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Is Designing Hermeneutical?

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An atomistic language model is frequently used to codify what is seen as the logical sequence of steps in the design process. Following the critique of Wittgenstein, this language model, derived from Positivist theory, has been generally abandoned by philosophers of language. It is argued here that despite its apparent successes in the short term, the model embodies a fundamental misunderstanding of the nature of the design process. Drawing on recent studies of language in philosophical hermeneutics, and especially the work of Hans-Georg Gadamer, the authors argue that design activity proceeds by way of a hermeneutical circle, involving the projection of pre-understandings and a dialogical structure of question and answer. Design does not fall within the domain of natural science with a base in formal logic, but belongs rather to the domain of the human and hermeneutical sciences with a base in the processes of understanding and interpretation. Atomistic language models of design are antipathetic to hermeneutical functioning, and impede rather than assist design understanding and practice.

It is commonly supposed that design activity can be described, codified and explained in terms of an algorithmic logic model derived from language theory. The model, exemplified in the work of Stiny, Mitchell, Yoshikawa, and Coyne *et al.*, is the basis of much of the current research in design methodology and CAD.[1] Mitchell gives an elegant description of the model.[2] He claims that design can be described in words that make up a critical language and such word descriptions can be formalized using the notation of first-order predicate calculus. Design worlds, he says, consist of "graphic tokens which, like words, can be manipulated according to certain grammatical rules."

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[1] See George Stiny, "Introduction to Shape and Shape Grammars," *Environment and Planning B*, 7 (1980): 342-351; William J. Mitchell, *The Logic of Architecture: Design, Computation, and Cognition*, Cambridge, Massachusetts, MIT Press, 1990; H. Yoshikawa, "General Design Theory and a CAD System," in T. Sata and E. Warman (eds), *Man-Machine Communications in CAD/CAM*, Amsterdam, North-Holland, 1981; R.D. Coyne, M.A. Rosenman, A.D. Radford, M. Balachandran and G.S. Gero, *Knowledge-Based Design Systems*, Reading, Massachusetts, Addison Wesley, 1990; and Richard Coyne, *Logic Models of Design*, London, Pitman, 1988. Aart Bijl (*Computer Discipline and Design Practice: Shaping Our Future,* Edinburgh University Press, Edinburgh, 1989) expresses unease and ambivalence, prevalent within the CAD research community, about all-embracing computational models of design. The computer scientists and linguists, Terry Winograd and Fernando Flores (*Understanding Computers and Cognition*, Reading, Massachusetts, Addison-Wesley, 1987) give a stimulating critique of the algorithimic logic model.

[2] Mitchell, *op. cit.*

He sees design processes "as computations in design worlds with the objective of satisfying predicates of form and function stated in a critical language."[3] Mitchell specifies that there are three main parts to this model:

> "First… the relationship of criticism to design may be understood as a matter of truth-functional semantics of a critical language in a design world. Second… design worlds may be specified by formal grammars. Third… the rules of such grammars encode knowledge of how to put together buildings that function adequately. Thus the relation of form to function is strongly mediated by the syntactic and semantic rules under which a designer operates."[4] [66]

He says that, "the first step in precise formulation of a design world is to specify the primitives (kinds of elementary graphic tokens) out of which designs may be assembled."[5]

This model presupposes that the process of designing is analogous or equivalent to the process by which we use language; that the process can be described in terms of primary tokens (for example, geometric shapes) which equate words; and that these primary elements can be manipulated according to grammatical rules so as to build up coherent structures in the same manner that words can be combined in accordance with the rules of logic to form meaningful sentences. The model derives from a Positivist theory of language, which relies for its cohesion and integrity on the concept that verbal atoms (words) correspond to objects in the real world. These primary verbal tokens combine to form larger information segments such as sentences. To be meaningful, say the Positivists, these combinations of verbal tokens or word atoms must be assembled according to the rules of formal logic. If they do not conform to these rules they are meaningless and the statements they convey are false.

In the following we shall attempt to show the limitations of this view of language, a view which underpins many prevailing assumptions concerning the nature of the design process, in particular those which make appeal to logic, formal systems, and the computational paradigms of Artificial Intelligence.

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The Positivist concept of an exact and determinate language made up of symbols which correspond to a unique set of atomic facts traces to Plato. He speaks of the "weakness of the *logos*,"[6] by which he means that spoken language is treacherous, that it has a tendency to slip out of our control so that meanings disappear into the thickets of

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[3] *Ibid.*, pp. ix-x.

[4] *Ibid.*, p. x.

[5] *Ibid.*, p. 39.

[6] Plato, *Seventh Letter* 342 E 4.

ambiguity, self-contradiction and paradox.[7] Ordinary spoken language is unequal to the task of representing reality; it does not directly correspond to its referent. Ordinary language must be replaced by a system of signs which corresponds exactly to the structure of what is. To control our thinking we must resort to a system of signs that can be controlled, a formal language that always behaves according to the dictates of logic. For Plato, the paradigmatic expression of such a language was the language of mathematics; the ideal language for thinking is one in which words function like numbers. In this way, "the word, just like the number, becomes the mere sign of a being that is well-defined and hence pre-known."[8] Only statements expressed in such a formal language could lay claim to certainty.

The Logical Positivists attempted to formulate a "language of science," constructed on the base of mathematical logic. Their aim was to define a precise, certain and [67] meaningful language that is clearly demarcated from meaningless pseudo-sentences.[9] They based their enterprise on the concept of logical atomism, the notion that words have a direct correspondence to things which are discrete, explicit and determinate; that words and what they stand for are like atoms or primary elements; and that words, as primary elements of language, can be brought together in logical sequences to form statements that are meaningful because they are certain, possessing a truth that can be tested against the rules of logic and against the things or facts they represent.

These efforts culminated in Wittgenstein's *Tractatus Logico-Philosophicus*[10] (the "bible of Logical Positivism"), the definitive exposition of the Positivist theory of language, in which he specified just such a precise and perfect language, one which would escape opinions, purposes, values, and intentions. All subjective notions and purposive meanings were banished from the domain of concrete experience. He maintained that "the ultimate constituents of the world are a unique set of atomic facts whose combinations are pictured or mirrored in the relations among symbols in a logically perfect language," that "the world can be described completely by knowing all these atomic propositions," and that "there is one basic use of language: to convey information…" It follows that "all language which conveys information is exact and determinate."[11] The *Tractatus* thus defines the world in terms of a set of atomic facts which can be expressed in logically independent propositions. Everything can be

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[7] Plato, *Cratylus, passim*. Cf. Gerald L. Bruns, "On the Weakness of Language in the Human Sciences," in John S. Nelson, Allan Megill and Donald A. McCloskey (eds), *The Rhetoric of the Human Sciences—Language and Argument in Scholarship and Public Affairs*, Madison, Wisconsin, University of Wisconsin Press, 1987, pp. 239-262.

[8] Hans-Georg Gadamer, *Truth and Method*, London, Sheed and Ward, 1975, p. 373.

[9] Jack Mendelson, "The Habermas-Gadamer Debate," *New German Critique* 18 (1979): 44-73, p. 49.

[10] Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, trans. D.F. Pears and B.F. McGuiness, London, Routledge and Kegan Paul, 1961.

[11] The quotes are taken from Barry Gross, *Analytic Philosophy*, New York, Pegasus, 1970, p. 143, where he lists the basic assumptions of Wittgenstein's *Tractatus*. Cf. P. Christopher Smith, "Gadamer's Hermeneutics and Ordinary Language Philosophy," *The Thomist* 43 (1979): 296-321, p. 300.

expressed in the formal language of logic. "The limits of my language mean the limits of my world. Logic fills the world: the limits of the world are also its limits."[12]

Wittgenstein's Critique of Positivist Concepts of Language

With the appearance of the *Tractatus* the Positivist position seemed invincible. By the middle of this century, however, it was wholly demolished, defeated not so much by attacks from outside, but from within. Positivism self-destructed. It fell apart under the self-reflexive impact of its own criteria. The most potent of these internal assaults came from Wittgenstein himself, who turned his immense critical talents to an analysis of his own earlier thinking, dismantled the *Tractatus* and consigned to irrelevance the Positivist notion that atomic units of language correspond to realities in an objective world.

Wittgenstein negates the assertion that logical language alone is meaningful by pointing to the language of ordinary use, which manages to communicate meanings even though it blatantly fails to conform to the constraints of formal logic. The "weakness of the logos" is not so powerless that it cannot adequately convey meanings for our everyday purposes. Live language, language as it is spoken in the context of ordinary human activity, is not an exact system of invented signs. Wittgenstein expresses this in an architectural metaphor: [68]

> "Our language can be seen as an ancient city: a maze of little streets and squares, of old and new houses, of houses with additions from various periods and this surrounded by a multitude of new boroughs with straight regular streets and uniform houses."[13]

The new boroughs with straight streets and uniform houses are the formal languages of mathematics and logic; and the maze of little streets and squares is language as it is spoken in the context of the lived world.

Wittgenstein says that "the speaking of language is part of an activity, or a form of life."[14] We can only understand spoken language in the context in which it is spoken. Ordinary language is wholly entwined in networks of common sense conventions; linguistic practices cannot be separated from concrete "life forms," that is, attitudes, world views and a cultural ethos.

Our ability to understand everyday speech depends on our ability to reduce the ambiguity of the individual terms by placing them within the global context of the situation in which they are used. It is not necessary to eliminate ambiguity; we do not need to take refuge in a formal language. We have a sense of the situation; we pick up clues and cues in the parts and the whole and by a filtering process involving a large degree of "ambiguity tolerance" we sift out possibilities and arrive at a sufficient sense for the purposes at hand.

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[12] Wittgenstein, *Tractatus*, § 5.6.

[13] Ludwig Wittgenstein, *Philosophical Investigations*, trans. G.E.M. Anscombe, New York, Macmillan, 1958, § 18.

[14] *Ibid.*, § 23.

Our ability to understand language,

"is a matter of our sharing routes of interest and feeling, modes of response, senses of humour and of significance and of fulfilment, of what is outrageous, of what is similar to what else, what a rebuke, what forgiveness, of when an utterance is an assertion, when an appeal, when an explanation—all the whirl of organism Wittgenstein calls 'forms of life'."[15]

When children learn a language they are engaged in a form of life. They share at least some of the goals and interests of their parents and other teachers, and these goals and interests and the activity they are engaged in with others in a particular situation reduce the possible references of the words that are being used. The teacher does not define words for the child; the child and the teacher understand each other and learning can take place not because the child learns rules but because the child and his teacher share a context. Wittgenstein says, "What one acquires here is not a technique; one learns correct judgments. There are also rules, but they do not form a system, and only experienced people can apply them right. Unlike calculation rules."[16]

Wittgenstein says that when we engage in ordinary spoken language in our daily [69] activities we are involved in language games. We do not so much learn a language as participate in it, as we participate in playing games; and we do not so much learn a language as learn the rules of the games in which language operates. The rules of language change as the life situation, that is, the life game, changes. When as children we learn these games, we are at the same time being trained to view the world in certain socially determined ways. Language games are played according to rules that apply within a particular situation. Our activities are inseparably interwoven with language; we live in a language-constituted world; and in order to act in that world we must know how to play the language game in the particular circumstances that apply in the situation in which we find ourselves. We must know the rules of the language game that is being played at any moment; we must know the appropriate responses to whatever is said.

The rules of language are immanent within particular language games. They are indigenous to the games themselves. They cannot be disentangled from the particular situations in which they occur, so that we cannot specify common structures that apply to all language situations. They cannot be abstracted from the language games and made to constitute a transcendental grammar. There is no grammar that joins the games one to another. Language games stand as if in isolation from each other. They are hermetically sealed.

Wittgenstein has shown not only that language is part of life forms, but also that language forms life; it is constitutive of the world we experience. Language frames the world in which we live; it frames the way we see the things in the world; and therefore language cannot be an object which we can invent or create. Our relationship with language is not one of subject and object, since we are within language and part of its process.

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[15] Stanley Cavell, Must We Mean What We Say? New York, Charles Scribner's Sons, 1969, p. 52.

[16] Wittgenstein, *Philosophical Investigations*, *op. cit.*, p. 227.

We are so involved in the language games we play, says Wittgenstein, that we cannot stand outside them so as to describe them. Language can only be expressed in terms of rules if we step outside language, in which case we are describing what language *should* do; but as soon as we attempt to determine the rules governing what language does in fact, we are in a double bind, because we are caught up in the language game and objectivity is forever elusive. To catch language in the net of rules we need rules by which to recognize the context in which the rules apply, rules to recognize the lived situation, the intentions of the speaker, the anticipations of the listener, and other rules in an endless series. These given, we then need yet more rules to govern the application of these meta-rules, and so on to infinite regress.[17]

Wittgenstein says we can't describe the language games we play because we are absorbed in them. A self-reflexive paradox vitiates the Positivist model of language: any model that purports to describe language must stand outside language and regard it as an object; but this is not possible because we must use language to [70] describe language. Plato's enterprise of constructing a perfect and precise language is doomed to failure. Such a language only *seems* more certain and true than the everyday spoken language of the market place and the dinner table. The meanings of the words 'certainty' and 'truth' are wholly dependent on the situation in which they are used in the context of a language event. We cannot look to a precise, logical language to provide ultimately true answers; at best we can seek responses that are appropriate within the context of a particular situation.

Statements made in ordinary language usage are not true or false but, as Austin says, felicitous or infelicitous, which is to say, appropriate or inappropriate within the context of the language game being played.[18] A statement either fits the situation in which it appears or it does not. It is felicitous and meaningful if it fits with or is appropriate in the context of the state of play, but if it does not fit or is inappropriate it is then infelicitous and incomprehensible. When an inappropriate and incomprehensible statement intrudes into the language game, the situation seizes up and the game stops.

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In summary, Wittgenstein's radical attack on the atomic model of language is based on the argument that the meanings of words do not derive from a logical calculus. Firstly, we cannot give a precise definition of a word because its meaning is forever changing according to the situation in which it is used. Meanings differ with context. The meaning of a word is precisely its use. We cannot, therefore, discern the meanings of words and sentences in isolation or in the abstract. A word is polysemic; it does not have a single meaning, and its various meanings merge, interpenetrate, are in a continual flux that eludes definition and rules. The definition of the word is blurred and

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[17] Hubert L. Dreyfus, *What Computers Can't Do. The Limits of Artificial Intelligence.* New York, Harper and Row, 1979, p. 203.

[18] Austin, J.L. *How to Do Things with Words*, Cambridge, Mass. Harvard University Press, 1962, p. 145.

continually changing; it is infinitely flexible.

Secondly, *we* define terms. We construct meanings, and the use of a term is determined by arbitrary convention. So similarly, grammars do not exist until we construct them; and we construct them according to conventions. Because of the porosity and flexibility of meaning that inheres within language we cannot specify a universal and transcendental grammar. The forms that language takes are determined by its usage: language is intimately related to particular human actions and anticipations and expectations of such actions. Rules are not imposed on the language from without and as upon an object, but inhere within a particular language game played in a particular life situation, which forms part of a socially constituted set of conventions.

Wittgenstein's description of language as a game highlights the point that the meaning of language does not depend on its fragmentary units having a one-to-one correspondence to things in an extra-linguistic world, units that combine to form logical structures. The meaning of language depends, rather, on the way it is used in a context. The bewitchment of language that Socrates deplored in the *Cratylus* [71] cannot be avoided by replacing its ambiguities and paradoxes with precise symbols designating a reality that stands outside of language. Whatever reality "out there" might be, it is inextricably interwoven with language, and cannot be considered except in the context of language as it is spoken in ordinary discourse.

Language is not a sign system, a language of symbols; nor is it an information system.[19] It is a language game, and as such it breaks out of the limits that any symbolic system necessarily implies. It is not made up of atomic tokens which represent or correspond to elements of reality in an extra-linguistic world; and it cannot be forced into the straitjacket of formal grammars without altering what it really is.

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Coming to the analysis of language from an entirely different direction Heidegger and Gadamer reach similar conclusions. Their arguments will emerge when we come to discuss the nature of understanding and the dynamics of dialogue in the following.

The Natural and the Human Sciences

Those who use the atomic language model to structure their researches will probably find Wittgenstein's critique irrelevant. If the model has led to the discovery of useful practical applications, especially in CAD studies, why abandon it? No scientific research can proceed in the absence of a model, and this one must continue to serve until another that is demonstrably more fruitful comes to take its place. Taking their cue from post-Kuhnian thought they could correctly argue that it is beside the point whether the model

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[19] Language is not a sign system as described in Structuralism or by Chomsky. This is a theme that we intend to develop elsewhere, especially as it relates to these systems as providing a theoretical base for Post-Modernist architecture.

is true or false in any absolute sense.[20] No philosopher of science would now claim that scientific models are "true," any more than they would claim that science itself deals with truth, but this has not prevented science and its models from being awesomely successful.[21] Science succeeds, even if its models do not correspond to any external reality. If models become obsolete and are replaced, it is not because the new model is truer than the old, but merely because it leads to new discoveries with technological relevance. Only a naive scientism would claim that science advances by way of models that progressively approach nearer to an objective reality. If the atomic language model is productive, does it matter that it derives from a disreputable and discarded theory?

The counter-argument hinges on a differentiation of the human and natural sciences. Natural science has not been uniformly successful in all areas of investigation. The remarkable achievements of its methods in the physical domain have not been matched in the domain of the study of human behaviour. Here they have been at best limited and at worst debilitating.

In its heyday Positivism argued for the "unity of science," asserting that all science, human as well as natural, must use the same methodology. In this view the human sciences could only lay claims to truth and certainty if they used the methods of the natural sciences. Positivism claimed that "the laws and concepts of the special sciences must belong to *one* single system… They must constitute [72] a unified science with one conceptual system (a language common to all the sciences) containing the conceptual systems of the individual sciences as members and their languages as sublanguages."[22] The human sciences must adopt the models and precise formal language of the hard sciences such as physics if their claims to certitude or truth were to be taken seriously. The methodology of natural science was the only access to objective and certain knowledge.[23]

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[20] This is a recurrent theme in post-modern thought. See, e.g., Hilary Lawson and Lisa Appignanesi (eds) *Dismantling Truth,* London, Weidenfeld and Nicolson, 1989; Richard J. Bernstein, *Beyond Objectivism and Relativism*, Oxford, Basil Blackwell, 1983; Robert Hollinger (ed.) *Hermeneutics and Praxis*, Notre Dame, Indiana, University of Notre Dame,1985; Richard Rorty, *Philosophy and the Mirror of Nature*, Oxford, Basil Blackwell, 1980; Fred. R. Dallmayr and Thomas A. McCarthy (eds) *Understanding and Social Inquiry*, Notre Dame and London, University of Notre Dame Press, 1977; Paul Rabinow and William M. Sullivan (eds) *Interpretive Social Science—A Second Look*, Berkeley, University of California Press, 1979; etc

[21] If this success is not dependent on truth, what is its basis? It can be answered that natural science is simply a node in a network of human activities and its success and power result from a complex interaction of historical, economic, political, ideological, technical and other factors. Cf. Bruno Latour, "Clothing the Naked World," in Lawson and Appignanesi, *op. cit.*, 102-126, p. 124.

[22] Viktor Kraft, *The Vienna Circle and the Origin of Neo-Positivism: A Chapter in the History of Recent Philosophy*, trans. Arthur Pap, New York, Philosophical Library, 1953, pp. 160-1.

[23] See Roy J. Howard, *Three Faces of Hermeneutics—An Introduction to Current Theories of Understanding*, Berkeley, University of California Press, 1982, Introduction. Since the collapse of positivism the unity of science has found new champions, notably Mary Hesse ("In Defense of Objectivity," *Proceedings of the British Academy*, 58, 1972), and Richard Rorty (see e.g., *Philosophy and the Mirror of Nature*, *op. cit.*, *passim.*) Their

The Positivist notion of the unity of science is now as discredited as are its theories of atomic language. The human sciences have regained their place in the sun, and without resort to the methodology of the natural sciences. It is now seen that the natural and human sciences deal with different areas of study, and that the methods of the hard sciences are wholly inappropriate when applied in the domain of human actions. The difference between the natural and human sciences relates to the differences between things and people. Whereas the methods and models of the natural sciences are successful in the manipulation and control of physical phenomena, they are distorting and misleading when applied to the study of human actions and interactions.[24]

The distinction between the natural and the human sciences hinges on the notion of self-reflexivity.[25] Human behaviour is at the same time the object and the subject of the human sciences; human science is the study of humans by humans; the study of human activity is a human activity; the study itself forms part of what is studied; and any understanding of human actions must be gained from within the field of human activity. The scientist in the humanities cannot break free from human society, and cannot step outside it to examine it as an external object. The criteria of objectivity demanded by the natural sciences are self-negating when applied to the study of human behaviour.[26]

In the name of objectivity, the practitioner of natural science must ignore the practices whereby facts are selected and theories and hypotheses are constructed, and must regard these practices as external to the scientific endeavour. The practitioner of human science, on the contrary, must take them into account as forming part of the very behaviour that the human sciences seek to understand. No patterns of human behaviour can be understood unless these patterns of selection and exclusion are taken into account.

The natural sciences examine and explain phenomena which do not ascribe meanings or understandings to themselves; the natural sciences are not, and cannot be, self-reflexive; their success depends on their background practices remaining opaque to

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support of the notion of the unity of science is, however, for a reason that is the radical opposite of that put forward by Positivism: they claim that all sciences are hermeneutically rather than logically based. For a general discussion on the human versus the natural sciences and on the unity of science, see Hubert L. Dreyfus, "Holism and Hermeneutics," Charles Taylor, "Understanding in Human Science," and Richard Rorty, "A Reply to Dreyfus and Taylor," all in *Review of Metaphysics* 34, 1 (1980): 3-46. Cf. Charles Taylor, "Interpretation and the Sciences of Man," *Review of Metaphysics* 25 (1971): 3-34.

[24] An extensive literature has appeared during the last decade which attempts to define the limits of scientific methodology when applied in the social sciences and to indicate the nature of the distortions and exclusions that result from its inappropriate use. See particularly Richard Bernstein, *The Restructuring of Social and Political Theory*, Oxford, Basil Blackwell, 1976; *idem*, *Beyond Objectivism and Relativism*, Oxford, Basil Blackwell, 1983; and *idem*, "From Hermeneutics to Praxis," in Hollinger, 272-96; Dallmayr and McCarthy, *op. cit.*; Nelson, Megill and McCloskey, *op. cit.*; etc.

[25] See Hilary Lawson, *Reflexivity— The Post-modern Predicament*, London, Hutchinson, 1985.

[26] See Bernstein, *Beyond Objectivity…*, *op. cit.*, for the post-modern dismantling of the concept of objectivity, in both the human and the natural sciences.

their practitioners, on their being taken for granted and ignored.[27] The human sciences, by contrast, attempt to understand phenomena which have self-referential and reflexive meanings and understandings; they are necessarily self-reflexive and concerned with their own background practices; and their success depends on their understanding and awareness of their background practices.[28] So whereas the interpretive practices of the scientist play no internal role in the formulation of theories or models in the natural sciences, those same interpretive practices play a major internal role in the human sciences. The human sciences have no reason to exist except to question the bases of human action, and this necessarily includes the self-reflexive study of the bases of their own modes of interpretation. The natural and the human sciences differ in the fact that background is external in the former and internal in the latter.

Using its own methods, natural science has no way of grasping that it cannot exist without a community of scientists who communicate in a scientific language. This is a matter of self-reflexive understanding, and can only be grasped hermeneutically.[29] To suppose otherwise, as Apel has pointed out, is to presuppose a "methodical solipsism." To claim that objective knowledge is possible without intersubjective understanding is to say that science could function in a society of one person. On the contrary, says Apel, empirical science is only possible by way of communication among the members of a scientific community.[30] Scientific rationality is predicated on "the metascientific rationality of intersubjective discourse,"[31] and we cannot describe communication as taking place between objects. We cannot describe the modes of experience and cognition that form the communicative aspect of natural science in terms of the "thing language" that science uses. The study of intersubjective communication and interaction, involving self-reflexive understanding, is precisely the domain of the human sciences. They differ radically from the natural sciences in their goals, their relation to practice and the type of knowledge they disclose.

As Apel argues, natural science has a technological relationship to practice, whereas the human sciences, concerned with understanding modes of intersubjective communication, relate to practice by way of understanding the conventions of meaning

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[27] We follow Apel in excluding behaviourist psychology and statistical sociology from the human sciences as being wholly non-reflexive. They deal exclusively with humans as "things," and have a technological relation to practice. See Karl-Otto Apel, "The A Priori of Communication and the Foundation of the Humanities," in Dallmayr and McCarthy, *op. cit.*, 292-315, p. 309.

[28] Rorty denies this distinction, claiming that "anything is, for purposes of being inquired into, constituted within a 'web of meanings'." In his view the meanings of actions and practices equate what their agents say about them. See Georgia Warnke, *Gadamer, Hermeneutics, Tradition and Reason*, London, Polity Press, 1987, pp. 141 ff.

[29] Cf. Kurt Mueller-Vollmer (ed.), *The Hermeneutics Reader—Texts of the German Tradition from the Enlightenment to the Present*, London, Basil Blackwell, 1985, Introduction, p. 44.

[30] Apel, *op. cit.*, pp. 297 ff.

[31] Alfred Schutz, "Concept and Theory Formation in the Social Sciences," in Dallmayr and McCarthy, *op. cit.*, pp. 286 ff.

that operate in a human setting. They are interested in the aims of practice rather than a technological manipulation of objects.[32] The models of the natural sciences may be appropriate in the domains of "inanimate objects" but are inappropriate—and disabling—in the domains of human action.

The natural and the human sciences are, therefore, different. But what difference does this difference make?

It makes a difference to the way we view the nature of the design process. Insofar as the activity of designing is a human activity its study belongs within the domain of the human sciences rather than the domain of the natural sciences. If conceived as reducible to the manipulation of things (such as the manipulation of shapes conceived of as words in the Mitchell model) it could justifiably be located within the confines of natural science; but if conceived as relating to the wider context of human actions and interactions it must be positioned squarely within the domain of the human sciences. Any assertion that design science is a human rather than a natural science pivots on the notions, fundamental to recent hermeneutical philosophy, that the human sciences are sciences of understanding rather than of knowledge, and that understanding arises not by the use of method, but by way of the operation of what is termed the "hermeneutical circle."[33] This has profound implications for our understanding of the design process, and must be explained in some detail.

The Hermeneutical Circle

Hermeneutic studies attempt to answer the question, How does understanding arise? How, for example, do we understand everyday language if, as we have seen, it does not follow the rules of logic and is shot through with ambiguities and imprecision? Philosophical hermeneutics answers that when we understand language, or anything else for that matter, it is because of the working of the hermeneutic circle.[34]

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[32] Apel, *op. cit.*, p. 307.

[33] The origins of the concept of the hermeneutical circle trace to ancient rhetoric and to processes of construing sentences. It was identified as the process of interpretation by the Romantic hermeneuticists, Ast, Schleiermacher, and Dilthey. Its profound implications have been drawn out by Heidegger and Gadamer. A bibliography on the subject is given in Gayle Ormiston and Alan D. Schrift (eds), *The Hermeneutic Tradition: From Ast to Ricoeur*, Albany, State University of New York, 1990.

[34] The following analysis of hermeneutics derives mainly from Martin Heidegger and Hans-Georg Gadamer. See Martin Heidegger, *Being and Time*, trans. John Macquarrie and Edward Robinson, London, Basil Blackwell, 1962; Hans-Georg Gadamer, *Truth and Method*, London, Sheed and Ward, 1975; *idem*, *Reason in the Age of Science*, trans. Frederick G. Lawrence, Cambridge, Mass., MIT Press, 1981; *idem*, *Philosophical Hermeneutics*, trans. and ed. David E. Linge, Berkeley, University of California Press, 1976; *idem*, "The Problem of Historical Consciousness," *Graduate Faculty Philosophical Journal* 5, 1 (1975), repr. in Rabinow and Sullivan, *op. cit.*, pp. 82-140; *idem*, "Hermeneutics and Social Science," *Cultural Hermeneutics* 2 (1975): 307-16; and *idem*, "The Universality of the Hermeneutical Problem," in Ormiston and Schrift, *op. cit.*, pp. 147-158. A large literature has appeared in recent years commenting on and expanding the findings of these two philosophers. See the

The hermeneutical circle has to do with the circular relation of the whole and its parts in any event of interpretation. We cannot understand the meaning of a part of a language event until we grasp the meaning of the whole; and we cannot understand the meaning of the whole until we grasp the meaning of the parts. That is, we cannot understand the meanings of the words that make up a sentence until we can locate them in the context of the sentence as a whole; and we cannot understand the meaning of the whole sentence until we understand the meanings of the words that it comprises. By extension, the meaning of a concept depends on the context (or the horizon)[35] within which it occurs; but this context is made up of the concepts to which it gives meaning. Any act of understanding language involves an interplay of text and context. The whole and the part give meaning to each other; understanding is circular.

Thus we understand what someone says to us or something we read because of a reciprocal relationship between the whole and the part. These are inseparable in the process of interpretation. The meaning of the sentence as a whole reflects back and modifies the meanings of its component parts, the words. The whole can only be understood in terms of its constitutive parts and these parts in turn can only be construed in terms of the whole which they constitute.

This formulation may appear simple or even banal, but the apparent simplicity is deceptive, concealing complexities that are proving powerful enough to pose a real threat to philosophical concepts that have been considered foundational since Descartes.

The circle involves a logical contradiction: if we must understand the whole before we can understand the parts and yet the parts derive their meaning from the whole, then understanding can never begin. We cannot start with a whole that has no parts; and we cannot start with the parts until we understand the whole. This paradox does not imply that the circle is vicious, but merely that logic is inadequate to the task of understanding the working of understanding. Yet understanding occurs, so there must be some leap that enables us to understand the whole and the parts at the same time, however contrary

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previously cited bibliography in Ormiston and Schrift, *op. cit*. We have also relied heavily on Warnke, *op. cit.*; Joel C. Weinsheimer, *Gadamer's Hermeneutics: A Reading of Truth and Method*, New Haven and London, Yale University Press, 1985; Richard E. Palmer, *Hermeneutics—Interpretation Theory in Schleiermacher, Dilthey, Heidegger and Gadamer*, Evanston, Northwestern University Press, 1969; Dieter Misgeld, "On Gadamer's Hermeneutics," *Philosophy of the Social Sciences* 9, 2 (1979): 221-39; David E. Linge, "Editor's Introduction," in Gadamer, *Philosophical Hermeneutics*, *op. cit.*, pp. i - lviii; Roy J. Howard, *op. cit.*; James S. Hans, "Hermeneutics, Play, Deconstruction," *Philosophy Today* 24 (1980): 297-316; *idem*, "Hans-Georg Gadamer and Hermeneutic Phenomenology." *Philosophy Today* 22 (1978): 3-19; Klaus Dockhorn, "Hans-Georg Gadamer's *Truth and Method*." *Philosophy and Rhetoric* 13, 3 (1980): 160-80.

[35] Gadamer (*Truth and Method*, *op. cit.*, p. 269) defines "horizon" as follows: "Every finite present has its limitations. We define the concept of 'situation' by saying that it represents a standpoint that limits the possibility of vision. Hence an essential part of the concept of situation is the concept of 'horizon.' The horizon is the range of vision that includes everything that can be seen from a particular vantage point." When we use the terms "horizon" and design "situation" in the following, we are using them in the sense in which Gadamer here defines them.

to the rules of logic this may seem.

Looking at this from a slightly different viewpoint, the logical paradox implies that we can only understand the sentence *after* it has been construed as a whole, so that the meanings of its constituent parts can then be understood in retrospect. Understanding of language, however, does not proceed in this retrospective manner, but at the same time as the language event takes place. We understand words as they are uttered. On a larger scale, we cannot fully understand the parts of a text except in the light of the text as a whole, but we nevertheless understand the parts as we read them and before we have completed reading the whole text. How is this possible?

> "A person who is trying to understand a text," says Gadamer, "is always performing an act of projecting. He projects before himself a meaning for the text as a whole as soon as some initial meaning emerges in the text. Again, the latter emerges only because he is reading the text with particular expectations in regard to a certain meaning. The working of this fore-project, which is constantly revised in terms of what emerges as he penetrates into the meaning, is understanding what is there."[36]

When reading a text or hearing a speech utterance, we have initial intimations and expectations of what the meaning of the whole will be, and interpret accordingly what we are reading or hearing at the moment. We pick up clues and cues from the parts, and from these construct an antecedent formulation of the whole, which then functions in a dialectical fashion to refine and redefine the parts. We move from partial and disjointed insights to an understanding of the whole and back to the yet-to-be-understood portions of the text. As soon as we initially discover some elements that can be understood, we sketch out the meaning of the whole text. We cast forward (or fore-cast) a preliminary project, which is progressively corrected as the process of understanding advances. Interpretation brings with it an anticipation, albeit vague and informal, of the meaning of the whole; and the light of this anticipation plays back to illuminate the parts. This prior understanding is in turn corrected or confirmed, and gradually specified, as the details react upon it. [73]

That is to say, we project a meaning of the whole even as we begin to read the text or hear the speaker and understand the parts accordingly. This preliminary projection is continually revised as the reader or listener penetrates deeper into the meaning of the parts. The projection, at first unclear and only existing in outline, plays back into the interpretations of the parts, requiring their revision even as the projected meaning itself is continually revised in the light of the interpretation and increasing understanding of the parts. By this process of to-and-fro reflection the understanding of the whole gradually emerges.

As Habermas puts it, the future exists as a horizon of expectations, which fuse hypothetically the fragments of previous experience into an intuitively grasped totality. We anticipate end states by reference to which events, both past and present, smoothly

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[36] Gadamer, *Truth and Method*, *op. cit.*, p. 236.

coalesce into "action-orienting stories."[37] This is a cycle of anticipation and revision. We anticipate the outcome of our activities and interpretation proceeds in the ambience of an anticipated outcome. The outcome permeates our present understanding.

Understanding thus involves a process of projection, but what is the nature of this projection?

Describing what he calls the "fore-structure of understanding," Heidegger says that in any interpretive event, such as understanding spoken language, a text, or the meaning of an object, before we begin consciously to interpret we have already placed the matter to be interpreted in a certain context, viewed it from a pre-given perspective, and conceived it in a certain way.[38]

> "The process that Heidegger describes is that every revision of the fore-project is capable of projecting before itself a new project of meaning, that rival projects can emerge side by side until it becomes clearer what the unity of meaning is, that interpretation begins with fore-conceptions that are replaced by more suitable ones. This constant process of new projection is the movement of understanding and interpretation."[39]

Gadamer terms these fore-structures "prejudices," with the provocative intent of calling into question the Enlightenment's "prejudice against prejudice," which he sees as a wholly false interpretation of the nature of consciousness and as instrumental in creating an ethos of alienation. He aims to rehabilitate prejudice (pre-judging), rescuing it from its pejorative connotations. All understanding, he says, necessarily involves prejudice, fore-meanings that are not fully objectifiable. These prejudices can be either enabling or disabling, depending on the way in which they are opened up to hermeneutical understanding.

Interpretation, then, is "the working out of possibilities projected in understanding," [74] that is, it is the working out of how something figures in the context in which it stands.

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[37] Jürgen Habermas, "A Review of Gadamer's *Truth and Method*," in Dallmayr and McCarthy, *op. cit.*, 335-363, p. 350.

[38] Heidegger, *Being and Time*, *op. cit.*, ¶ 31-33 (pp. 182-203.) Heidegger terms these three fore-structures "fore-having" (*Vorhabe*), "fore-sight" or "fore-seeing" (*Vorsicht*), and "fore-conception" or "fore-hypothesis" (*Vorgriff*). *Vorhabe* includes all the culturally acquired skills and practices we employ in acts of interpretation; these cultural practices are constitutive of our being, and thus determine what we find intelligible. *Vorsicht* includes all the resources of a common descriptive language, the vocabulary or conceptual scheme we bring to the act of interpretation, and which determines what we count as real and what are relevant aspects of what we interpret. *Vorgriff* is a hypothesis we have concerning the thing being interpreted; it is the "conceptual reservoir" that we hold in advance and bring to the interpretive act. See Heidegger, *Being and Time*, *op. cit.*, p. 193; Warnke, *op. cit.*, 77 ff.; Patrick A. Heelan, *Space-Perception and the Philosophy of Science*, Berkeley, University of California Press, 1983, pp. 220 ff.; *idem*, "Perception as a Hermeneutical Act," *Review of Metaphysics* 37 (1983): 61-75, pp. 69 ff.; Winograd and Flores, *op. cit.*, pp. 75 ff; Ormiston and Schrift, *op. cit.*, pp. 15 ff.

[39] Gadamer, *Truth and Method*, *op. cit.*, p. 236.

Heidegger and Gadamer both say that this anticipatory projection of meaning underlies every act of understanding. In sensing a thing we sense it *as* something. When we hear a sound we don't, except by an artificial and willed withdrawal of understanding, hear a meaningless, disembodied and abstracted sound, a mere impact upon the ear, but hear it as something carrying meaning—the cry of a baby, the screech of a tyre, the sound of a voice. When we see something, we see it not as a meaningless object to which we only later, and as a subsequent action, attach a meaning, but rather as something that we immediately, and coincident with the seeing, see as something already meaningful. The act of seeing something is an act of recognizing it, of understanding it as what it is.[40]

The action of sensing a thing *as* something presupposes and *requires* that there is a preunderstanding of what the thing is prior to the simultaneous acts of sensing and recognizing it. In this action we understand the thing, we understand what it is, because we already understand it, and bring that prior understanding with us to the sensing and the recognizing.

> "In interpretation we do not, so to speak, throw a 'signification' over some naked thing which is present-at-hand, we do not stick a value on it; but when something within-the-world is encountered as such, the thing in question already has an involvement which is disclosed to our understanding of the world, and this involvement is one which gets laid out by the interpretation." [41]

That is to say, when we interpret something as something, when we understand it as something, we do not first perceive it as an object and *then* clothe it with meaning. The interpretation is grounded in something we have in advance, a preunderstanding. We have a fore-conception. "An interpretation is never a presuppositionless apprehending of something presented to us."[42] Meaning gets its structure from these preunderstandings, which render the thing intelligible. All interpretation therefore operates in the forestructures. The interpretation has already understood what is to be interpreted.

Similarly, we understand a speech utterance instantly, at the moment of hearing it. We understand it as meaningful, not after hearing it, but as we hear it. This understanding is only possible because we have a prior understanding of what the statement is saying even as it is spoken. We have, as it were, projected an understanding onto the statement in the moment of its enunciation, and in this manner understand the statement *as* something.

In our everyday, normal relationship with the world in which we live we make sense [75] of things without having first to grasp them conceptually as objects that stand over against us. Things are simply there; they are not alien and distanced objects, but are familiar and already understood. Things are, in Heidegger's phrase, "ready-to-hand."

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[40] This concept of understanding as metaphoric comes from Heidegger (*Being and Time*, *op. cit.*, ¶ 33, pp. 195-203 and cf. p. 410). Heelan, *Space-Perception…*, *op. cit.*, *passim*, develops the Heideggerian concepts as they relate to perception.

[41] Heidegger, *Being and Time*, *op. cit.*, pp. 190-1.

[42] *Ibid.*, pp. 191-2.

We perceive them "circumspectively," that is, not as objects, but in a practical manner, either as things that have some practical use or else simply as things that are there in the situation in which we operate. We don't need to ask what things are doing there; they are familiar, at home, in their right place; they do not surprise us; we do not have to explain their presence; they do not elicit from us some special account of their meaning, because they are already, just as they are, meaningful. A hammer is of practical concern to the carpenter, but has no theoretical interest for him, except when something goes wrong, when there is a "breakdown" in this relationship, and the hammer registers as an object or, as Heidegger puts it, it becomes "present-to-hand."

Our understanding of things in the lived world is not a matter of knowing objects but of taking them for granted. They are there, in our circumspective perception; they are already understood; our relationship to the world is already hermeneutical through and through; we understand things before they are there as objects for our direct inspection.

Not only do we throw forward our pre-understandings in every act of interpretation, says Heidegger, but the pre-understandings themselves have been "thrown" into our present situation from past experience. We are not simply "objects" in the world, objects without a history and as if isolated from the past, but are thrown into the midst of a network of understandings of practices, institutions, conventions, aims, tools, expectations, and a multitude of other factors that make us what we are.

Nor are our projections merely arbitrary productions of the subjective imagination. The projection derives from experience brought to bear on the clues scattered in the situation we are in.[43] Anticipations of the completed whole are not the positings of subjectivity but emerge from preunderstandings that inhere within the situation itself.[44]

A typical positivist and empiricist criticism of the hermeneutical circle claims that the circle is vicious in that the "validation" of an interpretation can only be by appeal to other interpretations of the "parts," so that we are caught up in an endless cycle of interpretations.[45] In this view there must be some criterion or method that stands apart from the circle of interpretations, something to which we can refer to assess the truth or falsity of our interpretations. In answer to this it can be said that we do not choose to enter the circle of interpretation. We are already in it, in all our thinking and actions, including the act of establishing scientific criteria of validation. As much as it may scandalize empiricists and positivists, the criteria by which we assess interpretations are nothing more or less than other interpretations. If the [76] adequacy, or felicity, of our

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[43] The nature of experience involves notions of skill, tacit understanding and what Gadamer calls "effective-historical consciousness."

[44] These preunderstandings derive in large part from the tradition—both cultural and professional—in which the practitioner operates. See Günther Buck, "The Structure of Hermeneutic Experience and the Problem of Tradition," *New Literary History* 10, 1 (Autumn 1978): 31-47.

[45] Studies in this dissenting mode include E.D. Hirsch Jr., *Validity in Interpretation*, New Haven, Connecticut, Yale University Press, 1967; Charles Altieri, "The Hermeneutics of Literary Indeterminacy: A Dissent from the New Orthodoxy," *New Literary History* 10, 1 (1978): 71-100; Anthony Savile, "Historicity and the Hermeneutic Circle," *idem*, 49-70; Peter Szondi, "Introduction to Literary Hermeneutics," *idem*, 17-30.

interpretation is not apparent to others, then the best we can do is refer them to other interpretations that support and expand our own. This again is the functioning of the hermeneutical circle: we establish an interpretation by appealing to other interpretations as a grounding for our own, which operation is an inter-referencing of whole and part. If this does not lead to unassailable certainty, then neither do any other events of understanding, including those that take place within the domain of rigorous scientific method. This lack of final and absolute certainty is the inescapable epistemological predicament that is built into the human condition. It is a condition of our own finitude.[46]

Meaning is not fixed and firm, but is historical; it changes with time and as the situation changes. Understanding is in perpetual flux. Meaning is not an immutable object that stands over against us but is an everchanging part of an ever-changing situation. It is not an object, but neither is it subjective. It is not something we think first and then throw over onto an external object. It is known from within and can only be so known: we cannot get around in front of meaning, any more than we can get around in front of language. We are embedded in meaning structures, and so cannot view them as objects that can be tested by the criteria of logic. Meaning exists prior to any separation of subject and object. In the interpretive act the Cartesian subject-object dichotomy dissolves.

How, then, can we assess the validity of interpretations? A projected interpretation only approximates what the whole might be and is highly fallible. It may well be a wholly inappropriate anticipation. Given that we cannot resolve conflicts between interpretations by an appeal to empirical evidence or to formal logic, since these presuppose a taken-for-granted understanding of what type of evidence and what type of argument can be allowed to enter into the discourse, by what token can we say that a projected interpretation is not merely arbitrary?

"The only thing that characterizes the arbitrariness of inappropriate fore-meanings is that they come to nothing in the working-out. But understanding achieves its full potentiality only when the fore-meanings it uses are not arbitrary."[47]

The interpreter must not rely on the fore-meanings at once available to him, but must,

"examine explicitly the origin and validity of the fore-meanings present within him… This fundamental requirement must be [77] seen as the radicalization of a procedure that in fact we exercise whenever we understand anything."[48]

We assess the validity of interpretations by entering into a "dialectic of guessing and validation."[49] The projection must be perceived to be open to error and must be

[46] To label this as "relativism" is merely to pander to untenable Positivist notions of "objectivity." See Taylor, "Interpretation…" *op. cit.*, p. 65. Cf. Bernstein, *Beyond Objectivism…*, *op. cit.*, pp. 133 f., and *passim*.

[47] Gadamer, *Truth and Method*, *op. cit.*, p. 237.

[48] *Idem*.

[49] The phrase is from Paul Ricoeur, "Ethics and Culture—Habermas and Gadamer in Dialogue," *Philosophy Today* 17 (1973): 153-65. Cf. Paul Rabinow and William M. Sullivan (eds), *Interpretive Social Science—A Second Look*, Berkeley, University of California, 1979, p. 15.

constantly recast, which is to say, reinterpreted. This is achieved by way of a dialogic exchange of question and answer, now to be examined as having direct relevance to the dynamics of the process of designing.

The Dialogical Basis of Understanding

Gadamer gives a series of metaphors to elucidate the nature of the hermeneutical event.[50] One metaphor likens understanding to the dialectical process of question and answer that takes place in serious conversation. It is pertinent here because it relates to themes to be developed in the following and also because it gives a picture of the functioning of language that is wholly opposed to the atomic language model. Gadamer cites authentic conversation or dialogue as the quintessential hermeneutic event.

Gadamer describes a dialogue as,

"a process of two people understanding each other. Thus it is characteristic of every true conversation that each opens himself to the other person, truly accepts his point of view as worthy of consideration and gets inside the other to such an extent that he understands not a particular individual, but what he says. The thing that has to be grasped is the objective rightness or otherwise of his opinion, so that they can agree with each other on the subject."[51]

By dialogue he does not mean idle chatter, but genuine conversation, which he characterizes as follows:

"A fundamental conversation is never one that we want to conduct. Rather, it is generally more correct to say that we fall into conversation, or even that we become involved in it. The way in which one word follows another, with the conversation taking its own turnings and reaching its own conclusion, may well be conducted in some way, but the people conversing are far less the leaders of it than the led. Understanding or its failure is like a process which happens to us."[52]

True dialogue is the opposite of argument. Both sides are immersed in the discussion. They are both concerned to enlarge their understanding of a subject. As in the exemplar of all dialogue, Socratic dialectic, it is a process of interrogation and appropriation. It involves a recognition and assimilation of the unfamiliar. In authentic dialogue the positions of both partners are transformed. A genuine dialogue is a give and take whereby the participants arrive at a new understanding.

To think of the dialogue as an encounter between a subject (I) and an other (thou) [78] is to misread a subject-object dichotomy into a situation where it does not apply. In genuine dialogue the participants are caught up in the give and take, in such an involved way that they lose themselves in the conversation. The conversation has an internal

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[50] Gadamer's *Truth and Method* could be described as a series of such metaphors.

[51] Gadamer, *Truth and Method*, *op. cit.*, p. 347.

[52] *Ibid.*, p. 345.

buoyancy, the to-and-fro movement of a wholly absorbing game.[53] Gadamer makes the equation of the dynamics of dialogue and game-playing explicit when he says,

"Now I understand that the basic constitution of the game, to be filled with its spirit—the spirit of buoyancy, freedom and the joy of success—and to fulfill him who is playing, is structurally related to the constitution of the dialogue in which language is a reality. When one enters into a dialogue with another person and then is carried further by the dialogue, it is no longer the will of the individual person, holding itself back or exposing itself, that is determinative. Rather, the law of the subject matter is at issue in the dialogue and elicits statement and counterstatement and in the end plays them into each other."[54]

The question-answer structure is a form of the hermeneutical circle since the question posits a preliminary way of seeing. The hermeneutical experience is dialogical. The reader enters into a dialogue with a text, commences a to-and-fro give and take that proceeds until understanding is reached. The dialogue enables the text to reveal itself and enables a new understanding.

Dialectic and the method of the natural sciences proceed in entirely different ways. In method the inquirer controls and manipulates; in dialectic the subject matter of the discussion poses questions to which the inquirer responds. The subject matter interrogates the inquirer. The dialectical process is entered into so that the subject matter can reveal itself. Gadamer says that experience has its dialectical fulfillment "not in knowing but in an openness for experience, which is itself set in free play by experience."[55]

In the paradigmatic hermeneutical event, the interpretation of a text, there is a reciprocity of questioning: the interpreter asks a question of the text, and at the same time the text addresses a question to the interpreter. Further, to understand the text is to understand the question asked by the text. This is the question-answer structure of all true dialogue, a structure which is radically fundamental in every hermeneutic act. Gadamer claims that, like the hermeneutical circle, the structure of questioning inheres in all experience. He says,

"It is obvious that in all experience the structure of questioning is presupposed. Experience is not to be had without questioning. The realization that some matter is other than one had first thought presupposes the process of passing through questioning. The openness which lies in the nature of experience is, logically seen, as openness to thus or thus. It has the structure of a question."[56] [79]

The hermeneutical experience begins when the interpreter is sufficiently open to allow the text to question him or her. By this process the horizon of the interpreter is

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[53] Play is another of the metaphors that Gadamer uses to provide insights into the nature of the workings of the hermeneutical enterprise.

[54] Gadamer, *Philosophical Hermeneutics*, *op. cit.*, p. 66.

[55] *Ibid.*, p. 338.

[56] *Ibid.*, p. 344. Cf. Ted Peter, "The Nature and Role of Presupposition: An Inquiry into Contemporary Hermeneutics," *International Philosophical Review* 19, 2 (1974): 209-222, p. 217.

fused with the horizon of the text.[57] The text "unhinges" our prejudices and suggests its own. What is essential in any true dialogue is an openness to what the other is saying, so as to test our own understandings and preunderstandings.

Genuine conversationalists must be open to the questioning of the other, but this openness is not the "open-mindedness" of the *tabula rasa*. We ask questions which have a particular orientation, directed by our preunderstandings.[58] A question is always directional or intentional in character.

To say that a text questions us is to say that it speaks to us in the manner of a partner in a conversation. Is this a valid analogy? Gadamer acknowledges that the encounter with the text is not the same as the encounter between two people engaged in a conversation, in that the interpreter projectively supplies the meanings of the text. The text obviously does not in any literal sense speak and ask questions, and cannot even be said to speak for the author; but the concept of the text asking questions has validity in that in the act of its interpretation there is a communication, a fusion of horizons, in a common sphere of meaning. The disclosure of new understandings of a subject matter that is common to the text and the interpreter makes the hermeneutic situation the equivalent of the transmission of meanings that takes place in a dialogue conducted by two people. The dialogue with the text is like a living conversation "in that it is the common object that unites the partners, the text and the interpreter."[59] In the same way that a creative discourse is not originated or imagined by the interpreter but has its own impetus, takes its own course, and leads the participants, so the interpreter does not guide the conversation with a text but is rather guided through the subject matter.[60]

Inquiry by way of question and answer characterizes the human and hermeneutic sciences. It is their distinctive mark just as the use of rigorous method is the distinctive mark of the natural sciences. The dialogic inquiry by means of question and answer is not a method: "There is no method of learning to question, of saying what is questionable."[61] Genuine questions are not something we think up nor something we do. On the contrary, they occur to us, they happen, they arise of their own accord.

There is no method of making up questions, but they can nevertheless be prevented from arising. They only occur to us if we allow them to arise and if the conditions are conducive to their appearance and acceptance. The conditions are conducive when the interpreter is given over to the dialogue, as happens when we are engrossed in a stimulating conversation. In this situation I do not choose my words with care; I do not plan what I am about to say, but speak spontaneously. I hear my own words as I utter them and at the same time as my listener hears them, and they can be as [80] disclosive to me as they are to the other. The conversation transcends the separation of subject and

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[57] The notion of the fusion of horizons is fundamental to Gadamer's philosophy of hermeneutics. See Jan Edward Garrett, "Hans-Georg Gadamer on 'Fusion of Horizons'," *Man and World* 7 (1978): 392-400.

[58] Cf. Peter, "The Nature and Role of Presupposition…," *op. cit., passim.*

[59] Gadamer, *Truth and Method*, *op. cit.*, p. 349.

[60] Cf. John Hogan, "Gadamer and the Hermeneutical Experience," *Philosophy Today* 20 (1976): 3-12.

[61] Gadamer, *Truth and Method*, *op. cit.*, p. 329.

object. I interpret the other speaker's questions and objections in ways unintended when uttered. The conversation has a life of its own, leading the speakers into areas that are new to them, and going beyond their initial intentions and interests. We are caught up in conversation; questions arise effortlessly from the conversation itself, generated by its internal dynamics.[62] We sustain conversations; we do not create them, even if they draw upon out total interpretive skills and experience.

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Hermeneutical philosophy claims that the hermeneutical process outlined in the preceding is primordial and universal. It operates not only in the understanding of language and texts, but in every act of understanding. Processes of understanding are radically fundamental to all human perception, thought and action. The hermeneutical process is more basic than and prior to the use of logic, formal languages and scientific method, and therefore forms the foundation for all rationality.

The hermeneutical circle applies to one's whole life, which is an ongoing process of interpreting experiences.[63] Our interpretation of experiences modifies our perception of the past and our anticipations of the future; and our understanding of the past and the future forms the context in which we interpret experiences. Understanding and experience are in constant interaction. Our self-understanding affects our understanding of all other things. All understanding is self-understanding.

In this sense hermeneutics is fundamental to our mode of being. Understanding is not one of our activities in the world, but is basic to everything we do and are. "Understanding is the original character of the being of human life itself."[64] The hermeneutical structure acts in every kind of experience-gathering and in every mode of cognitive acquisition, including the acquisition of language. It operates in all exposition and in all learning. The hermeneutic circle that operates in the understanding of a text is a particular instance of a general state of affairs.

The operation of the hermeneutical circle is not the employment of a method. It is not something we can choose to use or not, in the manner of a tool. It is, rather, embedded in all thought and in all action. To elucidate the workings of this structure is not to formulate a new-found procedure as an alternative to others; it is not to propose a non-mathematically based model in contrast to models based on the paradigms of mathematics and formal language. It is, rather, simply to indicate what is operating in every act of understanding, operating at such a basic and radical level that it cannot be dispensed with, cannot be rejected or accepted. To speak of [81] choosing it as a method is as meaningless as to speak of the acceptance or rejection of language.

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[62] Cf. Alisdair MacIntyre, "Contexts and Interpretation. Reflections on Hans-Georg Gadamer's *Truth and Method*," *Boston University Journal* 24, 1 (1978): 41-.

[63] The application of the hermeneutical circle to life experience (*Erlebnis*) is a pivotal concept in the philosophy of Dilthey. Cf. Warnke, *op. cit.*, pp. 26 ff.

[64] Gadamer, *Truth and Method*, *op. cit.*, p. 230.

Designing and the Hermeneutical Circle

After this long excursion, it is time to return and apply these findings to the design process. Even a cursory examination of the protocol studies of Donald Schön indicates that the design process he describes works according to the dynamics of the hermeneutical circle, proceeding by way of a dialogic exchange with the design situation.[65]

Schön speaks of design as "reflection-in-action," which is "a reflective conversation with the situation." "The principle is that you work simultaneously from the unit and from the total and then go in cycles—back and forth, back and forth…" We "begin with a discipline, even if it is arbitrary," which, in hermeneutical terms, is the projection of a preunderstanding. This projected discipline, says Schön, is a "what if," to be adopted in order to discover its consequences, and can always "be broken open later." The designer thus begins the design task by shaping the situation in accordance with an initial appreciation. The situation then "talks back" and the designer responds to the situation's back talk by reflecting-in-action on the construction of the problem, the strategies of action, or the model of the phenomena. The process then develops in a circle—"back and forth, back and forth." Each move draws out the implications of earlier moves, seen as having consequences that are described and evaluated in terms drawn from one or more design domains, and having implications binding on later moves, creating new problems to be described and solved. In this way the designer spins out "a web of moves, consequences, implications, appreciations and further moves."[66]

What Schön describes here is a clear and straightforward account of the working of the hermeneutical circle. The designer proceeds by way of a continuing inter-referencing of a projected whole and the particulars that make up the design situation.

In the design process we project the meaning of the whole and work out the implications of this projection by referring it back to the parts.[67] There is a prescient anticipation of the whole, which is then explicated in the individual parts. The design is continually re-determined by an anticipatory movement of the pre-understanding. The designer has an anticipation of the whole which guides his or her understanding of the particularities. Understanding arises by a process of constant revisions.

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[65] Donald A. Schön, *The Reflective Practitioner—How Professionals Think in Action*, New York, Basic Books, 1983. Schön's studies are a sound base for research into the hermeneutical nature of the design process. Cf. Peter G. Rowe, *Design Thinking*, Cambridge, Mass., MIT Press, 1987.

[66] *Ibid.*, pp. 78 ff.

[67] The associations are reflected in etymologies. We speak of the design "project," which word literally means a "throwing before." "Project" is used to translate Heidegger's *Entwurf*, which means "throwing something off or away from one," with a stronger sense of "throwing" than does the English equivalent. In its common usage, however, *Entwurf* means "designing" or "sketching" some intended "project." It is also used in the sense of "projection" as when we say that a geometer "projects" a circle onto a plane surface. See Ormiston and Schrift, *op. cit.*, p. 130 (fn. 6).

Bernstein's description of the hermeneutical circle as a "continuous dialectical [82] tacking between local detail and global structures… a sort of intellectual perpetual motion" applies equally well to the design process.[68] The design process turns local detail and global structures into explications of each other.

The design process can be compared with the interpretation of a text. Design is an interpretative activity, one of understanding a design situation rather than of solving a problem.[69] Designers come to the design situation with a pre-understanding of what the designed artefact will be. Even as they begin to examine the 'text' of the design situation—the parameters that 'define' it—they have a pre-understanding, a vague projection of the completed product. As they proceed with their interpretation and as their understanding increases by way of an interpretation of the parts, the projected whole is modified, refined, and clarified. This process is fluid, repetitive and continuous. It furnishes a kaleidoscope of ever-changing reflections, revisions, false starts and back-tracking, leading eventually to a clarification of the projection.[70]

We project a provisional image of a future fulfillment from our present situation of understanding, into which we have been thrown by our past design experience. There is a mutual influencing and interaction of past, present and future understandings. Our present understanding of the artefact projects forward to adumbrate the artefact in its future completion, and this provisional projection then throws back to refashion our present understanding, which in turn throws back to refashion our understanding of our past experience… and so the cycle continues.

In the design process we often do not fully know what the goal is until we have reached it.[71] Nevertheless, the obscurity of the goal does not block our design activity. Even though initially we don't know precisely what we are striving to achieve, we have some sort of vague preconception. The particulars of the situation give us clues to the unknown.[72] Our ability to arrive at a design goal depends on our ability to anticipate a hidden potentiality.

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[68] The phrase comes from Bernstein, *Beyond Objectivism…*, *op. cit.*, p. 95, where he is speaking of the hermeneutical process in general.

[69] We consider the term "project" to be more appropriate to describe the design task and its goal than is the word "problem," which carries over connotations from mathematics and the physical sciences. To speak of the Gothic masons, for example, as having the "problem" of designing Chartres is faintly ludicrous. To speak of "problems" is already on the way to handing over design to fundamentalist scientism. On the other hand, the etymology of the word "problem" itself carries associations with "project." It comes from the Greek *problema*, -*matos*, from *pro-ballô*, "to throw before," that is, "fore-throwing."

[70] This is obviously merely an outline of what is a complex procedure. The design develops both verbally and by way of images; and there is an involvement of the body as well as the mind. It is intended elsewhere to develop the ideas sketched here.

[71] This is one of the characteristics of the "wicked problems" that at one time exercised design methodologists.

[72] Cf. Michael Polanyi, *Personal Knowledge*, Chicago, Illinois, University of Chicago Press, 1958, pp. 126 ff. Aspects of Polanyi's thinking, working from an epistemological base, show remarkable parallels with hermeneutics.

Again, even when the designer approaches a particular design task with a sense of its unintelligibility, a single factor in the design situation, perhaps some characteristic of the site or some specific requirement of the client, can illuminate and orient the task, drawing what was without coherence into a preliminary projection of a meaningful whole. The single factor suggests an image of the whole.[73] With this projection, albeit vague, the hermeneutical circle has been entered and can proceed in its back-and-forth way.

The efficacy of the process depends on keeping it moving. It also depends on an openness that allows for the intrusion of rival projections. Every projection contains the potentiality of itself projecting a new design. Alternate projections can develop side by side until they coalesce or one drops out of the contest. [83]

Designing is grounded in understanding and is nothing other than the explication of what has already been understood. This does not mean, however, that the design is predetermined, or that the process must take a preordained sequence of logical steps, nor that there is a preestablished result—the answer—and prescribed methodological steps to that result. The explication of what is already understood only unfolds when the process is fluid and retroactive. The projected task completion must be allowed to reflect back into the design situation and affect the interpretation of particulars.

The hermeneutic act of designing follows a dialectical structure of question and answer.[74] The designer projects an anticipated completion of the work, and then enters into a dialogue with it, questioning its validity in the light of the particular factors that make up the design situation. The designer then allows the design situation to ask questions in its turn. The answers given by the situation and the questions it raises evoke further answers and questions, and the design proceeds by a back-and-forth, to-and-fro movement of query and response.[75]

If the design process is a dialogical cycle of question and answer, who or what does the design situation question? It questions all the prejudgments, preunderstandings, values and attitudes which the designer brings to the design situation, preconceptions which are taken for granted since they are for the greater part unconscious.[76] The question is referred back to the designer's own fore-structures.

When designing, designers are continually being questioned. They can facilitate that

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[73] Cf. Jane Darke, "The Primary Generator of the Design Process," *Design Studies* 1, 1 (1979): 36-44.

[74] We are here in the realm of metaphor, where the literal or true/false statement is alien. The metaphor of dialogue, the back-and-forth of question and answer, is a metaphor for a process that might or might not be conscious, and might or might not be verbal. For the designer, the visualization of forms in the imagination can be as evocative as any question articulated verbally.

[75] The dialogue is multi-faceted, with a multitude of questioners and answerers. The conditions of the site, the brief, and all the other factors have their questions and their answers. It is not intended here to go into specifics.

[76] The "unconscious" here is not to be confused with the unconscious of psychoanalysis. Unlike the contents of the psychoanalytical unconscious, what is brought into the open in the hermeneutical process has not been repressed. The disclosure is not brought about by the removal of some sort of blockage, but is, rather, the revealing of the nature of the thing, which is the resultant nexus of an historic process.

process by laying themselves open to the questions, leaving themselves vulnerable, at risk, by taking the questions as probings of their prejudgments; or they can proceed in a one-sided manner, asking questions of the situation, but protecting their preestablished biases by not allowing themselves to be questioned in return. In the former case there is a revelatory disclosure of unconscious mind sets, and this disclosure renders the design process not only a dis-covery (an uncovering) of the artefact as it reveals itself in the process of discourse (in the manner in which insights reveal themselves to participants in a conversation), but it is also self-revelatory, a process of self-discovery or of edification.[77]

The process of design is thus a disclosure, in two senses. Firstly, it is a disclosing of the artefact that is being designed; and secondly, and simultaneously, it is an unfolding of self-understanding, since it reveals one's preunderstandings. It uncovers the preconceptions that are constitutive of the design outcome, and at the same time brings to light the prejudices that are constitutive of what we are. The design process is an edification in two senses: it builds up the artefact and edifies the designer.

Is the analogy between designing and dialogue valid? In dialogue we speak with [84] another person. In designing we enter into a discourse with a design situation and with our own design projections. In what sense can these be said to speak or ask questions?

We can engage in dialogue with things as well as people.[78] The project and the design situation are self-representing and act as texts, which the designer engages in dialogue. The designer enters into a dialogue with his or her own project and with the design situation as with unfamiliar and alien texts, allowing them to question preunderstandings.

In the design situation the designer speaks for the situation, channeling the questions it asks to him or herself.[79] One partner in the hermeneutical conversation, namely the design situation, like the text in its interpretation, is expressed only through the other partner, the designer-interpreter. In this the design situation is continually changing as the conversation proceeds. The situation does not answer and question the interpreter as some static thing. The situation changes as the interpreter's understanding of it changes, and this understanding is conditioned by the designer's prejudgments and preunderstandings. This rules out the notion of any "objective" analysis of the constitutive factors in a design situation. Not only do we select those "objects" in accordance with our interpretive preconceptions, but they are what we understand them to be at this moment. They have no abiding presence.

In the manner of a spirited conversation, which carries the speakers along and in which they are wholly involved, the design situation carries the designer in its flow.

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[77] The concept of edification (*Bildung*), involving associations with cultivation and education, is basic to the thinking of Gadamer. Rorty (*Philosophy and the Mirror of Nature*, *op. cit.*) borrows the idea, and makes it central to his concepts concerning the function of philosophy.

[78] Latour, *op. cit.*, pp. 121 ff., develops the concepts of things as speakers in a dialogue.

[79] A tutor in the design studio performs the same translating function.

Good conversation absorbs the speakers; so likewise the action of designing, when it is proceeding as it should, absorbs the designer. Designers are truly designing when they are so absorbed in the task that they are not aware that they are designing, nor that the design situation is an object outside themselves.

There is no end point in the hermeneutical circle; and neither is there a starting point. We do not come into a design situation without [85] presuppositions. There is a minimal preknowledge necessary for understanding, without which the designer cannot begin to design. Descartes' ideal of a prejudiceless transparency of mind is unattainable. Not only does every part of the design presuppose the others, but we bring presuppositions regarding the whole situation and its parts by way of our experience, both our general life-experience and our more specific experience as designers. The most raw of design students, wholly untrained in design, has nevertheless been exposed from birth to the products of the design process. He or she comes to the design situation with this experience preforming suppositions concerning the nature of the product. It is fruitless to attempt to wipe the mind clean, to regain a *tabula rasa*, so that the student will come to the design task with an "open mind." There is no such thing as an open mind if this means a mind without prejudice, but the mind can be open to the questions raised by the design situation, open to the questions that threaten inappropriate presuppositions. To say that we bring prejudicial presuppositions to a task is not to say that those presuppositions cannot be made explicit nor that they cannot be challenged and changed or abandoned. This is precisely the nature of the hermeneutical process of [86] question and answer when it is operating in an open and unrestrained manner. The presuppositions of the designer, projected as an anticipation of wholeness, are in a perpetual state of interrogation, review, revision or rejection. If the design educator acknowledges the ineradicable existence of presuppositions, recognizing them as stemming from the experience that underpins all understanding and as the base from which the design image is projected, then he or she, rather than attempting to eradicate prejudices in students, will introduce them to a design dialectic, in which those presuppositions and preunderstandings are continually under question and are revised, expanded or rejected as responses to those questions.

We believe that this, rather than any model based on logical sequences of operations, is the fitting and appropriate foundation of a design education.

Dialogical versus Logical Design

We have, then, two opposed concepts of language as metaphors for the design process. On the one hand there is the model of formalized language, the language of primary units that are combined according to the rules of logic to form meaningful structures; and on the other hand there is the metaphor of the language of conversation and dialogue, which

is the language of interpretation.[80]

The two notions of language are mutually exclusive. The language of hermeneutics and dialogue is wholly antithetical to formal language. Habermas asserts that the unequivocal character of formalized languages is purchased at the cost of any possibility of dialogue. Formal calculi, he says, have a monadological structure, a structure that excludes conversation; they permit implications, but not communications; they replace dialogue with a mere exchange of information.[81] Bruns has shown that we only understand something when it is open to questioning. We cannot understand what is taken as settled and fixed. To be understood it must be restored to the questioning that gives it its sense.[82] Gadamer says that, "the logic of the human sciences… is the logic of the question,"[83] which means that it is dialogical rather than propositional. Propositional language shuts off questioning; it stops the interrogative flow; it expunges the ambiguities that open up new questions. In determinate, formalized language experience comes to a stand, assumes a fixed state, and expresses itself in assertions; but every assertion is the answer to a question. It is the task of the human (that is to say, hermeneutical) sciences to recall the questions that scientific propositions have forgotten, and to recall the process of conversation whence the proposition arose before it solidified into stasis. When a statement is considered definitive, it closes off any further questioning, for it is the definitive answer to whatever question was asked. No further question need be asked. In opposition to the propositional affirmations of the natural sciences, the human sciences affirm "the primacy of process over state and of question over statement."[84]

Whereas formal language is a language at the disposal of the user, the language of authentic dialogue does not belong to the speakers, but rather possesses and guides them. Its function is not instrumental, but disclosive; it reveals understanding from within itself, and thereby serves as a medium that transmits understanding between the speakers. We do not use language in a conversation as a set of pre-given atomic meanings accompanied by a set of rules for their combination. On the contrary, as we have seen, the meaning of words depends on the situation in which they are used, and the logic of language is not the logician's logic but a logic of question and answer. The language used in conversation cannot be reduced to logically formalizable rule-grammars.

If, as we have proposed, the design process is one of question and answer, then we can begin to see the dangers inherent in the use of models of formal language to describe and control it. Formal language by its very structure excludes and precludes the

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[80] Models are forms of metaphors; but metaphors are not necessarily models. Metaphor is the general term for a structure that includes models. Models as defined by science have limitations that are not binding on other types of metaphor.

[81] Habermas, *op. cit.*, p. 341.

[82] Bruns, *op. cit.*, 252 ff.

[83] Gadamer, *Truth and Method*, *op. cit.*, p. 333.

[84] Cf. Weinsheimer, *op. cit.*, p. 206.

operation of a dialogical exchange. The formal language model presupposes a separation of subject and object, and thereby conceals the dialectical nature of understanding. It obviates the engrossed involvement in which the subject and the object merge, an involvement which is the mark of genuine dialogue and the mark of genuine design activity. The formal model purchases finality at the price of holding open possibilities. In dialogue finality is forever suspended; the presuppositions of the participants are under continual review.

The dialogical and logical approaches to designing are irreconcilable. Designing, being a hermeneutical enterprise, does not employ inductive logic. It does not build generalizations from particulars in a linear and incremental manner, but predicts a generalization, the whole, and then works back and forth between that projected generalization and the particulars. In contrast to the deductive-nomological and inductive methods of explanation, which proceed by way of conclusions logically drawn from premises, the design process has no premises or conclusions. The whole and the parts of the interpretive situation are used neither deductively nor inductively, but as entities which confer understanding, as speakers in a dialogical oscillation between interpretation and assessment. It starts with no categorically definite question, problem, *explanandum* or conclusion; nor, equally, does it start from premises. The project—the perfected whole which is aimed for—only becomes more definite and determinate as the particularities of the situation become clearer; and these, in turn, are only understood with greater clarity as the whole is disclosed. [87] In retrospect, both the "conclusion" and the "premises" are seen to have been incoherent at the beginning of the interpretive process.[85]

Designing is primarily an interpretative activity. It is an activity that pertains to understanding a design situation rather than to having a knowledge of formulae, theorems and algorithms. Designing is a hermeneutical rather than an epistemological event. In the hermeneutical event application is interwoven with and wholly inseparable from interpretation and understanding; in the epistemological event, knowledge and its application are separate and sequential: knowledge is prior to its application. The answers to the questions arising in the situation are known in advance. They do not vary according to peculiar exigencies or contingencies.[86] In the epistemological schema, theory precedes practice. In the hermeneutical event theory cannot be divorced from practice. The theory, such as it is, only comes into consciousness, is only clarified, disclosed, in the process of its application. Theory and practice coalesce in the act of interpretation; general principles are revealed as what they are, are revealed to be what they are, come to be understood in their being, in the unfolding of their application in the

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[85] Cf. Heelan, *Space-Perception…*, *op. cit.*, pp. 265 f. The implications for abduction still remain to be demonstrated.

[86] In the same way that a primary tenet of Functionalist architecture was that buildings should have the same style everywhere, whatever the local conditions. Hence the "International" Style.

event.[87]

The non-logical nature of the design process is shown in that, as was said previously, a single factor in the design situation can trigger the whole design process. Something in a part evokes a preconception of the whole. Explanations of such "leaps" cannot be encompassed by logic; but they are comfortably accommodated within the hermeneutic horizon, and without resort to notions of intuition, creativity, and the other processes supposedly hidden beyond scrutiny in the "black box" of subjectivity. Such leaps in the design process can be explicitly understood in terms of the situation in which they occur, their relation to the parts and whole within a field of interactions.[88]

The hermeneutical nature of the design event has nothing to do with methodological analysis or hypothesis forming. A question in a dialogical situation projects a preliminary and provisional way of seeing. The question has its own horizon of expectations, which are subject to change according to the answer. Analysis and methodical questioning, by contrast, operate within a structure of inflexible presuppositions, which are not in turn called into question. The answer to the question is always expected to lie within the framework of the structure. The testing of a hypothesis is not a dialogical questioning, in which the answer in turn asks questions of the questioner, that is, in which the dialogue of question and answer breaks out of the framework of the methodological structure. In true dialogue the other's arguments are seen as a way of questioning oneself, and thus of transforming one's own understanding.[89] In logical discourse, by contrast, such a self-questioning is not possible.

This differentiates the hermeneutic projection from the scientific hypothesis. [88] It would be an error to suppose that hermeneutic projections are simply hypotheses, or that the hermeneutical design process described in the preceding is nothing other than the hypothesis-testing model of designing. The hermeneutical circle is wholly different to the process of verification or falsification of a hypothesis. The hypothesis, as conceived in Positivist methodology, formulates a specific anticipation, which is accepted in total or rejected outright on the evidence of testing procedures; experience answers the hypothesis with a simple yes or no, but in no way alters its content. The state of affairs proposed in the hypothesis is existent or non-existent. The hermeneutical anticipation, by contrast, feeds back into the particularities of the situation. The anticipation is either "fulfilled" or "disappointed"; if fulfilled it enriches the particularities, which then play back to enrich the anticipations; and if disappointed it likewise places the particularities in a new light, opening up new expectations and triggering further projections. In either case, whether the projection is fulfilled or disappointed, the horizon is enlarged.[90] The

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[87] This leads into some of Gadamer's most valuable insights: the identity of understanding, interpretation and application; the working of *phronesis*; the identity of theory and practice; the operation of ethics in practice; etc. It would take us too far afield to develp these considerations here.

[88] It is intended to develop this theme elsewhere in a study of the hermeneutical function of metaphor as it relates to the design process.

[89] Cf. Palmer, *op. cit.*, pp. 233 ff.

[90] This theme is developed by Buck, *op. cit.*, pp. 35 ff.

horizon change due to a disappointment of expectation is unlike the falsification of a hypothesis by way of a method. We have said that the disappointment of a projected expectation enlarges the expectation horizon. This enlargement is the discovery of something that has existed in the situation all along; it is implied in the old, discredited expectation. Unlike an hypothesis, which is discrete and strictly defined, every expectation horizon contains other horizons potentially within itself, alternate horizons which are revealed when the original expectation collapses. Gadamer posits that the disappointment of an anticipation is really a reversal of consciousness, a self-confrontation, which not only reveals our delusive opinions, but also the ways in which we have unconsciously been proceeding, thus bringing about a restructuring of understanding.

Logic-based models are powerless to comprehend (in both senses) the "irrational," contradictory and confused nature of much of the designer's activities. These aspects of the design process are wholly outside the limits of logic-based models. The same design behaviour "makes sense," however, when we approach it from the viewpoint not of logical knowledge but of understanding. We can make sense of design activities when we understand why the designer uses them, even when they are not logical, and this understanding arises when we locate design activities within the field of the design situation and the meanings that situation has for the designer. Making sense of the meanings of design actions and a design situation can only proceed by way of reference to the circle of interpretation. Design actions and design situations make up a "text" that can be read. This "reading," however, can only be explained not by reference to some external criterion, but to other readings that have reference to a projected whole. No argument based solely on logic is relevant in this never-ending play of interpretive readings.

All questions are prejudicial since they isolate out one thing rather than another to be answered; but whereas the limitations of a scientific model closes the view to [889] new developments, the question, precisely because it is limited, *opens up* views. As Gadamer says,

> "The openness of the question is not boundless. It is limited by the horizon of the question. A question which lacks this is, so to speak, floating. It becomes a question only when the fluid indeterminacy of the direction in which it is pointing is overcome by a specific alternative being presented. In other words, the question has to be asked. The asking of it implies openness, but also limitation. It implies the explicit establishing of presuppositions, in terms of which can be seen what still remains open."[91]

Whereas the use of logical methods is intended to arrive at a "solution" of a design "problem," a design process that proceeds by way of question and answer can have no final end. The answers given to a question open up further questions for those who are open and receptive to questioning. There is no "correct" answer that can be arrived at in the manner in which a correct answer can be arrived at by following a prescribed

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[91] Gadamer, *Truth and Method*, *op. cit.*, p. 327.

sequence of mathematical or logical steps. In the design process the answer to a question only opens up further questions, in a never-ending series. The end of the process is always imposed from outside the process, not from any finality that is found in the process itself. Whatever the nature of the external constraints that force an end to the ongoing process, every designer knows that any design could always be taken further.

The design process is an uncovering of *tacit* understanding,[92] and this hidden understanding is not something fixed, crystalline, frozen. It is processual, fluid, in incessant flux. It cannot, therefore, be brought to the surface in the manner of an archaeological find—some lifeless object—dredged up from the depths of the mind. Understanding is always in process, and this process is unending. It has no endpoint; it can never reach finality or completion. We never reach a point where it can be said, "Disclosure is complete," because new understandings are ever possible. Interpretation is never at an end. An interpretation evokes new interpretations. Understanding plays back to elicit new responses from the past; and plays forward to elicit new responses from the future. The design event is an inexhaustibly prolific and productive matrix, because it is a matrix that is ever reforming itself in conformity with its product.

<p style="text-align:center">•   •   •   •   •</p>

The general philosophical critique of the atomistic language model gains a new significance in the light of hermeneutic insights into the nature of the design process. At the level of ordinary speech and action meaning plays a basic and necessary role in all human behaviour. Every situation has meaning. If things and situations have meanings they do so within a network of other meanings. In the same way that a [90] word only has meaning in a context and in relation to other words used within a situation, so things only have meaning in relation to other things and other meanings in the field of meanings that the situation comprises. We cannot derive meaning from a single, isolated, unrelated thing.

Likewise the elements, the single, atomic "tokens" that are combined according to grammatical rules, have no meaning to the degree that they are isolated from a context; and, conversely, they are meaningful to the degree that they are embedded in a rich play and counter-play of other "elements," each carrying its own meaning, a meaning which, in the manner of a word in spoken language, can only be understood in relation to a context. As with concepts in a semantic field, where the introduction of new concepts alters the boundaries of other concepts, meanings are founded in relationships and contrasts.

A formal language—a rule-bound and artificial language made up of primary tokens—no more gives a true account of the language of design than it does of ordinary spoken language. The language of design, like normal spoken language, does not

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[92] We use the term "tacit understanding" rather than Polanyi's term "tacit knowledge" because understanding and knowledge, as noted above, are to be distinguished. The concept of "tacit knowledge" leads into a web of epistemological pre-assumptions that are irrelevant in this context.

proceed according to rules, nor do we learn it by way of rules. The design world no more consists of a set of atomic facts whose relationship can be expressed in logical propositions than does the world at large. We do not experience either of these worlds as a set of objective facts. 'Facts' interrelate with and interpenetrate other 'facts'; they cannot be considered in isolation, nor are they separable. We have always already interpreted 'facts' in the context of human needs, expectations, preoccupations, preconceptions, intimations. As soon as we make a 'fact' explicit, isolate it and rip it from context, we have lost its richness of meaning. To give a single and precise meaning to the 'fact' is its emasculation. As are words in language, every fact, whether in a design world or in the world as a whole, is polysemic.

Herein lies the basis for the hermeneutic critique of the atomistic notion of language and design with which this article commenced. We cannot understand the meanings of isolated elements such as words in a sentence or design tokens in a design situation unless we have a prior knowledge of the whole context within which the elements occur; we cannot substitute a stepwise, algorithmic procedure for practice involving interpretation, since our choice of elements is dictated by our understanding of the practice. The practice is not "legitimized" by a "rational reconstruction" out of the elements. We cannot avoid the circle of understanding; we cannot grasp the parts, the steps, of a process such as designing unless we know beforehand how the whole thing works, and we cannot get this holistic grasp until we understand the parts.[93]

To view the word or the design element as an atomic unit is to view it as an object, which presupposes a subject. But the word only has meaning in the context of interpretation, and interpretation, as Heidegger and Gadamer have insisted, [91] involves a fusion of the subject and the object. The act of interpretation dissolves the subject-object dichotomy. We do not stand back and apart from words as we use them in a situation. We are involved with words and with the situation. We do not possess words nor use them in the manner of tools, things to be used and manipulated, but we *are* the words we use. Language possesses us. We do not stand over against language, but are embedded in it.

So also, in the design process, we do not stand over against the entities that make up the design situation and manipulate them to form larger entities. If there is any sense at all in speaking about design "elements," there can be none in speaking about their manipulation. We do not control the various elements that enter into the design event. Quite on the contrary, they have meaning and relevance in that situation to the degree that we are caught up in the process, to the extent that those entities reveal themselves, indicate possibilities, and lead us in a process of disclosure.

To regard design tokens as objects to be manipulated and controlled is to accept the instrumental view of language, which sees language as a tool, as something external to the subject, something to be used. Such a view immobilizes the spontaneous play of dialogical exchange that is the hallmark of the design process; it prevents the disclosive function of language, in which language reveals new understandings from and of itself.

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[93] Rorty, *Philosophy and the Mirror of Nature*, *op. cit.*, p. 319.

It blocks the free flow of interpretation.

The atomistic language model casts potentialities of understanding in pre-established molds. It formulates possibilities of understanding *in advance* and once and for all. It pre-defines the limits of the process and thereby contains its free movement and blocks the disclosive function of dialogical language. Whereas hermeneutical designing proceeds within a network of shifting relationships, formal logic fixes this state of flux in static formulae. The fluidity of design is captured, as if by a camera, in algorithmic "stills."

Codified knowledge brings pre-known and pre-scribed answers to the design situation. Knowing the answers in advance, questions are redundant. Knowing excludes questioning. Those who know need not listen; they have the game sewn up. Pre-scribed decisions keep the situation silent.

The atomistic model renders the hermeneutical circle vicious. It pre-establishes projected meanings so that only what has been previously selected as knowable can become known, thus blocking the acquisition of new knowledge or understanding. The algorithmic formula encapsulates a knowledge of what has gone before. What has gone before becomes the prescription for what is to follow. A petrifaction of the past becomes the paradigm for present action. Presuppositions are necessarily brought to every interpretive event; but whereas the presuppositions of method have [92] frozen understanding in advance, the hermeneutical circle allows for an ongoing progression of understandings.

The atomistic language model, furthermore, is an exercise in exclusion. The model narrowly defines design in terms of its own preoccupations. It deals with only a tiny portion of what goes on in a design situation and excludes all else. To define design as the manipulation of formal elements is to exclude the greater part of design, the part relating to its physical and human context. What the model defines is not the design process as such but, at best, one of its ancillary activities. To answer that the manipulation of tokens is merely an exemplary process that could be extended by analogy to cover every aspect of designing is to enter into an infinite regress like the one Wittgenstein describes, in which the results derived by the manipulation of fragmentary aspects of the design situation must then be combined by meta-rules of manipulation to form wholes which in turn need a new set of rules… and so on, endlessly. Hermeneutics would add that the parts to be combined can only be understood in terms of an anticipated, projected whole.

The term "exclusive" has two senses: excluding the other, and uniqueness. The atomic language model of design is exclusive in both senses. It excludes whatever is not contained within its definition of design; and it can be taken by the unwary to be *the* design process. This is to regard the use of a design grammar as design itself, as if we were to regard grammar as the operative principle in writing or speaking.

An algorithm, whether or not it makes explicit use of linguistic models, selects out the commonalities of different design situations. It works in the domain of universals, of what is shared by every member of a class. Such is the nature of scientific laws. But in the realm of design, as in the human sciences, it is precisely the distinctive, the

particular, the unique, the unrepeated and the unrepeatable, the idiosyncratic, that is important. Difference, not sameness, is the proper focus of study. It is not what this design situation has in common with all other design situations, or what this sequence of design operations shares with all others that is important, but what marks it out as special, individual, distinctive—as it is in our dealings with people.

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In conclusion, if, as has been argued here, the design process belongs to the domain of social actions and interactions, is firmly embedded in a human situation, and is a focal nexus within a network of intersubjective relationships, then it is more appropriately studied in terms of hermeneutic structures than of the natural sciences. It is to be understood not in terms of a language of precise logic which manipulates atomic tokens in an exact sign system, as in computational models of [93] design,[94] but rather in terms of the language of everyday conversation, which is the language of social interaction. It belongs to the domain of dialogic question and answer. Designing is hermeneutical.

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[94] Winograd and Flores, *op. cit.*, discuss the appropriate use of computers within a hermeneutical context. They describe a particular approach to computer system design which facilitates human dialogue and interaction.

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