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Engaging Technology: A Missing Link in the Sociological Study of Human Knowing and Acting

Abstract

Whereas technology has been the focus of much discourse in both public theatres and sociological arenas, comparatively little attention has been given to the study of the ways that people actually deal with technology as realms of human knowing and acting.

Working from a symbolic interactionist perspective (Mead 1934; Blumer 1969) and drawing on classical Greek scholarship as well as some interim sources, this paper addresses technology as a humanly engaged process.

Attending to human group life as "something in the making" and focusing on the activities entailed in encountering, using, developing, promoting, obtaining, and resisting instances of technology, this paper outlines a research agenda intended to foster situated (i.e. ethnographic) examinations of technologically-engaged, humanly enacted realities. It also serves as a reference point for assembling and comparing studies of the technology process that deal with this set of activities.

Keywords
Technology; Science; Sociology; Theory; Ethnography; Community; Pragmatism; Symbolic Interaction; Constructionism; Activity; Process

Although our contemporaries often envision technology as residing in material goods, particularly those associated with mechanized or automated, if not also electronic and computer aided, processes, this paper outlines a research agenda for studying technology more fundamentally as humanly engaged, conceptually achieved instances of enabling devices.

Rather than adopting the standpoint that technology resides in particular objects and their functions, we take the viewpoint that technology is achieved as people invoke concepts, understandings and procedures in pursuing particular realms of activity and the objectives applied therein. The emphasis, therefore, is on the ways that people engage technology not only as instances of enabling devices "in the

making" but also as matters that can be comprehended only within the context of people's participation as agents and interactors in ongoing community life.

Once technology is envisioned as consisting of humanly engaged enabling devices, it becomes more readily apparent that virtually every area of community life is saturated with instances of technology. This includes all realms of: religion, morality and spirituality; education, science and scholarship; speech, communication and literature; government, politics and policy; health, hygiene and medicine; deviance, law and regulation; food, clothing and fashion; industry, business and consumer behavior; sports, recreation and entertainment; agriculture, forestry and animal care; travel, transportation and tourism; family, friendship and collective events. Although particular modes and instances of technology may vary greatly from society to society as well as within societies and the subgroups therein overtime, humanly known and engaged reality is thoroughly interfused with instances of technology.

Moreover, technology would have no existence apart from human notions of purpose, usage, development and transformation as socially engaged, interlinked sets of processes. It is most ironic, therefore, that sociologists and other students of the human condition have given so little attention to this exceedingly consequential and pervasive feature of community life.

It is not the case that technology has been neglected in day to day practical, applied-vocational or academic contexts. However, little consideration has been given to technology as a humanly experienced, actively engaged phenomenon.

Whereas (a) the practical day-to-day community emphasis typically is one of finding more immediate, better ways of accomplishing certain tasks or objectives (as in enabling devices associated with concepts, procedures, and material goods) and (b) technicians, instructors and innovators in applied fields have endeavored to maintain current technologies, educate others on procedures and develop more viable instances of enabling devices, (c) the dominant social science emphasis has revolved around questions pertaining to the impact of instances of technology on one or more realms of community life. These are important matters pertaining to technology more generally. Still, none of these emphases provide (d) a means of studying the ways that people, as functioning members of the community, actually experience instances of technology or actively and knowingly participate in the technology-making process.

Although some might question the importance of this latter objective, saying that it does little to help solve problems of more immediate or pressing sorts, we take the position that this latter objective is exceedingly important. By examining the ways that people engage and experience technology in enacted, process terms we not only will better understand the "what and how" of technology but we also will better comprehend others as well as ourselves as participants in the human community. The study of technology as an actively engaged, social process is highly consequential for the understanding of community life - both in terms of the more immediate present and in broader, more extended transsituational and transhistorical comparative terms.

Interestingly, too, although sociologists and other academics, like people more generally, often become intrigued with the "new and exciting" features of particular instances of technology, there is comparatively little appreciation of the developmental potency or foundational relevance of the enabling devices that people earlier had developed. As we hope to indicate as well, these developmental, cumulative and yet often disjunctured flows of community life are important aspects of a scholarly consideration of technology as also is the potential that historical

materials addressing people's experiences with instances of technology offer for comparative analysis.

Whereas sociologists often envision symbolic interaction and the related pragmatist,[3] ethnomethodological and social constructionist approaches as pertinent to the analysis of interpersonal relations, these theoretical and methodological approaches are less frequently referenced in discussions of social change and technology. Instead, sociologists and many others in the social sciences typically contend that change and technology can be best understood through the use of "macro-oriented" analyses (wherein scholars broadly talk about the impact or implications of technology for social change in society).

Because notions of social change, technology and human living conditions represent consequential and intriguing issues, we may expect people to attend to "impact" considerations of technology both in the present and throughout the future of the human experience. At the same time, though, these discussions, even when they focus on particular kinds of technologies (such as automobiles, airplanes or computers) and reference particular users, specific outcomes, life-style implications and the like, tend to be (unavoidably) vague and are largely disconnected from people's first-hand experiences with the particular realms of technology under consideration.

These macro-oriented modes of research and analysis also fail to recognize that human group life does not take place as abstracted sets of variables but is accomplished and built up only as people do things and fit their lines of activity together, in purposive, meaningful ways, with the activities of others. People need not assume cooperative stances on any consistent basis and may define themselves in competitive, oppositionary and disinterested terms relative to others. However, it is within these realms of activity and interchange that technology achieves its viability and virtual existence. As a result, whereas more sweeping "macro" analyses may be instructive in certain respects, they are notably ineffectual for informing social scientists about people's *experiences with* technology.

In what follows, we attempt to move past these more speculative macro analyses by focusing on technology as denoting instances of human involvement.[4] Working directly within the symbolic interactionist tradition (Mead 1934; Blumer 1969; Strauss 1993; Prus 1996, 1997b), this statement emphasizes the importance of addressing technology in *enacted* terms.

This paper assumes three objectives: (1) to present a more fully sociological, humanly experienced vision of technology;[5] (2) to indicate some of the enduring features of this orientation by acknowledging early Greek thought on *technê* and (3) to develop a research agenda that would enable scholars to attend, in more focused and

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[3] A sociological extension of American pragmatist philosophy (as articulated by Charles Sanders Peirce 1934, William James 1975[1909] and 1979[1907], John Dewey 1975[1910], and George Herbert Mead 1934), symbolic interactionism has been most notably shaped by the works of George Herbert Mead and especially Mead's (1934) *Mind, Self and Society*. Also see Blumer (1969, 2004).

[4] The terms "culture" and "technology" may seem synonymous in some respects. However, as used herein, the term "technology" suggests a specificity of human focus (as in context, activity, purpose and adjustment) that the more encompassing term "culture" tends to obscure. Further, as indicated throughout, the emphasis is not on technology as a general cultural concept or as particular configurations of material artifacts, but rather on the ways in which people *engage* specific instances of technology.

Relatedly, although people often talk about technology in general terms, the position adopted here is that things achieve no technological essences (as enabling devices - concepts, equipment, procedures) apart from the humanly experienced instances in which they are invoked.

[5] As suggested in some philosophical considerations of technology (e.g. Heidegger 1927, 1954; Ihde 1991; Johnson 1998) some of those in the "philosophy of technology" tradition also view technology most fundamentally as a "social process." However, they have given little direct attention to the study of the ways in which people engage technology in enacted instances. Ihde and Johnson provide valuable reviews of the philosophic literature in this area.

sustained manners, to the ways in which people engage technology. Although the emphasis, thus, is on grounding theory pertaining to technology (and social change) in more situated instances, the material developed here not only has a transsituational or transcontextual relevance, but also has a transhistorical dimension.

Further, by indicating the various standpoints that people may assume in engaging instances of technology, we begin to see the ways in which more molar or macro social processes are built up around the things that people actually do and the enabling devices that people specifically use in pursuing their endeavors.

Still, readers are cautioned about the inevitably tentative nature of the present statement. While (a) suggesting lines of inquiry that researchers might productively pursue in comprehending human experiences with technology and (b) serving as a reference point for synthesizing research on technology as something in the making, this statement is apt to be of most value as an enabling device when (c) it is reconfigured to more accurately (and completely) reflect researchers' examinations of people's experiences with enabling devices.[6]

Defining Technology

As used herein, *technology* refers to any object (i.e. any enabling "device") that people use in attempts to accomplish any activity.[7] While people often invoke the term "technology" to refer more exclusively to physical or material artifacts (and especially more complex pieces of equipment), technology always has a conceptual, intentioned or purposive dimension. Consequentially, every instance of technology achieves its fullest meaning when envisioned as an *intersubjective, mindfully enacted process*.

Addressing the human endeavor entailed in activities ranging from people attending to the fundamental necessities of physiological existence to all realms of playful experience, technology encompasses all manners of [objects] that people use to do things within their theaters of operation. This includes not only the sorts of things (e.g. material products and processes) commonly associated with physical phenomena but also, and even more centrally, people's language (and concepts) and instrumentally-focused activities (and procedures).[8]

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[6] Although the use of [brackets] to offset particular references may be disconcerting to some readers, we have occasionally used this device to alert readers to the problematic nature of the particular terms being referenced.

[7] While technology implies a means-ends or instrumentalist orientation, there is no requirement that any instances of technology that people invoke need be effective (e.g., efficient viable, or "wise") in enabling them to achieve intended objectives.

[8] Although this approach to technology may seem excessively broad to some readers and some might even suggest that it encompasses all artifacts, if not all physical phenomena and all human behavior, we retain a pragmatist position in defining technology. That is, **nothing represents an instance of technology (i.e. an enabling device) until someone defines or otherwise acts toward it as such**.

Technology, thus, does not reside in any phenomena but things "take on a quality as technology" when people define or otherwise knowingly act toward those things as enabling devices (a rock only becomes "part of the technology process" when someone uses it to pound a stake into the ground, for example). Or, somewhat relatedly, the seemingly material Berlin Wall has become used by some psychologists as a mechanism for interpreting the cultural mindsets of the German people (Leuenberger 2006).

We may distinguish (a) things that are intended and/or developed as enabling devices from (b) things that are envisioned as having the potential to become enabling devices and (c) those things that are knowingly used in attempts to accomplish something. Further, although the people whose lives intersect at some point with particular instances of technology may assume highly diverse roles in the particular technology process at hand (e.g. from developers and users to unwitting targets and disinterested bystanders), it also is important to be mindful of people's tendencies to take earlier instances of technology for granted. Thus, for example, people often assume language, the alphabet,

Further, while people may develop and employ enabling devices in both more individualized and more collective, interactive settings, there is no requirement that specific instances of technology be effective in allowing people to achieve desired or intended outcomes.

As well, enabling devices need not be pursued to their "full development" to constitute technology for our purposes. Indeed, many [enabling devices] may be only vaguely envisioned or articulated and only partially developed or implemented.[9]

Likewise, regardless of how compelling, groundbreaking, or challenging particular instances or fields of technology may seem, it is exceedingly important, at the outset, to acknowledge *the intersubjective foundations of technology*; to emphasize that people *use language* (i.e. a community-based enabling device) as *the* primary means of envisioning, transmitting and engaging other instances of technology.

Language may not be the first capacity that [humans] developed in the process of becoming humans, but speech as a mechanism for collectively developing and sharing meanings is the singularly most consequential feature of *being human*.[10] Indeed, symbolic interchange represents the most fundamental, unique, versatile and encompassing enabling device to which those who constitute the human community have access.

This is not to discount human capacities for encountering sensations,[11] engaging other modes of activity or the importance of the [physical / material] environments in which people exist, but rather to recognize the profoundly intersubjective or linguistically-mediated (meaningful, deliberative, interactive) essence of all aspects of people's *enacted* realities.

Over the centuries a number of people have explicitly commented on the enabling features of language. This includes Thucydides (c460-400BCE), Plato (c420-348BCE), Aristotle (c384-322BCE), Cicero (c106-43BCE) and Augustine (c354-430CE), amongst others.[12] The following quote from Isocrates (c436-338BCE), while strikingly elegant in its formulation, is not especially atypical of Greek and Roman views of language among philosophers and rhetoricians; Isocrates (1928):

> For in the other powers which we possess we are in no respect superior to other living creatures; nay, we are inferior to many in swiftness and in strength and in other resources; but, because there has been implanted in us the

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containers, electricity, books and computers are "merely there" as they engage other instances of technology - even though these latter enabling devices may be centrally contingent on these earlier developments. The implication for us, as scholars, is to be mindful of the broader contexts of the technology process while attending to the more particular notions of technology that people invoke in the specific settings at hand.

[9] Some readers may consider this conception of technology to be excessively sweeping, but by maintaining these broader parameters one may be better able to appreciate the variants that "technology" may assume without artificially blunting, obscuring or unduly restricting our consideration of the human condition.

[10] As used herein, "language" encompasses all of those symbols that people use in making indications to (and receiving indications from) others. To be humanly meaningful as a mode of communication, it is necessary as Durkheim (1912) and Mead (1934) observe that symbols acquire some sharedness, that any indications or signification directed toward the other achieve some mutuality (or invoke reference points in the other that approximate those experienced by the self). Also, see Prus (2007b, 2007d).

[11] It is appropriate to acknowledge that people encounter the environment via "the senses" (i.e. sound, sight, touch, smell and taste) but these matters, too, are only meaningfully experienced (interpreted, defined, acted toward) though the use of language (see Durkheim 1912; Mead 1934). Aristotle's observations (see *On the Soul* and *Sense and Sensibilia*) on these and some related matters (e.g. locomotion, memory, recollection) remain remarkably compelling (e.g. see Prus 2007b).

[12] Also see, for instance, the interim scholarship of Thomas Aquinas [1981], Dante Alighieri [1989], John Locke [1995], Johann Herder [1966], Wilhelm Dilthey (see Ermarth 1978), Emile Durkheim (1915 [1912]) and George Herbert Mead (1934).

> power to persuade each other and to make clear to each other whatever we desire, not only have we escaped the life of wild beasts, but we have come together and founded cities and made laws and invented arts; and, generally speaking, there is no institution devised by man which the power of speech has not helped us to establish... With this faculty we both contend against others on matters which are open to dispute and seek light for ourselves on things which are unknown; for the same arguments which we use in persuading others when we speak in public, we employ also when we deliberate in our own thoughts; and while we call eloquent those who are able to speak before a crowd, we regard as sage those who most skillfully debate their problems in their own minds. And, if there is need to speak in brief summary of this power, we shall find that none of the things which are done with intelligence take place without the help of speech, but that in all our actions as well as in all our thoughts speech is our guide, and is most employed by those who have the most wisdom. (pp. 79-81)

Thomas Hobbes (c1588-1679), who has a good working familiarity with some of the Greek literature, also makes this point in a compelling fashion; Hobbes (1994):

> The invention of printing, though ingenious, compared with the invention of letters is no great matter... A profitable invention for continuing the memory of time past... But the most noble and profitable invention of all other was that of SPEECH, consisting of names or appellations, and their connexion, whereby men register their thoughts, recall them when they are past, and also declare them one to another for mutual utility and conversation, without which there had been amongst men, neither common wealth, nor society, nor contract, nor peace, no more than amongst lions, bears and wolves. (pp. 15-16)

A similar, but also fundamental observation is made by a contemporary philosopher, Robert R. Johnson (1998):

> As unreflective we may be of language as a technology, it is still a human construct, a human invention that is taught, learned, and used in strategic ways, much as we might use hammers, automobiles, or computers. (p. 9)

Still, as with technology more generally, it should not be assumed that all or even most instances of language usage within particular group settings will achieve a degree of mutuality or sharedness that allows the participants to completely (or even adequately on many occasions) comprehend the viewpoints (and intentions) of the other.

Relatedly, because language represents the most effective (foundational) means of establishing the meanings (and utilization) of all technologies, the problematics of humanly achieving intersubjectivity are (by extension) pertinent to people's encounters with technologies of all sorts.

For all practical purposes, then, all of those who become linguistically socialized into particular human communities as newborns and other newcomers effectively become “technologically engaged” in the process. While these newcomers subsequently may develop other enabling devices on their own or in conjunction with others, they are first *witnesses* to, and *users* of, pre-established community-based technologies (also see Prus 2007d).

As a corollary of sorts, it may also be observed that if any of the enabling devices that people later develop are to achieve more consequential senses of continuity (and become more fully integrated into people’s life-worlds), it will be necessary that others be able to access (i.e. share, achieve some mutuality with) these technologies.

Further, although people often envision, discuss and use technology as though the objects (e.g. airplanes, telephones, computers, watches) to which they refer are distinct enabling entities, it is important that analysts acknowledge the *multi-technologically* embedded features of particular instances of technology. Quite directly, all instances of (humanly meaningful) technology are built on, are composed of, or require the implementation of, a multiplicity of subtechnologies or (primary and secondary) enabling devices.

It is both convenient and typical for people to refer to enabling devices in more singular terms, but such notions are highly misleading. Thus, for example, if one considers some currently commonplace items such as automobiles, televisions, computers, shoes, pencils and erasers, cups and spoons, it becomes apparent that they (a) consist of (or their production requires) particular subarrays of technologies.

Likewise, their use presumes that people (b) will specifically be able to connect these items with other (humanly meaningful) objects and (c) possess broader, contextual stocks of knowledge (including objectives, procedures, and proficiencies), as well as (d) embark on focused (reflective, intentional, interactive) enterprise in order to "give existence, shape and signification" to these [devices]. The same notions seem to hold for enabling devices such as laws, governments, scholarly disciplines, books, poetry, humor and other human interchanges, concepts, logic, theory and other realms of enterprise that are thought to have a more limited or minimalist "physical" or "material" nature.

We will be discussing the ways in which people engage technology in more situated terms within the core of this paper, but by examining some early Greek thought on technology we arrive at a more comprehensive base with which to approach, demystify and study technology on the continually unfolding "contemporary" scene.

Technê as a Concept

> *Now, isn't it of the greatest importance that warfare be practiced well? And is fighting a war so easy that a farmer or a cobbler or any other craftsman can be a soldier at the same time? Though no one can become so much as a good player of checkers or dice if he considers it only as a sideline and doesn't practice it from childhood. Or can someone pick up a shield or any other weapon or tool of war and immediately perform adequately in an infantry battle or any other kind? No other tool makes anyone who picks it up a craftsman or champion unless he has acquired the requisite knowledge and has had sufficient practice.*
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> *If tools could make anyone who picked them up an expert, they'd be valuable indeed*. (Plato, *Republic*: 374c-e [Reeve Trans.])

Clearly, technology did not originate with the classical Greeks (circa 700-300BCE). Likewise, much Hellenistic technology (and thought) did not originate with the Greeks.[13]

[13] For some general sources on classical Greek thought, see Freeman (1949), Popper (1957), Bogardus (1960), Gouldner (1965), Peters (1967), Guthrie (1971), Becker and Barnes (1978) and McKirahan (1994). However, there is no substitute for more direct examinations of the texts associated with Plato, Aristotle and others of the era.

See Popper (1957), Bogardus, (1960), Becker and Barnes (1978), Martindale (1981) and Bryant (1996) for materials that more directly acknowledge the significance of early Greek thought for contemporary structuralist sociology. Popkin (1999) and Habib (2008) provide valuable historical reviews of the development of philosophy and literary criticism, respectively, from the classical Greek era to the

The Greeks were highly active travelers and traders in the larger Mediterranean arena, but they also appear to have learned much from an array of visitors and migratory peoples.

As well, the early Greeks (possibly building on materials from the Phoenicians, Babylonians, Egyptians and Sicilians) not only developed a highly sophisticated phonetic written language, but also were among the greatest scholars and compilers of knowledge known to mankind. Still, this is not an essay on Greek technology or a tribute to Hellenistic accomplishments. Our intention, much more modestly, is to utilize some writings from the classical Greek era that address technology as "something in-the-making."

As Roochnik (1996) observes, Greek scholars, reputedly at least as far back as the legendary figures Homer (circa 700BCE) and Hesiod (circa 700BCE), not only made reference to *technê* as a concept but also used the term in ways that encompassed (a) such things as the skill of craftspeople as well as (b) people's capacities for developing and implementing plans and (c) altering the forms of things presented to others.

At some basic levels, too, their use of *technê* also implies (d) a particularized knowledge of, or set of procedures for dealing with, some subject matter (tangible or intangible), (e) an instrumental orientation in pursuing a goal or objective and (f) something (e.g. knowledge, procedures, products) that can be appreciated by, or shared with others who might pursue similar objectives.

Relatedly, Roochnik (1996) notes that *technê* subsequently was not only applied (and debated with respect) to matters of medical practice (Hippocrates [460-359BCE]) and rhetoric (e.g. Gorgias [480-380BCE], Plato [427-327BCE], Aristotle [384-322BCE], Isocrates [436-338BCE]), but *technê* also was invoked (promoted and questioned) with regard to the shaping of character and community morality (as in Plato's *Republic* and *Laws* and Aristotle's *Nicomachean Ethics*).

For our present purposes, though, it may be adequate to focus more directly on Plato and Aristotle (given the sociological relevance of, and the philosophic detail associated with, their works, as well as a greater familiarity with their texts within the academic community).

Given both the incredibly vast array of topics with which Plato and Aristotle dealt and the highly diverse conceptual (and often morally / religiously inspired) viewpoints with which they and others have approached their works, it need not be surprising that the Greek concept *technê* has been comparatively neglected over the millennia. Still, the early Greek literature suggests a more comprehensive view of technology than that with which most social scientists presently work.

More directly, this material (along with the early philosophic insights on which Plato and Aristotle build) encourages us to view technology as (a) consisting of multidimensional, humanly engaged [intellectual and material] essences, (b) an enduring, transsituational concern and (c) a dynamic, enacted, community-based phenomenon.

Although much of Plato's work (particularly that which is associated with Socrates) may be seen as questioning the viability (possibility, authenticity and relevance) of people knowing about (and knowingly engaging) the [sensate world], Plato's fuller considerations of the human condition suggest otherwise. Thus, even the dialectic (*dialecktike*) method of philosophizing that Plato utilizes in presenting (and contesting) Socrates' thoughts takes Plato squarely into considerations of technological practices

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present time. Emile Durkheim (1977[1903-1904]) provides an especially valuable analysis of the development of Western social thought.

For a more explicit consideration of the linkages of classical Greek thought with American pragmatism and Chicago-symbolic interactionism, see Prus (2003a, 2004, 2007a, 2008, 2009a).

(and *reasoning* as an essential "enabling device"), as also do some other tasks he pursues.

Plato may not have developed an explicit "theory of technology," but his little known *Charmides* presents a highly insightful statement on the desirability of establishing a "science of science." As such, it represents an early, very thoughtful precursor to more contemporary considerations of a sociology or philosophy of knowledge – as also does Plato's more extensive *Theaetetus*.

While often arguing for Socratic notions of apriori or preexisting forms (of things) and the impossibility of people attaining viable knowledge about the world, Plato also remains attentive to a variety of dimensions of *technê*. Thus, in developing his dialogues, Plato explicitly acknowledges a broader set of (humanly invoked) features of *technê*, as expressed by matters pertaining to *gnostike* (theoretical), *logistike* (logic), *kritike* (critical), *poietike* (craftsmanship), *mimesis* (developing images, imitating), *praktike* (building) and *epitaktike* (directive, as in statesmanship).[14]

Whereas Plato promotes a rigorous conceptually enabling, dialectic philosophy, many other aspects of Plato's attentiveness to *technê* are notably evident in *Republic* and *Laws*. Working with the moral ideal (and clearly preMarxist vision) of a communist state, Plato invokes wide ranges of technologies (concepts, organizations, physical structures, materials, procedures, and interpersonal relations) in discussing the development and maintenance of the city-state.

Thus, matters pertaining to city location and arrangements, agriculture, politics, military, trade, morality, religion, education, recreation, taxation and welfare, criminality and justice, family routines and population composition, amongst others, are presented as arenas that are clearly intended to be objects of deliberative planning and ongoing human (crafted, mindful, adjustive) enterprise.

Still, despite Plato's sweeping (and yet comparatively detailed) emphasis on enabling devices (including his explicit considerations of religion and mythology as means of fostering community cohesion, maintaining the social order, and building character), Plato's considerations of technology (i.e. enabling devices) pale when compared to those of Aristotle.

Perhaps, most centrally, whereas Plato remains somewhat wedded to Socrates' notions of the impossibility of people achieving viable knowledge about the sensate world, Aristotle intends to develop materials that directly *build on* and *facilitate human knowing* of the world. Clearly, Aristotle has benefitted extensively from Plato's scholarship. However, Aristotle's emphasis on the ways that humans might more knowingly and effectively engage the world is much more explicit and encompassing than is that of Plato.

Indeed, given Aristotle's pronounced emphases on developing, explaining, and analyzing enabling devices across the fuller range of his texts, Aristotle remains *the* intellectual exemplar of the technological perspective. However, and rather ironically, given Aristotle's enduring contributions to academia (including the foundational development of the analytic, physical and social sciences), there has been a comparative disregard of *technology as denoting realms of human activity and interchange* over the millennia.

As active, day-to-day participants in community life, almost everyone seems to (a) recognize that they use things (as enabling devices) to accomplish particular objectives, (b) know that some of their contemporaries are working on "new, improved" versions of enabling devices, and (c) talk about (if also not wish for) new kinds of technology. However, (d) when people can conveniently access and use particular enabling

[14] We found Peter's (1967) consideration of "Greek philosophical terms) helpful in developing this material on Plato.

devices, much of the mystique that they earlier might have associated with these particular instances of technology often becomes taken for granted.

Even sociologists, historians, philosophers and other students of the human condition frequently become caught up in the technology mystiques of their own present (or specific other past or futuristic eras) and lose perspective on the longer-term developmental flows (and disjunctures) of realms of technological innovation. Many forget or disregard the point that the technology of the more immediate present is contingent on the technologies that people earlier had developed. As well, they often overlook the point that the technologies of the present can only be comprehended in terms of the enabling devices of the past (see Durkheim 1912, 1977 [1903-1904]; Prus 2007b). Whereas a more adequate sociological theory of technology would require a comparative, historical (i.e. transhistorical) knowledge base, the more fundamental conceptual relevance of technology as an *engaged* feature of human life-worlds has been obscured over the millennia.

In, "The Question Concerning Technology," Martin Heidegger (1954) directly links Aristotle's "doctrine of the four causes" to the concept of technology by focusing on the "instrumentality" or means-ends aspects of technology. Addressing Aristotle's generic depiction of "the four causes,"[15] Heidegger draws attention to (1) *hyle* or the material or physical features of some phenomenon (i.e. that of which it is made); (2) *eidos* or the form that something assumes; (3) *telos* or the emergent and eventual (possibly anticipated) outcome and (4) *kinoun* or the mover of the process or effect.[16] At base is the recognition that *without human agency* (especially the capacities for intention and action), there is no technology.

Heidegger addresses these four features of technology in an insightful manner but, unlike Aristotle, Heidegger fails to sustain his analysis on a more participatory or humanly enacted level. Instead, Heidegger subsequently asks about the (broader) historical implications of technology for society. Working at this latter level, Heidegger posits that the key feature (now "function") of technology is not one of producing specific things, but rather to reveal or uncover potentialities; to (more or less continuously) allow people to "bring forth" new variants of technological revelations.

Consistent with Durkheim (1912, 1977 [1903-1904]; also see Prus 2009b), the present statement acknowledges the broader, historical-developmental capacities of people to use technology to prepare themselves for subsequent encounters with phenomena of all sorts.

Thus, technology is envisioned as consisting of humanly invoked *instances* of situated enabling devices. Technology revolves around the things that people

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[15] What would become known as Aristotle's "doctrine of the four causes" is stated most directly in "*Physics* (especially 194b-196a) and *Metaphysics* (980a-983b; 1013a-1014a). However, those who examine either of the fuller texts will appreciate that Aristotle not only (a) recognizes that the number, variations and interrelatedness of "causes" can be great indeed, but that he also (b) envisions causes as terms that people call or assign to things. As well, Aristotle (c) observes that causality may be distinguished with respect to: potential, engaged and past effects; natural and human causes; accidental and intended human causes. Also see Miller (1969), Puddephatt and Prus (2007), Grills and Prus (2008).

[16] Relatedly, when discussing human agency more directly and singularly (see *Nicomachean Ethics"* (1110a-1115a) or *Eudemian Ethics* (1222-1227a), Aristotle is particularly attentive to the deliberative nature (i.e. minded capacity) of human conduct (in producing "cause and effect"). *Rhetoric*, *Poetics*, and *Politics* attest somewhat more directly to people's capacities to shape or effect outcomes by influencing and resisting one another. In these sources, too, Aristotle acknowledges the uniquely enabling feature of human language (logos) for the human condition (and some related [interactive and inter-agency] notions of human causation).

Thus, in contrast to many in the contemporary social sciences, Aristotle is highly mindful of the ways that people enter into the causal process as agents – both on a more solitary, reflective basis and as interactants with the potential to persuade and accept as well as resist the influences of others. For further considerations of these matters, see Blumer (1969), Prus (1996) and Grills and Prus (2008).

purposively use when they pursue some objective or otherwise act toward aspects of the more immediate "here and now" implied in ongoing community life.

While re-establishing connections with the images of technology put forth by the early Greeks, and epitomized most centrally by Aristotle, the current statement extends these in two noteworthy respects. First, whereas Aristotle is intent on fostering the development of a great variety of enabling technologies (i.e. a vast array of scholarly disciplines and practical endeavors as well as the stocks of knowledge, theoretical developments and procedures implied therein) and insists on focusing on activity in the study of the human condition (see *Nicomachean Ethics*), the present project (much more modestly) encourages sustained ethnographic examinations of the ways that people *engage* instances of technology.

Secondly, while Aristotle was a most astute observer (and possibly the most remarkable scholar in recorded history), his analyses of the human condition (technological ventures included) could be supplemented by instances of more sustained comparative analyses and the associated assessment and systematic articulation of process-oriented concepts pertaining to the ways that people engage instances of technology across the entire range of human group life.

Hence, while benefiting centrally from contemporary pragmatist / interactionist and associated scholarship as well as from more explicit examinations of Aristotle's texts (e.g. see Prus 2004, 2007a, 2008, 2009a), the present project focuses on people's situated experiences with instances of enabling devices. *Methodologically*, it encourages extended and explicit reliance on open-ended ethnographic inquiry with people engaging instances of technology in all of their facets. Indeed, this researcher-participant interchange is seen as the essential means of generating and qualifying knowledge about technology in the human community.

Consistent with Aristotle's comparative analytical (i.e. analytic induction) emphasis, the material presented here has a pronounced generic or transcontextual thrust. The position taken here also stresses Aristotle's (pragmatist) emphasis on developing analyses of the human condition by focusing on people's activities as meaningful, purposive endeavors. This statement is intended to enable scholars to examine, comprehend and develop viable theory about the ways in which all manners of people actively (and mindedly) invoke instances of technology in order to deal with matters in their respective "here and now" situations.

Experiencing Technology

Although building on the social phenomenological considerations of science and technology associated with constructionist and ethnomethodological approaches,[17] as well as Thomas Kuhn's (1962, 1970) analysis of "the structure of scientific revolutions," the material that follows is centrally informed by the symbolic interactionist tradition associated with George Herbert Mead (1934) and Herbert Blumer (1969). Whereas Chicago-style interactionism represents a synthesis of pragmatist philosophy with ethnographic research, it also assumes the task of defining the features of human group life in comparative analytic process terms. This reflects what Glaser and Strauss (1967) term "grounded theory" or what Blumer (1969) and Prus (1996) reference as generic processes.

[17] We here refer to the social phenomenological analysis of human lived experience associated with Alfred Schutz (1962, 1964, 1967), Peter Berger and Thomas Luckmann (1966) and Harold Garfinkel (1967). Those familiar with this literature may appreciate the many affinities of this material with the pragmatist / interactionist tradition.

At a foundational level, it is assumed that (1) people are community-based beings who, in the process of learning language (from those who pre-exist them in the community), acquire mindedness or ways of making sense of [things in the world], including themselves; (2) on acquiring the viewpoints of others in the community (i.e. achieving intersubjectivity), people act toward the objects of their awareness in meaningful (self-reflective and adjustive) manners and (3) people not only develop assortments of associations with others, but also have capacities to anticipate, influence, cooperate, resist, and otherwise adjust to others (and the things that others do) as they go about their activities.

Approached thusly, (4) things envisioned or otherwise referenced as objects are not self-evident entities nor do they possess inherent qualities or properties. Instead, phenomena are "brought into existence as objects" and assume particular qualities as people acknowledge, delineate, name, define, and otherwise act toward these [things].[18,19]

Relatedly, objects assume emergent, situated qualities. Rather than matters whose realities pre-exist human awareness or that exist independently of human definition, objects encompass only those matters that people know about, acknowledge, or otherwise refer (including things that they consciously "notice" or "wonder about") within their more situated, here and now invoked frames of experience.

Like those in the social sciences more generally, the interactionists have given little explicit attention to science and technology as fields of study. Still, the interactionists and the kindred community of scholars (constructionists, ethnomethodologists and realist anthropologists) have made some important contributions to science and technology studies (STS).[20] Included among those who have contributed to the broader pragmatist (activity oriented) study of science and technology are: Thomas Kuhn (1962), Barry Barnes (1974), David Bloor (1976), Bruno Latour and Steve Woolgar (1979), Karin Knorr-Cetina (1981, 1995, 1999, 2002), H. M.

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[18] For more complete considerations of the premises undergirding interactionist analysis, see Mead (1934), Blumer (1969), Strauss (1993), Prus (1996, 1997b, 1999, 2007b, 2007d) and Prus and Grills (2003).

[19] Methodologically, the emphasis is on researchers achieving extended levels of intimate familiarity (Blumer 1969) with their human subject matter by attending in great detail to people's lived experiences. This is to be accomplished not only through (a) researchers' observations of others in the settings at hand and (b) by researchers drawing on their own experiences in related settings, but much more centrally by (c) pursuing intersubjectivity with others by engaging in extended open-ended inquiry with these people about their experiences with instances of technology. The objective is to provide a careful, thorough analysis of the life-worlds under consideration by attending to (and representing) the viewpoints, practices and other experiences of those engaged in these settings.

[20] As may be apparent to those who examine three interrelated handbooks devoted to the study of science and technology (Spiegel-Rosing and de Solla Price 1977; Jasanoff et al. 1995; and Hackett et al. 2008), those focusing more directly on science and technology are far from homogeneous in their emphases.

Not only are there substantial tensions between those who more pluralistically study science and technology as realms of human accomplishment (as fields of activity and interchange) and those who intend (moralistically) to shape the directions of science and technology (and the people involved in production and usage), but the sociological field of science and technology (as with religion, family, politics, and deviance) has become interfused with wide arrays of theoretical, methodological, analytic, moralist, trendy and opportunistic emphases. Accordingly, it is the terms "science" and "technology" amidst people's broader scholarly interests in these phenomena, rather than a more coherent scholarly orientation, that provides the primary reference point for the field.

By contrast, those adopting a constructionist approach (like the interactionists) generally are attentive to the matters of intersubjectivity, multiple realities or life-worlds, agency (as in knowing, interpretation, purpose, intention), activity, interchange and [objects] as points of knowing engagement. The emphasis, thus, is on science and technology as social products and social processes – with concepts, agency, activity and interchange recognized as central features of all realms of community life.

Collins (1983, 1985), Andrew Pickering (1984, 1992, 1995), Michael Lynch (1985, 1993), Michael Mulkay (1985), Trevor Pinch (1986, 1993, 1996, 2007, 2009), Trevor Pinch and Weibe Bijker (1987), Sharon Traweek (1988), Gideon Kunda (1992), Bryan Pfaffenberger (1992a, 1992b, 2001), H. M. Collins and Trevor Pinch (1993, 1998), Stephen Barley and Beth Bechky (1994), Adele Clarke and Joan Fujimura (1992), Kathryn Henderson (1995, 1998, 1999), Frank Nutch (1996), Diane Vaughan (1996, 1998, 2004, 2006), Robert A. Campbell (2003), Carrie Sanders (2006), Gary A. Fine (2007), Max Travers (2007), Adele Clarke and Susan Leigh Star (2008), Ariane Hanemaayer (2009) and Philip Vannini, (2009).[21]

Even though their focus generally was not on science or technology, the interactionists and their kindred scholars have given extended attention to a wide array of "enabling devices" in their quests to comprehend the ways that *people do things.* As a result, these ethnographic considerations of the matter of people "developing and using enabling objects" have great relevance for comprehending the ways in which people engage science and technology.[22] See, for instance, studies of mountain climbers (Mitchell 1983), tattoo artists (Sanders, 1989), magicians (Prus and Sharper 1991), deep-sea divers (Hunt, 1995), "white water rafters" (Holyfield 1999), work dogs (Sanders 1999), and music enthusiasts (Merrill 2009).

Also pertinent to understanding how people go about activities in the realms of science and technology are ethnographic studies of "the acquisition of technique." This is apparent in studies of hobos (Anderson 1923), thieves and hustlers (Sutherland 1937; Prus and Sharper 1977, 1991; Prus and Irini 1980; Adler 1985; Steffensmeier 1986), cabdrivers (Davis 1959), bus drivers (Slosar 1973), drug users (Becker 1963), musicians (Becker 1963; MacLeod 1993), medical students (Haas and Shaffir 1987), comedians (Stebbins 1990), people involved in marketing and interpersonal sales (Prus 1989a, 1989b; Prus and Frisby 1990), restaurant chefs Fine (1996), preadolescents fitting in with their peers (Adler and Adler 1998) and high school debaters (Fine 2001).

Some ethnographic work dealing with "the formation and coordination of associations" as enabling devices, can be found in ethnographic studies of hustlers (Sutherland 1937; Prus and Sharper 1977), union organizers (Karsh et al. 1953), street and biker gangs (Thrasher 1927; Keiser 1969; Wolf 1991), service providers (Wiseman 1970), marketers (Prus 1989a,b; Prus and Frisby 1990), political parties (Grills 1994), role-playing games (Fine 1983), baseball teams (Fine 1987), musicians (MacLeod 1993), those involved in high school debates (Fine 2001) and emergency services (Sanders 2006). Indeed, once one overcomes the mystique associate with "science and technology," it becomes evident that a great deal of interactionist ethnography, along with realist ethnography in anthropology (see Pfaffenberger 1992a), can be invoked in suggestive as well as comparative, analytic terms.

[21] More sustained reviews of what may be termed "the constructionist literature on science and technology" can be found in Pfaffenberger (1992a), Knorr-Cetina (1995), Pinch (1996, 2007), Collins and Evans (2002), Sismondo (2004, 2008) and Clarke and Star (2008).

[22] Readers may find *Subcultural Mosaics and Intersubjective Realities* (Prus 1997b) useful in comprehending the potential of interactionist ethnography for enabling the study of any and all realms of community life. In discussing interactionist ethnography, we are referring to what, more precisely, would be defined as Chicago-style or Blumerian symbolic interactionism, with its emphasis on pursuing the study of human group life in more pluralistic (nonpartisan, nonmoralist, nonprescriptive) terms. This may be contrasted with the neomarxist emphases of postmodernist or "cultural studies" approaches that sometimes are presented as interactionist ethnography (e.g. Denzin 1992). See Prus (2007c) for a more sustained consideration of a pluralist "public sociology."

Studying Technology: A Research Agenda

In what follows, we provide a relatively encompassing portrayal of the ways in which humans experience technology. Although this material has been organized around the activities that people do as they "engage instances of technology," readers are cautioned that this statement is primarily analytic in character and simply cannot offer the compelling, in-depth data-base (exploratory field and testing zone) that one obtains through sustained, situated ethnographic examinations of people's activities.

This statement, then, is intended to encourage ethnographic research. It is *not* and should not be seen as a substitute for first-hand field research or any ensuing comparative analysis. Accordingly, the material introduced here is inevitably tentative and, as such, represents something to be assessed, extended, reconstituted and possibly rejected, as scholars ethnographically examine the ways in which people experience technology in the evershifting "here and now" of community life.

Approached in this fashion, we expect that this framework can provide a highly instructive way of envisioning technology within the context of human endeavor. Drawing a closer linkage between social theory and human activity, the present material also encourages a conceptual, methodological and substantive coherence that is lacking in other approaches to technology in the social sciences.[23]

Before turning our focus more directly to the seemingly endless human quest for enabling devices or instances of technology, two other conceptual qualifications are in order. These revolve around (a) the multiplicity of *meanings* that people may associate with particular phenomena and (b) the somewhat related multiplicity of *operational standpoints* with which people may engage specific objects. Since this statement represents an excursion into human enacted realities, it is necessary to make these matters more explicit before proceeding further. Indeed, without some direct appreciation of these notions, any analysis of technology as a humanly experienced phenomenon would be most inadequate.

Because people may define any [object] in a wide variety of manners, even such seemingly simple or obvious "objects" as those *intended* as shoes, cups or spoons need not be experienced as "shoes," "cups," or "spoons" by others. Thus, even when others acknowledge the existence of particular things, they may attribute quite different meanings (e.g. fascinations, utilities, irrelevancies) to these [objects], perhaps completely nullifying or recasting any intended "technological" features. Since things take on meanings by virtue of the ways that people act toward them, *objects become* ***instances of technology*** when and according to the ways in which, people act toward these particular essences *as enabling devices* of some sort.

Relatedly, it is highly instructive to distinguish at least five aspects of technology. Thus, in addition to (a) any physical or material qualities associated with instances of technology, it is essential that researchers also attend to (b) technique – as in developing and sustaining generalized sets of intentions or objectives, situated types of applications, procedures, and instruction, as well as invoking more regularized in-use modifications and procedural adjustments; (c) the conceptual base that people experientially and mindfully develop over time in the historical flows, challenges, activities and interchanges associated with the ongoing accomplishment of human group life; (d) the more immediate, situated, participatory roles that people invoke in creating, applying, producing, testing, interpreting, assessing, promoting, purchasing, adjusting, extending, reconfiguring, resisting and otherwise knowingly engaging

[23] In addition to Blumer's (1969) critique of the limitations of variable analysis for examining and comprehending all realms of human group life, readers also are referred to Prus (1996, 1997b, 1999, 2007b, 2007d), Puddephatt and Prus (2007) and Grills and Prus (2008).

instances of technology amidst their activities and interchanges with others in the community and (e) the ways that people define and attempt to manage themselves and their associates with respect to particular instances of technology. This latter matter includes people coming to terms with their own stocks of knowledge and their senses of purpose, applications and challenges, as well as their more immediate strategic adjustments, disaffections, resistances and associated interchanges. It also would encompass the associated matters of people experiencing elements of success, satisfaction and frustration as they define and relate to others with respect to particular instances of technology.

In short, far from being something that is to be valued for any particular material essences or behavioral procedures, all instances of technology are to be understood within the contexts of ongoing community life and people's activities and experiences therein. Accordingly, the more fundamental question is *not* how instances of technology impact on people but how people make sense of and otherwise engage instances of technology within the ongoing accomplishment of human group life. Indeed, instances of technology would have no meaning apart from the humanly enacted reality of community life.

Technology, thus, does *not* inhere in particular objects but rather things *acquire* technological essence only when specific people envision, approach, or otherwise act toward those items as a means of accomplishing something in some particular context. Like other aspects of the situation that the participants may define in one or other ways, the people involved may later decide that specific instances of technology failed to offer the advantages they had anticipated. Relatedly, people may take certain (earlier defined) enabling devices for granted or let them fall into disuse, thereby relinquishing or negating some or all of their technological qualities.

In addition to appreciating people's capacities to envision and act toward specific instances of technology in a great many ways, both across and within cultural contexts, it is also analytically instructive to attend to the *multiple standpoints* that people involved in the broader theatres of operation may assume with respect to particular enabling devices.

As well, because the same people can adopt a multiplicity of viewpoints on things, the very same people may approach and act toward instances of technology in a plurality of manners on a shifting, if not also sometimes a simultaneous, basis. Indeed, the very same people may both appreciate and resent particular instances of technology or aspects thereof and face the prospects of dealing with these tensions (in greater and lesser degrees) as they go about their activities.

Still, on a broader basis, we may distinguish those who engage particular instances of technology as (1) observers (attendees, witnesses, targets); (2) users (adaptors); (3) developers (also conceptualizers, designers, producers); (4) promoters (conveyers, instructors, marketers); (5) acquirers (general public; commercial, industrial and governmental agencies) and (6) resisters (as in disinterested, disaffected, competitive, oppositional parties).

Focusing on the latter six *modes of engaging instances of technology*, the discussion following outlines some of the more central processes entailed in *encountering*, *using*, *developing*, *promoting, acquiring* and *resisting* instances of technology. These processes have been given an ordering for presentational purposes, but this does not imply any necessary flow with respect to specific instances of technology. Thus, for example, while resistance might seem to logically follow the introduction of some particular technology, people may develop (preliminary) resistances to certain kinds of ideas or concepts, with the result that some (contingent) innovations might only later, or perhaps never, be developed.

Although some might have found the material following more intriguing had we developed a research agenda that was derived more exclusively from studies of science and technology, we did not do that. In part, studies of science and technology, while increasing overall, are notably limited in number, substance, depth and intellectual coherence. As well, because of its sustained emphasis on process, the interactionist approach enables scholars to transcend the mystiques associated with particular substantive fields (such as science and technology, religion, deviance, politics, and entertainment) and focus on the more generic or transcontextual features of human group life. Moreover, once scholars focus on process and activity in interactionist terms, they not only have access to a body of ethnographic research and analysis that has been accumulated over the past century (see Prus 1996, 1997b; Prus and Grills 2003) but that also has an exceptional degree of theoretical and methodological coherence - thereby allowing for more sustained transcontextual (transsituational and transhistorical) comparative analysis.

Thus, while presenting the materials following in ways that are consistent with developments in the interactionist and kindred interpretivist literature on science and technology, we have been able to incorporate a comparatively vast and potent set of conceptual, ethnographic and comparative analytical resources into the research agenda presented here. We also have benefitted from the articulation of some earlier, notably parallel analytic paradigms (see Prus 1996, 1997b, 1999, 2003b, 2004; Prus and Grills 2003).

Still, although we have tried to be comprehensive in suggesting several lines of inquiry (and associated subthemes) for research on technology as well as providing a means of integrating studies of people's experiences with technology into the broader study of community life through the use of symbolic interaction, this statement is cast as a research agenda. Accordingly, this material is to be tested in the field and assessed for its viability at each point in the process.

Engaging Instances of Technology

Denoting an emergent, interactive, often disjunctured process, technology implies continuity as well as ongoing activity, assessment and strategic adjustment and interchange in the midst of disruption and change. Thus, to help frame the materials following for the reader, we have provided an overview of the major processes and subthemes entailed in engaging instances of technology. Although we have given an order to the lists that follow, it should not be assumed that people's considerations of instances of technology will encompass all of these subprocesses or that people need follow the particular ordering of the subprocesses identified here. Likewise, since we are focusing on a set of interrelated processes, some overlap of the activities subsumed in these processes is inevitable.

Encountering Technology
- *Attending to and Defining Instances of Technology*

Using Technology
- *Anticipating the Utility of Instances of Technology*
- *Directly Engaging Instances of Technology*
- *Sharing Instances of Technology with Others*
- Incorporating Instances of Technology into Present Life-world Activities

Developing Technology
- *Articulating Concepts and Envisioning Instances of Technology*
- *Assembling Instances of Technology*
- *Developing Procedures for Utilizing Instances of Technology*

Testing Instances of Technology for Quality
Funding (and resourcing) Instances of Technology
Collectively Developing Instances of Technology
Promoting Technology
Promoting Awareness of Instances of Technology
Encouraging Usage of Instances of Technology
Embarking on Marketing and Sales Activities
Acquiring Technology
Purchasing Instances of Technology
Resisting Technology
Experiencing Reservations about Instances of Technology
Resisting Instances of Technology
Defining Instances of Technology as Threats to the Collectivity

Encountering Technology

Because of the different ways that people may acknowledge and act toward things, the matter of "encountering technology" is steeped in ambiguity. First, whether people become cognizant of particular instances of technology on either a more solitary or collective basis, they need not share the meanings that others might assign to these things. Thus, specific people's appreciations of particular instances of technology that others (or even that they, themselves, develop) may seem acutely limited, if not also highly inappropriate, from other people's viewpoints.

Notably, too, even when people directly acknowledge the specific instances of technology that others intend, it is not apparent that they will focus on the particular features of these devices that these others had defined as consequential. Because people may attend (and give meaning) to anything that they associate with specific enabling devices, particular audiences may focus on any variety of aspects of the phenomena (instances of technology) they encounter.

While the specific qualities of objects to which people attend in any instance may be quite variable, people knowingly encountering enabling devices may acknowledge things such as: underlying concepts (e.g. principles, viability, novelty); materials (e.g. shapes, surfaces, composition, subcomponents); procedures of use; potential applications or demonstrated outcomes; users (e.g. characteristics, prestige attached to, affinities with users) and producers (e.g. reliability, loyalties).

Although these (and other object demarcations, such as weight, color, prestige considerations) may seem mundane in certain respects, a more explicit recognition of the *variable focal* points that people may invoke is essential if analysts are to comprehend the ways that people envision specific instances of technology in the setting at hand.

An attentiveness to people's reference points vis-à-vis particular instances of technology is consequential not only in respect to (a) participants' preliminary awareness and sustained attentiveness of items as enabling devices of any sort, but also (b) the ways in which participants bring notions of self and other into play as they *engage* particular instances of technology. Accordingly, it is most instructive for analysts to be mindful of the ways that people envision and act toward themselves and others (e.g. observers, buyers, producers) as they encounter specific instances of technology.

Since people may vary so extensively both with respect to (a) the particular objects that they discern and (b) any enabling qualities they associate with those

items[24], processes of the following sort may enable researchers to more directly examine the ways in which people *encounter or attend to [things]* and *define the particular relevance* of these things as enabling devices or instances of technology.

Attending to and Defining Instances of Technology

- ⇨ Learning about instances of technology from others.
- ⇨ Attending to instances of technology on one's own.
- ⇨ Experiencing ambiguity regarding instances of technology.
- ⇨ Attending to particular aspects of technology (e.g. functions, components design).
- ⇨ Experiencing intrigues with instances of technology.
- ⇨ Experiencing disaffections with instances of technology.
- ⇨ Discussing instances of technology with others.
- ⇨ Defining instances of technology as notably functional, advantageous.
- ⇨ Defining instances of technology as inconsequential, irrelevant, or problematic.

Using Technology

While people may be seen to engage technology whenever they knowingly encounter or attend to things that they define as enabling devices of some sort, we may also ask about the more explicit deployment, application or adoption of specific enabling devices or those instances in which people assume a more focused, participatory orientation with respect to specific instances of technology.[25]

Because people engage enabling devices with varying interests, applications, intensities, enthusiasm, ambiguities, competence and reservations, they may not only invoke specific technologies in wide varieties of solitary and group contexts, but they may also redefine the relevance of particular instances of technology as they work their ways through the settings at hand. Still, by acknowledging subprocesses of the following types, analysts may develop more viable appreciations of what is involved in people *using technology* (in their own terms and instances).

Anticipating the Utility of Instances of Technology

- ⇨ Envisioning applications or utility of instances of technology.
- ⇨ Experiencing reservations about using instances of technology.
- ⇨ Accessing / acquiring instances of technology.
- ⇨ Preparing for specific engagements with instances of technology.

[24] Attributions are seen as "enabling" when they point to distinctions, properties, or other qualities that people associate with some objective or accomplishment. Thus, people may distinguish between "red" and "green" color demarcations but these designations only become enabling features when people incorporate those distinctions into some objective (e.g. traffic safety, fashion design, more consistently reproducing nature scenes in a piece of artwork or even attending to aesthetic appreciation).

[25] While scientists (see Knorr-Cetina 1995; Campbell 2003) may be one of the most revered users (as well as producers) of technology, it should be appreciated that virtually anyone who attempts to employ things (i.e. concepts, procedures, equipment, teams) in the course of trying to accomplish something is a user of technology. Thus, for instance, although some may be inclined to dismiss the activities of drug users in considerations of technology, Howard Becker's (1963) ethnographic consideration of "becoming a marihuana user" provides a particularly compelling illustration of a number of aspects of the process of engaging technology in people's pursuits of desired recreational-emotional effects.

Directly Engaging Instances of Technology

- ⇨ Making contact with instances of technology.
- ⇨ Achieving familiarity with instances of technology.
- ⇨ Encountering limitations with instances of technology.
- ⇨ Developing procedures for using instances of technology.
- ⇨ Assessing experiences with instances of technology.
- ⇨ Comparing options / ideals relative to instances of technology.
- ⇨ Modifying / customizing / personalizing instances of technology.
- ⇨ Experiencing failure, frustration, loss with instances of technology.
- ⇨ Discontinuing usage of instances of technology.
- ⇨ Seeking alternatives to instances of technology.
- ⇨ Devising other uses for existing instances of technology.

Sharing Instances of Technology with Others

- ⇨ Using instances of technology in group settings.
- ⇨ Using instances of technology to affect other people's experiences.
- ⇨ Informing others of instances of technology.
- ⇨ Instructing others on the use of instances of technology.
- ⇨ Making instances of technology available to others.

Further, whereas people may actively promote and facilitate the use of particular instances of technology or otherwise be highly instrumental in encouraging others to attend to these enabling devices amidst other (existing and emerging) developments, the longer-term viability of these items is contingent on the ways and extent to which users integrate (i.e. engage, utilize) particular innovations within their own theaters of operation.

Incorporating Instances of Technology into Present Life-World Activities

- ⇨ Envisioning utility / applications of instances of technology.
- ⇨ Experiencing reservations regarding instances of technology.
- ⇨ Anticipating difficulties with instances of technology.
- ⇨ Engaging / assessing / rejecting instances of technology.
- ⇨ Achieving fluency in the use of instances of technology.
- ⇨ Extending applications of instances of technology.
- ⇨ Organizing other things around instances of technology.

The processes just delineated need not be invoked in the order presented here and researchers are apt to encounter considerable diversity in the ways that people engage particular instances of technology. Thus, for example, some people may have no reservations about using particular enabling devices and others may never own certain things themselves. In other cases, too, people may develop techniques for using items prior to encountering limitations, while others may set out to “acquire techniques” for using things only after encountering difficulties in earlier attempts to use those particular enabling devices.

Developing Technology

While people sometimes envision themselves as highly accomplished performers because they are able to employ existing instances of technology with some proficiency,[26] we would be most remiss were we not to attend to the processes by which people generate, devise, manufacture, or otherwise modify the enabling devices that subsequently are put into operation.

Recognizing both the more cooperative and cumulative, as well as the more sporadic, disconnected and competitive (if not also sometimes highly hostile) endeavors that undergird the production of specific technologies,[27] terms such as "develop," "create" or "generate" are used here to refer to any cases in which people (individually or collectively) devise or even conceptually identify (seemingly) new, different or altered connections between things.

Viewed thusly, some things may be "invented" and "reinvented," as well as "repackaged" over perpetuity. Likewise, only some of the more substantial innovations that people develop may be recognized by others in the community as unique, noteworthy or valuable contributions. The emphasis, hence, is not on identifying "genius," the first originators, key figures or major breakthroughs associated with specific instances of technology, but to attend more generically to the processes by which people develop instances of enabling devices.

Moreover, it may be useful at certain points (or contexts) to distinguish between people producing "prototypes" (as with conceptual models, working equipment, procedures of use and testing for quality) and those manufacturing or otherwise reproducing existing instances of technology for themselves and others. However, these processes are often much more interconnected than might first seem (as with purposes or objectives for use or concerns about funding, testing, revisions and so forth).

Since the people involved in "creating," generating or producing all manners of prototypes as well as those reproducing existing instances of enabling devices appear to engage in activities of the following sort, detailed ethnographic research along these lines would help social scientists better comprehend "the innovation process" as well as the ways that people engage (and pursue) projects revolving around instances of technology more generally.[28]

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[26] For example, consider the sense of accomplishment that people sometimes experience when they are able to "drive a car," encode telephone numbers or "surf-the-net" (on a computer system).

[27] See, for instance, Thomas Kuhn's (1970) *The Structure of Scientific Revolutions*.

[28] Although comparatively little of the material developed within "the sociology of science" is informed by direct ethnographic inquiry, these field studies provide some exceedingly valuable insights into the ways that the sets of scholars working in the physical sciences deal with technology. While best known for their conceptual developments, products, and results, those in the broader scientific community also encounter, use, promote and resist as well as develop technology. Knorr-Cetina's (1995) review of this literature is highly instructive in this regard as, for instance, also are Barley and Bechky's (1994) consideration of the work of "technicians" in science programs, Henderson's (1995, 1998) study of the production of prototypes in the medical field and Campbell's (2003) study of producing scientists in academia.

Hopefully, by laying out a set of processes that deal with people's experiences more generally, the present statement may provide an analytical prototype that encourages some syntheses of a highly insightful but conceptually fragmented literature, as well as suggest some future lines of inquiry for this exceedingly promising area of research.

Articulating Concepts and Envisioning Instances of Technology[29,30]

- ⇨ Acquiring (community-based) stocks of knowledge about things.[31]
- ⇨ Delineating, naming, categorizing, defining things.
- ⇨ Attending to ("previously unrecognized") linkages between things.
- ⇨ Questing for enabling devices[32].
- ⇨ Defining particular instances of enabling devices in the situations at hand.
- ⇨ Defining procedures and associated concepts regarding emergent instances of technology.[33]
- ⇨ Revising / rejecting concepts associated with particular instances of technology.

Assembling Instances of Technology

- ⇨ Gathering materials / components for instances of technology.
- ⇨ Designing (shaping, packaging, illustrating) instances of technology.
- ⇨ Integrating components / processes of instances of technology.
- ⇨ Comparing (and contrasting) instances of technology.
- ⇨ Testing (and assessing) instances of technology.
- ⇨ Standardizing and maintaining instances of technology.
- ⇨ Encountering operational limitations with instances of technology.
- ⇨ Assessing / revising / dismissing instances of technology.

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[29] While concepts, equipment, procedures, and tests may overlap in many cases, it should be appreciated that although all equipment, procedures and tests presume concepts of sorts, a great many "prototypes" need not move beyond the conceptual stage. Likewise, relatively distinct realms of enterprise (and industries) may develop around the production of particular kinds of concepts, equipment, practices and testing procedures. Henderson's (1995, 1998) examination of the production of paper and plastic (modelled) prototypes is particularly relevant to notions of these sorts.

[30] One may also envision interpersonal associations and other human arrangements (e.g. understandings, organizations, policies, laws) as denoting "enabling devices" or technologies of major consequence in the human community. Although some of these associations (and the arrangements implied therein) may never move beyond the emergent prototypical stage, other associations may assume more objectified forms (i.e. more enduring, broadly recognized, frequently referenced, imitated). As with all instances of technology, human associations achieve their technological essences when they are acted toward as "enabling devices" or as ways of achieving (however problematic this may be in practice) some objective by those attending to these matters.

Although the practices of "forming and coordinating associations" and "reaching understandings" are highly complex topics that take us well beyond the scope of the present paper, readers may find some earlier works (Prus 1997b, 1999, 2003b; Prus and Grills 2003) suggestive in coming to terms with a related set of issues. These human arrangements may lack some of the physical features or material qualities associated with other technologies, but in no way does this minimize their consequence for those pursuing particular objectives within the community.

[31] As suggested by Aristotle and Francis Bacon, for instance, in their respective considerations of scholarly disciplines, more extended technological advances are contingent on people developing focused realms of community-based knowing (and interchange). Also see Durkheim (1977) and Latour (1987).

[32] The assumption here is that people have some problem, task, or unresolved tension associated with earlier and/or ongoing encounters with particular objects, situations, or objectives. These endeavors may be systematically or only occasionally pursued. They may be highly focused and precise or only vaguely defined. Likewise, they may be casually, playfully, experimentally, determinedly or desperately implemented.

[33] Although theory is intended to indicate linkages between two or more concepts (as abstract object representations), theory (too) is subject to revision whenever people examine the instances presumably encompassed by the theory at hand (thereby allowing for extensions, reformulations and rejections of that theory). Notably, however, without some preliminary expressions or articulation of these notions, the opportunities for more enhanced or viable linkages would be severely limited. Glaser and Strauss's (1967) statement on "grounded theory" is instructive vis-à-vis the theoretical insights in the social sciences that may be generated as people more directly examine instances in (developmental) process terms.

Developing Procedures for Utilizing Instances of Technology

- ⇨ Invoking procedural stocks of knowledge / applications of instances of technology.
- ⇨ Attending to secondary agendas (e.g. efficiency, costs, safety) in using instances of technology.
- ⇨ Comparing and testing instances of technology.
- ⇨ Standardizing procedures and maintenance for instances of technology.
- ⇨ Encountering procedural limitations with instances of technology.
- ⇨ Assessing and revising procedures for evaluating instances of technology.

Testing Instances of Technology for Quality

- ⇨ Invoking objectives for instances of technology.
- ⇨ Articulating quality-related standards for instances of technology.
- ⇨ Attending to concepts, equipment, procedures.
- ⇨ Establishing procedural criteria for assessing instances of technology.
- ⇨ Specifying indicators (of quality) for instances of technology.
- ⇨ Monitoring conditions / recording effects for instances of technology.
- ⇨ Interpreting and assessing results for instances of technology.
- ⇨ Encountering operational limitations regarding instances of technology.
- ⇨ Assessing / revising criteria for instances of technology.

Funding (and resourcing) Instances of Technology

- ⇨ Developing projects (instances of technology) on one's own.
- ⇨ Seeking, obtaining, and maintaining sponsors for instances of technology.[34]
- ⇨ Arranging for personnel, equipment, procedures.

Collectively Developing Instances of Technology[35]

- ⇨ Attending to other people's productions of, experiences with, instances of technology.
- ⇨ Copying instances of technology (concepts, equipment, procedures, applications) from others.
- ⇨ Consulting with others / obtaining instruction from others regarding instances of technology.
- ⇨ Receiving encouragement, assistance, and other technology-related resources from others.
- ⇨ Coordinating instances of technology projects with others.
- ⇨ Encountering instances of technology-related resistance from associates, sponsors.
- ⇨ Becoming disengaged from collective ventures involving instances of technology.
- ⇨ Resurrecting collective ventures dealing with instances of technology.

Promoting Technology

People sometimes develop and use enabling devices largely on their own, but in order to achieve broader viability it is necessary that instances of technology become shared with others in the community. It is not supposed that technological developments are adopted by others simply because they are thought "valuable" in

[34] Bruno Latour's (1987) consideration of networks and other modes of support is suggestive here.
[35] For fuller discussions of people's involvements in associations, collective events, and influence and resistance work more generally, see Prus (1999) and Prus and Grills (2003).

certain respects by their innovators, but rather because others develop interests in these items and begin to incorporate them, as enabling devices, into their more particular theatres of operation.

Further, even when others develop interests in particular enabling devices, it should not be assumed that their appreciations of these objects are direct, quick and enduring or even vaguely consistent with the intentions of those involved in their development.

From the promoters' viewpoint, the tasks of "generating awareness" and "encouraging the use" of particular enabling devices, while interrelated, both seem consequential in sharing technology with others.

Promoting Awareness of Instances of Technology

- ⇨ Identifying and naming instances of technology.
- ⇨ Communicating / disclosing / recording instances of technology.
- ⇨ Emphasizing / justifying / encouraging instances of technology.

Encouraging Usage of Instances of Technology

- ⇨ Providing others with instances of technology.
- ⇨ Providing instruction / simplifying operations / enhancing safety regarding technology.
- ⇨ Generating trust regarding technology (concepts, products, applications, producers).
- ⇨ Extending features, applications, support systems of instances of technology.
- ⇨ Increasing durability, portability, accessibility of instances of technology.

Although some may intend to isolate technology from the seemingly "crass and commercial" features of the marketplace, the two are much more inseparable than may seem on the surface. Accordingly, those interested in the technology process may find it useful to locate technological ventures within the context of marketplace activities.[36]

Embarking on Marketing and Sales Activities

- ⇨ Setting up businesses involving instances of technology.
- ⇨ Developing management activities around instances of technology.
- ⇨ Purchasing products (instances of technology) for manufacture, resale.
- ⇨ Setting prices for instances of technology.
- ⇨ Using the media to promote instances of technology.
- ⇨ Approaching prospective buyers at their places of business, homes.
- ⇨ Promoting instances of technology at trade shows, other exhibits.
- ⇨ Presenting instances of technology to prospective buyers on an interpersonal basis.
- ⇨ Generating trust among prospective buyers.
- ⇨ Neutralizing resistance from prospective buyers.
- ⇨ Obtaining commitments from prospective buyers.
- ⇨ Encountering troublesome customers.
- ⇨ Developing loyalty regarding instances of technology.
- ⇨ Reducing prices or "holding sales" on instances of technology.
- ⇨ Maintaining enthusiasm on the part of marketing and sales staff.

[36] These processes have been adopted from Prus (1989a, 1989b). These texts offer ethnographic materials and analysis of marketing and sales activity pertaining to a wide variety of consumer, industrial and commercial products and services. Also see Prus and Frisby (1990). A more extended conceptual statement on "the influence (and resistance) process" is available in Prus (1999). Because of the generic nature of these materials, they would apply to any [instance of technology] that anyone might attempt to promote or convey to anyone else on a more solitary or collective basis.

Whereas comparatively few of the day to day "makers and shakers" of the marketplace may innovatively contribute to the development of new instances of technology, as well as have more ready access to certain instances of technology as members of particular communities, there can be little doubt that their enthusiasm (i.e. enterprise) in promoting products and services, even if primarily financially motivated, has created a profound receptivity to new technological developments and the consumption of these instances of technology more generally.[37]

Still, the producers and sponsors of any technology are dependent on others obtaining these devices for the popularity and endurance of these objects as well as the continuity of their own technological ventures. Thus, although we earlier considered the ways that people might engage instances of technology as users, it also is important to acknowledge the ways that people enter into the technology process as purchasers.

Acquiring Technology

While people may freely obtain instruction from others on some matters of technique or otherwise learn ways of integrating objects that are more readily available to them into their activities, the focus here is on the ways that people acquire instances of technology through trade or exchange.

There are many ways of obtaining technology other than through the direct exchanges of goods, services, and related capital (consider borrowing, copying, informal instruction, theft, espionage).[38] However, the acquisition of technology by the general public as well as those involved in industrial, commercial, and governmental ventures represents a particularly consequential feature of the technology-engagement process (see Prus 1989a, 1989b; Prus and Fleras, 1996; Oudshoorn and Pinch, 2003). Furthermore, as with the promotional process more generally, a great deal of activity in contemporary society is organized around the quest for goods and services that "do things" or enable people to achieve various objectives.

Whereas some sectors of the community (such as those involved in science, technological development and medicine, as well as the military and other branches of the government) may be seen as particularly important consumers of technology, the general public also is extensively involved in the acquisition of technology. Further, even though some of the products and services that members of the general public pursue may have obvious instrumental utility (i.e. work, health, home related applications), a considerable amount of commonly sought after technology pertains to matters of recreation and entertainment (including children's playthings).

Derived from a study of consumer behavior, the following processes have been recast somewhat more generically so that they could be used as points of departure for

[37] Assuming roles as intermediaries between manufacturers and consumers, merchants not only may provide feedback on the popularity of many instances of technology but also may serve as especially noteworthy testing grounds for manufacturer's products and may provide suggestions for technological adjustments and other innovations pertaining to existing instances of technology.

[38] As most readers realize, it is much easier as well as faster and often more effective to copy ideas, procedures, and material developments from others than to create these on one's own. Thus, in addition to the more dramatic instances of industrial espionage, it is not uncommon for manufacturers to purchase instances of technology that competitors have developed with the express purpose of disassembling these items to permit closer analysis, modification and reproduction. Even highly fleeting examinations of enabling devices or small bits of information pertaining to the construction or usage of certain instances of technology may be adequate on occasion to reproduce and/or enhance their potential as enabling devices.

studying the ways that people more generally enter into the technology process as purchasers or traders of various sorts.

Purchasing Technology

- ⇨ Learning about products (i.e. instances of technology).
- ⇨ Assessing purchasing arenas.
- ⇨ Venturing into purchasing arenas.
- ⇨ Attending to interests, ambiguities, and finances.
- ⇨ Shopping and purchasing instances of technology in groups.
- ⇨ Anticipating encounters with salespeople.
- ⇨ Attributing trust and invoking scepticism.
- ⇨ Averting interpersonal influence.
- ⇨ Pursuing quality in purchasing instances of technology.
- ⇨ Attending to brand differentiations regarding instances of technology.
- ⇨ Engaging in comparison shopping.
- ⇨ Pursuing discounts, bargains, deals.
- ⇨ Making situated adjustments regarding instances of technology.
- ⇨ Managing expenditures pertaining to instances of technology.
- ⇨ Stabilizing purchasing practices involving instances of technology.[39]

Whereas aspects of resistance (as in reservations, limitations and direct opposition) permeate a great many features of the acquisition processes just outlined (and consumptive activity cannot be adequately understood apart from traders' involvements as *both* targets and tacticians - see Prus 1999), it is instructive to consider people's resistances to technology in somewhat broader terms.

Resisting Technology

It may be tempting to focus on "success" stories and audience receptivities when considering technological developments, but it may be no less instructive to more directly acknowledge (and inquire into) the resistances, reservations, opposition or other obstacles that those promoting specific instances of technology may experience.

Resistance from other people is not synonymous with technological inadequacy, "dead ends," or failure. Nevertheless, these resistances signify noteworthy challenges that those promoting enabling devices may encounter. Indeed, the "lack of receptivity" on the part of consuming audiences is apt to contribute more centrally to the eventual neglect or demise of specific technological innovations than might any features, functions or qualities of those instances of technology. Thus, it is essential to consider the inattention, reservations, criticisms, and other obstructions associated with particular technologies by perspective users and others in the broader community.

As a particularly consequential case in point, one might consider the resistances of various peoples (academics included) to classical Greek scholarship over the millennia. Thus, following the death of Alexander the Great (c356-323BCE) and the break up the Greek empire, the Greeks (after 300BCE) themselves, became proportionately more attentive to morality, religion, and totalizing skepticism (vs. knowing and examining the sensate world). After invading Greece (c150BCE), the Romans adopted much material

[39] While informed by research on marketing and sales (Prus 1989a, 1989b; Prus and Frisby 1990; Prus and Fleras 1996), these processes also have been refined through an ethnographic study of consumer behavior (partially developed in Prus 1991, 1993, 1994, 1997a; Prus and Dawson 1991).

and poetic Greek technology, but were considerably less attentive to classical Greek philosophy as an instructive realm of conceptual technology.

In turn, the early Christian fathers maintained some contact with Greek philosophy (most notably the religious texts associated with Plato), but approached Greek pagan philosophy (most consequentially Aristotle) with considerable hostility. The Vikings and others who later sacked Roman and Christian informed European settlements displayed little regard for written text of any sort. Somewhat ironically, European scholars would later (amidst the crusades) become re-acquainted with more aspects of Greek scholarship (and conceptual technology) through contacts with Islamic and Judaic scholars in Spain.

Still, as Durkheim (1977[1903-1904]) indicates in his analysis of the evolution of Western social thought, there would be many other resistances to (the technologically enlightened) classical Greek scholarship in the centuries that followed (including the artistic, expressive [vs. philosophic] emphases of the 16th century Renaissance).

Speaking more generally, though, because of the vast assortment of viewpoints that people may adopt with respect to the presence or use of any object relative to their own theaters of operation, one finds that resistances to instances of technology are commonplace, if not also particularly intense in many cases.

First, just as some people may be attracted to specific enabling devices because of the potential that they associate with these developments so, in somewhat parallel fashions, others may view particular technologies as likely to have disruptive or other undesired effects on their own life-worlds (or those of others whose situations they hope to regulate in some way).

Thus, in addition to those who may resist particular instances of technology on more highly direct, device-related grounds (as with disinterest, skepticism, and competitive viewpoints), people may oppose particular instances of technology because of threats or more pressing emphases that they associate with notions of community morality, physical safety, profit motives, intergroup relations, interpersonal relations, and personal competence and prestige, for instance.

Relatedly, too, many instances of technology may never encounter resistance from outsiders because their productions, applications, or promotions were curtailed by insider (e.g. producers, sponsors) disinterest, reservations, or more overt opposition at earlier stages of development. Likewise, while some people (insiders or outsiders) may resist instances of technology on a more solitary basis, other oppositional endeavors may reflect wide assortments (and perhaps highly sustained realms) of collective endeavor.

Given the potentially broadly-based and diversely-constituted sources of resistance that those using, developing and promoting instances of technology may encounter from others, it seems most instructive for researchers to focus on processes of the following sort:[40]

Experiencing Reservations about Instances of Technology

- ⇨ Defining instances of technology as problematic in some way.
- ⇨ Envisioning instances of technology as counter-productive, irrelevant, redundant or obsolete.
- ⇨ Opposing particular features (concepts, devices, components, applications, outcomes).

[40] Whether or not the originators or others who support specific enabling devices might be able to offset individual and collective resistances to their instances of technology, a fuller appreciation of promoted and contested technologies takes us more directly into a consideration of influence and resistance work (see Prus 1999).

- ⇨ Experiencing disaffection with the innovators, promoters, or users of instances of technology.
- ⇨ Viewing instances of technology as competitive with one's own instances of technology.

Resisting Instances of Technology

- ⇨ Proposing modifications to instances of technology.
- ⇨ Promoting (and sustaining) alternative technologies.
- ⇨ Encountering encouragements from others to use alternative technologies.
- ⇨ Opposing instances of technology on a solitary and/or collective basis.

Defining Instances of Technology as Threats to the Collectivity

Although we have approached technology as representing instances of enabling devices, it is the case (as this broader discussion of resistance implies) that instances of technology are not always welcomed in these terms. Accordingly, we may ask more specifically when particular instances of technology are defined as threats, problems or disasters within the broader community or some more substantial sector within. Notably, too, whereas some threats may be related to potential, claimed or "proven" malfunctions of particular enabling devices (and associated physical or physiological risks), other concerns may revolve around definitions of particular instances of technology as disruptive, corrupting, immoral, sacrilegious or threatening in other ways.

Deriving conceptual inspiration from Herbert Blumer (1971; also see Prus and Grills 2003) who emphasizes the point that *social problems represent the processes and products of community definition* rather than objective matters of fact, we attend to the ways that people may define and deal with instances of technology as threats to the collectivity. This includes processes of the following sort:

- ⇨ Generating preliminary definitions of instances of technology as troublesome or threatening.
- ⇨ Focusing audience attention on instances of technology or otherwise dramatizing concerns.
- ⇨ Vilifying instances of technology and any supporters (producers, promoters, users).
- ⇨ Justifying concerns by referencing supporters, experts, evidence, and threats.
- ⇨ Emphasizing the necessity of immediate action to deal with instances of technology.
- ⇨ Developing alliances and coordinating activities with other oppositionary parties.
- ⇨ Neutralizing alternative viewpoints regarding instances of technology.
- ⇨ Articulating preliminary agendas for dealing with instances of technology.
- ⇨ Dealing with internal (insider) disagreements regarding instances of technology.
- ⇨ Developing specific policies and programs for opposing instances of technology.
- ⇨ Assigning responsibility for opposing instances of technology to prominent persons or agencies.
- ⇨ Dealing with resistance from any supporters of instances of technology.
- ⇨ Assessing and readjusting plans and tactics to make resistance more viable.

In Perspective

Although technology is often envisioned in more material (and "scientific") ways, if not also vague, more discursive terms that seem beyond the realms of sustained sociological (and ethnographic) inquiry, technology becomes notably demystified and better understood when it is approached as a realm of human *enacted* reality.

Moreover, by approaching technology as "enabling devices in the making," as matters that are most centrally realized through humanly engaged realms of activity, this latter viewpoint also suggests some consequential lapses in social theory and substantive inquiry.

Adopting a viewpoint that is more thoroughly "transmodernist" or that would allow us to examine the nature of human knowing and acting across the corridors of time (also see Prus 2004), we observe that, like structuralist and idealist approaches to technology more generally, many of the central features of a pragmatist, interactionist or constructionist approach to technology may be located in the scholarship of the classical Greek era (c700-300 BCE).

However, in contrast to more structuralist (factors-oriented) and more idealist (prescriptive, moralist, totalizing relativist or cynicist) viewpoints, the emphasis here is on *connecting theory with human enacted reality.* Focusing on instances of technology as humanly experienced (and engaged) phenomena, the position adopted here is not only grounded in activity but also is *transcontextual* and *transhistorical* in emphasis.

Encompassing an endless array of *enabling devices*, technology is fundamental for comprehending the human condition in both situated and transsituational respects. Indeed, without a conceptual scheme and a methodology that enables social scientists to examine technology as a humanly engaged essence, sociological theory will have limited relevance for understanding the ways in which community life is accomplished. It is here that we strive for a theory of technology that is highly attentive to the linkages of language, objects, activity and adjustive interchange.

While the early Greek concept of *technê* instructively draws attention to (1) the enduring, multiplistic, humanly engaged essences of technology, a more adequate sociological approach to the study of technology also requires (2) an explicit appreciation of the linguistic, definitional, enacted and adjustive features of people's attempts to do things in their respective life-worlds; (3) a sustained, intersubjectively-informed examination of the ways in which people do things in actual, situated (as opposed to ideal, hypothetical or normative) instances and (4) the necessity of scholars attending directly to the multiple standpoints that *people invoke* (variously) in *encountering, using, developing, promoting, acquiring and resisting* instances of technology within their particular theaters of operation.

Beyond suggesting lines of research on the ways that people engage technology, the present statement provides a set of focal points that may be used in synthesizing research materials that deal with human group life in the making. Accordingly, the material presented here should become more valuable as it is reworked and reconstituted to more accurately and fully reflect subsequent research on people's experiences with technology.

The approach taken to the study of technology in this paper generally would not require a major adjustment to the ways that ethnographers working in the interactionist and kindred traditions conduct research or do analyses. Still, this more explicit *technology-as-experienced* emphasis may help researchers permeate "the technology mystique" as well as alert scholars to some matters that might have remained in the background as researchers engaged the field in other ways. The present statement also may suggest some additional ways of recasting materials that people already may have collected; thereby adding another dimension to the studies at hand.

Given the centrality of enabling devices for the entire realm of meaningful human activity, it may be anticipated that, in addition to learning more about the processes entailed in engaging technology in a more generic sense, sustained ethnographic examinations of people using enabling devices also would provide an invaluable set of avenues by which scholars may learn a great deal about people's activities in particular substantive arenas.

Finally, because the instances of technology that people experience keep changing, the agenda outlined here suggests some viable opportunities for new realms of ethnographic inquiry. Moreover, in drawing attention to the socially constituted and actively engaged features of all manners of enabling devices, ethnographic research and transsituational comparative analysis focusing on the ways that "people engage technology" is relevant not only to sociologists and others in the human sciences but to everyone who would like to know how people accomplish things within the evershifting, "here and now" essences of community life.

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References

Adler, Patricia A. (1985) *Wheeling and Dealing*. New York: Columbia University Press.

Adler, Patricia A. and Peter Adler (1998) *Peer Power: Preadolescent Culture and Identity*. New Brunswick, NJ: Routledge.

Alighieri Dante [1989] *The Banquet.* Translated by Christopher Ryan. Saratoga, CA: ANMA Libri.

Anderson, Nels (1923) *The Hobo*. Chicago: University of Chicago Press.

Aquinas, Thomas [1981] *Summa Theologica* Translated by the Fathers of the English Dominican Province. Ellen, TX: Christian Classics.

Aristotle [1915-1946] *The Works of Aristotle*, edited by W. D. Ross. London: Oxford University Press (11 volumes).

------. [1995] *The Complete Works of Aristotle*, edited by Jonathan Barns. Princeton, NJ: Princeton University Press (2 volumes).

Augustine [1958] O*n Christian Doctrine [De Doctrina Christiana]*. Translated by D. W. Robertson, Jr. Indianapolis, IN: Bobbs-Merrill.

Bacon, Francis (1974 [1605]) *The Advancement of Learning* and *The New Atlantis* edited by Arthur Johnson. New York: Oxford University Press.

Barley, Stephen R. and Beth A. Bechky (1994)."In the Backrooms of Science: Notes on the Work of Science Technicians." *Work and Occupations* 21:85-126.

Barnes, Barry (1974) *Scientific Knowledge and Sociological Theory*. London: Routledge and Kegan Paul.

Becker, Howard and Harry Elmer Barnes (1978) *Social Thought: From Lore to Science* (3rd. ed.). Gloucester, MA: Peter Smith.

Becker, Howard S. (1963) *Outsiders*. New York: Free Press.

Berger, Peter and Thomas Luckmann (1966) *The Social Construction of Reality*. New York: Anchor.

Bloor, David (1976) *Knowledge and Social Imagery*. London: Routledge and Kegan Paul.

Blumer, Herbert (1969) *Symbolic Interaction*. Englewood Cliffs, NJ: Prentice-Hall.

------. (1971) "Social problems as Collective Behavior." *Social Problems* 18: 298-306.

------. (2004) *George Herbert Mead and Human Conduct* edited and introduced by Thomas J. Morrione. New York: Altamira (Roman and Littlefield).

Bogardus, Emory (1960) *The Development of Social Thought* (4th ed.). New York: McKay.

Bryant, Joseph M. (1996) *Moral Codes and Social Structure in Ancient Greece: A Sociology of Greek Ethics from Homer to the Epicureans and Stoics*. Albany, NY: State University of New York Press.

Campbell, Robert A. (2003) "Preparing the Next Generation of Scientists: The Social Process of Managing Students." *Social Studies of Science* 33: 897-927.

Cicero, Marcus Tullius [1946] *De Inventione*. Translated by H. M. Hubbell. Cambridge, MA: Harvard University Press (1949).

Clarke, Adelele E. and Joan H. Fujimura (1992) *The Right Tools for the Job: At Work in Twentieth Century Life Sciences*. Princeton, NJ: Princeton University Press.

Clarke, Adele and Susan Leigh Star (2008) "The Social Worlds Framework: A Theory / Methods Package." Pp. 113-137 in *Handbook of Science and Technology Studies* edited by Edward J. Hackett, Olga Amsterdamska, Michael Lynch and Judy Wajcman. Third Edition. Thousand Oaks, CA: Sage.

Collins, H.M. (1983) "The Sociology of Scientific Knowledge: Studies of Contemporary Science." *Annual Review of Sociology* 9: 255-85.

------. (1985) *Changing Order: Replication and Induction in Scientific Practice*. London: Sage.

Collins, H.M., and Robert Evans (2002) "The Third Wave of Science Studies: Studies of Expertise and Experience." *Social Studies of Science* 32: 235-296.

Collins, H.M., and Trevor Pinch (1993) *The Golem: What Everyone Should Know About Science.* New York: Cambridge University Press.

------. (1998) *The Golem at Large: What You Should Know About Technology*. New York: Cambridge University Press.

Davis, Fred (1959) "The Cabdriver and His Fare: Facets of a Fleeting Relationship." *American Journal of Sociology* 65: 158-165.

Denzin, Norman (1992) *Symbolic Interaction and Cultural Studies*. Cambridge, MA: Blackwell.

Dewey, John (1975 [1910]) *How We Think*. Amherst, NY: Prometheus.

Durkheim, Emile (1915 [1912]) *The Elementary Forms of the Religious Life.* Translated by Joseph Ward Swain. London: Allen and Unwin.

------. (1977 [1903-1904]) *The Evolution of Educational Thought*. Translated by Peter Collins. London: Routledge & Kegan Paul.

------. (1983 [1913-1914]) *Pragmatism and Sociology*. Translated by J. C. Whitehouse. New York: Cambridge University Press.

Ermarth, Michael (1978) *Wilhelm Dilthey: The Critique of Historical Reason*. Chicago: University of Chicago Press.

Fine, Gary A. (1983) *Shared Fantasy: Role Playing Games as Social Worlds*. Chicago: University of Chicago Press.

------. (1987) *With the Boys: Little League Baseball and Preadolescent Culture*. Chicago: University of Chicago Press.

------. (1996) *Kitchens*. Chicago: University of Chicago Press.

------. (2001) *Gifted Tongues*. Princeton, NJ: Princeton University Press.

------. (2007) *Authors of the Storm: Meteorology and the Culture of Prediction*. Chicago: University of Chicago Press.

Freeman, Kathleen (1949) *The Pre-Socratic Philosophers* (Second edition). Oxford: Basil Blackwell.

Garfinkel, Harold (1967) *Studies in Ethnomethodology*. Englewood Cliffs, NJ: Prentice-Hall.

Glaser, Barney and Anselm Strauss (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.

Gouldner, Alvin (1965) *Enter Plato: Classical Greece and the Origins of Social Theory*. New York: Basic.

Grills, Scott (1994) "Recruitment Practices of the Christian Heritage Party." Pp. 96-108 in *Doing Everyday Life: Ethnography as Human Lived Experience* edited by Mary Lorenz Dietz, Robert Prus, and William Shaffir. Toronto: Copp Clark Longman.

Grills, Scott and Robert Prus (2008) "The Myth of the Independent Variable: Reconceptualizing Class, Gender, Race, and Age as Subcultural Processes." *The American Sociologist* 39 (1): 19-37.

Guthrie, W.K.C. (1971) *The Sophists*. New York: Cambridge University Press.

Haas, Jack, and William Shaffir (1987) *Becoming Doctors: The Adaption of a Cloak of Competence.* Greenwich, CT: JAI.

Habib, M.A.R. (2008) *A History of Literary Criticism and Theory*. Malden, MA: Blackwell.

Hackett, Edward J., Olga Amsterdamska, Michael Lynch and Judy Wajcman (2008) *Handbook of Science and Technology Studies*. Third Edition. Thousand Oaks, CA: Sage.

Hanemaayer, Ariane (2009) "A Grounded Theory Approach to Engaging Technology on the Paintball Field." Pp. 157-168 in *Material Culture and Technology in Everyday Life: Ethnographic Approaches* edited by Philip Vannini. New York: Peter Lang.

Heidegger, Martin (1927) *Being and Time.* Translated by John Macquarrie and Edward Robinson. New York: Harper and Row.

------. (1954) *The Question Concerning Technology and Other Essays*. Translated by William Lovett. New York: Harper Torchbooks.

Henderson, Kathryn (1995) “The Political Career of a Prototype: The Importance of the Visual in Design Engineering Consensus and Conflict.” *Social Problems* 42: 274-299.

------. (1998) “The Aura of 'High Tech' in a World of Messy Practice.” *The Sociological Quarterly* 39: 645-672.

------. (1999) *On Line and On Paper: Visual Representations, Visual Culture and Computer Graphics in Design Engineering*. M.I.T. Press.

Herder, Johann Gottfried von (1966 [1789]) *Outlines of a Philosophy of the History of Man*. Translated by T. Churchill. New York: Bergman.

Hobbes, Thomas (1994) *Leviathan, with Selected Variants from the Latin edition of 1668* edited by Edwin Curley. Indianapolis, IN: Hackett.

Holyfield, Lori (1999) “Manufacturing Adventure: The Buying and Selling of Emotions.” *Journal of Contemporary Ethnography* 28:3-32.

Hunt, Jennifer C. (1995) “Divers' Accounts of Normal Risks.” *Symbolic Interaction* 18: 439-462.

Ihde, Don (1991) *Instrumental Realism: The Interface between Philosophy of Science and Philosophy of Technology*. Bloomington: Indiana University Press.

Isocrates [1928] “Nicocles or the Cypians,” in *Isocrates* Volume 1. Translated by George Norlin. Cambridge, MA: Harvard University Press.

James, William (1975 [1909]) *The Meaning of Truth: Sequel to 'Pragmatism*. Cambridge, MA: Harvard University Press.

------. (1979 [1907]) *Pragmatism: A New Name for Some Old Ways of Thinking*. Cambridge, MA: Harvard University Press.

Jasanoff, Sheila, Gerald E. Markle, James C. Paterson and Trevor Pinch (1995) *Handbook of Science and Technology Studies*. Thousand Oaks, CA: Sage.

Johnson, Robert R.(1998) *User-Centered Technology: A Rhetorical Theory for Computers and Other Mundane Artifacts*. Albany, NY: State University of New York Press.

Karsh, Bernard; Joel Seidman and Daisy M. Lilienthal (1953) “The Union Organizer and His Tactics: A Case Study.” *American Journal of Sociology* 59:113-122.

Keiser, Lincoln R. (1969) *The Vice Lords: Warriors of the Streets*. New York: Holt, Rinehart and Winston.

Knorr-Cetina, Karin (1981) *The Manufacture of Knowledge: An Essay on the Constructionist and Contextual Nature of Science*. Oxford: Permagon.

------. 1995 “Laboratory Studies: The Cultural Approach to the Study of Science.” Pp. 140-166 in *Handbook of Science and Technology* edited by Shiela Jasanoff, G.E. Markle, J.C. Petersen and Trevor Pinch,. Thousand Oaks, CA: Sage.

------. 1999 *Epistemic Cultures: How Sciences Make Knowledge*. Cambridge, MA: Harvard University Press.

------. 2002 “Global Microstructures: The Virtual Societies of Financial Markets.” *American Journal of Sociology* 107: 905-95

Kuhn, Thomas S. (1962) *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.

------. (1970) *The Structure of Scientific Revolutions*. Second edition. Chicago: University of Chicago Press.

Kunda, Gideon (1992) *Engineering Culture: Control and Commitment in a High-Tech Corporation*. Philadelphia: Temple University Press.

Latour, Bruno (1987) *Science in Action*. Cambridge, MA: Harvard University Press.

Latour, Bruno and Steve Woolgar (1979) *Laboratory Life: The Social Construction of Scientific Facts*. London: Sage.

Leuenberger, Christine (2006) "Constructions of the Berlin Wall: How Material Culture is Used in Psychological Theory." *Social Problems* 53:18-37.

Locke, John (1995 [1693]) *An Essay Concerning Human Understanding*. Amherst, NY: Prometheus.

Lynch, Michael (1985) *Art and Artifact in Laboratory Science: A Study of Shop Work and Shop Talk in a Research Laboratory*. London: Routledge and Kegan Paul.

------. (1993) *Scientific Practice and Ordinary Action: Ethnomethodology and Social Studies of Science*. Cambridge: Cambridge University Press.

MacLeod, Bruce A. (1993) *Club Date Musicians: Playing the New York Party Circuit*. Urbana, IL: University of Illinois Press.

Martindale, Don (1981) *The Nature and Types of Sociological Theory* (second edition). Boston: Houghton Mifflin.

McKirahan, Richard D. Jr. (1994) *Philosophy before Socrates*. Indianapolis, IN: Hackett.

Mead, George H. (1934) *Mind, Self and Society* edited by Charles W. Morris. Chicago: University of Chicago Press.

Merrill, Bryce (2009) "Making it, not Making it: Creating Music in Everyday Life." Pp. 193-209 in *Material Culture and Technology in Everyday Life: Ethnographic Approaches* edited by Philip Vannini. New York: Peter Lang.

Miller, Alfred Eric (1969) "Physis and Physics: Aristotle's Descriptive Phenomenology of Nature as the Metaphysical Foundation and Critique of Modern Science." Doctoral Dissertation in Philosophy. University of Hamburg. Hamburg, Germany.

Mitchell, Richard G., Jr. (1983) *Mountain Experience: The Psychology and Sociology of Adventure*. Chicago: University of Chicago Press.

Mulkay, Michael (1985) *Word and the World: Explorations in the Form of Sociological Analysis*. London: Allen and Unwin.

Nutch, Frank (1996) "Gadgets, Gizmos, and Instruments: Science for the Tinkering." *Science, Technology & Human Values* 21: 214-228.

Oudshoorn, Nelly and Trevor Pinch (2003) *How Users Matter: The Co-Construction of Users and Technology.* Cambridge, MA: MIT.

Peirce, Charles Sanders (1934) *The Collected Papers of Charles Sanders Peirce*. Volumes 5 and 6. Cambridge, MA: Bellknap Press of Harvard University Press.

Peters, F.E. (1967) *Greek Philosophical Terms: A Historical Lexicon*. New York: New York University Press.

Pickering, Andrew (1984) *Constructing Quarks: A Sociological History of Particle Physics*. Chicago: University of Chicago Press.

------. (1992) *Science as Practice and Culture*. Chicago: University of Chicago Press.

------. (1995) *The Mangle of Practice: Time, Agency, and Science*. Chicago: University of Chicago Press.

Pinch, Trevor (1986) *Confronting Nature: The Sociology of Solar Neutrino Detection*. Dordrecht, the Netherlands: D. Reidel.

------. (1993) "Testing, One, Two, Three – Testing: Toward a Sociology of Testing." *Science, Technology, and Human Values* 18: 25-41.

------. (1996) "The Social Construction of Technology: A Review." Pp. 17-36 in *Technological Change: Methods and Themes in the History of Technology* edited by R. Fox. Amsterdam, the Netherlands: Harwood.

------. (2007) "The Sociology of Science and Technology." Pp. 266-275 in *21st Century Sociology: A Reference Handbook* edited by Clifton Bryant and Dennis Peck. Thousand Oaks: Sage.

-----. (2009) "SCOT: The Old, the New, and the Non-Human." Pp. 45-58 in *Material Culture and Technology in Everyday Life: Ethnographic Approaches* edited by Philip Vannini. New York: Peter Lang.

Pinch, Trevor and Wiebe E. Bijker (1987) "The Social Construction of Facts and Artifacts: Or How Sociology of Science and the Sociology of Technology Might Benefit from Each Other." Pp. 17-50 in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* edited by Wiebe E. Bijker, Thomas P. Hughes, and Trevor Pinch. Cambridge, MA: MIT.

Pfaffenberger, Bryan (1992a) "Social Anthropology of Technology." *Annual Review of Anthropology* 21: 491-516.

------. (1992b) "Technological Dramas." *Science, Technology, and Human Values* 17: 282-312.

------. (2001) "Symbols Do Not Create Meaning – Activities Do, Or, Why Symbolic Anthropology Needs the Anthropology of Technology." in, *Anthropological Perspectives on Technology* edited by Michael Schiffer. Tucson, AZ: University of Arizona Press.

Plato [1961] *The Collected Dialogues of Plato* edited by Edith Hamilton and Huntington Cairns. Princeton, NJ: Princeton University Press.

------. [1997] *Plato: The Collected Works* edited by John M. Cooper. Indianapolis: Hackett.

Popkin, Richard H. (1999) *The Columbia History of Western Philosophy*. New York: Columbia University Press.

Popper, K. R. (1957) *The Open Society and Its Enemies*: London. UK: Routledge and Kegan Paul.

Prus, Robert. (1989a) *Making Sales: Influence as Interpersonal Accomplishment*. Newbury Park, CA: Sage.

------. (1989b) *Pursuing Customers: An Ethnography of Marketing Activities*. Newbury Park, CA: Sage.

------. (1991) “Just Browsing Thanks: Focused and Diffuse Shopping Practices.” Pp. 296-302 in *1991 AMA Winter Educators' Conference Proceedings*. Volume 2 edited by Terry L. Childers et al. Chicago, IL: American Marketing Association.

------. (1993) “Shopping with Companions: Images, Influences, and Interpersonal Dilemmas.” *Qualitative Sociology* 16 (2): 87-110.

------. (1994) “Consumers as Targets: Autonomy, Accountability and Anticipation of the Influence Process.” *Qualitative Sociology* 17 (3): 243-262.

------. (1996*) Symbolic Interaction and Ethnographic Research: Intersubjectivity and the Study of Human Lived Experience*. Albany: State University of New York Press.

------. (1997a) “Shoppers as Elusive Targets: Reluctant Involvements, Evasive Tactics, and the Influence Process.” Pp. 221-246 in *Studies in Symbolic Interaction*, Supplement 3,. Greenwich, CT: Jai Press.

------. (1997b*) Subcultural Mosaics and Intersubjective Realities: An Ethnographic Research Agenda for Pragmatizing the Social Sciences*. Albany: State University of New York Press.

------. (1999) *Beyond the Power Mystique: Power as Intersubjective Accomplishment.* Albany: State University of New York Press.

------. (2003a) “Ancient Precursors.” Pp. 19-38 in *Handbook of Symbolic Interactionism*, edited by Larry T. Reynolds and Nancy J. Herman-Kinney. Walnut Creek, CA: Altamira.

------. (2003b) “Policy as a Collective Venture: A Symbolic Interactionist Approach to the Study of Organizational Directives.” *International Journal of Sociology and Social Policy* 23 (6): 13-60.

------. (2004) “Symbolic Interaction and Classical Greek Scholarship: Conceptual Foundations, Historical Continuities, and Transcontextual Relevancies.” *The American Sociologist* 35 (1): 5-33.

------. (2007a) “Aristotle’s *Nicomachean Ethics*: Laying the Foundations for a Pragmatist Consideration of Human Knowing and Acting.” *Qualitative Sociology Review* 3 (2): 5-45

------. (2007b) “Human Memory, Social Process, and the Pragmatist Metamorphosis: Ethnological Foundations, Ethnographic Contributions and Conceptual Challenges.” *Journal of Contemporary Ethnography* 36 (4): 378-437.

------. (2007c) “The Intellectual Canons of a Public Sociology: Pragmatist Foundations, Historical Extensions, and Humanly Engaged Realities.” Pp. 195-235 in *Public Sociology: The Contemporary Debate* edited by Lawrence T. Nichols. New Brunswick, NJ: Transaction.

------. (2007d) “On Studying Ethnologs (Not just People, ‘Societies in Miniature’): On the Necessities of Ethnography, History, and Comparative Analysis.” *Journal of Contemporary Ethnography* 36 (6): 669-703.

------. (2008) “Aristotle’s *Rhetoric*: A Pragmatist Analysis of Persuasive Interchange.” *Qualitative Sociology Review* 4 (2): 24-62.

------. (2009a) “Poetic Expressions and Human Enacted Realities: Plato and Aristotle Engage Pragmatist Motifs in Greek Fictional Representations.” *Qualitative Sociology Review 5* (1): 3-27.

------. (2009b) “Reconceptualizing the Study of Community Life: Emile Durkheim’s Pragmatism and Sociology.” *The American Sociologist* 40: 106-146.

Prus, Robert and Lorne Dawson (1991) “Shop Til You Drop: Shopping as Recreational and Laborious Activity.” *Canadian Journal of Sociology* 16 (2): 145-164.

Prus, Robert and Augie Fleras (1996) “'Pitching' Images of the Community to the Generalized Other: Promotional Strategies of Economic Development Officers.” Pp. 99-128 in *Current Research on Occupations and Professions: Societal Influences*. Volume 9. Edited by Helena Znaniecki Lopata. Greenwich CT: JAI.

Prus, Robert, and Wendy Frisby (1990) “Persuasion as Practical Accomplishment: Tactical Manoeuverings at Home Party Plans.” Pp. 133-162 in *Current Research on Occupations and Professions: Societal Influences*. Volume 5, edited by Helena Znaniecki Lopata. Greenwich, CT: JAI.

Prus, Robert and Scott Grills (2003) *The Deviant Mystique: Involvements, Realities, and Regulation*. Westport, CN: Praeger.

Prus, Robert and Styllianoss Irini (1980) *Hookers, Rounders, and Desk Clerks: The Social Organization of the Hotel Community*. Salem, WI: Sheffield.

Prus, Robert and C.R.D. Sharper (1977) *Road Hustler: The Career Contingencies of Professional Card and Dice Hustlers*. Lexington, MA: Lexington Books

------. (1991) *Road Hustler: Hustlers, Magic and the Thief Subculture*. New York: Kaufman and Greenberg.

Puddephatt, Antony and Robert Prus (2007) “Causality, Agency, and Reality: Plato and Aristotle Meet G. H. Mead and Herbert Blumer.” *Sociological Focus* 40 (3): 265-286.

Roochnik, David (1996) *Of Art and Wisdom: Plato's Understanding of Technê*. University Park, PA: Pennsylvania State University Press.

Sanders, Carrie (2006) “Have you been Identified? Hidden Boundary Work in Emergency Services Classification.” *Information, Communication & Society* 9: 714-736.

Sanders, Clinton (1989) *Customizing the Body: The Art and Culture of Tattooing*. Philadelphia: Temple University Press.

------. (1999) *Understanding Dogs: Living and Working with Canine Companions*. Philadelphia: Temple University Press.

Schutz, Alfred. (1962) *Collected Papers I: The Problem of Social Reality*. The Hague: Martinus Nijhoff.

------. (1964) *Collected Papers II: Studies in Social Theory*. The Hague: Martinus Nijhoff.

------. (1967 [1932]) *The Phenomenology of the Social World*. Translated by George Walsh and Frederick Lehnert. Evanston, IL: Northwestern University Press.

Sismondo, Sergio (2004) *An Introduction to Science and Technology Studies*. Oxford: Blackwell.

------. (2008) “Science and Technology Studies and an Engaged Program.” Pp. 13-31 in *Handbook of Science and Technology Studies* edited by Edward J. Hackett, Olga Amsterdamska, Michael Lynch and Judy Wajcman. Third Edition. Thousand Oaks, CA: Sage.

Slosar, John A. (1973) “Ogre, Bandit, and Operating Employee.” *Urban Life and Culture* 1: 339-362.

Spiegel-Rosing, Ina and Derek K. de Solla Price (1977) *Handbook of Science, Technology, and Society*. Thousand Oaks, CA: Sage.

Stebbins, Robert (1990) *The Laugh Makers: Stand-up Comedy as Art, Business, and Life-Style*. Kingston, Ontario: McGill-Queen's University Press.

Steffensmeier, Darrell (1986) *The Fence: In the Shadow of Two Worlds*. Totawa, NJ: Rowman and Littlefield.

Strauss, Anselm (1993) *Continual Permutations of Action*. Hawthorne, NY: Aldine de Gruyter.

Sutherland, Edwin (1937) *The Professional Thief*. Chicago: University of Chicago Press.

Thrasher, Frederic M. (1927) *The Gang*. Chicago: University of Chicago Press.

Thucydides [1972] *History of the Peloponnesian War*. Translated by Rex Warner with an Introduction by M.I. Finley. New York: Penguin Putnam.

Travers, Max (2007) *The New Bureaucracy: Quality Assurance and Its Critics*. Bristol, UK: Polity.

Traweek, Sharon (1988) *Beamtimes and Lifetimes: The World of High Energy Physics*. Cambridge, MA: Harvard University Press.

Vannini, Philip (2009) “Material Culture Studies and the Sociology and Anthropology of Technology.” Pp. 15-26 in *Material Culture and Technology in Everyday Life* edited by Philip Vannini. New York: Peter Lang.

Vaughan, Diane (1996) *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA.* Chicago, IL: University of Chicago Press.

------. (1998) “The Dark Side of Organizations: Mistake, Misconduct, and Disaster.” *Annual Review of Sociology* 25: 271–305.

------. (2004) “Theorizing Disaster: Analogy, Historical Ethnography, and the ‘Challenger’ Accident.” *Ethnography* 5: 313-45.

------. (2006) “NASA Revisited: Theory, Analogy, and Public Sociology.” *American Journal of Sociology* 112: 353-93.

Wiseman, Jacqueline (1970) *Stations of the Lost: The Treatment of Skid Row Alcoholics*. Chicago: University of Chicago Press.

Wolf, Daniel (1991) *The Rebels: A Brotherhood of Outlaw Bikers*. Toronto, Ontario: University of Toronto Press.

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