms of technological production, and this is seen in the Manhattan project for which Oppenheimer was later to say that scientists had finally come to know sin (Winner, 1985). The experience of Robert Oppenheimer illustrates the blurring of the boundary between what is and is not considered science. It also revealed the many values that are within production, both dormant and active, which exclude others. Years later when Oppenheimer protested against the development of the hydrogen bomb, he was berated for not showing loyalty either to the project or to the United States. The effect of this was long term in that future researchers were not encouraged to cross the line and serve purely scientific interests or those outside of the established agenda. In other words, it was established that doubts of morals and loyalty had no place in the realm of the scientific (Bernal, 1971, p. 844). Here we see an example of how technology can carry ethical implications along side its technical applications. It is also

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a case where an active attempt on the part of society charges technological exploration with certain ideals to the exclusion of others. So morals were removed from scientific and technological development. Could they not be reintroduced in order to change how we understand <technology> as well as to alter technological production?

Technological values, as we know them now, are non neutral in the sense that these values are given high priority over others. Our society has created the conditions that support the perpetuation and diffusion of such values. For instance, the idea of Adam Smith's "invisible hand" determining production whereby competition would regulate activity between men is an ironic demonstration of how technological values can disperse throughout society if we let them. The invisible hand has connotations of a divinity, but it is really a metaphysical justification of selfishness; and it can be pointed to when environmental concerns are raised. Here, it may be added, is a form of technological determinism that was socially created with exactly the type of results considered. This is a form of technological *intentionalism*. We see a similar situation in more recent times with the intentional creation of a "war economy" in the US which Eisenhower termed the "Military Industrial Complex". The MIC is a perfect example of certain values, interests and social relations being given an egregious amount of prioritization over others, and the effects of such a choice were not beyond the political leaders of the time, least of all Eisenhower. In fact in a televised speech he put the effects in blunt terms by stating how many hospitals could be built with the price of a jet fighter, how many schools could be built with the price of a destroyer, etc (Bernal, 1971).

If technology can be the vehicle for determining certain types of results as well as that which precludes other results, there is a logical argument that other rationales will determine entirely different results. In order to challenge this, however, our efforts must not stem from technological solutions alone. I am looking for a freer relationship with

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technology, an uninhibited dialogue with technology. According to Heidegger, "such a relationship would be one in which technology is decisively confronted and in which technological engagements do not close us off from non instrumental possibilities" (Scharff & Dusek, 2005, p. 248). If <technology> is challenged to the point that we don't always "see" it from an instrumental perspective, then perhaps technological change and choice would truly be revolutionary and not just more efficient, faster expressions of the same.

I advocate that we evaluate the possibility or extent of such coordination between a type of society and its correlating technology, either as a perpetuation of certain values, hierarchies, and political interests and then ask: is this the type of society we want or can we not construct <technology> based on different values, like the human condition in general? If we consider that religion was once able to determine many aspects of Western civilization prior to the Renaissance but whose influence was later marginalized by the intellectual movement of the Enlightenment, perhaps then we should treat <technology> in a similar fashion as something flexible. Thus, we have the fuel to look for a new project of technology.

Technology's conceptual constitution is not absolute; rather, it is dependent upon social relations, and it evolves in conjunction with society. By this I mean to approach technology from the conceptual level set on changing <technology> to make it match the diverse and/or needed conditions that evolution demands. As things are now, besides that of a tool, the aporia of technology is based on power/control—a logic of domination, over nature and other men (Aronowitz, 1988). This is fine, but are there not other potential foundations for our main interface with the outside? In other words reformulating the issue in these terms would question the perspective that *might (power)* does not necessarily make *right*. Humans are complex entities; therefore, it is worth while to explore the possibility of *complexifying* that which is between us and everything else--<technology>. The act of the

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aforementioned is a project, consciously guided toward challenging <technology> to address the complexity and diversity of the total human experience.

L. Augmenting perspective

Revealing new perspectives is partly done by acknowledging spaces where perspective are suppressed or absent. This process can be understood as creating epistemologies out of our pool of social relations. A perspective is practically ineffective unless and until its interpretation is validated. No on has a private language with the world. Recognizing the perspective of another is an act which requires strength and the desire to make experience more complex.

A complete contextualization and challenging of <technology> could show that technology is more than it seems. Just as war, ironically, can involve some sense of understanding or identification with the other, technology can manifest other values. Perhaps, even, we will have a new understanding of efficiency. This requires a plurality of perspectives. The plurality of perspectives requires a plurality of social relations that must be encouraged; but, as is often the case, these are suppressed.

These alternative perspectives are sometimes suppressed by subtle means. <Technology> is something that we have come to rely on when it should rely on us. It is important to maintain a critical awareness of the nature of our relationship to technology in order that we may be better arbiters of its development, application, and association with the many diverse areas our lives. The latter refers to technology as a fulltime partner in our negotiation with experience, but are there not situations that would benefit from a decrease dependence on technological means? This is difficult to imagine due to technology's attachment to the idea of progress as established by the Enlightenment and its association with the term "modern". What are the long term effects of a world whose criteria are more and more influenced by technology? One such effect could be the loss of critical value. By

this I am referring to the possibility of a technological world criticizing itself based on technological values. Is there any real criticism if each approach is tinged with technological values as we know them today?

A fundamental purpose of this investigation is to diversify the way we see technology or technological change in as far as these entities relate to the idea of progress and to society as a whole. In a sense the object of this study is to evaluate the coordinated existence between types of societies and their resulting technologies. How we see technology involves its role over time, either through technological change or progress. Once attached to progress, technology becomes an umbrella for describing society in all its forms. Technology's essence is forward looking in its search for purpose in this way. Does it have to be this way? Can not technology look toward its relationship to the human condition for its inspiration? Are we in danger of loosing other influential ideals? Are these technological ideals so ingrained that they are not able to be supplanted? In short, the issue is *not that* <technology> is calibrated toward anything, of course technology has a purpose; but the issues are *how* the concept is constructed in order to accomplish something and *what* it is designed to accomplish. In other words the point of departure is the function of technology as an adjective and not its function as a subject. There are many possible functions as an adjective is the point.

If we live in an increasingly technological society to the extent that this type of society excludes other social forms, is it then justified, and, if so, on what basis? Here, irony is playing out its hand as technology is actually limiting itself by controlling social relations. We may be limiting the way we think, or our potential to think by continuously resorting to the technological crutch. What happens when we are confronted with a problem that cannot be solved technologically, as is the case with disaster relief or immigration? Javier Ordoñez put such a question to debate long before both issues did in fact become

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problematic (Ordoñez, 2001). This is an example of a dearth of perspective. <Technology> does not have to be technological only; it could exist along side other forms of social relations and technological expressions.

Ordoñez's query asks us to remain critical to certain contexts where technological values and the rationale of the Enlightenment are not appropriate. For instance, the hyper-rationality of the Enlightenment would encourage Machiavellian or unilateral behavior in order to achieve the goals of a Nation. In this day and age, with an emphasis on multinational corporations and the awareness of a confused sense of identity, the very idea of nationality is under the microscope; therefore, is it not counterintuitive to build a wall between two nations when the global trend would suggest quite another action. What types of technological solutions should be considered or ignored altogether? To answer this question, one must fully know <technology> apart from its association with progress and its values that we have traditionally come to associate with modern technology and the Enlightenment. In other words, the potential of <technology> must be uncovered by an increased awareness of the importance of the many social relations that could constitute its meaning with the end of maximizing technological expressions.

The problem mentioned above also reflects an inability to distinguish between types of problems. For instance the old adage comes to mind: *when all you have is a hammer everything looks like a nail.* We are unable to distinguish between that which is merely *possible* from that which is *technologically possible.* This is just as challenging as it is to see technology as the manifestation of diverse ideals. We cannot predict what the results of technological production will be. Nor can we return to previous conditions before the introduction of a certain technology; unlike political revolutions which can be overthrown and returned to normal. Once the Genie is out of the bottle, it/they cannot be put back inside. One can only make wishes when we should really be concerned with the type of

Genie that is now reaping havoc throughout our overall environs. The issue is that one type of Genie will not suffice for all types of problems. Problems are diverse and therefore our technological applications should reflect this diversity as well.

Daniel Boorstin alludes to these very circumstances in his book, *The Republic of Technology* where he cautions us against the hegemony of technological values. In one example of differentiating the technological element from its context, Boorstin says that we have a difficult challenge—that of cultivating the political arts and the technological ones separately and not merely cultivating one through the other. This, he says, will be very difficult since, "never before has a people been so tempted to believe that anything is technologically possible. And a consequence has been that perhaps no people before us has found it so difficult to continue unabashed in search of the prudent limits of the politically possible" (1978, pps. 34-35). Boorstin is talking about a frame of mind that is limited since we are trying to apply a technological perspective to everything. He uses the word "prudent" which suggests that technological thinking cannot be applied exhaustively to every realm—in this case the realm of the political. This statement is also prophetic in that we will attempt anything under the assumption that it is technologically possible when we should spend time investigating and reflecting upon if it is politically imprudent to do so. In addition we are not asking whether even a technological solution is the appropriate route. Again, a critical perspective will protect us from our whims.

M. The more we think technology is the more it can be

If the concept of technology were sufficiently diversified and broadened, calling attention to all types of social relations with which it is in contact, then we might be able to understand the full effects of its influence and its relation to society in a much more complex and holistic manner. The inspiration for technology lies with us. <Technology> is based on our needs which flow from our ideas.

Perhaps more optimistically, the diversification of <technology> through a celebration of its potential as provided by the many aspects of society will result in variations of technological expressions. Questioning the concept of <technology> is an exercise in postmodernism in that this activity is a re-relativization of its ontology (the "is" of something) to force it to meet our ever-evolving demands. Recall Bill Clinton, the caudillo of postmodernism. He made it popular to question the "is"—to challenge it so as to expose a thing's ontology to other possible interpretations. We are reluctant to perform this operation on <technology> since it has been so good to us for so long. Of course, why would one be concerned (bothered really) with questioning the concept of technology since what <technology> is, is what it does for us? The answer stems from our selfish tendencies which have culminated with the problems of the 20th century that no one will deny.

If we need something that has not been addressed by technology, then we will develop a technology to meet that very need; however, this process does not unfold without creating problems in other areas of experience. So it is safe to say that a limited concept of technology leans toward a society marked by friction among the many aspects of humanity or that a more diversified understanding of technology would lend itself to the realization of a more harmonious existence. If <technology> were sufficiently diversified and expanded, then perhaps these newly created areas would, in turn, influence technological production and reduce this friction. <Technology> can be more thereby maximizing technological expressions if we experiment with how we understand the concept. It is my hope that a creative and open-minded interpretation of <technology> will have a positive effect on technological production.

Technology is already an authority in our society. But technology's continued validation as a concept emanates from a myriad of social relations which, in order to have a legitimizing influence, need to be revealed, acknowledged or encouraged by uncovering

their links to potentially innovative technological expressions. If we are truly technological

animals, then technology needs also to be truly human, reflecting all aspects of humanity

and not just a limited number of values and social relations. Let me provide some examples

of how a concept could emanate from a variety of social relations.

N. Simple example

The word "please" can have a different connotation depending on the circumstance,

context and, most importantly, cultural setting. In some cultures, for instance, "please" is an

extension of <ask> whereas in other cultures "please" can be a command. Another

example: in some cultures one honks the horn to prevent something; but in others the horn

is used after something has not occurred. A final example: "thank you" is after the fact in

some cultures while it is before the desired result of the fact in other cultures. The point is

that there are social relations behind these expressions that could be used as resources for

the expansion of a concept if they were given the opportunity to influence. If <technology>

is our interface with the other, it would make sense if it were the product of as many social

relations as possible in order that it may be a more open and democratic interface. This

would allow for a more liberal exchange with the other as well as promote the conditions

which would encourage critical reflection.

II. LATENT POTENTIAL WITHIN THE CONCEPT OF <TECHNOLOGY>

A. <Technology> as a social and empirical negotiation

Expanding the concept requires increased recognition of social relations and individual and subjective participation. Conceptual flexibility can exist if concepts are exposed to a multitude of social relations. Technology as it now and could be depends on a diversification of its interpretation.

The concept of <technology> includes various components which are merely etiquettes whose characteristics are not legislative. <Technology> includes knowledge, expectations, values, practices, artifacts, social behavior and elements which tie it to a certain type of social structure. That <technology> contains a list of components is not to say that it has a fixed trajectory or that its components, mentioned above, may only operate within a certain parameter. For example knowledge can take many forms. The purpose of this thesis is to explore how <technology's> components can be manipulated by looking for new empirical resources which can be used to diversify and expand our understanding of this concept.

Given that <comparison> is an axiom of our experience, then it should be promoted and given a special place in our experience. In order to do this <contact> should be liberated from adversarial situations; or rather adversarial situation should be enhanced by a different understanding of contact and not inhibited by it. Contact should be characterized, not as adversarial but as complimentary. <Technology> has stabilized within a foundation of a few core values, but these values even are relative within the simple idea of conversion; therefore, as an interface <technology> could be characterized as adversarial and not complimentary. <Technology> represents the conversion of human capacity and the conversion of nature which has been consistent across cultural and historical contexts.

The Enlightenment narrowed <technology> within the boundaries of a few ideals that were thought to be most adequate for the achievement of the goals as the time; namely, the desire to avoid war and be less subject to disease.

Nevertheless, much of what we understand as <technology> is often the result of trial and error within a certain social context which can differ drastically depending on the circumstances; however, such discrepancy should not diminish the importance of individual interpretations of the concept technology and its component parts. The concept of technology is limited partly because we have a tendency to call up images of artifacts when someone says the word "technology". Carl Mitcham writes that:

> there is a primacy of reference to the making of material artifacts, especially
> since this making has been modified and influenced by modern science, and
> from this is derived a loose, analogous set of other references. An initial need in
> the philosophy of technology is for some mapping our or clarification of this
> conceptual one and many, a conceptual one and many that can be assumed to
> reflect a real diversity of types of technologies with various interrelations and
> levels of unity (1994, p. 152).

Here unity is an advantage. It represents a common denominator among the many interpretations that could comprise <technology>. Mapping out is a process of recognition and legitimization of these perspectives which can then produce different types of technologies.

Such individual and subjective diversity can provide us with profound variations on a subject. Success of a technological application, even, can be socially determined. For example, the accuracy of the Patriot Missile during the first Gulf War was not an objective issue. There were many conflicting interpretations of the execution of the missile throughout the war (MacKinzie, 1999). In another example, the final product of the NASA

moon landing was the result of little negotiation of scientific laws and a lot of technological troubleshooting. Little scientific value resulted from the journey, but technology was advanced greatly (Feibleman,1983). Was this a success? Some values and social relations were perpetuated while others were absent from consideration.

<Technology> viewed as the result of social relations and negotiation, and not as an absolute concept, certainly demands a privileged place in our conceptual treasure chest. In any event, our concept of technology is founded upon a sense of conversion, but this idea of conversion has emerged as a form of domination of nature and each other; and <technology> has adversarial implications whose purpose is to exclude, at least to some extent, other potential variables and elements. Technology is not necessarily a theoretically objective term; in fact, it is quite accepted that it is not since its purpose is to have a proactive effect upon our world. In any event, this is not to suggest that <technology> is not subject to the whims and vicissitudes of socially determined norms and practices. So, <conversion>, just like <ownership> can be neutral but its applications, however, are not. This is because they are determined by certain social relations.

Social relations require multiple levels of participation—namely practice, the most evident of our social relations involving <technology>. Carl Mitcham argues that we and our relations to others are much more determined through our practical-technical know how than our theoretical knowledge, and that our idea of "being with technology" should be defined through such a privileged positioning of technology (Scharff & Dusek, 2005, p. 487). Practical-technical know-how requires a heightened individual participation at the level of entire civilizations in order to achieve the level of validity required to match the privileged position that we have allowed technology to enjoy. Our social relations are many, and considering the role that technology has in these, it would make sense to consider the possibilities that these numerous relations could have an effect on the very

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concept of technology. <Technology>, for Mitcham, is a concept which is profoundly connected with our social relations, and it is primary to others in a hierarchy of concepts; however, the question remains which social relations are given precedence over others in the production of technological expressions?

B. <Technology> as intention within systems of appreciation and expectation

The concept is heavily defined by purpose and its connection to systems that appreciate, reward and encourage the successful application of particular technologies which reflect purpose. The *autonymization* of systems of use is an expansion of the concept of technology.

When the word "technology" is used to talk of things, actions, processes, methods and systems, as well as ideas like progress and efficiency, discussions can lead to chaos. Knowing the purpose behind a technology, let's say, will help us to clarify this problem. In "What is Technology", Stephen Klein argues that "we think of technology first and foremost as involving both socio-technical systems of manufacture and socio-technical systems of use". Knowing the purposes behind these social systems, argues Kline, will give true insight as to the products, know-how, and techniques (Scharff & Dusek, 2005, p. 208). In this sense, Kline exhibits a very materialist approach to the relation between technology and our society in that he thinks technology is not a neutral entity. He feels that there needs to be some conceptual clarity when talking about technology especially since these social systems have been the foundation for human societies for some time (Scharff & Dusek, 2005, p. 208).

Technology can be discussed within two different planes of understanding and they are not to be confused with one another. In terms of its use:

The current vague use of the word "technology" hides from view two central concepts, and a central pattern of human behavior that we must have to make

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sense of our views of many critical questions in the current world including how

we understand innovation, how we can communicate across Snow's culture gap,

and how we understand the way in which we humans make our living on the

planet (Kline, 2005, p. 210).

The two concepts that are hidden are: artifacts and know-how which correspond to Kline's

broadened definition of technology as a "socio-technical systems of manufacture and use".

It is the purposes to which these systems are put that really divulge the physical bases of all

societies throughout history. Purpose is tied to social expectation and its system of reward,

neither of which are legislative.

For Kline, the system of manufacture and of use constitutes the foundations of

civilizations. He states that "we need more than just the hardware to create these extensions

of human capacities....The central point is that we have learned to vastly extend our

muscular, sensing, and mental capacities through the use of socio-technical systems of use

and manufacture" (2005, p. 211). It is not enough to have the ability to use a certain tool.

We must also have the knowledge of the tool and an appreciation for its use—a system

which rewards its use, for example. This has been happening to us for millennia. Kline talks

of how we must consider the underlying purpose and structure of our actions in order to

have a better understanding of technology. The current pattern of human behavior is that

we, unlike other animals, purposefully innovate in order to make something function better.

But what is better and what is the provenance of our idea of <better>?

We would be nothing without technology, according to Kline; but we must be aware

of the sources of our technological explosion in order to maintain a "well-balanced"

relationship of dialogue with technology. These socio-technical systems are the source of

our power, but that power has a price. "Using the extensions that become possible with

current socio-technical systems, we have in a large measure become the lords of the planet.

If we are to exercise the powers of lordship well, we will certainly need to be clear on the source of those powers and the processes through which they are exercised" (2005, p. 212). Kline is talking about being able to critically analyze the fundamental causes for certain technological expressions which is to question the values and social relations within <technology>. Sure, there is power within the discrimination of a system of use; but there is ever more power in being able to judge how and why we use.

Knowledge is power and to know something is to know it in its entirety. We, humanity, are the sources of that power; since we were the ones who are able to integrate the various social systems without which, as Kline states, we would be a pathetic species. Again, we are the source since we have historically and purposefully sought to improve the functioning of socio-technical systems.

As it stands now, there is an established purpose which guides the development of the socio-technical systems of manufacture and use, but we can never be too informed of the potential effects of technological choice. Effects are actually subtle links to new angles or perspectives. Effects are the manifestation of channels between individualized participation and technological expression. These links allow us to be better informed about technological expression. Being well informed of technological choice requires the unleashing of individual participation or the acknowledgement of social relations that are scattered throughout the systems of use, though not considered during production or choice. Our interpretation of technological choice is limited to success, power relations, etc when we only make these reflections after production. Our collective society is much more complex than this, as we are, and it is capable of many more values and social relations apart from those attached to a limited system of use.

To make a system of use reflect a society's diversity and complexity, <purpose> could be expanded to include more aspects of society. This implies that certain purposes

could be encouraged in a society and others can be left to atrophy. Ideally a correlative technology would ensue which corresponded to the expanded idea of purpose. Part of what is <technology> constitutes our values and lack of reflection on our values, but these lost values could be uncovered allowing them to have a legitimate influence upon technological expression. This suggestion could diminish the discriminatory qualities that certain systems of use exhibit.

C. A definition of technology

Part of the analysis of <technology> begins with a definition of it as an object to be studied and used as a tool of analysis. This is also to initiate a dialogue with the subject at hand.

One definition is that technology is something which cooperates with humankind as a means calibrated toward an identifiable and intentional end. This section is about looking at the bigger picture to allow the concept itself to be a tool for analysis. The technological standard can unite our collective experience and serve to create spaces or new sources of influence. To know something is to know it from its conceptual origins up to its empirical presence, both actual and potential.

Maurice Richter thinks that it is important to highlight what is considered to be technological as opposed to other activities such as art or belief in order to establish a conceptual ground for analyzing individual technologies in terms of their metaphysical presence. This is done in two stages: the first establishes an activity as "technological"; the second compares an individual technology to its conceptual base. Such a conceptual approach would provide us with the possibility of an objective and neutral standard by which to evaluate individual technologies or technological change without running the risk of subjective analyses tinged with social and cultural conventions. Once an activity is labeled as technological, then it becomes appropriate to judge its components based on the

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many other activities considered to be technological as well. As we will see, Richter shows that technological activities are extremely diverse in nature and execution (1982).

Given the complications of predicting technological achievements and the social conditions which give rise to them, Maurice Richter feels that analyzing technology should be done in a universal fashion rather than from an historical approach or a case by case basis. A universal concept of technology affords one with an analytical base that is not to be confounded by local conditions. For him, technology can be maintained as a means, and excluded from ends activities, if all technological application is herded under the same rubric-that is a means to identifiable and intentional ends. In *Technology and Social Complexity,* Richter investigates the similarities between contemporary technology and the more rudimentary technologies of the past. Despite the wide variety of practices and material applications these can be analyzed coherently within the same conceptual framework of <technology>. Richter's approach to the relationship between society and technology is conceptual in order to avoid personal convictions, historical trends, and contextual complications. Richter advocates an approach which is detached from his own convictions as well as historical trends that one might consider obvious or above analysis. He also advocates including a macro level of analysis since "science has progressed largely by flowing around localized obstacles" (1982, p. 6).

Admittedly, excluding local perspective from participation with the concept of technology in addition to establishing a universally applicable definition of technology would serve to limit its conceptual potential; however, we first need to know what technology means to all of us in a uniform fashion in order to objectively compare the social relations and technological expressions that can in turn expand the concept of technology.

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In the introduction of *Technology and Social Complexity*, Richter writes that it is

just as problematic to try and predict the effects and timing of a technology as it is to

predict the social conditions under which a technological innovation is likely to occur. Plus,

there is extreme diversity of perspectives as to the relation between sociology and

technology; therefore, a unified approach could prove fruitful. "Between the technological

determinists and their most extreme opponents, we find diverse intermediate positions";

also there is great diversity of experts from a variety of fields who have addressed this issue

(1982, p. 3). It is for these reasons that Richter feels that sociology is the appropriate field

to approach the society and technology relationship. "Although economics, political

science, history, and anthropology each makes a specialized contribution to the study of the

relation between technology and society, only sociology provides a potential basis for

integrating these contributions and for analyzing the technology-society relationship in

general" (p. 4). Generally speaking our collective society, according to Richter, has a

uniform understanding of the concept of technology—that of intentionally means applied to

previously identifiable ends.

Here, we are beginning to see the potential of <technology> by experimenting with

its source of power—humanity in the complete sense. The idea is that one discipline can

tell us something new about another. This is to encourage the emergence of perspectives,

and sociology is a collection of perspectives and social relations friendly to the possibility

of novel approximations.

Richter's sociological approach is rather abstract. He seeks to "view technology in

what might appear to be a comparatively detached way" (1982, p. 4). By this he means that

building a conceptual understanding of this relationship cannot be forced or at least it is

possible to detach oneself from an idea. An approximation characterized as sociological

would have as a foundation all of society, thus its social relations and perspectives and their

relation to technology. The action of detachment is actually to provide room for increased interpretation. We cannot prefabricate an analysis. "A general understanding of the relation between technology and society, with much talked about practical and moral issues de-emphasized, may thus contribute usefully even though indirectly--perhaps we should say usefully because indirectly—to a clearer understanding of these issues" (p. 5). If there is no motive, either political or moral, then there is "room" for flexible interpretation. There are dangers to letting the means be controlled by the ends, and these goals can be any form of epistemology since an epistemology is an agenda at the end of the day.

A certain approach to the exclusion of another has a determinative effect upon our conceptualization of experience. As regards to historical approaches, Richter feels that a hindsight perspective seen from the present with the same eye will do one of the two following things: 1) the future will look like the past, and 2) the investigator will be conceptually debilitated by the allusion of a common agenda. Richter is "skeptical even about the existence of trends that are generally taken for granted as too obvious to require proof" (1982, p. 5). If we look back, we are raising questions about matters that appear to be already settled.

The mere recognition of trends is an exercise in looking back or looking at contexts that are no longer real because conditions have changed. In any event, a trend implies unreliable sources of analysis. To address this problem requires the first step of finding the relationship between society and technology which gives rise to its existence. This is the task of sociology. For instance, Richter asks us to analyze war from a general concept rather than from the commonly accepted idea that wars have become more and more destructive. "If we confine our attention to wars already fought, rather than to hypothetical future wars, the currently popular idea that warfare has become increasingly destructive is questionable: it is not at all clear that the world wars of our century have been more

devastating to Western society than the Peloponnesian War was to the society of ancient Greece 24 centuries ago" (1982, p. 5). To Richter it is not obvious that wars are increasingly destructive and it is a handicap to think thus. Trends organize our thoughts in a way that might not be accurate. Trends encapsulate the past while making us think that the future will be the same. Historical approaches can encourage us to think in tendencies whereas a sociological approach is more open to possible interpretation.

While sociology is about contextualization, it is also about attempts at unification; and for my purposes, this involves the unification of society under a set of social relations concerning technology. Richter is anti-context in the sense that investigations can lead to limited conclusions when confined to specific contexts. For instance, "science appears to be heavily controlled by social pressures when one examines numerous particular contexts in which scientific research is undertaken and the way in which science at a global level appears comparatively free from social control" (1982, p. 6). <Science>, he says, has advanced despite localized contexts. In addition he is encouraging numerous particular contexts, which is what sociology aspires to.

This is not to suggest that Richter is asking us to ignore the global experience. Richter advocates including both a macroscopic and microscopic approach to the relationship between technology and society. The relationship between technology and society must be evaluated by considering the local conditions in conjunction with the global arena since there appears to be more social control in the former and more autonomy on the part of technology in the latter. The problem comes to light when we realize that:

> localized observations of the technology-society relationship are likely, by
>
> themselves, to give us a distorted view of this relationship as a whole. For example,
>
> from a comparatively microscopic point of view, social pressures often appear to
>
> sharply control the appearance and utilization of technological innovations, whereas

from a more macroscopic perspective, technology appears to have had a relatively

(although nowhere near completely) autonomous growth (1982, p. 6).

If localized observations distort the universal image of the technology-society relationship, then would it not make sense to consider <technology> as a potentially highly subjective concept? In this case subjective would mean that technology is susceptible to our many individual perspectives and interpretations.

Maintaining viable both local and universal approaches helps one avoid assumptions and false predictions about both social evolution and technology which can lead us astray as we try and evaluate actual technologies within their social settings. In other words, Richter feels that one of these approaches to the exclusion of the other is inadequate when attempting to either evaluate specific (historical) relationships between technology and society or their relation to the greater concepts of <technology> and <society> as a whole. In addition, this analytical exercise is a way to alter the graduation of the lenses with which we use to view technological expression. The more prescriptions we have, the more visions we have of technological expressions; and, therefore the more variations we could have on technological choice. The idea of being able to shift perspectives, either from one discipline to another or between the micro and macro, is a means to create perspective and diversify interpretation.

Returning to Richter's example of war, his inclusion of macro and microscopic perspectives asks us to take into consideration the overall context of specific wars while at the same time deferring to the relationship between a general concept of war and its affect on societies throughout history. This frame of mind can also be applied to specific technologies as they fit under their larger conceptual umbrella. By keeping in mind that the many specific technologies can be analyzed within a general idea, Richter wants to show that, "such a wide range of phenomena can be analyzed coherently within the framework of

the same concept and to provide a broad historical and comparative perspective within which our exciting, promising and deadly new technologies can be more clearly understood" (1982, p. 6). Richter is concerned with the effects of technologies as well as our interpretations of them which will be more sophisticated and valuable if we can make comparisons with the past but within the same conceptual framework. Comparisons are important for critical analysis, but there must be at least some structure so we are not comparing apples to computers, for example.

Richter's detached approach to the relationship between society and technology is similar to his definition of technology. Richter feels that we can better understand technology if we are able to look at all technologies: from sticks that chimpanzees use to catch termites to hydrogen bombs and spelling systems. But how can we look at all without an exhaustive and impossible list?

Richter's definition of technology serves two purposes: 1) it distinguishes it from other activities that are artistic, supernatural, and accidental; and 2) it allows us to include as many technologies as possible, even those that cease to be or appear not to be technological. <Technology> "encompasses tools and practices deliberately employed as natural means for attaining clearly identifiable ends" (1982, p. 8). Technology is a means to an end and not an end in itself like art or even science for the sake of science; however, if science is employed to solve a particular problem that was conceived beforehand, then science can be a form of technology. A rain dance can even be considered technological, but only if the participants are aware that the activity is organized to promote tribal unity, maintain relations, etc. and not to bring the rain (p. 9). A liberal idea of technology encourages diversification of technological expressions. It encourages us to look for novel inspirations.

According to Richter, there are a wide variety of technologies. As for the tools requirement, humans can be used as components of a machine just like toos: for example, an army. Lewis Mumford states that humans were the first machines which were like a prototype for later machines. In addition, the use of Arabic numerals is also an example of a technology. "We thus have symbolic as well as material and organizational tools" (1982, p. 11). The many practices of persuasion can also be understood as a technology. These would include the education of children by their parents or peers. Also, formal education as well as advertising practices and political persuasion are considered technological. Finally, "refraining from doing something can be classified as a practice" (p. 12) if the result is both desired and preconceived. A non-traditional understanding of technology is a way to encourage new technological expressions.

The only types of purposive activities that Richter excludes from being technological are those that are systems of support for other technologies; however, these are contextual and even support systems can be technologies in another context. For example, the institution of auto insurance is a support system for the technology of transportation in one context; it is a technology in the sense that it is a practice to protect the financial interests of its clientele. It should be clear now that an orthodox understanding of technology might exclude certain practices that Richter considers to be technological. Our traditional definition of technology is expansive enough to incorporate even some elementns that are commonly considered to be anti-technological. This was the case in 1957 when Chairman Mao organized the people of Beijing in a war against the black bird that had come to be a nuisance. People were ordered to come out of their houses and places of work at a certain hour and stand on their roofs or on any perch that a black bird might land. The idea was to prevent them from landing so that they would fall out of the sky and

die from exhaustion. Of course this solution created other obvious problems, but that is a characteristic which is certainly consistent with technology (Richter, 1982).

Finally, technology can also be a form of tradition as long as the reason for the adoption of the tradition matches the original purpose of the tradition. For example, the US constitution is a form of technology in this sense. It was conceived for reasons (the balance of powers and federalism) which served as a model for other political entities who wanted similar results. "The separation of powers in the United States was a deliberate product of a written constitution and [it was] a clear example of organizational technology" (Richter, 1982, p. 15). As time passed, however, the US Constitution has been taken for granted and appreciated for its own sake and it is maintained through blind acceptance of its principles, "rather than as an outcome of means-ends calculations, to that extent the Constitution has been losing its original technological character". This has happened over time but also when new political entities emulate its components for the same reasons. "It is also possible for an established technology to continue to exist while ceasing to be fully technological" (p. 15).

So, what is the analytical feasibility of having such a broad understanding of technology? The point is that a broad understanding can be universally applied then analyzed as such. In certain circumstances, a technology is or is not a means; and having a solid definition provides us with at least this variable, as a means. In this fashion, way we are able to see how a technology emerges and evolves through social relations but all the while starting with the basic definition that Richter establishes. Again, to know something is to know it throughout its entire development, from its incipient beginnings to the disastrous or glorious effects of its application.

Richter's definition of technology and his abstract sociological approach unite various disciplines, social relations and activities within the common conceptual umbrella.

A broad definition also prioritizes diversity and flexibility. The relationship between technology and society allow one to see new technologies as well as old practices and traditions in a new light, a technological light. <Technology>, thus understood, is a universal concept which provides us with an objective standard by which to measure our society and social activities while at the same time allowing us to see an enormous array of activities as being technological. If so much of society has a technological common denominator, perhaps aspects that have been hitherto ignored, then the technological element will give them credibility for purposes of analysis.

In addition, if there are so many widely diverse activities, apparently unrelated, that are understood to be technological, then such activities can form part of the standard by which we evaluate other technologies and their effects. It becomes legitimate to evaluate a particular technology based on another activity since they are both technological.

Thus, diverse activities such as traditions and anti-technological activities are judged by the technological standard. This allows us to look at our own society and question the relations which gave rise to the specific technologies. Richter's analysis seems to suggest that we are a technological society in the sense that the majority of our activities can be reduced to a technological aporia. Such a realization can unite us and our activities. This makes it feasible, for example, for two apparently distinct activities to influence one another. Our very idea of social constituency will be blurred; fewer boundaries will be seen between experience serving to create spaces of influence and checks and balances from other aspects of society.

Perhaps, if we reorganize our social relations, then the face of technology will change as well. Also, such a broad understanding of technology might provide us with a conceptual avenue toward further diversification of material production. A universal concept of <technology> provides an investigator with a common idea which encourages

objectivity in the face of local conditions. These local conditions, in turn, are united by the idea of technology being an intentionally arrived upon end which gives one a common point of departure when exploring potentially new influences for the concept of <technology>. There is still room, however, in space and time before one arrives at the ends, meaning that the how, with what core values, and in what fashion of achieving the end are left to the individual contexts. Nevertheless, Richter is asking us to maintain open to new inspirations for technological expressions. If tradition can serve as an inspiration for technological expressions, then we can look for other inspirations—social relations, that already exist within society but have not so far been encouraged to exercise influence. This searching for social relations as inspiration can be understood as a project—a conceptual common ground for a myriad of social relations, perspectives and activities.

In his article, "A Plea for Science Studies" Philip Kitcher also defends the application of sociology to science. I will apply sociology, just as I did earlier, by analogy to technology, particularly to its conceptual constitution. One of his arguments is that those who attack science studies must concede that the field's proponents are well informed and they are doing important work; however, it is not given due credit since there is other sexier work going on in science, thus promoting the tendency to hold science per se in high regard and allow the sociology of science to be a step child. To acknowledge this, he says, would be a step in the right direction. Not all of science studies are comprised of humanist thugs, to use his term.

Kitcher feels that sociologists should do justice to two sets of themes: one characterized as positivists or "rational-realist" which, it has been criticized, is too immune to social influences; and two, the "socio-historical" set which has been criticized for being too vulnerable to social influences. The role of STS is to do justice to both. In short, Kitcher is trying to explain why we give credit to certain methods and epistemologies,

taking into consideration institutions, values and social relations (reputation, competition, resources, etc). For my purposes STS is a means toward conceptual clarification. For instance, STS would help explain certain concepts in a certain situation based on social components. <Success> and <efficiency> might be likely targets for conceptual clarification. "Reflective scientists want to understand the ways in which existing arrangements foreclose certain kinds of opportunities" (1998, p. 46). Notice that Kitcher uses the adjective reflective to describe scientists, almost as if this were a relatively new category of scientists. Well, it is.

A generalized picture is needed to fully understand science. Kitcher finishes the article with a number of analogies about the various types of houses that could be used to represent an STS approach to science. Nevertheless, "what is needed is slum clearance and urban renewal, a project in which historians, philosophers, sociologists, and scientists all should be invited to join" (Kitcher, 1998, p. 50). Recall the main issue of the article: to understand why we give credit to certain approaches and others not. <Understanding>, <recognition> and <judgment> are all concepts applied. Social convention determines the result. In other words, how we appreciate a thing is a socially determined, meaning that there are numerous factors as to why one thing is appreciated and another is not. Sociology is the proper epistemological context for the studies, not only for science but for technology as well. Science is hardly judged without its technological expressions. The basic <success> of a thing is socially determined and debatable. Science is judged based on the technological productions; otherwise, science is in an ivory tower, and who cares what it does?

Ironically, conceptual clarity is accomplished by interdisciplinary work. The concept expands once more social relations, values, disciplines and perspectives are

allowed to participate. Finding the means of participation is the construction of an epistemology.

A major component of the concept of <technology> is how we perceive its effects. Douglas MacLean, in his article "Social Values and the Distribution of Risk", looks at how social values play a role in estimating risk and measuring the benefit of controlling risk balanced with "technologically feasible". These same values are the essence of social policies (1986). For my purposes, the relation between values and risk is analogous to the values behind these concepts which are used toward technological choice. In fact, MacLean does not appeal to concepts directly since they are mere faces of some values; he appeals to consent (p. 5). Consent is a continuum. As we move in either direction, its properties changes from the explicit, to the actual and to the hypothetical. A more individualized and contextualized approach is more appropriate. So, according to MacLean, large scale social projects are unacceptable because they focus too often on a single concept; for instance, <safety>. Some activities require <risk> to be recognized as constitutive to that activity— rock climbing, for example (pp. 28-29). Thus if we focus too much on one value or one set of social relations, we are severely restricting an activity. Maybe we are even excluding an activity. Imagine this type of thinking applied to <technology>. Technology should not necessarily restrict an activity simply because it is concentrated too much on a few values.

Whereas individual choice is too subjective and personal, public policies are comprised of much more than just values; social relations are also considered. "In public decisions the demands are much greater simply to make the choice that has the best overall consequences and to aim explicitly at designing policies to realize these consequences" (MacLean, 1986, p. 76). Here we see behind a potential project based on values and social relations at the level of an entire society.

According to MacLean, social values guide our judgments; and values determine concepts. Concepts are not clear and neither are values. "The distinction between estimation and evaluating is not always clear, especially where a range of different consequences is measured and compared, just as the distinction between fact and value is not always clear" (1986, p. 77). Behind this process is our conceptual construction which is comprised of values, relations and expectations. Technologies impose risk, and when risk of technological choice is at stake there are alternative choices and possible outcomes to consider. Resources must be diverted and found; part of what constitutes a resource is <perspective>. The maximization of resource requires the cultivation of perspective and new social relations for a more holistic evaluation of risk and/or technological choice.

General analytic methods, for MacLean, are determinative, therefore potentially damaging. His idea is to find a way to avoid situations where we are unprepared, either intellectually and socially, to determine risk due to our generalized methods. General methods, he argues, are pregnant with "judgments about the relative importance of different distributive goals [which] depend on particular knowledge of the situation or context. Why should we think we would be better off allowing our judgments and intuitions to be corrected by some general analytic method?" (1986, p. 84-85). At the heart of this question is the exaltation of individualized or contextual conceptual construction.

Take for example the concept of human life. It has a flexible value depending on the circumstance, and so do policies; therefore, judgment about technological decisions would be too. This means that the meta-concept of <risk> is also relative; its constitution goes beyond mere economic factors. Behind our concepts are social values which vary depending on the circumstance. "Important social values may not easily be regimented or made systematic, but might instead demand a more complicated set of responses, the details of which must be determined by the particular circumstances" (MacLean, 1986, p. 89).

Now, not all values can be considered in every occasion much like Lincoln's famous

response when asked about the ramifications of freeing the slaves. I paraphrase: *you can*

only please some of the people some of the time.

No. The above is an example of how not all values can be considered all the time.

Nevertheless, <technology> is a concept comprised of social values and its expressions are

the direct result, as well as the perpetuators of, certain social relations. "People want to

know that the things they value deeply…are being guarded and protected by the agency we

have created to be the trustee of these values" (MacLean, 1986, p. 89). Such a desire can be

applied by analogy to <technology>. Technology is our interface with the other; it is that

which transmits our values and social relations to the world. Does technology reflect all or

the adequate values to make us feel secure in the choice and application of our

technological expressions?

 D. <Technology> as social relations: technology is an epistemic, and it is an

   empirical filter—invisible technologies

 It can also be argued that the concept of <technology>, as an invisible technology, is

part of the mechanism behind social relations of power. This is another example of a type

of project. In this case, social relations of power are invisible technologies used by the State

or large corporations, let's say, to align us toward the completion of a goal. The concept of

<technology>, besides artifacts, systems of use, and technological systems also includes

social relations, both at the level of the individual as well as an entire civilization. They are

power relations, in the Foucault sense. These would include productions with economic

aims and institutions whose goal is social regulation. In short they are "disciplines, both

collective and individual, procedures of normalization exercised in the name of the power

of the state, demands of society, or of population zones" (Foucault, 1984, p. 48). Foucault

asks if capacity and free will have a place in such power structures. This is also a major

dilemma that we inherited from the Enlightenment whereby freedom has been *relativized* to

the point of confusing it with activities associated with standardization or control. We

operate, in other words, within boundaries of convention and normalcy. Alternately,

conventions can be created for different results—a project.

Foucault argues that true control comes from the power to establish the parameters

of normalcy. "Disciplinary power rules in effect by structuring the parameters and limits of

thought and practice, sanctioning and prescribing normal and/or deviant behavior" (Hardt

& Negri, 2000, p. 23). One of the ways to do this is to create the parameters is through

technology's relationship to the state. "Power is now exercised through machines that

directly organize the brains (in communication systems, information networks, etc) and

bodies (in welfare systems, monitored activities, etc) toward a state of autonomous

alienation from the sense of life and the desire for creativity" (p. 23). According to Foucault

this type of power is executed from its very presence in our entire lives, a bio-power where

not only production but the economic, cultural and biological aspects of society are

consumed within the state. So, society is held together by these power relations, but its

individual members are isolated from one another. This could be an Achilles heal for the

State in that it has isolated every citizen from the other, thus establishing a potential

monster of creation and productivity; therefore, the hope against the control of the State and

its technical measures lies in "a maximum plurality and uncontainable singularization" (p.

25). This is much like the act of cutting off one head of the monster only to find out that

two heads have replaced it. A heightened sense of diversified participation, though

calibrated toward cooperation instead of isolation, would be a manner by which to expand

the concept of technology; but how can we encourage this type of participation?

So the question becomes what can man do in such a scenario where the social

relations are manipulated by technologies of control? Technology in this way becomes a

filter for being which determines types of social relations. The totality of technology is "the forms of rationality that organize [our] ways of doing things (this might be called the technological aspect) and the freedom with which [we] act within these practical systems" (Foucault, 1984, p. 48). Understanding the nature of these actions is the purview of the philosophy of technology. How can the plurality of society be maximized so we can draw from this diverse potential? The answer seems to lie in the idea that if we reorganize our social relations, the pluralities will be encouraged to bloom. A reorganization of social relations, as well as our overall goals, will result in the flowering of our diverse potential thereby allowing the pluralities of our society to act as the manifestation of free will without being inhibited by power relations.

Authors such as Jacques Ellul and Herbert Marcuse would argue that social conditions have led to the emergence of the above relationship between technology and humanity. In other words, our social conditions have created the context by which invisible technologies have come to control social direction. This can be seen as a natural order. They would agree with Foucault that there is a technological mechanism that participates at all levels of society defining action and interpretation—guiding social relations, in other words. Foucault was recognizing the dominance certain social relations over others; I am trying to reveal the others.

E. <Technology> as the narrative of progress

Our model of progress came from practices and procedures, as social relations, established just before the scientific revolution. The concept of technology is often confused and/or identified with the concept of progress. Nevertheless, the association is actually quite logical but the relation between the two concepts produced what we know as "modern technology". The reality is that modern technology is the face of progress, but technology is not an open idea; it has origins in specific social relations and systems of

expectation. The association that we make between progress and modern technology is far from an objective assessment of their individual properties. Nevertheless, this association is understandable given that technology's role since the Enlightenment has been the vehicle for the overall betterment of man's condition. This is modern technology. There are also more tangible reasons for the tight association between technology and progress or that progress is analogous with technological progress. Before Bacon there is only scant mention of the concept of progress as we know it, suggesting that we had different ideas of progress prior to the Enlightenment. A certain idea of progress has a corresponding idea of technology.

Edgar Zlizel, in his article, "Genesis of the idea of Modern Progress", asks what are the social conditions which gave rise to our modern idea of progress as well as what is the ontology of our modern idea of progress. He tries to show that, "the modern idea of progress through cooperation stems, like many other elements of modern scientific procedure, form the superior artisans of the fifteenth and sixteenth centuries" (1957, p. 252). Modern scientific procedure molded the subjective and creative elements of these artisans to constitute a cohesive idea of progress. So, we see that within <progress> there is agreement in cooperation and procedure but there is also a distinct connection to tangible objects, the artisans and their products, as they relate to the everyday world. Zilsel uses the term "superior artisans". The modern idea of progress is a "meta" social relation whose essence trickles down to influence other social relations. One's superiority in the timeframe that Zilsel was dealing with would have been characterized as competition for the successful participation within a local community. These social relations are the background for the incipient connection between progress and technology whereby we can still divine heavily creative elements and individualized participation.

Within the parameters of the Enlightenment paradigm, progress originally had the form of scientific progress, later it began to be exclusively identified with technology. This is progress with almost a predetermined path—the canalization of progress. Scientific progress is: "(1) the insight that scientific knowledge is brought about step by step through contributions of generations of explorers building upon and gradually amending the findings of their predecessors; (2) the belief that this process is never completed; (3) the conviction that contribution to this development, either for its own sake or for the public benefit, constitutes the very aim of the true scientist" (Zilsel, 1957, p. 252). Prior to the sixteenth century, however, classical scientists did not consider their publications to be contributions to science per se. Science is a type of discourse that would have influenced intellectual production as there would have been "modifications" tailored to the requirements of science. But, prior to the Enlightenment, science was not put forth for practical purposes. Only in the areas of artillery or navigation did this occur; so there might be some theoretical conflict between the approaches of scientific and technological understandings of progress. Needless to say, technological practice is the result of an evolution to which many different contexts contribute; to have this contribution society needed to have been "liberated" and competition would have to have been encouraged. Understanding a concept as something channeled can present an image of <technology> whereby certain perspectives, values and social relations are either within the path of the channel or they are outside it.

The emergence of competition was the result of the evolution of a grand narrative. Once the slave society was eliminated, the lower classes were encouraged to participate in technological progress. Prior to this, artisans fought hard to preserve their techniques and to keep them out of the hands of other competing work groups. Competition between artisans, however, did encourage a process of trial and error to achieve a level of innovation which

would mark one group or the other as the choice within a context of competition. In such a setting, people are working together and sharing ideas. Then, "only the artisan who had either invented some commercial or technological innovation or who understood the value of the invention of another fellow became a capitalistic manufacturer. Thus, the inventive genius of the individual gradually came to the fore" (Zilsel, 1957, p. 257). Nevertheless, this individual needed to have some idea of the value of the artifact within a capitalist context.

To demonstrate the usefulness of their products, artisans had to demonstrate the superiority of their workshops through being beneficial to the public. This last accounted for the scientific ideal of science for science, but it also illustrates the necessary social condition of capitalism for the flowering of technological progress.

The characteristics that we attribute to progress developed at this time—mainly the ideals of use and competition. Ideologically speaking, in the sixteenth century, there was a breakdown in the distinction between the ideas of liberal and mechanical. So, the idea of betterment was no longer bound to lofty ideas of spiritual growth. Technological problems began to interest the academics. At this time, "the scholars were in the closest contact with manual workers…They shared of course the utilitarian concept of science with the artisans" (Zilsel, 1957, p. 269). Here we see an incipient technological manifestation of progress where there is a definite relationship between disciplines. Later, with Bacon, this relationship became much more formalized as knowledge came to be considered technological knowledge as *the* way to liberate man. "Manifestly, the idea of science we usually regard as Baconian is rooted in the requirements of early capitalistic economy and technology; its rudiments appear first in treatises of fifteenth century craftsmen [Nevertheless] the ideal of progress of civilization begins only with Bacon" (p. 272). With the elimination of slavery and the emergence of capitalism, scientific progress came down

to earth and manifested as technological progress as social conditions made it beneficial to innovate. In any event, we have an explosion of social relations contributing to the creating of perspective as the combination of two elements can have a numerous results. These results were either encouraged or suppressed in the original treatises founded on the cooperation between academics and artisans. The contact between the academics and artisans was a social relation that was encouraged, implying that other social relations could have been encouraged as well.

The development of an expert society is almost a natural result of the combination of utility, needs and competition. In this section we have seen that the unlocking of the secret to technology is in appropriately contextualizing its role in our society. The question of technology's place in society and Zilsel's article suggest that the emergence of a culture of experts participated in the construction of our current idea of progress. The nature of <technology> is heavily determined by context, and trial and error often determines the final result of innovation. Also, the ends pursued by technological production are determined by social systems within society; however, at the end of the day, technology is the means. Means is the expression of an expert in competition with others for the ends. The means and ends are separate. If this was not the case, we would confuse technological expression with artistic pursuits. Analytically speaking it is extremely important that we maintain technology as a means; since, to do the opposite, to think of it as an end, would be kin to analyzing an apple with the assumption that it is an orange. Whether or not technology is accurately still a means in our day remains to be seen, but we must not confuse it with artistic ends. Nor must it be identified with any other end which is to predetermine technological production. Progress, as a certain type of progress, is such an example of an end.

Finally technology has come to be inextricably identified with progress which links

technology to forms of reason applied throughout many other social activities. Technology,

comprehensive social development, understanding and experience are inextricably related

to the extent that it is almost impossible to divest a social manifestation of its technological

garb. Technology is the result of social negotiation and, in turn, new social activities are in

one way or another determined by a technological essence. Technology is a social

phenomenon leaving out no aspect of society that is unaffected by technology. What we

consider to be technology is the result of a large "movement" at the level of an entire

civilization. How did this construction of technology come about? Zilsel suggests that a

certain economic ideology served as a guide for a certain type of progress. Perhaps a

historical overview as to the emergence of modern technology will shed light on how it

came to be that an economic ideology determined the path of <technology> and its

expressions.

F. Conclusion

<Technology>, as the conjunction of certain values and expectations, demonstrates

a tendency to exclude others sets of social relations. That technology excludes is due to a

corresponding type of society which perpetuates these characteristics. However, this is not

to say that the concept has a legislative constitution; its components, interpretations, ideas,

etc. depend on our diverse participation.

But how is technology to be exposed to new social forms or relations? This chapter

showed that new perspectives and disciplines, when they are in contact with the concept,

can diversify the conceptual constitution. Perhaps most importantly, <technology>, as the

material result of human practice, had origins in individual innovation which did not

necessarily respond to global historical circumstances until later (This will be discussed in

more detail in chapter III). This transition, from individual interpretation to a response to

the global narrative, excluded certain values and expectations; therefore, this is potential within society that could be used to expand the scope of <technology>.

The aporia of <technology> can be one of conversion. Technology has consistently been understood to be a practice that is not characterized as an activity related to belief, art or accidental phenomena. <Technology> is the foundation for social relations that emerge as means calibrated toward intentional and identifiable ends; <technology> can also come to represent hope or a society's desire for certain values to manifest as technological expressions. In this sense <technology> remains a form of conversion, but the means have become the ends which serve to influence the manner by which the means are performed. In this sense, <technology> is non neutral. <Technology> is even more hegemonic in that it favors certain forms of social relations and practices and excludes others. For instance, the ideal of progress, as understood since the advent of modern technology, has determined that practice must be consistent with a larger project which obviously influences the form or manner by which the practice is carried out. <Technology> works within a structure that serves as a regulator of whatever power relationship.

Power relationships and forms of progress, however, are chosen. At the end of the day, <technology> continues to be the essence of practice; but practice is not predetermined by any specific project. Subjectivity or individual interpretation is a prerequisite to know-how since the latter will always entail contextual conditions that are not universally consistent; so a broader conceptual base with the aggregation of perspective would enhance our understanding of <technology> itself. If <technology> were understood to be purely a means and not an end, then the means would be more open to flexible practices that could promote diversity and answer a broader range of needs. This is so because the ends themselves would not be determining the manner by which the means are revealed. <Technology> responds to social pressure, and social pressure has often come in the form

of projects, such as the Enlightenment and the special interests surrounding capitalism and the development of the State; but the project itself is arbitrary. Yes, the essential foundation of <technology> is conversion; but the manner by which conversion manifests as social relations is left to us.

<Technology> is the product of certain values, systems of expectation and reward and, above all, social relations. Additionally, <technology> is the calculated result of a preference to particular combinations of the aforementioned social elements to the exclusion of others. Naturally, any concept is relative. Consider a federal system of government whereby the individual states can differ on such issues as life: the death penalty and abortion. In fact, even when life begins or ends is disputable among the nations of both Mexico and the United States.

As a concept made up of values and social relations, <technology> is society's reflection; but we have seen that this reflection is not always accurate as it may prioritize certain values while suppressing others. Society has allowed certain forms, derived from our experience, to influence the construction of <technology>. If <technology> is the product of social relations, then would the concept not be more diverse if it were exposed to more combinations of social relations? Some social relations are more appropriate for certain technological expressions and contexts than others.

These relations and perspectives can be cultivated in order that technology may appropriately reflect them given a very specific set of circumstances. Power relations and systems of application restrict the concept of technology by limited process of consideration and interests, thereby passively excluding new and different social relations and perspectives. In addition, a much more subtle presence, an economic ideology, influences the path of technology.

III. HISTORICAL DEVELOPMENT

Introduction

The construction of our idea of <technology> and the diffusion of certain

technological values throughout society has proven to be the result of an almost global

narrative calibrated to perpetuate certain ends. For practical purposes, this narrative could

be understood as a system which can, in turn, be interpreted to be the foundations of the

concept of <technology>. In other words, the form that our concept of technology has taken

is the result of both large scale social movements (narratives) and the emergence of certain

ideals, values and norms of practice, but there are still elements of subjectivity in the

origins of <technology>. These elements are like sleeping resources for an alternative or

additional development of <technology>.

This chapter will demonstrate that the construction of <technology> is the direct

response to the historical circumstances from the Renaissance to the 20th century. There is a

relation between the historical narrative and the trajectory of technology without alluding to

the possibility of agency on the part of one or the other. We are the agents.

A. <Technology> as a sociological problem and not an historical one

<Technology> is a subjective and localized way of knowing when approached from

a sociological perspective. Due to the pragmatic concerns of constructing a linear narrative,

History is a much more conservative epistemology. An historical approach to technology

would require a theory for purposes of legitimization. I have chosen sociology.

Technology, like even the process of individualization or subjectivity, is a social process. In

fact these two processes, technological choice and identity creation, are closely related

since each constitutes a cultural face or expression of a particular society. But the idea of

"technology in history" seems problematic since many might interpret this approach as one

where we follow history through technological development—as if they were parallel. This is a methodological mistake just like a purely historical approach is a mistake. To remedy this I have chosen sociology as the context and science as the subject with the simple logic of: if the process of science can be understood in a sociological setting, then *a fortiori* this same application to technology is quite appropriate.

Norbert Elias is of the opinion that it is not appropriate to place the evolution of science within an historical context. History implies a linear succession of events where certain perspectives, circumstances or social elements are excluded if they do not jibe with the overall narrative. Methodologically speaking, sociology operates as a two-way valve whereby the subject is exposed to correction and revision. "A testable theory of the development of science can only be worked out in cross-fertilization and in a continuous two-way traffic with the progressing empirical research" (1972, p. 120). Words such as "fertilization" and "progressing" imply the enrichment of increased local exposure, but not from the same old resources. Resources must be found. In other words, a:

> history of science has to prove itself and may have to be changed in light of
>
> relevant empirical evidence...that the evidence may have to be changed, that it
>
> may have to be selected, connected and interpreted differently in accordance
>
> with a different theory of the history or the progress of science (p. 121).

The process of connecting and interpreting is one way of uncovering new perspectives, or even creating new perspectives and social relations.

Elias encourages the uncovering of new perspectives by diminishing the autonomy of science and increasing the autonomy of the subject, whatever it may be; but he uses the term "relative autonomy". Relative autonomy, for Elias, is "a symbol of the need for closer and more continued co-operation between representatives of different academic

disciplines" (p.132). Such cooperation is a way to generate new angles, perspectives and social relations which could expand the concept of technology and its expressions.

The advent of modern science coincides with the dawn of another very social element of society—money. The widespread use of money, religious wars and the Black Death called for a new kind of social philosophy. This social philosophy can be understood in terms of Modern philosophy. Science was an effect of this modernity whereby "objectivity" became a virtue. "The source of this objectivity, paradoxically enough, was to be found in one's own subjectivity" (Solomon, 1996, p. 177). Knowledge, in the late Renaissance, was accessible for the benefit for oneself as well as for political purposes. One can know the outside world by looking within oneself. It goes without saying that ways of knowing are accomplished through technology which is our main interface with the other, be it knowledge or whatever. Unfortunately, this form of subjectivity was European while the objectivity was global. There were political reasons for a subjective path to know the worlds; therefore Modernity had a specific face and each local application was limited though widespread. Had a more liberal idea of subjectivity been established, perhaps we would have a broader understanding of technology? Or had the political objectives, such as the need to take power from the church or to colonize for capitalist purposes been different there might have been an entirely different understanding of technology? <Technology> is a subjective and local way of knowing, but it was restricted by the purposes behind its application.

B. <Technology> as a dialogue, as a narrative

The degree to which I am referring would be to think about <technology> at the level of an entire civilization, as a revolution and as a new order. From a historical perspective, <technology> is more appropriately approached from a practical angle since the evolution of a tool almost has a logical form. In addition it is easier to analyze the

evolution of <technology> from its use or role as a tool per se since there is more material dedicated to this than to technology as a concept. Nevertheless, we can make educated assumptions about the concept through its use, adaptation and diffusion throughout society. Ironically, due to the level of cultural diversity with which material technologies (technological expressions) have come into contact, there has emerged a relatively smooth and uniform technological evolution in terms of a certain type of technology. Certain values and social relations forced or guided this potential diversity to be consistent with the essences of the values. This process of standardization is a mechanism whereby competition between societies, local adaptation to technological introduction and shared characteristics encourage a similar evolution and application of a technology from one cultural setting to another. All of this is indicative of a dialogue with technology whereby local factors are encouraged to interact with technology in a certain way, and <technology> becomes the result of a type of evolution—progress.

This process, argues Arnold Pacey, is not necessary, especially if we redefine our understanding of progress. Pacey is of the opinion that progress has too much of a linear connotation where it could be much more complex. Progress is considered natural where the technologies survive, and this is considered positive; but other technologies die when there is little room for an open and retroactive relationship with the people. Such a relationship is composed of social relations founded on critical reflection which sounds positive though it is actually subversive, and therefore not encouraged, to traditional understandings of technology. "The way to avoid such negative results is to introduce the new technology in a more flexible form to allow for a dialogue which may lead to modifications, possibly in equipment, but more especially in social arrangements affecting its use" (1996, p. viii). Technological production and therefore <technology> is the result of positive contact among different cultures (p. 1).

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Arnold Pacey argues that "technical progress is more often the result of a dialogue—of exchanges of technical ideas" (1996, p. 147). But how diverse is this exchange of ideas in terms of the various perspectives allowed to participate? Pacey mentioned "social arrangements" which could affect the use of a technology. Well, these social arrangements must also have certain expectations that are allowed to surface which would affect the use of the technology. Pacey feels that <technology> is a collective effort; therefore, it could be argued that creating the conditions which promote collective activity and participation would have a positive effect on technological production—creating the conditions for a positive dialogue with technology as well as other users. What is the evolution of this dialogue or potential dialogue?

Narratives, such as the evolution of technology and science, require consistency and respect for the processes that have come before them. In other words, there are no jumps in time when evaluating the evolution of something which is why I have chosen to begin with the late Middle Ages. The roots of modern technology have provenance during this time and there is consistency to the present.

Towards the end of the Middle Ages, there was an increase in activity in the development of towns, trades, and industry which began to erode the foundations of the feudal society. The aforementioned developments led to the use of monetary currency, the rise of the bourgeoisie class and finally formalized capitalism. Improved techniques led to improved science which in turn founded better techniques. These social and structural changes "inaugurated a new order in economy and science. With better techniques, better modes of transport, and more ample markets, the production of commodities for sale steadily increased....This combined technical, economic, and scientific revolution is a unique social phenomenon" (Bernal, 1971, p. 373). There were, however, some obstacles to this phenomenon as its interpretation was guided by the idea of <separation>, or the

categorization of entities. The distinction between the spiritual and physical would be an example of such a separation.

C. The elevation of subjectivity to a virtue

Subjectivity, through individual interpretation and validation, was a building block in truth construction. Despite the common understanding that the Italian Renaissance was characterized as an exercise in humanism, there was also a strong foundation of skepticism, skepticism of the senses stemming from recognizing that we have a weakened ability to observe. Ideas of solipsism, for example, were thrown out the window due to the use of telescopes to observe the stars. For instance, Michel de Montaigne (1533-1592) "doubted whether human beings were capable of finding the truth or recognizing it if they did find it, just as they seemed to be incapable of understanding justice or, more important, acting justly...He placed his emphasis on the idea of nature, embedded in us as *character*". To Montaigne human customs and ideas are relative (Solomon, 1996, p. 179). Here, we see an elevation of subjectivity as individual interpretation which is apart from any system or civilization.

Subjectivity, but in terms of the individual, was also a major concept in Descartes' method. To doubt everything outside the self, for instance, is almost selfish and not subjective and ego centric. "Descartes' philosophy accordingly begins with the demand that each of us establish for ourselves the truth of what we believe, and this means to establish it with certainty, using the application of mathematics". Math is a technological expression, and Descartes' encouraged its application due to his skepticism of the senses (Solomon, 1996, p. 181). If one mistrusts his senses then he must import the services of technology; the application of said technology, according to Descartes and his distaste for common sense, must be done at the individual level.

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Subjectivity is, again, a dubious term. Subjectivity, in terms of trying to understand Descartes' use of it, "puts a premium on interiority, introspection, the idea that the mind is an inner realm containing thoughts (anything mental)" (Solomon, 1996, 184). Subjectivity also constitutes opinion for him and not common knowledge. "Subjectivity may also refer to personal experience, which implies a certain perspective and its limitations…Descartes' subjectivism is a powerful form of individualism and a defense of individual authority and autonomy" (p.185). To achieve such transcendentalism, the individual must be able to rise above social conditions, such as the market or colonization. These are social entities which *condition* experience.

D. <Technology> as an economic order dominated by man and experience

The above would not have been possible were it not for the de-emphasis of the metaphysical followed by a validation of the empirical. Experience is a process of negotiation characterized by trial and error, but during this time individual effort was folded into larger modes of production.

The Renaissance was a celebration of the separation of the natural from the spiritual world. In terms of method, there was "the distinction between facts and values, or between living organisms and inanimate matter—that continue to dominate the way we look at the natural world and construct theories about how it works" (Dickson, 1988, p. 316). It was also a period in which the efforts of social organization were executed according to scientific principles. Nevertheless, "they were little more than reflections of new techniques by which one group of individuals is able to control and exploit the activities of others" (p. 314). Even as early as the late 14th century, in Italy, we can see examples of the sophisticated relationships that were beginning to emerge as a result of economic, scientific, cultural and political trends. Such changes especially occurred in the Italian cites. "These cities saw the emergence of some of the first efforts to organize workshop

production—for example, in the textile and the leather industries, where the tools were collected, owned, and largely controlled by the new class of merchants, rather than, as previously, by the medieval craft guilds" (p. 315). Organized production would have suppressed the individual elements of the medieval craft guilds (mentioned above: Zilsel) as competing creativity would have been an obstacle to organization and increased levels of production. Social organization began to depend on technological production which was a highly rationalized means of promoting the interests of the governing "state"—an idea which came to fruition later during the Enlightenment.

Trade was the order of the day during the Renaissance. There was a "change in the system of social relations from that based on a fixed hereditary status to one based on buying and selling commodities and labor. The major economic factor that provided the drive for the movement was the rapid extension of trade made possible by a greater available surplus. This surplus was due to the effect of the technical improvements ...in agriculture and cloth making" (Bernal, 1971, p. 380). In addition, the printing press served to disseminate technical advances, but the Renaissance was not only an economic revolution. "What gives its importance in science, art and politics is that it was a conscious movement...They [scholars and artists] had set themselves in opposition to the whole pattern of medieval life, and they strove to create a new pattern as near as possible to that of classical antiquity" (p. 383). Here we see a project with a model for behavior where the intellectuals of this time were not satisfied with being recipients of information; they wished to study the texts first hand. Science was in the hands of humanity though through technology, and humanity could play a part in its development. This was an early example of a project calibrated toward specific ends. The paradigm through which the world was viewed can be understood to be a type of personification of nature.

The interpretation of the world as a whole was now subject to individual interpretation thus giving rise to prejudiced attempts to manipulate it which is where technology comes in, but technology feeds off human complexity. We are technology's source of power. There was a rise in humanism brought about by a rejection of the feudal ideas of a hierarchy in support of a more secular attitude of society. In addition, there was a more personal relationship to religion. This notion was encouraged by the translation of the word of God to the vernacular. Also, the new use of instruments for observation of the universe contributed to humanism since the newly created heliocentric world could be observed through the telescope and not by way of theories of ancient scholars. This encouraged learning and experience by the individual. Individual observation led to the interest in new fields which the ancients neglected. There was also a renewed link between the craftsman and the scholar. The scholar contributed the world views, the methods of computation and argument to the marriage between the instruments and the object. The craftsman contributed knowledge of the devices that had evolved in the middle ages. The operations of nature could be explained by machinery which was man's creation.

Various technological developments were the result of the social circumstances just mentioned which made their acceptance a natural process since they were not implemented from above by the church or the monarchy, let's say. These developments emerged from empirical processes, local need and the increased exchange of skills and ideas. Humanity became the measure of the world—an idea which made participation all the more easy. Mankind was, in a sense, liberated. Trade, economy and capital provided civilization with a system of production and reward which encouraged individual achievement. Ideas became a commodity, and technological expression is the tangible body of these ideas. They were its reflection.

Ideas, however, need a framework which would provide a formal system of rewards. Innovation needs a vehicle. At this time, it was the rise of capitalism that made the flowering of science both possible and necessary, but later, during the industrial revolution, the opposite was the case. A more complex and diverse system of technology served as a necessary fuel for capitalism. The combined forces of capitalism and the needs generated by the technological advances led to further developments which in turn created the sense that this relationship was a natural occurrence. "The use of the technical devices of the late Middle Ages enabled agriculture, manufacturing, and trade to increase and spread over ever larger areas. The material needs of the economic advance led to further developments of techniques, particularly those of mining, warfare, and navigation" (Bernal, 1971, p. 374). These innovations naturally instigated problems stemming from the unpredictable behavior of these materials and their processes which gave rise to further technological development. Again, we are witnessing a phenomenon kin to a natural evolution; but it is still a social project heavily influenced by individual participation.

Individuality and innovation require a mechanism which can appropriately evaluate, label and reward activities that are not necessarily in line with other more mundane activities; otherwise, there is no incentive to innovate or be creative. Individual effort needed to be highlighted and appreciated. At this time, currency was becoming the medium of exchange which was a tangible expression of one's worth or the worth of his/her labor. As a result, men were in more control of their immediate experiences and paths toward a more comfortable life. It is ironic that currency, our link to a rational world wide system of reward would also encourage subjectivity. In order for subjectivity and individuality to be true resources, all aspects and efforts of the individual needed to be considered worthy for creativity and discovery. The world was being "discovered" through the subjective potential and individual interpretation of humanity. "The Renaissance in Europe was an age

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of discoveries of which the discovery of America was only one. The foundations of modern science were being laid while the Pilgrims landed at Plymouth. Francis Bacon's *Novum Organum* persuaded men to turn from the authority of Aristotle to the evidence of their senses" (Boorstin, 1978, pp. 39-40). The newly discovered lands in America were a treasure chest for the senses and experience, and this surplus of empirical data influenced Bacon's theory of massing data to create systems of understanding. <New> became a staple for <technology> and technological expression, and currency became the means to gage the worth of either an individual or a technology. Most importantly, <new> also applied to the manner by which the world was seen. The world was, in a sense personified.

We were told how to *be* with Science by Francis Bacon, the English lawyer (These are two very qualifying terms—English and lawyer—and therefore intentionally included in my description of Bacon). "Bacon not only wrote about how science should be studied in terms of collecting, classifying and analyzing facts. He also put forward ideas about how scientific work should be organized, and how it could benefit from collective effort with an implicit division of labor" (Pacey, 1996, pp. 97-98). It can be argued that the entire world was organized under such a manner in that even nations, as colonies, became resources— hence the justification for imperialism. In addition, Bacon's method of understanding science and its role in civilization is just that, a method; and another could easily have replaced it or allowed to coexist with it. The point is that his method was chosen; it was itself a project based on control and domination.

The shift away from the authority of Aristotle was very democratic in the sense that it encouraged any man to generate knowledge from his participation with the world. Later this relationship with the land was replaced with the machine. The perception was that the land once provided us with treasures and unlimited possibilities, but now the machine provides us with unlimited possibilities for the present and future. What had once

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predetermined creation, God, was out of man's hands; but the machine was man's

invention. It was not man's world to be shaped. "Bacon also emphasizes the importance of

scientific cooperation. In his *New Atlantis* (1627) he describes an ideal state ruled by a body

of scientists organized, according to the principle of the division of labor, in nine groups.

Technological and physical laboratories and agricultural stations are at the disposal of the

scientists" (Zilsel, 1957, p. 271). The nation was organized into divisions of labor for

production. This is a project where the authority was clearly no longer with God or with

any school which did not have an empirical foundation. The authority was with man

himself and his means to exercise his domination over the natural world was technology.

Empiricism, for it to be considered a worthy resource, would have to depend on a large

amount of experience which came from man. Implicitly there is the suggestion that all

types of experience from all types of man must be encouraged. Had Bacon stopped with

"man" in general as the authority and omitted the part about domination and the state, there

could have resulted the holistic understanding of <technology> that I am proposing.

Man has been liberated from past authorities to control the world, and the degree of

diversity through which this control is exercised is determined by the amount of innovative

technology. The desire for technological innovation and its apparent rewards can serve to

break down former barriers. The advent of the scientific revolution at the end of the Middle

Ages is characterized as a change in relationship to the idea of knowledge which went from

"being a means of reconciliation of man with the world as it is, was, and ever will be, come

doomsday, to one of controlling Nature through knowledge of its eternal laws" (Bernal,

1971, p. 375). This was brought about by a concern for material wealth which was basically

a desire to learn more about the practice of the tradesmen with the hopes of gaining more

money for their efforts. The relationship between improved wealth and trade was a bridge

between the aristocratic society and the plebian one whereby there was a common ground

between them. The interests of science were beginning to infiltrate all of society, regardless of one's status. Society, all of society, came to be understood in objective terms which needed an objective means to address its needs.

The effect that the increased technological production had on science is a social phenomenon, and a new economic class of people was created. It began with the increasing presence of towns and populations became denser and a new economy based on the production of commodities was required to satisfy the growing needs of the populations. These growing needs led to further advances in the development of techniques (experiment and calculation), principally, in the areas of warfare, mining and navigation. There were, in turn, new problems and limits that surfaced with these techniques, and new experiences showed new limits. "By the beginning of the seventeenth century, a new and enterprising bourgeoisie was able to respond to this stimulus and build up the essentials of experimental science" (Bernal, 1971, pp. 374-375). Science gained much from its contact with practical experience, and there was now the incentive to innovate, suggesting that individual experience was encouraged to influence technological expression. Furthermore, the rise of the middle class was due in part to the political successes of the 17th and 18th centuries; though it could be argued that the political developments were simply a justification of the changing conditions of society and not the cause.

The new science was a break from the past, but it was also a response to the failures of feudal society to meet changing needs which nascent forms of capitalism were able to satisfy. The Scientific Revolution is marked by three phases in both the political/economic and the scientific sectors. The first phase of the political/economic realm consists in the Renaissance where navigational feats provoked the emergence of Spain as the first great world power after the Roman Empire (as we understand powers today). The second stage is characterized by the opening up of America and the religious reformation. The third stage

was a compromise between the monarchies of Europe and the rising bourgeoisie class. These historical contexts can be understood as sets of social relations which defined scientific and technological evolution.

These stages show the conditions which established the preeminence of science, through technology, to control exterior conditions and channel them to the benefit of man and nations, even at the social level. Technology was given free reign to help man exert control over the natural world. Nature was now controllable and once man understood better its laws, then he could establish his domination through technology. The first stage in the scientific realm was a challenge to the world view that carried over from the Middle Ages. It is marked by Copernicus' rejection of an earth centered universe. The second phase is identified by experimental improvements initiated by Bacon and Descartes. "The third phase marked the triumph of the new science, its rapid growth with the spread to new fields, and its first organization into societies" (Bernal, 1971, p. 378). The culmination of this period was with Newton and the foundation of natural laws from which all science could be built. "From now on, independent particles could interact freely, guided by the invisible constitution of Natural Laws. In turn the knowledge of these laws was seen to be the key to the harnessing of the powers of Nature in the service of man. Sublime contemplation had given way to profitable action" (p. 378). What we see with these three stages is a democratization of the world in that it is firmly in the hands of humanity, or those who dare to challenge Nature. Challenging nature became profitable, and it required an industrious class of people to operate throughout the complexities that this new relationship demanded. Finally, laws can be considered a type of rationality which affects technological expression. Nevertheless we are seeing the cultivation of technology's potential as it is based on man; however, this source of power is limited since it is based on the "service of man" which is a qualification of man's relationship with nature.

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These laws could have been seen in a different light, thereby having different interpretations of them. The result of these interpretations could have had a different effect upon technological application as well as the concept of <technology>. Most would agree that technology per se characterizes man and his relation to the world, but the fact that the institutionalization of technology developed in conjunction with a certain class of people and not so much through the efforts of individuals suggests that <technology>, by its nature, is a plural or democratic concept. How can we further cultivate this aspect of technology?

E. Philosophized sociology: legitimizing the relativity of the subject-other relation

The word modern is a loaded adjective; it has a specific connotation which is the product of a relation between a type of progress and its corresponding technology. Modern philosophy, then, is a philosophy which either contributed to the construction and understanding of technology and/or it is an approach to philosophy that is charged with the influential relationship between progress and technology.

As I have argued, <technology> is our primary interface with the other. This idea has origins in a time in history where the subject was elevated, almost eulogized. In the nascent stages of the Enlightenment paradigm, there is evidence that the concept of <subject> had an extremely atomized understanding in its relation to the other. Leibniz was of the opinion that the world "consists of innumerable simple substances. These simple substances are called monads, each of which is self contained and independent of all others...Every monad is like a little self or psyche. It perceives the world—including what would seem to be interactions with other monads—from its own peculiar perspective. No monad actually interacts with any other" (Solomon, 1996, p. 186). For Leibniz, these perceptions emerged based on their internal state, determined by God, whereby their connections created a pre-established harmony—the best of all possible worlds.

Perhaps Leibniz was suggesting that our approach to the world, just prior to the

Enlightenment, was impeding us from seeing or encouraging this harmony. He wanted to

organize our understanding of the world in a way which would help us see this harmony.

Leibniz wanted to tackle much more complex questions than perhaps the ones that were

dominating the current social relations. Leibniz was, "deeply moved by very human

problems. [His] metaphysical fiddling with 'substance' was a vehicle for exploring much

more demanding and difficult questions" (Solomon, 1996, p. 186).

Leibniz was concerned with deeply human problems. For him, an approach

characterized by a heightened sense of humanism was that which could help us see this

harmony. It matters not if the God paradigm is no longer the excuse nor the operative

mechanism for philosophical approaches. "God" was merely a label. With his division of

the world into monads, Leibniz was trying to shake up or stimulate the recognition of a

variety of social relations and perspectives. He was also suggesting that if a subject is self

contained and predetermined by God, then it does not have the tendency to be determined

by any one system that we establish in the future or *have already established*.

We need to separate ourselves from political or economic systems of understanding

in order to explore the internal nature of individual selves (monads, if you will) in order to

see how they may relate to one another. This separation from established systems is an

elevation or a glorification of the individual subject.

F. <Technology> as method

Individual experience became the foundations for the construction of knowledge.

<Technology> is the interface between individual experience and the creation of

knowledge. Modern science, it can be said, is a compromise between the ideas of Francis

Bacon and Rene Descartes whereby each contributed to the body of knowledge that would

characterize modern technology. Both theory and empirical wealth became important but each had foundations in individual experience. In short:

> Bacon's [method] was that of collecting materials, carrying our experiments on a
> large scale, and finding the results from a sheer mass of evidence—an
> essentially inductive method. Descartes on the other hand believed in the rapier
> thrust of pure intuition. He held that with clarity of thought it should be possible
> to discover everything rationally knowable, experiment coming in essentially as
> an auxiliary to deductive thought (Bernal, 1971, p. 441).

Bacon proposed an organization of evidence to build systems whereas Descartes was actually constructing a system. Bacon was an inspirer of science and invention which led to the progress of material industry. From the mass of experience we will find the scientific laws; therefore, man's individuality, through experience, had a place in the construction of knowledge. The weight of facts would lead to truth, but the emergence of facts as the foundation for truth would require diverse perspectives since a fact is a subjective interpretation as the phenomenon is viewed from a variety of angles.

Descartes' system begins with the division of the universe into the measurable and non-measurable. Science belonged to the latter which he ironically used to prove the existence of a higher being. "From his famous first deduction, *I think therefore I am,* he drew the conclusion that as all men can conceive something more perfect than themselves, a perfect being must exist" (Bernal, 1971, p. 446). A connection between this idea and faith in progress can be made. Descartes' universe was based on truths derived from empirical conclusions that were founded on the first principles of clarity. "Thus in his ultimate objective Descartes did not differ much from Bacon...Bacon and Descartes between them raised the status of experimental science to esteem in polite circles" (p. 447). Nevertheless, we can see the foundations of technology as an entity that was highly susceptible to

individualized negotiation at the foundations since experiment is simply a structured form of experience. Experience does not derive from a model or a model individual who possesses the patent to its form; rather, experience and experimentation come from perspectives that have passed through certain social relations and are considered valid. Other social relations could have just as easily served as a filter for authority.

<Technology> is the result of trial and error and the aggregation of facts (Bacon) as well as individual intention (Descartes). Individual success is a technological expression which, according to Descartes' method, begins with the point of view of the individual subject. Perhaps if Bacon's influence had been less successful in comparison to Descartes', <technology> would have developed along a more flexible path thereby incorporating the diverse aspects of humanity as each individual would be encouraged to exploit his/her perspective.

G. <Technology> as the reflection of society

<Technology> is susceptible to scientific laws and social organization. It came to be organized into a rational scheme. Later in the 1700s, there came to be a stronger sense of unity throughout humanity and the natural world. The philosophers of the, eighteenth century could take the scientific understanding of the world that Newton had provided, with the establishment of mathematics as the superior form of investigation. The job of the philosophers was to justify it and reconcile it with experience. Their approach coincided with the new political and economic pattern that was beginning to appear in their own time which coincided with the market and industrial revolutions of the time (Bernal, 1971). In this time a universal feeling of order and unification had taken over coming from the application of Newton's ideas to all of experience. The social world was used to justify the successes of the scientific community. <Unity> was heavily tailored by a scientific component. If there were such ideas in the inception of modern technology, then the ideas

of unification would preclude liberal experimentation in the more mature days of modern technology. The new political and economic order of the time superimposed a pattern of development over technology. The ends were beginning to determine the means.

Universal laws were established from which nature could be reconstructed and manipulated. "In one word Newton established, once and for all, the dynamic view of the universe instead of the static one that had satisfied the Ancients....Newton's work...provided a reliable method which could be used confidently by the scientists of later times. At the same time it reassured scientists and non scientists alike that the universe was regulated by simple mathematical laws" (Bernal, 1971, pp. 488-489). Science was by now an established institution, but one that could potentially affect other institutions, and "paradoxically,...the most immediate effect of Newton's ideas was in the economic and political field...[Newton's ideas] were to create the general skepticism of authority and belief in laisser-faire that were to lower the prestige of religion and respect for a divinely constituted order of society....They were to contribute directly to the Enlightenment and thus to the ideas of the French Revolution" (p. 489). From basic but "universal" laws, specific regulations would follow without offending the general principles of the universal laws of humanity. These were analogous to Newton's first laws. <Unity>, as determined by the social relations that favored the superiority of the scientific laws, is merely a type of unity. It is ironic that ideas such as unification and order are actually very hegemonic and exclusive of other forms. If all action and beings are ordered in a certain way, then it seems improbable or unattractive to look for something beyond this order. In fact, a perspective that is outside this order would either be punished or ignored.

Thus, society and nature were seen to be more interrelated, though there was not a two-way street of influence flowing between them. "Newton's ideas of a rational, mechanical universe were expanded into a broad social philosophy by such individuals as

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John Locke in England and Voltaire in France. The idea that the social world could also be placed on a rational footing greatly influenced the thinking of Thomas Jefferson, Benjamin Franklin, and others among the Founding Fathers" (Dickson, 1988, pp. 316-317). But this is not to say that there is any one necessary way to integrate society and technology. Science could have been applied differently to society which would have been basically a different understanding of <technology>. In addition, "society" could have, in turn, influenced technological progress.

The idea of associating social progress with material scientific advancement, however, began much earlier. "Francis Bacon was taken to be, and rightly, the first great man who had given a new direction to science and who had linked it definitely once more to the progress of material industry" (Bernal, 1971, p. 443). Understanding of Nature was the best means of manipulating it to the benefit of man. "He famously claimed that knowledge is power—that is, that through knowledge of nature and its technological applications, humans can achieve a purity of mind and behavior" (Scharff, & Dusek, 2005, p. 5). There are many ways to interpret this aphorism, but one way to see the issue is from the viewpoint that types of *knowledges* actually compete for the dominant form of representation. Once you posses knowledge, you control the distribution of knowledge, or vice versa, in a particular form. One form functions as the dominant one—power. So, one form of knowledge is *the* power at *a* particular time; therefore, power is not exclusively and necessarily exercised through one form of knowledge.

Through Bacon we see a juxtaposition of scientific rationality, that of a mathematical understanding of nature's resources, and social conditions. The earth and man's activities were quantified. In sum, "the two basic transformations of the sixteenth and seventeenth centuries which made those of the eighteenth centuries possible were the birth of experimental quantitative science and of the capitalist methods of production"

(Bernal, 1971, p. 519). These perspectives meshed in the form of increased material production which served as the end that determined the development of the means. Experimental, quantitative science was in a certain context which directed its development. This context was global capitalism.

This was not quite what the Enlightenment was all about. In terms of modifying our interpretation of the world:

> the Enlightenment project of Modernity had two strands. One was for the differentiation for the first time of science, morality and art-no longer fused in a revealed religion-into autonomous value spheres, each governed by its own norms—truth, justice, beauty. The other was the release of the potential of these newly liberated domains into the subjective flux of daily life, interacting to enrich it. This was the program that had gone astray (Anderson, 2006, pp. 37-38).

The latter idea of the liberated domains of enriching the individual experience did not go as planned. Science de-sublimated meaning, but in the process it was able to remove moral considerations. This is effectively downplaying human participation. "Liberated domains" implies a conceptual separation which would, in turn, encourage critical reflection as the ideal of comparison is preserved, but once one domain is too heavily influenced by another. This is conceptual hegemony sets in and suppresses critical reflection. As a result moral considerations were effectively removed from scientific endeavors. Certain social relations who could have kept moral concerns on an equal plane with the scientific could have been encouraged, but they were not. One could understand this in terms of a balance of power among domains of experience—the moral, the social, the scientific, etc.

H. Empiricism as subjectivity (individual interpretation)

In response to the abstract reason and metaphysical approach of the likes of Leibniz, the empiricists believed that knowledge is gained by experience. Locke was the initial proponent of this epistemology. What is problematic is that, "Locke's new political world would be defined by the relatively recent notion of human rights—in particular, the right to private property" (Solomon, 1996, p. 194). The problem with this is that subjectivity was guided by this idea of private property.

Instead of a pre-established tendency within the "individual", Locke was of the opinion that the mind was a "blank tablet which would be written on by experience throughout one's life...From these sensations our understanding allows us to derive various new and more complex ideas" (Solomon, 1996, p. 195). Since the inspiration for new and more complex ideas comes from experience but is processed within our minds, outside systems of understandings don't enjoy their normal prioritization in determining how we think. The subject is given priority over outside systems of interpretations.

According to Locke, we, as subjects, perceive two different types of experience, "those which we perceive as inherent in an object itself, such as shape or mass, and those which we perceive in ourselves—that is, in the effects that a thing has on us" (Solomon, 1996, p. 195). Although this approach is diametrically opposed to the rationalists, there is a consistency between them. This consistency is the elevation of the individual subject.

I. <Technology> as a reflection of man's ontology

<Technology> benefited from a new understanding of man, an appreciation of man's full potential. "Man" was a potential which needed to be liberated. The result of this was the emergence of a new class of people, what we call the middle class. The result is that social institutions were reorganized to accommodate this new understanding of man.

Once these ideas were established, then the creation of a class of people that could meet the needs of production and market requirements became fundamental. In fact, the relationship between science and production began to really evolve after the revolution in England which placed Charles II as the first constitutional monarch. At this time, "a new class of manufacturers was making its first appearance...The great increase of manufacture and trade...together with the new possibilities of navigation, kept mechanical production at a premium" (Bernal, 1971, p 448). The relationship between the social conditions of the time in conjunction with technological advancement meant that "in science, as in politics, a break with tradition [of the church and feudal, slave owning society] meant liberation of human ingenuity into hitherto closed fields. No part of the universe was too distant, no trade too humble, for the interests of the new scientists" (p 490). Scientific and technological innovation needed to be *subjectified*, meaning that discovery was to be situated in the empirical realm at all levels. Capitalism provided the remunerative element of such endeavors. "Thus under capitalism, in its first phase, the new incentive of profit was putting a premium on technical advance," (p 495) further establishing the importance of both the social conditions, through capitalism, and technological advancement as contributors to technology's systemic presence. Many aspects of society, institutions, forms of government, etc, had to answer to changes which were brooding from below. Capitalism was a double edged sword. From one angle it provided the context which encouraged and rewarded subjective and individual participation. From another it directed creativity within channels of profit and competition, thus vitiating production in a certain way.

Neither religion nor philosophy enjoys the degree of contact to society and its rewards as do science and technology. Man was the greater resource and the combination with science, as an area open to all in terms of method, proved to be a much more powerful weapon than, let's say, belief or birthright. Science had earned its status as the privileged

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discourse through the unity of method, empirical evidence, and observation. "As a result, institutions of the state as well as the economy—education systems, government bureaus, the law and criminal justice systems—emulate scientific procedures" (Aronowitz, 1988, p. 8). Even religion had to be modified as the population was increasingly involved in the material production of technology and the exchange of ideas. Science was a project with an equally powerful effect and scope to those of religion. Both institutions emerged in parallel. For instance:

> The rise of Protestantism in leading industrializing countries in the 18th and 19th
>
> centuries seemed to provide moral sanction for the preeminent position of modern
>
> science as knowledge....The type of knowledge offered by religion was confined to
>
> the ethical sphere; it concerned itself with family life, personal grief, and, when it
>
> felt obligated to take social action, it was remedial rather than transformative.
>
> The great denominations of Protestantism relinquished...a claim on
>
> epistemological as well as ontological truth. However, in the 19th and early
>
> 20th centuries the triumph of world capitalism over the remnants of the old
>
> feudal aristocracy in eastern and southern Europe forced even the recalcitrant
>
> Catholic and other orthodox churches to accommodate to the new world order
>
> (p. 9).

Were these circumstances the result of a natural evolution throughout society, or could a different set of conditions have emerged which would have resulted in a distinct understanding of <technology>? The world order that emerged, it should be understood, was one determined by the privileged discourse of scientific rationality. The scientific rationality is *a form* of objectivity or method which bridges, or has the effect of doing so, cultural or economic differences.

Nevertheless, technology thrived under these liberated conditions of man and

innovation. Religion had been placed in man's hands thus encouraging individual effort, the

result of which was personalized technological development. Again, the liberated

conditions of man do not have an absolute form; they could have taken others. It is simply a

matter of positioning perspectives and social relations in order to achieve a certain world.

J. <Technology> as the reflection of values

<Technology> was influenced by the paradigm of wealth in property and money

which thus restricted individual participation. Recall Locke's idea that the right to property

was a fundamental human right. "The idea that a person was entitled to property, not by law

or custom but by natural right, provided the solid foundation for what would later come to

be called capitalism...The Protestant revolution had already provided the work ethic that

legitimized a worldly emphasis on success". This idea of <success> was determined by the

wealth paradigm. Wealth was generated by the practices of colonialism. "The new-found

wealth of the new world provided the fuel for one of the greatest economic revolutions in

history". This revolution also influenced the type of philosophy to be applied (Solomon,

1996, p. 199).

A new commercialism emerged where money was the medium for exchange. There

was also a strong, and historically determining, element of competition among nations. "As

long as the wealth of a nation was defined by the money in the royal treasury, the

aspirations of the individual would remain on the defensive. And so long as commerce was

still defined by a guild-like mentality, assuring quality but also minimizing competition,

both individual initiative and industrial cooperation would be hampered" (Solomon, 1996,

p. 200). Here we see the prioritizing of certain values and social relations over others: the

nation over the individual, for instance. Self interest, that of the nation, eclipses altruism.

Nevertheless, it was conceived that the competition of self interests would serve the public good in that it would provide the citizens with a better and cheaper product (Solomon, 1996, p. 201)—a form of social-economic Darwinism. This is also the seed of neo-liberalism which forever altered the course of the Enlightenment away from a true sense of liberalism to a type of liberalism which focused on only a few values and sets of social relations. An example of this is Laissez Faire.

The wealth paradigm was the combined result of historical events and a vision of the world as something *ownable*. These historical events could have been reconstructed in any manner of ways that had nothing to do with ownership in this sense. In fact, prior to publishing *The Wealth of Nations* (1776), Adam Smith "wrote another book, an account of human nature in terms of moral sentiments. Smith was concerned with the gentler human feelings, with the motives that moved men and women and allowed them to live together in society". The foundations for Smith's earlier endeavor were the "development of character and cultivation of those social sentiments that allow us to live together harmoniously" (Solomon, 1996, p. 201).

<Selfishness> was attacked by Smith and Hume who "argued for the naturalness of the exemplary moral sentiment, sympathy". <Sympathy> thus can be understood by the phrase of putting oneself in the shoes of another. "Sympathy so conceived is thus not actually a sentiment but rather a vehicle for understanding other people's sentiments…It is an act of imagination by which one can appreciate the feelings of another person by putting oneself in his place". Thus, despite the axiom that we are inherently selfish, we are not essentially selfish; rather we are social creatures who act on behalf of others. Ultimately, the problem was that selfishness overcame our tendency toward sympathy (Solomon, 1996, p. 202). Encouraging an "act of imagination" to understand another's sentiments is an elevation of the individual perspective in regards to the other. This could have been a

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project, but it was derailed by the competition among nations and particular ideas that

<ownership> and <action> should be unleashed and were supported by lax government

policies. Ownership became tinged by an idea of owning a piece of the market and the

successful achievement of such was highly lauded.

The construction of the United States was precisely that—a construction. It was

founded, as well as its technological expressions of the Constitution and the Bill of Rights,

on certain ideals. These ideals were characteristically pro-business for a certain class of

people—land owning yeomen, tradesman and, of course, lawyers. Their combined interests

determined the path of the United States and deviated from the paradigm of the

Enlightenment (Solomon, 1996). It would seem that local experience greatly modified the

ideals of the Enlightenment. This suggests a prioritization of the individual; however, the

path of his/her growth was predetermined by the structure of society and its influence upon

the form of government.

Kant tried to diminish the influence of experience by exploring the possibility of a

transcendental reason. Certain ideals, such as freedom, could only involve polemics which

practical reason could solve. We organize experience into categories that are common to

all. And here we have a strong element of determinism as these categories caused

experience. These categories are *a priori* forms of intuition. This is not to say that we can

choose how we organize the world's impressions; rather, these basic structures are

necessary and universal. To further distinguish himself from the empiricists, he shifted the

idea of the self from the individual to one where the concept was understood as a

transcendental ego. "The self is, first of all, an activity, or an enormous set of activities,

imposing the categories on sensations received and coming to understand the world"

(Solomon, 1996, pp. 209-210). These categories are an imposition from the outside; they

are a myth which guides experience. Even though this "project" was done at the highest

level of intellectualism, such ideas trickled down to influence social relations. Other such projects could be initiated by Academia.

Nevertheless, the search for their existence and their correct application is a very subjective exercise. This last part constitutes the self as an individual. "This is the self that acts as an agent, the self that deliberates and acts, the self that is moral or immoral, responsible or irresponsible, the self that lives at the heart of the practical world" (Solomon, 1996, p. 210). For Kant there was an order in nature. There was a "harmony of nature with our faculties [which could] guide us toward an even more profound religious perspective, a sense of the world not limited to knowledge and freedom or even to faith". This was a cosmic harmony (pp. 213-214). To operate within this harmony, a new idea of freedom had to be fabricated, a notion which Kant addressed in his second critique. Freedom was not associated with free will as we all were equally not free in that experience was structured by an internal idea of causality. <Freedom> was now a mark of individuality and not free will. Evidence of this is seen in the manifestation of "forms of desires, moods, felt needs, and emotions which Kant collectively calls 'inclinations'. Inclinations naturally lead to actions" (p. 211). In order for said inclinations to find a path to a harmonious participation with nature, they must be liberated. This liberation is a celebration in a liberal negotiation with the world. Unfortunately, very localized circumstances curbed this ideal understanding of liberalism and channeled it toward one characterized by nationalism.

K. <Technology> as a form of power

Scientific advancement was seen as the key to success, especially as Western European nations were competing at the global level. Science was a vehicle to power. Power shaped the concept of <technology>.In other words a conscious effort was made to promote the sciences for the betterment of their respective nations. In England the Royal Society was a vehicle for this. "By stimulating the naturalist's insight into trades it was

enabled to lay the foundations of that rational evaluation and reconstruction of the traditional arts and manufactures that was to become the Industrial Revolution" (Bernal, 1971, p. 455). The Royal Society was a proactive project geared toward creating the conditions favorable to technological development. The other effect of the Royal Society and other such schools was that science was becoming an institution like law and medicine. The State required this type of institution, but what if there had emerged another form of governing body whose institutions were oriented toward different goals—a different project entirely?

What united the various institutions was a sense of liberation from the obstacles that had hitherto inhibited man's destiny as well as competition with other nation-states. Tradition is often an obstacle to innovation and this occurred in science, politics and religion. Liberation, it seemed, was contagious but liberation from one area can lead to new obstacles in another to which technological solutions could be applied. For example, "the solutions reached in mining and metal working, transport and textiles, were technical solutions, but by breaking with tradition they raised new problems which modern science was created to solve" (Bernal, 1971, p. 491). In a more global relationship, one approaching the idea of a seamless web, navigation was a meeting ground for the three areas of politics, science and economics. "By proving its worth there, science became an established part of the new dominant capitalist civilization. It acquired status and continuity that it was never to loose" (pp. 493-495). Again, the circuit between the two entities was not one characterized by mutual influence. Many aspects of civilization, it would seem, would have their scientific elements, especially within the capitalist economy. However, this all occurred in the brutal context of colonialism whereby European powers competed for a share in the market for which a nation's manufacturing ability would supply. The technological advances which promoted these efforts were cherished, but one has to

wonder about the emergence of different types of technological expressions under different circumstances. Colonialism set the stage for the flowering of certain types of technology and not others.

<Technology> began to assume an aura of limitless possibility, regardless of whether its application was right or wrong. The achievements of this time gave men great confidence in the things that could actually be done, like sailing to America for instance. "More important than the achievement itself was the knowledge that it was only a beginning, that there was no limit to possible advance along the same line". Progress was still, unlike during the industrial revolution, an ideal. "Under capitalism in its first phase the new incentive of profit was putting a premium of technical advance" (Bernal, 1971, p. 495). Capitalism put the meat on the bones, so to speak, of the idea of progress. Before that, progress was much more liberally interpreted. Again, progress, as we know it, developed along a very context-specific path suggesting that there are many ways to interpret progress itself; and, from the time between the Renaissance and early capitalism, progress was more of hope and it was not yet totally directed by the exigencies of high capitalism.

L. <Technology> as social relations

<Technology> manifests as progress in all aspects of society. Therefore, sociology should have a privileged place in the study of the relationship between society and technology. Projects in the form of national policies controlled the type of technological expressions. By the time of the incipient existence of the industrial revolution, momentum in the type of production had set in, and the shift in control of production was a crucial aspect to fulfilling this idea of technological progress. The shift in production was from the craftsmen to the merchants and owners of production. "Already by the end of the seventeenth century the stage was set for the further advance of the new capitalist—mode of production" (Bernal, 1971, p. 504). The irony of this is that the reduction of the

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craftsman, and his role in production, to the status of a worker, was needed to create goods competitively that would help man's overall condition. The breakup of guilds was another important factor that aided in the liberation of production as trade restrictions were abandoned in favor of market demands. The expanding market put a premium on technological ingenuity in the textile industry and scientific inventions like the steam engine reduced production costs. The market meant:

> Better organization of labor, the division and specialization of tasks, the factory
>
> system, and ultimately power driven machinery, were all means to this end, and
>
> all drew from it the social drive necessary to break down the older established
>
> systems of production. Once this process started in the latter part of the 18th
>
> century it tended to grow and spread to other fields by its own success based
>
> firmly on the new capital it generated (p. 504).

The process was beginning to unify many aspects of society. Society had an identifiable purpose inextricably linked to technological production, and social relations followed suit. Scientific progress was happening against a background of an expanding capitalist market that was putting pressure on science more and more. Later, in the 19th and 20th century, the benefits of technology were applying the pressure and society and government were following.

Studying the relationship between technology and society from the perspective of the social sciences could highlight the extent and implications of technology's influence upon our lives. The institution of technology had the effect of uniting many aspects of society much like that of a system. In an example were technology's systemic properties are both socially constructed and deterministic is witnessed during the height of the industrialization of Western society. The Eighteenth and Nineteenth centuries:

were the period of the establishment of science as an indispensable force of a

new industrial civilization. The new methods of experimental science

elaborated in the seventeenth century revolution were to be extended over the

whole range of human experience and at the same time their applications were

to keep pace with and infuse the great transformation of the means of

production which we call the industrial revolution....The whole movement [of

the industrial revolution] was far more closely identified with the growth of and

inner transformation of the economic system of capitalism, from the phase

dominated by merchants and small farmers to one dominated by financiers and

heavy industry (Bernal, 1971, p. 503).

Society and technology developed in tandem as the context of capitalism created the

incentives for the expansion of technology whose pattern can be traced up to now. Social

relations in general were being guided by scientific values.

The shift from trade to production was a project. The industrialization of Western

Europe was a shift in paradigm for sources of wealth and diversity. Prior to the industrial

revolution these fountains of resources were land and trade. At the end of the 18th century:

in Europe this was a period in which the main focus of economic expansion

shifted from international trade to domestic manufacture—the origins of the

industrial revolution. Technologically, the period saw the development of

machines—for example, those driven by steam and coal—more suitable for

centralized production in factories than for decentralized production in small-

scale workshops; the advances of science at this time, ranging from electricity to

chemistry, made a direct contribution toward such goals (Dickson, 1988, p.

316).

These changes signified massive social adaptations, and it could be argued that a form of technological determinism was acting upon social relations. For instance at the level of the individual, a worker was less oriented or dedicated to the product as he/she was to the value of the relationship between the worker, the time and the product. And at the level of a nation technological production was seen as a national aim or project; therefore, it would make sense that technological production would reflect this national aim. This is a form of centralization or rationalization heavily influenced by the Enlightenment, but a national aim does not have a predetermined form the alteration of which could alter technology's material form or direction in terms of technological change. What if the social relations that preserved the individual's identity in his/her relation to work were encouraged?

An historical perspective is the recognition of time and experience as parenthetical brackets which epitomize or guide both being and action. Experience within time is a set of circumstances which act to filter perspective. Rarely is such a filter seen, like one does not see the bridge of his glasses since they are too close to the eyes. According to Daniel Boorstin, history began with man's discovery of the new as a state as well as a well seen quality. "By the late seventeenth or early eighteenth century, progress had commonly come to mean advancement to a higher stage, advancement to better and better conditions, continuous improvement" (1978, p. 17). It no longer only meant the forward progression in time and space; rather progress was an ideal that represented positive change. The idea of progress is also an active protagonist in society, either through our use of artifacts or the existence of its instrumental ideals throughout society. Progress does not follow a necessary path; however, technology became the primary vehicle for the realization of progress, and it could be argued that this was done to the exclusion of other forms of progress. <Technology>, then, is almost naturally a hegemonic entity in that it excludes other forms of progress. This hegemony manifests as technological expressions.

The awareness of time around the epoch of the Enlightenment is marked by technological progress, and the apparent reification of the technological order as that which represented both the fruit of science and incentive for capitalism has origins at this time as the notions of instrumental reason were intended to be applied to all aspects of society. The Enlightenment can be termed as the, "recognition of the historical and irreversible element in human affairs. According to the official, Newtonian, liberal view, Natural laws, [were to be] extended from the solar system to cover the world of life and society" (Bernal, 1971, p. 543). There was an active attempt to promote the natural laws in order to elevate man above his surroundings. This was the new paradigm of progress.

Technology became the standard by which progress was measured, leaving behind the original liberal foundations of the Enlightenment; however, the individual scientist had come to have more of a role in society. Technological production and innovation were inroads to this elevated position. Innovation is an insult to tradition:

> The transition from science as a liberating idea [in the 18th]...to a material force
>
> capable of changing the pattern of life, as it appeared to everyone at the end of
>
> the nineteenth, is not, as we have seen, one simple process, but the outcome of a
>
> conflict with many phases of alternating, rapid, or retarded advanced. In that
>
> struggle the individual scientists could not avoid being forced to consider not
>
> only the eternal order of Nature but also the consequences of successful
>
> interferences with it by the new forces of technology and science (Bernal,
>
> 1971, p. 663).

Scientific and technological achievements brought new questions and responsibilities which made the role of the scientist much more complex. These achievements also connected science and humanity in ways that could distinctly be interpreted as "human". So, <technology> as progress could be expanded to mean progress in ways that go beyond

the material. To what extent did this happen? Well, the previous quote implies that an individual scientist would have to contend with multiple interferences which are perspectives. So, there was, at one time, a cultivation of diversified perspectives.

M. Technological progress as an unquestioned good?

The following section is about the possibility of re-channeling science to other ends. Science is pure in its search for knowledge unless and until it is draped in a technological form. The form is arbitrary, but the tendency is to pursue military technologies; again this is a technology influence by a power paradigm.

The conditions of the twentieth century are such that sacrifices were made for unlimited technological production. In certain terms the social conditions, through our institutions, were configured so as to promote technological production. I am not only talking about numbers or the quantity of production; I am referring to types of production influenced by the relationship between science and governments or science and private industry (Dickson, 1988). Competition is the name of the game, either militarily or through the private sector. At this time we experienced a second scientific revolution in the sense that for the first time in history, science was directly involved in economic, industrial and military developments. Science is no longer an appendage within society; rather it is a major player in social development.

Capitalism encouraged countries to secure foreign markets, either through colonization, conquest or monopolistic business practices. This is all some form of competition which can, and has, led to war. "These background conditions can help to explain the differences in the rate of advance and in the kind of use of science in the world of the latter twentieth century" (Bernal, 1971, p. 706). Military science is certainly a significant part of science in the twentieth century, but another factor is the cooperation of various institutions united for a single purpose, albeit victory, profit, etc.

Bernal argues that war is merely the catalyst and that scientific development would have occurred anyway in some form or another. Regarding the development of the atom bomb, he says:

> it is sufficient to emphasize the new kind of large scale industrial enterprise that has grown around atom bomb production, implying a closer partnership than ever by monopoly electrical and chemical combines with the military and the government, by which, without and risk to themselves, the firms can draw ever vaster sums from the Treasury (1971, p. 836).

This is indicative of the type of large scale production with multiple industries and the full blessing of the government. However, if we disregard the result of this effort, the atom bomb, it becomes easier to appreciate the interdisciplinary cooperation and alacrity of production that occurred at this time. "This furnishes an undeniable proof of what science could do, if it were strategically applied to the satisfaction of human needs rather than to purposes of destruction" (p. 836). The former is a project based on human complexity and the latter is founded upon destruction and domination. The material form of <technology>, then, is far from predetermined. The operative words are the "kind of use of science"; the kind is not necessary. It would appear that there is untapped potential within the cooperation of various aspects of society that would have had different effects on the form of <technology> we have as a concept as well as its applications. The Manhattan project was simply a face of a certain type of interdisciplinary energy. What could have resulted from the same energy with different goals, asks Bernal.

In the second half of the twentieth century it became clear that science, as opposed to other institutions, definitely had the power to affect humanity for better or worse. The point is that science was going to affect society, and it did not matter how. "The problem now is rather that of finding the means of directing science to constructive and not

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destructive ends" (Bernal, 1971, p. 716). The two World Wars and the cold war have showed science that there was no need to wait years before putting an idea into practice. With military necessity and unlimited funds there was a greater impulse for science to be extremely efficient in the areas of destruction. In addition to military urgency and financial backing, another important factor in this was the relationship between scientists and practical men who in conjunction were able to quickly put ideas into a framework of application. Trial and error, with unlimited funds as is the case with American wars, provides science with the fodder for technological advance (p. 717). Bernal is suggesting that science could be guided in various directions resulting in quite different technological materializations. The events and corresponding technological expressions of the 20th century give us reason to at least experiment with new types of <technologies>, ones whose expressions reflect the complexity of human existence and not just domination or control.

N. <Technology> as "technique"

The aporia of <technology> on a grand scale, both as technological expressions and social relations has sociological and historical foundations. The above paragraph talked about technological production being the result of unified efforts, either by way of a government or large scale capitalist practices; however, the inspiration behind technological production can also come from much more subtle influences. Material technologies are local and heavily determined by social components, but the idea of technique has global or universal implications. The invisibility of technique is what makes it so powerful. Technique, as an invisible mega-technology affecting social direction, can have effects in many distinct way and areas of society.

Epistemologically speaking, technique is actually a weapon of sociology in that it has cohesive properties which unite many facets of society and civilizations. even. This operation is described by Jacques Ellul's technique which is far more than machine

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technology. Technique "refers to any complex of standard means for attaining a pre-determined result". The technical man is obsessed with the result or the one best way to do something, and technique is his way of negotiating the world. Technique has a role in modern society and it is the operating mechanism of a system of thought. The rule of technique is expanding more and more into all aspects of life. "Every part of a technical civilization responds to the social needs generated by technique itself. Progress then consists in progressive de-humanization—a busy, pointless, and, in the end, suicidal submission to technique" (Ellul, 1964, pp. vi – viii). With the passing of time technique has become more and more prevalent in our lives. How did these circumstances come about? Ellul would argue that distinct sociological conditions, promulgated by the Enlightenment, made it ripe for the diffusion of technique. Specifically, the sets of circumstances are commerce and war. It is characterized as the one best way to do something, but this is not to suggest that the result or the manner by which the activity is realized is necessary. In other words, "best" is the debatable term.

After the Second World War, science and technology began to be understood in global or international terms as well as political ones since they were the key to economic and international security. Society as a whole has certainly been affected, at least to some extent, by this new understanding and relationship with science and technology. The term "technique" is a way to homogenize the totality of effects of the elevated importance of science and technology, and Ellul's work *The Technological Society* is basically a sociological study of the effects that technological values have had upon society. Both competition for market shares and military necessity have heavily determined the direction of science and technology for the entire twentieth century as well as united the world under a similar way of thinking. In Ellul's exact words, the term *technique* is "a totality of methods rationally arrived at and having absolute efficiency in every field of human

activity" (Ellul, 1964, p. xxv). In the context of commerce and war, technique is the totality

of methods directed toward either a larger share of the market or total victory, respectively.

With the goal of expanding one's market share, the exploitation of people and resources are

quite appropriate and, in fact, applauded in the name of efficiency. Ironically, technological

production and change are now more than ever influenced by the need to overcome

diversity in production and application. By this I mean that a certain few values determine

production when there are innumerable values throughout society from which to draw. It

would seem that the totality of social relations would have far more complex values and

empirical determinations which would affect <technology> than just the ones mentioned by

Ellul.

Within the framework of global capitalism, technique is applied toward a favorable

participation within the market. Technology reflects the needs dictated by this relationship,

meaning that logical technological production cannot ignore the forces of global

competition. In a capitalist world, most peoples (nations) have this in common, either from

the perspective of production and/or from use. Ellul feels, despite the variations of cultures

throughout the world, "everything tends to align itself on technical principles. In the past,

different civilizations took different paths; today all peoples follow the same road and the

same impulse...All the business of life, from work and amusement to love and death, is

seen from the technical point of view" (1964, p. 117). This is referring to how technique

does not have geographic barriers nor is it hampered by cultural conventions. The ups and

downs of technique transfer well in the hands of industrialized and developing nations

alike. For instance, in the area of agriculture, the most up to date procedures have become

universal (Ellul, 1964, p. 116). That the process by which they have become universal is

"universal" does not suggest that it is the best way. In fact universal applications have led

to controversies in the developing countries in terms of policies promoting certain

applications and quashing others. Universal can be understood as hegemonic as perspectives are washed downstream with the realization of technique.

In the sense that civilizations are taking similar paths, Ellul is referring to an inability to ignore the global environment, our common market, and the need to have a favorable participation within it. The various civilizations may not be at the same level of development within the overall trajectory, but they are going in the same direction (1964). This is not to say that civilizations are becoming homogenized; rather, it is to say that civilizations are being transformed by the same rule or mechanism. For example, China is a technical China, but the phenomenon of technique involves the idea that the same problems are surfacing in different parts of the world.

On the other hand, the great advantage of technique is that it creates conditions favorable to technological innovation, meaning that competition in a common realm of experience promotes participation from all over the world. We all operate within the same framework of rewards. Also, one cannot ignore the advantages of uniformity in the area production. International standards indeed help to streamline commerce and inadvertently they serve as a common ground in negotiations and relations. Standardization also comes in the form of expectation and values.

Ironically, the wars and heightened commerce over the last four hundred years have created the conditions favorable to technique whereas the initial influences for the investment in technological production were to alleviate us from wars. For instance "war provokes the sudden and stupefying adaptation of the savage to machinery and discipline. The second factor governing technical invasion is commerce. It was mandatory for the Western powers to conquer the markets necessary for Western industry and technical life" (Ellul, 1964, p. 118). Depending on what side of technique one is on, meaning exploiter or exploited, would determine the level of participation. War and commerce have the ability to

involve and activate peoples all over the globe. It does not matter if one is the oppressor or the oppressed, the conquistador or the vanquished. All that matters is contact. Again, there are no geographic boundaries to technique, but this is not to say that there are not qualitative changes with the adaptation to and of technique. War is far from the only inspiration for technique. Global economic movements would be another. Nevertheless, the point is the scale of such movements and not the particular form of movement which suggests that different forms of movements would result in different types of technological production. On the other hand, if technique reaches such a diverse array of civilization then it has a unifying potential, or a standardization potential. <Conquest> and <exploitation> do not have to be the dominant foundational concepts behind <technology>; but, within a single narrative defined be global capitalism, this is hard to avoid.

The uniformity of technique has the power to mask results. This uniformity, regardless of its ultimate intention, is accomplished by the exportation of technicians, methods and education to other parts of the world, either for reasons of commerce or war. Here the expansion of technology becomes either altruistic or imperialistic depending on the overall circumstances. The causes are subtly different, but the results are drastically different. For example, the American involvement in various Third World nations was executed either to expand the US market share serving as a buffer to encroaching communism or it was truly an effort to raise the standard of living in the developing countries (Ellul, 1964, p. 120). A similar dichotomy between imperialism and altruism was seen in the dawn of the Spanish Empire who used the pretext of spreading Christianity in order to exploit the precious minerals as well as to force the local culture into being an efficient cog in the Spanish machine. In any event, technology as technique cannot ignore the global connotation that it carries, meaning that it could be considered objective as a global entity but not necessarily neutral in a local setting.

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The global management of markets is also representative of technique. Attitudes

such as these have become more prevalent since the end of the Second World War,

whereby the implementation of the Marshall Plan "set the stage for large amounts of private

U.S. direct investment in Europe, laying the groundwork for multinational companies"

(Chomsky, 2003, p. 150). This is technique in the form of economic imperialism with the

understanding that the expanding market would increase the need for technological

production within the US. In fact the very idea of a "constant war economy" is an example

of technique par excellence. The business interests of the United States dominated foreign

policy then and still do today, as is seen in the prodigious American involvement in the

Middle East. Nevertheless, global management is neither a predetermined nor necessary

strategy. It can take many forms, and global management requires an agenda and the

agenda is in no way predetermined or written in stone. The agenda can be a project of a

different form.

In the 20th century, technique is a label which can be applied to many such

international conflicts. It is seen through international intervention, resulting in an

expansion of power and influence for the U.S. and other Western powers. Fighting

communism, and later terrorism, was for the Americans an efficient excuse to spread their

ideals. This was an efficient way that was cheaper both in money and morale than an all out

war with the Russian people. After WWII, the American government looked for ways to

support a growing U.S. economy. Truman's Four Point Plan involved sending technicians

to former colonies in order to raise the local standard of living but also to be able to exploit

the natural resources of that country, which can be seen as both an efficient and rational

measure to accomplish many objectives at once (Ellul, 1964). Technique has also taken the

form of a conscious effort to maintain the US war economy which Eisenhower was to

denounce as the Military Industrial Complex (Bernal, 1971). In this case, the government

was weak in the face of business development. Eisenhower warned that we may control technological development if there is a comparable power elsewhere, but until then there is a dominant trajectory.

The fact that Eisenhower was the one to raise the issue is more than a little ironic since he should have been the one to prevent the skewed relationship that ultimately developed between the Congress, arms developers and the military; but the point is that he was warning us against technological overkill whereby missile technology drains resources for other types of technologies. So, technique is many methods whereby technology is a mere component.

Eisenhower was keenly aware of a limited understanding of <technology>, and what is important here is that he was concerned with a waste of technological resources being poured into such a limited aspect of humanity—a never ending war economy. Besides the obvious negative repercussions of the Enlightenment, such as hyper-nationalism and fascism, the aspirations and strategy of the Military Industrial Complex is the epitome of Modernism gone mad in that the foundations of the present are within an ideal future, but a future fueled by the threat of war. Not only is this a limited understanding of <technology> but it is also an example of a misguided resource—the misdirection of <technology>as a meta-resource when this resources could also reflect many other aspects and solve many other problems. Technological production is directed by technique—but one technique among many potential techniques, not the technique. Technique serves as the essence of <technology>, but it does not have to be so limited in terms of application. Ironically, technique unifies us and our interests in the sense that it serves to standardize our values and expectations. At the same time, however, technique separates us from other values that could function as positive influences upon technological production.

Speaking of a limited understanding of <technology>, Noam Chomsky wrote of the possible outcomes of such in his book *Hegemony or Survival*. These interests can either be beneficial or nefarious to the world, and the effects of technique are not necessarily neutral. One of Chomsky's arguments relates to the negligence of the Industrialized nations and their corporate bedfellows whose interests are commonly nefarious for the rest of the world. He illustrates this by citing the 20th century biologist, Ernst Mayr, who claimed that the average life expectancy of a species is around 100,000 years. Mayr then adds that the inchoate formations of human civilization began around 100,000 years ago suggesting that we are rapidly approaching the end of our existence. Chomsky links this fact to the ideals of capitalism by claiming that the governments of the First World intentionally create favorable conditions for multinational companies so that they may be able to abstract the materials and natural resources, regardless of their origin, needed for the perpetuation of the global economy. In other words, the interests of capitalism, or a few elites, are given precedence over local circumstances. In this sense, the US and its corporate partners are also the seed of diplomatic breakdown in that the conditions favorable for multinational corporations are an impasse at the negotiation table. They are a given without sufficient reflection or consideration for local needs (Chomsky, 2003).

A limited understanding of <technology> can have far reaching effects as Chomsky leads us to believe. Perhaps if we had a broader concept, one that included more of the totality of human existence, then we could avoid the complexity of problems that Chomsky is alluding to: political, environmental, etc. Technique is authoritative in that it can be understood to be a narrative which commands social relations, expectations, economics and material production, whereas it could also benefit from the life world, to use Habermas' term. Spheres of life that are not directly related to technique need to be given a chance to participate so that there is a mutual flow of influence. Habermas suggests that this could be

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possible if there are "barriers to protect the spontaneity of the life world from the incursions of the market forces and bureaucratic administration". Habermas himself concedes that this would require colossal effort; nevertheless, this is feasible if we encourage "the ability of the life world to develop institutions capable of limiting the internal dynamics of the economic and administrative action systems [as well as] guiding of social modernization along other non capitalists paths" (Anderson, 2006, p. 38). Habermas is talking about a restructuring of the world order to include other agendas as well as generate new ones. These are new social relations which would be fuel for an expanded scope of <technology>--a project.

O. Conclusion

The historical contexts of the emergence of the Nation-State and the incipient global capitalism proved to be highly determinative in the development of <technology>. These circumstances promoted certain values and expectations to the exclusion of others. <Technology> is a concept that was heavily influenced by the idea of international power.

It cannot be ignored that <technology> is a concept which now more than ever resides in a global context. It affects far more realms of society than simply material production. The question is whether the global outreach of technology, as technique, can be utilized for diversifying the paths of technology or will it be used to retard its growth. In any event it is the global movement's partnership with technique that is questionable, meaning that a change in movement would have an analogous affect on technological production.

Historically speaking, technique serves as a means to analyze our global trajectory from unifying organizing principles. Epistemologically speaking technique is a way of objectifying certain events and methods, and an investigator, if encouraged by Academia and rewarded by Industry, can ignore the local contexts and concentrate on the all-

encompassing mechanism behind the specific actions and social relations. Given that technique resides in many aspects of our lives, one can approach the issue from one of two ways. Either technique serves to include diverse perspectives or it can be characterized as a homogenizing force. In any event, technique is a project whose conditions such as war, production and commerce promote the type of social relations that behoove these very conditions—a vicious cycle which will continue until the resources of the life world or the totality of the human experience are liberated. Technique is the result of its historical circumstances.

We see that modern technology emerged as early as the 14th century as a democratic institution woven into the fabric of society and reflecting the conditions of the time. It was democratic in the sense that it was directly linked the rise of the individual at the decline of feudal Europe. As trade increased, contact between individuals was enriched, and urban centers began to replace the importance of feudal hierarchies. Empiricism emerged as the ultimate foundation for innovation. The notion of currency, in place of land as the measure of worth, is also very democratic and thus conducive to technological innovation since the ultimate success of a technology requires trial and error exercised throughout a variety of contexts and social conditions. In fact, a class of people was needed to be created in order to promote technological innovation, especially as the newly emerging nation-states were competing for power on the world stage. Thus, <technology> began as a very subjective concept with the potential to reflect humanity's multifarious nature. Using Thomas Hughes' concept of momentum whereby it is easier to influence technological development in the early stages than it is in the later ones (Hughes, 1985), we can determine that in its inception <technology> was more of a subjective manifestation had the potential to develop along a much more diverse path, but later, when the stakes were higher, the potential to alter its course, as modern technology, was greatly restricted.

The type of <technology> we have emerged within the parameters of various

projects that incorporated civilizations and spanned over the last five to six hundred years.

These projects can be classified as the goals of Capitalism, the Renaissance, the

Enlightenment, and the State. In a certain sense, the potential fruits of the Renaissance were

harnessed or tailored by the Enlightenment for those that suited the expansion of the State.

The middle class was needed to promote the overall interests of the aforementioned

projects, but the issue is not *that a new class* was created; rather, the issue is *how this class*

served the projects. For instance, Newton's laws are more or less objective, but they were

applied in a totally subjective fashion suggesting that they could have been applied in

various other ways. Nevertheless, the social pressures of a market system in conjunction

with the interests of the State sufficiently narrowed the scope of <technology>. Ellul's idea

of technique encapsulates this overall project of technology that has come down to us over

the last few hundred years. Technique is a set of social relations determined by a context of

market and state competition that is better seen with explosive capitalism and the wars of

the 20th century.

Were it not for the rise of the nation-state and the competition for colonies needed

for the raw materials of manufacturing, <technology> and its technological expressions

would have evolved differently. Thus, progress as well reflects the restricted vision of

<technology>. Certain values are more conducive to the needs of the nation-state and

certain values are excluded which is a very rational approach, and all that was needed was

the tool or the vehicle to carry out the goals of the State. It is this trend or narrative that has

directed civilization for the last 500 years. At first it was Reason which was given the role

of altering history's trajectory, but it was modern technology which abruptly arrogated this

role as the vehicle for progress. Thus, <technology> became forever associated with ideals

of progress and vice versa. This was not considered a problem since technological progress

meant power, wealth and security. Technological progress is also implicated in the creation of a type of rationality which has permeated all of society. So, the democratic origins of technology are hardly seen these days. Technological progress is only one form of progress, and progress is based on certain values that have emerged throughout the evolution of our collective society.

Technological progress could be reconstructed so as to encourage social relations which can counteract the dominant values behind <technology>and technological expression; and, perhaps this reconstruction could create other forms of progress. In other words, could not a better context for a more positive dialogue been established by the increased contact of social relations based on a greater variety of human experience and values? Could it have been any other way, or could there have been a different understanding of <technology> which would have had a positive effect on progress or material production of technology? Certain types of social relations have determined our technological expressions as well as our concept of <technology>, but history has shown us that <technology> could reflect the totality of human experience in addition to the form that it has now. <Technology> and its expressions could have followed a more diverse path; but it became heavily determined by historical events: rise of nationalism and the capitalist system.

Perhaps if we rearrange our social relations or uncover ones that have not been given credit regarding our understanding of <technology> then we would have different results. Nevertheless, the form of technology is the outer shell of a rationality of a certain type to the exclusion of others. The essence of our <technology> can be understood to have a tendency which reflects domination, control, and instrumental reason, and technique is the label for the channeling of social relations to promote certain interests to the exclusion of others. This relationship is the direct result of historical circumstances to the exclusion of

others. Our social relations (as expectations, values, actions) favor this form of <technology> which is the result of historical circumstance and not in any way logically determined.

We can avoid a restrictive understanding of <technology> by prioritizing the subject, the individual, both as an observer and target of investigation. Possible projects could be: 1)a factory system whose operations depend on individual participation; 2) *autonimization* of the subject of investigation whereby it needs as many perspectives as possible with an end toward exhausting its ontological properties; 3) the *autonimization* of the self within the larger contextual reality; 4) a form of reason which looks at nature as the key to technology rather than the inverse of this idea; or 5) a form of reason which encourages looking at an object as a thing in itself and not as just a thing to be used for something else.

Nevertheless, we have a form of reason that shapes and is shaped by conditions that developed during the Enlightenment. Let's look more closely at the origins of this rationality, through an exploration of the project of the Enlightenment.

IV. ENLIGHTENMENT

Introduction

The foundations of our form of <technology> materialized in conjunction with the movement of the Enlightenment. This relationship restricted our potential to think freely; and, as a result, our concept of <technology> is limited. The proponents of the Enlightenment were responding to the historical context favored a paradigm which focused on reason rather than belief; it was nevertheless a project. The result was an optimistic treatment of technology, no matter what. Truth, in Bacon's words, was what works. Was the Enlightenment a self defeating project or it is merely unfinished? Ideally the Enlightenment paradigm was based on a cosmopolitan vision of the world and an elevation of liberalism to promote the full experience of humanism. Nevertheless, it took a turn. In America it was determined and limited by certain interests and geographical potentialities, and in France historical events caused the people to be estranged from the original ideals.

The Enlightenment of the 18th century began as an attempt to make all customs and institutions useful for humankind in as many ways as possible. Part of the foundations for such a notion came from Kant's idea of *a thing in itself* and not as a phenomenon—as a thing experienced by us (Solomon, 1996, p. 215). This was, in fact, a project whereby a liberated object would serve as a model for the liberation of types of perspectives and disciplines. In this section we will see that this project was compromised by certain interests.

Science and technology became the vehicles as well as standards by which to carry out this endeavor. The idea of rational was calibrated to meet the demands of science and technology. Eventually, technology became pervasive in our everyday lives and technical ways of thinking came to obscure others. It could be argued that a scientific and technical

rationality has come to define a new culture but one that, for all intents and purposes, is universal. This rationale dominated social relations and suppressed perspective.

The Enlightenment project can be summarized as a strategy, as a technique, but for what? The Enlightenment is characterized as the organization of rational actions geared toward a central entity to the detriment of other entities. Despite its original liberal intentions, the "seventeenth and eighteenth-century European states were interested in technical progress as a source of greater national power, population and treasure" (MacKinzie & Wajcman, 1999, p. 15). The result is modern technology with its permanent relation to power and wealth. Modern is the term with which I wish to contend. This investigation is largely about dissecting and perhaps enhancing the "modern" of modern technology. I am looking for other adjectives to exist *along side* that of modern when talking about technology. The following is an overview of many approaches of how the Enlightenment ideals have permeated society, and how the type of <technology> we have has emerged as *the* form.

A. The Enlightenment as technique

For Jacques Ellul the Enlightenment is a technique whose existence as a narrative is perpetuated by commerce and war. In retrospection, the Enlightenment was a sociological project constructed to maintain the conditions that make it ripe for the diffusion of the type of technique which maintains the conditions for commerce and war—again a limited understanding of <technology>. The Enlightenment was a comprehensive effort across many fields to liberate man from ignorance, inconvenience, disease and war; however, Enlightenment quickly shed its liberal connotation and became associated with modern technology exclusively. This ideal of modern technology effectively served to overshadow other valuable resources for a truly liberal evolution. This was due to the fact that social

relations and institutions which promoted the perpetuation of modern technology were given such authority that other institutions and social relations were forced to the way side.

Recalling Ellul's idea of technique, his notion of the Enlightenment is the unification of means to promote the means themselves. For example, the idea of the nation-state came out of the economic conditions created during the Enlightenment. The nation-state is a very pragmatic institution, but is it the means or the end for <technology>? The nation-state makes certain practices possible, but the nation-state as such has become the reason to do certain things, such as going to war. <Technology> should serve peoples, and organizations of peoples, such as the nation-state, should not be used as pretexts for technological ends, such as colonialism and exploitation. This raises the question: what if our idea of government were reorganized irrespective of the idea of a nation? A <nation> implies faith and loyalty to an ideal cohesiveness with others while <government> merely implies a structure based on justice or security, for example. What if <government> were relieved of its nationalist implications? Perhaps the resulting structure could actually reflect the original liberal ideals of the Enlightenment or a more harmonious and global experience.

Enlightenment is a kind of meta-technology for a better life. For one, it is based on the idea of a liberating reason that all humans posses which makes its translation to the global scale, at least theoretically, quite feasible since we all posses it. The global implications involve the philosophical negotiation of humanity, values, practices and technologies. The Enlightenment is also behind the policies of colonialism and expansion that fueled the participation in a global market as well as the nationalistic tendencies created by the need for identity in the formation of nation-states. Progress exacts a high price.

Progress at this time, we can recall, began to be associated with the betterment of mankind through technology. Progress is a problematic term. The idea of a better existence through technology is a nebulous and relative goal somewhat related to the goals of a state or an economy since goals can be well seen while at the same time other goals are excluded. The ideals of the Enlightenment encouraged that the institutions be restructured so as to be useful to humanity. As a result science and technology were called upon to guide our behavior and structure our institutions; our ideas of reason and rationality reflected this condition. In other words, a technical way of thinking began to infiltrate our negotiation with the world on many levels, and the goal of a freer society was thought possible through scientific progress. This involved a certain level of integration of all of society to the norms established by science whereby the many component parts of society were organized such that a common goal could be achieved. The Enlightenment called upon the industrious individual to serve the universal (the market or the state for example). The epitome of this can be seen in Napoleon's conquest and, then later, organization of Europe under a system or a code of laws. Napoleon applied the ideals of the Enlightenment to military organization and recruitment, to laws and to society on a grand scale (Ellul, 1964). Society came together, at least in the sense that part of it was organized toward a common goal—the liberation of man— which was considered to be the vehicle for rational behavior. The liberation of man implies the unleashing of the full potential of humanity, but this potential was quantified so as to quash much of this potential that did not serve technique as described above. Technique is a rationale. Society operated under the influence of this rationalism, but rational behavior does not have predetermined ends. By this I mean that the ends could change depending on the goals. Below we can see the negative aspects of blind rationalism.

Rationalism in the form of man's liberation gradually became secondary to a rationalism organized toward the preservation of hierarchies. Ironically, the Enlightenment began as a banner for the individual, a true celebration of liberalism, but this became impractical as competition among Western European nations escalated; therefore, a form of operational rationalism subsumed the ideals of humanism which were reoriented to include a global perspective, regardless of the cost. The Enlightenment's primacy of means over man did not fully take root until it became evident that the organization of forces (in every sense) was seen as an advantage over the promotion of individual freedom. We are united by our freedom instead of isolated by it. At this time society was seen not as organized for the individual but as organized by the individual. This can be seen as an invisible technology of means. For instance:

> with the issue of Renaissance humanism, which still haunted the seventeenth
>
> century—it believed not only in the knowledge and respect for the human being
>
> but in the genuine supremacy of man over means. This humanism bound up with
>
> the idea of universalism did not allow techniques to grow...This had to wait
>
> until the eighteenth century to see technical progress suddenly explode in every
>
> country and in every area of human endeavor (Ellul, 1964, pp. 41-42).

The focus of humanism had to be shifted from individuality and liberalism, in the total sense, to an idea of humanism united by individual needs. For example, the idea of the greater good could be used as a justification for measures that might contradict one's idea of free will. Also, the promotion of technological production can be taken as a step toward solving problems that we all have, but sacrifices must be made by the individuals in order to make this happen. Is technical progress the only or best way to encourage the human endeavor?

The technical progress came with the advent of the industrial revolution and the coinciding political and economic structures. However, the industrial revolution was not the first or only form of this world-wide organization. Recall that society itself was reorganized within common values and expectations. At the level of an entire society, this reorganization can be understood to be a "technique" or a system of thought that converts qualitative aspects of life into quantitative ones. This ordering, or redistribution, is most obvious with the industrial revolution as classes were organized around forms of production, but this event is far from the only example of this new way of thinking. The industrial revolution is only about revolutions in material production; however, Enlightenment, as technique, participated in all aspects of our lives. For instance:

> The change [was] not in the use of a natural force but in the application of technique in all spheres of life. The technical revolution meant the emergence of a state that was truly conscious of itself and was autonomous in relation to anything that did not serve its interests...It entailed the creation of a precise military technique (...) in the field of strategy and in the fields of organization, logistics and recruitment; the beginning of economic technique with the physiocrats, and the latter the liberals. In administration and police power, it was the period of rationalized systems, unified hierarchies, card indices and regular reports (Ellul, 1964, p. 43).

The measures mentioned above certainly put the interests of the state above those of the individual, and technological production would reflect this prioritization of interests. This is ironic since the state should protect the individual. Technique also applied directly to the human realms. People had to work and obey the law, particularly in France after the revolution. With Napoleon's policies "there were to be no more loafers, (under the French Revolution they were imprisoned) no more privileged persons, no special interest.

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Everyone must serve in accordance with the strictures of technique" (p. 43). Here, the means have become the ends. Progress was seen in the promotion of the means.

Progress, or technological change for the betterment of humankind, was redefined as a concept during the Enlightenment. Experience that was once qualitative was reorganized so as to maximize the qualitative aspects which served to order Nature out of chaos (Ellul, 1964, p. 43). Progress was the label given to this, and from then on it became a condition related to a state of existence in addition to its former understanding as a change in position in time and space. Change was now a change through technique as applied to all aspects of life. Change was progress, but change was also directed by technological progress. The ordering of chaos was the agenda which could be applied without scruples to many aspects of society, including policies on colonialism and even piracy. Is this the only type of change or progress? Can there not be progress of another sort, even one on an equally global scale? Progress is modern technology as set forth by the Enlightenment such that technology is the manifestation of instrumental reason. The point is that change did not have a random or disperse or diverse effect on society; rather, change was heavily guided by a certain idea of progress and to all aspects of society. There was a sense of uniformity and standardization which could have precluded the emergence of other such influences.

B. <Technology> as calculability, as a separation from nature

One Form of Enlightenment: is there any other way? The Enlightenment was a self defeating project in that we cannot know nature apart from seeing it as a resource for a specified purpose. In a slight contrast to Ellul, Horkheimer and Adorno understand technique not to be the natural result of social conditions; rather, it is a myth—a myth characterized by power and our estrangement from the world and not an organization of it. Nevertheless, both understandings of the Enlightenment as technique are agendas which serve to promote certain social relations and perspectives while suppressing others. Like

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Ellul, for Horkheimer and Adorn, technique is a type of ideology which caters to the individual needs but serves the overall ideology that nature is a standing reserve for our use; however, means are still the primary ends. In this sense, <technology> is a form of knowledge of nature. Through Horkheimer and Adorno we see that technology is the result of a certain way of seeing the world kin to a power relationship. Power relationships are by nature alienating in terms of certain qualities. To exercise control one must surrender any possibility of truly knowing those qualities in the thing to be controlled that do not serve the purpose of the controlling.

The individual has no real role in Enlightenment; rather he/she is an apparatus necessary for the perpetuation of the ideology. This ideology is one where the individual is united, not by liberalism or inalienable rights, but by needs constructed out of consumption. For this reason, freedom becomes an ambiguous term. For example, in politics and in the culture industry, the individual is studied so that the political platform or product may be tailor-made to coerce the individual. The opposite of the individual is ideology since it has universal implications; and in our case the ideology is capitalism. The ideology has been established; so, freedom is merely choice within the ideology (Horkheimer & Adorno, 2002). In order to understand Horkheimer and Adorno's interpretation and criticism of the Enlightenment, it helps to think of it as a project. Such an analogy facilitates the application of the general, in whatever form, to the specific realizations which is necessary since Horkheimer and Adorno draw from such examples as medicine men and the holocaust. In short, the Enlightenment for Horkheimer and Adorno meant that we will have a repetition of the same song but with different tunes.

Theodore Adorno and Max Horkheimer have a pessimistic concept of the Enlightenment. They have uncovered the Achilles heal of the Enlightenment which was another myth—that Nature was something created for our ends—an invisible technology, if

you will. In an effort to abolish superstition and myths, they argue that the Enlightenment was blind to its own mythical foundations of totality, integration and certainty or the *instrumentalization* of reason. Originally, the Enlightenment was an attempt to liberate society from fear, and it was meant to place man as the master of nature. This was done in a manner that reflected a rational domination of nature's mysteries which included natural disasters, diseases, and inconvenience due to our biological shortcomings and the obstacles of Nature.

Horkheimer and Adorno, however, characterized our mastery of nature as an estrangement from nature or as a disenchantment of the world. They see Enlightenment as that which severed as the bond between man and nature. We are not in nature; nature is ours. The Enlightenment removed belief and tradition as obstacles to the betterment of man; but "the happy match between the mind of man and the nature of things with the result that humanity [has been] unable to use its knowledge for the betterment of its condition" (2002, p. 1). So, the Enlightenment was a retreat from belief and tradition as authority and was an attempt to harbor the idea that systematic inquiry into Nature's mystery would establish man as its master. Horkheimer and Adorno argue that this has led to calamity.

Originally the Enlightenment was the promotion of a method whose results would be the objective gathering of data to be applied towards man's improved condition. Horkheimer and Adorno cite Francis Bacon who advocated that systematic enquiries into nature would be exempt from power and corruption. "Knowledge obtained through such enquiry would not only be exempt from the influence of wealth and power but would establish man as the master of nature" (Horkheimer & Adorno, 2002, p. 1). In other words, knowledge had to be harnessed in order to avoid obtaining it through chance or power relations. It was better to obtain it by systematic enquiry to avoid exploitation; however,

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methods of inquiry are methods of power, and power is not a "democratic" concept. There is a price to pay. The result is that man has power over nature but not knowledge of it. This is so because the object of knowledge became man's betterment and not his understanding of nature, necessarily. Technology is a form of knowledge—a knowledge based on the conversion of nature to a standing reserve; therefore, man's continued participation with nature serves to sustain this form of knowledge as a viable entity. Here, we see the essence of many social relations which formed as a result of this particular understanding of Nature.

<Technology> is the aporia of the new type of knowledge that originated in the Enlightenment. Technology as knowledge is prejudiced; it is almost instinctual for it to reflect the bourgeoisie's technology of capitalism. "Technology is the essence of this knowledge. It aims to produce neither concepts nor images, nor the joy of understanding, but method, exploitation of the labor of others, capital" (Horkheimer & Adorno, 2002, p. 2). In short, this form of knowledge is the foundation for the ideology of capitalism. Horkheimer and Adorno are cynical towards this type of knowledge since it is just that, a *type* of knowledge, suggesting that there are other types of knowledge. The aphorism *knowledge is power* is not so much based on the idea that having knowledge will bring one power, but as the notion that knowledge is the manifestation of power, from whatever form. The form of power will be reflected in the technology. Another form of power could be purity of mind and behavior through the successful applications of nature's laws (Scharff, & Dusek, 2005, p. 5). The latter understanding would seem to be much more receptive to potentially diverse technological applications or, at the very least it would promote new types of technology. Knowledge is a tool. For now it is at the service of the bourgeoisie economy. In the past, it has also been at the service of Kings and our desire to exploit creation (Horkheimer & Adorno, 2002, p. 2). Can we not put knowledge at the service of other manifestations of social relations other than exploitation?

As things are, however, there is a major element of domination in the foundation of <technology>, and the technological expressions are merely a method, a way of maximizing our contact with nature. Even though our contact with nature is each time more influenced by technology, this contact is categorically limited due to the nature of <technology> to which we have become accustomed. <Technology> promotes the recreation of old tools; however, these tools are useful in perpetuating a certain type of technology—*same song, different tune*. "The many things, which according to Bacon, knowledge still held in store are themselves mere instruments: the radio as a sublimated printing press, the dive bomber as a more effective form of artillery, remote control as a more reliable compass. What human beings seek to learn from nature is how to use it to dominate wholly both it and human beings" (Horkheimer & Adorno, 2002, p. 2). The ideology remains the same; it is the form which changes to suit needs generated by this very ideology. Man became the master of nature which was achieved through a conversion of nature by encapsulating it within mathematical terms, or within terms that would be less susceptible to mythical unknowables. Quality is less difficult to convert once it has been categorized into qualitative terms. Conversion is not necessarily knowing; in fact, it could be argued that conversion is a revelation of not understanding. A change in the ideology changes technological production.

The ideology we are speaking of is one which epitomizes exploitation. Technology is a manifestation of this type of relationship which assumes a form that is not random; rather it is determined by this essence of exploitation. This is kin to short term satisfaction that is not true knowledge "in discovery of particulars not revealed before, for the better endowment and help of man's life" (Horkheimer & Adorno, 2002, p. 2). Horkheimer and Adorno label knowledge as an operation characterized by effective procedure; however, the reality is that knowledge is tinged with satisfaction or it "is for pleasure, and not for fruit or

generation" (p. 2). If knowledge is based on man's satisfaction, then there will be no mysteries revealed other that those related to man's satisfaction. Discovery is characterized by this. Could there not be other forms or essences of discovery? The concept of fruit suggests a continuity of one's labor. As the fruit contains a seed, its essence will be passed on for future generations. In terms of material technology, there is a thread or pattern to technological development whereby the future is of prime consideration. The future has become a market. There is a trajectory within a type of knowledge considered in such a fashion. It is not random or subject to our whims. It is conscious of a great many contexts. Nevertheless, as it stands knowledge is an order whose aporia is a form of exploitation.

Some of the consequences of this new order are the following. Things are not considered for their qualities in their own right but only in their ability to achieve something else. Absolute ideas are synonymous to our representation of them. Apart from its association with causality, meaning is lost. "From now on matter was finally to be controlled without the illusion of immanent powers or hidden properties. For enlightenment, anything which does not conform to the standard of calculability and utility must be viewed with suspicion" (Horkheimer, & Adorno, 2002, p. 3). The Enlightenment removed diversity from the world in the sense that all was brought under the rubric of the subject. The subject incorporates everything which is a highly rational manner by which to arrange Nature's mysteries. Yes, there are qualities, but their recognizable features are arranged in a fashion that is conducive to individualized interpretation, so to speak. In this arrangement, there is a corrosive rationality to the Enlightenment. The diversity within the totality is masked by unity—a unity organized by a rationality through which anthropomorphism serves as the model for organization.

In addition to an anthropomorphic perspective the Enlightenment unified nature under the myth of mathesis. Unity was the order of the day:

For the Enlightenment only what can be encompassed by unity has the status of

an existent or an event. Its ideal is the system from which everything and anything

follows...Despite the pluralism of the different fields of research, Bacon's postulate

of *una scientia universalis* is as hostile to anything which cannot be connected as

Leibniz's *mathesis universalis* is to discontinuity. The multiplicity of forms is

reduced to position and arrangement, history to fact, things to matter (Horkheimer

& Adorno, 2002, p. 4).

In this sense mathesis sounds more like taxonomy, and existence and experience become

determined by their relation to a rational system and formal logic provided by the

Enlightenment thinkers with a scheme for making the world calculable.

A central thesis to *Dialectic of Enlightenment* is that nature is converted into a

resource for man's use by way of technology. This results in our ability to manipulate

nature without really knowing it. Horkheimer and Adorno write that technology is a way of

harnessing nature's mysteries and resources; and, in this way, we are obliging the world to

exist within the criteria that we have created. In other words, the ideals of calculability and

utility serve to unify the world in an artificial manner that results in an alienation from the

nature of things (2002, p. 3). In simpler terms, nature looses its qualitative essence and is

only recognized for its worth as reserve material for our instrumental view of the world.

This is virtually a conversion of nature into alien terms, a myth created by men for their

purposes. We are denying ourselves perspectives which are based on qualitative

approaches. Could not quantitative and qualitative interpretations exist in a more

complimentary way? How about different criteria, different <technology> and

technological expression?

The idea of alienation filtered into our relations with our fellow human beings

which emerged in many aspects of society. Once the subject emerged and was given

priority in nature's interpretation, the idea of a struggle among men and with nature was recognized and condoned. This is the foundation of our interaction with other men and with nature. This is also a set of social relations whose manifestations reflect this core idea. It serves as a primary cause before interpretation and negotiation:

> The awakening of the subject is bought with the recognition of power as the
>
> principle of all relationships. In face of the unity of such reason the distinction
>
> between God and man is reduced to an irrelevance....In their mastery of nature,
>
> the creative God and the ordering mind are alike. Man's likeness to God consists in
>
> sovereignty over existence, in the lordly gaze, in the command...Human beings
>
> purchase the increase in their power with estrangement from that which it is
>
> exerted (Horkheimer & Adorno, 2002, p. 6).

We know nature in as far as it exists for us and as a thing to be manipulated. The unity of nature lies in our limited framework of understanding it. The uniqueness of nature's elements has been reduced.

The rationality of the Enlightenment also stripped nature of its individuality in another sense—through representation. Science and representation have been standardized:

> Representation gives way to universally fungibility. An atom is smashed not as a
>
> representative but as a specimen of matter, and the rabbit suffering the torment
>
> of the laboratory is seen not as representative but, mistakenly, as a mere
>
> exemplar. Because in functional science the differences are so fluid that
>
> everything is submerged in one and the same matter, the scientific object is
>
> petrified, whereas the rigid ritual of former times appears supple in its
>
> substitution of one thing for another. The world of magic still retained
>
> differences whose traces have vanished in linguistic forms. The
>
> manifold affinities between existing things are supplanted by the single

relationship the subject who confers meaning and the meaningless object,

between rational significance and its accidental bearer (Horkheimer & Adorno,

2002, p. 7).

Relationships are less seen among nature as they are relations to us. In a sense, it could be no other way; but in another sense, could this perspective not coexist with others, or could there not be a hierarchy of perspectives whereby other perspectives are at least given a place to be considered or compared to others?

The conditions that gave rise to the Enlightenment and the current market system spawned the redefinition of reason directed toward social and natural domination. The price we paid for this is a limitation of the utility of <reason> as a concept. Horkheimer and Adorno "lament the enlightenment", which according to them invented a kind of science and technology that did dominate nature but did not promote the "flowering of reason", but the result was an enlightenment characterized by prediction and control (Horkheimer & Adorno, 2002). These two values, prediction and control, kept a lid on the potential of reason which maintained that instrumental reason, through technology, would thrive until today. Recall "the manifold affinities between existing things are supplanted by the single relationship between the subject who confers meaning and the meaningless object, between rational significance and accidental bearer". The "flowering of reason" is its modification to reflect certain values (prediction and control) to the exclusion of others. The flowering of reason could imply the cultivation of potential and the channeling of this resource into as many aspects of life, reflecting a multitude of values, as possible.

Within these manifold affinities there is potential that is quashed by the application of one form of reason to the exclusion of another. Is there not more potential within the subject other than to rearrange the environment for his/her purposes? How could these affinities be maximized in order to create a more fluid and diverse dialogue with

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<technology>? What is known is only known by way of a predetermined framework. Possibility becomes possible as... Thought had to be liberated from the individual whims of man. It had to be organized so it would take a certain direction which gives it a certain amount of autonomy over the object of thought. Thought is somehow separate from the object in the sense that it manifests as a form of domination of the object. This form of thought is ideology, but it is a restriction upon our relationship to nature and technological expressions.

Modern technology has instilled within us the idea that anything is possible as long as it is carried out in terms of controlling the world, not necessarily imitating it. In other words, any such thing is possible and acknowledged as long as the "thing" which emerges from the efforts of possibility is essentially the fruit of control. Horkheimer and Adorno draw upon the idea of a medicine man to illustrate the distinct types of relationships one can have with Nature. On the one hand we can imitate Nature, on the other we can distance ourselves from it by establishing the relationship as one based on power. "The autonomy of thought in relation to objects, as manifested in the reality-adequacy of the Ego, was a prerequisite for the replacement of the localized practices of the medicine man by all-embracing industrial technology," which they intend to mean the technology of monopoly (p. 7). This refers to a type of thought whereby everything is organized under this specific mechanism which is not so much a method as it is a form of prejudgment. For example, "when in mathematics the unknown becomes the unknown quantity in an equation, it is made into something long familiar before any value has been assigned. Nature, before and after quantum theory, is what can be registered mathematically; even what cannot be assimilated, the insoluble and irrational, is fenced in by mathematical theorems". The trial is not the root of untruth but in the form of the trial itself. Again, this is a type of relationship whose result is that the autonomy of thought is questionable. In society, we

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purposefully establish many types of relationships for different results. Could there not be a myriad of relationships between man and Nature? Knowledge is a form of pre-knowing, but this does not have to be the case, and thinking is the perpetuation of this exercise.

The question that they raise is: are we still thinking or merely promoting the "machine" that we use to help us think? We are not thinking while we think. Thought and judgment are tied to the experience of domination of nature, and meaning is restricted to the actual. Meaning is devoid of tradition which is another form of social cohesion, whereas according to Horkheimer and Adorno what unifies us is a limited understanding of the object—an understanding only in as far as it stems from domination and control. Concepts do not have cohesive properties. There are no absolutes, and the post moderns have taken this to the extreme. For instance, now it is very common in an investigative setting to hear someone say: "well, it depends on what you mean by..." In any given setting the same concept could demonstrate a variety of meanings. Postmodernism is not the sublimation of the individual, as it was with the Enlightenment, but it is the anxiety of the individual without identity. The individual, as a category, is no match for global capitalism.

Capitalism is now the one grand narrative. All participate within its contextual boundaries and free will is only free will as determined by this context. Even though the post modern world is characterized by unrestrained subjectivity, "the postmodern was a sentence on alternative illusions" (Anderson, 2006, p. 46). The individual is caught between the desire to express his/her limitless freedom and the restraints of the system which cannot be avoided. Paradoxically, meaning is simultaneously standardized by the system and fragmented in individual application. The paradox of <meaning> serves to maintain isolation between individuals. At the same time we are unified by this manifestation of meaning, and the price we pay is that we are atomized from each other and from nature;

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and the notion of <free> is flexible only within a very hegemonic framework. Ironically we are unified by this ideal of separation.

According to Horkheimer and Adorno, the Enlightenment rationale of unity was also witnessed in religion as the written word was turned over to the individual to be interpreted. In the practice of religion, the *word* replaced the art of belief which was anathematized as the unfounded heir to mythology. "The attempt made by faith under Protestantism to locate the principle of truth, which transcends faith and without which faith cannot exist, directly in the word itself, as in primeval times, and to restore the symbolic power of the word itself, was paid for by obedience to the word, but not in its sacred form" (2002, p. 14). This is obedience to a system rather than to meaning or potential meaning. It encouraged a blind faith in the word without intellectual participation. The word is the source of the faith. The word is more determined by its connection to the system of words rather than to the meaning of the object. This form of meaning is a form of objectification as meaning becomes encapsulated within language systems.

The idea of objectification is especially important in power struggles. Horkheimer and Adorno point to language as the result of an evolutionary struggle where the product of language was a manifestation of power struggles and class domination. "The repetition of nature which [symbols] signify always manifests itself in later times as the permanence of social compulsion, which the symbols represent. The dread objectified in the fixed image becomes a sign of the consolidated power of the privileged" (2002, p. 16). The structure and order of language represents a hierarchy as there are patterns of inference and dependence which correspond to the real conditions of society. The structure of a social hierarchy exists for the particular interests which preserve the structure. It is mutually reinforcing. For example:

Power confronts the individual as the universal, as the reason which informs

reality. The power of all the members of society, to whom as individuals no

other way is open, is constantly summated, through the division of labor imposed

upon them, in the realization of the whole, whose rationality is thereby

multiplied over again. What is done to all by the few always takes the form of

the subduing of individuals by the many: the oppression of society always bears

the features of oppression by a collective (p. 16).

The idea of the rational whole decreased the importance of individual identity or

perspective. In fact, the individual must identify with the masses in order to be counted as a

veritable social force. By reverting to the power of society, the individual is serving to

promote the order. In a scenario of power, the individual must be objectified into an entity

which serves the power hierarchy and does not challenge it. In this case the individual is the

consumer.

The individual has given up his/her subjective participatory power. He has forfeited

part of his/her ability to impose creativity because the tools to be used are those which

serve a hierarchy, leaving little room for interpretation outside this framework. "The unity

of collectivity and power now revealed itself in the generality which faulty content

necessarily takes on in language...The impartiality of scientific language deprived what

was powerless of the strength to make itself heard and merely provided the existing order

with a neutral sign for itself" Horkheimer & Adorno, 2002, p. 17). In the Enlightenment,

representation and reality were at a deadlock, making qualitative resistance difficult. If

there are no universal, metaphysical concepts, language becomes the manifestation of

proven experience, power struggles of might makes right. Also, tools are calibrated to

perpetuating power struggles and hierarchies. Recall Habermas' comment on the lack of

fair play between science, morality and art when influencing social relations.

In addition to our relationship to nature, the ontology of the individual is also affected. The instrumental rationale of the Enlightenment not only objectified nature but it alienated individuals from themselves and others. Our criterion of existence is based on self preservation. We define ourselves in the success or failure of our ability to adapt to, not our being, but our function:

> in the bourgeois economy the social work of each individual is mediated by the principle of the self; for some this labor is supposed to yield increased capital, for others the strength for extra work. But the more heavily the process of self preservation is based on the bourgeois division of labor, the more it enforces the self-alienation of individuals, who must mold themselves to the technical apparatus body and soul (Horkheimer, & Adorno, 2002, p. 23).

Here, we see technological values engulfing the being of the self as technology is developed for such purposes. Self preservation is more than a religion; it is the way of being in the world to the extent that all activity is objectified. Meaning is restricted to historical or human understanding. The relationship to nature is defined solely by its service to man. "Not only is domination paid for with the estrangement of human beings from the dominated objects, but the relationships of human beings, including the relationship of individuals to themselves, have themselves been bewitched by the objectification of the mind". The criterion for individual experience is self preservation (p. 21). At the core of identity is the idea of self preservation. Are there not other types? Or could not this idea exist along side others? Here, Horkheimer and Adorno are talking about the suppression of social relations that could be applied toward other ends that are not in effect. As things are, types of social relations are promoted to the exclusion of others, and one set of these relations is types of knowledge.

For Horkheimer and Adorno, the Enlightenment is also an abstract manifestation of the circumstances which promote a type of knowledge. The scientific method and technological production are the tools which most directly promote this ideology. The Enlightenment, as the foundation of this ideology, is not necessarily a portable weapon to maintain power-knowledge structures; rather, Horkheimer and Adorno are merely explaining how the various structures that penetrate society have formed, thereby establishing this ideology a status quo of interpretation. For instance, science is the preferred form of language which has removed suggestive power from expression apart from its use. "For the scientific temper, any deviation of thought from the business of manipulating the actual, any stepping outside the jurisdiction of existence, is no less senseless and self destructive than it would be for the magician to step outside the magic circle drawn for his incantation" (Horkheimer, & Adorno, 2002, p. 19). It is a circle, perhaps a circle among many possible other forms, upon reality which enframes our interaction with the world. This idea is similar to Kant's promulgation that knowledge penetrates all beings, but once this occurs the being is no longer a being. The point is that there is a priority given to this type of relationship which by prestige precludes others. Basically, capitalism is a sum total of social relations whereby technology is seen as the engine which perpetuates capitalism. This seems to be an arbitrary relation and it is by no means necessary to the various needs of our collective civilization. Nature is nature as so defined; therefore our negotiation of nature and our total environment, social included, and technology is that which we resort to in order to help us with these negotiations. This seems to be a limited application of technology.

Part of why Horkheimer and Adorno label the Enlightenment as a myth is that it is self defeating. It was supposed to be the showcase of the individual and liberalism, but it resulted in the elevation of a selfish individual who exists for an ideology which isolates

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individuals from one another. Reason is now entirely purposive, meaning that the other becomes the object of reason which is not conducive to a harmonious existence in society. "The self, entirely encompassed by civilization, is dissolved in an element composed of the very inhumanity which civilization has sought from the first to escape...By subordinating life in its entirety to the requirements of its preservation, the controlling minority guarantees, with its own security, the continuation of the whole" (Horkheimer & Adorno, 2002, p. 24). This led to an exploitation of the individual as a component rather than a free entity. Such a contradiction, that of self preservation and life, preserves a hierarchy that can be exploited since the power of the individual is set against its own liberating potential. Could we not search for the social relations which promote the individual's liberating potential in order to have a more positive effect upon <technology> and technological expression?

It would seem that our civilization is based, in essence, on nothing other than self preservation. The Enlightenment constituted a fear of myth, to use their phrase, which was addressed by the emergence of a reason based on self preservation. Everything is first and foremost a thing in an economic relationship whereby:

> the endeavor of preserving oneself is the first and only basis of virtue, contains the true maxim of Western civilization, in which the religious and bourgeoisie are laid to rest. The self which, after the methodical extirpation of all natural traces of mythological, was sublimated into a transcendental or logical subject, formed by the reference point of reason, the legislating authority of action (Horkheimer, & Adorno, 2002, p. 22).

The subject serves the system of self preservation such that the system is kept alive by the subject's participation. For example, there is a monopoly on a certain type of meaning

which is promoted by a limited relationship with nature founded on an instrumental notion of reason. Nature is the result of a procress, a technical one:

> The technical process, to which the subject has been reified after the eradication
>
> of that process from consciousness, is as free from the ambiguous meanings of
>
> mythical thought as from meaning altogether, since reason itself has become
>
> merely an aid to the all-encompassing economic apparatus. Reason serves as a
>
> universal tool for the fabrication of all other tools, rigidly purpose-directed and
>
> as calamitous as the precisely calculated operations of material production, the
>
> results of which for human beings escape all calculation. Reason's old ambition to
>
> be purely an instrument of purposes has finally been fulfilled. The exclusivity
>
> of logical laws stems from this obdurate adherence to function and ultimately
>
> from the compulsive character of self preservation. The latter is constantly
>
> magnified into the choice between survival and doom, a choice which is reflected
>
> even in the principle that, of two contradictory propositions, only one can be
>
> true and the other false (p. 23).

Meaning, according to Horkheimer and Adorno, is heavily determined by an economic apparatus whereby the subject, or the self, has transcended individuality resulting in an overarching, all applicable idea of self preservation. Thought has become a marketing tool for a certain type of system.

If we are tied to one type of system, what we are experiencing is only a scion of the relationship between the individual and the system. Thought becomes thought in terms of the extent that even the thought processes of our so called leaders are hampered. "A consequence to the restriction of thought to organization and administration, rehearsed by those in charge from artful Odysseus to artless chairmen of the board, is the stupidity which afflicts the great as soon as they have to perform tasks other than the manipulation of the

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small" (Horkheimer, & Adorno, 2002, p. 28). Science and technology are the manifestation of the betrayal of the Enlightenment in that they embody experience as manipulation and self preservation. Modern technology makes nothing new, only more efficient of the same but within the framework of manipulation and self preservation. In our attempt to overcome fear, we have forfeited ourselves to another "form" of fear—to that which determined this limited framework. The Enlightenment had meant to be a liberator of man, but what has occurred was a self sacrifice to the immediate benefits of modern technology as the larger concept of <quality> was reduced to <functions>. If technological expressions can be reduced to functions, then could they not be reduced to other essential qualities?

There is power within thought per se, but this power is severely restricted by positivist reoriented thought. The notion of concepts looses its metaphysical potential and is grounded on a form of thought as such. In this sense <freedom> is merely freedom to manipulate. "Enlightenment...was never immune to confusing freedom with the business of self-preservation. The suspension of the concept, whether done in the name of progress or of culture, which had both long since formed a secret alliance against truth, gave free rein to the lie" (Horkheimer, & Adorno, 2002, p. 32). A concept with foundations of self preservation is a subject-oriented concept whose meaning has been determined. In addition freedom has been relativized beyond any liberal connotation of the word. Power is preserved in the collective thought processes of society in that necessity becomes the foundation for thought and therefore social relations. Again, thought is though as. The victim is reflection:

> By sacrificing thought, which in its reified form as mathematics, machinery, organization, avenges itself on a humanity forgetful of it, enlightenment forfeited its own realization. By subjecting everything particular to its discipline, it left the uncomprehended whole free to remain as mastery over things against the life

and consciousness of human beings. But a true praxis capable of overturning the

status quo depends on theory's refusal to yield to the oblivion in which society

allows thought to ossify (p. 33).

We are, in a sense, slaves to our forms of thought, and change is weakened by this

paradigm of convention. <Technology>, it would seem, could benefit from a more complex

and diverse paradigm of thought. The liberation of thought would lead to the liberation of

technological production. In addition thought as such or thought based on self preservation

tinges our idea of freedom; thought becomes the vehicle for certain forms and the

suppressor of others.

Consistency in thought can also be put in a positive light, meaning the

Enlightenment has been successful in that there is relatively little chaos in terms of global

interpretations of aesthetics and economic structure. Standardization was seen as the path to

rationalization and security. This sameness is perhaps best seen in the culture industry as

there are many systems who behave very loyally within a cohesion of social relations

defined by a mastery over things. Horkheimer and Adorno demonstrate that the very act of

consumption is the act of reifying and preserving the cultural systems as mere components

of a larger goal—the perpetuation of capital or the market, for instance. The distinction

between the universal and particular is false. The universal tinges the particular with

standards and sets its limits. The culture industry is about standardization, putting the

benefits in the hands of the few who control its development (2002).

There is efficiency in this manner of controlling cultural output in as far as

technological production is served, but <technology> itself is inhibited. There is nothing

within <technology> which determines that it must manifest as standardization and mass

production, but this is the reality since all technological expression, the culture industry

included, is the manifestation of a monopoly of a certain type of thought. This is merely the

function that technology has been assigned. "Culture is infecting everything with sameness...Even the aesthetic manifestations of political opposites proclaim the same inflexible rhythm" (Horkheimer & Adorno, 2002, p. 94). The public's wishes are considered only as receivers and not as participants. "The mentality of the public, which allegedly and actually favors the system of culture industry, is a part of the system, not an excuse for it" (p. 96). Here again, the means have overtaken the ends. So, instead of being a source of varied inspiration, the public reinforces the categories of sameness throughout artistic expression. Decisions are made, not based on public desire, but on supporting the technical apparatus which conveys art to the public. "Any need which might escape the central control is repressed by that of individual consciousness" (p. 95). By this they mean that individuals are categorized by technology. For instance the transformation from the telephone to the radio demonstrates that the public can be molded into uniformized listeners whereas the former allowed the public to remain, more or less, subjective participants.

Genres of entertainment are mixed; in fact, genres are merely different expressions of the same content. The result is that they can be easily adapted from one to another, thus demonstrating that they are not at all different from one another. "An explanation in terms of the specific interests of the technical apparatus and its personnel would be closer to the truth" (Horkheimer & Adorno, 2002, p. 96). A change or a shift in the interests would mean a positive change in the technical apparatus.

Technology, through machines, most directly addresses need; therefore, those who control production likewise control need. There is an imbalance in experience. For example:

> The technical antithesis between few production centers and widely dispersed reception necessitates organization and planning by those in control. The standardized forms, it is claimed, were originally derived from the needs of the

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consumers: that is why they were accepted with so little resistance. In reality, a

cycle of manipulation and retroactive need is unifying the system ever more

tightly. What is not mentioned is that the rate in which technology is gaining

power over society is the power of those whose economic position is strongest.

Technical rationality today is the rationality of domination (Horkheimer &

Adorno, 2002, p. 95)

The result is a strong technological system which actually inhibits the essence of

<technology>. It can be argued that the totality suffers since the aporia of the technological

realm was to provide succor for its human counterpart; however, technological production

is merely addressing more sophisticated needs of the same kind. The satisfaction of needs is

a one way street, meaning that this process does not answer a genuine dearth of comfort.

Satisfaction is not to fulfill voids. It is to create them based on the requirements of the

providers.

On the other hand, from a different perspective on society as a whole, one of the

greatest achievements of the Enlightenment was its attempted integration of the many

diverse entities that comprise a particular economic civilization. Branching out from the

cultural realm and taking a look at the operations of the society as a whole, we see that ours

is a society that does not consist in isolated systems. Society became the manifestation of a

machine. For instance:

The dependence of the most powerful broadcasting company on the electric

industry, or the film on the banks, characterizes the whole sphere, the individual

sectors of which are themselves economically intertwined. Everything is so

tightly clustered that the concentration of intellect reaches a level where it

overflows the demarcations between company names and technical sectors

(Horkheimer & Adorno, 2002, p. 96).

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There seems to be the suggestion that the difference between various forms of production is arbitrary, and they are, in essence, the same. This is a limitation on the understanding of <technology> and its material production. I agree that contact is a means to generate new technological expressions. Contact also encourages a more positive dialogue between society and <technology>, but connections can be made that are not the mere perpetuation of the same. Here, contact between systems is understood as a circuit mechanism which is a transmission; but connections could mean the recognition of a space for dialogue that allows for diversity in technological expression and not just the repetition of the same song but of a different tune. It is this type of meta-activity which could favor the concept of technology and its expressions.

There is very little qualitative distinction between aspects of society as well as our scale of expectation over the years. Even what we perceive today as obviously atrocious is just a copy of the past. This is to say that even the evil of today, Hitler to use their example, is just a copy of the past in the form of a circus conductor. This puts a premium upon the origins while the forms of the present are treated diminutively.

The limits of the Enlightenment are actually extensions of its very mythic essence. There exists a process of alienation and oppression whose effects often go unpunished or unrecognized as negative since this alienating activity is in line with the project or goal. That which is different is considered to be an obstacle instead of a viable entity. The project objectifies the other, as was the case with the holocaust (Horkheimer & Adorno, 2002). Our standard of judgment is skewed by this limitation. Changing our understanding of the other would serve as an added resource for technological expression.

The very acknowledgement of the other, through oppression, merely serves to reinforce the friend-foe relationship. This is what they call "false projection". "If mimesis, makes itself resemble its surroundings, false projection makes its surroundings resemble

itself...which displaces the volatile inward into the outer world, branding the intimate friend as foe" (Horkheimer & Adorno, 2002, p. 154). The essence of the two is the same. In the former there is mere replication. In the latter there is the desire to make the other coincide with the self. The essence of the two is the same in another regard as well. They are both the outward manifestations of domination—the former dominated, and the later the dominator.

For better or worse, the material manifestations and social realities are interchangeable in so far as they themselves are not *the* one and only result but merely the same result with different forms. The essence remains the same. With this it appears that Horkheimer and Adorno are saying that there could be other forms which exist alongside those extant. We are actually freer to deviate from previous forms than we thought. We are free to flow from the essence, the essence as manipulation and control; and we can ignore, judge or perpetuate the current forms, as the essence lies within the authoritative forms and not within their ontological forms. This is to say that the way a domino falls does not have to follow the previous domino (existing forms); rather it simply has to fall (the essence of the relationship). Where and how the domino falls could be determined by another source, such as a liberated concept or the individual freed from particular forms of thought. We are actually mentally weak in the face of difference; we are unequipped to deal with it other than by a mechanism characterized by the relationship of obstacle and the one who overcomes it.

In an instrumental paradigm, there is also weakness in our relationship to nature, too. Nature is not weak, but very powerful in the form of natural disasters and disease; but we are weak in confronting it in as far as our means of negotiating our relationship to it are limited. Nature has its Achilles' heal as well. It can be converted to a tool or resource for our use. It is from this weakness that man is able to perceive something as something

needed to be controlled, dominated or manipulated, often without scruples. So, perhaps self preservation is not just about survival per se. It could also be about moral self preservation and justification for one's actions. Self preservation seems to be here now and forever; but, it would appear that the outward projections of this fundamental concept are wide open to change.

The project is prioritized over all other obstacles even the individuals who constitute the whole. The enormous difference between the whole and the individual creates tension, and survival within the project takes precedence over reflection. The act of survival has the effect of nullifying tension, but this does not eliminate the disproportionate relationship between the omnipotence of the project versus the impotence of the individual. In this scenario there is no such thing as true reconciliation. The lack of a reconciliatory element in society will be an obvious cause of friction within the individual who understands the basic relationship between cause and effect.

The individuality of the subject has been weakened; the subject has been subjected to an existence within a predetermined context. "For this reason the psychological determinants of the individual…have not disappeared with the individual itself. However these character types are now being assigned to their mathematically exact positions within the coordinates of power" (Horkheimer & Adorno, 2002, p. 170). There is still hope, as Horkheimer and Adorno suggest, within the individual even as the subject has been extinguished. This hope can be understood in the dichotomy between the personas of Odysseus and Achilles—a dichotomy which is an allegory for the self defeating aspects of the Enlightenment. The former is the master of nature while the other participates with it in a total sense. With their characters as archetypes we have two opposing models for technology. Achilles is the foundation for a technology based on *being* while Odysseus is the model for a technology based on *doing*. Achilles participates with nature by being a part

of it; he does not deny himself as a member of the whole. *A tiger can't change its stripes.* Odysseus separates himself from nature by mastering it.

The result is that Odysseus chooses life through the mastery and sacrifice of nature and the other. Achilles, on the other hand, transcends such trivialities to excel within universal standards of experience—he obtains fame while the other, cunning. "The formula for Odysseus's cunning is that the detached, instrumental mind, by submissively embracing nature, renders to nature what is hers and thereby cheats her" (Horkheimer & Adorno, 2002, p. 45). Achilles shows us a level of consciousness that is able to rise above such treachery. In fact, he is unable to avoid sacrificing his own life for an end that is not curbed by the mastery of nature.

The dichotomy that constitutes the relationship between Odysseus and Achilles can be understood as one between Passion and Reason. Achilles is an element within nature, exercising his gifts passionately without restraint—even though they take him to his death. In a sense he permits nature to take its course, and he will also be true to himself. He does not deny his passions, nor does he manipulate nature's. Achilles needs to see nature take her course, giving her free reign; and he even sacrifices his own life in order to participate in a liberated idea of nature. On the other hand, Odysseus does not participate with nature, he manipulates it. He sacrifices nature and his companions for his own survival. The potential of the individual has merely been misguided and wasted. If this potential were liberated from the goals of the project, then perhaps there would result an altogether distinct technological production. Odysseus is our model of <technology>.

The beginning of the 19th century was a time characterized by the collecting and gathering of specimen, data, etc. These phenomena had to be organized, but how? By the middle to late 19th century Darwinism emerged as a challenge to an Enlightenment model for organization. It provided us with the questions of: who we are in relation to the whole

and where are we going; for instance, ape, man, superman. The last man, a character which

Nietzsche added, was the one who was content. We cannot evolve past this stage (Solomon,

1996, p. 232). The last man can be characterized as the perfect relationship between

<technology> and <humanity>. Technology provides us with everything and we do not

even have to participate in technological choice; we are simply satisfied. "We can continue

to consume our comforts, minimize dangers, ignore the mysterious and unknown, and

discourage creativity, until the world is so safe for us that we will become ineradicable, like

the dog flea". Here the point was to present us with models or theories of existence which

explained how things are and might have been. A counter model, one that encouraged

creativity, might be one that either is based on passion or other values apart from

consumerism.

The Enlightenment was a choice, once and for all, of a model. In another example

similar to the bifurcation between Achilles and Odysseus, is Nietzsche's distinction

between the Apollonian versus the Dionysian tragedies. Dionysus represented the

"dynamic flux of being, the acceptance of fate, the chaos of creativity. The individual is

indispensable from this perspective, but the individual can find profound satisfaction in

being part of the wild, unfolding rush of life". Individual experience is not real. "Our true

reality is our participation in the life of the whole" (Solomon, 1996, p. 233). This is a

model or a project that could have served for that of <technology> but did not. It was a

project that praised the individual which did not give legitimacy to any manmade order.

The apollonian perspective is just the opposite. It shows that the individual

experience is very real, even vulnerable. This perspective reflects the Greek appreciation of

beauty and order. The tragedy, as a means of expression, was in fact an aesthetic manner by

which to organize a horrific reality. This project is about ordering a wild nature and not

participating in it (Solomon, 1996, p. 233). This was the model chosen for <technology>, a

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model characterized by organizing and separating ourselves from nature.

C. Enlightenment as universal understanding

Inter-Subjectivity is the result of a collective process of understanding the other. The purpose is to arrive at a sense of "emerging" meaning and validity. This can also be thought of as creating the conditions for heightened critical thinking.

Jurgen Habermas inherited his interpretation of the Enlightenment from Kant who felt that the realization of the American and French revolutions, for the first time, put Reason in a place in history in terms of being able to affect its course. Reason now had a proactive aura attached to it, and it was treated as a self affirmation, yet it remained aloof to history as it appeared to be independent of the contingencies of history. For Habermas, philosophy's commitment to the institutions and laws, through reason, evolves over time; hence the project of the Enlightenment is not finished. In other words the Enlightenment is a philosophical commitment to our civilization and its institutions which is not over. The Enlightenment, for the disciple of Horkheimer and Adorno, was merely the beginning of a project that has not been completed, and our participation as free individuals is a crucial element to this completion; however, for Habermas, our allegiance is not to the apparent tradition of Enlightenment; it is toward a constitution of inter-subjective communication whereby identity, validity, meaning, and understanding are arrived at through this process. Reason is transparent and non-manipulative communication (Borradori, 2003). This is his theory of inter-subjective communication.

The above is difficult to achieve, Habermas concedes, since the structure of the capitalist societies has effectively calibrated critical reflection such that there is only critical reflection and analysis as within an economic structure.

On the one hand [capitalist societies] are governed by systems of impersonal coordination, mediated by the steering mechanisms of money and power, which

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cannot be recovered by any collective agency, on pain of regressive de-

differentiation of separate institutional orders—market, administration, law, etc.

On the other hand, the life-world that is integrated by inter-subjective norms, in

which communicative rather than instrumental action prevails, needs to be

protected from colonization by the systems.

The public sphere was supposed to rationalize the apparent discrepancy between

instrumental and communicative social relations (Anderson, 2006, pp. 39-40). This did not

happen, but what is important is that it was recognized that an entire sphere of experience

was colonized by another, thus suppressing its potential value as a pool of perspectives.

Habermas' interpretation of the Enlightenment as an evolutionary process has

transformed Reason from one of instrumental mastery to inter-subjective reconciliation. In

a sense this is the essence or aporia of an invisible technology. Could not this invisible core

be encouraged to emerge and affect material technological production? Reason, for

Habermas, is a mechanism, but it is one that is not necessary which suggests that it can be

exchanged for another.

It can be argued, however, that Habermas' theory of communication is already in

practice, though not in any formal way. If we interpret his theory to be one where validity

and understanding are arrived at through our contact with the other and not as a context

defined by competition and domination, then we can easily see how the other perspective is

a prerequisite to truth. This already occurs in a certain sense. Recall that often times we

don't have an opinion about something or an answer to a problem until someone else asks

the question or raises the issue. There is a two-way street here whereupon validity,

understanding and meaning are arrived at through the contact with the other. The problem

is that the market and economic systems operate with instrumental values and the life-

world functions with communicative and the latter is no match for the former in terms of

being able to exercise influence (Anderson, 2006, p. 39). A real project would be to recognize and give deference to the social relations that would encourage the communicative values to enjoy a fair exchange with the instrumental values.

In terms of creating a social project, the question becomes can this be formalized? I see no reason why not, since we already have established means of debate. For example, the "Lincoln-Douglas" debate, our judicial system and even means of communicating the news are formalized social conventions for transmission. This does not suggest that they are the only means by which validity is achieved.

The mechanism behind the process can be thought of as a personal responsibility belonging to the world citizenry of all which acts as an antidote to the inhumanity of the 20th century. Responsibility transcends time and tradition; it is anchored toward the others and to the future, like our ides of progress. Habermas treats history with a critical eye rather than as an entity from which either to respect through tradition or reject by regret or repressed consciousness as was the case with the Holocaust. In an interview for Giovanna Borradori's book, *Philosophy in a Time of Terror*, he comments that "'after Auschwitz our national consciousness can be derived only from the better traditions in our history; a history that is not unexamined but instead appropriated critically'". Borradori adds that "the problem for him is not that the Enlightenment has failed as an intellectual project but that its original critical attitude toward history got lost, opening the way for political barbarism" (2003, p. 13). Similar to Horkheimer and Adorno, Habermas feels that one of the true failures of the Enlightenment was a loss of critical energy stemming up from individuality as a whole.

The Enlightenment is a break in history in the traditional sense. It was a denial of history as an illustration of the easy and natural transitions between authorities. The Enlightenment is a true moment in history in that it marks one of the few occasions where

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"change" was so evident, immediate and widely felt that the way people viewed the world was altered, but, more importantly, they were conscious of it. Habermas inherited from Kant the belief that the Enlightenment highlights a break with authority that is seen though our relationship to nature, at the level of the state and through the liberation o of the individual as the vehicle.

The aforementioned is a point of departure for Critical Theory whose focus is conceptual emancipation through a diagnosis of historical events for the improvement of the human condition. Habermas advocates a full investigation of history in order to determine the validity of certain events. For instance, as the Nation-State claims its origin in the Enlightenment, so can all the problems generated by this particular historical phenomenon. Habermas feels that only when the importance of the nation-state is diminished will we be able to truly conceive of the idea of <international> in terms of laws, understanding, etc. This will be difficult since mass consumption is the order of the day, and this is very easily satisfied by the partnership between the nation-state and the market—another legacy of the Enlightenment (Borradori, 2003). Mass consumption has the effect of quashing individual reflection. "For Habermas, mass consumption and its ideology, consumerism, not only silence rational-critical consensus but imposes itself onto the most vulnerable participants in the public sphere: those whose level of wealth is greater than their level of education" (p. 58). What we see here is a mechanism beneath technological production that controls it. Could not these components be rearranged to reflect new forms of material technologies—new expressions? When we encounter the other, nature and even ourselves we approach them with an adversarial attitude. Why must this be the case? Why not approach with a more reconciliatory frame of mind?

The polemic of the above is the inspiration for his *Theory of Communicative Action* whereby "we learn who we are as autonomous agents from our basic relations with others"

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(Borradori, 2003, p. 46). The ideal comes from no where other than our contact with each other. Validity is a process which develops over time; it emerges, but without the other, it cannot blossom. "Bits of ideality trickle down into our everyday life the more we communicate effectively with others. This allows us to become more autonomous individuals, more mature, and emancipated agents, and ultimately, more rational citizens" (p. 47). We are not inhibited by our judgment of others; they are agents in our very liberation since rational agreement is the goal rather than the realization of instrumental reason. We are freer because the other provides us with conceptual latitude. Before an individual had his/her perspective, now it is broadened by the understanding generated by the contact with the other. Judgment has the effect of negative understanding; it is the denial of, at least, a portion of the overall understanding. This is what the Theory of Communication endeavors to achieve.

Despite Habermas' optimism one cannot deny the body of research which maintains that there is a fatalistic trait of the Enlightenment. That the Enlightenment contains the seeds of self-destruction is maintained by Habermas' predecessors Horkheimer and Adorno and Weber. "Weber's argument revolves around the possibility that the secularization of knowledge mandated by the Enlightenment ignites a 'disenchantment of the world' which erodes the foundations of traditional ways of life. Such disenchantment leaves the human subject alone: as all ideas of cosmic harmony are dispelled, the world comes to be perceived as an external object to be used for utilitarian ends" (Borradori, 2003, pp. 69-70). This process, according to Weber is a reification of our relation to nature; and our social relations as determined by the capitalist mode of production. Weber's iron cage is a prison of efficient bureaucratic blindness which came about as a result of indiscriminate growth of instrumental rationality (p. 71). But Habermas parts with Weber in the area of tradition. To Weber the loss of tradition is a disenchantment, while for Habermas tradition was the

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obstacle to rational autonomy all along. The very idea of the blind allegiance to tradition is opposed to inter-subjective rationality, remembering that one's enunciation can in no way obtain validity without a desire to reach out to the other. Blind faith or dogmatism is the very denial of the other half, so to speak, needed to complete validity.

D. Inter-subjective participation is preserved in the public realm

The Enlightenment was conceived as an enrichment of all aspects of life. These aspects became institutions, categories, specialties, etc where each one developed an expert culture distinct from all the rest. Then there is the rest of the population. Specialization and popularization cannot be reconciled (Anderson, 2006, p. 39). However, one way to obtain this reconciliation, Habermas believes, is to restore individuality and freedom in the public realm in order to create the conditions ripe for participatory democracy (Habermas, 1995). Currently, the public sphere or society is a web of rules. Habermas would see it differently. "The public sphere would be the democratic site of an annealing between the two" (Anderson, 2006, p. 40).

Within the mutual understanding of individuals is the potential for a more diversified and harmonious reason. Reason, he feels, is still fueled by the subjective and aesthetic experience—the hope of the Enlightenment. The Enlightenment began the foundations of a system of communication and understanding that breaks down subjective barriers thus promoting general inter-understanding (Habermas, 1995). The intentions of the Enlightenment were well founded, and Habermas maintains the hope that its project has not failed; it is only incomplete. Today we attach the term modernity to the process of Enlightenment since it implies modern technology and a sense of the never-ending pursuit of progress with a heroic future, but for Habermas the sense of progress is marked by a process of arriving at understanding, meaning and validity. Habermas' unique idea of progress, as opposed to its traditional understanding, could have a positive effect upon

<technology> and technological expressions. Modernity can be the manifestation of *a* progress and not one form of progress.

Progress depends on an unknown but glorious future. The term modernity did not even come about until the 1950s; and, it could be argued that its emergence was a recognition of the surviving characteristics of the Enlightenment. The use of the word modernity is a slight nod to the past but only in as far as there is an acknowledgement of the continuity of goals, but its true orientation is to the ever extending and broadening of the future. The trajectory of the future takes the shape of a hand-held fan or the Nile delta. It spreads outward and is always spreading, building upon itself—reconstructing itself. "Any modern subject is confronted with the task of grasping its own time independently from what is mandated by a sacred Scripture or tradition" (Borradori, 2003, p. 77).Time is much less a parenthetical division of action than it is an afterthought. In fact, time is not a now; it is a later. The present is anchored in the future much like buying something on credit. "This understanding of time, radicalized yet again in surrealism, grounds the kinship of modernity with mode or fashion" (Habermas, 1995, p. 9). Modernity is a denial of the present which is just the past with different clothing. Modernity is based on an idea that *normativity* must be created out of itself or with the *inter-subjective* contact. The former is fatalistic while the latter is a mechanism that could create the conditions for the flowering of the human perspective in all directions and delving into all categories of experience.

The Enlightenment was a conscious sacrifice to progress understood as a better state of material and physical existence. The parts that have survived are the cumulative, mutually reinforcing and functional virtues toward the ends of the whole which was originally humanity; but this goal has now become the market and the state. In the Enlightenment the secularization of society created a cultural void that was filled by the market and the state. In brief:

The new structures of society were marked by the differentiation of the two

functionally intermeshing systems that had taken shape around the organizational

cores of the capitalist enterprise and the bureaucratic state apparatus. Weber

understood this process as the institutionalization of purposive-rational

economic and administrative action. To the degree that everyday life was affected

by this cultural and societal rationalization, traditional forms of life—which in the

early modern period were differentiated primarily according to one's trade—

were dissolved (Habermas, 1995, p. 1).

Local traditions, practices and beliefs were discouraged in favor of a universal and rational

order whose structure favored the well being of the state. Weber's idea of the iron cage of

social bureaucratization was limited to social relations and the idea that humans were

products and producers of this hyper rationalized system. But he did not envision the

technological world system that we are approaching.

Thomas McCarthy writes in the introduction to *The Philosophical Discourse of*

Modernity that Habermas is promoting a new paradigm—one that is not based on the self.

Habermas feels that the new paradigm is no longer consciousness and that reason is

embedded within history, body, society and action. Modernity, according to Habermas, was

not created only by the tentacles of intentional rationality, though "he views reason as

inescapably situated, as concretized in history, society, body, and language..., however, he

holds that the defects of the Enlightenment can only be made good by further

enlightenment" (1995, p. xvii). Further enlightenment is achieved by the allowing of more

and more conditions and circumstances which promote, "this orientation of communicative

action to validity claims admitting argument and counterargument [which] is precisely what

makes possible the learning processes that lead to transformations of our world views and

thus of the very conditions and standards of rationality" (p. xvii).

Contrary to the detractors of Enlightenment, Habermas feels that modernity houses developments as well as restrictions of reason. "Among the former, he mentions the unthawing and reflective refraction of cultural traditions, the universalization of norms and generalization of values, and the growing individuation of personal identities—all prerequisites for that effectively democratic organization of society through which alone reason can, in the end, become practical" (McCarthy, 1995, p. xvii). There is a host of potential reserve resource for the flowering of reason. For Habermas, the Enlightenment project needs the counter-positions in order to arrive at validity which is why the Enlightenment is a process still in the making. There is much left to do, but the problems are hard to uncover due to the standardization of experience as determined by an all inclusive rationality. Habermas' mission is to uncover the elements of Reason which encourage "boundary breaking" activities.

In Western Europe, in conjunction with Protestant reforms, a rationalization of society dominated such that capitalist and bureaucratic state institutions flourished. Traditional forms of life were dissolved. This is not necessarily a negative thing. "Emile Durkheim and George Herbert Mead saw rationalized life-worlds as characterized by a reflective treatment of traditions that have lost their quasi-natural status; by the *universalization* of norms of action and the generalization of values, which set communicative action free from narrowly restricted contexts and enlarge the field of options" (Habermas, 1995, p. 2). In this sense modernity is still very much alive. Modernity is cumulative and mutually reinforcing. In regards to the former, it is all of society; and in regards to the latter the efforts are self sufficient since they are directed toward the mobilization of the forces of production, its regulation, and the development of the appropriate society. Modernity is very much alive in technology and, even though Habermas does not often refer to technology per se, technology can be an example of the

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common ground that Habermas envisions could help break down subjective barriers to understanding. If reason and communication were liberated, then perhaps <technology> would reflect this liberation and evolution of reason.

Unfortunately, the evolution of Reason served to suppress the liberal development of the individual. The personal and altruistic premises of the Enlightenment appear to be dead whereas the sublimated goals of the Enlightenment live on as a unified project. It is progress as a better state of existence which perseveres. We can imagine that this desire is common to us all. In so many words, the humanism or liberalism of the Enlightenment, with its orientation towards a world shaped by the individual, was an obstacle to the burgeoning states that could not expand their power unless all of society could be effectively organized and motivated toward the goals of the market and the state. This was accomplished by using rational methods of recruitment and legislation which were basically efficient measures to temper the aspirations of a nation. Once the separation of modernity from its original understanding of individual freedom has occurred, then one can see the suppression of the subject in favor of the system. "From this perspective, a self-sufficiently advancing modernization of society has separated itself from the impulses of a cultural modernity (fear of many subjects) that has seemingly become obsolete in the meantime; it only carries out the functional laws of economy and state, technology and science, which are supposed to have amalgamated into a system that cannot be influenced" (Habermas, 1995, p. 3). Again, the problem appears to be a loss of critical perspective due to the impossibility of free will to exercise perspective in the face of interests controlled by the market and the state. This can be viewed as an overcoming of trivial diversity with an end toward mutual satisfaction; however, it can also be seen as an abandonment (though, perhaps, temporarily) of the original intentions of the Enlightenment.

More specifically modernity is characterized by a homogenization of norms and values, the concentration of force for increased results, both militarily and in capitalist production, and the centralization of power with the state. The surviving legacy of the Enlightenment is that the concept of reason has become the "will to instrumental mastery" (Habermas, 1995, p. 4). Reason as such is immune to local differences and it can be said that it is calibrated by instrumental mastery. These goals are, in large part, achieved through technology as technology which is both the vehicle of rationalized accumulation and the goal of functionalism. Nevertheless, Habermas maintains the hope that reason can evolve from subject-centered reason to reason understood as communicative action (McCarthy, 1995, p. vii). This is, in effect, a new paradigm of the subject which can serve as an additional essential foundation for <technology> and technological expressions.

The root of Habermas' theory of communicative action is the controversy between Being and beings. As to the former, Habermas argues that it incorporates the "dialectical interdependence between a historically shaped understanding of the world and the experience and practice possible within its horizon....Meaning cannot be separated from validity" (McCarthy, 1995, p. xi). In this sense the subject, as a de-centered subject, is an actor within an ever changing environment of social interaction since communicative action is the paradigm. The idea of a subject which exists not necessarily for itself but only in so far as it exists with other subjects could serve as a model paradigm for <technology>. This is a subject without space; and the hope of modernity depends on timelessness.

Enlightenment survives as a project for the future. Recall that modernity is a notion based on timelessness in the sense of history; it is oriented toward the abstract time of the future. Modernity is that which is left over from Enlightenment in that it epitomizes a movement toward an abstract existence in the future. "The secular concept of modernity expresses the conviction that the future has already begun: it is the epoch that lives for the

future—that opens itself up to the novelty of the future" (Habermas, 1995, p. 5). We look toward the future with the idea of a constant renewal, a better beginning. "Modernity can and will no longer borrow the criteria by which it takes its orientation from the models supplied by another epoch; it has to create its normativity out of itself" (p. 7). Modernity is an ideology which depends upon a constant renewal. Modernity, as a forward dynamic, is the norm characterized as a still-to-come. In this sense, our understanding of modernity and that of Habermas' opinion that the Enlightenment is an unfinished project are consistent. There is the suggestion of hope that Habermas' model for social relations can have a positive effect upon <technology> and its expressions. Within the more liberal origins of Modernity would be a good place to start to create an alternative model for normativity. A return to basics would allow for inter-subjective values to flourish as it was at this time that the instrumental values had not yet achieved the hegemony that they would enjoy later.

E. History: a second look at the liberal origins of Modernity

Recall that the Enlightenment marked a true parenthesis in history. Those involved were aware of their *highlighted* place in history as opposed to others prior to them. There was a consciousness about it. In fact, the Enlightenment was able to define other moments as breaks with history such as the future or past epochs. The eighteenth century was the first time when the Renaissance was recognized as the beginning of an age, suggesting that the thinkers of the Enlightenment were analyzing history from a philosophical perspective and not as something cyclical which was the case prior to the Renaissance. To define an age as existing from the present to the future is to allude to an age where there is no end, nor any clear beginning. From the Enlightenment onward, Modernity was bracketed as one age, resulting in the sensation that the entire future was the domain of the ideas established at the time (Habermas, 1995, p. 7).

If modernity could not establish itself based on norms of the past, it was established based on a division from the past. Hegel marks the modern world by recognizing a self relation that he calls subjectivity, "the principle that all the essential factors present in the intellectual whole are now coming into their right in the course of their development" (Habermas, 1995, p. 16). In other words, with the freedom of subjectivity comes a maturation of perspective in many realms. For Hegel, subjectivity is individualism, the right to criticize, autonomy of action, and it is an idealistic philosophy. "The key historical events in establishing the principle of subjectivity are the Reformation, the Enlightenment, and the French Revolution. With Luther, religious faith became reflective; the world of the divine was changed in the solitude of subjectivity into something posited by ourselves" (p. 17). The will of man became the foundation of the laws and the state; the idea of subjectivity formulates the shape of modern culture. "This holds true first of all for objectifying science...for nature is a now system of known and recognized laws...[and man] is free through the acquaintance he has gained with nature". Man, says Hegel, is all that remains standing in nature since nature had been ordered into laws which man is free to interpret (p. 17). "In modernity, therefore, religious life, state, and society as well as science, morality and art are transformed into just so many embodiments of the principle of subjectivity" (p. 18). This seems to be a cry for liberal and diverse perspectives. Here the foundation for these many institutions was subjectivity.

The Phenomenology of the Spirit is a sublimation of an individual's experience within nature in order to arrive at a common experience characterized by fluidity. Concepts were conceptual (Solomon, 1996). For Hegel knowledge, even, requires individual participation. "Knowledge, Hegel insists, develops...Consciousness too is not timeless, nor is it just the transcendental perspective from which or within which we gain knowledge of the world. Consciousness grows. It develops new concepts and categories...Consciousness

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and knowledge are dynamic...They grown through confrontation and conflict, not by way of mere observation and understanding" (p. 217). Confrontation logically implies two or more entities, and dynamic implies constantly changing. Both of said concepts require individual subjects, free of qualities that could vitiate their properties which distinguish them as individuals.

For Hegel, the self is socially constructed. "Two self consciousnesses confront one another and fight for mutual recognition" (Solomon, 1996, p. 218). Such a confrontation is more of a contract. Flexibility and contextual concepts bring us together. "Where Kant had defended a rigidly ordered, neatly defined set of such categories, Hegel is concerned to demonstrate the fluidity and mutually defining nature of such concepts. Concepts are always contextual. Their meaning depends on their contrasts and complements" (p. 219). The other is needed for validity, much like Habermas' theory of inter-subjective communication. In a certain sense, Hegel's project was a celebration of the individual; but in another way, it was self defeating.

For Hegel, the individual was secondary to the state. "His point was not that the individual doesn't count but rather that the significance of the individual is dependent of the social context in which he or she lives". Hegel's philosophy, written only six years after the fall of Napoleon, was undeniably influenced by history. He was an early social constructivist which is a school that is heavily guided by an approach which is "after the fact". The Social Constructivists look for causes and not consequences to describe what has already happened. Hegel preached that we are a product of our society, but a specific type of society—a civil society (Solomon, 1996, p. 220). This type of society constructs the individual; it is almost axiomatic that the making of an individual is a social act. The form of society will determine the form of individual, limiting options with the promotion of certain values and social relations to the exclusion of others.

Whereas in the past, certain traditions and authorities established the various institutions, with the Enlightenment it was the will of man that set the course in a balance between what the individual perceives as valid and what he desires for his particular ends. The many spheres of life were further and further separated from one another, reflecting the principle of subjectivity or a Kantian idea of relative reason (Habermas, 1995, pp. 17-19). Social relations, interpretations and interaction with nature are within this paradigm of subjectivity. "The question now is whether one can obtain from subjectivity and self consciousness criteria that are taken from the modern world and are at the same time fit for orienting oneself within it". This sort of criteria, argues Habermas, can only be fashioned out of itself. It cannot come from history, nor can it be imposed from the outside. This sort of criteria is very much like the ideas of modernity and progress except that their orientations are not toward an unknown future, but toward an ideal of Being. It is also similar to an idea of an outwardly focused subject. Being is liberated since it is not oriented toward itself or a system. It is oriented toward an idea of an expanded and complex existence.

The *Dialectic of Enlightenment* exposes the contradiction which binds society. At the same time society is unified and separated by the concept of subjectivity, and the Enlightenment sets the stage for a world of individuals whose only source of inter-understanding is a mutual idea of reason oriented toward an experience characterized by alienation. For Hagel, this was a problem since the critique of the present would be severely weakened (Habermas, 1995, ch. 2). This is a high price to pay.

Ironically, the carving out of the individual, the process of subjectivity, actually serves to hamper reflection and criticism since the other is not a resource; rather it is an obstacle. In reviewing *The Dialectic of Enlightenment*, Habermas writes that the Odyssey is an allegory of the price one must pay for the privilege of subjectivity, or identity. Recall

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that according to Horkheimer and Adorno, another myth has taken over in the Enlightenment, that of self preservation. It is a myth in so far as subjectivity became tinged with self preservation whereas this trait is far from an immanent component of subjectivity. Within the conceptual context of "self preservation" thinking for oneself or free will quite naturally evolved into a form of competition within the conditions of the market, state, society and other subjects rather than become a unifying principle. The establishment of the self is also a separation of the self from nature and others. "The compulsion toward rational domination of externally impinging natural forces has set the subject upon the course of a formative process that heightens productive forces without limit for the sake of sheer self-preservation, but lets the forces of reconciliation that transcend mere self preservation atrophy" (Habermas, 1995, p. 110). There is no reconciliation with the other in terms of mutual benefit. This was a permanent result of the Enlightenment, according to Horkheimer and Adorno, and it is what was necessary for the creation of identity without which technology would be truly primitive. Identity has become an existence within the conceptual bounds of self preservation.

F. Diversity within society would result in more critical reflection

Habermas is not convinced of Horkheimer and Adorno's view of the Enlightenment. He argues that it does not do justice to the "rational content of cultural modernity" which he says goes beyond technically useful knowledge whereby reconciliation is achieved through contact that is not entirely instrumental. Habermas, "has in mind the productivity and explosive power of basic aesthetic experiences that a subjectivity liberated from the imperatives of purposive activity and from conventions of quotidian perception gains from its own de-centering". Such gains, he argues, come from the values that are appropriate to self-realization (1995, p.113). The question is how to

liberate aesthetic experience to the degree that the individual can freely influence technological innovation.

Habermas sees the term humanity as incorporating a diverse relationship to nature and other men. Here, humanity is more like the idea of humane. Habermas is not sure that reason is subordinated under instrumental reason. Instrumental reason is subordinate to substantive reason for Habermas. Thus, when Horkheimer and Adorno argue that, "reason itself destroys the humanity it first made possible," (1995, p. 110) Habermas feels that this does not do justice to the many expert cultures that have grown out of substantive reason. The individualist patterns of identity formation were necessary to form our many institutions and branches of science. It is in such conditions that expert culture is encouraged to surface. The expert culture dissects and divides truth into a phenomenon that is relative, temporal, and subjectively useful. Technological innovation could result from such a foundation. The problem is that expert culture has been misguided and, as we remember from the above, specialization and popularization are irreconcilable without a common forum. The public forum, for Habermas, can serve to neutralize reason and prevent any one set of values or social relations from unduly influencing its progress. For example, instrumental values have been a guide for measuring the effects of reason. Instrumentalism is a domination of nature and other men but it is a limiting concept in terms of describing what occurs within the subject during self-realization, and the public forum would be that which gives opportunity to other forms of reason, the competition of which would promote critical reflection.

Nevertheless, critical reflection is severely weakened given that some values are given an unwarranted amount of authority. Concretely we can see the Enlightenment ideals of standardization and integration in the global environment of today, especially in the areas of logistics and communication. The rationales of consolidation and integration were

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made possible by the advances in modern technology which made the world smaller, in a sense, like no other event in history. Habermas seems to be suggesting that there is a commonality within our collective experience that could lead to inter-subjective understanding and communication. Perhaps this could lead to a broadened paradigm for technological development. Inter-subjective understanding requires contact with the other; so at least the Enlightenment has established the infrastructure which facilitates this contact.

G. Enlightenment as a type of progress

Enlightenment's tangible evidence is measured by technological innovations—material and human. The direction of civilization is determined by the type of progress inaugurated by modern technology. Modern technology is a promise, a hope and a guarantee. The Enlightenment is a type of promise through technology. <Technology> is an historical narrative called progress. The technological paradigm has influenced our common narrative and it has concealed other values not associated with certain standards that we have attributed to technology. For instance, practicality is a value which stymies the influence of other potential values. It also diminishes our potential for critical reflection.

For Albert Borgmann the hope and purpose of technology lay in the origins of the Enlightenment as man's chief means to achieve comfort, autonomy and free will. He calls this the "promise of technology", and he comments on the amazing rate at which technology has helped our existence saying "the splendor of the promise of technology appears bright to this very day when we remember how recently misery and deprivation have been shaping human life" (1984, p. 35), however it is also at the heart of a social debate. Is technology helping us reach a utopia or is it the cause of dystopia? The answer to this is in the use we make of the devices.

The potential totality of hope within the Enlightenment lives through and is hidden by technology since it has dominated the type of hope we have. It determines our expectations:

> The Enlightenment is known to us primarily as an intellectual and cultural
>
> revolution, a breaking of the fetters of religious superstition and ancient dogma.
>
> The Enlightenment was the original liberation movement of our
>
> time…Technology is sometimes, in an aside, mentioned as an offspring…;
>
> however, technology has become the decisive current in the stream of modern
>
> history (Borgmann, 1984, p. 35).

Within this relationship, however, is a conundrum since, "the promise of technology has both fueled and disguised the gigantic transformative endeavors that have given our time its character". The modern world is technology, and, as a result, technology filters critique and determines progress of a certain kind. The technological model, or the concept of <technology>, is the embodiment of our expectation.

<Technology> has so permeated our lives at many levels that our existence is inconceivable without it. In other words, "if the determining factor in our lives resides and sustains itself primarily in the inconspicuous setting of our daily surroundings and activities, then the decisive force of our time inevitably escapes scrutiny and criticism" (Borgmann, 1984, p. 3). The empirical manifestation of the determining factor is what Borgmann calls a device which is both material and conceptual, hardware and software (meaning practices). Cultural practices are guided by the device program. Everyday devices "represent clear and accessible cases of the pattern or paradigm of modern technology" (p. 3). Devices are so convenient and practical that, ironically, they embody a conflict of institutions and experience such that we question the gains of the practical experience of something momentous like a symphony (p. 4). Again, we are talking about the loss of

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critical reflection; and, as was mentioned earlier, material technology becomes the obvious, ready-made standard by which to gage other activities.

According to Borgmann, <technology> embodies the unification of two realms of entities or understandings by joining the technical production with the commodity (1984). However, due to the practical aspect of technology, we are unaware of the uniqueness of the commodity and the experience surrounding it. Ironically, much that relates to our experience with technology evades reflection because of its practical element, and the more practical or efficient a device is, the more we loose. What aspects of our lives, asks Borgmann, are endangered by the device program? Borgmann is concerned that we are loosing contact with, let's say, heat when we use the device of an iron when ironing our clothes. We are detached from the process making of hear. Convenience makes it easy for us to be blissfully removed from this process. We are too involved in the availability of heat to be concerned with its overall production.

For Albert Borgmann, technology is a very general and widely applicable concept. It is "the way in which we take up with the world" (1984, p. 35). It is how we attain liberty and prosperity. "The pattern of technology is fundamental to the shape that the world has assumed over the last three centuries" (p. 35). Ironically, such a pattern is hard to see; we only see it when it fails. How can we see it? Borgmann suggests returning to the origin of modern technology—the Enlightenment.

Technology was, intentionally or not, the ultimate goal of the Enlightenment all along; and Enlightenment is the domination of nature, the elevation of method and the sovereignty of the individual. Chapter eight of Albert Borgmann's book *Technology and the Character of Contemporary Life: the promise of technology* demonstrates that the original efforts of the Enlightenment were "to increase the power of reason and allow it to be asserted in the material realm. 'I am laboring', Bacon wrote, 'to lay the foundation, not

of any sect or discipline, but of human utility and power'....[and drawing from Descartes] and so make ourselves masters and possessors of nature" (1984, p. 36). The original promise of the Enlightenment, and thus technology, did not spring from "a lust of power, from sheer human imperialism. It [was] from the start connected with the aim of liberating humanity from disease, hunger, toil, and of enriching life with learning, art and athletics". These were real issues. Descartes commented that "this would not only be desirable in bringing about the invention of an infinity of devices to enable us to enjoy the fruits of agriculture and all the wealth of the earth without labor, but even more so in conserving health, the principle good and basis of all other goods in life". If we synthesize the thoughts of Bacon and Descartes, then we can see that utility and power are behind technological expressions which then become the foundation of our general well being (principle good). It is our form of hope. Unity and power are the essences of types of social relations and technological expressions.

Technology is the manifestation of hope, but it is also the problem as the problem lies within the execution or application of technology. In other words, technology is the result of the enlightened vision of a utopia; but this vision was increasingly narrowed, according to Borgmann, as the utopia became a selfish version characterized by domination. This selfishness can be understood as a convenience of separation from the world and from each other which is a dominant characteristic of technology, and technology's convenience determines a specific pattern of lifestyle. This model is discernible in everyday actions, and it has global effects. For example the pattern divides life between labor and leisure, plus it promotes the perspective that the earth is a technological device. Borgmann argues that technology has worked well in the areas of disease and hunger, but that when we resort to it for more significant experiences, it encourages a life dominated by lazy consumption. Lazy consumption is almost a natural

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result. This does not constitute a rejection of technology; rather Borgmann calls for discourse about the nature of such a life bathed in consumption and convenience. He admonishes us to make room for encountering things and practices in their own right and not just as vehicles for convenience. Changing the model, the nature of such a life, which directs most of our experience, would perhaps reflect in technological expressions.

According to Albert Borgmann, the device or technology is our access to the paradigm which determines our modern existence (1984, p. 3). The device is the manifestation of both the commodity and the mechanical elements of technology. The device program is a trend in modern society. It is the result of a social negotiation between convenience and the technical capabilities at hand. It appears that Borgmann is advocating that we install different types of technologies along side the more traditional forms. For instance, if we reflect on the nature of our current paradigm concerning technology then society should foster technologies that integrate life, labor and leisure rather than separating them. To counter the trend of the device program, Borgmann encourages the proliferation of activities which are not masked by the device program such as more down to earth activities. He asks us to seek out activities which challenge the human comprehension. That the device program guides such a wide range of our daily experience is the problem because there is no check upon its activities; however, through different types of practice we might be able to combat the detrimental effects that the device program has upon our diverse potential to comprehend and reflect upon experience. Borgmann is advocating that we endeavor to reveal that which is concealed by the device program. "Challenging the human comprehension" is a celebration of critical reflection; however, our social relations are determined by values such as convenience.

Even though the Enlightenment was intended to be a social revolution liberating man from fear and the toils of nature, its foundations also cultivated the roots of the notion

of technological determinism. That this occurred is due to our ready belief and submission to modern technology. For the purposes of establishing a relationship between the Enlightenment and technology, I take technological determinism to be a causal relationship between a type of society and the technology which defines its social relations. A particular society has a corresponding type of technology which, in turn, reinforces this form of society. This sounds democratic, and it seems to be an effect of a multifarious society; however, technology can also be the result of a few values and interests which preclude the emergence of others. The Enlightenment project was a good example of the filtering of values such that certain values were projected onto society with the hope of obtaining the recent advantages of the natural sciences—the belief that we can put order to nature through technology. Society is determined by this singular approach to nature. The idea of "putting order to nature" is heavily charged with certain values when there could have been other ways to negotiate our relationship to Nature.

In the Enlightenment, science and technology were seen to be powerful agents of social change whereby the evolution of certain aspects of society was seen as the result of a natural and inevitable process. "The intellectual heritage of technological determinism can be traced to the enthusiasm and faith in technology as a liberating force expressed by leaders of the eighteenth century Enlightenment". This deterministic thinking began to take shape when people started to attribute agency to technology as a force in shaping history. Perhaps the greatest analogy of this is the viewpoint of the universe as a mechanical clock (Smith, M.R.1996, p. 2). The technological system which we are trying to evaluate stems from a scientific rationale whose foundations began during the Enlightenment as way to reduce the effects of the unknown by categorizing its properties into calculable data within a unified a rationale method of approach. To be able to accomplish this, it was necessary for nature to be stripped of its individual or defining qualities and converted into a

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quantifiable reserve. This rationale is a guide for action in many categories of life whose

essential characteristics are founded in an instrumental and mathematical approach to

nature whereby nature's intrinsic properties are stripped and converted to objects for man's

use. This form of reason is also highly unifying, thus encouraging the use of its method in a

variety of aspects of society.

Advances in material technologies were not the only fruit of the Enlightenment, but

they were seen as the vehicle towards achieving other social goals. They were a proven

model. What was considered good was determined by technology whose type of material

manifestations were the standard by which good was judged:

> Benjamin Franklin and Thomas Jefferson, foremost among the new nation's
>
> prophets of progress, were true believers in human kind's steady moral and
>
> material improvement. As avid proponents of the cause of liberty, they looked to
>
> the new mechanical technologies of the era as means of achieving the virtuous
>
> and prosperous republican society that they associated with the goals of the
>
> American Revolution. For them, progress meant the pursuit of technology and
>
> science in the interests of human betterment (intellectual, moral, spiritual) and
>
> material prosperity (Smith, M.R. 1996, p. 3).

For these men there was a causal connection between invention and manufacturing and all

facets (members) of society, but their idea of invention was personal and unselfish

production unlike the new mechanical technologies that Alexander Hamilton began to

claim had a life of its own. The advantages of technological production were so obvious

that it was natural to use it as the standard by which to judge all experience. This is a form

of determinism. Material prosperity requires the emergence of a certain class of people, and

the conditions for their prosperity had to be created. Incidentally, the aforementioned

process can be understood to be an invisible technological expression—a project.

H. A class of people created as a component to the economy and its goals

The Enlightenment is a mechanism for a type of relationship between the social organization and its corresponding operational goal which channels social relations to reflect this economy. Heightened technological change and production were social and historical phenomena whereby scientific advances and the diffusion of capitalism combined to create the conditions ripe for Enlightenment. The principle of private property and the practice of currency-exchange (the price to pay for one's private services or a thing's worth) are also scions of the Enlightenment. The notions of private property and currency exchange produced a guiding incentive for technological innovation since <worth> and <wants> are voids waiting to be filled. "The environment of the eighteenth and nineteenth centuries provided both a novel and an extremely effective encouragement for the development of an industrial technology" (Heilbroner, 2005, pp. 402-403). The emergence of the bourgeoisie class was important for technology since, through the expansion of currency and the opening of continental markets, values per se began to assume a tangible and causal constitution. Money is a rational conversion *par excellence* as well as an efficient means of establishing credible worth. Currency became a virtue. It is no accident that the surge of innovations and inventions occurred in unison with that of monetary exchange. So, modern technology came about in conjunction with the ideals of personal gain. This is a phenomenon which increased exponentially with the industrial age. Attaching value to individuality and action is a project.

Without a rigid social hierarchy, there was room for another type of hierarchy based on worth and production. William Pitt is the quintessential example that Ellul refers to in *Technological Society* with the end of exemplifying this new order after the regicide of Charles I and the downfall of the absolute monarchy in one of the world's first modern, capitalistic country. The beheading of the King had a symbolic effect throughout capitalist

inclined nations. The new order allowed for men to be judged by their practical worth rather than their birthright (1964, p. 56). According to Ellul, value integrates man and technology into a larger system, as an economic technique is based on production. Value is an objective criterion with which to judge the worth of both—but on the same scale; value automatically places us and our creations in a hierarchy. "A hierarchy can better be established when precise rules are specified which are based on the economic value of the human being" (p. 225). Such a value system allows a society to "wash its hands" of other interests; but the relationship between the market criterion and the individual creates the conditions whereby man may exponentially demonstrate his penchant for freedom. So, the new economy of freedom is designed to promote the efforts of the individual: everything and everyone has a price and the market determines the system of rewards. Could such a notion of private ownership ever really be conducive to forms of understanding, other than those based on instrumental mastery? Let's explore this idea.

After the Battle of Waterloo, England's supreme position in the world was fully established. The industrial revolution brought commerce which then ushered in another important paradigm—consumerism. Utility was the foundation of a new paradigm, ethics and morals which derailed the liberal intentions of the Enlightenment. "The new emphasis on personal satisfaction naturally suggested a new philosophy, a philosophy in which the maximization of personal happiness would become the ultimate end". (Solomon, 1996, p. 230). Pleasure was maximized and pain was minimized. Economics is behind all of this, but a very limited vision of economics. The selfish element of this philosophy smothered any individual participation. There was reception but not contribution on the part of the subject. The individual was a recipient.

Economics is the acknowledgement of a mechanism between parts and the whole; there is nothing necessary about <economy> suggesting its association to monetary wealth

or comfort. <Liberalism> was aborted for what John Stuart Mills referred to as individual rights, another precursor to <neo-liberalism>. Free enterprise was a label placed upon the market and the potential to negotiate it. Freedom was let out of the gates, but the gates led only to the market; so business was the paradigm and the government was structured to favor this aspect of society. One's only limitation to freedom was that of someone else's. Though this philosophy came about due to market conditions, it was also associated with free speech which was used to justify, by analogy, the new ideals. For my purposes, freedom of speech is the permission of a certain perspective which inevitably came from a set of social relations and values. These perspectives must be heard; and Mills was of the opinion that the truth emerges out of discussion and argument. "No one can be so sure of his or her opinion that censorship of another is justified, and the possibility that the censored view might in fact be correct is a further reason to condemn censorship in any form" (Solomon, 1996, p. 231). Here we see, at least, the good intentions of creating the conditions which favor the emergence of perspective. This is a project; unfortunately, the ideological context severely limited its application.

Now, either the market conditions severely limited our idea of liberalism and freedom or these conditions were much stronger than any notions related to the effects of free speech. The point is that liberalism was channeled down a certain path. Granted, a person needed freedom to realize his/her talents and happiness; but it was a type of happiness. In fact, even when J.S. Mill pulled away from his earlier free market enthusiasm, he still felt that it was economic stability which was essential for the condition of freedom (Solomon, 1996, p. 231). This path has a particular set of values and social relations. Economy was no longer only a mechanism; it had become an ideology.

I. Enlightenment is a practice defined by technology applied to all aspects of our lives

This practice is defined by <technology> applied to all aspects of our lives.

We are technological entities. Our institutions, actions and thoughts are guided by <technology's> essence. Humanity has both grown with and grown up along side technology, making it quite logical and appropriate to understand the Humanities in terms of technology and vice versa. According to Jose' Ortega y Gasset, the definition of man is that of a technological animal since technology addresses wants and humans, due to the vicissitudes of evolution, are no longer determined by need nor instinct (1983). In fact, Benjamin Franklin felt that were it not for our inventiveness we would not have survived as a race, from the beginning onward. We are not equipped to live in the wild; so Franklin's opinion is valid. Thus, technology's privileged place in understanding the modern man is of the utmost importance. As a result technology is almost the context for the approximations of philosophy and the humanities since it highlights the distinction between the pre-modern and modern world. Our successes and problems are at least indirectly related to technology.

Technological issues are intertwined with sociological polemics, making their study the appropriate scope of sociology rather than the natural sciences. <Technology> can be understood as social relations or practice. Plus analyzing "technology in practice" makes it easier to see a causal relationship between certain discoveries and the development of mankind which, in a way, places technology on a higher plane than philosophy. For instance, Francis Bacon argued that traditional philosophy has done very little in the way of global development in comparison with gunpowder, printing, and the compass. For instance, one field, engineering, may approach the specific developments of technology while another, the humanities, may address the larger implications of technological choice. This distinction affects how technological change is interpreted, but it also shows how one approach is on a higher plane than the other.

For example, engineering is also within the scope of the social sciences in terms of an overall understanding of <technology>, including both its material and social

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implications. Engineering is concerned with the materials and their use while the social

sciences' definition includes these traditional considerations and much more. The

Enlightenment was a diffusion of science throughout the numerous practical needs of man.

"The 1800s promoted the Enlightenment vision of a union between science and the

practical arts in which science would provide a method of solving practical problems and

thus serve as a foundation for systemic progress" (Mitcham, 1994, p. 146). If we

understand modern technology to be the material manifestation of the Enlightenment, then

modern technology is the marriage between science and the practical arts resulting in the

many technical fields and realms of expertise. Nevertheless, like the example of

engineering, the Enlightenment stymied the social aspects of epistemological issues

surrounding <technology>.

J. Transcendental Enlightenment: multilevel experience

A transcendental Enlightenment refers to an idea of awareness, a level of

consciousness, which is a project characterized by a way of thinking and seeing the world

in a holistic sense which would include other influences apart from science.

For C. Wright Mills the Enlightenment is a promise that man can actively

participate in history through the combined values of reason and personal freedom. The

Enlightenment is perpetuated through positive change guided by science. His study, *The

Sociological Imagination*, is about man being able to see himself in both the realm of the

individual and the universal as well as to mix institutions and cross value standards.

Basically the sociological imagination is to:

> understand the larger historical scene in terms of its meaning for the inner life and
>
> the external career of a variety of individuals. The sociological imagination enables
>
> him to take into account how individuals in the welter of their daily experience,
>
> often become falsely conscious of their social positions....The sociological

imagination is the capacity to shift from one perspective to another—from the

political to the psychological; from examination of a single family to comparative

assessment of the national budgets of the world; from the theological school to the

military establishment; from considerations of an oil industry to studies of

contemporary poetry...and to see relations between the two (2000, p. 7).

To be able to do this, to have this skill, according to Mills, would prevent much of the

friction that persists in our society which is what the Enlightenment intended by instilling

the values of freedom and reason. The sociological imagination is the vision of a socially

driven mechanism that could operate in the underpinnings of all aspects of society and their

social relations. This approach, considering the individual and the universal, is similar to

Habermas' idea of a complete diagnosis of historical events in order to arrive at validity;

however, Mills' idea depends on the individual's ability to shift between disciplines and to

expand his/her perspective outward including more of a universal context. Rather than

validity, Mills seems to be looking for a reality—but one that the individual is encouraged

to know.

So, for Mills, the Enlightenment is an apparent contradiction between the rationality

of the individual, his expression of free will, versus that of a larger system, one requiring

the implementation of reason; but the contradiction is constantly reconciling itself since

man is aware of his role of making history. Humanity's awareness of its history making

potential is the result of seeing the one and the whole and the relations between the two. We

have witnessed this phenomenon in many instances whereby man is able to appear

reasonable in his immediate realm while irrational in others. Humanity, through technology

mainly and not science necessarily, has become aware of its potential to alter the course of

history.

Take the development of the atom bomb as an example. The thousands of scientists involved in the production of the bomb were united in its completion; however, there were quite a few who recognized the potential effects of its use in a realm that transcends time and space. Due to the fabrication and application of the bomb, concepts have changed and the line between science and morality was forever blurred. Nevertheless, this is the type of activity which reinforces our awareness that we make history, and, in this case, we are able to alter history's conceptual and disciplinary foundations. Also, new concepts and questions emerged as a result of the added contact between certain technological advances and social relations.

Part of our ability to make history comes from having a model to which other institutions can follow. In this sense, science, with technological production as its primary representation, has so influenced other institutions. The Enlightenment has inculcated with us the idea that other forces of influence are weaker in the face of scientific styles of thinking. <Technology> has become an institution which has the prestige to be used as a model for other institutions. Nevertheless, there is a scientific paradigm behind technological expressions which is used to justify action:

> The idea that institutions in general lag behind technology and science in general is a very popular idea. It involves a positive evaluation of science and orderly

> > progressive change; in brief, it is a liberal continuation of the Enlightenment

> > with its full rationalism, its messianic and now politically naïve admiration of

> > physical science as a model of thinking and action, and of the conception of time

> > as progress (Mills, 2000, p. 89).

Science in general has become a guide for many social institutions. Awareness of science as a common factor among many such institutions and perspectives, then, serves as a link

between the individual and universal existence. Mills is saying that we are naïve in believing that physical science is a model for our way of thinking.

Even the institution of the individual has been bastardized by the Enlightenment. The Enlightenment ideals were constructed upon the idea that there was a general nature of man; this has been called into question lately, especially since what survived from the Enlightenment, namely scientific values and dependence on technology, is not directly derived from man's constitution, only his needs and wants. The concept of the individual has been reoriented toward his/her role in the whole. More importantly, the idea of making history depends on one's interpretation of the nature of man. For at least three centuries we have been satisfied with a certain understanding of man, but lately this has been questioned. Mills' sociological imagination is an insight into how we are uncomfortable with the Enlightenment's image of man. Enlightenment created totalitarian governments; and the nation-state, in general, has become far too powerful to tolerate an image of man as that which both preserves individuality and serves as the cohesive properties of civilization— this is the sociological imagination. Mills is asking us to recover this vision despite the effects of the nation-state. Given the new global paradigm that has emerged since Mills wrote *The Sociological Imagination*, one might argue that the nation has lost its importance; but let us not forget that it is the nation that makes alliances with other nations. Such agreements are often for the end of contextualizing technological development— either for checking its expansion or encouraging it. Treaties, wars and embargos are international diplomatic measures taken so that certain technologies may be allowed to flourish or not.

So, the image of man, as the vehicle for free will balanced by a respect for his/her society has been vitiated by a certain tendency toward a technological world:

It is in this area that the nature of human nature—the generic image of man,

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inherited from the Enlightenment—has in our time been brought into question

by the rise of totalitarian governments, by ethnographic relativism, by discovery

of the great potential of irrationality in man, and by the very rapidity with which

men and women can apparently be historically transformed (Mills, 2000, p.

158).

We are susceptible to irrationality. This is just as true now as it was during the early stages

of WWII. Mills is asking if we are really that weak. In a time of totalitarian governments, a

more docile image of man was needed, but will we always have totalitarian governments,

or do we simply alter what we mean by totalitarian, a totalitarian capitalism perhaps? No,

we will not always have this; as mentioned earlier our form of government will be

determined by technological innovations. Mills seems to be implying that the position

which the Enlightenment assigned to man in the world is not the result of any a priori

relationship to his nature. This image was fabricated. The rationale of the Enlightenment

that there is a constant eye toward the universal can easily be put toward addressing

irrational or nefarious ends, but we are satisfied with the ends. The ends justify the means,

in other words. Mills is saying that the Enlightenment actually limited man's influence by

creating an image of man that does not reflect his totality. He is implying that the horrors of

the 20th century would not have occurred if humanity had been encouraged to achieve

another level of consciousness—one that could have helped us avoid the hyper-rationality

which led to the conflicts of the last century.

Mills, writing in the late 50s, remarks that we are at the end of the Modern era, and

it has become necessary to define that which delineates one era from the next. He does this

by commenting that our traditional ideas of liberalism and socialism today, as compared to

the Enlightenment, have become almost irrelevant as adequate explanations of the world

and humanity (2000, p. 166). The Enlightenment thinkers were under the assumption that

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there was an inherent and necessary relationship between reason and freedom. For instance, increased freedom comes from rationality applied in a general sense throughout the expanding needs of man and reason is the individual application. "Increased rationality is held to be the prime condition of increased freedom. The liberating notion of progress by reason, the faith in science as an unmixed good, the demand for popular education and the faith in its political meaning for democracy—all these ideals of the Enlightenment have rested upon the happy assumption of the inherent relation of reason and freedom". Freedom is the child of increased, rational awareness. To be free is to be rationally aware—true, in fact, for Western thinkers as well as Marxist liturgy.

That reason is the result of the free individual is a residue of the Enlightenment. Nevertheless, while the rationality of large economic and governmental structures has increased, the ability of the individual to act rationally in the face of them has not. While the rationality of the one has increased exponentially, the reason of the other has atrophied. This relationship causes us to question the values of freedom and reason. For example:

> Great and rational organizations have increased—in brief bureaucracies—have
> indeed increased, but the substantive reason of the individual at large has not.
> Caught in the limited milieu of their everyday lives, ordinary men often cannot
> reason about the great structures—rational and irrational—of which their milieu
> are subordinate parts. Accordingly, they often carry out a series of apparently
> rational actions without any ideas of the ends they serve…Even men of
> technically supreme intelligence may efficiently perform their assigned work
> and yet not know that it is to result in the first atom bomb (Mills, 2000, p. 168).

The result of this contradiction is a lack or loss of critical input from man, according to Mills, such that man is not able to navigate society with the interests of self and the larger society in mind. Man has become paralyzed, in a sense. The bomb could be a metaphor for

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any such large scale result where individuality is seen as an obstacle. The sociological imagination is conceived to combat this degree of ignorance since the sociological imagination is a level of consciousness characterized by conceptual flexibility. Within such a mental context, an individual must be able to project from the local experience upon the global and vice versa. One must perceive the local experience in its totality without being unduly influenced by the great structures of the economic and industrial systems. This process is a promotion of critical reflection. It suggests that the ability to change perspective would have a positive effect upon our direction as a civilization but through the efforts of the individual. It is a very post modern approach in this sense. It is a project.

However, what we are witnessing in our time is a technological and bureaucratic rationality which acts against social or individual intelligence. Social organizations, such as technological systems or bureaucracies, are not necessarily manifestations of socialism, nor are they the grand summation of the individual will and our ability to reason. "Rationally organized social arrangements are not necessarily a means of increased freedom—for the individual or for the society. In fact they are often means of tyranny and manipulation, a means of expropriating the very chance to reason, the very capacity to act as a free man" (Mills, 2000, p. 169). Men feel they have, according to Mills, a responsibility to make sense of history and they want to know what they can do about it. Such rationally organized social institutions can be an obstacle to, not only exercising an active presence in society as a whole, but to seeing the relations between the existence of one, his purpose, and his path and the larger implications.

The role of the social scientist is to study history and society to look for possible avenues for interventions in order to make the future more congruent to social interests as a whole. "We study history to discern the alternatives within them the ways in which they are and can be controlled. For only in this way can we come to know the limits and the

meaning of human freedom" (Mills, 2000, p.174). Reason's purpose is to enlarge the scope of individual choices, according to Mills; and the social scientist must uncover the conditions which are conducive to such a formulation of reason. Reason has, one in the same, a universal and local connotation. The aforementioned conceptual activity is to expand the scope of <technology> and to increase the conditions required for a smoother dialogue with technology and its expressions.

Mills seems to be talking about the possibility of dissecting the social circumstances in order to enlarge reason's applicability. Freedom is a heightened sense of awareness. We should question social institutions with the end of searching for avenues to intervention, which, I believe includes technological innovation and choice. The larger interests seem to dominate the individual ones and the concepts of freedom and reason are oriented away from the individual and toward the rationales of the bureaucracies, technological systems of profit, etc. Society needs to be reoriented such that the individual, through reason, can expand choice and thus diversify <technology> and its expressions. Mills is promoting a type of project which is defined by conceptual mobility where one's perspective can freely move between the local and the global without being unduly influenced by the larger systems of the global thereby allowing the multifarious conditions of the local to have a positive influence upon the global.

K. Romantic response to the Enlightenment

A romantic Enlightenment can be interpreted as a reverse of the Enlightenment we know. Instead of technology as that which gives shape and purpose to nature, this perspective highlights nature as that which guides technological activity. Rousseau was opposed to the idea that we are selfish animals. The premise of the *Social Contract* is that human nature is basically good whereby we band together not out of fear but to find our higher moral natures. "Children should be educated naturally, he argued, in order to

develop this higher sense of morals on the basis of their natural dispositions, in their own way and at their own pace. They should not be straight jacketed into the often unnatural mores of society" (Solomon, 1996, p. 210). So, not only do we need the other to find our means of connection, but we should be isolated from social conventions. Here again we see an example of a project which elevates the subject while the other is given a privileged place as well. This is a project based on the consideration of the other and not the domination of the other.

The French Revolution followed closely on the heals of the American one but their foundations were very different. The Americans had a very strict idea and belief in private property, but the French, guided by Rousseau, did not use <private property> as their paradigm or project. Instead the French revolution was characterized by our common sense of independence and a mutual commitment to society. Whereas the first revolution was a commitment to ideas and practice, the second was a dedication to one another—the ideals that bound individuals, a form of reason (Solomon, 1996, p. 203). In other words the revolutions can be understood within the contexts of practicality and reason subsequently, the former being more rational and the latter more romantic. In fact the results of the American Revolution, the Constitution and the Bill of Rights were not ideals, as was the Social Contract. They, "constituted perhaps the first instance of a social contract—not a fiction, not a metaphor, but an actual agreement, arduously negotiated and actually signed by the people or their representatives". These technological expressions determined the distribution of power and showed the boundaries of the government in their show of power upon the individual (p. 204).

<Technology> is a measuring stick. It is the recognized and celebrated paradigm for successful living, and this has been the case for the last three to five hundred years. Francis Bacon encouraged us to turn our attention to technology showing a preference over politics

and philosophy as the principle subjects for social concern and interests. Nevertheless, the approach to technology was done by philosophical means, suggesting that "the humanities conceived technology" and not the other way around (Mitcham, 1984, p. 39). This is not self evident since making per se is not readily considered an end. In fact Rousseau criticized the possibility that technological progress necessarily "contributes to the advancement of society by bringing about a unification of wealth and virtue" (p. 40).

Rousseau felt that the progression of science and its applications bring more corruption to our soles; the sciences and the arts are the fruit of our sins. "He shocked his contemporaries by challenging their complacent progressivism. Where they saw only scientific progress and the promise of what Comte called social reorganization leading to world peace and human happiness, Rousseau perceived progress of the sciences and arts as leading instead to a decline and decadence" (Scharff & Dusek, 2005, p. 6). Rousseau is saying that the scientific model is not the only model for progress. In a related example it could be argued that our culture is limited by commerce and money whereas the nature of our concerns could be much richer in terms of diversified experience. Progress, according to Rousseau, is not only advanced and seen through science.

Whereas in America, business was promoted and the leaders of the Revolution already power before; in France the Revolution was much more ideal. It was an attempt to place the power into the hands of the masses—a very Romantic notion. The problem was that the masses turned to violent competition. This led to the need for control—Napoleon; and the Enlightenment took a drastic turn. Rationalism became tinged with structure, hierarchy and Nationalist control (Solomon, 1996).

If the Enlightenment movement was about a struggle to establish an objective reason, Romanticism was about a celebration of passion and genius. Feelings and immediate experience put us in touch with our individual, vital powers. According to

Herder, "our ability to reflect and conceptualize and distinguish consciousness from the

world made us the first of God's creatures to be liberated...[But] the life of feeling...was

essential to being a whole person, at one with (and not just knowing about) the world"

(Solomon, 1996, p. 222). The life of feeling is a distinct paradigm from that of technology

and the machine. In fact, "both Herder and Vico were early opponents of technology, or at

any rate, they felt uneasy about the new celebration of the machine. Like Rousseau, they

challenged the general Enlightenment wisdom that praised science and technology for its

improvement of human life". Instead of the machine paradigm, they chose the individual,

and all its goods and evils, as the model for society. The individual was a complex and

dynamic entity, but it still pertained to a larger unity. "This became the definitive image of

romanticism, unity out of discord and conflict, universality emerging out of particularity,

God and the Absolute emanating from the complexity and confusion of everyday life". The

individual subject with all his/her emotional and tactile baggage was required to construct a

model for society. It was a major component in our relationship with the universal

everything.

Carl Mitcham has compiled a romantic critique of modern technology and how it

has affected the essential elements of life. He looks at such authors as Mumford, Ellul,

Ortega, and Heidegger for such a purpose. "Romanticism affirms the significance of

endeavors that transcend such limitations [as commerce and money]...of beings outside the

constrictions of civilization and the possibility of some vital faculty of mind with access to

deeper truths about reality than the rational intellect" (1984 p. 40).

For now I will only focus on Heidegger since I will spend time talking about the others

later, but what is important is the recognition of beings (forces, concepts, procedures, social

relations) outside the scope of influence which could have a positive effect upon

<technology> and technological expressions.

Modern Technology for Martin Heidegger is a particular kind of conversion of nature into energy that can be stored and transmitted. He compares the water and wind technologies to the electric plant which is a separation from the earth as well as other forms of revealing, to use Heideggerian terminology. Using wind and air is relying on the earth, while the electric plant is an expression of modern technology which "is a revealing that sets up and challenges nature to yield a kind of energy that can be independently stored and transmitted". The earlier forms of technology were more holistic while the other is almost purely instrumental in that these objects have no value apart from human use. And in this sense, technology, for Heidegger, is not neutral, stemming as it does from the scientific rationale. "Modern Science is characterized by an objectification of the natural world, the re-presentation of the world in mathematical terms that necessarily leave out of account its earthiness, thus setting up the possibility for producing objects without true individuality or thinghood" (Mitcham, 1984, p. 52). Heidegger uses the term "necessarily" to entertain the possibility that other such logics will lead to other forms of technologies.

For Heidegger, then, technological expression is a certain way to exploit the earth, suggesting that there may be others. Technology, in any form, will always non neutral in their exclusion, by its mere presence, of other forms. "Modern technology proceeds to exploit the earth in a new way—extracting stored up energy in the form of coal, then transforming it into electricity that can be re-stored and kept ready for distribution or use at human will" (Mitcham, 1984, p. 52). If the thing, the natural object, is constantly approached this way—as an object to be transformed into a standing reserve—then the thing that results is always the same. By this I mean that the material result, technological production, will be fundamentally the same. Nothing new will be created, only improved upon. Our concept of <technology> is hampering our ability to know something apart from it as an object for our use, and "use" even is not really challenged. It is merely challenged

in a linear direction whereby our technological production is an exercise in converting things into more of the same.

Regarding our penchant for superlatives, Heidegger refers to the atom bomb as simply a better form of physical destruction. Our creations are resources. We order reality a certain way that is determined by technology. We begin our revealing with the idea that we are revealing resources. The very idea that Nature is referred to as a resource is problematic. This has the effect of covering up or obscuring the thing in itself or its very being. Since we are preprogrammed to challenge nature to reveal resources, everything we come into contact with is so challenged in the same manner. For example, "technology cannot be understood in terms of technology" because we would find it difficult to uncover anything that was not programmed. There needs to be an approach which focuses on the substantive properties of technology. "Modern technology...is so certain about how to construct this or fabricate that. It has an efficient method or procedure that excludes all other methods or procedures". Heidegger's substantive theory may seem a bit far fetched, dogmatic even, but he does point to the important fact that "an overwhelming involvement in the material level tends to detract from metaphysical and spiritual reality...[Technology] rejects or ignores the more subtle affairs of the mind and heart" (Mitcham, 1984, p. 54). To overcome technology's presence, at least in certain forms, Mitcham recommends that we ride it out, endure the negative effects, like a stomach ache, until someone finally acknowledges certain technological inspirations (like the standing reserve) as a problem. It would seem that an improved understanding would open up the possibility of a more diversified and democratic interpretation of <technology> thus the conditions for a dialogue would be improved. Heidegger is saying that our linear evolution of technological production is a reflection of a limited understanding of <technology>. At the present we are

limited by an understanding that excludes the metaphysical and spiritual aspects of our lives which could influence technological expressions.

Romanticism was also a paradigm which emerged as a direct and almost logical reaction to the industrial revolution. This paradigm had to do with a way to relate to nature. The conditions of the industrial revolution determined that nature was for our use. The essence of the Romanticism movement was that man could exist with nature in a more organic sense which was a reaction to a Newtonian view of the world. The Romantics also proposed the heightened importance of imagination and feeling as opposed to a scientific rationality. In contrast to the Enlightenment which considered artifice to be the key to nature, the romantics believed the reverse, that nature was the key to artifice. Nature had been re-conceptualized (Mitcham, 2005). This is a project based on a new understanding of a key concept.

L. The Enlightenment today

The long term effects of the Enlightenment are very much with us. There are many negative repercussions of this highly structured and rationalized system of activity, especially as our technological endeavors are geared toward the State and driven by power. The Enlightenment encouraged integration, interdependence, bureaucracy and even exploitation for the greater purposes of humankind through institutions such as the bourgeoisie and later the market and the state. Modern technology is that which unifies much of the world through either direct participation or in some systemic fashion. Many aspects of the world are unified by a technological common denominator. For example, our world has been technologically politicized, making it difficult to alter its direction due to the internal links between government and technological research and overall international activities. In general:

Modern technology has had several implications for the structure of global trade.

It has provided the transportation and communication infrastructures that have

increased the interdependence of national economies. It has also made possible

the rapid growth of multinational corporations primarily dominated by United

States capital, by allowing the global decentralization of production under the

control of a single organization. And it has placed technological innovation at

the heart of economic decision making of both developed and less developed

nations. The overall result has been to integrate the world increasingly into a

single economic system, and to institute a single international division of

labor (Dickson, 1988, p. 165).

The direction of our world is more than slightly influenced by considerations made for

modern technology. Technology is like an only son. Science and technology are so

important to the conditions throughout the world that the issue about the control and

distribution of science and technology has come to heavily dominate international relations

commercially and in peace, and in war. If technological innovation is at the heart of

economic decision making, could this relationship not be just as easily reversed? This is a

mere model for social relations, but models are not predetermined; they are the result of

arbitrary social negotiation.

Speaking of models, we are still following Bacon's guide which established that

technical opportunities are the result of man's continued dominion of nature. "The

significance of the Renaissance and the Scientific Revolution to modern debates is that they

created the concepts—for example, the distinction between facts and values, or between

living organisms and inanimate matter—that continue to dominate the way we look at the

natural world and construct theories about how it works" (Dickson, 1988, p. 316). The high

priority given to technical advantages which come from the domination of nature was later

used as justification for increased political control. In the early days of the industrial revolution, society saw the factory as that which required centralized production and increased domestic manufacturing. Given the needs generated by the factory, there emerged, "the idea that the social world could also be placed on a rational footing" (p. 317). Social relations needed to be adjusted to maximize the advantages of the factory system, and the view of a mechanical universe served this purpose. With the progression of the years, this idea did not change.

The scientific advances of the 19th century gave science the right to attempt scientific solutions to social problems. The result is that our social relations are in large part determined by certain forms of technological development. In the 20th century, "the new technological opportunities opened up by microelectronics and biotechnology offer new possibilities for social growth...,[however] access will be predominately through the marketplace, and that new technologies in the form of industrial processes or consumer products will be determined primarily by their ability to generate profit" (Dickson, 1988, p. 323). David Dickson argues that we do not have to accept these paradigms of technological production. He states that it is through public institutions that we may be able to alter technological development as they constitute a means to channel research results out of the university or government laboratory. By this he is also arguing that the market is not the only mechanism to do this. Nevertheless, the major obstacle to a shift in the path of scientific and technological development is political as there has developed a tight relationship between the state, the market, and the university research systems. In sum, if we, meaning Academia in conjunction with Industry and Government, alter or create new public institutions, then technology will reflect these changes. We could also create new incentives which reward different partnerships between institutions or among international entities.

From our contemporary perspective, one can contextualize the Enlightenment in a very skeptical way. Practically speaking, it is the cause of colonization, imperialism and the exploitation of the planet. Such behavior is a social relation whereby experience is considered rational and good if it promotes the functioning of the state. An extreme example is putting the blame of the genocide of the Jews on this form of hyper-rationalism, which sprung from the Enlightenment (Borradori, 2003). In short, radical and often ludicrous action is justified and rewarded based on the form of rationalism that came from the Enlightenment.

M. Conclusions

The Enlightenment was a model, a social project, whereby the organization of nature and knowledge would serve to elevate humanity, at whatever the cost. Truly liberal principles were the foundations for the ultimate vision of the Enlightenment. This vision was oriented toward, not only the liberation from war and disease, but toward the liberation of man's faculties and their orientation to the world. It was understood that through the benefits of modern technology humanity would be freer to negotiate the world in many different ways. These characteristics were the foundation for the original model of the Enlightenment, but science, through the development of modern technology, was to be a guiding thread of this model. Modern technology was to turn nature into man's tool.

Nevertheless, this model could have been based on a scientific paradigm which is constructed around the idea of viewing *a thing in itself* and not as its function. How we relate to nature is not written in stone. There were ancient models for the structure of technology which showed that the models of the Enlightenment were mere mythological applications and could have been substituted for any other. The Enlightenment also manipulated our concept of <man>. It converted man from the vehicle for liberal expression to a mere consumer, and governments were modeled in such a way so as to

capitalize on this economic translation of man. After the Enlightenment, there were many responses in the 19th century which revealed the failures of the earlier, more liberal movement. These responses highlighted the structures of our current societies where the other is the enemy or an obstacle and not a necessary component for understanding or validity. Humanity does not have to see Nature as a thing to be converted to use where man is the master. An option to this could be to interpret our relation to nature as one that is more organic whereby the influence flows freely between the two entities of man and nature.

Due to the events of the 20th century, we are beginning to question the motives and means of the Enlightenment. Looking back we can determine that the Enlightenment put restrictions upon the idea of progress. Ideas of determinism in the 20th century reflect this restriction where the total potential of man is channeled to favor certain goals. In fact, there was a conscious effort to suppress the liberalism that flourished during the Renaissance in order to tailor the potential of man to serve the needs of capitalism and the State. The Enlightenment chose certain aspects of humanity and excluded others. What happened to this latent potential within man? The Enlightenment forced us to question the very image of man. Man's purpose was directed toward a larger project—that of the liberation of man from the toil's of nature. Nature was to be reorganized so as to be either something to be liberated from or used in this process of liberation. Truth about nature was now truth as defined by the aforementioned criterion. In this sense the Enlightenment was a historical project, linearly geared toward the future; whereas man is a much more holistic concept that can project itself in all directions and in many different ways.

The Enlightenment, however, molded man's potential to reveal itself in only certain ways. This is a restriction upon critical reflection. We need a diverse relationship in order to promote critical reflection. The other is something to be welcomed and not dominated,

but we confront the other with ideas of domination. Regarding nature as a resource acts as a form of exclusion from diversity. For one, we are separated from nature in every way other than those which treat nature as such. Nature is treated with uniformity which also serves to suppress critical reflection. Freedom is the liberation of expressing our needs, our total needs and not only those propagated by the values of the Enlightenment. In order to promote critical reflection contact with the other should be free and not tinged with self preservation. So, <technology> can remain as a form of conversion, but it does not have to be a conversion characterized as self preservation. We don't know the other as long as we are influenced by selfish interests.

From Ellul we see that we are unified under a rational technique, and it is useless to deny it. In fact, technique serves as an incorporating element which invites change and links it to the web of social elements. Technique is the label we can give to a certain social mechanism that has emerged since the Enlightenment. However, what began as a liberal movement, quickly turned into a technological rationale due to the demands of commerce and war. For Horkheimer and Adorno, the Enlightenment has seeds of self destruction since it is based on a separation of man from nature. We exercise power over nature at the cost of not knowing it. This is the type of technology we promote as a result. Heidegger, as well, felt that the type of technology is the result of a conversion of nature into a standing reserve for our use—an idea which he claims has origins in the Enlightenment.

For Habermas, on the other hand, the Enlightenment is not finished. It is still evolving as our universal concepts that will one day unite us are still in the process of development. Reason is not instrumental reason for Habermas; rather it is a mechanism which operates so as to validate through inter-subjective communication. Like Habermas, C. Wright Mills argued that the Enlightenment is not over. It has taught us the idea of dual perspective such that we are able to see the abstract whole within the daily activities of our

lives, thus maintaining an idea of universal trajectory even within local experience. Heightened perspective increases our individual freedom which could, in turn, influence the outward form of technological expressions. This perspective is a form of reason. Perhaps, this was the main purpose of the Enlightenment after all; but, reason was originally conceived as a unifying concept and not one that would divide nations and individuals. Nevertheless, from Mills, at least, we are presented with an idea of seeing connections between peoples rather than divisions. For instance when we see the application of instrumental rationality in our daily lives, we can make connections between trivialities and larger historical movements.

Finally, the types of technologies that have emerged are largely due to their relation to profit and power, both of which lead to the creations of certain types of societies. We are satisfied if we can participate in the benefits of profit, comfort, convenience; and the types of technologies are marked by a division of leisure and labor. As to power, technology is used as the means, ends and justification for the security of a nation, economic and political security. The Enlightenment was a project which shaped <technology> so that it would reflect certain tendencies.

The liberal intentions of the Enlightenment were victim of historical and political exigencies which demanded that technological production, in both our conceptual construction of <technology> and in the creation of our technological expressions, took a certain path. The interests of the State and the values of a burgeoning capitalism determined <technology's> path. The total experience and perspective of humanity was not given credit for being a positive influence upon technological production. Only certain aspects of our lives were thought to be worthy. The real looser was technology itself as the other aspects of humanity were not encouraged to have a positive influence upon technology,

even though the potential was there to be taken advantage of. This potential was channeled,

though very efficiently, to promote certain interests.