

## Science (Fiction), Technology, (in)Formation

*If Mr. X is suspected not to understand what Mr. Y says, then it is theoretically not possible, by having Mr. Y do nothing but talk further with Mr. X, completely to clarify this situation in any finite time.*

Shannon & Weaver (1949)

*Information can tell us everything. It has all the answers. But they are answers to questions we have not asked, and which doubtless don't even arise.*

Jean Baudrillard (1990)

Transcontinental networks of fiber optic, silicon, and air: global telecommunications and the World Wide Web. On the surface it all flows at Einstein's constant: the speed of light. Yet, for all this information, there's quite a bit of noise in the channel. To try to make sense of it all would seem to require some facts, but how do we tell fact from fiction when post-industrialism calls such things into question? Can we even speak of facts anymore in a world where fiction is becoming cliché (Hollywood et al)?

As a first step in addressing such questions, we will explore the evolution of fact and fiction in post-industrial science. In addition, the Is/Ought distinction in critical theory will be examined. And finally, the informative role of cultural studies in the understanding of Technoculture will be considered.

### ***Fact vs. Fiction***

The dominant role of technology in post-industrial society is due in no small part to developments in science. In order to better understand these developments, a path will be traced from the logical positivists to the post modernists concerning fact and fiction. These developments call into question the authority of science, logic, and knowledge in post-industrial society. Any relevant theory would need to take such developments into account.

To situate the following analysis: the four main eras of intellectual history are Ancient, Medieval, Modern (Enlightenment) and Post-Industrial (Late-Capitalist/Post-Modern). In addition, the sciences can be divided into 1st generation Aristotelian, 2nd generation Newtonian, 3rd generation Relativity and Quantum theory, and the 4th generation search for a TOE (theory of everything; Hawking *et al*).

The modern era was divided between the rationalists (Descartes, Leibniz, Spinoza) who claimed knowledge was found in the mind, and the empiricists (Locke, Berkeley, Hume) who claimed that knowledge was found in the senses (sense experience). Kant, following the rationalists and empiricists, claimed knowledge was found both in the mind and experience, but the truth of this was inaccessible to reason. At the turn of the century, the logical positivists (Russell, Whitehead, Wittgenstein, Carnap, G.E. Moore) claimed such metaphysical statements as Kant's were meaningless.

Logical positivists believe in an empirical (sensory) reality that can be discovered scientifically (Williamson 179). The observer can be completely objective and the observer's life histories, experiences, viewpoints, and interpretations do not influence the choice of methodology, data analysis, and strategy of theoretical development. Truths can be discovered by science that are timeless and eternal (universal) and are valid no matter what the particular context. In addition, the positivists proposed the verifiability criterion of meaning: a statement is meaningful only if there is the possibility that it can be verified through empirical evidence; valid statements are expressed with the rules of formal logic.

Several developments in theoretical physics and the philosophy of logic called into question the validity of logical positivism (Hofstadter 181). Perhaps the most important was Heisenberg's uncertainty principle: the exact position and velocity of a particle cannot be determined

simultaneously; the energy level of a particle at a specific point in time cannot be determined simultaneously. The universe is indeterminate and an “observer effect” disturbs reality; absolute objectivity is a myth. Logic was also called into question with Gödel’s Proof: *every* logical system is inconsistent *or* incomplete; and Russell’s Paradox: the set of all (logical) sets is itself an illogical set. As a result, quantum physicists, analytic philosophers, and meta-logicians were forced to acknowledge the limits of scientific observation and logic.

The crisis when confronting Heisenberg’s uncertainty principle, Gödel’s proof, and Russell’s paradox informed post positivism: there is an objective reality discreet from subjective human interpretation, but human subjectivity obscures this objective reality, hence the need for scientific hypotheses and deduction. The same hold for truth, there is an absolute truth but this truth is obscured by human subjectivity. What can be determined by science is only what is absolutely false.

As Popper says, “Our belief in any particular (scientific) law cannot have a safer basis than our unsuccessful critical attempts to refute it” (112); post-positivists replace validity with falsification: scientific theories are hypotheses from which can be deduced statements testable by observation; if the appropriate experimental observations falsify these statements, the hypothesis is refuted. If a hypothesis survives efforts to falsify it, it may be tentatively accepted. No scientific theory, however, can be conclusively established; related to this is the acknowledgment that “all our observations are theory laden; there is no pure, disinterested, theory-free observation” (84).

Popper’s contemporaries in theoretical physics were grappling with similar conclusions. Heisenberg refuted immediate experience with theoretical science; he also questioned the instrumental view of science (Dewey, Kuhn) in which *prediction* was the criterion for truth. As

Heisenberg puts it, “If predictive power were indeed the only criterion for truth, Ptolemy’s astronomy would be no worse than Newton’s” (36). Ptolemy’s geocentric astronomy, with the aid of a tedious and complex mathematics (and hypothetical planetary motions consisting of differentials and epicycles), was quite accurate in predicting the movements of the planetary bodies. Yet, “Newton’s equations express the paths of the planets much more fully and correctly than Ptolemy’s did; Newton, so to speak, described the plan of nature’s own construction” (36). Such comments sound closer to metaphysics than logical positivism.

Theoretical physicist James Jeans (and contemporary of Heisenberg’s) went farther: The essential fact is simply that all the pictures which science now draws of nature, and which alone seem capable of according with observational fact, are mathematical pictures...they are nothing more than pictures – fictions if you like, if by fiction you mean that science is not yet in contact with ultimate reality. (9)

Jeans argued that science is fiction, not fact. Fellow physicist Arthur Eddington agreed: “We have learnt that the exploration of the external world by the methods of physical science leads not to concrete reality, but to a world of symbols” (10). And Niels Bohr echoed “it is wrong to think that the task of science is to find out how nature is. Science concerns only what we can say about nature” (244).

Following this, a related development in the *history* of science also occurred: Thomas Kuhn’s paradigm theory. As Kuhn defines it, a paradigm is a set of theories, ideas, abstractions, beliefs that “provide models from which spring particular traditions of scientific research” (10). Examples of paradigms include Aristotelian dynamics, Copernican astronomy, Newtonian optics, and Einstein’s theories of relativity. A paradigm shift is a crisis brought on by conflict between two or more paradigms, in which the “fittest” paradigm survives. There is no synthesis:

Kuhn claims that paradigms are incommensurable (incompatible), hence the crisis; the resulting change is comparable to a revolution. Implicit in this argument is the claim that science is an instrument for solving problems. Thus, Kuhn's evolutionary model of science calls into question the teleology (purpose) of the scientific enterprise. As Kuhn states, "we may have to relinquish the notion that changes of paradigm carry scientists closer and closer to the truth" (170).

Perhaps the most cited theorist in the social sciences, Kuhn's constructivist model has had a profound impact on post-industrial science. Constructivism takes a radical turn with the post modernist Michel Foucault:

Each society has its regime of truth: that is the types of discourse which it accepts and makes function as true; the mechanisms and instances which enable one to distinguish true from false statements, the status of those who are charged with saying what counts as true. (73)

According to Foucault, our contemporary regime of truth is science, in the medieval era it was religion, in the ancient era it was art. Truth is power; learning is indoctrination. Foucault analyzed truth as the effect of power relations:

All knowledge rests upon injustice (that there is no right, not even in the act of knowing, to truth or a foundation for truth) and that the instinct for knowledge is malicious (something murderous, opposed to the happiness of mankind.) (95)

Perhaps the most relevant contribution was made by a contemporary of Foucault's; Lyotard argues that science is a narrative which references no raw facts or events; facts or events are the result of previous narratives which following narratives use as a reference (126). By this, Lyotard does not mean to deny facts or events, but only that they are inevitably mediated by narratives.

Theories themselves are only concealed narratives that mask their narrative in objective truth (scientific meta-narrative); the alternative to theories are fables (stories that fall outside of sanctioned meta-narratives.)

Science is based on narrative, not knowledge. To illustrate, Lyotard cites the *Pagus*, or the frontier as referred to in cultic religions of ancient Greece. Such regions were the habitats of the gods, and the cults which seduced them. The cults deceived and seduced the gods through speech; *speech as a way of producing effects, not professing the truth*. As the ancient Greek sophist Gorgias defined it, *speech for the just is an art form, for the unjust it is the want to be right*. And the pagan gods were narrators themselves, demanding not to react but to reply. To sum up: the creative power of making and telling stories is the source of scientific knowledge; facts are fiction.

The path thus traced from the logical positivists to the post modernists may not be definitive, or complete, but the information does help clarify the problem: an aesthetic theory of technology would need to take the question of fact and fiction into account.

If science is on such shaky ground, is critical theory an alternative? A brief analysis of critical theory may be instructive either way.

### ***Is/Ought***

*One can have the clearest and most complete knowledge of what is, and yet not be able to deduct from that what should be the goal of our human aspirations.*

Einstein (1929)

For Einstein, as for critical theorists, reality is a problem; but even more of a problem is what *ought* to be; for *ought* implies value (hence the relevance of aesthetic theory.) A critique of post-industrialism would imply an understanding of what post-industrialism *is*. Addressing just

such issues, critical theory may prove most informative. We will now examine several positions held by critical theorists and conclude with the post modern response.

Critical theorists claim reality *is* a political construction that is determined by social oppression (Williamson 182). This oppression forms a history of war between the haves and the have nots: a hegemony (political domination) and abuse of power by patriarchal, ethnocentric, political and economic elites. Critical theorists analyze the base (socio-economic facts) and superstructure (culture) of a society to emancipate repressed elements. It is the work of reason to interpret and combat social oppression. As such, critical theorists write value-laden texts that promote political agendas in the attempt to transform society according to how it *ought* to be. Critical theorists include Theodore Adorno, William Benjamin, Guy Dedord, Hanna Arendt, and Simone de Beauvoir. A concise summarization of critical theory is provided by Herbert Marcuse:

The closed operational universe of advanced industrial civilization with its terrifying harmony of freedom and oppression, productivity and destruction, growth and regression is pre-designed in this idea of Reason as a specific historical project. (123)

While critical theorists have been successful in a critique of post industrialism, they have yet to be as successful in practice; implementing social change seems to require more than just critique. The post modern reply to critical theory is informative; post-modernists have responded to critical theorists by refuting their logic, the validity of reason, and the privileged position of the intellectual (Williamson 188). Post modernists refute critical theory's privileging of political reality: some post-modernists suggest reality is only a form of human subjectivity, others say there are no subjects at all, only objects. Post-modernists (Baudrillard, Lyotard, Derrida, Rorty, Fish) emphasize that reality *is* an interpretation. As a result, many post-modernists abandon validity and reliability and focus on creativity and personalization; they force change by

subverting the political altogether (and by offering new ways of interpreting and understanding reality.)

Although critical theory offers a method for the determination and critique of post-industrialism, it may be limited in practice. A critical theory that takes the post modern reply into account may offer both formidable critical techniques and a post modern practice that is potentially more effective.

Technoscience has spawned a whole new culture (alternately referred to as Technoculture, cyberculture, web culture) accessible to anyone who surfs the information superhighway of the Web. To study technoscience is to study Technoculture. Sociology, anthropology, and cultural studies all offer differing ways of studying culture; an examination follows to determine which (if any) is most relevant to Technoculture.

### ***Technoculture***

Culture can be thought of as, “a way of life based on a signifying order developed originally in a tribal context that is passed along through the signifying order from one generation to the next” (Danezi & Perron 23). Many cultural theorists tend to view tribes and cultures as synonymous. In this sense, a society can be thought of as a “super-tribe,” a collectivity of individuals who, although they may not all have the same tribal origins, nevertheless participate, by and large, in the signifying order of the dominant tribe. It is beginning to be recognized by cultural theorists that the dominant form of American culture is *Technoculture*:

American Culture is *Technoculture*, from the boardroom to the bedroom. Truckers and cyberpunks, rap musicians and concert pianists, even hippies and the Amish all employ technologies in such a way that their cultural activity is not intelligibly separate from the utilization of these technologies. (Mensner & Aronowitz, 20)

Cultural studies may pave the way to an understanding of Technoculture; to begin it may be instructive to trace the development of cultural studies itself. The following will be just such an attempt.

Cultural studies began with sociology. The topic of study for sociologists is society; a society is a collectivity of individuals who share a mainstream culture (Danezi & Perron 366). Sociology emerged in the 19th century with such thinkers as Karl Marx, Emile Durkheim, and Max Weber. Sociologists focus on economic, political, and religious aspects of society. *The Protestant Ethic and the Spirit of Capitalism* by Max Weber is representative of some of the themes that initially concerned sociologists. In the text, Weber argues that the economic system known as capitalism can trace its origins to the value and belief system of protestant Christianity (1930). While sociology was effective in the study of Western societies, it neglected the study of so called primitive or alternative societies.

Anthropology is a discipline that formed in response to such neglect. It was popularized in the early 20th century as the study of the culture of tribal peoples. Anthropology studies the cultural systems, social structures, and organization of tribal peoples as an attempt to account for the origins, histories, and multiplicities of races, cultures, and civilizations (Vidich and Lyman as cited in Williamson 179).

Founding anthropologists include Bronislaw Malinowski, Margaret Mead, and Gregory Bateson (Williamson 179). Malinowski (1884-1942) was a Polish-born British anthropologist regarded as the founder of the “functional” school of anthropology, which maintains that human institutions should be examined in the context of the culture as a whole. He took part in an expedition to New Guinea and Melanesia (1914) and spent several years studying the peoples of the Trobriand Islands of the southwest Pacific. He taught at the University of London and Yale.

Mead (1901-78) was an American anthropologist, widely known for her studies of primitive societies and her contributions to social anthropology. Mead conducted notable research in New Guinea, Samoa Islands, and Bali. Attracting controversy, she was known to hide under the beds of Samoans in an effort to study their mating habits. Bateson (1904 - 1980) was a British-born U.S. anthropologist whose studies included both ecology and the philosophy of mind.

Anthropology now includes many sub-disciplines such as business anthropology, linguistic anthropology, medical anthropology, social anthropology, migration and border studies, change and development, and more. One criticism of anthropology is that it has over-specialized and isolated itself from the rest of the academic community while neglecting many contemporary forms of cultural; cultural studies is the response.

Cultural studies is not a discipline so much as an academic revolution; a discipline that claims not to be a discipline: a radical critical approach for understanding racial, national, social, or gender identities (Sardar & Van Loon 87). Cultural theorists function by borrowing freely from social science disciplines and all branches of humanities and the arts. Cultural studies appropriates theories and methodologies from anthropology, art theory, linguistics, literary criticism, musicology, philosophy, political science, psychology, and sociology. The roots of cultural studies can be traced to a group of British intellectuals that formed the Centre for Contemporary Cultural Studies (CCCS) at the University of Birmingham in 1964. These intellectuals included Richard Hoggart, Raymond Williams, E.P. Thompson, and Stuart Hall. Cultural theorists study the “other” in all its cultural manifestations: class, race, and gender identity, diaspora (minority groups living in exile), feminism, queer theory, post-colonialism, orientalism, media, cyborgs, and globalization.

The path thus traced from sociology to anthropology to cultural studies is instructive: cultural studies is informative of Technoculture.

### **Conclusion**

Any theory of technology should take the role of fact and fiction in post-industrial science into account. In addition, a critical theory that takes post modernism seriously may offer both formidable critical techniques and effective practice. And finally, a study of Technoculture would be (and has been) well informed by cultural studies.

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