THE IMPLICATIONS OF THEORIES OF KNOWLEDGE AND MEANING
FOR THEORIES OF ARCHITECTURE

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For Stanford Anderson, Hong-Bin Kang, and Emily Susskind without whose support, encouragement and criticism this paper would not have been written.
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The Implications of Theories of Knowledge and Meaning for Theories of Architecture

by

Jonathan Paul Mathews

Submitted to the Department of Architecture on May 19, 1978, in partial fulfillment of the requirements for the degree of Master of Architecture in Advanced Studies.

Abstract

Architectural theory often overlooks the fact that it must, whether explicitly or not, situate itself within a range of attitudes toward knowledge and meaning. This essay will focus in particular on the theory and ideology of Peter Eisenman. I have chosen Eisenman in part because his work provides an illustration of the way in which ideological decisions play a role in the location of theories of architecture within a spectrum of attitudes toward epistemology and meaning; and in part because criticism of the manifest failings of Eisenman's view may point to criticism of many traditional architectural attitudes.

The implications of the epistemology and the account of meaning adopted by an architectural theory are enormous. The epistemological attitudes a theory adopts are manifested in the definition of its own rationale - that is, in its account of the relative dependence or independence of architecture from history, in whether it sees architectural "progress" resulting from a set of internal, formal rules or from external, social pressure, and in whether it regards the relationship of the conceptual to the physical as being located in the mind's unchanging ability to structure the world or in societal use of changing conventions to organize reality. Similarly, the attitude a theory of architecture adopts towards meaning is revealed by whether it finds meaning produced by the correspondence between the mind's cognitive structures and their physical manifestations or by the conventions linking socioculturally determined values with their physical tokens.

To understand architecture theory in this context, I have investigated a range of epistemological and linguistic theories. In particular, this essay will focus upon accounts of knowledge and of language which originate with the collapse of inductivism. In the epistemological sphere, the failure of an inductive rationale for knowledge undermined the view of knowledge as "objective", of the pursuit of knowledge of the physical world as an autonomous enterprise, in which the correspondence of scientific facts with reality was distorted only by inaccuracy of technique and the like. Instead, these
post-inductive epistemologies focus increasingly on the social nature of knowledge and on science as a cultural artifact; "true" scientific accounts are seen increasingly as reflections on a society's metaphysical biases, and "knowledge" increasingly as the expression of social convention. Just as the sociocultural becomes the distorting lens obscuring our "objective" view of reality, so too, for linguistics, the crisis appears as the breakdown of the unsullied correspondence between world/language/mind. No longer a value-free code for mental "pictures" of real objects, language becomes itself a system with its own laws which organizes reality, and meaning a mechanism of that system rather than the correspondence of word to thing.

The almost-intuitive reasonableness of these analogies is hardly accidental: in fact, they are hardly mere analogies. As I have argued, it is not possible to discuss architecture and architecture theory without giving an account, however implicit, of its epistemological status on the one hand and of its capacities for, and mechanisms of, meaning on the other. It is, then, no surprise to discover that architecture finds cousins in science, the usual subject of epistemological research, and in language, the usual realm of theories of meaning. The point of architectural theory is to account for the relationship of architecture to its history, to its social context, to its stated program, and to its conceptual and perceptual focus - and this is true even for a theory that admits of no such relationships. It is hoped that realization of these inherent positions of architectural theory will make theory more aware of the breadth of its implications. For this, the case of Peter Eisenman should prove instructive.

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Introduction

Architectural theory often overlooks the fact that it must, whether explicitly or not, situate itself within a range of attitudes toward knowledge and meaning. This essay will focus in particular on the theory and ideology of Peter Eisenman. I have chosen Eisenman in part because his work provides an illustration of the way in which ideological decisions play a role in the location of theories of architecture within a spectrum of attitudes toward epistemology and meaning; and in part because criticism of the manifest failings of Eisenman's view may point to criticism of many traditional architectural attitudes.

The implications of epistemology and the account of meaning adopted by an architectural theory are enormous. The epistemological attitudes a theory adopts are manifested in the definition of its own rationale - that is, in its account of the relative dependence or independence of architecture from history, in whether it sees architectural "progress" resulting from a set of internal, formal rules or from external, social pressure, and in whether it finds the relationship of the conceptual to the physical as located in the mind's unchanging ability to structure the world or in societal use of changing conventions to organize reality. Similarly, the attitude a theory of architecture adopts towards meaning is revealed by whether it finds meaning produced by the correspondence between the mind's cognitive structures and their physical manifestations or by the conventions linking socioculturally determined values with their physical tokens.
To understand this view of architectural theory I have investigated a range of epistemological and linguistic theories. In particular, this essay will focus upon accounts of knowledge and of language which originate with the collapse of inductivism. In the epistemological sphere, the failure of an inductive rationale for knowledge undermined the view of knowledge as "objective", of the pursuit of knowledge of the physical world as an autonomous enterprise, in which the correspondence of scientific facts with reality was distorted only by inaccuracy of technique and the like. Instead, these post-inductive epistemologies focus increasingly on the social nature of knowledge and on science as a cultural artifact; "true" scientific accounts are seen increasingly as reflections of a society's metaphysical biases, and "knowledge" increasingly as the expression of social convention. Just as the sociocultural becomes the distorting lens obscuring our "objective" view of reality, so too, for linguistics, the crisis appears as the breakdown of the unsullied correspondence between world/language/mind. No longer a value-free code for mental "pictures" of real objects, language becomes itself a system with its own laws which organize reality, and meaning a mechanism of that system rather than the correspondence of word to thing.

Even on this sketchy account of post-inductive theories of knowledge and language it should be clear why they play such a crucial role in architectural theory. It is more than a process of analogy between architecture and science on the one hand, language on the other, although,
in fact, such analogies are suggestive and frequently sustained. The categories, terminology, and procedures of epistemology and of linguistics are often applied to architectural discussion precisely because of the persuasiveness of these analogies. (Indeed, Eisenman makes, as we shall see, an explicit analogy to language the basis of his theory.) Architecture bears no striking resemblance to science as it is described by theorists of knowledge: it has a complex of social, cultural, technological, and other components; it has both internal and societal criteria for problem-solving. More importantly, as a fundamental social institution, it has, much like science, been subject to a great deal of conscious theorizing, concerning its methodology, objectives, and legitimacy. These attitudes, to science as to architecture, have been uniformly permeated with our implicit suppositions concerning the physical world and "true" knowledge of it. Similarly, the view of "architecture-as-language" has a suggestive ring: On this model, architecture as a "language" can be analyzed using the categories of linguistic theory, since it exhibits parallel phenomena, and serves parallel functions, to those of language. It has both conceptual and physical characteristics; it has a certain structure relating elements in a particular way; and it takes on both communicative and utilitarian functions.

The almost-intuitive reasonableness of these analogies is hardly accidental: in fact, they are hardly mere analogies. As I have argued, it is not possible to discuss architecture without giving an account,
however implicit, of its epistemological status on the one hand and of its capacities for, and mechanisms of, meaning on the other. It is, then, no surprise to discover that architecture finds cousins in science, the usual subject of epistemological research, and in language, the usual realm of theories of meaning. The point of architectural theory is to account for the relationship of architecture to its history, to its social context, to its stated program, and to its conceptual and perceptual focus — and this is true even for a theory that admits of no such relationships. It is hoped that realization of these inherent positions of architectural theory will make theory more aware of the breadth of its implications. For this, the case of Peter Eisenman should prove instructive.
This section will examine the implications of post-inductive epistemologies, and I will begin by examining the conflict between rival epistemological research programs, each having as its hard core alternative views of the autonomy of rationality, of science, and of the growth of knowledge; that is, alternative views on the demarcation between external and internal history in Lakatos' formulation, and a different priority in the hierarchy of images of knowledge in Elkana's terms.

I will first briefly describe the various research programs of Lakatos and of his predecessors. These views, of which Lakatos is the last proponent, are designed to maintain empirical foundations for rationalism, and to save rationalism and intellectual honesty from the sceptics, and the sociologists. We will examine Lakatos' more flexible and relativistic approach to the growth of knowledge, and, in particular, his attitudes towards the role of history in testing theories of knowledge, his concept that theoretical growth and empiricalness must be linked, and that theoretical growth must precede empirical growth; and the impact of Lakatos' allowing of appeals against factual evidence, which leaves any research program immune not only from instant dismissal, but from any final refutation as well.

In particular, we will compare the role of conventional judgements in all these programs, and the associated problems of demarcating between
internal and external history. We will then examine Feyerabend's contention that Lakatos' view has so loosened scientific standards that its implications can only be methodological anarchy, and that this can only be beneficial. In particular, we will examine Feyerabend's claim that (i) Lakatos' conventionalism internal to science depends nonetheless on external factors to explain the growth of knowledge; and that (ii) his concept of the continually expanding empirical content of theories is not a meaningful one (particularly in the case of mature research programs), since their contents cannot be commensurable.

More critically, we will examine the hard core of Feyerabend's approach: that these theories constitute alternative forms of life, such that their grammars are untranslatable because they contain incommensurable cosmologies, and that not only is the attempt to reduce their diversity to single, well-understood logic futile, it is also positively harmful. Such an approach would preclude understanding the forms of life themselves; this can only be achieved through 'anthropological' fieldwork to see how scientists actually progress, and produce knowledge, and it is a process directly analogous to myth-making. It similarly precludes attempting the major goal of Feyerabend's thought, which is to understand the nature of incommensurability itself, in order to proliferate alternative world views and forms of life, and in particular, an alternative to the Western, scientific view with its bias towards standards of rationality and towards recourse to empirical justification. This requires nothing less than a new language to describe these "complex
historico-anthropological phenomena, which must be invented, through a long, and as yet very incomplete process."

    We can then reinterpret Feyerabend's "anarchism" in the light of his extremely consistent drive towards the realization of this research program. Just as Galileo, while trying to establish his new world view and supersede the Aristotelian form of life (not disprove it, of course), had to rely on the production of enough "nonsense" to produce a sufficiently articulated new language of his own, so Feyerabend, in superseding the rationalist idealist program, which naturally works considerably better than his at the moment, must adopt an anarchism independent of all previous systems, until he invents the elements and learns his new language. In the meantime, he must also deluge his opponents with propaganda, to make "the illiterate logicians" of the scientific establishment take note, and alert the community at large to the birth of a new world view.

    We will then examine Y. Elkana's research program, representing a positive problem shift from Lakatos', and reinterpret Lakatos and, particularly, Feyerabend, in its light. Elkana firmly embraces an anthropology of rationalities, and is convinced that any standards of knowledge (whether methodological or otherwise) are culture bound. He argues, like Lakatos, that knowledge grows by a continuous dialogue between competing total world views, scientific research programs, but only within a culturally established framework. The body of knowledge (methods, solutions, problems, metaphysical hard core...) will interact
with socially determined images of knowledge (the task of science, nature of truth, sources of knowledge, methodologies...) and with socially determined values and norms (political ideologies, social pressures, and their relation to the support of institutions or research programs), and, at any given time, these are not distinguishable.

Following Feyerabend, Elkana aims at a multifaceted, "thick," "hermeneutic" description of science, and its changes, in Western society. However, he assumes that the changing interactions and conflicts between various research programs form a continuum and are commensurable. This is a critical premise. An account of the nature of the differences between research programs, or how world views are constituted, or what they are, is not attempted, and is probably not possible within this frame. Elkana's approach is purely descriptive, and though aimed at understanding, will not produce explanations of the causes of these phenomena.

The current philosophical interest in the problems of maintaining even the semblance of a rational basis for science, and in defining the limits and criteria for rationality, is the direct consequence of the collapse of inductivism -- the theory that, on the basis of objectively determined facts, universally true theories can be abstracted.

The only scientific statements accepted by the inductivist are these infallible inductive generalizations. Consequently, intellectual integrity depends on limiting oneself to proven statements - that is,
statements of observational fact or direct extrapolations from such facts. Because they recognized that statements of "fact" could be true, inductivists felt that a universal theory could be disproved by a hard fact. When this happened, there was no alternative but to abandon it.¹

In inductivism, no element of conventionalism is involved: facts may be observed without difficulty, and universal inductive laws apply. The scientific community, and society at large, can only rely on these principles and apply them; they have no further input, and in this sense, scientific knowledge is entirely independent of those who gather it. The success of science is seen as the result of the consistent application of these principles.

A rationalistic, inductivist, historian wishing to explain the rational development of science will look for the uncovering of factual evidence and its subsequent generalization, according to universal inductive principles, into universal laws. Theories are excluded from rational history and branded pseudo- or pre-scientific,² if it can be demonstrated that they do not follow this pattern. Nor can an inductivist historian explain why some facts and not others are chosen by the science of a given era, for this depends on external explanation and is thus somehow "accidental" to science.³

On this inductivist model of the "scientific method," science progresses linearly. Knowledge grows as more and more facts are unearthed, and are subsumed under progressively more powerful, more highly-generalized theories. The relation between fact and theory is seen as
unproblematic, and the accessibility of "pure fact" (strict observation, free from conceptualization) is assumed. Note, then, that each theory, while expanding on the empirical content of its predecessor(s), will thereby still contain all that earlier theories contained, and generate precisely the same set of "facts" (in addition of course, to those novel facts it accounts for). For this reason, the commensurability of successive or competing theories is simply never a problem. The new is seen as "the old, plus" and it is assumed that throughout theoretical change and conflict we are still talking about the same thing.

Hume first exposed the impossibility of inferring universal laws from specific facts and Popper was the first contemporary philosopher to face this fact, and to propose his own solution to the problem of science and rationality in the face of it.

"the advance of science is not due to the fact that more and more perceptual experiences accumulate in the course of time. Nor is it due to the fact that we are making better use of our senses. Out of uninterpreted experiences science cannot be distilled, no matter how industriously we gather and sort them. Bold ideas, unjustified anticipation, and speculative thought are our only means of interpreting nature.... And we must hazard them to win our prize. Those of us who are unwilling to expose their ideas to the hazard of refutation do not take part in the scientific game."  

Faced with the impossibility of ever proving theories in the traditional model, several alternatives have been proposed, giving different weight to the role and finality, of empirical refutation.

The first theory of this type, "naturalistic falsificationism" in Lakatos' terminology represents a major retreat from earlier theories
of rationality, since all theories are now considered fallible, but an empirical basis for science is still maintained, dogmatically, by arguing that empirical counterevidence, and only empirical counterevidence, can disprove a theory, although empirical evidence cannot establish any theory. The universal inductive logic has been abandoned, but the possibility of establishing hard facts has been maintained, based on the belief that it is possible to distinguish between theories, which are speculative, and observations, which are not. It is also maintained that once a proposition is established by observation, it is true, proven from the facts. In order to be rational one must now only propose disprovable fallible theories (others are 'un-scientific'), which must therefore exclude certain facts. Falsificationists must therefore specify the conditions for abandoning their theory, if they are in contradiction with these facts. 6

However, it is not possible to demarcate between observation and theory, since all observations depend on an initial bias on the part of the observer when he selects the information out of the infinity of 'facts' he might choose; and it is logically impossible to prove propositions with facts.

Furthermore, the standard requiring that all theories specify what facts would disprove them excludes the most widely respected theories since (i) probability-based theories, such as Newton's dynamics, work only if certain initial conditions are satisfied, and only under certain conditions. They cannot exclude anything, since any occurrence not
predicted by the theory can always be explained by a new subsidiary theory, explaining and predicting factors that might have distorted the observations. Indeed, some of Newton's greatest triumphs occurred when observational refutations were explained, and confirmed the theory all the more.  

Theories, then, contrary to the fallibilist view, are neither provable or disprovable; they have probability zero, and do not set any conditions under which they might be abandoned.

So rationalism has to retreat again and set less ambitious standards to defend its empirical hard-core against its sceptical detractors, and to establish new standards for intellectual honesty. Some way must be found to prefer some theories over others, and to ensure scientific progress. A number of theories have been proposed. They are characterized by their conventionalism, and by their delegation of the decision as to the status of theories to the (temporary) consensus of the scientific community. Conventionalists allow that science is an activity that builds "systems of pigeonholes" to organize facts into some coherent whole. It is decided, by convention, which systems to adopt, and to keep them intact as long as possible. They are not true - in the old-fashioned, absolutist, universal sense - but only "true by convention."

Lakatos distinguished two kinds of conventionalism. Conservative conventionalists (who contend that we are trapped since once a pigeon-hole system is dubbed "the true," and systems of auxiliary hypotheses
built to protect it, the refuting power of "empirical" evidence decreases); and revolutionary conventionalists (who contend that systems must sometimes be overthrown when they become too constricting). For revolutionary conventionalists, progress is still possible, and consists in the succession of new, simpler frameworks.10

A conventionalist will look for instances of cumbersome frameworks being overturned by simpler ones (Ptolemy/Copernicus). Conventionalism cannot explain why some facts rather than others are chosen for a particular pigeon-hole system, or why some rather than other pigeon-hole systems are adopted. These problems are seen as external, and may be explained by a variety of social, psychological, and other means.11

It is clear that, for the conventionalist, to accept rival systems of theories only because they are "simpler" is to reduce science to an aesthetic exercise, and does not advance the cause of rationalism very far. An alternative, which Lakatos calls methodological falsificationism,12 is proposed by Popper, whose theory is that it is not the whole pigeon-hole system that is conventionally "decided," but only the status of individual facts as they are brought to light. Instead of distinguishing systems by their simplicity, generality, etc., Popper "decides" only facts, which are distinguishable by a "generally accepted" technique, and which can falsify theories.13

So where the fallibilist sees theories disproved by facts, Popper sees theories disproved by "facts," and realizes that fallible theories are involved in establishing them. (It is obviously necessary to
establish boundaries between unproblematic background "knowledge" and "facts," from the theory to be tested. The necessary observation theories and their associated techniques are deemed unproblematic by convention and consensus; there is even conventionalism in the degree of corroboration which potential falsifying facts must have.) So in retaining the demand that a theory be rejected if it is "falsified" even if this does not mean that it has been disproven (the observation consensus may be wrong), the falsificationist is taking a daring risk. But this is the hallmark of the ("naive") falsificationist -- he only considers a theory "scientific" if it is falsifiable.

It is important to note that (i) probability laws may now be "scientific" if they specify rejection rules; and (ii) theories that only function under specified conditions can also be "scientific": if a theory, along with its conditions, is refuted, it is decided whether this is a refutation of the theory, or just a violation of the required conditions. Naturally, there will be severe tests to determine whether conditions are violated. This may be crucial, as one of the many anomalies that any theory is bound to have may, by convention, be promoted to a crucial experiment and become the decisive test which may cause the entire theory to be abandoned -- a procedure which makes many theories' dismissal imminent.

Clearly, this position is a significant improvement, but are its prescriptions too firm? More importantly, does it bear any resemblance to what scientists do? It does not, in three obvious cases:
(i) scientists are very slow to accept refutation; (ii) tests, rather than representing a confrontation between a single theory and a new set of facts, are often confrontations between several theories; and (iii) not only is the only acceptable or interesting outcome of such a test not falsification, it is often, in fact, corroboration. 16

Popper proposes an alternative, less stringent model: to reduce the conventionalism inherent in the "naive" approach, he specifies (i) that to be scientific a theory must have excess empirical content over its predecessor - it must lead to the discovery of new facts; and (ii) that auxiliary theories may defend theories against too arbitrary a dismissal, if they too represent a theoretically progressive problem shift - that is, if they predict some novel fact, and have excess empirical content over their predecessor. Single theories are no longer evaluated, but series of theories are; and the notions of growth and empiricalness are linked. Progress is a function of empirical growth. 17

It is clear that no single test alone can lead to falsification; a better theory must emerge first, and it is only better if it predicts new facts.

Nor is it single theories that are falsified, or pseudo-scientific, but sequences of theories, with their (progressive or not) auxiliary theories, to explain anomalies, and their observation theories.

Lakatos now proposes his contribution to this progressing epistemological research program. It is a methodology for scientific research programs (hereafter, MSRP) which are evaluated in terms of progressive problem shifts (successive theories producing increased
empirical content) or degenerating problem shifts. Each program has its own set of rules as to which problems should be addressed (positive heuristic) and which ignored (negative heuristic). 19

Each research program has as its hard core a set of metaphysical/conventional positions (e.g., the Cartesian metaphysic that the universe is a huge clockwork device) which will not be questioned (for the time being). They will be defended by the use of (progressive) auxiliary hypotheses that will form a protective belt around the core. If the protective belt cannot consistently produce novel facts then the hard core may have to be abandoned. 20 It is critical to note that it is immediately clear if hypotheses are theoretically content-increasing, although developing empirical evidence may take much longer. In other words, all that is necessary in order to stick to a program in the face of refutations, is the possibility of new empirical evidence, hopefully at regular intervals. 21

Each program also has a positive heuristic, which will dictate, to a large extent, the problems that the researchers will emphasize. So long as their program is progressing they will not pay too much attention to the many cases that their theories cannot yet account for. This heuristic will be a set of more and more comprehensive simulations of reality (according to the dictates of the hard core). 22 It will usually be obvious, in an early part of the research program, that parts of the theory are patently wrong or represent only the crudest approximations. It will be no surprise to the scientist that they will
not correspond to the available data. He will not be interested, until his program is more fully developed.\(^2\)\(^3\)

The positive heuristic may also be seen as a metaphysical principle, but a fairly flexible one since creative shifts in the positive heuristic may give a failing program a new impetus.\(^2\)\(^4\)

This positive heuristic is the main explanation for the comparative autonomy of science, its relative independence from outside interference in the conduct of its affairs. What is external for Popper has become internal for Lakatos.\(^2\)\(^5\)

Several crucial differences should be noticed between Lakatos' research program and Popper's theories. There is no instant falsification any longer – Popper's great negative experiments disappear; "crucial experiment is an honorific title,"\(^2\)\(^6\) conferred only long after the event, and may even be withdrawn. Any theory, even a false one, may be defended progressively for a long time and still be "rational."

There is no instant rationality either, since at any given time it may be difficult to tell which research program has the upper hand, and any program, no matter how badly it is doing, may stage a comeback.\(^2\)\(^7\)

However, the exact conditions of the various theories must be made public at all times.\(^2\)\(^8\) It is therefore perfectly rational to stick to a program for however long one chooses, despite counter-evidence; ultimately, the academic community will intervene, and stop funding the program or teaching its results. This is natural, and, for Lakatos, quite acceptable.\(^2\)\(^9\) There are, however, no internal rules for the research
foundation or the editor, when they accept or reject a program or a paper - this is a matter of "common sense." But it is common sense in a much more restricted framework than that of the conventionalist who decides between a simple or complex pigeon-hole system, or the Popperian who has to decide where to demarcate between problematic and un-problematic knowledge. 30

The MSRP, naturally, is also a historiography. Rather than look for revolutions, crucial experiments, and the like, the historian will look for progressive problem shifts. 31 It will also be supplemented by an external history (to explain, for example, why certain disciplines emerge or disappear in a certain time and place). One of Lakatos' main points is that the external influences of the fallibilists or of the methodological falsificationists have been transferred to internal history. Most importantly, irrefutable metaphysics, which are external to all previous epistemologies, is now an integral part of science and of its reconstruction. 32 Each theory of rationality, with its own definitions of internal and external, produces its own interpretation of the history of science. Each interpretation will need its own empirical external theory to explain the "non-rational" parts of history. But Lakatos argues that internal history, "the rational aspect of scientific growth, is completely explained by one's logic of scientific discovery." 33 The corollary to this is, clearly, that history depends on one's theory of scientific knowledge and of its growth; our observation of history is theory-laden, just as our observation of natural phenomena is.
The reconstruction of internal history, the rational part of history (according to our rationality theory) is firmly in World 3 — it is a disembodied version of scientific growth, in which the scientists' opinions, moods, status, is quite irrelevant, or at best a problem to be delegated to an external supplementary theory. Indeed, it is not accurate or relevant to say that there was, for example, a Proutian program. There is only the historian's reconstruction, which may even be substantially more complete than the "original."35

The stage is now set for Lakatos' theory for testing conventionalist epistemologies. Lakatos proposes that "as all methodologies function as historiographical (meta-historical) theories (or research programs).... (they) can be criticized by criticising the rational historical reconstructions to which they lead."36 In other words, competing historiographic research programs can be tested against the facts of history, just as competing scientific research programs can, and they will be assessed the same way: according to whether or not they are progressing.

Rationality, then, is conventional. Theories of rationality, driven by their own metaphysical hard cores, will compete just as other theories do. If they progress they will pursue the process of predicting new historical facts, and will explain more historical facts as internal. Naturally no theory will be able to explain them all, and this discrepancy will be remedied over time either by other historiographical research programs or by a progressive problem shift in the original
program. If it appears that the rational hard cores of these historiographic programs can only be defended by relying increasingly on external explanations, then this would be a clear sign, for a rationalist historian, that these historiographies are degenerating and that more original and innovative alternatives are needed.

At this point it is useful to review the extent to which Lakatos' MSRPs conventionalism is determined by decisions and beliefs of the scientist involved, and the extent to which the actual development of science, as well as its reconstruction, is dependent on external value judgements.

(i) The theory of rationality, just like any other research program, is subject to improvement, change, and replacement by a better theory. The choice of Lakatos' hard core and those of the alternative theories is a matter that can only be explained externally.

(ii) To decide whether a research program is to be abandoned, whether it is only temporarily degenerating, or progressing enough and in the right direction, requires consensus on the part of the scientific community via its journals, research funds, etc.

(iii) The choice of problems, the choice of hard core for a research program, the choice of positive heuristic, require decisions by the scientist, which will be partially influenced by (ii).

It is primarily on the grounds that these three categories of value judgement will undermine Lakatos' "autonomy of science" that Feyerabend is critical of the MSRP.37
Although approving of Lakatos' granting of a "breathing space" to research programs despite inconsistency, lack of empirical content, etc., and despite Lakatos' accepting that a method's standards are not beyond criticism, which naturally Feyerabend feels are major improvements over previous dogmas, he argues that Lakatos' method describes standards, and not what to do or how to act on them; therefore, it not only relies on external factors to give it any teeth and to explain the growth of knowledge, but it also depends on basic, culturally-determined value judgements to determine what science is and how it changes.

Lakatos' argument rests on two major points:

(i) that science is rational, and that its rationality can be tested against historical facts, but is independent of them.

"Progress in a theory of scientific rationality is assessed by its discovery of new historical facts, and by the reconstruction of a growing bulk of value-impregnated history as rational." This is the historiographical analogue to the scientist's progress being judged by the success of his positive heuristic, as Lakatos defines it.

However, according to Feyerabend, the basic facts of history which Lakatos assesses are themselves value judgements on behalf of the scientific community. They strictly define what is to be included. (They do not, for example, rate very highly the medieval, or the non-western.) If, then, Lakatos' history and therefore his historiographic testing has been contaminated, Feyerabend wants to know what hidden assumptions Lakatos is making about the nature of science. Is he just pushing his
own "conservative" bias in the disguise of rationality, when many other alternatives exist? Is Lakatos doing such violence to real history, by reconstructing it in the light of his preconceptions about what science is, that crucial part of science, the aspects that are essential for its survival, are being overlooked? (Feyerabend will define these as illogicality, subterfuge, anarchy...)\(^{40}\)

Whether explicit or implicit, there will be basic metaphysical value judgements at the hard core of Lakatos' position, and of his historiography, and of the MSRP, which may conflict with those of other research programs, say that of a medicine man. How then will it be possible to judge their respective epistemologies?\(^{41}\)

Is it even possible to judge whether, if a science must progress according to its own internal laws only, Aristotelians were any less rational than the followers of Galileo? They too had managed to accommodate many facts without changing their basic principles, thus maintaining their own standard of stability.\(^{42}\)

The medicine man too "has a complex set of rules and compares his results and tricks with those of other medicine men. He has a rich and coherent professional ideology."\(^{43}\) Yet he is not taken seriously. How is science superior when both it and the medicine man "produce results that conform to their standards and other results that do not conform to their standards?"\(^{44}\) For what reason does the medicine man fail to fit into Western images of science and standards of scientific conduct?

As Lakatos' hard core rationalist metaphysics, and his choice of
historical data for his historiographic theory will be at variance with other epistemologies with different hard cores and totally different concepts of sources of legitimate information, Feyerabend argues that Lakatos' independent standards are both compromised and useless.

(ii) that the autonomy of science is guaranteed by the internal generation of positive heuristics.

At the level of the practicing scientist, since there is no rational way to abandon a program, since it is always capable of resurgence, given sufficient imagination in the formulation of progressing problem shifts, not only is nothing excluded, but, in order not to reduce science to mere proliferation, social judgements (on the part of the scientific community) must intervene at regular intervals to cut off unproductive programs.

What is more important is that there is, according to Feyerabend, very little consensus at the time, while a scientist is working, to help him decide what (if anything) is a positive problem shift, and what is just the amassing of useless information. 45

So basic value judgements must be used here too -- value judgements that depend on social consensus and that are rarely made for any good reason.

Even empirical growth is value-laden, because not any empirical growth will do. Hence for Feyerabend, "anything goes." That is, it is precisely this kind of contrast between the standards Lakatos proposes for the MSRP and the actual process of choice and decision in science
that leads Feyerabend to claim that such standards are not only
innaccurate to the description of science, but, in fact, would impede
its progress if applied. Pushed far enough, these standards for the
selection, abandonment, and modification of scientific research programs
yield only social and personal value-judgements, firmly embedded in a
culture and a time. For Feyerabend, the credo of "anything goes"—
methodological anarchism—is not only a more accurate statement of the
procedures of the scientific community, but the only guide-line
permitting its continued success as well.

The evidence and techniques which a scientist has at his disposal,
his laws, his experimental results, his epistemological prejudices,
his attitude towards the absurd consequences of the theories he
does accept... never fully separated from the historical background.
The material is always contaminated by principles which he does
not know, and which, if known, would be very hard to test.46

This is the case both for the scientist, and for the epistemologist,
whose own world view must contain their own prejudices about what
information to use and what operations to perform on it. Theory and
observation, internal and external histories or contexts of discovery
and justification are all categorizations that are at least only
temporary, and should under no circumstances be regarded as having any
permanent validity or rationality.

So, to find out how a change occurs, how one research program takes
over from another, the extra-scientific motives behind change must be
analyzed; they largely override all the inadequacies of a new program,
and are entirely external to it.47 This must be the case, since,
according to Feyerabend, each new research program represents a new incommensurable world view. Hence, the substitution can only be made as a result of 'political' change, which is an integral part of the growth of knowledge. As far as Feyerabend is concerned, there can be no rational reason for Galileo's success or for the failure of Aristotelianism, because,

while the pre-Copernican theory was in trouble, the Copernican theory was in even greater trouble... (being) confronted by even more drastic refuting instances and implausibilities. 48

Galileo's theories were only backed up by other theories, which were also wrong, and he defended himself against his opponents by clever rhetoric and the unscrupulous use of ad hoc hypotheses.*

But Feyerabend goes further, to attack the very basis of all theories of scientific knowledge -- that knowledge grows. He argues that the foundations of this thesis, that different theories share similar contents, that they talk about the same things, is nothing more than an illusion. The difference between Copernican and Aristotelian systems is a difference between two different forms of life. The grammar of the commonly accepted Aristotelian idiom is incommensurable with that

* Typical of Galileo's "attitude" is his use of the telescope, to try to show why the brightness of Mars and of Venus do not correspond to those predicted by Copernicus' theory. The telescope produces new phenomena, unsupported by any plausible theory, which provides contradictory information, and also some information which seems to support Copernicus, namely that Mars and Venus do look as bright as they should, through the telescope. There is particularly no explanation of why the telescope should be effective extraterrestrially. (Aristotelians believed that terrestrial phenomena were indifferent from those in space.)
of the Copernicans. Galileo changes familiar connections between words and words. He introduces new concepts, words and impressions (he introduces new natural interpretations). He uses new principles (laws of inertia, universal relativity of motion) and alters the sensory code of his observation statements.49

Furthermore, it can be seen that Galileo was right - there was no reason to stick to the Aristotelian form of life, any more than there is a reason to stick to any form of life.

We can now see why Feyerabend considers any methodological approach to be so futile -- its assumptions, its goals, its ideas, its prejudices, the whole system of thought and of perceiving the world in which they are necessarily embedded, must be alien to those they are examining. So not only are all the factors which Lakatos argues are internal to science an integral part of an external form of life, so that, within a form of life (or a major scientific or historiographic research program) everything is conventional and everything has an external element, but there is no way of comparing alternative ways of life, since one can only be held against the terms of reference of the other, and these terms of reference undermine each other. Naturally, therefore, Galileo's work is "irrational" and "unmethodical" and of course his behavior is "anarchistic"* since in order to bring a new research program into the

* It is worth noting that while Feyerabend's actual historic reconstruction of Galileo's complete lack of support for any of his theories has been criticised by P.K. Machamer, and his suggestion that Newton wrongly derived his laws from Kepler has been exposed by I.B. Cohen, his main insight nevertheless holds true: Both scientists introduced radical conceptual innovations, that were completely out of step with conventional ideas.
world, in order to establish a new form of life, in order to develop a new language to structure the world, it is critical to demonstrate, by whatever means, that there are viable alternative modes of perception. Hence Feyerabend's Dadaism, his anarchism, and his "anything goes" philosophy.

Elkana accepts completely that science is a culturally determined system. It is dependent on a scientist's beliefs about science, and about its role, as well as about what constitute acceptable basic concepts and what are suitable topics and approaches for scientific thought or types of explanation - in other words, on culturally determined images of science and of rationality that are continuously shifting and changing.

He is, therefore, fully in agreement with Feyerabend on the impossibility (as well as the unsuitability) of the Lakatosian demarcation between internal and external history. Indeed, he considers this demarcation to be a degenerating problem shift, because there is a great deal more to be explained than just the growth of objective scientific knowledge. So, while agreeing with Lakatos that, for example, whether a problem shift is progressive or not is dependent on a scientist's beliefs, personality, or authority he also thinks that it is dependent on what, according to the scientist, are the basic concepts, theorizing in terms of which is legitimate scientific thought,... or whether, according to him, it is considered rational, to explain nature on the basis of conservation laws and symmetry rules....
These rational parameters are the images of science. The example of the positive heuristic is a particularly crucial one as its independence from active influence is the key to Lakatos' concept of rationality and to the autonomy of science, thereby supporting the claim that external history only plays a secondary supplementary role. (Internal conditions are necessary ones for the development of new, positive heuristics, whereas external conditions are not.) Elkana argues that internal necessary conditions produce an unlimited set of problems, any one of which could be chosen for future research. Which ones are chosen depends on which ones are in step with current images of science.

If internal criteria can produce infinite directions for positive heuristics, and if they can then also indefinitely produce novel facts, then the real problem of the reconstruction of history becomes one of reconstructing the decision-making process and the various conflicting criteria that are brought to bear on the problem; it is not just the reconstruction of 'rational' history.

These criteria, these images of knowledge, will be part rational (dependent on the body of existing knowledge, and the prevailing epistemological theory), and part irrational (the social attitudes and beliefs, whether within the scientific community or elsewhere, that go to make up the "spirit of an age").

Elkana expands the area of conflict between competing research programs to include:
(i) objectively universally understandable developments in the body of knowledge;

(ii) rational differences as to the role of science/importance of science (i.e., alternative images of science);

(iii) non-rational influences on men of science - directly, politically, or via his institutional framework.

In order to accomplish this, and paralleling Feyerabend's anthropological approach (see below) to the scientist at work, Elkana follows Clifford Geertz, and defines science as a cultural system. Furthermore, and even more critically, he defines it "not as an experimental science in quest of law, but an interpretive one in search of meaning." Science, then, just as any other cultural system (religions, art, commonsense, etc.) is an interpretation of the immediacies of experience, "and all these cultural systems are equally valid." Indeed the behavior of cultural systems is strikingly similar to that of science. Again quoting Geertz, Elkana argues that "religion, common-sense can be questioned, disputed, affirmed, developed, formalized, taught, etc...." and can vary dramatically from one people to the next in the same way as science does. We can see once more, in the tradition of positive problem shifts in the rationalist epistemological research program, that now any independent empirical justification for science has been abandoned, and there is now no demarcation between external and internal. All of it is the province of the history of science when viewed as a cultural system. But Elkana argues that this is not complete relativism either, and introduces the concept of "two-tier thinking," which maintains realism within a given cultural framework but claims relativism between frameworks. It thereby
precludes any all-embracing theory of culture - that is, of a notion of "culture" independent of a given frame of reference. Realism and relativism may be held simultaneously, and their connection lies in the various hierarchies of images of knowledge which bridge the gap between social norms, values, and ideologies, and the body of knowledge, the "permeable membrane" between relativism and rationality.

Rejecting any theory of culture and certainly any universal theory of rationality, Elkana adopts Geertz' ethnographic analytic tool of "thick description"\textsuperscript{56} to describe all the overlaying, interacting conceptual structures that the scientist must deal with. They may come from the body of knowledge itself; they may be epistemological; they may involve various sources, and various images, of knowledge. To identify the different layers and their interaction is thick description.

Furthermore, in the transition from the conceptual frameworks of one scientist to another's, and at the core of the controversies between one research program and another, lies a different hierarchy in the sources, images, etc. of science itself. And which of the given sources in a given time, place, and culture is considered primary, (or is considered at all), is socially determined, and has very little to do with the body of knowledge itself. So, as in Galileo's case, the conflict between Aristotelianism and Copernicanism is one involving the primacy of "celestial harmony" as a metaphysical principle, over observation or calculation.\textsuperscript{57}

Here again we can notice a remarkable parallel with Feyerabend, but
contradiction in the assumptions at the core of their respective research programs. Feyerabend, too, points to the introduction of new metaphysics and new images of knowledge (to borrow from Elkana), which he however considers to be incommensurable with the previous framework, because it consists in a different, untranslatable language with which to view and structure the world. That alternative world views are incommensurable is the hard core of Feyerabend's program. That they are commensurable, and can be translated, albeit in a complex way which may never be totally explainable and which Elkana does not attempt here, is the hard core of Elkana's position. (It is especially relevant to note here that several of the papers on which the present study is based are taken from Elkana's work-in-progress, which is to be an examination of the methodology to be used in writing a history of the past four hundred years of Western science — that is, in attempting just that act of comparing and translating.)* But both Elkana and Feyerabend adopt a hermeneutic 'anthropological' approach to the actual work and deliberations of the scientist, which is "thick description" is Elkana's terminology. Elkana's aim is to understand and describe the process of development of Western science. Feyerabend's is to understand the nature of the alternative forms of life and their transitions in order to proliferate them, as we shall see later.

* In this context, see also Elkana's "The Problem of Knowledge," in which he examines the difficulties involved in 'transplanting' sophisticated Western science to Third-World countries without disturbing traditional culture.
Let us now be more specific about Elkana's version of the growth of scientific knowledge. Following Lakatos he maintains that knowledge grows through a continuous competition between world views or scientific research programs. For the purpose of analysis he identifies three factors, determined by time and culture, which interact, and cannot really be distinguished. They are, as we have seen, the body of knowledge, the images of knowledge, and the set of general social values and norms.

The body of knowledge is the set of methods, problems to be solved, scientific research programs and their hard cores which at any time go to make up the existing state of knowledge. There will be a number of competing research programs, and whether there is consensus between them and they talk about 'objective scientific knowledge' will depend on whether they share the same (socially determined) images of knowledge, and whether they assign the same importance to them.58

The images of knowledge concern the task of science (understanding, prediction...) and its sources (authority, revelation, analogy, experiment...), etc. These images suggest which problems out of the many raised by the body of knowledge will be pursued. Methodologies, for example, operate by social consensus, and are decreed to be acceptable. These images of knowledge will include, among many others, which sources of knowledge are acceptable, and which have the greatest
importance.* This can be sense experience, revelation, authority, analogy, novelty, beauty, etc...; there is also a hierarchy among images according to how widely shared they are (by a culture, a community, a discipline, a laboratory). There is a hierarchy of duration of images of knowledge and of 'hierarchies' of images; the image may be linked to other social norms or ideologies. (A prevalent anti-religious materialism would heavily influence the order among sources of legitimation: novelty would be supported over tradition, for example.)

For every group under study there are many images in a hierarchical order that is itself an important image. These images and hierarchies have no absolute justification, and change over time. They are the bridge between social norms and values and the body of knowledge, and none of them are determinable from the body of knowledge itself.

The problem shift from Lakatos is very far-reaching: where Lakatos sees an internal theory of methodologies subject to internal replacement by a more progressive one, Elkana sees an existing but shifting body of knowledge and a set of historically determined images; where Lakatos sees positive heuristics internally determining new problems, and ignoring counter-instances, Elkana sees the action of hierarchies of images of knowledge, which will also cut off degenerating research.

* An example of a type of hierarchy is neoplatonic metaphysics: illumination from a divine source was considered the most fundamental source of knowledge. Sense- or experimental data were secondary sources of knowledge, and when knowledge is available from both sources there is a complex set of rules defining relations within the hierarchy.
programs.

But, while Elkana does represent a positive problem shift in the rationalist research program (now the relativist research program) and will be able to explain many new facts, the competition is not yet over. Elkana must still overcome Feyerabend's skepticism that his theory of images and their change will truly come to grips with the problem of translation between world views, and must also explain, better than Lakatos can, what it is about Western science, among so many other possibilities, that make it so "successful," something which his hermeneutic understanding of the processes involved will probably not reveal. The normative aspects of epistemology (if only from the point of view of allocating funds to competing research programs) is still a critical one, even if the 'standards' are relativized.

Let us examine Feyerabend's view on incommensurability, and the importance of its analysis for the history and philosophy of science, and compare his views on the theory/observation dichotomy and on the context of discovery/context of justification demarcation with Elkana's.

Feyerabend argues, following Whorf's analysis of language, that certain types of theory, namely fully mature research programs, are incommensurable because they do not just describe events, facts, states of affairs, but also shape them -- they have a structure, a grammar, that contains their own cosmology, their own covert classifications of reality (and also, therefore, their own built-in resistances to alternative theories) which influence thought, behaviour, and perception. (The
transitions between major scientific research programs is indeed categorized by discovery of these covert categorizations, which although unconscious, influenced all previous argument.)

They are as different as are the different aspects of a visual illusion, where, according to Feyerabend, because different mental sets are involved in the classification of a particular diagram, "a direct comparison is impossible. We may compare the two attitudes in our memory, but not while attending to the same picture."60

Any picture, Figure 1 for example,61 which shows some perspective is an excellent illustration of this point. This one may be treated as a three dimensional drawing of a cube in perspective, or as a two dimensional pattern in a plane. And it is not possible to focus on the transition. The two different perceived images depend on two different mental states, and we can only jump from one to the other.

But Feyerabend goes further, trying to illustrate the incommensurability of the world views of two people, one who sees perspective and the other who does not. Once perspective has been seen, then the "flat" interpretation can only be interpreted as part of an illusion by the perspective-seer - but the two dimensional interpretation, as seen by the non-perspective-seer, is not an illusion.62
Using an 'instrumentalistic' interpretation of the theories, which sees in them no more than instruments for the clarification of certain facts, one gets the impression that there is some common subject matter. Using a 'realistic' interpretation that tries to understand a theory in its own terms, such a subject matter seems to disappear, ... (leaving only) a definite feeling that it must exist.63

At no time, then, is it the case that one is a development, an elaboration, of its predecessor. For Feyerabend, the overlap is as big an illusion as is the 'explanation' or 'inclusion' of an early "version" by its more successful successor.

Despite the fact that these frameworks of thought, forms of life, and the language in which they express themselves are incommensurable, there is a temptation to describe them as primitive forerunners of Western common-sense, or to categorize them in terms of peculiar methodological preconceptions of Western science.

This is equivalent to trying to introduce concepts and ways of thinking, from a language that is different from ours, by writing a dictionary, a simple translation of primitive terms into English. These ways of thought can only be learned, and this learning process must not be cluttered with preconceived laws of the "illiterate logician" (as Feyerabend calls him), because if it is the most important parts may well be overlooked. This hermeneutic, anthropologist's approach is strikingly similar to Elkana's approach.

To return to Feyerabend's anthropological analogy: Since English, for example, is incommensurable with the language of any particular people, he will not find translation possible. He will have to build up
a new language-game, made up on English words, perhaps, but used in an unusual, and, at first, perhaps even nonsensical way. He will only be able to start explanations within his new linguistic system until it has become quite complex. This new language-game will not be English, because even though any anthropological field study may be "translated" into English, this would be a distortion of the original idiom, radically altering its grammar, and thereby remain unable to reveal its true world view.64

Any distinction between a theory and an observation is clearly futile, since the conceptual context of any observation, of any 'natural interpretation,' is itself a research program, a world view that has its own metaphysical hard core, ideologies, images of knowledge, all embedded in its particular linguistic resources, and which, for Feyerabend, would render these contexts incommensurable. It is equally clear that any attempt at distinguishing the context of 'discovery' from the context of 'justification' is futile, because it can only mean describing a form of life with a "language" whose "grammar" and whose logic undermines and contradicts that which is being described (that is, the framework belonging to the putative 'discovery').65

Elkana, acting on the assumption that different conceptual contexts are commensurable and translatable, and adopting his two-tier approach, argues that for any given context, it is decided what concepts are observational, and which theoretical. So, when trying to test a hypothesis against "facts," the validity of these "facts" (along with their
inherent theory-laden-ness) is provided by the framework. It is only relative to a given, particular cultural framework that we temporarily suspend our relativizing and become realists. 66

Elkana goes on to suggest an observation/theory continuum, ranging from what is by consensus, unproblematic and explained (extreme near), to what is problematic and alien (extreme distant), within a framework. 67 It is possible for experience for concepts to become experience near, as knowledge grows.* But as Elkana points out, it must be remembered that the background knowledge, the accepted conventions and consensus of a specific community, is itself a scientific research program with all the same ingredients: hard core, auxiliary theories, scientific metaphysics, images of knowledge, and ideologies.

Clearly, then, even experience near concepts may have to be abandoned if for one reason or another they appear incorrect. Indeed the layers of thick description (the layers of images of knowledge, etc...) that make up an observational context, an experience near concept, must be unraveled as a prerequisite for change. But

the elimination of a 'natural interpretation,' and its replacement by a new one, is tantamount to the creation of a new observation language - or, by changing the context, making an experience near term for a previously experience distant one. 68

* Thus, a concept like "atom" in the 1870's was experience distant ("observational"), while a concept like "gene" today is experience near ("theoretical"). This does not imply a genuine demarcation between theoretical and observational, just that the body of accepted knowledge today contains a larger number of theories that are "plausible" and, partially, at least, supported by evidence -- and thus, experience near.
The resistance, then, on the part of Aristotelians to Galileo's new observation language is explained by a confrontation between two socially determined views about knowledge acquisition (on earth and above it).

The growth (or is it just change?) of science can be explained (or is it just described?) by this process of sets of socially determined images of knowledge superceding one another.

As far as the context of justification and discovery dichotomy is concerned, and continuing with the two tier thinking/thick description approach, Elkana argues that:

What is required is an analysis of theories which concerns itself with the epistemic factors governing the discovery, the development, and acceptance or rejection of theories. Science is done within a Weltanschauung... and the job of philosophy of science is to analyse what is characteristic of a specific Weltanschauung.69

And Elkana aims to define this Weltanschauung by uncovering the layers of thick description that go to make it up - by undertaking his own archeology of knowledge.

Clearly, as there is no external, a-cultural system of reference, there can be no external discussion of reasonableness, and hence no "justification" of historical actions, from the point of view of a different frame. All that can be said is that for a given (cultural) context there may be consensus about what is reasonable and what is relevant. So, relative to this framework, we may decide a context of justification (just as, relative to framework, we can define an
observation/theory difference). Then a consensus is possible about the ordering of theories according to their rationality. Then we can define a methodology, then there can be progress, and then we can distinguish 'good' from 'bad' theories, according to our images of knowledge.

Continuing along this line we can also argue that commensurability can also be achieved relative to a framework. If scientists, in a community, share images of knowledge, they will probably reach consensus about which theories are better than others. If they do not, if there are divergent images or hierarchies of images, then disputes will arise, and a continuous critical dialogue will emerge, as the basis of these different "articulations of images."70

But this does not answer Feyerabend's critical accusation, that, different major research programs do not share any content, since the meaning of any theoretical term depends on its theoretical context, as its value (in the Saussurian sense) within the (theoretical) world view. Feyerabend might concede that scientists sharing the same hierarchies of images of knowledge may well agree on which are the best theories (although he feels that consensus among scientists is greatly overestimated), but it is about scientists/theories that do not share images of knowledge that Feyerabend is concerned (and this criticism would apply equally to Feyerabend's analysis of observation/theory and contexts of justification/discovery). Perceiving this problem, and agreeing with Feyerabend that incommensurability... depends on covert classifications and conceptual changes... (so that) it is hardly ever possible to give an explicit definition of it,71
Elkana proposes that it is more useful to speak of degrees of incommensurability, possibilities of sharing some content between theories, and introduces the concept of vague scientific concepts as playing a critical role in the transition periods between different theoretical frameworks, as scientists try to develop from one to the other. It is clear that this new, auxiliary hypothesis represents (in Lakatos' terms) a positive problem shift; Elkana has begun to find out what results this expanded historiographic category will yield by applying it to history in his work on the discovery of energy, on the laws of the conservation of energy, although his results have by no means been uncontested.

Elkana's research program is clearly progressing, and clearly constitutes a progressing problem shift from Lakatos'. But it is equally obvious that a definite answer is far from close. It is hardly clear that his cognitive concept of vagueness is any closer to the truth than Feyerabend's model of incommensurable illusions. Nor is the relationship of an image of knowledge to a Weltanschauung well-defined (is the latter the sum of the former? does a Weltanschauung determine images of knowledge? how, then, do new ones arise...?) or that everyone's images of images are the same, or that any consensus among creative scientists at the 'frontiers of knowledge' is ever anything more than partial.

Further, it is not clear what, precisely, the relationship of images of knowledge to science - its conduct and its history - actually
is. (Surely, it is not simply the sum of images that impact on actual science or that are uncovered by anthropological reconstruction; their effect on the history of science is neither linear nor unmediated. Do they make up a form of life, common perhaps to all scientists since ... Newton?) Nor can Elkana explain what makes Western science so 'successful': if 'success' depends on the choice and maintenance of certain kinds of images, what - and "culture" is no answer - arbitrates that choice and enforces it? In fact, why and how do certain hierarchies work better. (Must we return to Lakatos at this point, given his greater willingness to develop machinery for testing one approach against another, regardless of the restrictions this procedure may suggest?) Nor can Elkana provide any guidelines for what a scientist is to do; resting with description of the process, he leaves the scientist entirely at the mercy of a whole host of "influences": professional and cultural values, competing theories and images, none of which is he likely to fully understand at the time when he is called upon to choose between them. Finally, and perhaps most significantly, how can Elkana explain a shift in images of knowledge? That they are culturally embedded, hierarchically ordered, and so on, is not sufficient to understand why these particular images should be realized in a given time, place, and culture.

Much more critically, it is difficult to see whether Elkana's hermeneutic approach will ever explain. It is admirably suited for testing further historical/historiographic theories against the actual
human experience of science, but it leaves discussion precisely at the point where we are most deeply implicated and where we are most interested. For the process of insinuating ourselves into a given culture in order to unearth its innermost assumptions then denies us the ability to step out and reformulate our findings with a view towards discovering a rationale behind not only this one culture, but its successors as well. Two tier thinking permits us to be realists within this one framework and experience its logic free of any other epistemological baggage; but it also commits us to a relativism in comparing cultures which, while justifiable in the light of so much epistemic tyranny, precludes even raising – let alone answering – questions about culture qua culture, conceptual change qua conceptual change, images of knowledge qua images, and so on.

So Feyerabend is far from through; he too has a progressing program. While Elkana assumes commensurability and defends this assumption with the concepts of two tier thinking, thick description, and references, Feyerabend defends his hard core of incommensurability with proliferation, the anthropological study of language and meaning, the concept of conflicting mental sets, and the illusion of commensurability. His aim is no less than to develop a language, a world view, for understanding incommensurability, to understand what are forms of life, in all their diversity, rather than rank them according to some absurd rule, or merely describe their transition, and this therefore is the reason for his anti-rationalism. Like Galileo faced with an Aristotelian hegemony,
Feyerabend wishes to overturn the hegemony of the whole of Western culture, rationalism, to restructure the grammar of our perception. Feyerabend's research program is not without its problems: Are scientific research programs really world views in the sense that languages are? Could it be that scientific world views, embedded in a common culture, with its own world view, might be translatable, and not entirely incommensurable? Or, if research programs are truly incommensurable, does the possibility of communication collapse? What does it mean for incommensurability or illusion, when we notice that we can hold distinct and "incommensurable" perceptions in mind, and compare them - even jump from one to the other...?

Perhaps the most interesting observation, and the most basic shift from the Lakatosian tradition, is that now, in the final analysis, both research programs rely on cognitive mind-models, or at least analogies, as auxiliary hypotheses. Just as Elkana's interactions between theorizer and environment must, at some stage, come to an end with "ideas which seem to us innate, i.e. genetically conditional, and not immediately environment-laden," and just as he must rely on a psychological concept of "conceptual vagueness" to oil the cogs of his research program, so Feyerabend must rely on his psychological models of language and illusion. This is perhaps the major consequence of the abandonment of internal versus external explanations of knowledge, and of the distinctions between Popper's Worlds 1, 2, and 3.
This section will examine accounts of language and theories of meaning.

Let us start by locating the Chomskyan position relative to the problems of empirical knowledge. We have discussed the impossibility of maintaining a theory of induction not only as a basis for discovering universal laws, but indeed as a viable basis for explaining or justifying even the most commonplace of daily behavior. On the level of language, this problem shows up as a crucial issue in the relation of "world" to "mind." How can we infer the meaning of words from individual instances of their use and how do we come to understand and use language on the basis of such limited and often distorted stimuli; or, to put it more generally still, what is the relation between an individual's experience of the real world, his linguistic account of it, and the knowledge which he acquires? It is not a matter of coincidence or of analogy that we should raise problems of epistemology in the context of problems of language and meaning, or vice versa. It should be clear that any epistemological position will have associated with it a theory of language and language acquisition just as any theory of language will have inherent in it a theory or a view of the interaction between the mind and the empirical world.

As we shall see, language theories will vary precisely according to the degree of autonomy which they assign to the role of "mind" in
language, and with the extent to which they assign contributions of
innate structures of the mind to language, its acquisition, and its
use. Just as a Popperian epistemology gives primacy to the mental
activity of inventing theories, and reduces the role of the real world
to that of providing counter-examples, so Chomsky will argue that
genetically determined characteristics and maturation processes must
be the prime mover – the mind must provide "theories," innate properties,
and organizing principles, that categorize experience and set the
limits to what can be known. On the other hand, we will expect to find,
paralleling Feyerabend's relativism, positions on meaning which will give
the greatest priority to the social determinants of language and language
use. We will use as representative examples the work of Saussure and
of Wittgenstein. It is important to note that any theory of language
and meaning must take some position on the nature and function of innate
structures, just as any theory of knowledge is deficient if it does not
give an account of the origin, nature, and scope of rationality.

As we shall see, while the scope and subject-matter of these
competing theories is often different, they are by no means necessarily
either incompatible or incommensurable, and there is no reason why it
should not be possible for what I regard as the individual truths of
these apparently contradictory positions to be regarded as complementary.

Chomsky, then, rejects any theories of language use and
acquisition that depend on chance regularities in the environment and
their reinforcement, as well as any theory that would have the mind
producing random "theories," some of which are confirmed by the
environment, thus producing the consistency which we recognize in
language. It is simply not possible that language should be acquired
in this way, and such a theory will never be able to explain the
appropriate use of language in new situations for which the organism
has never had any prior experience to condition its appropriate response.
For Chomsky there must be something outside of experience which makes
our understanding of the world possible.

However, unlike Russell who argues that:

Induction is an independent logical principle, incapable of being
inferred either from experience or from other logical principles, and ... without this principle science is impossible.73

Chomsky appeals instead to a Kantian notion of the innateness of
forms of knowledge, which take on the role formerly assigned to induction:

Intrinsic principles of mental organization permit the construction
of rich systems of knowledge and belief on the basis of
scattered evidence.

He thus aligns himself with C.S. Peirce, arguing that:

The limits of human knowledge are determined by the rules that
limit admissible hypotheses which might conceivably be fairly
restrictive.74

It is Chomsky's hope that the study of language will reveal rules
that are biologically determined, and discard those that are merely the
result of history.

The central question, for Chomsky, both epistemologically and for
the study of language, is:

How is it that human beings, whose contact with the world is so
brief and personal and limited are nevertheless able to know as much as they do.75

He shifts the focus of the discussion from definitions of the justification of rational discourse, the definitions of rationality, and their testing in the light of history, to a discussion of the biological conditions of knowledge, shifting the main burden of explanation to the structure of the mind.

Naturally, while it is these cognitive structures that allow the relations with the real world that we see, they will also limit what can be known. Indeed, it is a condition of knowing that there be restrictive conditions on what can be known. For this reason, very general theories about the cognitive capacities of all organisms or theories about all human capacities will necessarily ignore those rich and very specifically designed aspects of the organism that allow it to function as it does.

It is the biologically determined structures of the mind that determine and allow interpretation of the world, and there is no reason to suppose that any of our cognitive faculties should be any different. Evidence suggests that the same applies to the structuring of the visual world, and Chomsky would like to extend our model for the acquisition of common-sense knowledge into the biological domain also. It is critical to notice that what is in question here is, of course, not the hypothesis that the mind has an innate organization, any more than it is disturbing to notice that there is a genetic code which determines that we have limbs and organs in a particular configuration.
Every theory about our cognitive faculties and their acquisition must address the issue and in any event, will make implicit assumptions about it. What is at stake here is the investigation of the role and limits of these domains, and the degree to which we can say that innate structures dominate the limits, acquisition, and use of our cognitive capacities.

To put the issue more clearly still, any approach to behavior will have to have hypotheses about the nature of some innate mechanisms. Chomskyan linguistics emphasize the poverty of the environmental stimuli that a child is subject to when he learns language, relative to his ability to understand and reproduce sentences that he has never heard before. They propose theories of syntax that are testable, and that can, in theory, eventually lead to explanations of "deep structures" that can be formulated in physical mechanistic terms. Other schools of linguists emphasize the context-sensitivity of language, that it is a social institution as much as a set of innate cognitive structures. But even a purely behaviorist approach to language will have to propose a mechanism that will account for language use and acquisition.

Generally, it is important to recall in this context that theories of this sort must distinguish between behavior that could be genetically transmitted, and behavior that in fact has been, since some behavior/behavioral information is clearly culturally transmitted. Mankind, by virtue of its ability to record and pass on what has been learned, has the ability to modify its behavior to suit changing environments,
without the need for genetic change, or for genetic coding of particular behaviors. The linguistic faculty itself is a sufficient evolutionary advance to make possible a very large range of behaviors, and cultural dynamics, however large or small its survival value, is as significant a transmitter of behaviors as genetic coding.

It is Chomsky's strategy in this context to concentrate on the preconditions for language use rather than on its actual practice in specific situations, for two reasons. Firstly, because it is a utopian project to attempt analysis, in real situations, of all the relevant stimuli on the individual, and all of the aspects of its life history, that prompt a particular response. Secondly, this project is worthless because if our account of language is not to be a catalogue of "influences," devoid of any explanatory power, it must include a level of abstraction from the facts, a level of generality that will be necessarily involved in the nature of the given cognitive realms, their relations among each other and to experience. (We will say more of Chomsky's method of abstraction, his methodological approach later, but we should notice that it consists in nothing that is different from the process of providing theories that we have discussed above.) The endeavor should therefore consist in trying to discover "those cognitive domains for which the organism has an intrinsic [innate] cognitive theory"; in other words, one which is not dependent on some kind of inductively based acquisition. In fact:

...for any domain it is reasonable to assume that there exists
a schematism defining the class of cognitive structures that can be attained.

It is because of these innate schematisms that:

Complex, highly articulated cognitive structures can be attained with considerable uniformity among individuals as the basis of scattered and restrictive evidence.77

There is an extremely important contrast between Chomsky's attitude that in order to use language (or any other cognitive faculty) normally within a speech community we must share the same mental structures, and a conventionalist or structuralist viewpoint which would argue that participation in a (speech) community depends on the participation in the necessary social conventions.

This contrast shows up clearly the accounts of meaning provided by each of these two views. For Chomsky, meaning - of words, of sentences - must be predicated on a system of innate structures. What is important, and empirically testable, is the degree to which

Experience... plays some role in the innately-given schematism for interpretation of the world of human experience.78

A whole host of factors may play a role, from "spatio-temporal continuity" to "figure ground and other gestalt properties," but this is clearly insufficient. Chomsky therefore rejects any Wittgensteinian notion that the meaning of words is a function of either verbal or ostensive definition since both

... can [only] be interpreted properly by someone who controls a rich, highly articulated theory of language and of the world.79

It is important to note a curious parallelism between this view and
Wittgenstein's. Indeed, the well-known difficulties of explaining almost any word (Wittgenstein's continuous attempts at defining the noun "game" is an excellent example), and the understanding of any expression are, on this account, dependent on an equally "rich" system of interrelated meanings whose framework is a "theory of language and of the world" implicit in a culture's attitude (rather than in an individual's mental structure) which consists of a network of linguistic convention.

The distinction between Wittgenstein's view and that of Chomsky when Chomsky argues that

We can easily imagine how an organism endowed with the conditions on the forms and organization of language could construct a specific system of interconnections among concepts and conditions of use and reference, on the basis of scanty evidence.80

And further claims that

The semantic system of language is given largely by a power independent of conscious choice.81

is, in my opinion, a distinction depending on alternative focuses of interest - we could say, in Lakatos' terms, hard cores. It is my argument that these hard cores are not incommensurable. While the Chomskyan research program emphasizes, and establishes as a necessary basis for linguistics, the understanding of the types of mechanism (of necessity, genetically determined), innate structures that make linguistic communication possible, Wittgenstein stresses instead the social variance and accord within the system, on the nature of the shifting balance between individual's limitless potential (perhaps
determined by genetic limits) for expression and his ability to communicate through conventionally constrained means.

It is a perfectly acceptable thesis that there are "innate principles of mind that make possible the acquisition of knowledge and systems of belief," but there is a great difference between seeing these attributes as a potential of the organism to organize, understand, etc., and arguing that specific aspects of the organism's beliefs are genetically determined.

It is also clear that a legitimate aim of biology, and of linguistics on Chomsky's model, is to understand the nature of that potential and its limits. Thus in examining the actual behavior of organisms, we will expect it to be a function of genetically determined faculties and growth processes and of the organism's particular life history. It is clear that Chomsky's notion of competence in the language we speak is a function both of our genetically determined linguistic faculties and of our environment - we are competent in English, after all. But there is no reason not to extend the argument further and follow, to a certain extent, a "Wittgensteinian" or "Saussurian" view of language, a view which focuses on the socially determined aspects of language - that is, on language as performance of a particularly constrained and yet flexible kind.

Where the boundary is drawn in the view we adopt defines a line between a deterministic view of biological processes and attributes from one which is interested in biological potentials and their impact. As
Chomsky points out, the position of the boundary between the biological and the social in the acquisition of knowledge in general and of linguistic meaning in particular should not be "uninvestigatable, any more than any other biological phenomenon is." But it is equally important to note that, when we are interested in the actual behavior of an organism, or the actual use of a language, we cannot give causal priority to either the innate or the social.

Before continuing with Chomsky's description of the actual approach adopted by his analysis of language, it is worth concentrating for a moment on his own methodology and on the term "mentalism" which is used in this context.

Firstly, and perhaps most importantly, we should note that Chomsky's "mentalism," methodologically, is mentalism as opposed to superficial descriptions - that is, it is synonymous with theoretical. It is not mentalism as opposed to materialism; it is not the emphasis on mind and its structure as opposed to emphasis on the physiological mechanisms of the body. In this context, it is important that Chomskyan linguistics sat against the prevailing Bloomfieldian "taxonomic linguistics," whose aim it was to avoid any reference to mental processes of any kind, but in particular to any vague notions of mind, which were so inaccessible as to be untestable.

Katz describes the controversy between mentalists and taxonomists as one between those who argue that "linguistic theories must contain concepts which enable linguists to formulate the principle of mental operation that underlies speech" and those who maintain that "purely
linguistic theories" are concerned with "predicting and exploring the facts of linguistic performance." 83

But the appeal to linguistic acts is not an appeal to a dualist psychology, since linguistic theories are, of necessity, abstract formalizations which correspond to actual neurophysiological structures. So the linguist's task is to

provide a theory which represents the structure of [which] any physical system must possess if it is to be capable of linguistic communication... These theoretical constructs... are intended to have psychological reality... [even if they do not] for the linguist require translation into neurophysiological terms. 84

It is also important that the move from taxonomy of surface structures to "mentalism" is a move which greatly expands the explanatory power of the theories into domains which are totally foreign to taxonomy. This comes as no surprise in view of the epistemology we have been examining, as well as the cognitive position Chomsky is putting forth. As I have argued above, and will mention repeatedly below, the relationship of an attitude toward language to a concommitant view of knowledge and the mind as knower is never accidental; a commitment on one issue implies a commitment on the other.

To return to Chomsky's analysis of the biologically determined structures of language:

The system of mechanisms and principles put to work in the acquisition of knowledge of language is the particular cognitive structure we call grammar. 85

Since language is common to the whole human species, but since particular languages obviously vary, it is necessary to posit a
universal grammar that determines the system of rule for all natural languages. What is finally learned as a language will have "the properties of a universal grammar and other, accidental ones."86

The key to discovering properties of this universal grammar is the discovery of invariant aspects of language that are clearly not learned. These abound in the rules of syntax, all of which importantly are characterized by their "structural dependence" (see below), a quality which is by no means necessary for any language, or even communicatively efficient, or learned - all characteristics which lead to the conclusion that they may be qualities of universal grammar. Thus

Stimulated by appropriate and continuing experience the language faculty creates a grammar that generates an infinite class of sentences with formal and semantic properties.87

However,

This might not be the case. It is a coherent and perhaps correct proposal that linguistic faculty constructs a grammar only in conjunction with other faculties of mind.88

In particular, it would not be unreasonable to argue that the language faculty acts in conjunction with that faculty that allows the acquisition of common-sense knowledge.* This would not necessarily refute the notion of language as being predicated on a separate mental structure, but places it in specific relation to other mental faculties. This, however, is a matter to be decided by testing and investigating

* This does not imply any identity between types of common-sense knowledge which in the Geertz sense vary across cultures, but rather that certain cognitive bases are common to them - for example, the permanence of objects.
alternative empirical theories.

Chomsky's position is that

there is an autonomous system of formal grammar, determined
in principle by the language faculty and its component
universal grammar. \textsuperscript{88a}

This formal grammar generates abstract structures that are associated
with "logical forms" by further principles of grammar. Beyond this it
may be impossible to distinguish between linguistic and non-linguistic
components of knowledge and belief.

It is worth pausing again to try to determine the impact of the
approach. We noted earlier that Chomsky shifts the burden of
explanation for the acquisition of knowledge, and therefore of language,
to the mind, and to the limits it imposes on what can be known.
Epistemologically this places Chomsky very close to Peirce's theory
of adduction, in which the mind possesses natural aptitudes for the
invention of hypotheses of certain kinds. Similarly with meaning, and
in particular when we consider problems of naming which, for Chomsky,
involve both the system of language and the system of "common sense
understanding," which allow us to determine the categories named. Both
of these are predicated on cognitive structures. In a certain sense,
this approximates the notion common to Wittgenstein and Saussure that
the system of language is intimately tied to a system of common sense
understanding - of language containing, reinforcing, and shaping
conceptual categories. The crucial difference is, of course, whether
mind or social convention is taken as the vehicle of this association.
A great many assumptions are brought to bear when objects are named, and for Chomsky what is of interest in this process is its biological aspects. For Wittgenstein, these assumptions are a part of a language game; Chomsky has placed the domain of social habits in the structure of the mind. Yet for both accounts, it is not the absolute characteristics of the object itself that determines what can be named, since it is unlikely that these can be known, or that it is necessary to know them.

Chomsky also argues that although "creativity," the appropriate use of totally new sentences in totally new situations, is a crucial aspect of language, this does not mean that we cannot study language independently from actual communication—that is, from its creative context. This is clearly implicit in any abstract, theoretical approach to language, but it also entails that a discussion of language based on "speech acts," or on the intent of the speaker, or on the specific conditions of communication will be entirely inadequate. It certainly precludes the definition of meaning in terms only of the actual linguistic behavior that takes place.

Intent as a determinant of meaning is a particularly loaded notion in view of the fact that it has traditionally been accorded great importance in the history of art and architecture. It seems clear that "intent" is not sufficient to determine meaning; a speaker's intent is only one, and probably an insignificant one at that, of the components of interpretation. Further, I do not need to know a speaker's intent to understand anything that he says; in fact, I do not need to have access
to any of his inner processes and experiences. This is the case both
for a cognitivist viewpoint, in which access to language depends on
sharing the same cognitive structures, and also from a conventionalist
point of view, in which it depends on sharing the same language-game.
Neither cognitive structures nor conventional associations and usages
will sustain an appeal to intent, the former because intent will be
unable to say anything about the universal structures common to all
linguistic behaviors, and the latter because the notion of intent steps
outside the bounds of what can be commonly understood through
language.

Thus Chomsky argues against any position that attempts to explain
meaning-determining rules as a function of communication, since an
appeal to communicating (of an idea) as an explanation of meaning will
only arrive at an analysis of successful communication, not of the
conditions of meaning. Indeed, he argues that communication is only
one function of language, not an essential one. Hence any instrumental
analysis of the language game is misleading. Expressions can be used
with their strict linguistic meaning, irrespective of the intentions of
the speaker and the attitudes of the audience.

This clearly results in an attitude for which the "rules which
determine meaning are social conventions" is inadequate, since what is
primary must be the innate cognitive structure, since conditioning and
training cannot possibly account for its acquisition. There can be no
question of conscious choice of rules, or of social determination of
them. Nor can social custom explain language creativity. It is critical for the Chomskyan position to distinguish rules of acquisition from rules of use.

Just as Chomsky, in assigning priority to structures of mind and to cognitive determinants of language, significantly undermines the taxonomic conception of language as nomenclature and language use and acquisition as inductive, so too views which instead focus on a view of language as a social system also reject the taxonomic attitude and again re-define the interrelationships of thought, language, and world. The initial impact of Saussure's work was, in fact, to refute the taxonomic ideal as reflected in the strict historicism of previous linguists.

* * * * *

The notion that language is a nomenclature, a set of words each of which corresponds to a particular thing, has a long history. It depends on realism, on the view that the world is ordered into categories of objects independently of any intervention by man. Each category is necessarily, therefore, identified by a name, which just stands for its correlate in the real world. Thus, in the Aristotelian formulation,

states of mind are the same for everyone, as are things, and these states are the reflections of things which are the same for everyone.91

So language reflects our perception of reality, which is in turn a reflection of the organization of reality. Language does not intervene in our understanding of the world, or in our organization of it; it is transparent. If the world is the same for everyone, and if we can
communicate with one another, the meaning of words must be identical for everyone (and correspond directly to the world). Thus communication is guaranteed through a necessary identity of thought, meaning, and reference.

The difficulty of maintaining this transparent correspondence should be clear given the difficulty we have in determining true theories about the world, and this is only emphasized by cultural differences. The lack of coincidence, for example, between the vocabularies of different languages, and the difficulty of translating from one to another, immediately puts the thesis in doubt, beginning to make clear that the relations between words and things is problematic. There is clearly a direct parallel between the failure to sustain the direct connection between the real world and linguistic categories and the failure to maintain simple inductive rules for the relation between experience and knowledge.

In fact, it is very important to recall here that it is precisely this view of the correspondence between world/language/mind/knowledge described above that constituted the traditional philosophical underpinnings of induction; and induction was only then perceived as problematic at the historical point when this model began to crumble. Further, just as at the collapse of inductivism two distinct methods of handling knowledge emerged, so too with the breakdown of the strict correspondence between words and things the stage is set for two distinct approaches to language. Parallelizing epistemological attitudes, these are the search
for an internal, cognitively-based logic of language, on the one hand, and an external, culturally-based account of linguistic relativism on the other. In either case, language, whether determined by mind or based on convention, interposes itself between facts and ideas, between the world and our knowledge of it.

We have examined some of the implications of the former approach in our discussion of the work of Noam Chomsky; we now turn to the work of Saussure to examine the other.

Saussure's starting point may be understood as the awareness of the individuality of every linguistic utterance, and in particular, of the complexity of the interactions between speech and context and between language and society that contribute to the understanding of these unique speech-acts between separate individuals. He is extremely aware of the many aspects from which one can approach language. So what is language?

C'est à la fois un produit social de la faculté du langage et un ensemble de conventions nécessaires, adoptées par le corps social pour permettre l'exercice de cette faculté chez les individus. Pris dans son tout, le langage est multiforme et hétéroclite; à cheval sur plusieurs domaines, à la fois physique, physiologique et psychique, il appartient encore au domaine individuel et au domaine social; il ne se laisse classer dans aucune catégorie des faits humains, parce qu'on ne sait comment degager son unité.92

Thus language is the product both of the human faculty that allows speech and of social conventions adopted to permit the exercise of this faculty. It is important to notice that Saussure rejects the primacy of the biological (which he does acknowledge) by arguing that language is
essentially a convention. This is perhaps because there seems to be no indication in Saussure that the structure of the mind could play any predetermined biological role. When Saussure speaks of the biological, he tends to speak primarily of the vocal auditory system. When he speaks of mind, he tends to limit himself to individual psychological phenomena, whose character is personal and specific to a particular context related to the production of an idea, rather than to a set of generalizable characteristics.  

Saussure rejects any view of language as nomenclature. He replaces it with a conception of language as a system of signs. These signs are not the mere assigning of a name to a thing, but the association of a concept with a sound. These two elements—concept and acoustic image—are what are termed the "signified" and the "signifier," and together form a sign. It is clear, for Saussure, that the system of concepts is a continuum with no pre-determined organization with which the system of sound (also a continuum) is to correspond. Sounds and meaning form two continuous series which it is always possible to sub-divide further. Speakers, users of a particular language, are able to identify groupings in these series, and the totality of these groupings is langue. The most important characteristic of these signs is that any signifier may be associated arbitrarily with any signified. This crucial characteristic largely determines the nature of Saussure's system; the rationale for this association is arbitrary. Saussure in speculating upon the future role that semiology might have in understanding sign-
systems in general extends the concept of arbitrariness to all such systems.

...tout moyen d'expression recu dans une société repose en principe sur une habitude collective ou, ce qui revient au même, sur la convention. 96

The use of any social sign, whether or not it has any intrinsic expressive value, will depend on a system of social conventions that determine its use in particular situations.

The arbitrariness of these signs should not distract our attention from the fact that language is not chosen by a linguistic community. That is, while the relationship between the signifier and the signified is arbitrary in the sense that it lacks an external justification beyond convention, it is not thereby a matter of individual choice.

Indeed, it is the arbitrary nature of signs which tends to explain the fact that language is not consciously changed, the way other social institutions may be: the very arbitrariness of the sign tends to make change in it rather pointless. Furthermore, language belongs to everybody; it is constantly in use; we are, and must be, too involved with it to detach ourselves from it long enough to bend it.

C'est parce que le signe est arbitraire qu'il ne connait d'autre loi que celle de la tradition, et c'est parce qu'il se fonde sur la tradition qu'il peut être arbitraire. 97

Although the arbitrariness of the signifier/signified relationship tends to protect it from active societal manipulation, it is this very arbitrariness which makes possible the displacement of the one relative to the other through time, while allowing the system of language to
remain intelligible. Arbitrariness protects language from manipulation yet assures change. Indeed, Saussure observes that no language is immune from change over time. Thus, while society is largely powerless to change its linguistic skin, it is also powerless to stop its changing.

This fact of the continuing shift of relations between signifier and signified re-emphasizes the rejection of language-as-nomenclature, and indeed, makes necessary a radical alternative: There can be no "real categories" to which linguistic terms can correspond. Language's organization is independent of the world's organization; indeed, language, as an historically determined set of conventions, imposes its own categorization on the world we perceive.98

This raises another crucial characteristic of the Saussurian system. If linguistic terms do not derive their meaning from categories in the real world, how do they mean? A sign only has a meaning when it is understood relative to the other elements in a linguistic system. Let us illustrate this point by referring to Saussure's analogy to a chess game to which we will return frequently. The elements in a chess game - castle, pawn, etc. - derive their meaning from their relations to one another. They have a certain value relative to the set of pieces (a value which may change in shifting configurations). Furthermore, the actual physical realization of the pieces demonstrates the arbitrariness of the sign's relation to their sensory manifestations (signifier) - the actual piece may take on any number of shapes and may be made in any
material and still retain the same significance. Units of the chess game have no material entity, since they have no necessary physical properties. Saussure makes a critical distinction between the language-unit and its actual physical manifestation (that is, between the sign and its signifier). Furthermore, as we have seen, the arbitrary nature of sign, relying for its definition solely on its relation to other signifiers and signifieds, is purely relational and abstract as well; signs do not stand for anything in particular, they too are distinguished from their particular manifestation.

La langue, est un tout en soi... et un principe de classification.

Can we be more specific about the role of these linguistic signs? Clearly, the same word, spoken by different people, will not sound identical, nor will the same word, used in different situations, necessarily mean the same thing. Thus, the reason for which we can speak of the 8:45 express from Geneva, notes Saussure, whether it is made up of entirely different locomotives and carriages every time, whether over the years it becomes much faster, or even whether it is late, is that the entity we are referring to is not a purely material one. It derives its identity from its position in a system - in this case, the system of train routes and times, i.e., the timetable. Again, we return to the problem of value.

Language, for Saussure, is only a system of values. It is an "algebra" of variables in which different instantiations yield different mathematical significances - different values.
Sans le secours des signes, nous serions incapables de distinguer deux idées d'une façon claire et constante. 

Thought, just like sound, is an undifferentiated continuum, until thought and sound, combined arbitrarily, coalesce to form a sign.

Le rôle caractéristique de la langue vis-à-vis de la pensée n'est pas de créer un moyen phonique matériel pour l'expression des idées, mais de servir d'intermédiaire entre la pensée et le son, dans des conditions telles que leur union aboutit nécessairement à des délimitations réciproques d'unités. La pensée, chaotique de sa nature, est forcée de se préciser en se décomposant.

The units of language occur at the boundaries between these continuums. Language, seen in this way, is form, not substance. It is a system of relations. The system produced by these associations is not determined by the sums of random pairs, but by the values these unstable entities have relative to one another. The value of arbitrary signs must necessarily depend on their places within a system. There are two types of opposition which are the sources of a sign's value: relations and equivalences. Thus, in a chain of elements, syntagmatic relations will determine the value of units through their relations to one another, while, independently of the sentence, words having something in common are associated with words that can take their place. Take, for example, the relations between a column and an architrave. This juxtaposition of
two elements present in space is analogous to syntagmatic relations, while there are paradigmatic relations (equivalences) between several types of columns. Thus, in language, a term's value in a sequence, depends upon its relations with the terms that precede and follow it and upon the relations between it and the other terms that might replace it. These syntagmatic and paradigmatic relations can be seen at all levels of linguistic analysis, whether the phonemic, the morphological, or the syntactic.

La langue est pour ainsi dire un algebre qui n'aurait que des termes complexes. Parmi les oppositions qu'elle comprend, il y en a qui sont plus significatives que d'autres; mais unite et fait de grammaire ne sont que des noms differentes pour designer des aspects divers du meme fait general: le jeu des oppositions linguistiques.105

We find everywhere

cette meme equilibre complexe de termes qui se conditionnent reciproquement.106

Another critical distinction and one which sets Saussure apart from his nineteenth century predecessors is his distinction between synchronic and diachronic linguistics, which is also a consequence of the arbitrariness of signs and their organization into a system. As we have seen, the composition of linguistic signs, because it does not correspond to a natural logic, is an important condition for allowing continuous and random change. Indeed, at any particular time, the actual forms of language are completely contingent on historical
processes.* This contingency, however, does not affect the fact that language is a system which, at any time, is determined by the arrangement of its terms. The use of language depends upon the understanding of these conventional and transient oppositions. Let us return to the chess analogy. The state of the game can be considered equivalent to a linguistic state at any given point. The value of the pieces depends upon their opposition to all the other pieces in a particular situation; furthermore, these relations will change from move to move. However, in order to be able to understand any particular position, it is not necessary to know by which one of the many possible routes it was arrived at.\textsuperscript{107} So too with the relationship of the synchronic condition of language to its diachronic "causes."

What is important for research is that the synchronic and the diachronic should be separated because they concern facts and laws of a completely different type. Synchronic laws, though general, are essentially descriptions of a particular state; nothing guarantees that they will persist. Diachronic laws do not reflect any one condition of language; rather, they put forward the rationale that informs change

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* Saussure is therefore very aware of the radically historical (and social) nature of language. In the absence of any natural logic, social consensus is the only valid criterion for the adequacy of any sign, since their differentiation and organization as a system has no external and natural requirements to correspond to. Societal use of language is its only norm. The facts that a linguist describes have been produced by a whole range of heterogenous and unpredictable causes, both external and historical as well as internal and dependent on its own potential for change.
from one linguistic state to another, and in this (limited) sense, are necessary and permanent, since change itself is an inherent part of the arbitrary system.

Saussure argues against any synthesis of synchronic and diachronic, again because of the arbitrary nature of linguistic signs.

Tant que par un des cotes un valeur a sa racine dans les choses et leurs rapports naturels (comme c'est le cas dans la science économique - par exemple un fond de terre vaut en proportion de ce qu'il rapporte), on peut jusqu'à un certain point suivre cette valeur dans le temps, tout en se souvenant qu'à chaque moment elle depend d'un systeme de valeurs contemporaine.108

The land itself, after all, has a natural basis for its value and its variability is therefore much less limited.

A particular, synchronic condition of language is always brought about by historical change; as a system of values, language is open to continuous and arbitrary evolution. However, only the fact of linguistic mutability is predetermined, and never the particular form that these mutations take. Diachronic change is necessary, but only in the sense that it must take place, not in the sense that it bears a functional relationship to its synchronic consequences and predecessors.

In rejecting the primacy of biology in language, Saussure argues that there is no reason to assume that our vocal apparatus should be made for language in the way in which our legs are designed for walking. On the other hand, he argues against Whitney, seeing language not as a totally arbitrary social product, an institution like any other, which only chose the vocal apparatus by accident.109 He sees the conventional/
social aspects of language as being prior to the physical.\textsuperscript{110}

If there is to be any overriding faculty it is not the articulatory one, but the ability of "constituer une langue, c'est a dire un systeme de signes distincts correspondants a des idees distinctes."\textsuperscript{111} This faculty precedes the formation of any signs, and is a condition for any language — indeed, for Saussure, of any sign system. This supports his thesis that the manifestations of any particular sign system must be basically social, since the biological faculties only define a general potential to construct sign systems. However, this is a potential which Saussure does not investigate at all, and there seems to be very little acknowledgement that it might play even a limiting role in sign systems, or in the behavior of language in particular.\textsuperscript{112}

We can appreciate this if we examine Saussure's description of the process of speech production and understanding. A concept produces an acoustic image; this is a purely psychological phenomenon, followed by a purely physiological process of transmitting an "appropriate impulse" to the speech organs which produce sound. Part of this process is "active" (that part of the circuit from the "centre d'association" of one speaker to the ear of another) and part is "passive" (the reverse hearing process). However, the process is not purely the uninterrupted flow of concepts between passive minds, since:

Il faut ajouter une faculte d'association et de coordination qui se manifeste des qu'il ne s'agit plus de signes isolés. C'est cette faculte qui joue le plus grand role dans l'organisation de la langue en tant que systeme.\textsuperscript{113}
The hearer however reverses the circuit. Saussure uses this simple schema primarily to distinguish the psychological (verbal image and concept) from the physical (speech and hearing).

But how are these systematic qualities achieved? How is it that there is a language, and that there are any conventionally understood signs? For Saussure, this can only be explained socially, since it cannot be a function of either the psychic part of the circuit (which is individual) or the physical part, which is unique to each instance, and, on its own, clearly does not define language.

C'est par le fonctionement des facultés réceptives et coordinatives que se forment, chez les sujets parlants des empreintes qui arrivent à être sensiblement les mêmes pour tous.114

Langue115 is the sum of all verbal images shared in all individuals. It is complete in no one individual's mind. The relationship of langue to parole116 separates the social from the individual. Langue is not determined by the speaker; he experiences its imposition passively. It is parole that is individual, active and intelligent.

Langue is the socially determined aspect of the language faculty, external to the individual, that he cannot change. Furthermore, the individual must go through a learning process in order to understand its workings. A parallel can be drawn here with Wittgenstein's brand of conventionalism, in which, too, the meaning-carrying part of language is not the individual's own repertoire, but its socially held and culturally arbitrated portion. In sharp contrast to this, Chomsky maintains the "verbal images" we use to link to meaning are located equally in mental
structures held by each competent language-user.

It should be clear that the fact that language, for Saussure, is indeed a sign system, despite the possibilities for confusion that might exist given the potential undifferentiation of thought and sound, depends on language being an entity which exists before the individual, an entity determined by historical and social usage, almost the result of an evolutionary process. (Indeed, it is a real material object—the associations, collectively sanctioned, that make up language are a reality in the mind).

Saussure posits a further distinction: between the faculty of language and language itself, the social institution. Language, as an institution, is comparable with other social institutions, but very different from them. It should be possible, argues Saussure, to develop a science for the study of sign systems in their social context, semiology, of which linguistics would form a part. Semiology, and therefore presumably language, would be a part of psychology, and the linguist's task should be to determine what makes "la langue un systeme special dans l'ensemble des faits semiologiques." But the scientific status of language depends ultimately on its position within a general science of signs. "Le probleme linguistique est avant tout semiologique." The true nature of language will be revealed only when we see it as a social sign system among others, whose individual characteristics, while of primary importance for the researcher, are again subsidiary to its semiological characteristics. Thus for Saussure
...non seulement on éclairera le problème linguistique, mais nous pensons qu'en considérant les rites, les coutumes, etc... comme des signes ses faits apparaîtront sous un autre jour, et on sentira le besoin de les regrouper dans la semiologie et de les expliquer par les lois de cette science.\textsuperscript{118a}

The Saussurian position is often accused of being concerned exclusively with surface structure, to the exclusion of deep structure, and is also, by the same token, accused of being anti-theoretical. Despite the undeniable progress that has been made since Saussure, and notwithstanding some of the definitive criticisms that have been made of it, particularly by the Chomskyan school, it would seem that this accusation is unjustified. It is worth noting that Saussure thought of his work primarily as a necessary redefinition of linguistics, theoretical classifications, and an inevitable preamble to scientific progress in the field. There seems to be little doubt that in this he was highly successful and that his contribution has been seminal in this regard.

The tripartite distinction he sets up between linguistic faculty, langue as a social manifestation, and parole, has been of lasting importance, and it is worth focusing on its differences from the Chomskyan model of competence and performance. Competence also is an intersection of a particular cognitive faculty with environmental conditions. But competence is much closer to the definition of linguistic faculty. While Chomsky's cognitive faculty requires a minimum of environmental stimuli to enable it to develop a competence in, say, English, Chomsky's metaphysical and theoretical thrust is towards
the characteristics of mind, of its cognitive faculties that allow language. Those social aspects which for Saussure are of such basic importance, which for Saussure, as well as for Wittgenstein, are so necessary for communication, are demoted from competence/\textit{langue} to performance/\textit{parole}/pragmatics. This is the result not only of a localized, methodologically inspired shift in focus, but also of a major, overall shift in theoretical orientation. For Saussure the emphasis is on social practices and conventions and for Chomsky, on inborn structures of mind.

As we have pointed out, the weakness of the Saussurian approach is very well exemplified by its reliance solely on the transmission of the conventions of language, in the same way that other social institutions are. The major theoretical advance of transformational grammar is the demonstration that this reliance on learning is quite inadequate to explain many critical aspects of language, and by extension, of knowledge; namely, that both are established on the basis of impoverished environmental stimuli, and that both achieve remarkable consistency. Language cannot simply be learned. Furthermore, critical aspects of Saussure's theory of "value" in the system of \textit{langue}, for Chomsky are a part of a universal grammar (which parallels Saussure's "linguistic faculty") and form a critical new dividing line between competence/performance. In particular, syntagmatic relations, those aspects of value that account for a sign's relations to other signs, are challenged by a radically different, and novel, conception of syntax, which also
radically alters the difficult relations of sentences to Saussure's schema.

Saussure is critical of the idea that the only units of language are sentences, from which one extracts words, and within which they acquire their meaning, since for him sentences cannot be part of langue since their individuality, appropriateness to context, etc., is their prime characteristic, placing them in the realm of parole.

Entre les phrases c'est la diversité qui domine, et des qu'on cherche ce qui les relie toutes à travers cette diversité on retrouve... le mot avec ses caractères grammaticaux. 119

For Chomsky, "ce qui les relie" is syntax, and the laws of universal grammar, biologically given by the mind, as we have seen. Indeed, it is these deep aspects of language which characterize its individualness (and furthermore tend to turn Chomsky away from any notion of a semiological umbrella to provide an overall theoretical frame for all kinds of communication). In particular, the notion of "structure dependence" undermines the notion of syntagmatic relations as a basis for value, since they are no longer part of a socially determined value system. Indeed, it undermines the whole notion of "langue" in Saussure's sense, by splitting it into two: a biological aspect, which is a function of the language facility (language) and an individual function, which is a component of performance.

This restricting of the field into innate/environmental has had an undeniable effect in terms of its increased explanatory power, and the production of new theories. But are we justified, even if we regard the
Saussurian theoretical position as superseded, in rejecting it totally, and in particular in rejecting it on the grounds of its inability to deal with anything other than "surface" phenomena? Is there not a great deal of value in the Saussurian insight that there is a (major) aspect of language that does act like an institution, namely the uses, associations, assumptions that seem largely to determine the pragmatics and much of semantics, particularly where it deals with meanings of words?

It seems to me that Saussure's unitary vision of language still holds many lessons for us, in that it comes very close to the understanding of language as a combination of both the innate and the environmental, without assigning causal priority to either, and in that it further emphasizes the systematic aspects of the socially acquired components of language, which in this sense may be regarded as a social artifact.

* * * * *

As we have seen, there are several important contrasts between the attitudes of structuralists and those of cognitivists toward what language is, and, therefore, toward what language should study - differences which are, ultimately, symptomatic of differing ideological orientations. For a structuralist, language is primarily a social institution, a framework in its essential aspects, external to the individual, which depends upon social relationships between individuals, and which is a condition for them. It is a "treasure of the mind,"
but is beyond the control of a single mind. This is langue: on this
definition, essentially a socially agreed upon network of relations.
More importantly, its basic units do not seem to include syntax or
sentences, or indeed, creativity (in the Chomskyan sense) at all.
These, for Saussure and for others, while being recognized as of huge
importance, are placed in the realm of parole. There is no doubt that
language's creativity, our ability to use it in new ways and in
unfamiliar and unforeseen circumstances, is difficult to explain, and
that the Saussurian notion of "analogy" as the mechanism for the
innovation and specificity of individual parole, remains unsatisfactory.
We can certainly argue that it is a "positive" problem shift for
generative grammar to have incorporated syntax into the domain of the
explanation of langue, and to have, at the same time, pursued the
Saussurian insight that language is primarily a psychological entity.

It is also important to recognize the axiomatic nature of the
 generative grammarian's definition of language, a definition which makes
 possible creativity by incorporating recursive rules into its deep
 structure. Sentences are generated in a way in which different values
 may be generated in an algebraic equation. As such, transformationalists
too are interested in structure, but structure of a creative sort, in
this limited sense, rather than the rather static, given entity of
Saussure's conception.

We should distinguish, however, when discussing "creativity" in
Chomskyan terms, between creativity in the sense of a formal recursive
mechanism as against appropriateness of context, which cannot be explained by any internal mechanism of this sort. This language-use creativity is in the realm of a theory of performance. The capacity for the former sort of creativity, essentially syntactic, is, however, a precondition for the latter sort of creativity. The syntactic faculty must be able to reproduce an infinite number of sentences to correspond to the infinite number of ideas that man can produce.

Notice again that the existence of a creative faculty to allow for the production of ideas does not in itself imply a Cartesian dualism. It is quite possible that thought may merely be a property of a mechanism with a level of complexity and organization equivalent to that which we characterize as "mind." Perhaps this is closer to the Chomskyan idea of "expressing ideas."

We can contrast this with Wittgenstein's view, which consistently focuses on the social aspects of language use rather than considering philosophical constructs such as "ideas," "inner processes," or "intentions." He is unwilling to go beyond the language-fact to any mental process, indeed he finds such a leap both unnecessary, since we can retrieve an adequate account of thinking, feeling, etc., purely through our knowledge of the conventional use of these terms, and also impossible - conceptually, we are too clearly trapped within our linguistic skins. Language as a social institution reflects a form of life, rather than any properties of mind, and language use grows out of intersubjective behavior, rather than individual thought.
In discussing linguistic competence Chomsky focuses on the particular competence necessary for the use of language which is particular to language alone, rather than on other "competences" which the individual also acquires and which are no less essential to the use of language. It seems clear that using language as one normally does, within the range of situations which one normally confronts, requires more than a mastery of syntax and semantics. There seems to be no reason therefore to reject the Wittgensteinian notion that to understand a language, one must be able to participate in a whole "form of life," and therefore, to be aware of, to have acquired and mastered, a great many social values, customs, and conventions. (This in itself does certainly not falsify Chomsky's approach; the fact that a language-competence interacts with other competences does not preclude focusing on that aspect of those competences which is most accessible and which is liable to prove the most productive, and in particular, which is liable to lead the most directly to an understanding of mental processes.) Naturally, how linguistic competence interacts with others is an important problem, and in particular, it would seem that it is only through these other competences that we will be able to explain the production of appropriate sentences in particular contexts. This, too, is Wittgenstein's point.

This observation, however, may lead us to ask how significant the boundaries set up between competence and performance are; and, indeed, to what extent the distinction between syntax, semantics, and pragmatics
can be sustained. It will also emphasize the fact that much of what is classified as performance when it is strictly opposed to linguistic competences consists itself of competences as well. To be more specific, it seems clear that the influence of a specific linguistic context cannot be ignored. Not only can it condition our understanding, but it would seem to require a competence that cannot be reduced to the competence that produces individual grammatical sentences. The concept of text is clearly

a semantic concept and, even more exactly, a pragmatic concept. 121

However,

there is no reason to believe that the study of this function does not belong to linguistics proper, especially if one considers that it has direct influence on sentence structure itself. 122

It seems clear that a competence for logical relations between sentences is an important linguistic competence which should, perhaps, not be relegated to performance.

The emphasis placed in the actual research of different linguists on the internal or the contextual is a function primarily of their metaphysical orientations, and there seems to be no reason at all why they should not be largely compatible. While Chomsky's argument for innate structures can remain uncontested, and while credit must be given to his and others' attempts to propose theories that are as restrictive as possible, and that have the greatest explanatory power, it is clear that the emphasis on the innate is also the result of an important
decision with historical and heuristic bases.

Nor is there any a priori argument for assigning priority to the syntactic or semantic over the pragmatic. Assigning a priority to competence over performance, emphasizing the innate over the social, may also entail giving language a peculiar burden relative to thought: that of being the vehicle for its expression. This tends to have two related failings: First, language tends to be seen as a value-free code, ignoring the fact that the means of expression is not independent of the thought, that linguistic structure is not transparent. In addition, emphasis on thought and its expression tends to locate the most important aspects of language within the individual, neglecting the actual facts of communication. Furthermore, it raises the spectre of private languages, tending to neglect the fact that language's communicative functions do not depend on having access to people's inner processes, and hence language's function cannot primarily be the expression of such processes. (That is, as Wittgenstein points out in this context, a statement purporting to express an inner process will make sense to us - qualify as "language" altogether - only to the extent to which it appeals to, and participates in, a commonly-held language-game.)

It could be said that the conception according to which the essence of language consists of the expression of ideas, understood in the sense of representations of the mind, has this time a clearly Cartesian resonance, in the bad sense of the term.
There is at the present time no 'unified' theory of meaning in language: no theory that is capable of taking on the analysis of all linguistic phenomena related to meaning whether syntactic, semantic, or pragmatic - in other words, a theory of performance. Nor is there any prospect of there being one. From a structuralist viewpoint, no advance has been made toward a general theory of signs that could meet these requirements.

In the absence of any unified empirical theory, it is my argument that theories of meaning, in parallel with epistemological attitudes, whether implicitly or explicitly held by practising architects as well as by architectural theoreticians and historians, primarily reflect their authors' ideological biases. It is my intention to demonstrate, using the specific example of P. Eisenman, just what epistemological and semantic consequences result from these metaphysical assumptions. These attitudes will determine what position is taken concerning "the profession," its independence, its own internal problems and issues, and, most importantly, concerning the relations between "pure design" and the social, cultural, and political context for design.

A very wide range of epistemological theories can be adopted, reflecting an orientation on the status of knowledge, its acquisition and its growth, and in particular they will reflect attitudes on the nature of "architectural knowledge." Is it to be considered an
independent set of rules with its own dynamics and procedures? Should we speak of architecture as a set of timeless objects to be interpreted according to predetermined logics of their own, or as a fundamentally social phenomenon whose understanding (and whose production) must depend on the context within which it is created, and on the complex levels of legitimacy and association that characterize any socially determined "game"? Can one speak of any historical continuity or genealogy between styles or is this an illusion that papers over totally different attitudes and situations with an irrelavent chronology? Each of the epistemological models we have analyzed could form the basis for both historical and normative models in architecture. Thus we will distinguish historians of pure "form" in architecture, those that go beyond the descriptive and the chronological, between those who see continuity or even progress from period to period, and those who will try to determine the incommensurable characteristics of, say, the Gothic and the Baroque. Those historians who acknowledge a historical context should also diverge according to how they relate the internal, "architectural" to the external, social, and according to the gradations they allow between those two polarities.

Paralleling these epistemological viewpoints, we will expect to find, implicit or explicit, theories of meaning, positioned within the continuum of theories devoted to language, which will entail different interpretations of a building and how it is said to "mean." At one end of the scale, architects will be interested solely in form and its
structure (and with the history of formal changes). At the other end of the scale architecture will be considered as a cultural artifact among many others, deriving its intelligibility from its position in a cultural kaleidoscope of connections and associations.

Every architectural position, then, practical or theoretical, will entail a position at each of these two levels — epistemology and meaning. We will explore a particular architectural theory which makes explicit use of language analogy as a key to understanding "meaning in architecture," and show how this particular metaphysical orientation determines the epistemological/semantic stance.

Peter Eisenman's theories of form and of the understanding of form, of the inherent possibilities of physical arrangements to transmit meaning, are of particular interest since they reflect in an extreme, but consistent fashion, many of the traditional positions in architectural criticism, and pursue them to an absurd and unworkable conclusion. In particular, his very selective interpretation of the Chomskyan model of linguistic syntax, and its transposition into a theory of syntax and semantics in architecture, will reveal his underlying ideological orientation, which, I submit, is a fundamentally idealist one. To be consistent with his metaphysics, his theory of meaning is necessarily incapable of meeting the requirements for an intelligible or productive theory of this type, and is certainly not compatible with Chomsky's. Despite Eisenman's protestations to the contrary, and despite his heralding of the new, post-functionalist
era in architectural thought and practice, his theoretical, and therefore professional shortcomings rest on his inability to overcome the inherent dualism that lies at the core of his philosophy. However, the critical stance taken concerning Eisenman's theories should not obscure the fact that he is a suggestive example of the necessity for architectural theory to be located in an epistemological- and meaning-space.

The theoretical orientation which has left the strongest mark on the mainstream of modern architecture is the doctrine that "form follows function." Form, the final physical artifact, was to be the reification of the function of the building, as defined by a well-defined list of requirements, a program. Architecture derived its legitimacy, its social relevance, from the objective and rational realization of the building's requirements in three dimensions. This objectivity was to minimize the architect's idiosyncratic contribution, making him a catalyst only, a convenient vehicle for this process. The new architecture was to be value-free and rational, devoid of the stylistic pastiche and eclecticism that characterized much of its nineteenth century precursors.

It has been noted by many commentators that the modern movement was not value-free in its design orientation. (It had a definite and demonstrable interest in the aesthetics of buildings, both for their own sake, and as a manifestation of the new technologies.); nor was the program value-free, since it was definitely the result of very powerful
ideals on the nature of the new society that architecture could help bring about, a goal which the modern movement has been conspicuously unsuccessful in realizing. Indeed, it would not be unfair to say that the maxim "form follows function" defined very little, since it is very unclear what was meant by "form," "follows," or "function."

As we have seen, the collapse of the inductivist orientation, whether in epistemology or in language, has had very wide-ranging repercussions, and could have resulted, with architects, in a vast array of possible responses. Eisenman, characteristically, focuses his attention on the internal, on the inherent logic of form. Noting, correctly, that no statement of objectives will necessarily result in a specific form, and noticing also that a program is necessarily a statement of social values, Eisenman rejects functionalism as naive. He also rejects the aesthetic agnostic, who acknowledging the satisfaction of program as a goal, and seeing no necessary connection between it and the final form, rejects any aesthetic consideration as totally superfluous, since the program does not entail the aesthetic result.

Eisenman argues instead that:

The making of form can be seen as an understanding of the logic inherent in any formal relationship, which can be described in any physical construct.125

This position goes beyond functionalism or aesthetics since:

The making of form can be seen as a problem of logical consistency, and the meaning which accrues to form may, in some way, be derived from the logical interaction of formal concepts.126
Furthermore:

Form seen as a problem of logical consistency can mediate and distinguish between problems of fact and problems of value: that is, between that which is actual and that which is implied.127

Eisenman begins his argument with Morris' distinction between syntax, semantics, and pragmatics, to which he assigns specific architectural interpretations: Pragmatics is the concern with the relationships of form to function, the use of technological means for the solution of a program. Semantics is the relation of form to meaning, which has traditionally come under the heading of iconography, the study of symbolism, and the interaction of physical objects with the cultural environment. Syntax, in architecture, corresponds to an analysis of the potential of form itself to communicate:

the mediation of form and function through a structure of formal relationships.128

In parallel with this taxonomy, Eisenman introduces the distinction between the conceptual and the perceptual. His aim is to go beyond "visual phenomena and their associated meanings" to more fundamental "conceptual" understanding of form and object.129 He notices both in modern art, and, to some extent in modern architecture, a shift from a primarily sensual approach to artifacts to a view that attempts to reduce the meaning derived from an aesthetic experience or representational image, and concentrates instead on transmitting meaning through the inherent qualities of the object alone. However, this "destruction" of as much as possible of the sensual has led conceptual art to overlook
the fact that physical form can also be used for conceptual ends - that is, "the universal aspects of physical form"\(^{129}\) have been neglected.

Central also to the conceptual-art position is the notion of aesthetic intention. The only thing that distinguishes an art object is that the idea of the object embodies an aesthetic intention, an intention which does not necessarily require any physical realization.\(^{130}\)

This position in itself, though perhaps intriguing if one is interested in the definition of art objects, does not exclude anything, since it is perfectly possible to have an idea about anything. In this trivial sense, then, the "intention to paint a picture or to design a building could be considered conceptual." In order to bypass this dead-end, Eisenman, noting the "the intention to paint a Madonna and child does not make the idea of the painting, as opposed to the idea of painting the painting, conceptual," distinguishes the intention to produce an art object from "idea within the thing itself, i.e., its conceptual structure." This conceptual structure is then defined as "that aspect of visible form which is intentionally put in the form to provide access to the inner form, or universal formal relationships." Furthermore, "these formal relationships are present in every form [but] may not be accessible... since they are undesigned."\(^{131}\)

It is no coincidence that Eisenman adopts such a fragmented interpretation of the terminology of linguistics. In particular, such a restrictive definition of pragmatics, one that restricts it to a
synonym for "practical," so that it can be dismissed (with inductivism and functionalism) as superfluous, does violence to linguistic theory. A concern with pragmatics is rather, in the study of language, a concern which makes explicit reference to language use, and to the influence of the conditions of use on meaning. To remove the issue of "use," Eisenman has simply reduced the notion of pragmatics. Similarly, Eisenman's definition of semantics is also revealing in view of the distortion of Chomskyan theory and attitude it represents: His account sees meaning as simply associated with "form." The explicit understanding, as we shall see, is that the process of understanding leads in stages from form (syntax) to its intended associations (semantics). The assumption here is that the "syntactic" is "deep" and important whereas the semantic tends to be "surface," "social," and to be overcome. This account bears little resemblance to Chomsky's view of the deep and surface, of syntax and semantics; the general thrust of Chomsky's approach is to use the general, formal, and abstract to build an explanatory framework for the particular. In contrast, Eisenman appropriates the abstract and formal primarily in order to render the concrete and perceptual insignificant. He uses the terminology and categories of transformational linguistics chiefly in order to provide a vocabulary for his formalist bias which will grant it some theoretical legitimacy. He has so impoverished these notions that his "linguistic" system (unlike Chomsky's) is unable to function without the added notions of expression and intent.
The fundamental insight in Chomsky is that sentences can be analyzed into abstract structures, and that these structures can explain more about language and meaning than was possible before. There is a continuous increase in explanatory power and empirical scope in transformational grammar. This explanation focuses, ultimately, on the mind. The aim of the transformational grammar approach is to provide a theory that can account for the infinite variety and appropriateness of language.

The abstraction process that Eisenman describes has no such explanatory power. On the contrary, in conjunction with the notion of intent, it necessarily excludes any. We have already criticized the idea of intent as the basis for any theory of meaning — in the context of architectural form, this notion precludes general explanation since each architectural entity must be brought to the idiosyncratic court of intent in order to be analyzed. It is clear that for an approach to form to match the achievements of the Chomskyan approach to language, it will have to determine ways in which form is structured by a cognitive faculty in a cultural context. Abstract laws of form might then be determined. This might, perhaps, be done through the analysis of a particular corpus. In relying on intent Eisenman rejects both the possibility of determining abstract laws of form-structuring and, by the same token, the possibility of interpretation that an actual architectural object might offer.

The appeal to obscure mental processes to avoid otherwise idiosyn-
cratic interpretation denies language's essential mediating function and sidesteps the crucial requirements of any successful theory by remaining essentially anecdotal. Where Chomsky's theory expands the scope of previous theory, Eisneman's cannot.

To return to Eisenman's theory of architecture, we next confront the notion of the relationship of the conceptual to the physical manifestation. "Physical reality itself has a conceptual aspect." However, it is not always the case that the object itself communicates its conceptual and aesthetic intention. Eisenman uses the example of a Duchamp urinal to illustrate an example of an object which can be promoted to an art object through a change in context, through changing a set of associations that are external to the object itself. In this case, the aesthetic intention is communicated only through our perception that it has nothing to do with the object itself, but is due to an intentional shift in context.

For Eisenman, the task of achieving a "conceptual architecture" must necessarily be concerned with an exploitation of the qualities and characteristics of physical, three-dimensional space, and, as we shall see, this for Eisenman will necessarily depend on an understanding of universal spatial parameters which will be context-free and culture-independent. Clearly, the problem of "conceptualizing" a work will be made more difficult by the day-to-day associations (semantic and pragmatic associations, in Eisenman's terminology) of all standard building elements: doors, windows, groundplane, entrance, external wall,
etc.

There is no conceptual aspect of architecture which can be thought of without the concept of pragmatic or functional object, otherwise it is not an architectural conception.134

This does not, according to Eisenman, make the project of a conceptual architecture infeasible, and he proposed that what is required to make an architecture conceptual is to treat its traditional elements so that they can be divorced from their original associations and made into the neutral, value-free elements of an abstract conception that goes beyond their pragmatic references and instead communicates the architect's intent to construct an architectural framework for which the elements and their relations will become indices.

This intent is to be made manifest through the organization of the object itself, and the problem of architectural design becomes a problem of communicating this underlying "meaning" through the particular internal organization of the form itself, without relying on any external sign system. It is this structure which should have the capacity to take the viewer from the sense (immediate) perception to a conceptual attitude.

It will therefore provide a means whereby conceptual relationships are conceivable as independent of actual relationships.135

Eisenman proposes for the purposes of analyzing buildings and distinguishing types of conceptual attitude from types of non-conceptual attitude the traditional linguistic categories introduced above of
pragmatics, semantics, and syntax, but modified and expanded so that both semantic and syntactic meaning may be determined in two ways — deep and surface. Eisenman wishes in this way to incorporate the purely sensual aspects of the object itself since, for the original linguistic taxonomy, this aspect of the written word is clearly irrelevant. At the same time, he is distinguishing within the "conceptual" class conceptual meaning which makes reference to the physical from that which does not. The following matrix illustrates the classification:

<table>
<thead>
<tr>
<th>Conceptual</th>
<th>Perceptual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Syntactic</td>
<td>Semantic</td>
</tr>
</tbody>
</table>

Fig. 3

This taxonomy, artificial though it may be, is necessary to sustain Eisenman’s insistence on the internal, universal logic of form as the basis for design. This is the hard-core of his position, and he uses his taxonomic filter to distinguish among traditional semantic attitudes and concentrate on those whose primary intention is both conceptual and syntactic. These operate at an abstract, deep level and do not depend whatsoever on external associations and references or on the participation in any set of social conventions for their understanding and appreciation.

As Chomsky points out, the linking of meaning with the word is a surface phenomenon, and it is the syntax — or the structure of the relationship between words — which is the nature of the deep structure of the conceptual aspect.
Within the semantic realm can be distinguished an attitude which uses direct literal reference to an already-known object to convey its meaning, from one in which meaning depends on a process of juxtaposition and comparison of known objects in the mind. Thus when Superstudio tip their hats to Hannes Meyer's Marxism as it is translated in his Palais des Nations building, it is done, according to Eisenman, through a direct visual similarity between their buildings and Meyer's, and is therefore primarily semantic, in a surface or perceptual sense, in its intention. On the other hand, a Venturi building which is dependent on the recognition of known historical, visual references, also depends for its interpretation on the mental juxtaposition of these images placed in the new context of Venturi's design. Thus Venturi's buildings are primarily semantic also, but at a conceptual level, and Eisenman describes Venturi's buildings as semantic in a "deep, abstract sense."

Again, within the syntactic realm, a realm that is concerned with abstract relations, a distinction is made between a syntactic intention that is deep/conceptual and one which is surface/perceptual. A surface orientation is concerned with the "actual structure of the perceived object." A conceptual orientation within the syntactic realm is primarily concerned with relations between objects.

LeCorbusier, who also illustrates the semantic/conceptual attitude in his work because he transposes images of known objects into a new (conceptual) context and gives them a new meaning, demonstrates a syntactic/perceptual dimension as well, since the "syntax" of his villa
at Garches, for example (the ABABA rhythm of the column spacing) refers not to the syntax of its Renaissance precedence (which would be semantic/conceptual) but to the "Renaissance ideal" in general (hence syntactic/perceptual). If LeCorbusier's intent had been to use an understanding of the syntax of the Renaissance precedent (presumably its column spacing) as a necessary element, to be compared with the syntax at Garches if the new building's meaning were to be understood, the implication is that this would have been more conceptual. However:

The syntactic dimension in LeCorbusier seems to be primarily concerned with the surface aspect - with giving full scale to the physical object so that it can be understood semantically.¹⁴⁰

The work of Terragni is seen, on this account, as embodying a mirror intention, since, while Terragni's work has historical references, particularly to certain Renaissance villas, this semantic reference is not primary, since Terragni's intent is to divest his forms of their traditional meaning and, instead, to use their "formal type as a deep level syntactic referent to which his forms correspond."¹⁴¹ The relational aspect of his work is implied; it must be reconstructed within the mind.

Within the realm where intent is primarily conceptual, a distinction is drawn between the conceptual/semantic and the conceptual/syntactic. Here Eisenman uses the comparison with the work of painters Jasper Johns and Kenneth Noland. A conceptual orientation is one which is concerned with relationships; but within this framework Eisenman distinguishes relationships that derive their sense from the prior knowledge of the
elements combined from those whose meaning is transmitted through the structure of form in the particular context - structure which is, therefore, independent of any prior knowledge and independent of any cultural reference. Thus, the concept of edge stress is used by both painters but it is communicated differently. Johns produces it by painting an American flag, a known image with well-understood characteristics, in such a way that the edge of the flag is also the edge of the canvas. This "stress" depends on the comparison in the mind between the known quantity "flag" and the boundaries of the picture plane. Noland's paintings, which consist of colored chevrons, produce edge-stress through the particular structuring of form in relation to the canvas, since his paintings do not involve known objects.142

Within the conceptual/syntactic realm, the most "abstract" of the categories proposed, it is still necessary to distinguish two approaches which define for Eisenman the nature of architectural syntax, which is its "dual" character. This distinction resides in the way in which the actual physical object is used to make clear the conceptual nature of the work. On the one hand, a work may be purely notational; the physical properties can be seen as a code standing directly for the "deep structural" characteristics which are to be understood, and the form itself as little more than a residual token. This is not the case with the Noland chevrons, where both the conceptual and the perceptual qualities of the object are used to communicate its aesthetic conceptual intention - an intention which can only be reconstructed by the mind.143
Before we examine Eisenman's technique for achieving dual syntactic structures in architecture, it is important to pause here to assess Eisenman's taxonomy and the evidence which he uses to support it. How meaningful is the "semantic/syntactic" distinction he draws in describing or reconstructing the architect's original intent? Does it serve any useful purpose at all in helping us understand how buildings function irrespective of their authors' intent? Controversial and badly understood as the methodological distinction is in linguistics, where the goal is explicitly to focus on the nature of innate mental structures as preconditions for language, is it even intelligible when one is trying to lay down design criteria and when one is interested in evaluating and interpreting people's reactions to buildings?

Part of the answer to these questions is suggested by noting the extreme opposition Eisenman sets up between semantics and syntax. No longer the essentially complementary entities they are on the Chomskyan model, they represent an exaggerated polarity. All abstract qualities are subsumed under the syntactic heading; semantics is taken to meaning everything perceptual. Abstraction, conceptualness is no longer seen as the generalization of the particular and perceptual; instead, it is seen as its opposition. This schema not only destroys the crucially important insight of the Chomskyan position, that the conceptual is not the independent opposite of the physical, but its mental correlate — we perceive the physical because it corresponds to the mental. It also
sets up a traditional dualism, lacking in Chomsky's theory, between the mind and the body, the conceptual and the perceptual, the abstract and the physical. In fact, this dualism approaches sheer idealism, since what is taken as basic and "real" on Eisenman's account is the mental and conceptual, and the physical thing is only an expression for, an encoding, of the non-physical. The intricate correlation between the mind and the physical world, the concept and the percept, has been destroyed. The complexity in epistemology of the relationship between the mental construct (theory) and the physical reality it describes is similarly denied by this simple-minded assertion of the priority of the conceptual.

An extensive analysis of the origins of the dichotomies Eisenman sets up would be beyond the scope of this paper, but it is useful to focus on the source of Eisenman's analysis of LeCorbusier, Colin Rowe's article "The Mathematics of the Ideal Villa," an article which shares many of Eisenman's theoretical preconceptions. It begins with a highly significant quotation from Sir Christopher Wren:

There are two cases of beauty - natural and customary. Natural beauty is from geometry consisting in uniformity, that is, quality and proportion. Customary beauty is begotten by use, as familiarity breeds love of things not in themselves lovely. Here lies great occasion for errors, but always the test is natural or geometrical beauty.144

Rowe's article attempts to establish, through the comparison of the villas of LeCorbusier and Palladio, that there was some actual historical allusion intended in LeCorbusier's villas, and that these two architects'
successes with their villas depends on their common mathematical standards. The degree to which any connections between LeCorbusier and Palladio is established is best demonstrated by the following quote, which is not unrepresentative. Commenting on quotations from each of the architects, where both describe their villas as sitting on a hill and looking out in all directions on marvelous views of the countryside, which evoke for LeCorbusier "un reve virgilien," he comments on LeCorbusier's Savoye villa:

> From the hygienically equipped boudoirs, pausing while ascending ramps, the memory of the Georgics no doubt interposes itself, and, perhaps, the historical reference may even add a stimulus as the car pulls out for Paris. (emphasis mine)\(^{145}\)

As Rowe himself points out, "these are two buildings which, in their forms and evocations, are superficially so entirely unlike that linking them together would seem to be facetious."\(^{146}\)

Indeed, in my opinion, the direct bridge is never successfully made. The point of this digression, however, was not to point out the inadequate factual support for Eisenman's acceptance of the assertion that LeCorbusier's building refers primarily to a Renaissance ideal, or to object to Rowe's intuitive standards of justification. It is to point to a deeper set of underlying assumptions, the assumption that, through commonly held, and by implication, universally true "mathematical" abstract qualities, there may be a plane on which buildings apparently unrelated historically, culturally, or formally, may be assessed and contrasted: a plane on which the intrinsic formal properties of works
of art can be recognized and appreciated. While Rowe is more literate in his presentation and perhaps more frankly idealist in his attitudes to design, Eisenman's insistence on the logic of form and its internal universal characteristics has the same implications.

As we have pointed out, this is one reaction, of many possible ones, to the failure of the inductivist ideology of form follows function associated with the modern movement. But the recoiling at the attempt at structuring society back into the traditional creative/artistic/professional concerns of building, the rejection of inductivism for a formalism loosely based on some kind of assumed cognitive or three-dimensional universals, can only be predicated on a distorted view of communication. To examine LeCorbusier's villa at Garches, and to reduce it to column organization ("the ABABA structure") and to the "semantic" reference to "the notion of a Renaissance ideal" is to guarantee an inadequate understanding of the actual characteristics of buildings, and the potential for use, irrespective of conscious design.

If the conceptual/perceptual taxonomy of syntactic and semantic intent does not function very well, how does the linguistic analogy bear up when contrasted with Chomsky's actual definition of syntax and semantics within the framework of transformational grammar? Rules of language, firstly, are defined as structure-dependent.

Structure dependence implies that grammar has rules that apply to "phrase markers," that is, tree diagrams that decompose sentences into abstract categories, through a process similar to parsing a sentence in
the classical sense.

For example, the sentence

```
NP  
  T N verb NP
  / | | \      
 The Boy hit the Ball
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Such grammars are inherently more powerful than grammars which try to describe, for example, language purely in terms of sequences of words from left to right. Transformations map phrase markers into other phrase markers. The phrase markers are initially generated by a base that generates a set of "initial phrase markers." The base consists of a "categorical component" and a lexicon. The categorical component contains the rules for determining how the levels in the tree diagram can be "rewritten" to form adjacent lower levels. (For example, Sentence NP + VP would be such a rule) and also contains the lexical categories themselves (articles (T) nouns (N) verbs (V), etc.) The lexical component consists of lexical items that correspond to lexical categories, and that are inserted through "lexical transformations." Further transformations turn the abstract lexical items into the final phonological sentence. Notice that these rules do not allow for any guess-work. The final surface structure does not imply the deep structure; it is determined by it by rules that every language unit must interiorize.
Initially, the deep structure of sentences were thought to contain all the necessary information for transformations, as well as the information required to determine the meaning of sentences. However, while Chomsky argues that surface structure determines phonetic form and grammatical relations in deep structure determine some elements of meaning, it is also the case that surface structure has a role in the determination of semantic interpretation. For example, the stress in the following sentences determines to whom a pronoun refers:

"John washed the car; I was afraid someone else would do it."

"John washed the car; I was afraid someone else would do it."^149

The first sentence implies that I am glad that John washed the car; the second sentence, that I am not. In the second sentence, "someone else" refers to John, but not in the first. It seems that both deep and surface structure contribute to meaning.

The rules that relate syntactic structure to meaning are not at all well understood... It is not clear at all that it is possible to distinguish sharply between the contribution of grammar to the determination of meaning and the contribution of the so-called 'pragmatic' considerations: questions of fact, belief, and context of utterance.^150

By contrast, this taxonomy of oppositions (conceptual/perceptual, deep/surface, syntactic/semantic) in Eisenman's theory, even if we do accept it as a positive step in our understanding of architectural artifacts, does not in itself give any clue to the means for achieving a "conceptual architecture." Indeed, it only hints at the transition which Eisenman is hoping to achieve in the practice and theory of
architecture; namely, a shift from issues of "meaning," "value," and "social legitimacy" to issues of "form," for its own internal characteristics and logic. Crucial to this process is the ignoring of any iconographic basis in favor of those formal structures of the physical environment that condition iconographic interpretation and make it possible.

Thus, Eisenman will reject the traditional issues of aesthetics, and the traditional analysis of building as being concerned exclusively with "surface" phenomena, even when they were dealing with some kinds of relational issues. Issues of size, scale, texture, etc. are clearly "surface" in Eisenman's taxonomy, but problems of the relations between architectural elements (sequences of elements, their relative location) are also surface phenomena even though they are syntactic (relational), since they only provide information about a specific configuration. They neglect the additional information which is latent in any environment. 151

This deeper level consists of abstract relations that can only be inferred from specific environments, that can be understood, but that are not actually manifest in the three dimensional shapes of the building. Indeed, there is no direct relation between this "underlying structure of relations" and the actual "shape" of the building.

Eisenman proposes two ways in which this type of (formal) information may be made clear and these techniques form the basis of his design strategy. Firstly, deep/conceptual information may be transmitted
by the viewer's ability to conceive physical elements as having been shifted from some "prior condition." For example, the two planes of Fig. 5 can be conceived as being "in a state of sheer displacement" if we conceive of the prior conditions, illustrated by Fig. 6 in our minds.152

This prior condition is an original rectilinear configuration, and a movement, relative to a set of pre-determined axes.

Naturally, the configuration in Fig. 5 can be described, but its intended meaning can only be understood by juxtaposing the actual perceived form with the prior conditions, in the mind. Only in this way can the idea of "sheer" be conceived, as a "transformation" of the prior conditions into the actual surface environment.

The meaning of this particular configuration is a function of the formal regularities perceived in the actual environment and their juxtaposition with a set of "deep structural regularities." The information is therefore dependent both on the actual distribution of elements, and on "the nature of our capacity to conceive of space and form."153

It is this type of meaning that is sought after in House 1, Eisenman describes the design process, which is also the decoding process for the observer, as it dictates the different steps he must go through:

First distinguish between those aspects of form which respond to pragmatic and functional requirements and, reduce or unload the existing meaning from the elements so that the
forms may be seen as a series of primitive marks. Second
take these marks and structure them in an environment.
Third relate their structure to another structure of a more
abstract and fundamental nature so that the relationships
provide a level of formal information previously
unavailable to the individual. 154

The first step is applied by using the color of the elements in a
non-traditional way (in a way which runs against the grain of the
stylistic vocabulary of the modern movement), and this becomes a marking
device. More importantly, the building is so designed that one cannot
see which beams, columns, etc. are structural and which are not. All
the elements which one would assume to be functional are not; and the
actual structural elements are not visible. Eisenman hopes by this to
remove the functional, "structural" associations of these elements.

This is achieved by a second step of organizing these neutralized
"marks" into a formal structure. It is important that this structure
be seen as the most important design issue in the environment, since it
acts as a preliminary stimulus to take the viewer from a primary interest
in the perceptual, and focus his attention on its formal organization
in which the intent (meaning) of the work is accessible.

Eisenman uses the columns and beams in two separate but overlapping
sets of formal structures: planes and volumes; relations of
frontality and sheer. The columns and beams mark both structures
(Fig. 7). There are two types of columns: rectangular ones which are
used in situations where implied planes cross, but are not read as
marking the plane, but as markers of a different kind (Fig. 8). 156
Furthermore, a second formal structure is created, an "implied diagonal," by removing beams and two columns from what would otherwise be a continuous "layering."

But there is a further stage:

The system of formal relationships, whether marked or not, in the actual environment, is usually considered the limit of formal relationships in architecture. 157

This is a level of information which is the product of "formal relationships interacting with another level of formal references."

We are here concerned with relations which are implied, between the actual structure and the deep structure. The deep structure describes both a set of irreducible formal regularities as well as the transformations of these regularities into a specific environment. 158

The transformations consist of such things as sheer, compression, rotation. Together the "deep" structures and their transformations of a given environment can add a new dimension to the information contained by any environment, provided of course that the environment can "mark," in some way, the deep structure and its transformations.
Conclusion

Eisenman's position is open to considerable internal criticism of the sort I have suggested because his account simply does not sustain the theoretical foundations he has claimed for it. As I argued above, his appropriation of linguistic categories does violence to these concepts; similarly, his account of meaning, claiming to rest on notions of "deep structure," "transformational rules," and the like, again distorts these notions beyond recognition. The causes of these distortions are again clearly a function of Eisenman's formalist ideological orientation. Internal criticism was not, however, the only aim of this analysis.

The aim was also to show that architectural theories necessarily imply position in epistemology and in the theory of meaning. Eisenman's attitudes commit him to a "naive" epistemological idealism and his biases entail a theory of meaning which combines the worst of dualistically-oriented abstractionism with the traditional view of "art as intent."
Footnotes

2. Ibid., p.198.
3. Ibid., p.199.
6. Ibid., p.96.
7. Ibid., p.100.
8. Ibid., p.95.
10. Ibid.
12. Ibid.
15. Ibid., p.110.
16. Ibid., p.115.
17. Ibid., p.119.
18. Ibid., p.132.
19. Ibid.
20. Ibid., p.134.
21. Ibid.
22. Ibid., p.135.
23. Ibid., p.136.
24. Ibid., p.137.
25. Ibid.
27. Ibid., p.209.
28. Ibid.
29. Ibid.
30. Ibid., p.207.
31. Ibid., p.209.
33. Ibid., p.215.
34. Sir. K.R. Popper,
36. Ibid., p.220.
37. P. Feyerabend, Against Method, especially Ch.16.
38. Ibid., p.183.
40. P. Feyerabend, Against Method, p.197.
41. Ibid., p.205.
42. Ibid., p.207.
43. Ibid., p.204.
44. Ibid., p.205.
45. Ibid., pp.202-3.
46. Ibid., p.66.
47. Ibid., pp.193-7.
48. Ibid., p.143.
49. Ibid., p.163.
51. Ibid., p.246.
52. Y. Elkana, Boston Colloquium for the Philosophy of Science Lecture, Lecture 1, Oct. 21, 1976, p.4.
53. Ibid.
54. Ibid., p.5.
55. Ibid., p.7.
56. Ibid., pp.10-12.
57. Ibid., p.16.
58. Ibid., p.18. (See also Lecture 2, Oct. 25, 1976, p.28.)
59. Ibid., pp.18-20 and p.23.
60. P. Feyerabend, Against Method, p.226.
61. Ibid.
62. Ibid., p.266.
63. Ibid., p.274.
64. Ibid., p.273.
65. Ibid., pp.277-8.
68. Ibid., p.21.
70. Ibid., p.38.
73. B. Russell, History of Western Philosophy, p.674.
74. N. Chomsky, Problems of Knowledge and Freedom, p.49.
75. B. Russell, Human Knowledge its Scope and Limits, p.v., quoted in
    Problems of Knowledge and Freedom, p.3.
77. Ibid., p.21.
78. N. Chomsky, Problems of Knowledge and Freedom, p.15.
79. Ibid., p.16.
80. Ibid., p.18.
81. Ibid.
82. N. Chomsky, Reflections on Language, p.18.
84. Ibid., p.129.
85. N. Chomsky, Reflections on Language, p.28.
86. Ibid., p.36.
87. Ibid., p.41.
88. Ibid., p.43.
88a. Ibid.
89. N. Chomsky, Problems of Knowledge and Freedom, p.19.
90. N. Chomsky, Reflections on Language, p.60.
92. F. de Saussure, Course de Linguistique Générale, p.25.
93. Ibid., pp.27-31 and pp.36-37.
94. Ibid., p.99.
95. Ibid., p.100.
96. Ibid., pp.100-101.
97. Ibid., p.108.
98. Ibid., p.156.
99. Ibid., p.43.
100. Ibid., p.25.
102. Ibid., p.168.
103. Ibid., p.155.
104. Ibid., p.156.
105. Ibid., p.168.
106. Ibid., p.25.
107. Ibid., pp.126-127.
112. Ibid.
113. Ibid., p.29.
114. Ibid., p.30.
115. Ibid.
116. Ibid.
117. Ibid., p.33.
118. Ibid., p.34.
118a. Ibid., p.35.
119. Ibid., p.149.
120. L. Wittgenstein, Philosophical Investigations.
122. Ibid.
123. Ibid., p.358.
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125. P. Eisenman, in 5 Architects, p.15.
126. Ibid.
127. Ibid.
129. Ibid.
130. Ibid.
131. Ibid.
132. Ibid.
133. Ibid.
134. Ibid.
135. Ibid.
136. Ibid., p.53.
137. Ibid.
138. Ibid.
139. Ibid.
140. Ibid.
141. Ibid.
142. Ibid.
143. Ibid.
144. in Colin Rowe, The Mathematics of the Ideal Villa, p.2.
145. Ibid., p.3.
146. Ibid.
147. I will not attempt a detailed description of Transformational Grammar. What I present here is taken directly from Syntactic Structures, Language and Mind, and Reflections on Language, by N. Chomsky.
148. Diagram taken from N. Chomsky, Syntactic Structures, p.27.
149. N. Chomsky, Language and Mind, p.110.
150. Ibid.
152. Ibid., p.6.
153. Ibid., pp.8-9.
154. P. Eisenman, in 5 Architects, p.15.
155. Ibid., p.16.
156. Ibid.
157. Ibid., p.17.
158. Ibid., p.18.
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From P. Eisenman
"Notes on a Conceptual Architecture II"
Figure 7
Figure 8
House 1 from 5 Architects, p.22.