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LIVING DOUBT

Essays concerning the epistemology of Charles Sanders Peirce

Edited by Guy Debrock and Menno Hulswit

SPRINGER-SCIENCE+BUSINESS MEDIA, B.V.

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There must be a real and living doubt, and without this all discussion is idle.
(Charles Sanders Peirce *W* 3:248)

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PREFACE

This volume contains a number of papers regarding the Epistemology of C.S. Peirce (1839-1914), that were presented during the Charles S. Peirce Sesquicentennial International Congress held at Harvard University in the Fall of 1989.

Although it is often said that Peirce is one of the most important North American philosophers, the real extent of the philosophical importance of his work begins to emerge only now. Whereas it was for a long time philosophically fashionable to regard pragmatism as a typically naïve and simplistic American approach to the serious problems of philosophy, there can be little doubt that recent epistemological literature points to a reversal of that trend. Indeed, pragmatism, and more specifically, Peirce's own brand of pragmaticism, a term which he invented in order to distance himself from other forms of pragmatism, may well provide the key to an epistemological theory which avoids the pitfalls of both foundationalism and relativism. The heart of Peirce's doctrine is his Logic, and any interpretation of his work that does not taken this fact into account is bound to offer a caricature of his thought. That 'Logic' is linked to a conception of knowledge and of science, which is increasingly recognized as maybe the only possible one. All we can do is *hope* that our inquiry, radically fallible though it may be, will ultimately converge to some position we may all agree upon.

Peirce never tired of saying that metaphysics is but the ape of logic. This view might be paraphrased by saying that, in a very real way, the prevailing anti-metaphysical mood of much of contemporary philosophy - a mood which Peirce no doubt would have diagnosed as yet another expression of an implicit metaphysic - does little more than ape the 'Logic' which he pioneered.

The papers of the present volume represent a rich and cosmopolitan variety of approach to Peirce's Epistemology. This may also partly explain the magnitude of the editorial work that is involved in the publication of such volume. It could not have been done without the support and the help of a number of people who deserve our gratitude.

The book would never have been conceived without the encouragement of Prof. K. Ketner of the Lubbock Institute for Studies in Pragmaticism. That it came to be is due to the initial efforts of Prof. C. Schuyt of the University of Amsterdam. We could not have done without the efficient assistance of Mrs. Harrie Schipdam who took care of the difficult and complex task of compiling and checking the index. We are also emdebted for the friendly help extended to

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But, in a very real way this Volume is the product of the painstaking efforts, the diligence and the infinite patience of Mrs. Trudy Hendriks who, within a short but very effective period of time not only coordinated every aspect of the project but saw to it that it was brought to a happy end. There simply is no adequate way that might express our gratitude for her dedication, and for the sheer magnitude of the work she has accomplished.

GUY DEBROCK
MENNO HULSWIT

ABBREVIATIONS

The following commonly accepted abbreviations are used to refer to the standard editions of Peirce's works.

CP	*Collected Papers of Charles Sanders Peirce,* edited by C. Hartshorne, P. Weiss (volumes 1-6), and A. Burks (volumes 7-8) (Cambridge: Harvard University Press, 1931-1958), followed by volume and paragraph numbers.
HP	*Historical Perspectives on Peirce's Logic of Science: A History of Science,* edited by Carolyn Eisele, 2 volumes (Berlin: Mouton-De Gruyter, 1985), followed by volume and page numbers.
MS	Peirce manuscripts in Houghton Library at Harvard University, followed by a number identified in Richard R. Robin, *annotated Catalogue of the Papers of Charles S. Peirce* (Amherst: University of Massachusetts Press, 1967), or in Richard R. Robin, "The Peirce Papers: A Supplementary Catalogue", *Transactions of the Charles S. Peirce Society,* 7(1971):37-57.
N	*Charles Sanders Peirce: Contributions to the Nation,* edited by Kenneth Laine Ketner and James Edward Cook, 4 volumes (Lubbock: Texas Tech. University Press, 1975-1987), followed by volume and page numbers.
NEM	*The New Elements of Mathematics by Charles S. Peirce,* edited by Carolyn Eisele, 4 volumes in 5 books (The Hage: Mouton, 1976), followed by volume and page numbers.
PW	*Semiotic and Significs: The Correspondence between Charles S. Peirce and Victoria Lady Welby,* edited by Charles S. Hardwick (Bloomington: Indiana University Press, 1977), followed by page numbers.
W	*Writings of Charles S. Peirce: A Chronological Edition,* edited by Max H. Fisch et al. (Bloomington: Indiana University Press, 1982-), followed by volume and page numbers.

INTRODUCTION

GUY DEBROCK

It is an intriguing paradox of present Western culture that, while the dream of a unified system of scientific knowledge has never been more alive, there is a growing doubt that any universally valid knowledge may ever be possible. The success of Newton's astonishing insights pales when compared with the successes of the Theory of Relativity and Quantum Mechanics. On the other hand, the scepticism of Hume which in the eighteenth century had awakened Kant from his 'dogmatic slumber' and impelled him to investigate the conditions of universally valid knowledge of fact, seems to be child's play when it is compared with the onslaught of the attacks upon the 'received view' of the nature of science, that were perpetrated by Popper, Kuhn, social constructivism, and post-modernism which seems to be the latest bandwagon from which a wide variety of intellectual guerilla fighters feel free to shoot from the hip on their favorite target.

Yet, this paradox may in part explain the rediscovery of pragmatism. It is well known that the tide of philosophical thought at the beginning of the century was dominated by a feeling of optimism in respect of the capacity of modern science. If only man could shake off the burden of metaphysics and let science do its lofty job, man would eventually discover the truth of things. This very optimism, together with an almost reverend attitude towards Science, may explain why American Pragmatism was shrugged off as irrelevant and weak. There was little patience with a theory which, although generally very sympathetic toward science, had emphasized the fallible aspect of knowledge in general, and of science in particular. Moreover, the suggestion made by the pragmatists, that our knowledge was somehow related to what we did, had given rise to the idea that the core of pragmatism consisted in the horrifying doctrine that 'whatever works' is thereby also true. Logical positivism, with its promise of rigorous method, seemed a far more attractive venue. But in the long run, thought corrected itself. Popper's criticism of the verificationist conception of science and Kuhn's historical work which showed that science does not necessarily progress in a straight ascending light, eventually forced everyone to go back to the basic questions regarding the possibility and the validity of human knowledge. And eventually, philosophers, at first mostly American, but eventually from all parts of the world, came to realize not

G. Debrock and M. Hulswit (eds.), Living Doubt, 1–9.

only that C.S. Peirce had already addressed the same issues, but that he also presented meaningful and original solutions.

1 Two Basic Dilemma's

Because the epistemology of Peirce is the topic of this volume, it is appropriate that the relevance of his work be put in a somewhat broader perspective.

The epistemology of Peirce may be seen against the background of two basic dilemmas: the dilemma of dualism and the dilemma of evolution. The dilemma of dualism, although usually associated with the name of Descartes, has been with us ever since Plato. The dilemma of evolution dates from the nineteenth century, although it too was endemic to Western thinking from its very beginning.

1.1 The Dilemma of Dualism

Usually, the problem of dualism is stated in terms of the mind-matter problem. This was indeed the way in which Descartes presented it. If the mind has properties that are totally other than the properties of matter, then mind and matter must be two entirely different substances that can have no influence upon each other. The foremost question in the seventeenth century was therefore to find a way out of this dilemma. All of these attempts, both rationalist and empiricist, were doomed to failure, largely because they stated the problem in terms of the Cartesian context. Whatever the merits of the solutions proposed may have been, in the end most thinkers have come to favor some form of reductionist materialism. The mind *is nothing but* the brain. Exit dilemma.

This presentation, however, is profoundly unsatisfactory because it is profoundly misleading. It is misleading because it completely blocks out the fact that the mind-matter dilemma is only part of a far more intriguing dilemma: viz. the dilemma of the relationship between whatever it is that knows and whatever it is that is known. Indeed the dilemma may - in the words of Plato's Second Letter - be seen as "the cause of all the trouble, and if that be not expelled from a man, he shall never genuinely find the truth" (Plato 1961:1566).

Indeed, there is every indication that Plato had seen the problem very sharply. Speaking of knowledge presupposes that there is something (the knower) that seeks to know something else (the known). But if so, the dilemma, as put in the words of Meno (80 d), is:

> But how will you look for something when you don't in the least know what it is? How on earth are you going to set up something

> you don't know as the object of your search? To put it another way, even if you come right up against it, how will you know that what you have found is the thing you didn't know? (Plato 1993:363)

Socrates (Meno 80 e) ties the dilemma to what he calls a "trick argument":

> that a man cannot try to discover either what he knows or what he does not know? He would not seek what he knows, for since he knows it there is no need of the inquiry, nor what he does not know, for in that case he does not even know what he is to look for. (Plato 1961:363)

The solution of Socrates, viz. that, by learning, we come to *recognize* things we already had *seen* before, does not solve the more basic dilemma of the status of the knower. We say that we know reality or the phenomena or whatever; and, by saying that, we say that whatever it is that knows is not part of reality or of the phenomena or of whatever it is that is known.

Put in modern terms, the dilemma concerns the status of science itself. Reductionism justifies itself by pointing to the results of science. It is science that tells us that the mind *is* the brain. Apart from the question whether that is indeed what science tells us,[1] there remains the more stubborn problem: What is science that it can tell us that? We cannot ask this question without presupposing again that there is something 'outside science' that might provide us with the answer.

The dilemma therefore is: either the object of our knowledge is 'foreign' to the knower and then no knowledge is possible, or the object of our knowledge is 'not foreign' to the 'knower' and in that case any theory of knowledge that presupposes a difference between the knower and the known must be wrong.

1.2 The Dilemma of Evolution

The Idea of Evolution confronts us with the following epistemlogical problem: either reality is structurally subject to continuous change, and then no knowledge is possible, or reality is structurally static and then the idea of evolution is trivial. The first horn of the dilemma is obvious. If there is no stability, there simply can be no knowledge. The second horn of the dilemma is based on the assumption that knowledge is possible only by virtue of *recognition,* and all recognition presupposes some basic stability. Henceforth, universally valid knowledge presupposes permanent stability. According to this assumption the only meaning of the word 'evolution' is the original meaning of the

[1]See, for instance, the thorough analysis of the position of Paul and Patricia Churchland in Susan Haack's recent book which emphasizes the importance of the thought of Peirce for epistemology (Haack 1993).

Latin word *evolutio*, which was first used to designate the gradual unfolding of a book-scroll. This activity consists in revealing a text that is already there. If it is seen from that perspective, evolution is simply a process which, although *to us* it remains largely inscrutable, is nevertheless never subject to change.

In short: if evolution is taken in the strongest possible sense, all knowledge is fundamentally problematic; and if (scientific) knowledge is to be taken serious, evolution is a trivial concept.

Remarkably, neither of the dilemma's mentioned here has played a central role in the philosophical discourse of this century. Instead all attention was focused on the status and the scope of science, as it has been ever since Hume had been awakened by the call of some pretty nasty riddles. Positivism was the reaction against the 'metaphysical' and 'idealist' solutions, and the reaction against positivism was largely a reaction against the one-sidedness of the positivist solution. The exclusive concern for the justification of scientific beliefs made us blind to the dilemma of dualism.

The dilemma of evolution too went largely unnoticed during the first part of the century. While most people gradually got used to the unpleasant idea that human beings had evolved from organisms they hated to be associated with, hardly anyone remarked that this discovery was bound to have some effect on the loftiness of human reason. The basic tenets of positivism did not in any way question the basic capacity of man to "build the world" as Carnap obviously hoped to do in his *Aufbau der Welt* (Carnap 1928). And even after Sir Karl Popper had pointed out the possibility of an evolutionary epistemology, and various other thinkers attempted to work out that idea, the epistemological consequences of a consistent theory of evolution for scientific knowledge are still largely on the back burner.

Meanwhile, pragmatism was hardly ever taken seriously. No doubt, this may have been largely due to the fact that the *Collected Papers* of Peirce were not published until the thirties. But more influential was the attack by luminaries such as B. Russell on what is now seen as a caricature of the basic tenets of pragmatism.

2 Peirce's Originality

Yet, anyone who would read the work of C.S. Peirce before reading the work of the classical positivists and philosophers of science, would be astounded by the neglect to which Peirce was condemned. Not only did Peirce address the basic questions that would be raised during the twentieth century, and not only did he formulate the ideas that, when uttered by later thinkers, would be hailed as 'revolutionary,' but he framed a theoretical context within which those ideas would find their meaning and justification.

Indeed, from the very beginning, Peirce had seen that the basic problems of philosophy could not be adequately dealt with without tackling the dilemma of dualism and the dilemma of evolution. Even more importantly, he offered a solution that would solve both problems at the same time.

2.1 The Pillars of Peirce's Epistemology

Peirce's epistemology is built upon a number of pillars that mark his work from its inception. Those pillars are (1) the thesis of fallibilism, (2) the thesis of the social impulse of knowledge, (3) the thesis of 'objective idealism,' (4) the pragmatic thesis.

The thesis of fallibilism which Peirce had formulated even before his contact with the work of Kant may be stated as the thesis that all knowledge is provisional. The corollary of the thesis is the doctrine that there are no absolutely first principles, which Peirce forcefully put forth in his anti-Cartesian papers of 1868.

The thesis of 'idealism' is simply the position that every reference to anything beyond what is knowable is mistaken. There is no *Ding an sich,* there is no absolutely external reality. The only reality we can think or speak of is the reality we can think or speak of.

The thesis of the social impulse of knowledge may be stated in two versions. In its positive version it states that there is a social compulsion towards truth. The implication of this positive version of the thesis is that the process of knowledge is self-corrective. No matter how outrageously wrong we may be at some time or other, eventually the error will correct itself. The negative version of the thesis of the social impulse may be called the principle of futility, which may be stated as the principle that, given some certainty which is unquestioningly accepted, it is futile to raise the question of the truth of that certainty.

The thesis of pragmatism is that the meaning of any statement is related to the conceivable practical consequences of the belief expressed in the statement. The implication of the thesis of pragmatism is the thesis of pragmaticism, viz. the thesis that the meaningfulness of any non-tautologous statement is related to its ability to be tested.

2.2 The Three Categories

But all these principles must ultimately be seen in the light of the doctrine of the three categories, which Peirce himself did call his gift to the world. Although the discovery of the categories occurred within the context of Peirce's interest for logic, it came to function within his philosophy both as the cor-

nerstone and as the heuristic principle of what may be called his philosophy of experience. The doctrine of the three categories states that whatever is real (i.e. non-fictitious) in the strong sense of the word (and only events are real in the strong sense of the word) has three inseparable aspects: an aspect of irreducible unrelatedness, and therefore of irreducible novelty, an aspect of irreducible relatedness to something else, and an aspect of irreducible definiteness.

If the doctrine of the three categories was Peirce's gift to the world, the most precious part of that gift was the insight that, because thirdness is essentially lawlike, it is also essentially thought-like. And the consequence thereof is that wherever there is something real, thought is at work. In one very simple principle, Peirce had once and for all unmasked the silly myth of dualism that had plagued Western thought ever since Plato. The real is not what is 'seen' in thought, but the real *is* real inasmuch as it carries within itself an element of thought. Long before the internalists thought they had conquered the myth of the God's Eye-view, Peirce had already conquered internalism as a sophism born from the obsession with overcoming dualism.

In 1859, when Peirce was twenty, his great philosophical hero was Kant who in his *Critique of Pure Reason* had staunchly defended the possibility of universal and necessary knowledge. In that same year, Darwin published his epoch-making work (Darwin 1859). Peirce would soon come to see that any serious philosophical reflection must come to grips with the incontrovertible facts which Darwin presented. He took it upon himself to interpret evolution in the strongest possible sense. The question was not to interpret the facts of evolution in terms of the 'given' laws of nature, but rather to explain the laws of nature in terms of an evolutionary philosophy. If laws were thought-like, and if all thought-belief is of the nature of habit, the laws of nature too must obviously be habits that had evolved. If seen from that perspective, epistemology and cosmology become two sides of the coin. And the metal from which the coin was made would be provided by Peirce's semeiotic. For both thought and natural events share the structure of a sign, and no sign can be without having its object and its interpretant. In that structure lies the synechistic core of the continually evolving universe. Not only does all symbol imply an unceasing chain of symbols, but every event implies the *evolution* of a whole continuous chain of events.

In short, Peirce offers a radical theory which supersedes dualism and takes evolution seriously. Far from being an obstacle to the possibility of thought, thought necessarily entails evolution, just as evolution entails thought. According to Peirce, thought not only evolves, but it converges in view of the ultimate interpretant which is truth, and the corollary of that truth is what we call reality.

3 Three Approaches

The essays of this volume are arranged in three major parts. The first part primarily contains essays in which the basic epistemological ideas of Peirce are discussed, the second part primarily focuses on the relationship between Peirce and other philosophers, and the third part concentrates upon the relationship between his epistemology and his semeiotic.

In the first essay of the first part, Hickman emphasizes the pivotal role of the concept of habit by virtue of which Peirce was able to avoid the pitfalls of both the practicalism of which he suspected his fellow pragmatists and the trap of the epistemoalogical problems raised by cognitivism of traditional philosophy. Olshewsky defends Peirce against the accusation of foundationalism which some of his interpreters have accused him of, and tries to show how, in Peirce's view, fallibilism and realism require each other. Palmer takes Peirce's side in showing that every appeal to transcendental arguments is in fact a disguised reappearance of the method of tenacity.

Any discussion of epistemological issues from a Peircean point of view requires a synthetic view of his position. To give such a view, however is more difficult than it seems. This may explain why different authors present Peirce's epistemology from different angles which may seem mutually exclusive. Chen squarely presents Peirce as an empirical non-agnostic realist with a correspondence theory of truth. On the other hand, Aune interestingly argues that some Peircean insight may be used to defend the reinstatement of *a priori* knowledge. Wu, who emphasizes the central importance of the pragmatic maxim, tries to unravel the arguments upon which Peirce construed that maxim. Werth emphasizes the importance of Peirce's evolutionism and attempts to understand Peirce's four methods of fixing belief in terms of their evolutionary value. But he rejects Peirce's objective idealism in favor of a materialistic determinism.

Peirce's epistemology cannot be separated from his Logic, nor his Logic from his semeiotic. A case in point which illustrates the close relationship between the issues involved is Peirce's interest for the Paradox of the Liar. Rivetti-Barbò stresses the fundamental value of Peirce's approach to that problem by showing that it leads the way to a correct understanding of what a 'true proposition' may be. Fabbrichesi on the other hand emphasizes the central importance of the concept of relation in Peirce's work, because it provides the central link between his logic, semeiotic and doctrine of categories, a link which receives its concrete embodiment in Peirce's Existential Graphs which allowed him to elaborate his new logic of relations. Lorenz proposes the interesting thesis that Peirce's pragmatics provide us with a substitute for traditional ontology, while he considers Peirce's semiotic the heir of epistemology.

In the second part of the book, the essays focus on the relationship between Peirce and other thinkers. Kremer-Marietti shows how Peirce's views, in spite of his criticism of Comte, sometimes strikingly resemble the views of the French positivist, for instance, in his theory of language, of history and the philosophy of science. Wójcicki compares the Peircean concept of truth with that of Aristotle, while taking into account the contributions of Polish philosophers in the period between the two World Wars. Whitney investigates the views of Peirce on the question of a belief in God from the perspective of two quite different authors for whom he showed a particular admiration: Duns Scotus and Friedrich Schiller. Buczynska explores Peirce's relationship to Descartes for whom he had little sympathy, and while doing so, rightly points out how often present-day commentators, particularly those who approach Peirce from a semeiotic point of view, fail to do justice to the original meaning of his concepts and theories. Winner stresses the remarkable similarity between Peirce and his contemporary Bolzano. Apart from some very interesting common features of their academic careers, both philosophers shared a great interest for the theory of signs.

It is well known that the views of the later Wittgenstein show a remarkable similarity with those of Peirce. This is particularly interesting in view of the fact that there is no evidence that Wittgenstein had read Peirce. Johanson explores the similarities and differences between the two thinkers. Woleński shows how – even more remarkably – several Polish philosophers defended various versions of fallibilism, and did so in a very thorough and original fashion. Zheng explores the theories of Peirce and Lakatos in respect of the question of scientific method and truth, and defends the position that Lakatos' conception of verisimilitude may be regarded as a pragmatic conception of truth.

Without comparing Peirce to any particular figure of history, Barth tries to re-interpret Peirce's notion of 'logical intention' in terms of representational functions, and thereby shows the relevance of his insight for contemporary logic.

Sleeper takes sides with Peirce against Putnam in the question regarding our obligation to be reasonable, and argues that the key to Peirce's position lies in the latter's synechistic view of the universe, which entails the position that truth is a matter of ontological necessity. Finally Ito compares Peirce with Donald Davidson, and shows that, in spite of the similarity of their view of the relationship between language and mind and the conceptual interrelatedness of the concepts of truth and communication, they profoundly differ in their view of self-consciousness.

The third part features some special issues that are primarily related to the relevance of Peirce for present-day semiotics. Jiang argues that, while Peirce

was both a justificationist and a naturalist, his justificationism is based on a semeiotic model, and his evolutionary naturalism saves him from the temptations of rationalism and empiricism alike. Thelin concentrates on Peirce's relevance for some basic questions regarding language. Réthoré tries to convince French semioticians of the relevance of Peirce's views on the subject. The volume closes with Vericat's interesting analysis of the importance of the subject of color in Peirce's work. Although apparently of secondary significance, his interest for color which appears in his very early work and plays a major importance in his Graphs, may reveal one of the prime but hidden aspects of Peirce's complex conceptual make-up.

All in all, the book shows by the variety of subjects and approaches, how multi-faceted the work of Peirce really is. If the importance of a philosophy is measured in terms of the cogency of the questions that are raised by it, then there can be no "living doubt" that Peirce was an important philosopher indeed.

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Part I

KNOWLEDGE, TRUTH AND THE PRAGMATIC PRINCIPLE

THE PRODUCTS OF PRAGMATISM

LARRY HICKMAN

> The real and living logical conclusion *is* [the] habit; the verbal formulation merely expresses it. [...] [A]ction cannot be a logical interpretant, because it lacks generality. (*CP* 5.491)
>
> The concept which is a logical interpretant is only imperfectly so. [...] It [...] is [...] inferior to the habit. [...] The deliberately formed, self-analyzing habit – self-analyzing because formed by the aid of analysis of the exercises that nourished it – is the living definition, the veritable and final logical interpretant. (*CP* 5.491)
>
> ... the whole function of thought is to produce habits of action. ... (*CP* 5.400)
>
> Moreover – *here is the point* – every man exercises more or less control over himself by means of modifying his own habits. ... (*CP* 5.487)

Critics of the pragmatists (and of the pragmaticists, in case there has been more than one of those) seem never to have tired of accusing them of making action an end in itself. Bertrand Russell misread them in this way, accusing Dewey of subordinating knowledge to action. Russell charged pragmatism with saying "that the only essential result of successful inquiry is successful action" (Russell 1969:304). He was later joined in this mistake by members of the Frankfurt School, including Max Horkheimer and Theodor Adorno (Horkheimer 1974:42ff).[1]

This misunderstanding has been more than a simple matter of the cultural differences between philosophers living on different sides of the Atlantic. Lewis Mumford, who should have known better, mocked Dewey's version of pragmatism as being "all dressed up, with no place to go" (Mumford 1968:137). This

[1] "The core of this philosophy [pragmatism] is the opinion that an idea, a concept, or a theory is nothing but a scheme or plan of action, and therefore truth is nothing but the successfulness of the idea."

G. Debrock and M. Hulswit (eds.), Living Doubt, 13–24.

charge has also been the occasion for the turning of pragmatist against fellow pragmatist. In 1902 Charles Peirce charged William James with holding the view that "the end of man is action" (*CP* 5.3). More recently, even Richard Bernstein has labeled the pragmatists' account of action as "vague." He has written that there is still "a great deal of confusion about what the pragmatists understood by 'action' and precisely what role action does or ought to play in understanding human life"(Bernstein 1971:xIiii).

Perhaps it was what both Peirce and Dewey characterized as his nominalism that led James to yield on occasion to the temptation to make action an end in itself. But the situation is quite different with respect to the work of Peirce and Dewey; their work exhibited elaborate safeguards against such a move. Dewey complained in his 1925 essay "The Development of American Pragmatism" that his critics had misunderstood him in just that regard. Earlier, Peirce, in his 1905 article "What Pragmatism Is," had already taken considerable delight in constructing a lengthy response to an imagined critic who had charged him with making "Doing the Be-all and the End-all of human life" (*CP* 5.429).

The manner in which Peirce and Dewey treated action was neither vague, nor did it make action an end in itself. In the hands of those two pragmatists, practice was regarded as much more than simple action; both men characterized action as an instrument of production, and both adjudicated action in terms of its products. Their critiques of action were embedded in their critiques of production.

It is not at all difficult to demonstrate that Russell, Mumford and Horkheimer misunderstood Peirce and Dewey, so I will leave that exercise aside. Beyond that, however, I wish to draw two conclusions from Peirce's and Dewey's treatments of cognition, action, and production. The first is that Peirce and Dewey were able to move beyond what are now called traditional "cognitivist" metaphysical positions, and even beyond the praxis philosophies of the continental thinkers from Marx through Scheler to Heidegger (and beyond), thence to fashion a comprehensive philosophy of production. The second is that what was to become Dewey's instrumentalist version of pragmatism is rooted firmly in the work of Peirce.

It is possible to see within the history of western philosophy a kind of tug-o-war between those who have sought to make theory dominant and those who have worked for the ascendancy of practice. Cognitivists, taking their cues Plato and Descartes, have tended to view the formation of correct concepts or ideas as the goal of philosophical activity. It is in this sense that much of contemporary linguistic analysis has been concerned with "getting clear" about various issues. The approach of the praxis philosophers, following Marx and Heidegger, has been quite different. Their emphasis has been more on

doing than on thinking, and their tendency has been to take into account a whole organism in an environment rather than just a ghost in a machine (or a brain in a vat). Don Ihde has captured this feature of the work of the early Heidegger, for example, in his assessment that Heidegger's goal was the practical knowing-involvement that comes through "such phenomena as moods and emotion and, what is more, bodily movement, such that the human being as a totality is 'being-in' an environment or world" (Ihde 1979:117).

After Peirce savaged Descartes in his 1877 and 1878 articles in the *Popular Science Monthly,* even the most obtuse of critics would have been reluctant to place him in the camp of the cognitivists. Consequently, exhibiting the unfortunate excluded-middle fixation found so frequently in much of the history of philosophy, critics of the pragmatists have tended to locate them inside the praxicalist camp. Bertrand Russell, for example, was fond of lumping them together with Marx.

But both Peirce and Dewey in fact located their own positions well outside of this cognitivist-praxicalist struggle, arguing that the positions of both camps are defective because they are incomplete. Peirce and Dewey did this by subordinating both theory and practice (cognition an action, thinking and doing), to production or making; to what the Greeks had called *poietike.*[2] It is not that they ignored either cognition or praxis, for they did not: it is just that neither Peirce nor Dewey thought cognition or praxis to be the end of inquiry.

But if pragmatism is concerned with production, what are its products? A general, though somewhat misleading answer is that the products of pragmatism are habits. The reason why this statement is a bit misleading is because the term "habit" is not univocal in the work of either Peirce or Dewey, and because of the presence in Peirce's work of what may be called "quasi-habits."

For Peirce, habits are associated with control, and control is linked to products and production. In the context of his remarks on critical commonsensism, Peirce outlined a continuum of levels of control which are correlated with the habits he calls "inhibitions and coordinations" (*CP* 5.533). Moving from less to more control, there are (a) habits that are unconscious, (b) habits that are instinctive, and (c) habits that are the result of training. Peirce has no difficulty describing a stream cutting its bed as the unconscious formation of a habit (*CP* 5.492). Ants and other insects which we do not normally count as trainable nevertheless operate according to instincts, which are another type of habit. And non-human animals, especially the higher primates, are capable of certain forms of training which habitualize in them certain forms

[2]Heidegger, too, makes much of *poietike*, but his emphasis is quite different. For Heidegger it is as if language itself absorbs other forms of *poietike*, and language becomes actor instead of tool.

of responses.[3] In none of these cases is control self conscious, but in each of them the level of complexity of control is linked to and consistent with the level of complexity of the entity or organism.

Among human beings, however, it is possible for an individual to be his or her own "training-master," and it is at this stage that control becomes self-control. Up to this point, habits have operated in Peirce's sketch as a *means* of control: as a *terminus a quo* of action (even though that action is not self-controlled). The habit that is the bed of the river controls its flow. Instincts genetically transmitted to insects control their activities. And the training instilled in a loquacious parrot controls its vocabulary.

Beyond this watershed, however, habit, in addition to being means of control, operates as goal of control: in addition to being a *terminus a quo* of action, it also functions as a *terminus ad quem* of action. But in addition to examples of self-training that involve gross motor functions, self-training may also be conducted in the imagination. Further, self training may involve just a single insight or association rather than a repetition.[4] Peirce is not reluctant to speak of habits as being "produced" even in such circumstances (*CP* 5.477).

In imaginative self-training, ideas and ideals often enter into the training process and serve as its norms. Among such ideals are the "leading principles" of Peirce's famous "thought experiments." Moreover, at a certain stage of self-control, ideas and ideals are themselves the subject of improvement by means of control. This is a very high level of production which Peirce calls control over control of control.

Peirce thought that language itself is a "phenomenon of self-control" (*CP* 5.534), but one in which two distinct levels are possible, corresponding to the grades of complexity with respect to which self-control is capable of being exercised. He was willing to admit that non-human animals use signs, but

[3] "Every decent house dog has been taught beliefs that appear to have no application to the wild state of the dog ..." (*CP*.5.512)

[4] Peirce explicitly rejects the view advanced by William James in *The Principles of Psychology* that the production of a habit must involve repetition. "[It] is noticeable that the iteration of the action is often said to be indispensable to the formation of a habit; but a very moderate exercise of observation suffices to refute this error. A single reading yesterday of a casual statement that the 'shtar chindis' means in Romany 'four shillings,' though it is unlikely to receive any reinforcement beyond the recalling of it, at this moment, is likely to produce the habit of thinking that 'four' in the Gipsy tongue is 'shtar,' that will last for months, if not years, though I should never call it to mind in the interval. To be sure, there has been some iteration just now, while I dwelt on the matter long enough to write these sentences; but I do not believe any reminiscence like this was needed to create the habit; for such instances have been extremely numerous in acquiring different languages. There are, of course, other means than repetition of intensifying habit-changes. In particular, there is a peculiar kind of effort, which may be likened to an imperative command addressed to the future self. I suppose the psychologist would call it an act of auto-suggestion" (*CP* 5.477).

he thought that the difference between their form of sign use and the forms invented and developed by human beings is exhibited in the extent to which human beings are able to control signs *in their role as signs.*

Another way of putting this is that human beings are able to conduct themselves in ways that are more productive than are the ways of non-human animals. Habits are what allow non-human animals to produce certain things, and this is also true of human beings. But human beings are in addition capable of producing habits, and their greater organizational complexity, their greater powers of self-control, allow them to craft these habits so that they are increasingly sharper and more pertinent to their existential situations. Like non-human animals, human beings are just "endowed" with a store of habits. Unlike non-human animals, they are able to manipulate and improve old ones and they are able to produce new ones.

Besides habits, Peirce thought that human beings produce what may be called "quasi-habits." Among these quasi-habits are what Peirce calls "hypostatic abstractions." In his 1905 remarks on common-sensism, Peirce lists several examples of hypostatic abstractions: a collection (or a class qua extended, i.e., predicable of its members), a multitude (or an abstraction from the predicate of a collection, i.e., "intended," or taken as a subject for further predication), a cardinal number (or a predicate of a multitude), an ordinal number(or an abstraction by means of which cardinal numbers are placed in space with respect to one another), and so on. Each of these things is a product of strictly controlled sign usage, or what Peirce calls a "logical interpretant," and the meaning of each is a habit, or general way of treating situations which may occur in the future.

Each of these things I have just listed, a collection, a multitude, a cardinal number, and an ordinal number, is also characterized by Peirce as an *ens rationis* or "being of reason." He follows the Thomists and Scotists of the thirteenth through the sixteenth centuries in this matter, adopting their technical term for an entity which is the result of the operation of the intellect in its interaction with its "data," literally whatever is given to it.

The scholastics had differed among themselves rather sharply regarding whether these *entia rationis* were invented or simply discovered as something pre-existing, and in this they anticipated the debates regarding the foundations of mathematics which were such an important feature of the intellectual life of the last decades of the last century and the first decades of our own (Hickman 1980).

Peirce thought that these *entia rationis* are produced, and that despite their name, they may sometimes be real. By calling some *entia rationis* "real," his terminology departed radically from that of the scholastics, although in terms of practical effects, his view reflects the position of one of the many

factions that made up the that movement. What Peirce means when he speaks of *entia rationis* being real is that once abstracted, once produced, they have effects that do not depend on what any one person thinks them to be.

Peirce has sometimes been misread on this point as being an epistemological realist of the sort who says that things are such as they are regardless of whether anyone ever knows them to be as they are. And there is a certain sense in which Peirce contributed to this misunderstanding by his use of the terminology of the scientific revolution of the seventeenth century.

The early paragraphs of the seventh volume of the *Collected Papers* indicate the extent to which he took over that terminology (although he intermingles it with the terminology of evolutionary theory). It is there that he tells us that science is not a body of knowledge, but "the concrete life of the men who are working to find out the truth" (*CP* 7.50). He thinks that this scientific passion is not something apart from the process of organic evolution, but something that is just a part of its emerging organizational complexity. "Given the oxygen, hydrogen, carbon, nitrogen, sulphur, phosphorus, etc., in sufficient quantities and under proper radiations, and living protoplasm will be produced, will develop, will gain power of self-control, and the scientific passion is sure to be generated. Such is my guess [he says]. Science was preordained, perhaps on the Sunday of the *Fiat lux*" (*CP* 7.50).

Peirce characterizes science as "storming the stronghold of truth" (*CP* 7.51), and as "a mode of life whose single animating purpose is to find out the real truth [...]" (*CP* 7.54). Further, "science is foredestined to reach the truth of every problem with as unerring an infallibility as the instincts of animals do their work" (*CP* 7.77). The infallibility of science is due to its rationality, or what may seem somewhat paradoxical, to its procedures for detecting whatever is fallible. The rationality of science lies precisely in the fact that it is "self-criticizing, self-controlling and self-controlled, and therefore open to incessant question" (*CP* 7.77).

Peirce's description of science might appear somewhat old-fashioned to many of us now. Some of us might have a tendency to wince at words like "real truth," "unerring infallibility," and "preordained." Taken by themselves, these terms might lead us to place Peirce among the cognitivists. But beneath these grand phrases, we can see Peirce at work constructing a kind of realism that is far different from the one that says that things are such as they are regardless of their being known by anybody. His language is that of seventeenth century science, but his message is Lamarckian and Darwinian: it includes as elements not only his doctrine of chance, his tychism, but also his view that the experimental method is the only one that is self-correcting.

For Peirce, scientific thinking, like thinking in general, is iconic. The difference between scientific reasoning and what he calls "sham" reasoning (*CP*

1.56-58) is that the experimentalist must exercise the kind of self-control that proceeds from a commitment to follow the dictates of reasoned inference, regardless of where such inference may lead.

But the goal of science, the goal of logic, the goal of self-control, the goal of production, is the finding out of what is before us, and this is only possible insofar as the investigator produces ever more finely wrought and powerful habits. We always produce more than we can consume, and it is the job of science to keep finding new patterns of consumption, and, thereby, new patterns of production. Habits are thus for Peirce both produced and productive. They are more or less the tools and instruments that Dewey was later to spotlight in the 1903 *Studies in Logical Theory* and in the 1916 *Essays in Experimental Logic.*

Now Peirce not only did not utilize the language of Dewey's instrumentalism, but was in fact quite critical of some of the features of Dewey's instrumentalized theory of inquiry (Hickman 1986). His response to Dewey's 1903 *Logic* was to accuse Dewey of lack of self-control, adding that perhaps it was because he, Dewey had become corrupted by having lived too long in Chicago. But when Peirce speaks of the things he calls "real," he, like Dewey, does not take them to be independent of all thinking, but only independent of any particular way of thinking about them. As he writes in "How to Make Our Ideas Clear," "reality is independent, not necessarily of thought in general, but only of what you or I or any finite number of men may think about it; and [...] on the other hand, though the object of the final opinion depends on what that opinion is, yet what that opinion is does not depend on what you or I or any man thinks" (*CP* 5.408). Understood in the context of his characterization of scientific method, this just means that the result of an experiment, qua general, does not depend on it being replicated in any *particular* experimental situation, though it must be replicable in some experimental situation.

I passed rather too quickly over Peirce's contention that self-controlled inquiry is iconic, so let me return to that matter, for it is an essential part of Peirce's account of production. He argues that perception is generally *beyond* our control; that we do not choose what we perceive. After the production of the *entia rationis* which Peirce calls "hypostatic abstractions," a new iconic situation is present. This, in fact, is the point of the work that leads to the hypostatic abstraction.

> All necessary reasoning without exception is diagrammatic. That is, we construct an icon of our hypothetical state of things and proceed to observe it. [...] We not only have to select the features of the diagram which it will be pertinent to pay attention to, but it is also of great importance to return again and again to certain

features. (*CP* 5.162)

After the construction of the diagram or icon, in other words, the experimenter is then able to perceive certain things about the new situation that were not theretofore present or (if it is later determined that they were present) were not obvious. But since perception is not generally a matter of self-control, since it is a matter of habits already autonomized, doesn't this mean that the task of the logician or scientist is just to be a keen observer rather than a "producer"? This is to a certain extent the case. But the qualifier "generally" is essential to understanding Peirce's position on this matter, since in certain circumstances perception is in Peirce's view linked to a kind of controlled conduct, a controlled product.

His example (*CP* 5.183) is of what we today know as the favorite figures of the gestalt psychologists. Looking at a "duck-rabbit" or "face-vase," it is as if the perceiver gets "tired" or "bored" with seeing it one way, then switches ground and figure or sees the figure as rotated. Once this is done, such switching may be a matter of control, as it is for those of us who are familiar with the work of the gestalt psychologists (or the artists, such as Escher, who have been influenced by the gestaltists). We can literally choose one percept over another, and this is where judgment, and production, enters into the situation.

Another way in which perception is linked to control lies in the transformation of the icons or diagrams. Peirce writes of "such a transformation of our diagrams that characters of one diagram may appear in another as things" (*CP* 5.162).

The meanings of the hypostatic abstractions just discussed are thus habits, and they mean that the person who interprets them will be inclined to do certain things under certain conditions; but they are also *produced* or manufactured. Peirce argues that the certainty of pure mathematics is "due to the circumstance that it relates to objects which are the creations of our own minds [...]" (*CP* 5.166). But what of the fact that mathematicians speak of "discoveries" rather than "products"? In one sense, self-control has led to the construction of the mathematical objects; but the mathematician may exhibit the surprise of discovery because weak or loose reasoning had led her or him to think such objects impossible or unlikely, or not even to think of them at all.

Now habits are for Peirce, as they were for Dewey, "janus-faced" entities. This is what Peirce has in mind when he refers to them as "inhibitions" *and* "coordinations." One face is their autonomy. William James characterized habit as the "flywheel" and the "mainspring" of society and of the inquiry undertaken by individuals. It is in this sense that a habit is a *terminus a quo*. It

is the dead but lingering force of momentum – a flywheel; or it is a live internal tension – a watch spring. In this sense a habit may function unconsciously, and this is the popular sense of some activity being called "habitual." This is the sense in which habits are "transparent" in use; they involve a certain autonomy. We do not have to think about tying our shoelaces or remember how to use the number two.

The other face of a habit involves the way in which it is formed. This is the function of habit as *terminus ad quem.* A habit has "to be formed" as a part of a successful piece of inquiry. A habit is in this sense a goal or ideal which is solidified as a part of the puzzle which Peirce thinks science continues to piece together. If action (of which inquiry is a species) is properly controlled, then its products are the habits he calls "final logical interpretants." Thus the "real and living logical conclusion" of a piece of reasoning is a habit (*CP* 5.491). Logical interpretants are products in a way in which actions can never be, because unlike actions, they are general: they are general in the sense that they are enduring instrumentalities for future action, and they are general in the sense that they are able to operate not only with respect to this or that thing, but with respect to a whole class of things.

In 1952, George Gentry published a very enlightening essay about these logical interpretants. It was included in the first series of *Studies in the Philosophy of Charles Sanders Peirce* (Gentry 1952). He pointed out that there are in Peirce's writings two very different kinds of logical interpretants. Early in his career, Peirce held the view that there is an infinite continuum of signs such that there is neither "first" nor "last" object which is not a sign of something further. More specifically, in his early work Peirce rejected the view that there is a terminal logical interpretant, or a logical interpretant which requires no further interpretant of the same category, that is, a sign. In his early work, Peirce argued that the interpretant of every sign is itself a sign of something further, that it has a logical interpretant – and so on to infinity.

These logical interpretants of intellectual concepts are what are best termed "quasi-habits." Like habits, they are conditional. Peirce tells us that they are associated with a "conditional future," and that in mathematics "they are as plenty as blackberries" (*CP* 5.483). Their conditionality also lies in the fact that they may or may not lead to action. But they are also like habits in that they are general. He tells us that they are "either general or intimately connected with generals ..." (*CP* 5.482). They are not actions, which are particular, but "ways" of acting, which are general: they are "rules" of action.[5]

[5] "I need not repeat that I do not say that it is the single deeds that constitute the habit. It is the single 'ways,' which are conditional propositions, each general" (*CP* 5.510).

But Peirce eventually abandoned this view for another one. Or, put perhaps more accurately, he added something to his earlier view which made it function better. In addition to there being logical interpretants which themselves have further logical interpretants, Peirce began to write of logical interpretants that are "ultimate" or "final" or "veritable." He realized that what he had developed up to that point were just "quasi-habits" that lacked something that habits must possess: they must possess what Gentry called "ultimacy" or "terminality with respect to an interpretative transaction. A terminal, i.e., an ultimate or final interpretant of the logical species is, as Peirce conceived it, an interpretant characterized by both conditionality and generality, which *itself* does not presuppose or require an interpretant in the proper sense"(Gentry 1952:78).

Whereas concepts can still function as "ordinary" logical interpretants, such concepts are now subordinated in terms of their importance to "final" logical interpretants, which are habits in the full sense. As Peirce puts it in his "Survey of Pragmaticism,"

> The concept which is a logical interpretant is only imperfectly so. It somewhat partakes of the nature of a verbal definition, and is as inferior to the habit, and much in the same way, as a verbal definition is inferior to the real definition. The deliberately formed, self-analyzing habit – self-analyzing because formed by the aid of analysis of the exercises that nourished it – is the living definition, the veritable and final logical interpretant. Consequently, the most perfect account of a concept that words can convey will consist in a description of the habit which that concept is calculated to produce. But how otherwise can a habit be described than by a description of the kind of action to which it gives rise, with the specification of the conditions and the motive? (*CP* 5.491)

The production of the final logical interpretant is a matter of self-control, the control which is exercised by means of judgments of perception insofar as that is possible, and the checking of consequences against certain habits of action which he calls "leading principles." The production of the final logical interpretant involves recourse to concepts and to activities – to thinking and to doing. But the ultimate products of Peirce's pragmatism are neither concepts nor activities: they are habits which are not themselves necessarily signs of something further.

Peirce thought that science is a habit of changing habits, and he called this a "plastic" habit (*NEM* 4.142). He argued that the Darwinian view, namely that "the whole gulf [between the simplest protozoa and human beings] has been bridged by imperceptible variations at birth," was inferior to the view

of Lamarck, namely that "it is exercise and the consequent growth which by imperceptible steps has transformed the Moner into Man" (*CP* 4.142). In short, some tychistic event occurs which is transformed by specialized and focused energy into new habits.

Peirce thought that evidence for the Lamarckian version of evolution was everywhere in the scientific-technological world.

> [S]ome invention like that of writing, or printing, or gunpowder, or the mariner's compass or the steam engine, in a comparatively short time changes men very profoundly. It seems strange that we who have seen such tremendous revolutions in all the habits of men during this century should put our faith in the influence of imperceptible variations to an extent that no other age ever did. Is it because we have so little of Asiatic immovability before our eyes that we do not realize now what the conservatism of old habit really is? (*CP* 4.142)

Scientific technology thus presents for Peirce the clearest exhibition of the ways in which a habit is produced: "It is formed by the interaction of the two elements, a [...] mind of common origin with the universe, and facts which are selected by that mind as its suitable pabulum"(*CP* 4.143).

Peirce's attention to the instruments of scientific technology offers a bridge to the second conclusion I wish to draw from his treatment of cognition, practice and production. Very briefly put, it is that Dewey's instrumentalism is happily rooted in the soil of Peirce's account of the production of habits. Like Peirce's habits, Dewey's instruments are *conditional, general,* and *final.* They are *conditional in the sense that they are available* for use if the proper situation presents itself. Like tools in a toolbox, it is not that they *must* be used, but that they are available for use. They are *general* because they are applicable to whole classes of situations, and those classes are defined by and further refine their associated tools. There is a class of objects to which a hammer can be applied; but if an object is included in that class to which the hammer is not fully applicable, then, given the proper motivation, the hammer can be redesigned. They are *final* because even though they may operate as signs of something further, there is no requirement that they do so: they terminate in action that is satisfactory, and that is all that can be asked. For Dewey, tools perform certain types of work, and if they perform satisfactorily there is no need to develop them further, to inquire into their extended meanings.

In sum, both Peirce and Dewey reached escape velocity with respect to the traditional and still raging debate between the cognitivists and the praxicalists. They accomplished this by measuring human development and accomplishment not in terms of ideas, nor in terms of activities, but in terms of

habits produced. Their root metaphors went beyond theory and practice all the way to production.

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REALISM AND ANTIFOUNDATIONALISM

THOMAS M. OLSHEWSKY

"Of course, it all goes back to Peirce," said Angelica Pabst to Persse McGarrigle after Morris Zapp's lecture on the reading of a text as a kind of narrative striptease. To McGarrigle's bewilderment over the allophone of his own name, she responds: "Peirce. Another variant spelling of your name. He was an American philosopher. He wrote somewhere about the impossibility of stripping the veils of representation from meaning. And that was before the First World War" (Lodge 1984:28). David Lodge tells me that Angelica got this interpretation of C.S. Peirce as a forerunner of post-structuralism from reading Patricia Parker's *Inescapable Romance* (Parker 1979), and that she in turn got it from the *Collected Papers of C.S. Peirce:*

> The meaning of a representation can be nothing but a representation. In fact, it is nothing but the representation itself stripped of irrelevant clothing. But this clothing never can be completely stripped off; it is only changed for something more diaphanous. (*CP* 1.399)

This role for Peirce as the forerunner of post-structuralism gains increasing attention among literary critics at the same time that Richard Rorty rejects Peirce for his foundationalist character, and even refuses to accord to him the name that Peirce himself gave to America's most prominent philosophical movement. I think Peirce has been miscast in both roles. I want to show why Peirce's realism does not imply the foundationalism often attributed to him, and why his fallibilism is a far cry from the post-structuralism often associated with him. Finally, I want to show how Peirce himself saw his fallibilism and realism requiring one another, and how they became increasingly entwined in his mature philosophy.

Intention and Representation

Rorty (Rorty 1979) distinguished philosophy with a capital "P" as foundational, constructive, and systematic from his own analytical, deconstructive, and "edifying" pursuits, largely on the basis of attributing a copy view of meaning and truth to the former, as opposed to the treatments of linguistic roles and rule-governed behaviors by the latter. The copy-view he traces to

G. Debrock and M. Hulswit (eds.), Living Doubt, 25–32.

Locke's representational epistemology which he characterizes as "the Mirror of Nature." Finding in Peirce a constructive, systematic account of meaning and truth, and finding that Peirce treats of intentions and representations, Rorty casts him in the Lockean tradition as a foundationalist. Since Peirce explicitly attacks this "copy-view" of representation in his 1868 attacks on Cartesian philosophy, this may be the best place to begin our appraisal of his foundationalism.

Peirce contends, against Descartes, that we not only lack intuition – immediate cognition, sensory or conceptual – but that we lack introspection, the ability to observe the workings of our consciousness. In pursuing the latter, he observes that while we often claim some "inner" observation of images of particulars, our accounts are never so definite and specific. He concludes this discussion by maintaining that

> [i]t is apparent that no man has a *true* image of the road to his office, or any other real thing. [...] It becomes very doubtful whether we ever have any such thing as an image in our imagination. [...] We carry away absolutely nothing of the color except the *consciousness that we could recognize it.* (*CP* 5.300)

He then chides Berkeley for giving a copy interpretation of Locke's account of representation, and Hume for following Berkeley in this misinterpretation (presumably, he would have similar words for Rorty). He then concludes: "I will now go so far as to say that we have no images, even in actual perception" (*CP* 5.303). In short, Peirce explicitly rejects a copy-account of knowledge and perception as a base for meaning and truth.

How then are we to take his representational views of knowledge? He gives us a clue in the distinction of the representationist from the presentationist. Representationism is "the doctrine that percepts stand for something behind them" (*CP* 5.607). By contrast, the presentationist holds that in perception, the sense of exertion and resistance are one and the same, a two-sided consciousness in which active object and acted-upon subject are inseparable. Here, Peirce historically anticipates the critical/simple realism and causal/phenomenal perception debates of the Twentieth Century, but without taking sides. He himself maintained that the mind is active in perception, so that perception is intelligible (i.e., inferential and semiotic), and its object is real (i.e., perception represents). Perception is thus not a fiction constructed from the presented. Representation is thus in the first instance the mind's response to what is presented in experience which gives significance to the presentation at once by interpreting it and by referring that interpretation not just to the experience itself, but to that which gave rise to the experience.

This leads us to another clue to his representational views, this one in his semiotic notion of a *representamen.* A representamen is a sign that stands for an object to an interpretant, but this standing-for is in no way a copying. Even icons are not to be taken as copies, but rather as signs that call our attention to some characteristics of the object they represent. We are misled in thinking of icons as "pictures" and of pictures as "copies". Pictures are a common kind of icon, but not the only one. For example, Peirce uses the *juxtaposition* of two algebraic equations of the same form as an illustration of iconic representation. Even pictures do not ordinarily "copy", but rather pick out features that will call our attention to features of the object. In short, icons require thirdness, both in the continuities and regularities that underly similarity and in the interpretation necessary for the recognition of that similarity. Icons depend upon exhibiting regularities for which individual objects prove to be the instantiations.

"A symbol is a representamen," Peirce says, "whose Representative character consists precisely in its being a rule that will determine its interpretant." This rule is the persistent role over time and across instances, in the semiotic process of a *"power"* of the representamen to determine *some* interpretant to being a representamen of the same object" (*CP* 1.542). The representative character of a sign is not to copy reality, but to "present again" through regular association of token with type and of sign with object, and of habit of action with circumstance, a rule that will bring into definite determination these relations. "The word [sign type] has no existence, although it has real being, *consisting in* the fact that existents [sign tokens] will conform to it."

Still another clue to the significance of representation for Peirce is the intentionality of representation. Peirce's theory of signs is pervasively intentional in all relevant senses. Signs take an object referentially, inferentially and teleologically. Understanding an object is to see it as a sign pointing to its effects causally, implying its effects, seeing that the nature of the thing is determined by its fulfillment in its effects. "What if we try taking the term "natural" or "real class" to mean a class of which all members owe their existence as members of the class to a common final cause?" (*CP* 1.204) For Peirce, there was no separating off the final from the efficient cause. He thought efforts to do so were "old-fashioned." The aims of the rules of reason are to match the regularities of nature, but this matching is not a copying. Concepts aim at establishing habits of action that correlate with the habits of nature. The meaning of a concept is the effect of its referent, the implications of a concept are the comprehension of the totality of those effects, and the completion of a concept is a rule that will predict all of those effects. A successful concept establishes habits of action that avoid surprises. That we may be surprised shows our fallibilism; that we never fully comprehend shows

our incompleteness. "The truth is that concepts are nothing but indefinite problematic judgments" (*CP* 4.583).

This gives us an account of representation that is perceptually derived, semiotically informed and intentionally motivated, with no suggestion of copying in the re-presenting. If this concept of representation thus relieves Peirce of the "copy-theory" charge, it opens the way to another issue of foundationalism, that of grounding. On first glance, Peirce's treatments of grounds and of dynamical objects as ways of getting at representational significance suggest the shadow of Kant's *Ding an sich.* If this, however, is a foundationalism, it is one of a very different sort from the transcendental one. The grounding of being in firstness is to assert that there is no being without qualification; the grounding of definite existence in secondness is to assert that there is no actuality without instantiation and interaction; the grounding of law in thirdness is to assert that there can be no intelligibility without regularity and continuity through time and space. These conditions for grounding phenomena determine *limits* to what may appear, but they do not give *determinate* limits in terms of which any particular form must appear. They do not give the form; they only require that what does *inform* must so *conform.* The talk about grounds thus is neither foundational nor antifoundational in the ways of recent debates. If it is foundational is some sense, it must be in a different, anti-cartesian sense.

The role of the dynamical object, as that which undergoes change, observation and action, also serves a limiting function in Peirce's epistemology. This object never itself becomes semiotically informed, but always stands over against our efforts as a limiting opposition. The only sense in which we know it is negatively: when our actions and experiences are not habituated to conform to its habits, we confront it in unanticipated surprise. Our concepts are devised to develop just those beliefs as habits of action which will avoid such surprises. So far as we function in an unimpeded way relative to the object, we judge our concepts to be adequate to the object. Thus, we may be said to take it into account by supposing that its dynamics are of such a specifiable nature that we can so cooperate with them. This conception of reality as opposition gives a base in reality for norming thought and action without appeal to something unintelligible and unknowable. "That to which the representation should conform, is itself something in the nature of a representation, or sign – something noumenal, intelligible, conceivable, and utterly unlike a thing-in-itself" (*CP* 5.553).

Phenomenologically, reality must be understood as opposition, and phenomenologically is the only way that we can understand reality. This makes Peirce's treatment of representation an interplay of the intentions of our actions that inform our world and the norming opposition of reality to which

they must conform for fulfillment. The foundations for this interplay are the incapacities of the mind, the ontological grounds for firstness, secondness and thirdness, and the dynamical objects to whose habits we attempt to conform our habits. This is a very different sense of foundational from that under attack by Rorty as "the Mirror of Nature." Concepts are activities of inference resolving into habits; propositions are implications to be judged negatively against the evidence of action and experience. Issues of meaning and truth are phenomenologically grounded, semioticallly informed, ontologically conformed.

Fallibilism without Relativism

A critique of Peirce's foundationalism less noted than that of Rorty, but more notable both for its sympathetic discernment and textual accuracy, is that of Joseph Margolis, in pursuit of his own "Pragmatism without Foundations." Margolis maintains that Peirce's foundationalism relies upon a sort of methodological absolutism, and he follows Quine in criticizing Peirce for "its assumption of a final organon of scientific method and its appeal to an infinite process" (Quine 1960:23, quoted in Margolis 1986:169). Margolis rightly finds Peirce's optimism about progress, based on his evolutionary biology and his fallibilism, to be insufficiently self-critical. "Fallibilism, reflexively conceived, is simply the discovery that verisimilitude and its pragmatic counterpart are methodologically inaccessible" (Margolis 1986:178). The upshot, on Margolis' analysis, is a kind of relativism compatible with realism, in which "foundationalism is rejected" and "historicism is embraced" and there is a "reaffirmation of the incompatibility of historicism and universalism" (Margolis 1986:182). "This is just what the full rejection of foundationalism entails [...] We remain forever burdened with reflections about contingency, relativity, non-convergence and ideological bias of our own practices" (Margolis 1986:180).[1]

Margolis rightly stresses the ideal character of Peirce's latter-day account of ultimate convergence, but gives little attention to the details of the common method of inquiry that Peirce espouses. Recently, Ines Riemer pointed out that from 1901, Peirce shifted his account of methodology from claiming different methods for different inquiries to a combination of methods for all inquiries. This generalization does not imply universalization nor absolutization. It is rather an attempt to account for the interplay of abduction/deduction/induction in all human inquiry. Since retroduction carries

[1]This may begin to sound a bit like Hilary Putnam's latter-day views on relativism as expounded in his Carus Lectures (Putnam 1988). For my critical comparison of Putnam's position with that of Peirce, see (Olshewsky 1988) "Peirce and Recent Realisms" in the Peirceana issue of *VS*, April, 1988.

us from experience to hypothesis, and induction from hypothesis to experience, Riemer maintains that Peirce's methodology has the effect of making the hermeneutical circle a spiral, and with this, progress is surely suggested. Also suggested is the interaction of inquiry with the phenomenological, semiotic and ontological conditions that I have already outlined.

Epagoge is the bringing in of something; *apagoge* is the leading out. Peirce gives us dual Latinization of the latter, and thus double connotation. Abduction is a carrying off, a leading away; retroduction is a returning of what is owed, a paying of debts (Olshewsky 1988). Although Peirce used both terms, he did not, as far as I know, make any division of labor between abduction and retroduction. The bringing out of the one is of a piece with the paying back of the other. The very bringing out of the "phenomena singled out for explanation" is already against the background of established habits of generality and continuity, but it must also be brought before the magistry of action and perception. The formulation is against the background of *thirdness* (signs interpreted by prior cognitions), and in the face of the force of *secondness.* That the habits of theory will match the habits of nature is a hope, not an expectation, one yet to be tried in the courts of inductive collection and deductive prediction. The paying back too, must be into the fund of thirdness, but in the coinage cast from the ore of secondness. Operationally, this may tend to be constructivistic, since the limits confronted even at the very basic level of perception turn out to have already been informed by abductive inference, and the theoretical framework is itself the habits of the inquirers that cannot guarantee the habits of nature; but ideally, the understanding is realistic, since relative secondness is rooted ultimately in the surd opposition of reality to both perception and action, and relative thirdness intends ultimate fulfillment in that "opinion which is fated to be ultimately agreed to by all who investigate."

That this convergence seems to Margolis an unlikely one is perhaps reminiscent of Arthur Fine's "small hand-full" problem: Why prefer a small handful of narrowly related theories in view of the fact that such a strategy produces only occasional success? (Fine 1985:87-89) On Peirce's conception of abduction, what we have is an *educated* guess. That the guess works only occasionally is an affirmation of fallibility. That it works on more occasions than what pure chance would lead us to predict is an affirmation that the habits of our inquiry have to some extent gotten in touch with the habits of nature. That we expect it to continue to do so is no more than an affirmation of our faith in the intelligibility of nature. This is the only way we are constituted to come to terms with nature. This orientation not only promises (modest) success in the short run, but, plausibly, convergence in the long run, if of course that run is long enough.

The presumption that the world is rational is itself hypothetical, and thus fallible. As Margolis himself points out, the fallibility thesis is not self-contradictory in its self-application. But this is by implication to acknowledge, contrary to Margolis' claims, that Peirce's fallibilism is in an interesting way non-foundational. "All reasoning makes a pretension; and if the pretension is true, the reasoning is valid" (*CP* 2.446). That our judgments about that truth remain provisional on the possibility that we could still be surprised hardly implies inaccessibility to the truth. It rather requires a grounding in reality as setting limits to our action while acknowledging that it is always in interaction with those limits that we calculate the formulations of our actions. Nor does openness to correction imply relativism, but rather confrontation with limits imposed by reality. That our corrections are made in relation to such limits, hypothesized or actual, is already a relativism far removed from that which Margolis proposes. Rather, it implies that fallibilism must go hand in hand with Peirce's dynamic, representational realism.

To this extent, then, Angelica Pabst was right. Our human resourcing of our environment is by its very nature representational. Stripping away the veils of representation from meaning will only produce more representations. Significance is always mediated by signs. This does not imply, as Richard Rorty has suggested, a copy theory of knowledge or a transcendental relation to reality. On the other hand, it does not lead, as Joseph Margolis proposes, to a conceptual relativism. What it gives us instead is an integration of realism with fallibilism, into which neither modern foundationalism nor post-modern post-structuralism can fit.

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FOUNDATIONS, CIRCULARITY, AND TRANSCENDENTAL ARGUMENTS

HUMPHREY PALMER

Tradition tells of a radical thinker who started one day on a spring-clean of all his opinions. Till then, he had taken most of them on trust, but he now realized that some were evidently wrong. From now on, he resolved, all decisions would be down to him. He would choose for himself what he was going to believe.

His first decision was to reject whatever he could manage to disbelieve. But he soon found one thing he could not very well deny: that all this disbelieving was going on, with him there doing it. So he decided to grant this single super-solid fact, and whatever else could be deduced from it. Might he not in this way construct an entirely reliable science, containing only undeniables? Anything not in it could then be discarded as finally unworthy of belief.

You may wish to call this theory-of-knowledge Cartesian, as Peirce would have done. It contains four major points:

1. that each thinker should decide for himself what he is going to believe;
2. that belief B may be accepted on the basis of belief A only if A implies B;
3. that the whole of genuine Science can thus be derived from a single basic Truth;
4. that any beliefs not thus made acceptable should be thrown away.

Descartes did himself propose item 2: that deduction is required, to justify one belief by another. The other three items do not go back to the historical Descartes.

Peirce attacked the first item as Cartesian. He said one could not choose what to believe, and one could not doubt things on purpose. But Descartes was not really choosing what he would believe, but rather proposing a test by which to select some beliefs to serve as axioms. In our terms, he was distinguishing necessary statements from contingent ones (Palmer 1985:13). Peirce later gave his blessing to experimental doubt, though not, it seems, to Descartes' doing it (*CP* 5.394). This looks like saying 'Don't you do it, I will,' like a Government debauching the currency.

G. Debrock and M. Hulswit (eds.), Living Doubt, 33–41.

According to the third item, the new science was all to be built on the sole foundation of the Cogito. This is true, and false, and quite ridiculous. It is ridiculous because no deductive structure can go beyond its starting-point: and even a syllogism needs two premisses. It is false, because Descartes accepted any statement as indubitable if it was *as evident as* the Cogito: for example, that he having existed could not later not have existed, or that two and three make five (*Meditation* 3). Neither of these truths can be deduced from the Cogito. However, the Cogito was the first indubitable statement to be recognized as such, so Descartes does take it as standard, for assessing all the rest.

By the fourth item in our little list, beliefs not baptized into the new and holy Science are to be damned, and cast aside eternally. Now Descartes did decide "to reject as absolutely false everything in which I could suppose the slightest reason for doubt" (*Discourse* 4): but this was part of his experiment, a test for acceptability. He did not intend to entirely discard whatever he could not prove. For he needed an interim ethic and religion, as a grandee needs a cottage while his posh new house is being built (*Discourse* 3). And when his spring-clean was over Descartes went back to regarding normal careful waking perception as reliable, like any ordinary chap (*Meditation* 6).

A more truly Cartesian program would therefore read like this:

> Any serious thinker should some day decide, first, which of his thoughts are quite undeniable; and then, which others can be deduced from them. Remaining beliefs will have lower status, but may still be acceptable for certain purposes.

Such a program is now called Foundationalist, as it seeks basic or foundational beliefs, by which the others may be justified. Of course these programs vary a little. Some allow non-deductive inference, to justify derived beliefs. Some do not require indubitable beliefs, to start from, but make do with those one is in no position to correct (incorrigibles), or those one just feels bound to hold (Fumerton 1988:178). And some are put in less subjective or individualist terms than those used by Descartes. Allowing for all these revisions and extensions, the main thesis of foundationalism would now run like this:

> Serious thinkers should jointly decide which statements qualify as foundational, and which others can be reliably derived from these by means of inference, thus constituting Science.

Does this mean that statements which turn out to be foundational can be accepted on that ground as reliable?

1 *Foundationalism*

The word 'foundation' conveys a misleading metaphor. Before building a house, we dig a hole in the ground and pour concrete into it, to hold the bottom layer of bricks in place and out of the weather. The deeper we dig the better, down away from the rain and onto strata that have solidified for centuries. Now an inference does in a way build one belief on another, bonding the top one to those below by a logical cement. These phrases convey that the inference is reliable, that is, the conclusion should be true or acceptable *if* the premisses are so. But are the premisses true? That cannot be settled by the metaphor, for the two cases diverge. In the real case of house-building people dig the hole first, pour concrete in, and then start piling bricks. In the metaphorical case of Science we start with the completed edifice and work down from brick to brick to see how solid it may be. 'Working down' consists of thinking up some previous premiss which we should have had, to get where we are now, by inference. As these dreamt-up 'previous' premisses get more and more remote we say we are 'digging deeper.' The deeper the better, we think, for the deeper we dig our foundations the safer our home is going to be. But that is just arguing by metaphor.

Can we do without the metaphor, to avoid being misled? Yes, if only we could find some non-metaphorical way to refer to the logical properties involved. We are to characterize beliefs which can be accepted without inference from others, unlike other beliefs which are accepted only by inference from these. Perhaps the word 'original' would serve us here: at least the metaphor involved is different. Some beliefs are inferred from others, some of these from others again, and so on; those which are inferred from but are not themselves inferred can be called originals.

How do we tell that a belief qualifies as original? By inspecting the system of inferences in question, to see if this belief stands at the head of it. This is one benefit of axiomatizing: it lets you see which things belong up front: up front *in that system,* anyway. There may be another system of ideas which has the same content but different axioms. There may also be a collection containing the same ideas, not yet worked up into an inferential system, so that no one can now say which items in it may one day serve as axioms.

To detect originals in a given and worked-out system of beliefs, only moderate logical competence would be required. Their originality is an aspect of the system they figure in; much as presidency is a feature of a state, although occupied by individuals. But a given system of beliefs is not given as final or perfect, correct or even adequate; so primacy in that system does not show a belief to be true or enlightening or acceptable. So when we have picked out the originals in some system, we shall still need to ask whether they are true.

Descartes' procedure shows appreciation of this point. He presents himself as picking up ideas to start from, because he has reason to think that they are reliable; and as then discovering the system they collectively imply. That seems a properly foundationalist approach. We could with equal propriety pick out some ideas first, by their place in a system, and then look round for a way of showing them reliable; though our friends will probably say we are just making our prejudices respectable. What will not do is to pick out some ideas as original and then claim that therefore they must be reliable. This is just asking to be led by the nose.

How can original ideas be shown reliable? We might say that we know one when we see one: that we can tell by inspection which notions could not possibly be wrong. Descartes is usually presented as making such a claim. Unfortunately the next thinker may intuit quite different items as reliable. There seems little point in discussing such intuitions, so each isolated Thinker ends up with his own private Science, in which he alone has total confidence. This result bothers us a lot, in questions of morality, but much less in matters of arithmetic.

Someone who just intuits X can give no reason for X except that it strikes him as correct. So he tends to get touchy, when people question X. Peirce thought such touchiness might be a mark of indubitability (*CP* 5.445). Collingwood makes a similar suggestion, for his 'Absolute Presuppositions' (Collingwood 1940:31). But they were discussing how to tell if something was original or foundational, not how to tell if it was reliable.

Descartes reached his first self-evident truth, the Cogito, by a process resembling inference. He tried supposing it untrue, found he couldn't, not even if an almighty Godlet were playing games with him: and concluded from this experiment that the idea in question had to be reliable. He then decided to accept whatever was equally evident: he could

> take it to be a general rule that the things we conceive very clearly and very distinctly are all true, but that there is nevertheless some difficulty in being able to recognize for certain which are the things we see distinctly. (*Discourse* 4)

This account suggests a degree of pondering and weighing and reaching a verdict, quite unlike those unfounded snap judgments which we expect of an intuitionist, and more like some sort of inference.

2 *Epistemology is rather Circular*

One obvious way to justify our originals is by inference from something else already held reliable. Now this might indeed show them reliable, but would also show them not to be originals. They would move down into the main body of theorems; and those other items we inferred them from would replace them, as originals. And about these in turn we would then have to ask: Can they be shown reliable? So justifying originals by inference from something else will never get us nearer having justified originals.

There is a similar problem for the theory of knowledge, quite in general. We set out to check or improve existing knowledge or Science by considering what mechanisms or procedures are actually available to us humans, for getting it. This supposes that we would recognize an instance of knowledge, if we came on one. But it turns out that even our best instances are open to dispute. So we turn to discuss what is to count as knowledge, feeling that this point requires to be settled first. Any answer to this question, however, can also be questioned in its turn, any account of knowledge can be criticized as epistemologically inadequate. Here is a truly Recurring Question which can never be finally answered just because it can always be asked again (Palmer 1981:347).

The theory of knowledge started life as a brief inquiry preliminary to major new contributions to the Sciences. It has become a full-time occupation, completely engrossing its devotees, and without much purchase on other people's thought. Yet it makes little progress, being hung up by this conundrum:

1. You can't tell what sorts of things humans can know until you know what knowing is.
2. Knowing what knowing is would be knowing something.
3. So knowing what knowing is would have to conform to the standards we are still struggling to set up.

The whole project of epistemology thus seems irredeemably circular.

You can't begin, in this critical game, unless you have begun. So you really can't begin at all. To evade this conundrum, people resort to pretense. Keeping ready to hand all the needful apparatus of concepts and standards, ways of judging and fundamental certainties, they kid themselves into thinking they have abandoned everything and are beginning intellectual life afresh. But it isn't an entirely fresh start. The slate may be clean, but the hand already knows how to write on it. Peirce loudly and rightly complained about these bogus new-born babes, especially Descartes (*CP* 5.264).

To show B true, we commonly look for some other item A which implies B and is already known. Now if all justification is to be by derivation in this

way, then it can never be begun. The circle of justification arises because we suppose that B can be justified as true only be deriving it from some higher truth. But maybe reasoning could also be used from alongside, so to speak, to show that B does indeed have whatever it takes to be a reliable original. Such an approach was favored by J.F. Fries, developing Kant's idea of Deduction as a non-derivational justifying argument (Nelson 1971:166).

3 Transcendental Arguments

Kant and others have experimented with a special form of argument, for showing originals true or acceptable. These arguments are called Transcendental, an impressive name and difficult to spell, but very variously interpreted. Let me give an example. Suppose some logician constructs a logic in which the Law of non-Contradiction is not an element. That is his privilege, if he likes that sort of thing. But we still won't listen, if he starts denying that Law, while commending his logic, for he must make implicit use of it when discussing anything. The Law of non-Contradiction, which is presupposed in all intelligent discourse, is thus shown to be an absolute Truth; so a foundationalist could safely build on it.

This line of argument was put forward by Tibor Machan at our Congress in 1976 (Machan 1981:254). Reasonings of this transcendental type are now quite popular, as they deliver objective socially-needed goods to lonely reasoners worried by a skepticism no one else bothers to refute.

To assess the effectiveness of these remedies, we must first state in general what is to count as a transcendental argument. I call an argument transcendental if it claims that an item P is presupposed by some activity A which is presently observed; and concludes that as A is going on, P must be true and cannot be denied. Such an argument, I claim, can never prove the truth of P, as the proof when fully stated would be circular. However, the same argument may serve to show that certain persons ought not to go around denying P, as they have need of it, in doing whatever they already do. In this sense, transcendental arguments are all *ad hominem.* Now, how can everyone's originals be established by arguments *ad hominem*?

Transcendental arguments have this pattern:

> A presupposes P,
> but A is happening,
> therefore P is true.

Descartes provides an example of this pattern:

> Somebody's thinking presupposes his being there,
> I am thinking, for doubting is one way to think,
> Therefore, I exist.

Let us grant, for the present, that the statement 'Brown is thinking' does presuppose that there is somebody called Brown, that Brown exists. And let us suppose that someone else, say Smith, has granted that Brown is thinking. Then the argument does really show that Smith has no business to say that Brown does not exist. The argument is good against Smith, in the light of previous commitments: that is what we mean by calling it *ad hominem.* It will still be good if Smith and Brown coalesce, as they do in Descartes' Cogito.

Now, if any Smith can thus satisfy himself that he should not say that Brown does not exist, what more can be needed to constitute a proof for everyone that Brown exists?

Let us suppose that Smith is observing an item or object called Brown. He sees this object knit its brows, scratch its head, stare into space, whistle through its teeth and finally scribble rapidly. Aha, says Smith, Brown is thinking; and he makes a note of it. In making this note, Smith is taking there to be a person called Brown, and not just some fancy gadgetry inside that trouser and that coat; for he cannot properly say 'Brown thinks' if he is really in doubt whether the person Brown exists. This means that Brown's being said to think cannot serve to establish that there is a person, called Brown, not without circularity; for saying 'Brown thinks' is already to take for granted that there is a person called Brown.

This point about circularity had better be put in non-temporal terms. In order to use Descartes' Cogito as a proof that he exists, we need a premiss which does not rest on this. But we have just said that thinking presupposes existing; indeed, being there is a necessary prerequisite to doing anything. So Brown's thinking, which presupposes his existing, cannot go to prove that very point, as it cannot be discovered or established *independently* (Palmer 1985:38).

Can we establish, say, the Law of non-contradiction by showing that even those who would deny it must perforce rely on it? We can show that *they* should not deny it; and maybe no one else is going to. But does this prove that it is true? Such a proof would require a starting-point *independent* of the item being proved. There is an extra difficulty in this case: it is said we cannot even engage in reasoning without relying on that Law; so how can your reasoning be relied upon, while you are still establishing its reliability? This means that we cannot prove the Law absolute or true, and will just have to go on taking it for granted: which is what Aristotle also held.

A good transcendental argument restricts the options open to someone

holding certain views or doing certain things. If everyone has to hold those views or do those things, the resulting restrictions will apply to everyone. Thus if we all rely on the Law of non-Contradiction, that will show that we all have no business to be denying it. So this *ad hominem* conclusion may become quite public and general, and apply to all rational beings, or at least to all English-speaking philosophers. But that does not show the conclusion true or absolute. It just shows we are all in the same boat, and what sort of boat we are in. Foundationalism on these terms is not very different from Coherentism.

For some, that conclusion is a welcome one. They say we have only one human and still imperfect Science or system of well-considered beliefs. We cannot think ourselves out of that world, to start constructing an alternative. Unable therefore to assess the system as a whole, we are going to have to just put up with it, like Carlyle's lady who enthused "I accept the Universe." We can assess individual ideas, by standards which themselves form the structure of the Whole. So we can, if we like, distinguish some ideas as original, by their place in the system. These original ideas will just have to be believed, once we see that the rest of the system is all derived from them. That is what the Coherentists are saying: at least, I think it is.

In this paper I have not shown that Foundationalism is right, or wrong, or unpatriotic, or incoherent, or anything. What I have tried to show is this: The Foundationalist tries to found all our supposed knowledge on certain basic ideas, the originals as I called them. These originals may in their turn require to be justified, that is, shown to be true or generally acceptable. But Transcendental Arguments are not a good way of doing this, as they involve a hidden but vicious circularity. Fundamentalism in this portentous garb reduces to saying "this is what everyone believes, and there's an end on it." For which everyday dogmatism we have another name.

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SOME ASPECTS OF PEIRCE'S THEORY OF KNOWLEDGE

QIWEI CHEN

Peirce, I think, was undoubtedly the greatest figure in the history of American Philosophy and also one of the most prominent thinkers in the modern West. He contributed so much to the treasure-house of the human mind, and his thought is so comprehensive and profound that it is not easy to grasp every aspect of his philosophy. Therefore, I'd like to limit myself to a discussion of just one small but important part of his philosophy: his theory of knowledge. And although he warned us that "every person who wishes to form an opinion concerning fundamental problems should first of all make a complete survey of human knowledge" (*CP* 6.9), I neither will nor could make a complete survey of Peirce's theory of knowledge in this paper, but I will just discuss several points of it.

1 The Independence of Reality as Object to Knowledge

Peirce was a realist both in his metaphysics and in his epistemology. His metaphysics is realistic in the sense that it admits the reality of universals or generals as well as that of particular and concrete things. His theory of knowledge is realistic in the sense that it insists upon an independent reality as the proper object of knowledge.

Although I won't say much about Peirce's metaphysics, I must discuss in some detail his conception of reality. For, while reality may be an important concept in metaphysics which, indeed, Peirce calls the "science of Reality" (*CP* 5.121), it is also central to epistemology. Knowledge always has real things for its objects: "If I *truly* know anything, that which I know must be *real*" (*CP* 5.94). So the problem is: what do we mean by the real, what does the reality of things consist of, and how is the relation of reality to knowledge?

Peirce defined the real in terms of its opposite. Following Spinoza's principle that "*Omnis determinatio est negatio*," he also held that "all determination is by negation." More particularly, that means that "we can first recognize any character only by putting an object which possesses it into comparison with an object which possesses it not" (*CP* 5.294). Now the opposite of the real, is the unreal. Therefore, the real "is a conception which we must first have had when we discovered that there was an unreal, an illusion; that is,

G. Debrock and M. Hulswit (eds.), Living Doubt, 43–53.

when we first corrected ourselves." Thus, it is self-correction that allows us to distinguish between "an *ens* relative to private inward determinations," which is the unreal, and "an *ens* such as would stand in the long run" and is "independent of the vagaries of me and you," which is the real (*CP* 5.311).

Elsewhere too Peirce explained the real by a comparison with the unreal. He said:

> Objects are divided into figments, dreams, etc., on the one hand, and realities on the other. The former are those which exist only inasmuch as you or I or some man imagines them; the latter are those which have an existence independent of your mind or mine or that of any number of persons. The real is that which is not whatever we happen to think it, but is unaffected by what we may think of it. (*CP* 8.12)

In short, "[we] may define the real as that whose characters are independent of what anybody may think them to be" (*CP* 5.405).

Thus, we see how the definition of reality involves the relation of reality as object to thought, i.e., how it involves knowledge. Indeed, this is the only way in which we can define it. For so ultimate and comprehensive is the concept of reality that no more can be said about it metaphysically than that it is "a mode of being." That leaves us with the question of the epistemological status of this mode of being (*CP* 6.349).

Yet Peirce reminded us not to confuse the independence of reality with externality. Everything that is real is independent of our thought, but that does not necessarily mean that it is external to the mind. Mental phenomena are as real as are physical phenomena, and therefore they too, in as much as they are real objects of knowledge, are independent of our thought. For example,

> ... an emotion of the mind is real, in the sense that it exists in the mind whether we are distinctly conscious of it or not. But it is not external because although it does not depend upon what we think about it, it does depend upon the state of our thoughts about something. (*CP* 7.339)

Thus, the key point of Peirce's realistic theory of knowledge is that reality as the object of knowledge is independent of, and unaffected by our thinking or knowing it.

However, there is a sense in which reality may not be said to be entirely independent of thought. A reality becomes an object of thought only when it is thought or when it is attached to an idea:

> What idea can be attached to that of which there is no idea? For if there be an idea of such a reality, it is the object of that idea of which we are speaking, and which is not independent of thought. It is clear that it is quite beyond the power of the mind to have an idea of something entirely independent of thought .... (*CP* 7.345)

Obviously, anything that would be "entirely independent of thought" would be entirely unthinkable, and therefore, unknowable. As it will be seen below, Peirce resolutely denied the possibility of things that are absolutely unknowable. Thus, when he referred to a reality not entirely independent of thought or "not necessarily independent of thought in general" (*CP* 5.408), he simply meant that there is no reality which is entirely beyond the capacity of thought and knowledge. This is not inconsistent with his realistic theory of knowledge.

2 Against Agnosticism: Nothing Absolutely Unknowable

In a review of Baldwin's *Dictionary of Philosophy*, Peirce indicated that the philosophy of his day was characterized by "a reaction against the general agnostic tendency of a generation ago" (*CP* 8.168). This tendency may be illustrated by Spencer's famous philosophy of "the Unknowable" or by Du Bois-Reymond's widely quoted words *ignoramus et ignorabimus*, and many other agnostic views that appeared towards the end of the 19th century. In this respect, we should say Peirce was a hero going against the tide. One of the obstacles to the advance of knowledge "which philosophers often set up across the roadway of inquiry lies in maintaining that this, that, and the other never can be known" (*CP* 1.138).

Contrary to agnostics, Peirce firmly believed that the world is knowable to us. This belief was deeply rooted in a fundamental conviction that man and nature are one. In virtue of their being part of nature, man and its mind must be in accordance with nature; indeed, "unless man has a natural bent in accordance with nature's, he has no chance of understanding nature at all" (*CP* 6.477). How could the mind understand the external world if man and nature, mind and matter, were separated into two radically different realms?

"To be sure," Peirce said, his realistic philosophy "will deny that there is any reality which is absolutely incognizable in itself, so that it cannot be taken into the mind" (*CP* 8.13). "The absolutely incognizable" is therefore an expression devoid of meaning:

> ... since the meaning of a word is the conception it conveys, the absolutely incognizable has no meaning because no conception attaches to it. It is therefore, a meaningless word ... (*CP* 5.310)

Thus, it is an important principle that "the absolutely incognizable is absolutely inconceivable" (*CP* 5.310).

This explains why, according to Peirce who greatly admired Kant, thought there was no chasm between the thing-in-itself and appearance. Appearances of sense are "only signs of the realities," while "the realities which they represent [are not] the unknowable cause of sensation" (*CP* 8.13);

> ... everything which is present to us is a phenomenal manifestation of ourselves. This does not prevent its being a phenomenon of something without us, just as a rainbow is at once a manifestation both of the sun and of the rain. (*CP* 5.283)

The appearances are not a wall separating us from the thing-in-itself, but a bridge leading us to the thing-in-itself. Similarly, the thing-in-itself is not hidden behind the appearance. Our experience of appearance *is* the experience of the thing-in-itself: "we have *direct experience of things in themselves*" (*CP* 6.95). Things-in-themselves, as experienced by us, are appearances, i.e., things-for-us, the objects of our knowledge. But though it be true that "our knowledge of things in themselves is entirely relative" to the human mind, that does not alter the fact that "all experience and all knowledge is knowledge of that which is, independently of being represented" (*CP* 6.95).

One reason why some philosophers regard things-in-themselves as unknowable is that they fail to recognize that things-in-themselves are related to or represented in the human mind, thereby depriving things-in-themselves of all determinations that are known to us. Only when things-in-themselves are considered as mere empty abstractions without any determination or representation, is there nothing in them that we may possibly know: "a reality which has no representation is one which has no relation and no quality" (*CP* 5.312). But there simply can be no such reality, no such thing-in-itself: "there is no thing which is in-itself in the sense of not being relative to the mind, though things which are relative to the mind doubtless are, apart from that relation" (*CP* 5.311). Peirce sums up his position when he writes that:

> There is nothing [...] to prevent our knowing outward things as they really are, and it is most likely that we do thus know them in numberless cases, although we can never be absolutely certain of doing so in any special case. (*CP* 5.311)

It is true that we are always ignorant of a great number of things and that we often make errors. But in spite of all that, knowledge does emerge from ignorance, truth from error, and therefore "ignorance and error can only be conceived as correlative to a real knowledge and truth, which latter are of

the nature of cognitions" (*CP* 5.257). There may be things that are actually unknown to us, but there is nothing unknowable in principle: "over against any cognition, there is an unknown but knowable reality; but over against all possible cognition, there is only the self-contradictory" (*CP* 5.257). There may be things of which we have no knowledge as yet, but there is nothing which is precluded from being known in the future if the conditions for knowing them be satisfied. There is no question that must forever be deprived of a solution, provided the meaning of the question be clear and the investigation of it be carried far enough (*CP* 5.409). "It is easy enough to mention a question the answer to which is not known to me today. But to aver that that answer will not be known tomorrow is somewhat risky"(*CP* 1.138). Peirce illustrated this point by pointing out that Auguste Comte had asserted with certainty that no man could by any possibility attain the knowledge of the chemical composition of the fixed stars, "but the ink was scarcely dry upon the printed page before the spectroscope was discovered and that which he had deemed absolutely unknowable was well on the way of getting ascertained" (*CP* 1.138).

In sum, Peirce teaches us that the human capacity for knowledge is both unlimited and limited. It is limited in the sense that perfect knowledge cannot be fulfilled in any one individual person and any one particular moment, but as the history of science has shown, every presumed limit has been proved to break down and to be overcome by the progress of knowledge from generation to generation. If it is considered as a process realized in all human beings both past and future, human knowledge is constantly increasing and "may increase beyond any assignable point," that is, there is no absolute limit that might restrict it. Indeed, "an absolute termination of all increase of knowledge is absolutely incognizable, and therefore does not exist" (*CP* 5.330).

3 Truth, Error and Fallibilism

Peirce has written a lot of things on truth, though he did not systematically explain his conception of truth.

3.1 Peirce's Conception of Correspondence

In accordance with his realistic theory of knowledge, Peirce held a correspondence theory of truth: truth consists in a conformity to something independent of any man's opinion of it (*CP* 5.211). Truth is the correspondence or the reference of a representation as sign to its object, because

> ... there must be an action of the object upon the sign to render the latter true. Without that, the object is not the representamen's object. (*CP* 5.554)

Now the representation or sign is what we call a proposition: "Truth and falsity are characters confined to propositions." A true proposition is like "a portrait with the name of the original below it," namely, its object, "if anybody looks at it, he can form a reasonably correct idea of how the original looked" (*CP* 5.569).

Therefore, truth is something objective. The objectivity of truth is especially indicated by the fact that "there is such a thing as a proposition correct whatever may be opinions about it" (*CP* 2.137); that "something is so – is correct, or just – whether you, or I, or anybody thinks it is so or not" (*CP* 2.135).

This emphasis on the objectivity of truth distinguishes Peirce's doctrine from James' pragmatism and Comte's positivism, in which the objectivity of truth is denied. Although James extended the application of Peirce's pragmatic principle of meaning to the theory of truth, he introduced a reference to utility and satisfaction in his definition of truth. According to James, we can say of truth that it is useful because it is true, or that it is true because it is useful. Peirce too at one time believed that "a theory cannot be sound unless it be susceptible of applications, immediate or remote" (*CP* 2.7). But contrary to James, he insisted that, though a sound or true theory may be useful directly or indirectly, it can never derive its truth from its usefulness. On the contrary, a theory may be useful *because* it is true, i.e., because it provides us with a correct explanation of things:

> The end of any theory is to furnish a rational account of its object [...] A theory directly aims at nothing but knowing. Maybe, if it be sound, it is likely, some day, prove useful. Still, fairness forbids our making utility the criterion of the excellence of the theory. (*CP* 2.1)

If, with James, we were to believe that truth is something that is merely useful for individual persons as James thought, then truth would be private and subjective. Peirce raised this objection frankly in a letter to James in June of 1907, which he wrote upon receiving a copy of James' book, *Pragmatism*: "What is utility, if it is confined to a single accidental person? Truth is public" (Perry 1948:291).

But even if utility were extended to all of society, it would not thereby coincide with truth, Peirce attacked the notion that our opinions should be tailored according to the "stability" or "interests" of society. Far from being related to the truth, they are rather "the mainspring of the mendacity and hypocrisy." "Truth is truth, whether it is opposed to the interests of society to admit it or not" (*CP* 8.143).

Peirce also rejected the view of Comte and other positivists who state that truth is identical with what is verifiable. Indeed, "[l]ike the majority of Comte's ideas, this is a bad interpretation of a *truth*" (*CP* 5.597). More specifically, "Comte's own notion of a *verifiable* hypothesis was that it must not suppose anything that you are not able directly to observe" (*CP* 5.597). But clearly, if that should be the case, we would be forbidden to believe in anything which cannot be detected or verified by direct perception or first impression of sense. According to this doctrine which proclaims that only direct percepts can yield real knowledge, all the intellectual parts of our knowledge must be fictions (*CP* 5.597). It is evident that, on that account, the truth cannot possibly be objective.

3.2 Truth and Fallibilism

Peirce unceasingly insists that truth is the goal of scientific inquiry and that it is undoubtedly attainable. But he rejected with equal vigor any suggestion of an absolute truth. Indeed, the view "holding that this or that law or truth has found its last and perfect formulation" is a "philosophical obstacle to the advance of knowledge" (*CP* 1.140). Although human knowledge is constantly progressing from imperfection to perfection, from the relative to the absolute, perfect and absolute truth must be seen as an ideal limit which in effect we can never reach.

There is a sense in which it may be said that truth is "that concordance of an abstract statement with the ideal limit towards which endless investigation would tend to bring scientific belief." But such concordance must be understood in terms of an endless approach to that ideal limit. Hence it presupposes that the abstract statement to which he refers is always inaccurate and one-sided, no matter how closely it approximates the ideal limit.

> ... we hope that in the progress of science its error will indefinitely diminish, just as the error of 3.14159, the value given for π, will indefinitely diminish as the calculation is carried to more and more places of decimals. What we call π is an ideal limit to which no numerical expression can be perfectly true. (*CP* 5.565)

We can never hope to attain absolute certainty, absolute exactitude and absolute universality by reasoning or any other means (*CP* 1.41-42). Nor can we ever exhaust all truths of the world. In this respect, Peirce referred to Newton's saying that "we are little children picking up pretty pebbles on the beach while the whole ocean lies before us unexplored" (*CP* 1.117). Thus, the idea of omniscience is utterly unreasonable, for "an omniscient being is necessarily destitute of the faculty of reason" (*CP* 7.323).

Therefore Peirce strongly fought against infallibilism. Infallibility is a myth; nobody has the right to proclaim himself infallible. "It may be [...] that it ought to be assumed that all our knowledge has some error in it" (*CP* 2.532). Knowledge is a process of growth in which truth and error are inseparable. Error undoubtedly is the opposite of truth, but it is not therefore simply a negative element in the process of knowledge. As a matter of fact, we do not know what truth is until we know what error is; there is no pursuit of truth, there can be no advance of knowledge, unless we have some idea of error. There must, says Peirce, have been a stage in the mental development of the human race and of each individual person, in which "the mind has not yet eaten of the fruit of the Tree of Knowledge of Truth and Falsity" (*CP* 3.488). In this stage where there is no clear conception of error or falsehood, man finds himself in a state that is not quite different from that of animal instinct. That is a state where reason is lacking, because "plainly without a knowledge of falsehood no development of discursive reason can take place" (*CP* 3.488). Moreover, error and the discovery of error may stimulate the progress of knowledge. Indeed, any scientific proposition or hypothesis that can be refuted may be erroneous, but the very error is "just what the scientific man is out gunning for more particularly," because the refutation of such hypothesis and the correction of its error may open up the way to further scientific inquiry: "if a hypothesis can quickly and easily be cleared away so as to go toward leaving the field free for the main struggle, this is an immense advantage" (*CP* 1.120).

Peirce's fallibilism may very well constitute one of the most important contributions to the theory of knowledge and the philosophy of science. By its opposition to various forms of dogmatism and by bringing to light the dialectic of truth and error, it shows the correct way whereby human knowledge can make its progress.

4 *Science: Empirical and* a priori

Peirce was an empiricist in maintaining that "[a]ll our knowledge may be said to rest upon *observed facts*" (*CP* 6.522). Scientific investigation begins with observation which supplies the raw material of sensation which then is processed, combined and analyzed by thought: "the conclusion to which we finally come ultimately depends entirely upon the observations" (*CP* 7.328).

Generally speaking, therefore the various branches of science, including logic and metaphysics, are founded on experience. Indeed, Peirce considers both logic and metaphysics as positive sciences derived from "positive categorical fact" (*CP* 5.39). "Logic does rest on certain facts of experience" (*CP* 5.110), while

> ... [m]etaphysics, even bad metaphysics, really rests on observations whether consciously or not [...] The data of metaphysics are not less open to observation, but immeasurably more so, than the data, say, of the very highly developed science of astronomy. (*CP* 6.2)

But there is one important exception to the rule that science is based on observation: mathematics "is the only science which never inquires what the actual facts are" (*CP* 3.560). "It makes no external observations, nor asserts anything as a real fact," it "is not a positive science" (*CP* 3.428). Indeed, "[m]athematics is the study of what is true of hypothetical states of things. That is its essence and definition" (*CP* 4.233). What the mathematicians mean by a 'hypothesis' is a proposition imagined to be strictly true of an ideal state of things (*CP* 3.558). To be an ideal state of things is also to be a possible state of things, "in the substantive logical sense" (*CP* 3.527). "Mathematics studies what is and what is not logically possible, without making itself responsible for its actual existence" (*CP* 1.184).

This raises the problem of the ontological status of the object of mathematics. According to Peirce's metaphysical realism, the ideal, the possible, is as much real as the actual, and the actual world or "the sensible world" is "but a fragment of the ideal world" (*CP* 3.527). Now, the end of pure mathematics "is to discover that real potential world," hence, "the typical pure mathematician is a sort of Platonist" (*CP* 1.646). This is certainly a true characterization of Peirce himself. But this Platonic feature of mathematics seems to be incompatible with another feature of mathematics which is repeatedly stressed by Peirce, viz. the fact that mathematics is a creation of the mind. Thus Peirce writes that "the objects which the mathematician observes and to which his conclusions relate are objects of his mind's own creation" (*CP* 3.426). And again: "The pure mathematician deals exclusively with hypotheses. [...] His hypotheses are creatures of his own imagination" (*CP* 5.567). Peirce even regarded the proposition of mathematics as a sign without a definite meaning:

> A proposition is not a statement of perfectly pure mathematics until it is devoid of all definite meaning, and comes to this – that a property of a certain icon is pointed out and is declared to belong to anything like it, of which instances are given. (*CP* 5.567)

Here Peirce obviously changed his realistic view on the object of mathematics into a form of conceptualism or even nominalism. Apparently he was not aware of this change of mind nor did the change have an influence upon his characterization of mathematical propositions as necessary. Indeed, "whether there

is any reality or not, the truth of the pure mathematical proposition is constituted by the impossibility of even finding a case in which it fails" (*CP* 5.567). Thus mathematical propositions are necessary propositions, and mathematics may be defined as "the science which draws necessary conclusions" (*CP* 3.558). But necessity is derived from the mere fact that "mathematics deals exclusively with hypothetical states of things, and asserts no matter of fact whatever; and [...] it is thus alone that the necessity of its conclusions is to be explained" (*CP* 4.232). In this respect, mathematics differs sharply from empirical science. About empirical things we can only have probable reasoning, "in regard to the real world, we have no right to presume that any given intelligible proposition is true in absolute strictness" (*CP* 3.558). Only in the case of hypothetical states of things can we refer to the whole range of possible world and thus achieve a necessary knowledge. In all other cases

> ... to assert that any source of information that is restricted to actual facts could afford us a necessary knowledge, that is, knowledge relating to a whole general range of possibility, would be a flat contradiction in terms. (*CP* 4.232)

Because the necessary knowledge of mathematics does not deal with empirical facts, mathematics must be a science a priori. Here Peirce seems to opt for the Kantian point of view; yet he also clearly differed from the Kantian perspective. He rejected the Kantian doctrine of pure space and time, and he refused to define mathematics as the a priori science of pure space and time. Ever since the appearance of non-Euclidean geometry, it had become clear that the science of space and the science of time are branches of physics, therefore, positive and experiential (*CP* 3.557). Therefore, if mathematics is an a priori science, it cannot possibly be a science of space and time. On the other hand, Peirce backed Kant's view that the object of mathematics is a "construction" formed by the human mind. For example, the object of geometry is not constructed out of empirical facts but by ideal hypothesis. "Being formed, the construction is submitted to the scrutiny of observation, and new relations are discovered among its parts" (*CP* 3.560). We may perform necessary reasoning by means of observation and mental experiment, but this does not mean that the necessary reasoning is of empirical nature, because "its necessary character is due simply to the circumstance that the subject of this observation and experiment is a diagram of our own creation" (*CP* 3.560). In this sense, the necessary knowledge of mathematics (geometry) is undoubtedly a priori and synthetic. In Peirce's own words:

> Kant regarded mathematical propositions as synthetical judgments *a priori*; wherein there is this much truth, that they are not, for the

> most part, what he called analytical judgments; that is, the predicate is not, in the sense he intended, contained in the definition of the subject. (*CP* 4.232)

But unlike Kant, Peirce did not believe that *all* mathematical propositions are synthetical a priori. In this respect the propositions of arithmetic sharply differ from geometrical ones (*CP* 4.232). Arithmetic deals with numbers which are also ideal constructions. But in their application to ideal constructions, the propositions of arithmetic, are merely analytical: "An analytical proposition is a definition or a proposition deducible from definitions; a synthetical proposition is a proposition not analytical." The propositions of arithmetic, which are analytical, "are, in fact, only corollaries from definitions" (*CP* 6.595). In this sense, "the whole of the theory of numbers belongs to logic" (*CP* 4.90). And Peirce drew the conclusion that "[t]hese considerations are sufficient of themselves to refute Kant's doctrine that the propositions of arithmetic are 'synthetical' " (*CP* 4.91).

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DETERMINATE MEANING AND ANALYTIC TRUTH

BRUCE AUNE

Although I have been an admirer of Quine's philosophy for many years, I have become convinced that his attack on the analytic-synthetic distinction has had some unfortunate consequences for epistemology (Quine 1953). Perhaps the most striking of these consequences is the recent revival of epistemological Cartesianism. Instead of concluding from Quine's criticism that purely *a priori* knowledge is nonexistent – that *all* our beliefs must face the tribunal of sense-experience – a growing number of philosophers, having retained their conviction that the existence of purely *a priori* knowledge is beyond question, simply insist that *a priori* knowledge cannot be achieved by mere analysis but requires, and gets, the support of "intuition" (Bealer 1987). Since I am as critical of intuition as Frege or Peirce and, at the same time, convinced that some genuine *a priori* knowledge is possible, I believe that a doctrine of analytic truth must be rehabilitated. A promising strategy for doing so can be found, I believe, in Peirce's writings. I intend to develop it here.

Logical truth, or the validity of certain argument forms, has almost always been considered something that we can know *a priori*, and I want to begin with a few remarks about it. What I want to say exposes a difficulty for Quine as well as for the Cartesians. For Quine, the difficulty concerns the "tribunal of experience." The difficulty is that the significance of an experiential outcome can be assessed only with the help of some presupposed logical principles. Experience by itself is powerless; the "tribunal" that our beliefs face must therefore be experience plus some logical principles or other. But which principles should be used? How can they be selected? Quine can't appeal to intuition here, and neither should the Cartesians.

Neo-Cartesians who believe in intuition still describe it on the model of vision: intuiting is supposed to be a kind of mental seeing (Gödel 1944; BonJour 1985: Appendix A). But this model is very inappropriate for a target like logical truth. The difficulty lies in the extreme generality of logical principles. "$\neg(S \wedge \neg S)$" may seem like a simple principle, a suitable object of mental vision, but the formulation is very misleading. The ingredient letter "S" is schematic; it stands in place of infinitely many formulas of infinitely varying complexity – and this infinite variety is an inappropriate object of even mental vision. When we think about possible members of this infinity,

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some can be brought to mind that falsify the law unless qualifications are made. I am thinking in the first instance of sentences such as "This sentence is false." Since assuming this S allows one to infer $\neg S$ and thus conclude $\neg S$ (since $S \rightarrow \neg S$ implies $\neg S$), and since assuming $\neg S$ allows one to infer S and thus to conclude S, the conjunction of this S and its negation seems provable. I am not saying that we cannot find reasons for disqualifying this case as a genuine counterinstance to the law of contradiction; I am saying that the task of finding such reasons shows the law to be (in its extreme generality) a very unsuitable object for a mental act of seeing. Too many formulas are involved; too many considerations arise; too much cannot be determined prior to the examination of actual cases.

Although I'll have more to say about logical truth towards the end of this paper, I think I have said enough to indicate that cases arising in the course of inquiry often require us to revise (or at least qualify) our logical assumptions and that we can have no advance, *a priori* guarantee that the assumptions we are now using are bound to be trouble-free. This sort of uncertainty leads to interesting questions about the status of logic as a body of knowledge and the sense in which logical truths could be said to be analytic – these are questions I'll return to. At the moment I want to move on to consider the sort of alleged analytic truth that has generated the recent debate – I mean such *formally* undecidable truths as "Princes are royal sons" and "Bachelors are unmarried." These examples are paradigms of alleged broadly analytic statements.

The conception of analytic truth to which Quine devoted most of his attention was Fregean, the idea being that statements are analytic when they can be reduced to logical truths by the interchange of synonyms (or when they can be demonstrated to be true by logical principles and explicit definitions of the ingredient nonlogical expressions) (Frege 1950:99-104). It seems to me that Quine's attack on this conception of analytic truth was successful. His point was not just that the notion of synonymy (and, therefore, the relevant notion of a definition) is obscure or too unclear for the job – though he did say this. It was also (and more importantly) that the suggested clarification did not succeed because plausible tests for the relevant kind of synonymy, "cognitive synonymy," seem to presuppose the notion of analyticity. "Sister" and "female sibling" are not supposed to be exact synonyms; they are supposed to be mere cognitive synonyms, alike in conceptual import or (as one might say) implications.

The suggestion for a new approach to analyticity that I find in Peirce turns Frege's conception upside-down. In his "Lectures on Pragmatism," which he delivered in Cambridge in 1903, Peirce developed a conception of meaning that, in view of what I have just said, might be termed "conceptual:" "what we call the meaning of a proposition [he said] embraces every obvious necessary

deduction from it" (5.165). Accepting what he called Kant's dictum (it could have been Frege's) that "obvious" necessary reasoning is merely explicative of the meaning of the terms of the premises, Peirce proceeded to "reverse" (as he said) the use Kant made of it. Instead of beginning with a conception of meaning (or of synonymy or an adequate definition of a nonlogical expression) and using the dictum "to express what necessary reasoning can do," he began with a conception of necessary reasoning and used the dictum to "fix our ideas as to what we shall understand by the meaning of a term" (*CP* 5.175). This amounts to using such reasoning to identify conceptual truths that clarify or "explicate" the conceptual meaning of some term or terms.

To appreciate the value of Peirce's suggestion here, we have to ask how the appropriate "necessary reasoning" is to be identified. In "Issues of Pragmatism," an article published in 1905 (*CP* 5.438-463), Peirce made some remarks that are very interesting in view of current claims about meaning. He said that the speech of ordinary people on nonabstract subjects is fairly indeterminate in meaning, but that when they intend to make their meaning determinate, so that there shall be no latitude of interpretation, they intend to fix what is implied and not implied by their words (*CP* 5.448). One way of identifying the appropriate necessary reasoning that identifies the meaning of certain words is to have the speaker fix their implications, making his or her commitments in using them explicit.

Not every speaker is skilled at fixing implications, and not every speaker speaks (or thinks) with precision. But intelligent speakers, at least in the course of friendly discussion or Socratic interrogation, can usually make some implications along some dimensions clear. Thus, while it may be very difficult for me to say what I mean (on a particular occasion) by the pronoun "on" or the connective "while," I can at least identify certain patterns of "necessary reasoning" involving them. For example, when I say that the cat is on the mat, you can understand me as implying that the mat is under the cat; and when I say that Nero fiddled while Rome burned, you can understand me as implying that Rome burned while Nero fiddled. Insofar as these implications fix the meaning, in certain respects, of the words I am using, two conditional statements (one about cats and mats, the other about Nero and Rome) are analytically true of my idiolect at the time I uttered those words.

Another way of identifying the appropriate necessary reasoning is to attend to patterns of reasoning that you and other sophisticated users of your language agree are obviously valid – "valid" in the generic sense of having no instances with true premises and false conclusions. Consider the following examples.

1. Jones buttered the toast in the bathroom at midnight with a knife stand-

ing on his head. Therefore, Jones buttered some toast.

2. That is a fake duck.
   Therefore, that is not really a duck.
3. John stabbed Harry with the intention of killing him.
   Therefore, John intended to kill Harry.
4. Lacking an umbrella, she hit him with a shoe.
   Therefore, she was not (on at least one occasion) holding an umbrella when she hit him.
5. Mary laughed after John left.
   Therefore, John may have left before Mary laughed.

Anyone skilled at logical analysis will agree, I think, that these arguments are valid in the generic sense I mentioned, but it is arguable that none is formally valid. I say this last point is "arguable" because none of the arguments has the surface structure of a formally valid inference. Donald Davidson has repeatedly insisted that arguments like (1) and (3) can be interpreted in a way that renders them formally valid (Davidson 1967). He may or may not be right on this matter; if he is, his theory can *account* for the perceived generic validity of two of the five forms. But the other forms are no less valid. The best explanation of their validity is found, I believe, in the meaning of such words as "fake" and "real," "before" and "after," which are determinate in relevant aspects. The validity of (4) depends largely on the position and function of the participle in the premise.

Although sophisticated speakers of English may attach a similar, fairly determinate significance to the key expressions in the arguments I have just cited, I think that the speech of most people (even sophisticated people interested in philosophy) is on the whole highly indeterminate in meaning. This is not something for them to be ashamed of: their purposes do not require greater precision of meaning, and they often don't want to be pinned down to precise assertions. I certainly don't want to be pinned down to a precise assertion whenever I use the indicative "if" in speaking to a general audience. I intend to conform to *modus ponens* and *modus tollens,* but in other respects my use is pretty indeterminate – particularly in respect to the value of if-statements with false antecedents.

The fact that the speech of most people is highly indeterminate shows Quine to be right in another respect: a sharp analytic-synthetic distinction can't be drawn for their speech. Since I am confident that no one's speech is wholly determinate, I can make an even stronger concession: a sharp analytic-synthetic distinction can't be drawn for anyone's speech. Nevertheless, some statements can be recognized as analytically true in the speech of most coher-

ent speakers, and all speakers can (if they wish) make their speech determinate in ways or contexts that yield analytic truths. One can say, for example, "When I speak of preference in this discussion, I am referring to a transitive relation" – thereby fixing the occasion-analyticity (as I might call it) of "Preference is transitive" or, by implication, of "$(x)(y)(z)$(if s prefers x to y & s prefers y to z, then s prefers x to z)."

There is no single reason for making one's speech determinate in this or that way, but one kind of reason is familiar in philosophy – namely, one's wish to resolve problems about how this or that is known, how this or that is possible, or how we can consistently believe this or that if suchandsuch a theory is true. Many philosophical problems can be resolved only by clarifying one's thoughts, by making oneself "master of one's meaning" (as Peirce put it). When one speaks or thinks in a significantly indeterminate way, this sort of clarification usually involves systematization and at least partial determination of meaning.

The idea that meaning is indeterminate is a truism among many philosophers influenced by Quine's later work on radical translation. One such philosopher, Davidson, has gone so far as to say that "there cannot be" determinate meanings (Davidson 1986:313). It is worth mentioning (in view of the impact of his views on the philosophy of language) that Davidson and I are actually talking about different subjects here. He is thinking of meaning from the standpoint of an interpreter: his subject is connected with the rubric, "S's utterance U at time t means that p." In the case of sentential utterances U, the formula replacing "p" here gives a complete or partial truth-condition that sometimes amounts to a translation of the mentioned utterance. The subject I have been concerned with might be called "speaker's meaning," for it covers speakers' attempts to clarify their own meaning in their own language. The indeterminacy Davidson is concerned with is closely related to what Quine has called "the indeterminacy of translation," which relates one language or idiolect to another. I am concerned with the indeterminacy of implicative relations holding between the worlds of a single language or idiolect.

But (you may ask) aren't these latter implicative relations parasitic on translational indeterminacy when they belong to a common language, one in which corresponding words of different speakers are presumed to be translational equivalents (or synonyms)? The point is a delicate one, but I don't think we have to speak of translation here to make sense of speaker-determinacy. Different speakers may make similar sounds in similar circumstances, and if their verbal interactions proceed smoothly with minimum noise, we can say they are speaking the same language and are understanding one another. Strictly, each speaker is proceeding in an idiolect of his or her own; and though one learns from another, there is no need to assume, in making sense of the im-

plications of one person's words, that they are or are not "good translations" (in an absolute *or* relative sense) of some words of another person. Actually, when we speak of the proper use, meaning, or reference of a certain word in a certain language ("unique," say, or "Elm"), we are singling out the use of certain sounds and marks by some people as *precedents* to be imitated or deferred to by others.

If a necessary reasoning, "P; so Q," serves as a partial unpacking of "P"'s meaning in someone's idiolect, the conditional statement "If P then Q" is, for that idiolect, an analytic truth. Having this status, it is not falsifiable by objects and events in the world. The latter may, however, induce a speaker to speak differently – to change the implications of his or her words. Such a speaker may thus reject the sentence "If P then Q," or, to use Quine's words, "give it up." But no falsity is thereby shown. It is easy to see this in connection with the word "lunacy." Originally, this word connoted a fancied lunar madness, an insanity caused in some way by the moon. For a speaker so using the word, it is analytic that if a person suffers from lunacy, he or she suffers from lunar madness. But natural facts do not (I assume) accord with the hypothesis that there is such a thing as lunacy (so understood). As people began to believe this, they began to use "lunacy" with altered implications, and the sentence I mentioned was "given up." But it was not shown to be false. No one with lunacy *in the original sense* was found who did not suffer from lunar madness.

Some nice things about this approach to analyticity are: (a) it doesn't presuppose the difficult notion of synonymy; (b) it can apply to words that, owing to vagueness, are only partly determinate in meaning – words that cannot be explicitly defined, or given necessary and sufficient conditions. Also, this approach is easily related to (and helps us to explicate) the phenomenon of meaning-change, which may be gradual, partial, and take place in the midst of indeterminacy. In these respects (in addition to being consistent with the criticisms by Quine that I mentioned) it is a big improvement over Frege's conception.

In spite of these virtues problems remain with the conception that must be discussed. One was posed by Quine in an early article, "Truth by Convention" (Quine 1966:70-99). In this article Quine argued against the view that certain truths may be merely verbal and conventional (or analytic) by saying that conventions such as definitions cannot possibly create truth; they can merely transmit it from one assertion to another. To create truth by the convention that, say, "A" is an abbreviation of "B," we need to start with at least one truth, say "A iff A," and use the convention to conclude "A iff B." In this simple model a logical truth is presupposed in the application of any convention; and since some analytic truths are logical truths, analytic truths cannot,

as a class, be mere verbal truths established or certifiable as true wholly by convention.

This problem concerning conventions and truth can be resolved by attending to the fact that not all conventions are definitional abbreviations. As far as logic is concerned, a particularly important kind of convention is a rule for the introduction and elimination of logical symbols. Every system of logic requires at least one rule of inference, and *modus ponens* (with or without a rule of substitution) is a standard choice. This rule, which permits us to infer a formula *Q* from the pair of premises *P* and *If P then Q,* is an elimination rule, for it allows the elimination of the logical symbol for conditionality – in English, for *"if ..., then ..."*. Thanks to Gerhard Genzen and others, we know that all logical truths (or all the theorems of standard systems of logic) can be obtained from a set of introduction and elimination rules (Kneale 1962:538-552). Since a system of this kind contains no axioms (or primitive logical truths), it is false that the conventions or rules of this system merely "transmit" truth from one logical truth to another. Here logical truths are derived from operations on mere suppositions, which are not known to be true. An extremely simple illustrative example of such a derivation is the following: Assume *P*; infer *P or Q* by disjunction-introduction; conclude *If P, then P or Q* by conditional proof. The conclusion thus obtained is a logical truth.

In his book *Convention* David Lewis has explained (even to Quine's satisfaction) how verbal conventions may become established without prior conventions that specify them (Lewis 1969). We can conclude from this that we do not have to assume logical conventions in order to put such conventions in effect. On the other hand, when we become self-conscious about the logic we are using and attempt to systematize it with a view to removing redundancy, achieving some kind of completeness, and dealing with troublesome cases (involving self-reference, relevance, etc.) we do use some logic to reason about logic, but we are prepared to kick away the ladder when we are done: if we are really happy about our system, we can proceed to use it.

Thinking of our logic in this Genzenized way requires a special interpretation of the ultimate uncertainty about logical laws that Quine has rightly emphasized: even these laws are subject to possible revision.[1] This ultimate uncertainty will not concern the truth of our logical axioms (we have none) but the satisfactoriness of our rules. We cannot be absolutely certain that they will never give us trouble. By assuming a higher-order logic, we can of course

[1]In (Quine 1953:43) Quine says: "Revision even of the logical law of the excluded middle has been proposed as a means of simplifying quantum mechanics; and what difference is there in principle between such a shift and the shift whereby Kepler superseded Ptolemy, or Einstein Newton, or Darwin Aristotle?" Additional motives for revising standard logic could be drawn from the need to deal with various sources of self-reference.

prove that our first-level system has desirable properties (standard systems can be proved to be consistent and complete), but a higher-order system is subject to possible revision as well: Cartesian certainty can never be reached no matter how high we fly.

These remarks about logic are easily related to Peirce's approach to analyticity. As I explained, his claim was that we can make the meanings of our words definite by fixing what (as we use them) is implied and not implied. The notion of implication pertinent to his claim is, I said, immediate implication, and what is thus implied by a premise is, I added, a necessary consequence of that premise. The logical rules I have been speaking of identify logically necessary consequences (immediate ones) of specifiable premises; the consequences partially fix the meaning of formulas containing the relevant logical words. The conception of analytic truth suggested by Peirce's remarks therefore identifies logical truths by the same principles of meaning-determination that it employs in identifying analytic truths of a non-formal kind. It does not accord a basic status to elementary logical truths and a derivate status to the elementary truths of a non-logical analytic kind. Both kinds of elementary truth have a comparable status – as they did in the views of empiricists like Hume.

One of the most interesting applications of this Peircean approach to analyticity concerns the nature of conceptual schemes and the basis for such subjects (such departments of metaphysics) as the philosophy of mind and the philosophy of action. Davidson has argued against the possibility (in fact, the intelligibility) of alternative conceptual schemes (Davidson 1974). If we describe such alternative schemes as mutually untranslatable languages, his case is extremely strong, perhaps irrefutable. But if we consider that Leibniz and the later Bertrand Russell (after *The Analysis of Mind*) had fundamentally different conceptual schemes – one based on monads, the other on spatiotemporal events – and that both could be formulated or embodied in German, French, or English, we shall want to describe alternative conceptual schemes in a very different way. I have argued that they are best described as different ways of thinking about the world, ways that involve different principles of classification, predicates with different interpretations, and sentences with different implications (Aune 1987;1988). The very same language (intuitively speaking) can be systematized in different ways and thus embody different schemes. When we pursue the philosophy of mind or the philosophy of action, we aren't taking part in an empirical investigation of the world, or an *a priori*, factual investigation of all possible worlds. We are clarifying (to some degree specifying or even constructing) a conceptual scheme – one in which mind and human actions are considered from a certain point of view.

Some final points now about the classification of natural things and materi-

als. It is a characteristically pragmatic thesis that natural kinds (not instances of such) are conventional constructs. In human history one system of classification is succeeded by another, and a classification like *reptile* (which is now obsolete because it doesn't accord with the classificatory aims of contemporary zoology[2]) did not have to disclose one of nature's "joints" to serve a legitimate scientific purpose. If this pragmatist thesis is right, however, statements specifying membership conditions for the kinds we recognize are *stipulative* or analytic. This outcome is sharply at odds with what seems to be the standard view nowadays: the so-called Kripke-Putnam interpretation of natural kind terms. I want to conclude by saying something about it. I'll concentrate on the account of Putnam (Putnam 1975:215-271; Putnam 1988:ch.2).

Putnam's basic idea is that the meaning of a term like "water" or "gold" is not fixed by some set of "operational criteria" necessary or sufficient for identifying a sample of the stuff. The meaning (to the extent that there is such a thing) is, rather, largely indexical: samples are water or gold if they have the same "ultimate constitution" as this or that paradigm. What is fixed by this sort of indexical meaning is a term's reference – or, for some terms, objects in the term's extension. Putnam takes this into account when he says that since it often takes experts to determine whether a given sample has the ultimate constitution of water or gold, there is a "division of labor" in determining the reference of terms for natural kinds. Because paradigmatic samples of water on earth are composed of H_2O, experts assure us that earth-water *is* H_2O. It always has been H_2O, Putnam adds, because the paradigms recognized as water today would have been recognized as water in 1750. (The reference of "water" has not changed since 1750, he says.) If a substance on twin-earth plays the role there that water plays here (filling lakes and ponds, quenching thirst, making plants grow) but has a different ultimate constitution, XYZ say, then it would not be water in spite of seeming indistinguishable from it.

This is not a satisfactory theory. For one thing, it is not internally coherent, for it does not really support Putnam's claim that the reference of the term "water" has been stable over the centuries. It may be true that the samples of liquid that we would call "water" today would have been considered water in 1750, but it is certainly not true that every sample of liquid called "water" in 1750 would be identified as H_2O today. Sea water is not H_2O, nor is the liquid found in muddy ponds, the Detroit river, or laboratory shelves. Putnam would like to discount the impurities in various samples, but how does he suppose a paradigmatic sample is to be identified? Not by chemical analysis, if his account is to make sense. Yet if samples are identified by nontechnical

[2]Snakes and turtles both satisfy the criteria for being reptiles; yet the DNA of reptiles is closer to that of birds than of snakes. Thus reptiles do not have the DNA similarity required for a scientifically up-to-date classification of an animal kind.

means – perhaps by the sort of tests available in 1750 – then different samples will diverge in chemical analysis, sea water (which is water but non-potable) differing very significantly from what is obtainable at a distillery.

The truth of the matter, I believe, is that "water," in common use, is an extremely vague term. Some of us now think of pure water as largely H_2O, but in knowing enough chemistry to think of water this way, we know that water is "the universal solvent" and that even samples from the distillery will be contaminated by their containers. Less sophisticated people think of water very differently. In view of its extreme indeterminacy of meaning, "water" is a very poor example for someone interested in drawing an analytic-synthetic distinction based on the actual use of words. If, as a philosopher, one is concerned to clarify the relation between being water and being H_2O, one will have to *begin* by making one's idea of water clear. Only after this is done – only after the meaning one attaches to 'water' is made significantly determinate and analytic consequences are identified – one can reasonably proceed with the task. Carnap called this initial step "explication," and I think he was right in thinking that it plays a central role in philosophy.

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PEIRCE'S ARGUMENTS FOR HIS PRAGMATISTIC MAXIM

YUNQIU WU

1 *Introduction*

Pragmaticism is mainly a method for ascertaining the meaning of intellectual concepts. At first glance, its kernel, crystallized in Peirce's maxim, does not seem difficult to understand. But, when searching for its underlying arguments, one often feels uneasy chewing the abstruse concepts, scattered assertions and vagrant observations. Moreover, brilliant though the ingredients of the doctrine may be, they are often complex. and Peirce did not always present his arguments in a clear manner.

Because the analysis of a philosophical work must pay more attention to the philosopher's arguments than to the conclusions, a student must make sure to focus on understanding the original arguments of a work rather than relying upon explanations of secondary sources. As a mysterious temple on top of a mountain attracts people to climb it, so the mystique around the mountain of Peirce impels me, in spite of my lack of strength, to try to conquer its slope.

In this paper, it will be assumed that the pragmatic maxim is the kernel of Peirce's new method. An attempt will be made to elicit the arguments on which Peirce construed his maxim, primarily as they are to be found in Volumes V and VI of the *Collected Papers.*

Let us begin by examining the pragmatic maxim so we can better discern the kernel of his method:

> Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object. (*CP* 5.402)

Thus, the meaning of a conception involves at least three notions, viz. a conception, its object, and the practical effects, together with the relations between them. Every conception implies there is an object to which that conception refers, and the conception of that object consists in the conception of the practical bearings.

In what follows I shall discuss Peirce's arguments in four sections. This will be followed by two additional sections that shall consist resp. of a summary

G. Debrock and M. Hulswit (eds.), Living Doubt, 67–77.

and a comment.

2 *The Psychological Basis*

First we want to know how Peirce arrived at his conclusion that the meaning of a conception is the whole of our conception of the practical effects and bearings of its object? Peirce himself gave us his answer to the question:

> What is the *proof* that the possible practical consequences of a concept constitute the sum total of the concept? The argument upon which I rested the maxim in my original paper was that *belief* consists mainly in being deliberately prepared to adopt the formula believed in as the guide to action. (*CP* 5.27)

Then the problem is whether it is true that a belief will motivate an action. To this Peirce immediately answered: "That I believe is quite evident" (*CP* 5.27). But what is his evidence? Or, in Peirce's own words: "But how do we know that belief is nothing but the deliberate preparedness to act according to the formula believed?" To which he immediately answers: "My original article carried this back to a psychological principle" (*CP* 5.28).

What, then, is that psychological principle? To this important question Peirce does not provide a specific answer. But, from his other discussions of pragmatism, it appears that he had borrowed Alexander Bain's theory of belief, a fact which was already pointed out by Max Fisch (Fisch 1986b). In the third edition of his *Mental Science,* Bain wrote:

> ... belief is a primitive disposition to follow out any sequence that has been once experienced, and to expect the result. It is a fact or incident of our Intellectual nature, although dependent as to its energy upon our Active and Emotional tendencies. (Bain 1872; quoted in Fisch 1986a: 85)

Peirce, in an unpublished letter to the editor of the *Sun* wrote:

> Green was especially impressed with the doctrines of Bain and impressed the rest of us with them; and finally the writer of this brought forward what we called the principle of pragmatism ... The particular point that had been made by Bain and that had most struck Green and through him the rest of us, was the insistence that what a man really believes is what he would be ready to act upon and to risk much upon. (*MS* 325; quoted in Fisch 1986b:96)

But although we now know that Peirce based his first premise that belief will initiate action in relevant occasions on Bain's theory of belief, we still want to know what evidence Bain advanced for his principle. It is likely that Bain justified his principle by an appeal to actual cases. Such is at any rate the conclusion of Fisch's analysis of Bain's text: "The evidence of belief in those cases in which occasions for action do arise is of course the objective evidence of our then acting in the appropriate way" (Fisch 1986b:84).

Peirce, however, went beyond Bain's principle. Indeed, he tells us that he

> ... endeavored to weave that truth in with others which he had made out for himself, so as to make a consistent doctrine of cognition. (MS 325; quoted in Fisch 1986b:95)

I am not sure that I have found all the *truths* Peirce made out for himself, but it appears that at least one of the differences between Peirce's and Bain's theory of belief consists in Peirce's doctrine that belief essentially involves habit (*CP* 5.397), and that habit is behavior association. This may be explained from both a logical and a psychological point of view. From the logical point of view, belief is a concept derived from habit; from a psychological point of view, belief embodies itself in a habit. In Peirce's own words: "it appeared to me to be requisite to connect Bain's doctrine on one hand with psychological phenomena and on another with logical distinctions" (quoted in Fisch 1986b:95).

2.1 Belief Embodies itself in Habit

Belief is not merely a potential preparedness to some action but a habit guiding action in relevant occasions. Belief "... involves the establishment in our nature of a rule of action, or, say for short, a *habit*" (*CP* 5.397).

Moreover, "[t]he feeling of believing is a more or less sure indication of there being established in our nature some habit which will determine our actions" (*CP* 5.371). In belief, people act by association. This association corresponds to something resembling a logical implication: whenever an antecedent occurs, a subsequent follows. Put in another way, actions will bring about certain consequences that are anticipated by the belief in question. Although Bain had suggested that belief was "essentially related to action" and that "action is the basis, or ultimate criterion of belief ..." (Fisch 1986b:85), he did not see habit as essentially being behavior guided by belief.

2.2 Belief is Concept from Habit

Peirce also dealt with habit from a logical point of view. A habit is in the end an intellectual association, a logical association. The difference between hu-

man behavior and the simple repetition of an action by other animate beings is that his actions are intellectually motivated, and not merely nervous associations or instinctive reflexes. The human being is a highly intelligent being. Contrary to Bain who had considered the process of doubt-belief mainly from a psychological perspective of expectations and reflections, Peirce insisted on the essentially logical structure of beliefs. A habit within the context of human action is the best display of human belief.

3 The Logical Basis

That a habit may be considered from both a psychological and a logical point of view entails that the formation of a habit involves an association both in the outer and in the inner world. According to Peirce the repetition of muscular efforts in the outer world forms an unconscious disposition, whereas the reiteration of mental efforts in the inner world creates an ideal association: "... the interaction of these two worlds chiefly consisting of a direct action of the outer world upon the inner and an indirect action of the inner world upon the outer through the operation of habits" (*CP* 5.493).

This brings us to a key point. The question arises: What is it that connects the two worlds? According to Peirce, the answer is that induction constitutes that connection. More particularly, every individual instance of an outer world association increases the strength of association within the inner world. Now, what we call induction is the process whereby we ascend from the singular to the general. Since beliefs are the expression of habits, and habits are regulations, beliefs come from induction:

> ... each new instance that is brought to the experience that supports an induction goes to strengthen that association of ideas – that inward habit – in which the tendency to believe in the inductive conclusion consists. (*CP* 5.478)

Thus, in some sense, every belief is the conclusion of an induction. The function of an induction consists in that from it people get a belief and follow a rule or law in their actions. And conversely, whoever acts under a rule or law, acts from habit. Peirce stressed the importance of induction for action:

> Induction infers a rule. Now, the belief of rule is a habit. That a habit is a rule active in us, is evident. That every belief is of the nature of a habit, in so far as it is of a general character, has been shown in the earlier papers of this series. Induction, therefore, is the logical formula which expresses the physiological process of formation of a habit. (*CP* 2.643)

Every action under a belief is therefore an individual case of that belief. The significance of identifying induction with belief is that it makes us see not only the connection between individual happenings and logical generality, but also the connection between a belief and its consequences. Induction is a bridge linking the two worlds: the particular practices of the outer world and the intelligent generality of the inner world. Induction generates a belief from practical individual cases, and it is by the guidance of such generality that we expect certain practical consequences from our habitual action.

This insight provides us with some further insight into the pragmatic principle that the meaning of a concept is related to the meaning of its practical consequences. It is induction that makes possible human knowledge and that increases the effectiveness of actions. In as much as the core of pragmatism resides in the pragmatic maxim which in turn hinges upon the process of induction, pragmatism simply lays bare the nature of thought:

> Thus the validity of induction depends upon the necessary relation between the general and the singular. It is precisely this which is the support of Pragmatism. (*CP* 5.170)

Bearing this in mind, we now can easily answer the question whether we can identify the practical effects and their bearings caused by a belief with the meaning of that belief.

4 The Principle of Behavior and the Meaning of Practical Consequences

How can practical consequences be explained? Different schools have different solutions to this problem. The essence of pragmatism is linked to a specific explanation of this problem. As we have seen, the evidence for the identification of the meaning of a conception with the conception of the practical effects of its objects is to be found in induction, and more specifically, in the correspondence between induction and habit. As it was pointed out, the process of formation of a belief in the inner world corresponds to a similar process whereby our habitual actions come to be in the outer world. Every singular effect brought about by an individual case increases the strength of induction not only before the belief is formed but also after it has come to be. In the form of belief, induction has the function of guiding our actions; and every consequence of that belief as made manifest in our actions embodies that belief. Again, in Peirce's own words: "... the *judgment* [...] is not a purely representatious event, but involves an act, an exertion of energy, and is liable to real consequences, or effects" (*CP* 5.547). And again: "Thereupon it follows that the concept has a capability of having a bearing upon conduct ..." (*CP* 5.548). Practical effects of actions therefore constitute the practical

meaning of that belief. Thus it would appear that Peirce was committed to some form of experimental operationalism.

That a belief can motivate actions together with the circumstance that an action will bring about practical effects forms the condition for the ascertaining of a meaning in respect of a certain belief. A belief that cannot initiate action and therefore can produce no effects whatever, could not possibly have meaning. Peirce would label such a belief as metaphysical jargon or chatter. A belief has meaning because it can be translated into action. Certain actions can be claimed to express what it is that is believed in: "Every belief is belief in a proposition. Now every proposition has its predicate which expresses *what* is believed, and its subjects which express *of what* it is believed" (*CP* 5.542). To predicate a conception is to put its object in operation. Any behavior under a belief will follow some predication to bring about certain effects.

Peirce distinguished practical from theoretical belief according to whether whatever is said to be believed can be directly predicated or not. In a practical belief (as for instance expressed in the proposition "anthracite is a convenient fuel"), what is believed can be predicated directly, and the practical bearings of the belief which is expressed in the predicate of the proposition may be directly 'considered.' In a theoretical belief, hoever, (as expressed for instance in the proposition "the pole of the earth describes an oval of a few rods diameter"), the practical bearings of what is expressed in the predicate only appear after it has been translated into some practical belief by deriving some testable proposition from it. If, in theoretical beliefs, we "distinguish between those which are expectations, and those which are not even that," then "there is just this difference between a practical belief and an expectation [...] that the former is expectant of muscular sensation, the latter of sensation not muscular" (*CP* 5.539-540). Here, the "muscular sensation" should be considered as a sensation of performance. This is clear from the context in which Peirce had said that a "practical belief may, therefore, be described as a habit of deliberate behavior" (*CP* 5.538). Thus, the essential distinction between a practical and a theoretical belief depends in final analysis upon the question whether or not a belief comes directly from an induction of experiences. If it does, then it will certainly have practical consequences and is therefore testable. This point is important, not only for pragmatism, but also for experimental science, because pragmatism is in fact "the experimentalist's view of assertion." To a typical scientist, to ascertain the meaning of a concept is to put it into an experimental condition necessary to obtain results: "All pragmatists will further agree that their method of ascertaining the meanings of words and concepts is no other than that experimental method ..." (*CP* 5.465).

5 *A New Method of Semeiotic Analysis*

In his later work Peirce attempted to show how the pragmatic maxim fits into his philosophy as an architectonic whole, the branches of which are based upon the foundation of a phenomenology which provided the description of the three basic categories of experience (*CP* 5.470-488). But if the Categories of firstness, secondness and thirdness constitute the basis of his philosophy, *semeiosis* is its heart. It is therefore necessary to examine the link between the pragmatic maxim and Peirce's theory of signs.

5.1 *Sign – the Essential Product of Thought*

The pragmatic maxim provides a method for determining the meaning of concepts. Because every concept has an object, every concept is a sign.

"We have no power of thinking without signs," (*CP* 5.2.65) Peirce proclaimed in examining "the spirit of Cartesianism" and the platform of modern science and philosophy. Any mental product comes first as a sign. For *symptoms* are *indexes* of an *object.* Thought produces a mental representation of the object and then uses a symbol to present it. A symbol for a mental representation is a sign (*CP* 5.169), and the mental representation presented is called the *immediate object* of the sign.

More specifically:

> In these cases, however, a mental representation of the index is produced, which mental representation is called the *immediate object* of the sign; and this object does triadically produce the intended, or proper, effect of the sign .... (*CP* 5.473)

Thus a sign has the following characters:
(1) The immediate object of the sign, which is not its symptom or index, but the mental representation of the object.
(2) The meaning or significance of a sign, which is therefore a mental representation.
(3) The interpretant of the sign, which is itself of the nature of a sign.

Because all concepts are signs, they also have the structure of signs, i.e. they have an object and an interpretant.

Peirce's theory of the interpretant has became the basis for a new method whereby the meaning of a sign may be made clear. Thereby pragmatism rests partly on an important argument from semeiosis (*CP* 5.488).

5.2 Logical Interpretant, the Most Important Mental Representation

Apparently, *mental representation* plays a key role in our understanding of the nature of a sign. In his anatomy of the meaning of a sign, Peirce preferred the word "interpretant" to "mental representation": "For the proper significate outcome of sign, I propose the name, the *interpretant* of the sign" (*CP* 5.473). Therefore, the meaning of a sign is not the sign itself but something else: in semeiotic parlance, it is the *interpretant* of the sign.

There are three general classes of interpretant: the "emotional interpretant," the "energetic interpretant" and the "logical interpretant" (*CP* 5.475-476). The most interesting of these for us is the logical interpretant which not only conveys the most "general nature" of a sign, i.e. with regard to persistency and commonality, but which also involves a *habit-change.* Indeed, habit is "the essence of the logical interpretant" (*CP* 5.486). By using the interpretant for ascertaining the meaning of a sign, Peirce established a new method different from the dyadic explanation of a sign; this is not only a new point of view in semiosis but it also establishes a new perspective for the general theory of meaning, for it shows that we can find the meaning of a sign, not by the sign itself, but by something else, viz. the general relation or habit represented by the interpretant.

5.3 The Meaning of an Intellectual Concept Expressed in its Logical Interpretant

The pragmatic maxim is not a theory of signs in general, but of those signs that are intellectual concepts. Peirce points out that intellectual concepts

> essentially carry some implication concerning the general behavior either of some conscious being or of some inanimate object, [...] namely, the 'would-acts,' 'would-dos' of habitual behavior" (*CP* 5.467).

This is important, for "... it is not all signs that have logical interpretants, but only intellectual concepts and the like; and these are all either general or intimately connected with generals ..." (*CP* 5.482).

It is clear that the problem of the meaning of an intellectual concept is the problem of its interpretant, which in turn is the problem of the proper significate effects of the sign. Thus, inferentially, intellectual concepts and interpretants have the same semeiotic connotation of generality, regularity or common association which is embodied in a habit. Therefore, we can easily see that to ascertain the meaning of an intellectual concept is to search for a habit-change, or to apprehend the practical effects of actions guided by the habit. And not the other way around.

Peirce stressed the point that intellectual concepts have an element of futurity; they express the conditional mood, the "*would-be*," and that this is the important character of interpretants. Why? and how is this related to the meaning of intellectual concepts? There are two layers here. First, Peirce thought that every general proposition first came to us as a conjecture or as *first logical interpretant* which had arisen from some involuntary experiences which then would stimulate us to various voluntary performances in the inner world, from which we then formulate the same inward activity, as a result of which our conjecture may be slightly modified. In short, the formulation of a concept is a process from the particular to the general.

This leads us to the second layer. It has already been established that not all signs have logical interpretants; only intellectual concepts and the like do because only intellectual concepts deal with generality. Moreover, a logical interpretant implicates a conditional mood or a certain action mode. That is to say,

> ... that the *whole* meaning of an intellectual predicate is that certain kinds of events would happen, [...] under certain kinds of existential conditions – provided it can be proved to be true. (*CP* 5.468)

We see here again that the concept of logical interpretant confirms Peirce's view of the nature of intellectual concepts and his belief that the meaning of those concepts consists in their practical consequences. Therefore, the pragmatic maxim is a specifically new rule for ascertaining the meaning of intellectual concepts as well as a theory of meaning in general.

An attempt at reconstruction

If my analysis or reconstruction of Peirce's argument is correct, one might summarize it as follows:

Preliminary Statements:

1. Pragmatism is mainly a method for ascertaining the meaning of intellectual conceptions.
2. The pragmatic maxim constitutes the kernel of the method.
3. The arguments justifying the pragmatic maxim may be stated as follows:

Major Premises:

1. Semeiotically, the meaning of a sign is its interpretant;
   Logical interpretant represents generality.

(a) Generality is habit both logically and psychologically.
(b) It is induction logically and behavioral association psychologically.
(c) A deliberate or self-controlled habit is a belief.

2. Psychologically,

   (a) any belief will motivate actions.
   (b) actions will follow habit implied in that belief.

3. Linguistically, any belief is such that, whenever it is expressed in a proposition, the object of the belief will be associated with certain expectations.
4. Operationalistically, any action which is involved in the belief, will bring about practical effects.

Minor Premise:

Only intellectual concepts have logical interpretants.

Conclusion:

1. The meaning of an intellectual concept presupposes the generality of the concept.
2. An intellectual concept makes people act according to certain expectations which are implied in the corresponding belief, and the ensuing actions will bring about certain practical consequences.

Additional observations:

1. The pragmatic maxim is just a method:

   (a) This method is nothing but an application of an old logical rule.
   (b) The nature of the rule is that of an appeal to the subsequent or practical effects to see the meaning of the concept.

2. The substantial stance of pragmatism is the doctrine that the meaning of concepts consists in the conception of practical effects which are involved in the object of the concept. Thus, pragmatists are in some way experimental operationalists.

Comment:

If a theory bears any new fruit on the tree of philosophy, then either some new

matter is found or a new chart is conceived by some philosopher. This is an application of Kant's view that all knowledge is an outcome of the blending of our *a priori* framework with sense content. But many contemporary philosophers think that the objects of our knowledge are not absolute antecedents; sometimes new methods may create new special objects for their field of study – a new existence. So, in my view, Peirce's new outcome is due to his excellent "framework" – his specific analysis in semeiotic and a new method – a "meta-method" in building the maxim. They are:

One: meaning is a third referent and comes from an analysis of a triadic dimension of a linguistic construction.

Two: conceptions may be studied metaphysically, psychologically and logically at the same time. Peirce adopted the method of drawing "the conceptions [...] from the thoughts as they present themselves in their logical form [... and putting] them in their right place in the mind" (*W* 1:63; see Fisch 1986b:108, n.83). That is what he did for his arguments – the habit-belief theory.

In my view, the justification of Peirce's arguments for his pragmatic maxim must meet an evaluation in terms of the two above topics (albeit not in the form of a syllogism), because these are the viewpoints of his arguments or, more specifically, the premises of his arguments; and his whole argument is not merely formally logical.

I am not about to pursue a discussion of this, for both topics involve many problems that were recently discussed within the context of structuralism, operationalism and methodology, and that exceeds the limits of this paper.

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EVOLUTIONARY EPISTEMOLOGY AND PRAGMATISM

LEE F. WERTH

It does not seem inappropriate to apply Darwin's concept of natural selection to our beliefs. Yet it would be wrong to infer that all those beliefs which have promoted habits of action congenial to survival are for that reason to be regarded as true. The "happy" stress-reducing lie is sometimes preferable to truth. Survival results from many natural adaptations; the bird that runs and kicks cannot fly. Natural selection allows our biologically evolved brains to be associated with thinking that is sometimes less than rational.

C.S. Peirce identified four methods which we employ in the fixation of our beliefs. Although he defended the view that only the scientific method is capable of producing knowledge, or warranted belief, it cannot be denied that the other methods too have a survival value. For example, virtually all societies practice some sort of religion. Possibly religions in a prenuclear age were simply harmless to the survival of the human species. Perhaps religions constitute "junk" concepts analogous to what is alleged to be junk-DNA,[1] and serve no useful purpose. Generally speaking, however, the presumption should be that predominating modes of thinking, whatever their origin may be, including religion, are quite likely to have a survival value to our species. It may be that a diversity of conceptual tactics is our best defense as a species, and that a mixture of the rational and irrational is better than "cold" logic.

We believe, according to Peirce, because we find doubting painful: "The irritation of doubt is the only immediate motive for the struggle to attain belief" (*CP* 5.375). "The irritation of doubt causes a struggle to attain a state of belief. I shall term this struggle *Inquiry* ..." (*CP* 5.374).

> Belief does not make us act at once, but puts us into such a condition that we shall behave in a certain way, when the occasion arises. Doubt has not the least effect of this sort, but stimulates us to action until it is destroyed. This reminds us of the irritation of a nerve and the reflex action produced thereby; while for the analogue of belief, in the nervous system, we must look to what are called nervous associations – for example, to that habit of the

[1]In the effort to map and sequence the human genome, repetitive DNA is found, and thought by some to serve no purpose, i.e., junk-DNA (Lewin 1988:603).

G. Debrock and M. Hulswit (eds.), Living Doubt, 79–87.

> nerves in consequence of which the smell of a peach will make the mouth water. (*CP* 5.373)

Although Peirce was an objective idealist and an indeterminist, it is possible to integrate his account of doubting-as-irritation and his pragmatic analysis of meaning into 'central state materialism,' the position that consciousness is a brain process. But irrespective of whether a central state identity thesis requires materialism, as long as all mental activities and states (doubting and believing) can be understood in physical terms, however 'physical' is construed, it becomes possible to use Darwinian biological evolution to account for the natural selection of beliefs which together have the greatest survival value for our species. If doubting and believing are biological, then we need not have a separate evolutionary account for the fixation of beliefs.

Peirce's account of biological processes turns things around. His version of objective idealism involves a single evolutionary process in terms of which biological evolution is subsumed. He regards matter and physical regularities as "hide-bound" habits of mind. Matter is mind looked at from the "outside." Perhaps one might call this 'central state idealism.'

Looking at Peirce's four methods of belief fixation reveals that all four are very much in evidence today. That we are not always logical, Peirce explains by saying:

> We are, doubtless, in the main logical animals, but we are not perfectly so. Most of us, for example, are naturally more sanguine and hopeful than logic would justify [...]. Logicality in regard to practical matters is the most useful quality an animal can possess, and might, therefore, result from natural selection; but outside of these it is probably of more advantage to the animal to have his mind filled with pleasing and encouraging visions, independently of their truth; and thus, upon unpractical subjects, natural selection might occasion a fallacious tendency of thought. (*CP* 5.366)

And Peirce observes:

> If the settlement of opinion is the sole object of inquiry, and if belief is of the nature of a habit, why should we not attain the desired end, by taking any answer to a question, which we may fancy, and constantly reiterating it to ourselves, dwelling on all which may conduce to that belief, and learning to turn with contempt and hatred from anything which might disturb it? This simple and direct method is really pursued by many men. (*CP* 5.377)

> ... the instinctive dislike of an undecided state of mind, exaggerated into a vague dread of doubt, makes men cling spasmodically

> to the views they already take. The man feels that if he only holds to his belief without wavering, it will be entirely satisfactory. Nor can it be denied that a steady and immovable faith yields great peace of mind. (*CP* 5.377)

This first method is the method of tenacity; it "yields peace of mind" but it also "may give rise to inconveniences, as if a man should resolutely continue to believe that fire would not burn him" (*CP* 5.377). The difficulty facing those who rely upon tenacity of belief is not limited to "inconvenience" as Peirce so succinctly understates it. Man is a social or community animal. That is why our confidence in our beliefs is undermined when it goes contrary to those of our peers. The tenacity is destroyed:

> ... tenacity will be unable to hold its ground in practice. The social impulse is against it [...] an impulse too strong in man to be suppressed, without danger of destroying the human species. Unless we make ourselves hermits, we shall necessarily influence each other's opinions; so that the problem becomes how to fix belief, not in the individual merely, but in the community. (*CP* 5.378)

Yet, there are cases where tenacity is nevertheless the most appropriate tactic:

> ... if a soldier is sure that a certain line of action is the only one that can save him & those he commands, he ought to believe it *will* save him, because that belief will enhance the success or the chances of it. *Useless* doubts are worse than useless. (*PW* 141)

The same applies to the second method which Peirce calls the method of authority:

> ... we must, in the first place, allow its immeasurable mental and moral superiority to the method of tenacity [...] for the mass of mankind, then, there is perhaps no better method than this. If it is their highest impulse to be intellectual slaves, then slaves they ought to remain. (*CP* 5.380)

And although Peirce seems to disparage this method, he credits it with producing cathedrals, pyramids, and other monuments to stable human cultures; for authority provides only slow changes, thus allowing arts and technology to develop and flourish. And yet, the method of authority too has its darker side: it can be cruel and intolerant, as it has so often been the case throughout history.

Today, when ill we rely upon medical authority which is largely self-policing and self-critical. Few of us have the skills or time to determine whether medical advice is truly scientifically justified. Moreover, medical case studies rarely satisfy the strict rules of scientific experimentation, such as controls, double-blind investigation, etc. Those undergoing chemotherapy are not unlike the soldier illustrating tenacity in the foregoing example: the cancer patient is best believing the therapy will work, and trusting authority.

Explanatory systems based upon authority ossify; consistency problems arise, or an approach lacks the efficacy to solve a new problem. At such times an attempt is made to "rationalize" the belief system. Scholastic philosophy in relation to Christian precepts provides an example. Attempts to systematize so as to achieve consistency are made.

The third approach is the *a priori* method. With respect to philosophical systems, it seems as though all seemingly consistent systems are tried by someone, rather like an evolutionary niche being occupied by some species; and debates rage among nominalists, realists, etc. If a view is shown to be inconsistent, its proponent is obliged to abandon it, although more commonly a new distinction is offered in order to salvage alleged consistency. The intellectual community may very well tolerate divergent views regarding the reality of universals, or other philosophical problems. In this respect the third method differs strongly from the others:

> This method resembles that by which conceptions of art have been brought to maturity. The most perfect example of it is to be found in the history of metaphysical philosophy. Systems of this sort have not usually rested upon observed facts, at least not in any great degree. They have been chiefly adopted because their fundamental propositions seemed "agreeable to reason." This is an apt expression; it does not mean that which agrees with experience, but that which we find ourselves inclined to believe. (*CP* 5.382)

A contemporary application of the *a priori* method of belief fixation involves the community of young physicists who are inclined to believe in the truth of superstring theory because of its formal elegance and consistency with established physics, and *not* because superstring has been empirically confirmed. Indeed it has been suggested that it will be a decade or more before superstring theory is able to make a prediction that might lend confirmation to that theory, or falsify it.[2]

[2]The talent tied up by an obsessive fondness for superstring worries physicist Gordon Fleming, who sees no predictions arising for at least a decade, a point he made in a lecture, "The Many Faces of Failure in Modern Physics," given during a *Workshop on Scientific*

The *a priori* method can be thought of as a useful tool of discovery, that is, it enables us to formulate our beliefs so that they may eventually be subjected to scientific inquiry, i.e., the experimental method which is the fourth method discussed by Peirce. Should the subject matter exclude the possibility of empirical experiment, that would by itself prove that it was not fit for scientific inquiry. Although the pragmatic criteria of meaning may not be as heavy-handed as the early verificationist criteria, it is likely that any pragmatist would exclude questions concerning the size and shape of invisible and intangible spirits. But the issue is not all that simple. The merits of the various Greek gods, when compared to those of Norse legends, may very well form the subject of intelligible debate in the context of the study of epic literature. The different aesthetic responses of the readers constitute a quasi-empirical test, provided we can specify and standardize the relevant community of readers. Pragmatists disagree with each other when it comes to determining what counts as a relevant difference whereby a difference in meaning can be established.

Peirce used the fourth method, which he called the "scientific method" of fixing belief, not only to discern differences of meaning, but also to clarify his concept of reality and to evaluate alleged truths.

In order to put this method in its proper perspective, it is important to see how Peirce conceived of the function of thought in scientific inquiry:

> ... the action of thought is excited by the irritation of doubt, and ceases when belief is attained; so that the production of belief is the sole function of thought. (*CP* 5.394)

Belief is of course related to thought. More specifically, a belief is thought "at rest." To have a belief is to have a habit of action:

> The essence of belief is the establishment of a habit, and different beliefs are distinguished by the different modes of action to which they give rise. If beliefs do not differ in this respect, if they appease the same doubt by producing the same rule of action, then no mere differences in the manner of consciousness of them can make them different beliefs .... (*CP* 5.398)

Peirce relates habits of action (beliefs) to sensible effects:

> ... every purpose of action is to produce some sensible result. Thus, we come down to what is tangible and practical as the root

Failure, which was held at the Center for the Philosophy of Science at the University of Pittsburgh (23-24 April 1988).

> of every real distinction of thought, no matter how subtle it may be; and there is no distinction of meaning so fine as to consist in anything but a possible difference of practice. (*CP* 5.400)

It is impossible that

> ... we should have an idea in our minds which relates to anything but conceived sensible effects of things. Our idea of anything *is* our idea of its sensible effects; and if we fancy that we have any other we deceive ourselves, and mistake a mere sensation accompanying the thought for a part of the thought itself. (*CP* 5.401)

For example, Peirce concludes that the Protestant-Catholic dispute over whether transubstantiation is literal or symbolic is no true disagreement. 'Reality' is explicated in terms of sensible effects:

> The only effect which real things have is to cause belief, for all the sensations which they excite emerge into consciousness in the form of beliefs. (*CP* 5.406)

Since the community of investigators is human, the sensations which real things excite in us will be of the same sort for different investigators; we have similar biological response patterns. Hence, we will come to the same scientific conclusions as long as we explicate ideas only in terms of sensible effects. In the long run scientific inquiry will yield truth and a knowledge of reality:

> The opinion which is fated to be ultimately agreed to by all who investigate is what we mean by the truth, and the object represented in this opinion is the real. That is the way I would explain reality. (*CP* 5.407)

It is doubtful whether Peirce's own account of evolution in terms of his objective idealism is such as to conform to his pragmatic criteria of meaning. Indeed, his pragmatic account of truth in terms of practical effects (his epistemology) would probably rule out as meaningless certain contemporary scientific theories which are otherwise quite compatible with his objective idealism (his ontology). For example, what sensible effects could possibly differentiate the ontological from the epistemological interpretation of quantum mechanical indeterminism? How could there be a difference in practice or any sensible effect which could enable us to distinguish a deterministic ontology, in which there exist allegedly unknowable causes of quantum mechanical events, from the indeterministic ontology in which the same events are construed in terms of

stochastic processes and as allegedly displaying genuine (ontological) randomness? Without any such sensible effects there can be no difference in meaning between regarding the universe as deterministic and viewing it as stochastic. Is an unknowable cause tantamount to no cause? On Peirce's pragmatic grounds there couldn't possibly be a difference in meaning. And if so, why then does Peirce consider chance as the driving force of the evolution of the universe? He clearly regards the philosophical issue of determinism as meaningful.

Ironically, Peirce's metaphysics anticipates contemporary quantum-indeterminism. Similarly, his emphasis on the tendency to generalize, i.e., the tendency of the universe to form habits (*CP* 6.454-55; 1.409) anticipates the view of those modern psychologists who find such tendencies in all those species capable of being operantly conditioned. Pigeons form stimulus-response habits. Are we so different?

Big bang cosmology involves the view that the four forces of nature evolved from an initial quantum-gravity state. The claim that the very laws of nature evolve constitutes a central idea in Peirce's cosmology (*CP* 6.33; 6.101). He argues that if the laws of nature were to be considered as initially given "brute facts" of the universe, it would be impossible to explain the evolution of a progressively greater variety, biological and otherwise. For, if the initial laws of nature were to have necessitated all future variety, that variety would be "contained" in the initial state, and could never have evolved. Nothing "new" could have evolved, any more than a deductive argument can produce information that is not already logically contained in the premises (*PW* 143-44; *CP* 1.174). Moreover, the limitations of the instruments we use make any proof of the absence of chance in nature impossible (*CP* 6.13).[3] Unfortunately for Peirce, the latter argument is either a fallacy (an argument *ad ignorantiam*), or it improperly puts the burden of proof where it does not belong. Moreover, the analogy between logical deduction and mechanistic determinism is based upon an unwarranted confusion of logical necessity with physical necessity. In a deterministic system, antecedent states necessitate the subsequent states, that is, it is considered physically impossible for there to be more than one possible future for any series of physical events. Those events which are possible will become actual. The antecedent states physically (not logically) necessitate their successors. This potential in the antecedent states becomes realized upon the actualization of the successive states. However, physical necessity does not entail that nothing new can evolve or that greater

[3]As our instruments become more accurate, we err less. We reach a limit of precision and become aware of error that can't be reduced. But does the limit entail that nature has chance in it as Peirce seems to think? Perhaps the correct conclusion is that being human has its limitations with respect to measurement and the scientific knowledge which depends upon it.

variety can not emerge. The future which is "contained" in present events does not coexist with those present events. With respect to logical deduction, the information which is "contained" in the premises is such that it coexists (tenselessly). The premises of a syllogism are logically prior to its conclusion, but this does not mean that the information in that conclusion occurs later. A deduction makes information explicit which is "already" there contained in the premises. In the case of a deterministic ontology, future events do not "already" exist but only their potential which becomes actualized. For example, many physical phenomena involve scattering of radiating, e.g., the shattering of glass and the deflection and spreading of light. A game of pocket billiards displays such scattering as the effect of the cue ball, following the "break." Despite what may seem a lucky (chancelike) shot, billiards is often used as an example of Newtonian (deterministic) mechanics. Yet Newtonian systems evolve and greater variety becomes actualized. Nor is the variety displayed merely a spreading of matter in space, or a change in shape as in the case of shattered glass. Many systems generally regarded as deterministic involve state changes where one sort of thing becomes another, e.g., a crystal precipitates from a saturated solution; a gas becomes a liquid; etc. Determinism is indeed logically compatible with the evolution of novelty.

Yet Peirce's metaphysics better anticipated some important current scientific theories than his sometimes dubious arguments would lead us to have expected. Even so, he did overlook the role of potentiality in a deterministic physics. It may be true that the present *does* somehow carry the future *within* itself, but only *potentially* so. 'What will be, *must* be,' does not entail, 'What will be, exists *now*.' Peirce confused logical with temporal priority. This is all the more remarkable in view of Peirce's reliance upon a "tendency to form habits," a tendency which is itself a potentiality. A tendency is not a chance event but a constraint. From what does a tendency arise? Aren't potentialities dependent upon actualities?[4]

Despite Peirce's metaphysics being a felicitous anticipation of current science, we ought to give greater credence to his four methods of the fixation of belief, i.e., his epistemology. If practical effects ground reality claims, can't we restore mind to its rightful place *in* nature, rather than place nature in mind as Peirce attempted? Shouldn't the presumption be in favor of iden-

[4]DNA as a chemical set of instructions, or a blueprint, is an example of how an *actual* molecule has the potential to determine the biological future of an organism. Potential energy in physics reveals how an *actually* existing state can enable us to predict future states of a mechanical system. In thermodynamics, free energy is contrasted with entropy. A log has the potential to provide a fire; ashes do not. Leibniz seems aware of what Peirce overlooks, and says, "... there is no such thing as a mere potentiality to act without any initial action. The force of a taut bow [...] is already present before the shooting of the bow... " (Leibniz 1966:314).

tifying consciousness with brain processes, so that biological evolution which accommodates the development of our brains, can thereby one day explain our cognitive information processing, i.e., explain our "minds" and our faulty epistemologies which, however prone to error they may be, explain our survival as a species? The method of tenacity shows that those who irrationally dare to hope when things are "hopeless" strive to survive, sometimes succeeding against the odds. Natural selection may not always be a lover of the truth, but dead right is dead wrong if ones's progeny do not survive.

Yet Peirce did emphasize that the scientific method of the fixation of belief provides the "reality contact" that is sometimes a necessary condition for our survival. Peirce did not, however, advocate physical determinism. Yet, there appear to be good reasons for assuming that nature is deterministic and that its laws are immutable. Indeed this assumption should be our preferred regulative ideal if we are to maintain the sustained effort and optimism required to investigate nature. No doubt the origin of the species and the evolution of man were affected by genetic mutations sometimes caused by radioactive decay, that is, by what are presently regarded as stochastic microphysical processes.[5] But for all that, determinism should remain our basic presupposition, our "attack" stance. In this respect, Peirce's appeal to ontological chance is the final retreat, not a cause for singing hosannas to an allegedly creative and loving universe in which Peirce and some process philosophers would like us to believe.

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[5] Perhaps what is inconceivable or non-measurable from our perspective is patently "mechanical" and law-like to extraterrestrials. To reject this claim is species chauvinism. Chimpanzees do not comprehend square roots, yet are our nearest relatives. Why should what appears indeterministic to us not be mechanistic to aliens with different biological endowments?

THE ANTINOMY OF THE LIAR AND THE CONCEPT OF 'TRUE PROPOSITION' IN PEIRCE'S SEMEIOTIC

FRANCESCA RIVETTI-BARBÒ

The thesis upon which Peirce grounded the solution of the Antinomy of the Liar is (in my opinion) fundamental. This holds, not only with regard to the solution of the Liar, but also in respect of the relations between colloquial and formalized languages (as these are understood nowadays). Moreover, it can be shown that, owing to the same thesis, the very source of the concept of 'true proposition' comes unexpectedly to light. These are the points which I would now like to explain.

1. Peirce's formulation of the Liar sentence was the following: "This proposition is not true." The deduction of the antinomy begins with the question: "Is this true or not?" The conclusion is deduced that "It is both true and not." He added that without doubt this "is absurd" (*CP* 5.340; also *CP* 2.618).

Here I shall not expound the deductions formulated by Peirce (which I have already extensively examined (Rivetti-Barbò 1986:9-42) and which can be consulted in the references cited). But, with Peirce, I would like to draw attention to the fact that "such modern authors as think the solution 'very easy' do not understand its difficulties" (*CP* 5.340n). I will, therefore, pass onto his proposed solution.

The principle of his solution is the thesis that every proposition, apart from what it explicitly asserts, "tacitly implies its own truth" (*CP* 3.446). Peirce proved this thesis with several arguments. One of these is drawn from the Liar (*CP* 5.340). Two further proofs, on the other hand, are independent of the Liar (*CP* 4.264; 4.282).

2. The true proposition that Peirce spoke about cannot belong to a fully formalized language, on account of that very same thesis, for a reason which we will now point out. Indeed, the proposition in question belongs to colloquial language. In saying this, I make use of the notion of "full formalization," which is common nowadays and which goes back to David Hilbert. The fact that these true propositions belong to non-formalized languages depends on the very notion of a formalized language. But a language is fully formalized if and only if everything within it is explicitly stated; that is, if and only if there is nothing in it which is "tacitly implied" (as Peirce said about true proposition).

G. Debrock and M. Hulswit (eds.), Living Doubt, 89–93.

Now I would like to draw attention to some well known features of formalized languages.

3. As is well known, *ad hoc* devices are introduced in order to avoid the Liar in formalized languages which contain the predicates "x is true" and "x is false." Usually, it is said that these predicates are meta-linguistic, whereas statements and formulas which we state to be true or false pertain to an object-language; the latter being sharply distinguished from its respective meta-language. As regards the truth and falsity of the statements of this meta-language, one has to make use of their respective meta-meta-linguistic predicates, and so on indefinitely. Note that this infinite regression is necessary, if and only if, one attributes to these predicates the onus of conferring truth and falsity to statements at a lower linguistic "level." And, in that case, it is impossible to find a source of any truth or falsity.

4. The way out of this difficulty is assured by colloquial language. It can be demonstrated that the predecence of colloquial language over formalized language is necessary, and that it is wrong to reduce the value of colloquial language to some indispensable device that must be used when introducing a novice to the study of symbolic logic. As is well known, logic for Peirce was not a formalism understood as pure calculus, completely founded on conventions. Instead, the foundation of logic is to be found in Semeiotic with its three terms, Sign, Interpretant and Object. We should not be surprised, therefore, if one of Peirce's theses requires us to recognize the necessary precedence of some signs taken from colloquial language, i.e., of a language which is not based only upon conventions.

One should add that such signs of non-formalized languages are necessary because we need them to express those "tacitly implied" truths of statements, which Peirce had mentioned. The necessity of such implied truths may be demonstrated by an argument which agrees with Peirce's views.

5. Peirce never took the Sign in isolation. No Sign is separated from the life of the Interpretant. Moreover, not all signs can be isolated from Objects, i.e., from the world of our experience in which everyone (every Interpretant) lives his own life. I would like to add that this non-isolation of the Sign and Semiosis rests entirely upon some truths regarding the life of man and his environment. For instance, the fact of having something at hand, the possibility of using it in order to keep oneself alive, and indeed human life itself, are really designated by a sign or by a symbol, if and only if, there is at least one true statement that can be verified by one of these objects. These theses form the basis both of the reasoning which I will now expound, and of the solution of

the paradox of the Liar.

6. The true propositions that were mentioned in the preceding paragraph, regarding our surroundings and our use of them in the business of living – and which we call "theoretical" propositions – do not refer to signs or symbols. Therefore, they cannot have as predicates "x is true" (nor "x is false"): where "true" (and "false") are taken as properties of some signs and of their meanings. Note that this is the usual meaning of these predicates; the one adopted by anyone whosoever. Therefore, theoretic propositions and the statements which express them – which we call object-language statements – can be true or false (like every proposition and/or statement) but they cannot explicitly express their truth (or falsity). What they express is in fact properties, relations, operations, and so on, concerning the life of man and his surroundings which *do not* belong to linguistic signs. Therefore, and as was rightly seen by Peirce, their truth can only be "tacitly implied." For this reason, they cannot belong to a formalized language; inasmuch as each formalized language requires that everything be explicitly stated (as I have already pointed out).

7. The truth which is tacitly implied by these propositions and statements, however, can be made explicit. Normally, this is done by the use of another statement in which a) the subject designates the proposition or statement at hand (and the truth of which was up to now tacitly implied), and b) the predicate is "is true." Thus the truth of the proposition is made explicit in a meta-theoretical and meta-linguistic proposition (and respective statement).

Take the following example: given that p is a statement of object-language (the meaning of which is a theoretical proposition); then, the statement obtained by substituting x with p in "x is true," i.e., "p is true," is a meta-linguistic statement (and its meaning is a meta-theoretical proposition). On the basis of the aforementioned thesis of Peirce, even the proposition signified by the statement "p is true" tacitly implies its own truth. Thus this truth may again be made explicit by using the respective meta-meta-linguistic predicate, and by obtaining from it (with a suitable change of its variable) the statement " 'p is true' is true." But again this proposition has a tacitly implicit truth which can be made explicit by means of its respective meta-meta-meta-linguistic statement; and so on, infinitely.

8. What is important in the thesis of Peirce is the recognition of a tacitly implied truth in statements, which makes the infinite regression concerning true statements quite harmless because the meta-linguistic statement and the proposition which is signified by it do not confer their truth on the statements at a lower linguistic "level;" rather, they only make it explicit. Thus, the

prime "source" of truth lies in propositions verified by *extra*-linguistic objects, and, more particularly in their tacitly implied truths. At least two further theses follow from this thesis of Peirce and from its consequences. The first of these is related to the paradox of the Liar and to its solution, the second to the connection between formalized and colloquial languages.

9. I shall begin with the latter point. The tacitly implied truth (which is also the source of other truths) may be found in many theoretical propositions, signified by statements of colloquial languages.

Is it possible to justify the introduction of truth as a predicate into formalized languages? In answering this question, the thesis which was proposed in §§4, 5 and 6 will be seen to provide a radical solution to the problem of the relation between the two kinds of language. Moreover, the introduction of a hierarchy of meta-languages into formalized languages in order to eliminate the paradox of the Liar no longer presents any problem inasmuch as it is no longer necessary that the source of truth be found in those formalized languages or in the hierarchy of meta-languages. On the contrary, this truth is to be found in colloquial language. And it is on this basis that any truth be conferred upon statements of formalized languages. Thus, from the perspective of formalized languages, the paradox of the Liar may be completely eliminated, without the notorious drawback deriving from the device adopted in order to avoid it.

10. It remains for us to examine the paradox of the Liar in *non*-artificial languages, that is, in natural languages. The solution which Peirce gave consists in recognizing that the proposition of the Liar inasmuch as "it is self-contradictory, is false;" thus, that which it explicitly asserts "being self-contradictory, is false; and hence, what it explicitly asserts is true. But what it tacitly implies (its own truth) is false" (*CP* 3.446; also 5.340; 2.352). This is the solution which Peirce attributed to Paulus Venetus (*CP* 2.618).

Peirce also specified the reason for the falsity of the proposition of the Liar: "a self-contradictory proposition is not meaningless, it means too much" (*CP* 2.352); since, (as he specified elsewhere), "it means two irreconcilable things" (*CP* 3.446), "Id est, it means both p and not p" (*CP* 2.352n).

This solution to the Liar's paradox could be improved by distinguishing *sense* from *reference*. The meaning of any true proposition is a compound of both sense and reference. What is wrong with the Liar's sentence is that the subject refers to the sentence as a whole.[1]

A comparison between my solution of the Liar's paradox and the solution put forward by Peirce may be summarized in the following two points. First,

[1]For a fuller explanation see my own writings on the subject.

the subject of the Liar's sentence designates an object which cannot effectively verify (or falsify) the sentence itself. Secondly, if this forces us to find in the Liar's sentence itself that which should verify it, then this can only be done by some sort of "duplication" which may correspond to an "excess" of meaning, which may be what Peirce meant when he said that the proposition of the Liar "means too much."

11. In conclusion note that the radical solution of the Liar is indispensable in order to make use of the notion of true proposition; such a solution is reached by the thesis which Peirce put forward.

Moreover, this leads to a widening of horizons. If there are true propositions it is possible that there are also truths which are more extensive and fruitful: that is, a truth of things, a truth of the universe, towards which we can direct ourselves (*CP* 8.12).[1]

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[1]Translated from Italian into English by Michael Dunne.

THE RELEVANCE OF THE CONCEPT OF RELATION IN PEIRCE

ROSSELLA FABBRICHESI LEO

In this paper I present my reading of Peirce's concept of relation, which hinges upon the following main issues:
1) The concept of relation acts as a guide through the innumerable logico-semeiotic or philosophical notions that he evolved, and provides an essential link between the various parts of his work and, in particular, his logic, semeiotic, and phaneroscopy.
2) When we have identified the characteristic elements of the concept of relation, we can reach a true understanding of what "logic" meant to Peirce and envisage the propositional logical order that he favored. We can thus capture the particular character of his work and see how it differs from that of the logicians who came after him and who did not always, in my view, grasp what he was driving at.
3) This leads straight to the theme of notation, or, more specifically, to the problem of Existential Graphs, a new graphical system designed, as I see it, to give form to the new logic of relations.

1. Peirce arrived at logic, as we know, after having read Kant and, in particular, after having pondered on the table of categories. What did not convince him in the Kantian order was the evident inadequacy of the formal principles which Kant had borrowed from a tradition which, though well entrenched, was decidedly obsolete, and which he had considered as the basis of the *a priori* functions of the intellect. These first categorical and philosophical studies were decisive in Peirce's turn to logic. And, more than any other, it was the category of relation, that drove him in the 70's to reinterpret classical logic, in his first important work on the logic of relatives.

The genesis of Peirce's interest in logic is thus inscribed in that myriad of closely-argued, often confused, but very important pages written between 1861 and 1867 on the search for a new categorical table and published in "On a New List of Categories." Witness the first volume of the *Writings,* from which it is clear that Peirce was stimulated by the idea that "to form a table of the categories is the great end of logic" (*W*1:351). Furthermore, the message of all these writings, and in particular of the middle portion of *NLC,*[1]

[1]From now on NLC will be used for "On a New List of Categories" and DNLR for

G. Debrock and M. Hulswit (eds.), Living Doubt, 95–102.

is the centrality of the category of relation, with its distinction - and this is the point I want to make now, since I think it is fundamental - between "internal" and "external" relations. I think we are all familiar with this famous passage:

> A quality may have a special determination which prevents its being prescinded from reference to a correlate. Hence there are two kinds of relation. 1st. That of relates whose reference to a ground is a prescindible or internal quality.
> 2nd. That of relates whose reference to a ground is an unprescindible or relative quality. ($W$2:55)

Peirce thus distinguished two broad kinds of relation: the first implies a mere concurrence of relates in a quality and these "are not distinguished" – or rather, we might say, they do not exist yet as such, being simply internal references to the ground, that is, to the "self," – whereas the second kind involves the opposition of the correlates and their real difference. The "imputed" or triadic relations belong to the second category, even though they need an Interpretant to bring into relation the two opposite relates (Fabbrichesi 1986).

Why do I think that this division (borrowed from the Medieval tradition) is fundamental, though generally overlooked by commentators? Because, being based on these two different relational models, it determines the main semiotic distinctions in relation to the object (icon-index-symbol) and the subsequent logical distinctions that will in the end bring down the traditional dyadic subject-predicate structure. The entire NLC seems to be built around the theme of relation, focusing attention not only on the categories and their references in the sense of relational qualities, but reaching the point of defining a sign as a triadic structure of reference, that is, of relation and mediation, and actually ending with a remark on the relativity of all things, not only of symbols, to the intellect. Everything is relation, that is, is sign (Sini 1978).

It is in this general philosophical sense that the concept of relation is stated. And again we find it in the gnoseological writings of 1868, where it occupies a privileged place in the definition of the inferential process of knowing, and consequently, in the definition of the sign. "Thought is action, and it consists in a relation" ($W$3:265) said Peirce pithily, connecting gnoseological analyses with pragmatism. And yet again, one need only leaf through the pages on "scientific metaphysics" to find continual and fundamental references to the theme of relation.

Thus, categories are relations (relations of different kinds, as we have seen), signs are relations, judgments and inferences are relations, things themselves are relations. It is only when he has made this point clear that Peirce turns

"Description of a Notation for the Logic of Relatives."

to relation as a logical category, seeking to define its properties, by means of the new tools offered by the nascent logical algebra, and moving on to a completely propositional logic. The "Description of a Notation for the Logic of Relatives" not only marks a point of departure in the field of logic, but it especially represents the point of arrival of a long series of *philosophical* and *categorical* studies to which it provides the answer. Peirce's interest in this new profile of formal logic is therefore the expression of his interest in the logical relation in the broadest sense of the term: as a theory of categories and of signs (Fabbrichesi 1992). That is, Peirce proceeds from the analysis of categories to logic, and back again to the analysis of categories: *DNLR* is generated by *NLC* and is directed towards what Murphey calls the "categorical revision of the 90's" (Murphey 1961).

A confirmation of these statements may be found in a celebrated passage of "On the Algebra of Logic" of 1885 in which, after saying that he proposed "to develop an algebra adequate to the treatment of all problems of deductive logic," Peirce went on to explain that "[a]ccordingly, the procedure contemplated should result in a list of categories of reasoning, the interest of which is not dependent upon the algebraic way of considering the subject" (*CP* 3.364). Certainly, the two studies run parallel, and if the concern with the formation of a new table of concepts underpins the logical algebra studies, the latter guide the new categorical definitions used from 1885 onwards; they are outlined in what may be called the watershed manuscript, "One, Two, Three: Fundamental Categories of Thought and Nature" (*MS* 901), where categories, instead of being regarded as ways of expressing being within the proposition, become purely formal, almost mathematical, structures of reference.

2. At this juncture we must ask ourselves what meaning the term "logic" or "logic of relations" had in Peirce's thought.

I wish to argue, and try to demonstrate, that Peirce's conception of logic was a very singular one, far removed from what the more perfunctory commentators and readers suppose it to be. First of all, I would confirm the historiographical notation to which I referred earlier: Peirce interpreted - we might almost say produced - the logic of relations as an essential verification of his categorical studies. In *MS* 898, on the list of categories, he wrote: "A thorough study of the logic of relatives confirms the conclusions which I had reached before going far in that study." In *DNLR* he once again put forward the triadic distinction of relations worked out in the categorical writings of the 60's. But now they have become functional in the logical formalization and in his new approach to the grammatical logical structure of propositions. However, it was not until the writings on triadic relatives of the 80's and 90's that Peirce arrived at a formal exposition that matched his philosophical thought.

Only then was he capable of *writing* them correctly, establishing an essential equilibrium between form and content, while his previous writings had been embroiled in the Boolean logic of classes. In 1880 the notation of a relative becomes, for example

$$l = \Sigma_i \Sigma_j (l)_{ij} (I : J)$$

where l denotes "lover," and where therefore the dyadic relation between individuals becomes a function of the term of relation, which determines it and forms it as such. First comes the relation and then come its relates; and the connection is at once triadic.

Thus Peirce did no more than transfer his analysis of categories and signs to the field of logic. Significantly, in one of his most important writings, "On the Algebra of Logic" of 1885, he devoted the opening paragraph entirely to signs. But he had already explained that logic was semeiotic in *NLC*, and we only have to consult the projected table of contents of the 1894 book entitled *How to Reason* to have additional and later confirmation.

But has this hypothesis ever been treated seriously? I think that the majority of commentators have proved less original and less courageous than Peirce himself. They failed to analyze the many unorthodox internal connections in his thinking, and concentrated mostly on the technical innovations he proposed for every discipline he approached.

As I see it, the true originality of Peirce's logical thought lies in the very characterization of the concept of relation. Relation is conceived not merely as a means for making logical calculus more powerful and effective, but as the central element in the structuring of a new order of discourse, modeled on categorical and sign figures, and *for that very reason* relation becomes the central element of a new way of interpreting the real:

> The logic of relatives is, therefore, far from being a specialized branch of logic. On the contrary, it greatly enlarges and amplifies all logical conceptions; and since metaphysical conceptions, as Kant showed [...], are but conceptions of logic transplanted, it follows that the new and higher notion of logic must be expected to work a mighty development in all philosophy. (*MS* 524)

In sum, Peirce was interested chiefly in the theme "How to Reason," in erecting a sort of critique of logical and argumentative reason, rather than in developing a potent calculus or yet another method of logical notation. The whole of the so-called Grand Logic proves it. It has nothing to do with Schröder, with whom he began a nonetheless rewarding dialogue in the 90's.

And yet, for all its importance, the Peircean approach hardly made an impact in the years that followed. Instead, it was the method proposed by

Schröder and his followers, who turned relation into a theme for mathematical exercises, downgrading it to the solving of algebraic equations, that caught on. From then on the investigations of relatives became a chapter in the logic of classes or in set theory, thereby losing autonomy and originality. It was certainly not in that direction that Peirce intended to proceed. For the logic of relations was meant to generate a new approach to logic and discourse, to become a model of a different way of conceiving categories, i.e., "imputations" of being. The purpose of underlining the divergence between his path and that of subsequent 20th century logicians is to signal a danger implicit in a large part of contemporary thought. Like many other 'twin' disciplines (semiotic, for a start), logic began the search for its scientific and formal status investigating a broad complex subject with deep philosophical roots like that of relations. But confronted with its composite texture, its connections with the linguistic, gnoseological and categorical apparatus, all of which would require a total theoretical revision of the certainties upon which this science was based for centuries, logic withdrew and dropped the subject, or rather limited, narrowed and disempowered it with the tools of calculus and of pure formal operationalism. Logic thus missed a fine opportunity for meditation on its guiding principles and hence on its own research programs. By ditching the investigation of relatives as too disquieting for its basic theoretical structure, logic condemned itself to dependence upon some hallowed conceptual models that can be traced back to the Aristotelian tradition and to the forms laid down by the Greek *logos*.

Peirce outlined, on the contrary, his idea of the "regeneration" of logic in "The Critic of Arguments" and "The Regenerated Logic." He wanted to free inferential reasoning from the dead wood of logicisms and of formal operationalism, and to force it to question its own foundations, starting the analysis in a perspective in which logic identifies itself not only with semeiotic, but also with theoretical philosophy, categoriology, pragmatism or even with "metaphysics" in the Peircean sense of the term. Indeed, the logic of relations "must entirely revolutionize logic and consequently metaphysics" (*MS* 280:66). And in another passage:

> Logic may be defined as the science of the laws of the stable establishment of beliefs. Then, *exact* logic will be that doctrine of the conditions of establishment of stable belief which rests upon perfectly undoubted observations and upon mathematical, that is, upon *diagrammatical*, or, *iconic*, thought. (*CP* 3.429)

Logic in this sense thus involves the need for a new grammar in both senses of the word: a new order of propositional terms and a new formal notation capable of reproducing that order. In respect of the first point I merely re-

fer to the grammatical researches Peirce conducted, especially in some of the manuscripts of the later years, in which he seriously tried to completely revolutionize the traditional grammatical order of propositions: being is seen as a relative, the rhema fulfills a central function, and the subject is equated with the index. Each term is a pure fragment of a proposition or of an argument, which to Peirce were one and the same thing; the two pillars of subject and predicate collapse, disclosing the bare skeleton of the discursive assertion: the rhema as relational function. Logic and grammar are no longer consistent with each other: the new logic of relations destroys the traditional Indo-European grammatical framework.

3. I shall now proceed to give an outline of the form of the scripture that the new logical content must assume. Clearly this outline would need to be enlarged in another paper to be properly understood, but I would begin by saying: the Existential Graphs are so expressive of the relational order as to suggest that they were developed for the purpose of expounding its formal essence. Indeed, one of the reasons for giving them the name they bear was that they expressed existential relations: "The author's writings on the logic of relations were substantially restricted to existential relations" (*CP* 3.574). Even more telling are quotations like these:

> The greatest lesson of the Logic of Relatives, and of which is merely its expression, Existential Graphs, is that the simple Concepts Indecomposable, Constituents or Elements of the Phaneron, do not, as the old Logic thought, differ from one another only in their matter, but also in their form. (*MS* 499s:17-18)

And in the same spirit Peirce continues:

> The Phaneron being itself far too elusive for direct observation, there can be no better method of studying it than through the Diagram of it which the System of Existential Graphs puts at our disposition. (*MS* 293:23-24)

> [In diagrams t]he Very Object under investigation [...] is the *form of a relation.* (*CP* 4.530)

> I invented several different systems of signs to deal with relations. [...] I was finally led to prefer what I call a diagrammatic syntax. (*MS* L231; see also *CP* 4.356)

While there is thus undoubtedly a strict nexus between logic of relations and existential graphs, it should also be noted that Peirce constantly linked these

logical notation studies with phaneroscopic tripartition, and hence with his philosophy of experience, proof that we must see his logic in a particular light. Moreover, as early as 1898, Peirce stated that "[i]t was considerations about the categories that taught me how to construct the system of graphs" (*MS* 439:19).

If we assume that graph theory, expressing the relational pattern, was determined by the categorical and phaneroscopic researches, we must not forget that Peirce on several occasions connected it with his theory of pragmaticism, as is perfectly clear from "Prolegomena to an Apology for Pragmaticism" or his "Lectures on Pragmatism" (1903).

> In my own mental history, it was the study of relations - in theory and in practice - which brought me to see that all conceptions, however abstracted and lofty, were capable of being defined with perfect formal precision in terms of the conceptions of everyday life. [...] It was this view which I endeavored to embody in my maxim of Pragmatism. (*MS* 313:30-31)

Considered in this way, as "the best diagram of thought," that is, of its phaneroscopic constituents, and as "Guide to pragmaticism" (*CP* 4.5-6), the Existential Graphs may lead to a different interpretation from those advanced to date, which have highlighted their more or less convincing character of logical calculus, an interpretation that Peirce dismissed as a "ridiculous conception." I will close by giving the gist of this different reading of the graph project on which, as we know, Peirce enthusiastically worked during the last years of his life.

There is certainly an essential relation between "The Matter of Scripture" and what it expresses. "Experimenting on them, *experiencing* the thing" (*CP* 4.86), said Peirce, referring to the graphs. There is thus an identification between *grammata* and *pragmata,* just as there is between thoughts and habits in the pragmatic hypothesis. For Peirce ideography seems to sum up and inscribe the sign-complexity of every behavioral habit, supplying the answer to the main question from which the pragmatist theory of meaning starts: What *is* an idea?, in other words, What does it *do*? What habits does it produce? In what facts (*pragmata*) is it expressed and in what scriptures (*grammata*) can it be recognized? Every fact is a scripture, or rather every habit is a scripture, impressed on that sheet of assertion that is the world. Every habit is a mark, and its shape can be revealed in a graph.

For this reason, I think, the Existential Graphs are the direct exemplification of the pragmatic rule. There is thus no difference between *gramma* and *pragma,* because both are marks of existence inscribed on the fabric of the world, as the only signs of human action. It is no accident that Peirce insisted

on the "Agency of the Scripture" (*CP* 4.552), on the gesture of the scripture as the pragmatic gesture *par excellence* (Sini 1992).

It therefore seems legitimate to propose that Peirce's pragmatic rule be paraphrased as follows: "Consider what graphical effects, which might conceivably have practical bearings, we conceive the object of our conception to have. Then our conception of these effects is the whole of our conception of the object." Every pragmatic relation is thus a form of iconic and symbolic inscription, an action, a gesture: the pragmatics of experience becomes in Peirce's logical system the pragmatics of scripture. Perhaps in the light of this reading some of the last notations of Peirce regarding the need to express ourselves *in* graphs, *on* the graphs themselves, reiterated in some chapters on the logic of relatives in *How to Reason,* make more sense. "One has not mastered a language as long as one has to think about it in another language. One must learn to think *in* it *about* facts" (*CP* 4.475). Making graphs must therefore be the logical habit of the future, or so Peirce hoped. The point I have wanted to make here is that this project should not be read as the last technical expression of his discoveries in formal logic, but as stemming from a radical critique of traditional "logical reasoning," and from his pursuit in depth of the concept of relation in its philosophical and categorical nuances.

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PRAGMATICS AND SEMEIOTIC: THE PEIRCEAN VERSION OF ONTOLOGY AND EPISTEMOLOGY

KUNO LORENZ

In his attempt to situate his own theory of symbols within the history of philosophical ideas, Nelson Goodman wrote that it belongs to

> that mainstream of modern philosophy that began when Kant exchanged the structure of the world for the structure of the mind, continued when C.I. Lewis exchanged the structure of the mind for the structure of concepts, and that now proceeds to exchange the structure of concepts for the structure of the several symbol systems of the sciences, philosophy, the arts, perception, and everyday discourse. (Goodman 1978)

And indeed, in the light of this characterization it is easy to see that pragmatics has become the modern heir of ontology with semiotics being its counterpart as the heir of epistemology. Of course, both disciplines must be understood in the sense which Peirce gave them, i.e., not as just two newly established empirical sciences, but as two ways of investigation, in which empirical procedures are united with philosophical or reflexive ones.

Within this broader perspective, both actions and sign-actions are treated not only as *objects* of research and representation, but also as a *means* of research and representation. These entities are not only observed and described according to certain standards, but they are also produced so as eventually – through a stepwise production of an ever more perspicuous internal structure – to achieve a reconstruction of what, in the case of observation and description, is considered to be given for investigation.

As it is well known, Wittgenstein used the term 'language-game' for the sort of activity that aims at disclosing what is going on by providing tools of comparison. Hence, the productions of actions and sign-actions serve a cognitive purpose, in as much as they delineate the very areas of objects which then are to be investigated in the usual manner. A language-game may count as a paradigm case of perceptual knowledge, insofar as it signifies by functioning as an icon in the Peircean sense of the term. Using a Wittgensteinean term, one might say that, by producing an icon, one invents a >prototype< which reveals an area of internally structured objects.

G. Debrock and M. Hulswit (eds.), Living Doubt, 103–108.

Moreover, it becomes obvious that even the distinction of action and sign-action, which is a special case of the basic and embarrassing distinction between world and language, must be seen as a relative distinction, in the light of a purely functional account both of what it means to be an object and what it means to be a sign (of an object). Indeed, we are asked to create what Nelson Goodman would call a new world version out of the familiar every day version we normally live in. This is done by looking at verbal language or other symbol systems, as types of actions like eating and sleeping, and by considering non-linguistic and, more especially, non-symbolic objects as parts in a web of interrelated and interdependent actions.

Hence, we initially naturalize language and other symbol systems, and we symbolize the world by paying attention to that feature of actions which underlies Goodman's treatment of exemplification as a tool whereby we tie actions to symbols, and which Wittgenstein has clarified by introducing language-games: actions are both performed (this is their natural side) and understood (their symbolic side).

The performance of actions is the result of an ability to produce tokens of a certain type; the understanding of actions is the result of an ability to identify different tokens as belonging to the same type.

By and large, the primary function of sign-actions, both in their natural or pragmatic aspect (performance) and in their symbolic or semiotic aspect (recognition or identification), is not to serve men's needs (though, of course, this is not excluded), but to enlarge or refine man's abilities. In this context, only the abilities on the semiotic side pertain to the understanding; they include not only conceptual, but also perceptual abilities which in turn may be served by skills that may (e.g. in painting) or may not involve the use of external tools.

In order to *create* the distinction between object and sign of an object, it may be helpful to turn to the suggestion made by Peirce himself that signs may be developed from objects. This suggestion is contained in his paper entitled "Meaning" from 1910:

> If a Sign is other than its Object, there must exist, either in thought or in expression, some explication or argument or other context, showing how – upon what system or for what reason the Sign represents the Object or set of Objects that it does. Now the Sign and the Explanation together make up another Sign, and since the Explanation will be a Sign, it will probably require an additional explanation, which taken together with the already enlarged Sign will make up a still larger Sign; and proceeding in the same way, we shall, or should, ultimately reach a Sign of itself, containing its own

> explanation and those of all its significant parts; and according to this explanation each such part has some other part as its Object. According to this every Sign has, actually or virtually, what we may call a *Precept* of Explanation according to which it is to be understood as a sort of emanation, so to speak, of its Object. (*CP* 2.230)

The argument calls for something which is a sign of itself, i.e., which combines object- and sign-features, or better: which *functions* in both ways. The basic point of Peirce's pragmatic foundation of semeiotic – as it has convincingly been shown in Bernd Michael Scherer's dissertation (Scherer 1984) – was to give an account of the process of separation between sign and its object within the framework of Peirce's Pragmatic Maxim. And the arguments used for that purpose are themselves sections of an open sign-process on the level of reconstruction (they may be looked at as *conceptualizations* of Wittgensteinian language-games). Now the descending sequence of interpretants ends with an ultimate logical interpretant (*CP* 5.476) which is identified as a habit-change which, in contemporary terminology, is nothing but the *acquisition of an action schema* such that all the ways of dealing with the object in respect of what is signified by the initial sign are included.

For further clarification it may be useful to turn to the Peircean reading of the semeiotic triangle:

> A *Sign* [...] stands in such a genuine triadic relation to [...] its *Object*, as to be capable of determining [...] its *Interpretant*, to assume the same triadic relation to its Object in which it stands itself to the same Object. (*CP* 2.274)

Each interpretant (cognitions of a mind, i.e., mental interpretants, are *some of them)* is itself a sign for the *same* object. Hence, each interpretant in its turn generates a new interpretant, *and so on.* The sequence of interpretants which gets started in that way may be called a sequence of growing understanding of the object by supplying more and more differentiated determinations. It should not be forgotten that Peirce insists upon ever new (i.e., logically, not empirically new), sign-users connecting the items of the sequence, which are therefore >quasi-minds<, not >minds<:

> ... signs require at least two Quasi-minds; a *Quasi-utterer* and a *Quasi-interpreter;* and although these two are at one (*i.e., are* one mind [i.e., the dialogically constituted general subject! K.L.]) in the sign itself, they must nevertheless be distinct. In the Sign they are, so to say, *welded.* (*CP* 4.551)

Going back to habit-changes, i.e., to *acquisitions* of action schemata, as our candidates for something which is a sign of itself and thus the end of the descending sequence of interpretants, we may conclude that a *verbal* sign of an object *signifies* a range of possibilities of dealing with that object. Even more generally, it might be said that, if the dummy term 'object' be deleted, understanding a sign-action (a symbolic action) is, by that very action, tantamount to knowing of a whole range of further actions which may be said to be signified by the symbolic action.

As long as the sign-action itself is part of the range of actions it signifies, the sign-action signifies symptomatically, though not yet symbolically. In verbal symptomatic sign-actions there is no separation of word and object: their relation is external, e.g. causal, and not internal, or symbolic.

The same idea of explaining how symbolic actions, i.e., verbal sign-actions, symbolize may be used to explain how ordinary actions function as (not yet verbal) sign-actions. Thus we arrive at the following equivalence: to understand an actualization/a performance of an action (>knowing what one is doing<) is knowing ways of dealing with it. In a more general way, one may say that knowing an object is the same as treating this object as a sign of its distinctions, i.e., those that can be made. And again this is nothing but treating an object as a sign of its internal structure, a structure which is exhibited in an open-ended sign process.

Just as a reminder let me – by way of elucidation – refer to the famous diamond example in Peirce's "How to Make Our Ideas Clear:" the linguistic sign 'hard' refers – in the context Peirce described – to a diamond with respect to hardness. And it represents, as its last interpretant, the schema of possible dealings with a diamond in as much as these pertain to hardness (like trying to scratch it, and so on). Indeed, it becomes a *linguistic* sign, but not prior to the acquisition of such an action schema. Now, one may read this account the other way round: a schema of possible dealings with an object may act as the *designatum* of a linguistic sign, in fact as its *rigid designatum.* Hence, there are indeed rigid designators – but these are general, not singular terms – which are used *indexically* in order to articulate a situation-type, such as, in our instance, hardness-of-diamond-situations. Such usage of general terms corresponds to what is now usually called an ostensive definition.

Returning to Peircean terminology, one may say that to understand a symbolic action is tantamount to knowing *through that symbolic action* of a set of other possible actions which might be called the *designatum* of the symbolic action.

I have deliberately dropped the additional specification that the other possible actions be possible dealings *with some object;* this deletion allows for the application of the Pragmatic Maxim to each and every term without stop-

ping short of thing-terms. On this level of conceptual reconstruction, things must be treated as parts of dealings with them. In view of this, the Peircean diamond example should hence be rendered in the following way:

If someone is uttering 'diamondhard' and is thereby performing a symbolic action, he discloses to the other party [i.e., he makes use of the function of communication of the term 'diamondhard'] that there are other actions in virtue of which there is experience of hardness of diamonds, that there is indeed an action-schema which by common standards is said to belong to the set of perceptual acts, e.g., >perceiving< hardness of diamonds. This action-schema is an open schema without criteria as yet – not even categorial ones – to delimit the set of instantiations of the hardness-of-diamond-situation-type, which is the *designatum* of 'diamondhard' [i.e., the term's function of signification].

It should be noted, however, according to this interpretation, that sign-actions and actions seem to be two different entities. Instead, they are simple actions with a dual function. Thus, going another step backward, the simplest structure to start with, is, of course, the one which shows up when one is able to >read< an actualization as a sign of its type/schema. This ability is conveyed by the >language game< which is usually referred to as the acquisition process of action competence in an elementary dialogue-situation: the agent performs the action, and the patient *at the same time* recognizes it, role-switching included (Lorenz 1990).

Here, we find ourselves at the primitive level where there is an object which is simultaneously an icon of it, i.e., an action, as an entity that is both pragmatic and semiotic. In order to advance from this level, one must split the type into parts, so that the actualization of one of these parts becomes a sign of the whole. This is exactly the level on which Peirce speaks of an index of an object: "If the Sign be an Index, we may think of it as a fragment torn away from the Object, the two in their Existence being one whole or a part of such whole" (*CP* 2.230).

Such are the symptomatic sign-actions. The rest is well known, though, of course, there are many more details to be dealt with, but which cannot be discussed within the scope of this paper.

I only hope that I have succeeded in convincing the reader of the necessity to interpret Peircean semeioseis (sign-processes) as being *both* a methodology *and* an ontology. Thus, semeioseis are objects and, in as much as they are at the same time ways whereby we get to know these objects, cognitions.

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PEIRCE'S EPISTEMOLOGY AS A GENERALIZED THEORY OF LANGUAGE

ANGÈLE KREMER-MARIETTI

1 *Comte and Peirce*

In previous studies I have dealt quite a lot with the philosophy of Auguste Comte (1798-1857), and what strikes me is how much better specialists of Comte would have understood Comte's view, had they known Peirce's semeiotic! In previous publications, I have repeatedly shown that Comte's work displays strong major and fundamental semiotic dispositions (Kremer 1982; 1983; 1988; and particularly Kremer 1983b:19-26). It is obvious to me that some of Comte's theories correspond with those of Peirce, especially in the field of epistemology, which Comte approached through a theory of language, history and the philosophy of science. If Peirce has criticized Comte, he might also have perceived some similarity with his own philosophy.

I have in mind particularly what Comte called his "positive logic," which was a set of three semiotic logics: the first called the logic of feelings, the second, the logic of images, and the third, the logic of signs. The tripartition of "feelings," "images" and "signs" contains semiotic elements recognizable in Peirce's semeiotic. Indeed, Comte's positive logic may be compared roughly with Peirce's original distinction between Firstness, Secondness, and Thirdness.

From an anthropological point of view, Comte found that fetishism, polytheism and monotheism were at the origin of these three logics, whose development was closely linked to the system of society. He thought that language is composed of connection-signs between two elements, thereby forming a sign system. Thus, man and the world constitute an interdependent system which is the effect of language. Some features of Comte's semiotics correspond with the Saussurian dichotomy, while others write the Peircean trichotomy. Comte proposes the dual distinction sensation/movement and its homologous "inner images"/"outer images;" but, like Peirce, he assumes a third connection-sign between the two elements. Thus, Comte reconstitutes the zoological roots of the sign based on the two sides of the reflex arc combined with a complementary third side constituting the "intermediary vitality."

Beyond a fundamental zoo-semiotics, there is also an anthropo-semiotics that determines on semiotics of Comte. Indeed, his epistemology hinges upon

G. Debrock and M. Hulswit (eds.), Living Doubt, 109–120.

a generalized theory of language. It will be shown that the same is true for Peirce.

There are certainly important differences between Comte and Peirce. Comte was haunted by the idea of constructing a system capable of helping French politics in the first half of the 19th century, whilst Peirce did not attempt such a system. Comte considered the fulfillment of humanity as the end and symbol of his Positive Philosophy, while Peirce saw humanity as a non-sufficient end. For Peirce humanity belongs to Secondness and reason to Thirdness. Moreover, as neither humanity nor reason was the final end, Peirce implied there was, in the words of Herbert Schneider (Schneider 1952) a kind of Fourthness that was the *summum bonum* (*CP* 5.433).

2 *The Originality of Peirce's Epistemology*

Peirce opened a paved way in which epistemology is linked to a theory of meaning and a theory of signs. Indeed, the general concern of epistemology is the question of what knowledge is and how it is possible. Epistemology seeks to answer the question: How can humans know about the natural world? Peirce gave his answer: only through the way of signs considered as tools and objects. Signs are not only linguistic, but also logical and pragmatic. Peirce is right to assert that we cannot think without signs (*CP* 5.251) and that every thought is itself a sign (*CP* 5.253), so that we are concerned with the concept of thought-sign (*CP* 5.283) and the idea that even man himself is a sign (*CP* 5.310).

Thus all signs, whether linguistic, logical or pragmatic, belong to a generalized theory of language, which Peirce summarized very early as follows:

> *Being, quality, relation,* and other universals are not known except as characters of words or other signs, attributed by a figure of speech to things. (*CP* 5.343)

Since it is accepted today that sciences take symbolical facts as objects to be described and constructed,[1] the task of epistemology has been re-defined: one must become aware of the ways in which signs are used as tools and objects in our knowledge, both on the level of ordinary language and of scientific discourse.

In matters of epistemology, Peirce gave us a theory of language, within which he lays bare the origins and the nature of knowledge, the presuppositions of knowledge, and the conditions of veracity of knowledge. But besides

[1]See (Granger 1979:14): "Une épistémologie du langage se développe dans la condition des sciences - celles-ci prennent les faits symboliques pour *objets* en vue de les décrire et de les construire." Compare this with (*CP* 5.93-119).

epistemology, Peirce developed many other fields of interest, one of which is that of speculative grammar (Réthoré 1988). Indeed, epistemology presupposes the speculative grammar, for the latter studies the signs themselves while epistemology studies the signs in their relation to the world.

The epistemologies of Comte and Peirce alike presuppose a generalized theory of language, which implies a reciprocity between reality and signification. The epistemology of Peirce is governed by an operational principle that acts as a primary, universal postulate which leads every activity of the human mind. In fact, the mind acts as mediator between the order of nature and the order of a community (which may be either a particular community or the community at large); therefore its activity depends upon both nature and society.

In respect of society, Peirce had recognized as early as 1868 – in the concluding portion of his article "Grounds of Validity of the Laws of Logic: Further consequences of Four Incapacities" – the fact that "the social principle is rooted intrinsically in logic" (*CP* 5.354). And as for nature, he had given in "How to make our Ideas clear" (1878) a kind of natural phenomenology of thought, speaking of doubt as a cause of irritation arising from indecisiveness in matters of action. The function of thought was to produce belief, after it had been excited by doubt. The effect of thought, which is belief, involves a habit which in turn is a "rule of action" so that belief becomes a "habit of action." Peirce's idea that "thought is essentially an action" (*CP* 5.388-410) is a view which he shares with Hobbes (Hobbes 1966a:5.253;1966b). Now, the action of thought begins with an activity, and this activity is a generalization of the effort (*CP* 5.442) of any kind of language which may be constituted by images, for percepts are images or kinetic images (*CP* 5.115).

Doubt and Belief, or question and decision, constitute thought which manifests its reality to us as arising from a stream of *images* passing rapidly through consciousness. In this regard, Peirce observes that thought "runs" like a melody through the succession of our sensations (*CP* 5.388-410), a theme which later would be extensively worked out by both William James and Henri Bergson.

Moreover, as thinking beings, men apprehend the world not through a personal, intuitive *cogito* (Peirce is strongly anti-Cartesian), but by virtue of the social status of logic. It is because the ideal perfection of knowledge which in the end constitutes reality belongs to a community, that any man within that community has access to the world only in as much as he identifies his own interests with those of the community (*CP* 5.356).

Furthermore, the human mind may be said to be founded "in the world." I borrow this Heideggerian expression, although it is clear that, within the context of Peirce's work, it should be interpreted in an altogether different

manner. In "The Order of Nature" (1878) Peirce wrote "... that the mind of man is strongly adapted to the comprehension of the world ..." (*CP* 6.417). Peirce establishes this fact which he considers as incontestable on the basis of some sort of holistic principle which probably constitutes Peirce's most basic certitude: that there is a total harmony between man and world. Here is another similarity between this principle and Comte's positivist certitude.

Indeed this very same belief is related to the question put forward by Einstein who wondered why it should be possible for the human mind to understand the universe. But, much though he could not understand why the universe is intelligible, he nevertheless was convinced that it was intelligible. Einstein did formulate his answer to that enigma in terms of the notion of unity, when in a letter to a friend (January 1938) he wrote: "The logically simple does not, of course, have to be physically true; but the physically true is logically simple, that is, it has unity at the foundation" (Holton 1988:259).

Peirce too refers to unity when he suggests that the understanding of the universe may be theoretically demonstrated by virtue of the theorem that "... there is a character peculiar to every possible group of objects" (*CP* 6.414). Practically however, the existence of this character may be shown to obtain through the action of thought, i.e., through "mental action," but also through the use of language, or, more precisely, through the use of any sign system and the kind of meaning which such system may provide. Both signs and representations belong to the nature of the real; both share the status of a positive fact, and therefore the forcefulness and hardness of Secondness. But the reality of the real is made possible by thought, i.e., by Thirdness. Thus, there is no "thing in itself" in the epistemology of Peirce, for all reality is basically founded upon interpretants and interpreters. The famous pragmatic maxim provides the rule that governs an epistemology which, instead of presupposing innate ideas, is based on the assumption that there is something like social-historical and experimental knowledge.

> Consider what effects, that might conceivably have practical bearings we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object. (*CP* 5.402)

The pragmatic turn of epistemology, expressed in 1878, is profoundly positive, and perfectly coherent with a holistic explanation that is valid for all phenomena. This coherence seems to me so well defined by Robert Almeder in relation to the meaning of sentences: "The meaning of the sentence is issued in terms of the conditions for the whole theory in which the sentence is embedded" (Almeder 1983:346,n16). Indeed, for Peirce, meaning is at once

referential, pragmatic and structural: it is a whole, not unlike the entire system "man-world."

3 The Legality of Scientific Communication

The main criticism levelled against Peirce's epistemology challenges the principle that the human mind is adapted to nature, and therefore rejects what has been called "Peirce's Ontological Postulate," viz. "that the structure of logic is the mirror of the structure of reality" (Freeman 1983:70).

This raises the question how Peirce could possibly justify his assertion of the structural homology between logic and reality, according to which the laws of the universe and the laws of the mind are positively the same (a position shared by Comte). The answer may be that man and the world are mediated by a situation-bound language which is the expression of human abilities and the range thereof. Indeed, Peirce teaches us that the semeiotic unity is represented by the proposition. Thus he stated in his "New List of Categories" (1867) that "The Unity to which the understanding reduces impressions is the unity of a proposition" (*CP* 1.548).

Following Kant and anticipating Einstein, Peirce was confronted with the problem of having to reduce "the manifold of sensuous impressions to unity" (*CP* 1.545). And he thought that this unity was given by the proposition which is "the connection of the predicate with the subject" (*CP* 1.548), as thought through the conception of being expressed in the copula. Abstraction or precision constitutes the conjunction of substance and being, and is first rendered possible through the proposition expressing the substance and its quality in the reference to a ground. The conception of quality heralds the passage from being to substance. But in order to know a quality we need a relation within the reference to a correlate. Finally, the reference to a correlate "conjoins to the substance the conception of a reference to an interpretant" (*CP* 1.553). Therefore, in addition to the related thing with ground and correlate, we need, in order to compare, a mediating representation: the latter has to represent the relate as being a representation of the same correlate represented by the mediating representation itself (*CP* 1.553). And Peirce explains why this mediating representation must be called an *interpretant*: "... because it fulfills the office of an interpreter, who says that a foreigner says the same thing which he himself says" (*CP* 1.553).

Thus, between being and substance there are these three accidents, quality, relation and representation, which from the very beginning are called resp. First, Second and Third, and which would later be developed into the conceptions of Firstness, Secondness and Thirdness. These five conceptions of being, substance, quality, relation and representation constitute the new list

of categories which Peirce established without making use of the terms of Aristotle or the judgments of Kant. Instead, he bases them upon the forms of inference according to whether a related thing is referred to a ground, a correlate or an interpretant. Thus, for Peirce, inference is the essential function of our knowing mind (*CP* 2.444). Peirce saw in these fundamental concepts the three elementary forms of predication or signification: qualities, relations and representations (*CP* 1.561). The *quale* (in 1905 he replaced "quality" by "non-relative characters" (*CP* 1.565)) refers to a ground; the *relation* which, having an object, the related, refers to both the ground and the correlate; and the *representamen* not only represents the object, but also refers to the ground, the correlate and the interpretant.

Peirce, who was quite proud of having found the Third, claimed that this allowed him to go further than De Morgan, the author of the essay "On the Logic of Relations" (1866). From De Morgan, Peirce had inferred that indecomposable predicates were of three classes: predicates applying to a single subject, predicates having two subjects (i.e., the subject nominative and the object accusative), and those having three such subjects or correlates. But De Morgan had failed to perceive the last of these classes, which according to Peirce expresses "some relation of an intellectual nature" (*CP* 1.562). All in all, the first Logic of Relations stated in 1867 formed the basis of Peirce's epistemology.

But Peirce went on developing his logical investigations in the field of relations, and as a result he changed his perspective on the nature of the proposition several times. In 1870 in his "Description of a Notation for the Logic of Relatives," he redefined the proposition as a transitive relation of inclusion. In his many writings during the year 1890, however, he maintained his first definition: a proposition consists of two parts, the predicate and the subject (*MS* 280). In "The Basis of Pragmaticism" of 1906, he observes that truth belongs to the proposition (*CP* 5.553). He considers the subject to be an indexical symbol, and the predicate an iconic symbol, while these are related to each other by a copula (*CP* 3.621) which is said to express a relation between some general terms and the universe.

In respect of the link between subject, copula and predicate, this logical trichotomy is remarkably confirmed in Strawson's book *Subject and Predicate in Logic and Grammar* (Strawson 1974; see also Paliaro 1950), where a similar idea of the tripartition of functions in a propositional combination is proposed. For Strawson, a sentence contains an expression specifying the particular, an expression specifying a general concept, and a third element which is described as "some feature of the mode of combination of the two aforementioned expressions" (Strawson 1974:21). In Strawson's view, it is this combination that "yields truth, if the particular exemplifies the concept – or, if the concept

applies to the particular" (Strawson 1974:21). The first two functions are the same in both logic and grammar, but in respect of the third function, Strawson states that the 'grappling machinery' is located on the verb-phrase, more surely than on the noun-phrase. Moreover, Strawson shares Peirce's view that the notion of sign is at the same time "expression," "meaning," "representation" and "communication." For Peirce the verb is primarily a pure icon, and only then a complete relative and a model of the general functioning of any assertion, while the copula has a function but no object (*CP* 2.343).

Indeed, apart from stating the tripartition of the proposition, Peirce also shows there is a link between this tripartition and the notion of communication. Any communication presupposes an utterer and an interpreter. Yet the utterance is still dependent upon a particular kind of assurance which is also subject to the principle of trichotomy: "As to the Nature of the Assurance of the Utterance: assurance of Instinct; assurance of Experience; assurance of Form" (*CP* 8.374). Peirce distinguished propositions from assertions (*MS* 517) – a distinction also made by our contemporary logicians – but he drew some consequences that are not shared by his modern counterparts. For Peirce, the logical properties of a proposition are dependent upon its assertive function within the relationship between the utterer and the interpreter. It is true that Granger also refers to the capacity of communication which science reveals in its dependence upon the "couple utterer/receiver" (Granger 1979:21). But, as has been shown by Risto Hilpinen (Hilpinen 1983), Peirce defined the truth of a proposition "as the utterer's ability to defend it successfully against the interpreter's attack," and he analyzed quantifier phrases so as to give to "quantified sentences correct truth conditions" which approach the "modern game-theoretical interpretation of quantifiers" (Hilpinen 1983:268).

4 The Phenomenology of Knowledge: An Account of Reality

After having seen the logical presupposition of scientific truth in Peirce's logic, we may now want to explore the phenomenology of knowledge in Peirce's epistemology. In his "Prolegomena to an Apology for Pragmaticism" of 1905 (*CP* 4.530-572), Peirce defined a percept as the immediate object of our knowledge (*CP* 4.539); but it is not an immediate perception. A distinction must be made. Therefore, in "Why Study Logic" of 1902, Peirce distinguished "percept," "perceptual fact" and "reasoning." A percept is a sense evidence (*CP* 2.141-3); perceptual facts, upon which our inferences (*CP* 2.141) repose, describe percepts (*CP* 2.143): they are immediate interpretants of perceptual judgments (*CP* 4.539). True reasoning is different from percept and perceptual fact (*CP* 2.144): its conclusion is located between the remembrance of past percepts and past perceptual facts, and the expectation of a future (*CP* 2.145).

The dynamic interpretant may be "Sympathetic, or Congruentive; Shocking or Percussive; Usual" (*CP* 8.370). The dynamic interpretant of a percept is a perceptual judgment which is a proposition of existence determined by its own dynamical object. And this latter is the percept (and the concept) that acquires the logical position of an abductive premise, which itself shows the perceptual judgment to be, an, albeit not necessary, abductive inference (*CP* 4.541).

To the perceptual universe are conjoined ever new universe *sems*, i.e., simple signs, which are interpretants of percepts, regarding "the Nature of the Influence of the Sign" (*CP* 8.373). And these interpretants of percepts open a way to Truth (*CP* 4.539), the highest abstraction. Besides *sems*, "simple signs," there are also *phemes*, or perceptual judgments, "with antecedent, consequent, and principle of sequence" (*CP* 8.373). Finally, there are *delomes* which replace arguments, and which represent change in thought-signs (Réthoré 1988:489). In relation to the higher abstraction, a false proposition would be a proposition from which could be deduced whatever a proposition itself opposed to a direct perceptual judgment (*CP* 2.327). In the consideration of perceptual judgments, the use of indexical expressions and predicates in these judgments also partake of the function of "Indices" and "Icons." Icons and Indices get their meaning within perceptual judgments. Perceptual cognition is thus not separable from a semeiotic expression of the percepts, because a sum of perceptual judgments exists through a flow of inferences.

So far, I have tried to expound Peirce's epistemology as depending upon a fundamental relation between the theory of knowledge and the theory of language, where the latter is understood as a logic and a pragmatics. This epistemology presupposes the mediation of mind between nature and society and a social principle rooted in logic. In this fundamental relation the pragmatic maxim plays its part as the nucleus holding together the different aspects belonging of Peirce's epistemology.

On the one hand, logic obeys the social principle, on the other, a natural phenomenology of mind leads to the belief and the rule and habit of thought as mental action. Moreover, it has been shown what are the logical presuppositions of knowledge in the proposition, which is always our representation, and it has been explained how the phenomenology of knowledge starts from the percept and ends with Truth. In both approaches to understanding Peirce's epistemology, the pragmatic maxim functioned as a sufficient principle: Peirce confirmed it like his other explanatory epistemological propositions.

By its capacity of insertion in a game-theoretical interpretation of quantifiers, as Hilpinen has shown, the originality of Peirce's epistemology is that it gives an account of reality and that it legalizes scientific communication.

5 *The three Types of Inference*

Peirce's analysis of the particularity of perceptual qualities and of the universality of abstract arguments, yielded three types of inference. These function as methodological connections in his epistemology. Deduction is the pure expression of thirdness, induction draws thirdness from secondness, and abduction or retroduction draws thirdness from intuitive firstness.

Deduction and induction are well known and have been extensively explored from an epistemological perspective. But what is new and interesting in Peirce's epistemology is the notion of abduction. Peirce explains abduction in his "History of Science" of 1896 (*CP* 1.19-49), which was never completed. We must keep in mind that the first steps of scientific inquiry have been and are always difficult. Abduction is a preliminary knowledge or theory, which may be true or false, but which is always necessary to every first observation. "When a man desires ardently to know the truth, his first effort will be to imagine what that truth can be." In his early classifications of arguments, in 1878 and 1893, Peirce who was in search of a method (*CP* 2.372-388) called "hypothesis" what he was later to call "abduction." And he compared induction and hypothesis. Induction is the generalization from a number of cases of which something is true. Hypothesis is a sort of reasoning "where we find some very curious circumstance, which would be explained by the supposition that it was a case of a certain general rule, and thereupon adopt that supposition." Even though induction is seen as a strong kind of inference, which infers from one set of facts another set of *similar* facts, hypothesis is especially useful as inferring from facts of one kind to facts of *another*.

When we look at the epistemological fact that rules of induction and rules of deduction are now to be understood now as "canons of validation rather than of discovery" (Hempel 1966:18), we must appreciate the operation of abduction. Peirce would have rejected the classical and presumedly ideal conception of scientific inquiry, according to which such inquiry goes through four stages:

> (1) Observation and recording of all facts, (2) analysis and classification of these facts, (3) inductive derivation of generalizations from them, and (4) further testing of the generalizations. (Hempel 1966:31)

This is what Carl G. Hempel calls "the narrow inductivist conception of scientific inquiry" (Hempel 1966:31) and if we ask now the cognitive theory proposed by Einstein regarding his own discoveries, we find confirmation of this new perspective. For Einstein, the concept plays the part of a mental connection between sense experiences, but it is not identical with "the totality

of sense impressions" referred to (Einstein 1954:291). Einstein assumed that a theoretical structure allows for theoretical descriptions that are not "directly dependent upon acts of empirical assertions" (Einstein 1949:674). In the same way as the Peircean abduction, concepts and system of concepts were seen by Einstein as a human creation. He presented the scientific, creative inference as going from the initial E (Experience) to the A (Axioms or principles), but through a J (Jump); with between A and the final E the necessary consequences: S, S', S" . Gerald Holton has recapitulated the complete cycle E-J-A-S-E as being Einstein's process of scientific theory construction, of which criteria are an "external validation" completed with an "inner perfection" (Holton 1986). It seems to me that the ways of Einstein's discovery is confirming the Peircean notion of abduction.

And in the Eight Lowell Conference of 1903, "How to Theorize" (*CP* 5.590-604), Peirce spoke of abduction as covering really "all the operations by which theories and conceptions are engendered." Criticizing Comte's theory of observation in the 28th Lesson of the *Cours de philosophie positive* (1830) (which, I guess, he misunderstood), Peirce explained what he understood properly with abduction: "any mode or degree of acceptance of a proposition as a truth." And he gave the truth condition of a good abduction, or of an explanatory hypothesis:

> Any hypothesis [...] may be admissible, in the absence of any special reasons to the contrary, provided it be capable of [...] verification.

He concluded that was the doctrine of pragmaticism. But we can say that it is also the doctrine of scientific experimentation and theorizing.

We could add that for Peirce there would always be discrepancies between theory and observation (*CP* 1.132). Therefore, the scientist must constantly keep theories as flexible as possible to accommodate wayward data (*CP* 5:376): causes are not always precise. But it also happens that some truths cannot be supposed as not being universal. Necessity is then to be considered simply as a postulate: "a material fact which we are not entitled to assume as a premise, but the truth of which is requisite to the validity of an inference" (*CP* 6.41). The necessary modality is that of a habit as being an epistemic dimension of meaning (*CP* 8.376).

From the standpoint of the scientific inquiry to the conclusive abduction, Peirce has tempted to follow the real process of questioning which characterizes human mind.

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Part II

PEIRCE AND
THE EPISTEMOLOGICAL TRADITION

PEIRCEAN VS. ARISTOTELIAN CONCEPTION OF TRUTH

RYSZARD WÓJCICKI

0. The initial idea of this paper was rather simple. I wanted to compare Peirce's views on logic as a critical study of habits of inquiry with corresponding views of Polish logicians from the twenty years period of independence of Poland ended by the Second World War. That was a period of intensive activity and considerable achievements of the Lvov-Warsaw School of Philosophy. A rather large group of outstanding logicians, among them Kazimierz Ajdukiewicz, Tadeusz Czeżowski, Tadeusz Kotarbiński, Stanisław Leśniewski, Jan Łukasiewicz, Alfred Tarski, to mention only those to whom I will refer throughout my paper, formed a part of the Lvov-Warsaw School, and all of these were leading figures of the School of Polish Logic. Besides the names mentioned above I will occasionally refer to Ludwik Fleck, another outstanding Polish scholar, though by no means a member of the Lvov-Warsaw School. Rather, he was an eminent outsider. A microbiologist, with a keen interest in philosophical foundations of science, he was one of the earliest and most incisive critics of the doctrine of Logical Positivism both in the form known from the Wiener Kreis and that cultivated by Polish logicians and philosophers.

On second thought, however, I thought it would be wiser to limit myself to an examination of one single issue, and to compare Peirce's conception of truth with the Aristotelian one in the context of some logical issues. The views of the Polish logicians I am going to mention will merely serve as auxiliary material illustrating some of the points I am going to make. I am ready to admit that, instead of Polish logicians, I could quite easily refer to views of outstanding logicians of any other country. However, the decision to parallel or, sometimes, contrast Peirce's ideas with those of representatives of Polish pre-War logic is not as accidental as it may seem, and is by no means motivated merely by the fact that the achievements of Polish logic are part of the intellectual tradition to which I am especially close.

To begin with, the majority of Polish logicians were of realistic persuasion, and hence they were naturally inclined towards the Aristotelian conception of truth. For Alfred Tarski who was a mathematician rather than a philosopher, the fact that his colleagues, notably Kotarbiński and Łukasiewicz had never renounced the classical conception of truth in spite of all difficulties to which it gave rise, was certainly a significant encouragement to undertaking

G. Debrock and M. Hulswit (eds.), Living Doubt, 125–135.

an effort to formalize it. This also explains why his celebrated paper on the notion of truth (Tarski 1930) gained immediately the full approval of Polish logicians. More particularly, the significance of Tarski's formalization of the Aristotelian conception of truth was fully recognized in the review of Tarski's paper, published by Kotarbiński in *Przegląd Filozoficzny,* the leading Polish philosophical journal at that time.

Another justification for contrasting Peirce with the Polish logicians is the fact that various specific issues of Peirce's inquiry on the notion of truth and selected relevant topics was also discussed by the Polish logicians. The fact that Peirce and Łukasiewicz approached many logical issues in a parallel way seems to be especially instructive in this respect.

1. Though, in the context of this paper, the question is of merely secondary significance, it is worth asking of whether Polish logicians from the Lvov-Warsaw School were familiar with philosophical achievements of Charles S. Peirce. They certainly knew and appreciated some purely formal ideas of the American philosopher and were familiar with at least some of his logical writings, particularly with his "On the Algebra of Logic" of 1885. For instance, they were aware that the idea of quantifiers was developed by Peirce independently of G. Frege. They correctly credited Peirce and not Schröder with developing the idea of verification procedure of formulas of the sentential calculus known as the 'matrix method' (Łukasiewicz and Tarski 1930; Łukasiewicz 1951). Indeed Schröder (Schröder 1890-1905) published his version of this method about five years later than Peirce. The Peircean theory of relations was axiomatized by Tarski (Tarski 1941). The Polish logicians were familiar with the Peirce Law $[(p \to q) \to p] \to p$, a rather sophisticated tautology of two-valued logic, and they acknowledged the fact that Peirce was the first to introduce nullary connectives (constants) into sentential calculus. Moreover they were aware of many other contributions of Peirce to logic and the foundations of mathematics. Thus the role of Peirce as one of the founders of contemporary logic was fully appreciated by the Polish logicians.

On the other hand, certainly people from the Lvov-Warsaw School did not consider Peirce's contributions to philosophy as the source of inspiration for their own philosophical studies. There are several reasons for this. Some of these are sociological. At the beginning of this century, European philosophers were predominantly Europe-centered, and, although American philosophers (notably William James) were highly esteemed on the Old Continent, this was not at all the case for Charles S. Peirce who, for that matter was not terribly popular in his own country either.

But, quite independently of any geographical or sociological factors, it is rather unlikely that Polish logicians would find the main body of Peircean

ideas attractive, even if they had taken pains to study them. They were influenced by ideas of Husserl, Brentano, Meinong, Bolzano, i.e., philosophers whose views have little in common with Peircean metaphysics.

2. For Peirce and his contemporaries, notably Gottlob Frege, the received view on logic was that expressed by, among others, John Stuart Mill. Logic was viewed as part of the science that concerns reasoning considered as a psychological process. But, as we now clearly see, after the penetrating analysis of the nature of logic given by Peirce and Frege, logic concerns neither states of mind nor psychological phenomena. It took a rather long time to establish the anti-psychologistic view of the nature of logic. But already in the early writings of the Polish logicians, especially those of Łukasiewicz, it was stressed time and again that logic is not a part of psychology and that the the two disciplines do not overlap each other.

There are two fundamental questions to which the anti-psychologistic position gives rise. One is what logic is about. The other concerns the epistemological status of the laws of logic. To a large extent an answer to these two questions is determined by the metaphysical framework within which they are asked.

So what is logic about? How was this question answered by Peirce and what was the answer offered by Polish logicians? The answer is that their views coincide: logic deals with methods of arriving at the truth, though it does not deal with *all* methods of this kind. It deals with those methods which do not involve anything that goes beyond language, i.e., beyond what may be articulated in the form of sentences. Thus language which is meant to be an abstract medium both to preserve and to convey any knowledge one may acquire, becomes the main concern of logicians.

In view of this fact, it is not surprising that both Peirce and Polish logicians have done so much to analyze the structure and the role of language. Clearly, the results of Polish logicians pushed further and thus complemented the work done by Peirce. For instance, he was not aware that object-language had to be separated from the meta-language; the need of such a separation was established by Leśniewski and Tarski. Nor was he interested in grammatical peculiarities the study of which resulted in Ajdukiewicz's idea of categorical grammar. Still Peirce was already fully aware that language, taken as an object of logical study, must be treated as some idealized structure formed according to certain well defined rules. Thus, long before Leśniewski and Tarski, he was one of the pioneers of the idea of the formalized treatment of linguistic phenomena.

3. To be sure that we properly understand the idea of logic as a theoretic

discipline which deals with methods of achieving truth, we should ask what is truth. At this juncture, we arrive at the question which is of central significance for a proper understanding of both the similarities and the differences between the ways of thinking of the two parties of my analysis, and which is also the central issue of this paper. Peirce's conception of truth varies with time. But there is one intuitive idea of truth that, beginning from his early paper "The Fixation of Belief,"[1] Peirce has persistently tried to grasp and to clarify: the idea of truth as the end point of human cognitive efforts. One arrives at the truth, a specific piece of truth to be sure, if one arrives at a belief that cannot be shaken by any further scientific inquiry. Of course, Peirce does not endorse the naïve view that, once achieved, truth can never be doubted again. In order to reach the end point, it does not suffice to provide a complete and adequate justification of the statement that expresses our belief; the justification must pass numerous cross confirmations, its accuracy and adequacy must be examined time and again, until the scientific community reach the full confidence in its acceptability. Only then can the end point, to use the terminology I have suggested above, be said to be achieved – the belief to be fixed.

Thus, as it was seen by Peirce, the process of scientific inquiry is cumulative. Our knowledge is not merely improving in its accuracy, exactness, economy etc., but it is also constantly expanding by establishing and thus collecting more and more true beliefs, even though we cannot be sure which of these are true and which are not.

The idea of truth as the end point of scientific investigations must be especially close to those who, like Peirce, have some mathematical training. How do we know whether a mathematical conjecture A is true? For the mathematician, the only way to settle such a question is to prove or to disprove A. When the proof of either A or not-A is given, and when furthermore, its soundness is checked a – virtually – unlimited number of times by students and users of the theorem, the fixation of belief is achieved. It becomes extremely unlikely that the truth reached in that way will be revised, that the theorem commonly accepted by generations of specialists will be waived, and that the process of inquiry will start anew.

Following Ludwik Fleck, Thomas S. Kuhn and Paul K. Feyerabend, many philosophers of science have come to doubt whether the history of science can be viewed as a history of continuous growth. Clearly, if their skepticism is justified, the idea of truth being the end point of inquiry must be unacceptable. But, in spite of that, mathematics seems to be an ideal and paradigmatic

[1]The paper was published in a series entitled *Illustrations of the Logic of Science* in the *Popular Science Monthly* in 1878-9.

instance of a continuously growing body of truths. That does not mean that contemporary mathematicians share all the well-established views of their colleagues from the past, or that they never revise or improve those views, but there is a clear and easy to grasp intuitive sense in which mathematics is a discipline that grows through the process of achieving consensus amongst specialists. Mathematics is not free from error, but unless the error concerns a question of marginal significance, a question of accidental and temporary interest, the error must eventually be traced and eradicated. Consequently, any result once achieved by legitimate methods must remain unshakable. This somewhat over-optimistic picture asks for some additional comments which, unfortunately, would exceed the limits of this paper.

The conception of truth as the end point of scientific inquiry does not appeal to any notion of reality. Truth is a matter of methods and people using them. Thus, whatever may be said about the correspondence between truth and reality – if one admits that there is any reality at all – must result from some additional considerations. The end point conception of truth is purely epistemological.

4. Anyone, who wholeheartedly and without any hesitation wants to subscribe to the end point idea of truth has no other choice but to assume that truth and reality are, in a sense, indiscernible. To speak about a state of affairs S (say, *it rains)* and to speak about the truth of the proposition that states that S (it is true that *it rains)* amounts to the same. The difference, to use the terminology suggested by Carnap, consists in selecting either a material or a formal mode of speech. This view is consistent with Peircean pragmatism, for the two sentences *"it rains"* and "it is true that *it rains"* are synonymous: all practical consequences which are admitted by the former are admitted by the latter and vice versa.

According to the Peircean conception of truth, i.e., the view that truth results from a continuous effort to arrive at the views that will be unanimously accepted, the attainment of truth does not merely describe reality, it also defines it. There is no reality beyond the truth, there is no reality other than that which may be known to us. Peirce rejects the idea of incognizable reality.

There is one rather subtle point to which the Peircean idea of truth and the corresponding conception of reality gives rise. Suppose we want to know which of the two contradictory claims, A and not-A, is true, thus we want to decide between A and not-A. And suppose that, in principle, the scientific methods we have at our disposal allow us to settle the question. Does this suffice to maintain that one of the two opposite claims is true? A seemingly obvious answer is "yes." But the positive answer alienates the truth from the actual process of inquiry. Indeed, there is little doubt that one can ask an enormous

amount of questions that can be solved with the help of scientific methods, but most of them are questions that will never be investigated. Consequently, we must admit that there are true propositions the truth-value of which is neither known nor will be known in the future. If so, truth becomes independent from the actual process of inquiry, i.e., from any *actual* scientific activity, and thus in some very specific sense truth becomes objective.

It turns out that the Peircean conception of truth admits of two alternative interpretations. One, that might be called *actualistic,* associates the notion of truth with the actual process of inquiry. Under this conception we are not allowed to declare any proposition to be true unless, sooner or later, its truth will be effectively established. The other, let me call it *virtualistic,* consists in defining the notion of truth in terms of the possibility of solving the question through a properly conducted process of inquiry, without postulating that the process should actually be implemented.

I do not feel confident enough of my knowledge of Peirce's philosophy to attempt to settle the question whether the author of "The Fixation of Belief" was fully aware of the two alternatives I have mentioned. In spite of some significant similarities, Peirce's idea of objectivity of truth and the corresponding idea of reality are not exactly the same as those implied by the virtualistic interpretation. It seems to me, however, that unless we agree that truth (and consequently, reality) should be interpreted virtualistically, the Peircean doctrine of truth is untenable.

5. It goes without saying that in order to subscribe to the Peircean idea of truth, one must believe that amongst all the methods applied in the search for truth, there is a body of methods that are not merely applied in science, but that are simply "sound," "legitimate," "good," and *therefore* scientific in the genuine sense of the word. This presents a problem the significance of which may be seen more readily by comparing the notion of truth with that of Aristotle. Under the Aristotelian conception of truth the notion of a scientific method is easily defined as a method that is infallible, i.e., a method which, if properly used, guarantees our arriving at the truth. Although this conception does not imply that we may easily recognize these methods, we at least know what it means for a method to be good, we know the *differential specific* of the class. Under the Peircean conception of truth, however, the Aristotelian definition of a scientific method is useless: one cannot define a good method by appealing to the notion of truth because the latter has been defined in terms of the former.

Peirce does offer an impressive body of efforts to define scientific methods, but we cannot help feeling that many of his proposals and suggestions are neither as clear nor as compelling as one might want them to be. Without

entering into a discussion of all the Peircean themes that are relevant to the question, such as his conception of the *phaneron* his theory of the categories, or his discussion of the three forms of reasoning, viz. deduction, induction and abduction, I shall limit myself to a few observations.

First, a preliminary remark regarding the taxonomy of the types of reasoning. It is worth noticing, perhaps, that Polish logicians (more specifically Łukasiewicz, Ajdukiewicz, Kotarbiński, Czeżowski and others) invested much effort and time to invent a clear-cut taxonomy of various types of reasoning, and it might be of some interest to compare the intuitive ideas underlying their efforts with those guiding the taxonomy suggested by Peirce. More specifically, it should be observed that, roughly speaking, abduction corresponds to the type of reasoning which Polish logicians preferred to call reduction.

But let me turn to the heart of the matter. What - according to Peirce - makes a specific form of reasoning good? No single answer to this question was offered by Peirce, rather he approached the problem in several alternative ways. Certainly, he looked at *logica utens* and by the process of suitable refinements tried to transform it into *logica docens*. But to say that a specific logical method is good because it is the refined version of a method actually applied in science may suffice as a justification of the method only if we uncritically accept the methods applied in science and, moreover, if we believe that the refinement proposed adequately grasps the essence of the method in question.

Let me dwell on this point. If we believe that science develops closer and closer to the truth, then it is only natural for us to believe that the methods applied in science are constantly improving. Moreover, upon the same belief, if a specific method proves to be unhealthy, then, perhaps not immediately, but after a sufficiently long period of time, scientists may be able to discover its deficiency and, consequently, may either improve upon the method or discard it altogether. The process of growth of science is a self-correcting process.

This may help us to grasp more adequately some rather crucial elements of Peircean philosophy. It should be remembered that Peirce distinguished four methods of fixing beliefs: tenacity, authority, the *a priori* method, and the method of science. Although each of these may be useful, the latter two were considered by Peirce to be of special significance. The description of the *a priori* method provided by Peirce (*CP* 5.392) corresponds in a striking manner to Fleck's description of the formation of "styles of thought" (*Denkstile*) (Fleck 1930). The method consists in a gradual harmonization of beliefs through the exchange of ideas among members of the scientific community, thus arriving at the stage when all members become able to see things in the same way. But Fleck and Peirce disagree rather radically as to the role of *Denkstile* or, alternatively, the *a priori* method. Fleck believed that different styles of thought could not be compared with one another, that it senseless to say that one of

them is better than another, and thus, that the substitution of one *Denkstil* by another could not be analyzed in terms of improvement. Peirce, on the other hand, treated the *a priori* approach as a stepping stone on the way to the scientific method. The essence of the divergence is clear: Peirce believed in the growth of science while Fleck was one of the earliest critics of that idea.

Actually, the three methods, of tenacity, of authority and *a priori* were viewed by Peirce as steps towards discovering the scientific one. Moreover, scientific ways of arriving at the truth must be looked for among those that are consistent with the three methods in question.

But a different way of deciding whether a method is scientific is to examine whether the method is infallible. Let me comment on this idea.

One who is familiar with Tarski's conception of consequence operation, must be struck by the Peircean idea which dates from his 1869 lecture series on British logicians, that, in order for an inference to be good, it must preserve truth. That idea is precisely the idea that was formalized by Tarski (Tarski 1936). But Tarski and Peirce were of dramatically different philosophical persuasion. Tarski's theory of truth is an implementation of the correspondence theory. Thus, as I have already mentioned, while Tarski could use the notion of truth in order to define sound inferences, Peirce could not use his notion of truth for that purpose without being inconsistent with himself. And indeed, I do not believe that he used it in that way. His penetrating analyses of the soundness of various kinds of reasoning that consisted in an evaluation of the chances they provide for leading us to the truth should not be seen as attempts at a definition of soundness. Rather, they were meant as a kind of pre-selection of the best candidates for scientific methods.

I am afraid that the way in which Peirce presented his ideas was often unfortunate. Not that Peirce failed to articulate himself in a clear manner, though various parts of his writings are not easily intelligible. What I have in mind is that Peirce tended to settle the matters he discussed in an authoritarian manner, to impose his views on the reader, rather than confronting him through an unbiased dispute with alternative ones. And perhaps, contrary to the spirit of his philosophical system, he seemed to believe that he alone was able to discover truth, though – according to his own doctrine – truth is what might be established only through the long social process of scientific investigations. This might explain why he classified some methods as scientific but failed to present arguments that would sufficiently support his view.

On second thought, however, there may be something deeply unjust in my accusing Peirce of an authoritarian attitude. His style was marked by a continual search for the ultimate solution, and in doing so he made use of several approaches and numerous variations of his ideas. Does not that prove that doubt, critical re-examination, and dissatisfaction with the results

achieved were typical of his work? Surely it does. And of course, one who keeps this in mind, would treat the authoritarian style of Peirce's writings as a disguise, or a rhetoric figure, rather than a manifestation of a genuine trait of the great thinker.

On the other hand Peirce rightly insisted that we must trust the faculties by which we acquire our knowledge as well as we must trust our ability to judge things properly. Scepticism, if overdone, hinders the growth of science, and thus, if we care for its progress, we are bound to uncritically accept some views as well as some methods applied in science. A point of discussion might be whether the "uncritical acceptance" suggested by Peirce should be understood as an acceptance that would block once and for all waiving the accepted view. I doubt this. 'Uncritical acceptance' must not be interpreted as dogmatic acceptance. Certainly, Peirce would agree that we should be prepared to give up any view, if by chance we discover a good reason to do so.

6. The final issue I want to comment upon concerns the relationship between the Peircean and the Aristotelian conception of truth. At first glance, these two conceptions are either inconsistent or incomparable or – if one prefers a more fashionable terminology – incommensurable.

Actually, I do believe that no keen student of the issue can think about truth without vacillating between the Aristotelian and the Peircean idea of truth. These two conceptions are complementary in a rather substantial sense. As Peirce believed himself and as it follows from the virtualistic interpretation of his view on the subject, his conception of truth is hardly intelligible without the hypothesis regarding the existence of objective reality. But if so, the question arises regarding the correspondence between reality and language, which, as we know from Tarski, is the central question regarding the Aristotelian theory of truth. On the other hand, in order to make the idea of objective reality intelligible, we must assume that, in one way or another, reality is accessible to us. But this in turn raises the question of the adequacy of the methods which make this reality accessible. Surely, whatever we know about objective reality, must be known through our methods of inquiry.

In spite of rather substantial metaphysical difference between the Peircean and the Aristotelian conceptions of truth, and more particularly, in spite of the fact that (under the Peircean terminology) the former is realistic while the latter is nominalistic, the two doctrines do not differ essentially unless the Aristotelian conception is paired with the belief that there is a reality inaccessible to us, i.e., a reality of which we cannot learn nothing. Indeed, if whatever exists can be learned, then reality may be defined in function of appropriately selected methods of inquiry. And in this way the Aristotelian and the Peircean views may be reduced one to the other.

But even if there should be an inaccessible reality, there still is a version of the correspondence conception of truth that is pragmatically (i.e., under the Peircean doctrine of pragmatism) equivalent to the conception of Peirce. I mean the version according to which a statement about an empirically inaccessible reality has no truth-value. In fact, this was exactly the conception of truth put forward by Kotarbiński, on which Łukasiewicz based his idea of three-valued logic. Now, from the Peircean point of view, inaccessibility of some part of reality is pragmatically equivalent to the fact that some questions are not decidable by scientific methods. The belief that such questions may exist motivated Peirce's criticism of the Law of Excluded Middle. Somewhat incorrectly this fact has been occasionally interpreted as an indication that Peirce was a precursor of three-valued logic.

7. The above discussed questions concerning the scientific method, and the relevance of those questions for the notion of truth belong to the area of investigations that, under the Peircean terminology, is covered by the term 'logic.' The way in which Peirce related logic to other philosophical disciplines, ethics and esthetics in particular, is well known. It may be of some interest to notice that Peirce was not alone in viewing truth as an ethical value. A very closely related position on the matter was held by Łukasiewicz. In fact, it seems to be held – at least implicitly – by anyone who, like Peirce, believes that the search for truth is the ultimate aim of scientific activity. For, if so, then truth becomes a kind of goodness scientists try to achieve. This may be an old-fashioned, not to say romantic idea of science, but one which perhaps we ought to try to keep alive.

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REASON, WILL AND BELIEF: INSIGHTS FROM DUNS SCOTUS AND C.S. PEIRCE

GORDON E. WHITNEY

This paper seeks to describe Peirce's explanation of man's widespread belief in God apart from special written revelation. In letters to William James, Peirce calls this belief "true theism" (Perry 1936:2.435; *CP* 8.262).

Peirce was well versed in the history of philosophy and criticized prior and contemporary writers for various defects which separated them from his position. However, he designated Duns Scotus (1266-1308) and Friedrich Schiller (1759-1805) as writers who made a favorable impression on him (*N* 2:151; *CP* 5.47n.; 6.328; 8.11; *PW* 77).

In scholasticism the soul was believed to possess two distinct faculties: intellect and will. While this may reflect a primitive psychology, the respective faculties were not viewed as physically distinct. Descartes *(The Passions of the Soul)* regarded human passions as "modes of the thinking substance" and listed the key passions as admiration, love, hate, desire, happiness and sadness. Spinoza refined this list giving priority to desire, happiness and sadness. Other emotions he derived from these under specific conditions. For Leibniz, man's soul as a monad, possesses perception, appetite and spontaneity. In man, these become thought, will and freedom, all operating through reason. These three writers are said to hold a "Rational Psychology."

Peirce, using his system of phenomenological categories, classified these three lines of thought as philosophies in which laws (thirdness) and events (secondness) were included but which omitted feeling and intuition (firstness) (*CP* 5.47n.). Barrett (Barrett 1984), who traced modern analytic thought back to Descartes, associates this school of thought with a loss of interest in the individual, the soul, and a theistic God who loves and is loved. Philosophers who emphasized experience, will, freedom, intuition, sentiment and feeling, tended to oppose this "Rational Psychology." Scotus, Schiller and Peirce are clearly in this group. Peirce held traditional beliefs about the soul and its faculties (feeling, volition, cognition) to be a useful model for understanding human nature. In his reviews for the *Nation* he wrote for a broad but educated audience. In this context he presented informal arguments against novel solutions to these old problems. He often noted such writers tended to ignore the continuity of testimony found in the history of philosophy (*N* 2:98;

G. Debrock and M. Hulswit (eds.), Living Doubt, 137–150.

2:202; 3:187). He also was serious when he asserted the abiding significance of possessing religious faith "like that of a little child" (*N* 1:29). D. Orange has further developed this theme from Peirce manuscript resources (Orange 1984:22,23). In the *Nation* he often opposed the merger of science and religion, holding that this method would always achieve its results at the expense of religion (*N* 1:28; 1:89; 1:178).

Peirce's underlying criticism was that the philosophic doctrine of the soul, although vague, had been around for a long time, and that any innovator would need to show that his proposed model of reality was superior to the traditional views. Peirce's views on religion must be considered against the background of his doctrine of a community tending towards the truth in the long run (*CP* 5.357; 8.12).

Since Peirce made contributions in so many different fields, a student of his work may be tempted to ignore Peirce's "traditional theism" and favor insights derived from the other themes he developed. But, in his "Neglected Argument," Peirce, seemingly aware that this might happen, issued a warning to such students when saying that, if you choose such a position "it will not give me a high opinion of your intelligence" (*CP* 6.465).

1 John Duns Scotus – Divine 'Quidditas:' The Limit of Natural Theology

Although Aquinas has long been the "approved" philosopher of the Catholic Church, and therefore his work has been the object of extensive scholarly research, there is a rising tide of interest in Scotus, that seems destined to elevate the latter to a second place of honor in Catholic thought (Ryan and Bonansea 1965; Balić 1967; Brown 1984; Wolter 1987). Peirce was unique in his early identification of the abiding significance of Scotus. This may partly explain the surge of interest in the American philosopher from the side of Catholic scholarship (Potter 1973; Saint-Maurice 1965:346).

While Thomas closely followed Aristotle both in his separation of devotion from knowledge and, more importantly, in his reliance upon reason, Scotus remained thoroughly loyal to the scholastic tradition of Augustine in his emphasis on the priority of the will over the intellect and in his emphasis that theology is a "practical science" the goal of which is "the love of God." The relationship between the thought of Peirce and that of Scotus may best be illustrated by considering the following topics: scholasticism, psychology, individuation, cognition, intellect and will.

1.1 The Scholastic Mind.

Scotus is not a philosopher in modern dress. His thought belongs to the scholastic world in respect of terminology, methods and issues. The direction of his inquiry is thoroughly Augustinian in that it starts from the idea that man's proper goal is the love of God. His method, however, is Aristotelian. Epistemologically, his conception of thought was fashioned after the model of visual perception: objects perceived directly within the mind were called "first intentions," while concepts derived from "first intentions" were "second intentions."

Man is capable of learning about God through *revelabilia*, things that can be revealed. Whatever can be revealed can either take the form of philosophical truths, or of *credibilia*. The latter are doctrines that are made known only through Scripture as taught by the Church (Delhaye 1960:115). The modes of activity (*habitus*) of the soul were "infused" if innate, or else "acquired" through experience when interpreted by the intellect (Harris 1927:2.2). Scotus in his *De primo principio,* considered the following attributes of God as *credibilia:* omnipotence, immensity, omnipresence, truth, justice, mercy and providence (Copleston 1952:250; Wolter 1983). The philosophic truths of God as creator, sustainer and governor of the world can be demonstrated by reason. However, personal immortality and the doctrine of predestination are possible but not rationally certain (Bonansea 1983:2,221; *Ordinatio* I,d.41, n.52).

Scotus' position regarding the role of, respectively, philosophy and theology, is midway between Anselm and William of Ockham. Whereas Anselm thought he could derive God's existence, the doctrine of Trinity and of a Divine-human Redeemer from "rational necessity" without resorting to the teaching of Scripture (Hopkins 1972:38-66). Ockham could admit as merely probable only one argument for the existence of God, and even that argument "from conserving causes" did not strictly entail the existence of a Supreme Being.

Peirce rejected Ockham's nominalism which denied the reality of "Thirdness" (natural laws). Yet, there was at least one point on which Peirce was closer to Anselm than to Scotus, because he found in his own categories an analogy of Trinity:

> As each thing has its symbol, so everything has its symbol. I mean [...] that symbol whose information is all-embracing; which signifies every fact about everything, not contingently but necessarily. As every soul of man is relative philosophy so this symbol is absolute unattainable philosophy. This [symbol] is the Creator of the World [...], a personal being for the same reason that all symbols are personal but also [...] the wellspring of all personality [...]

> [which] denotes not the contingent facts of the universe but the absolute law [...] to which the universe is subjected [...] Here, therefore, we have the divine trinity of the object, interpretant, and ground. Each fully constitutes the symbol, and yet all are essential to it. In many respects this trinity agrees with the Christian trinity; [...] The interpretant is evidently the Divine Logos or word [...] the Son of God. The ground being that, partaking of which is requisite to any communication with the Symbol corresponds in its function to the Holy Spirit. (*MS* 359)

Apart from theology, however, there are many other areas in which Peirce and Scotus have similar views. One area that is particularly fascinating concerns psychology.

1.2 Human Psychology

The suggestion that Scotus' doctrine might best be approached from the point of view of psychology dates from Harris (Harris 1927:2.249-304) and was elaborated by Devlin (Devlin 1950). If the term "psychology" be defined as "the science of mental processes, personal feelings, and human desires together with their affect on behavior," it may also encompass views which consider the relation between reason and will, and belief. Such views belong to what is usually called "faculty psychology" and which may be considered as a model in which concepts such as intellect, will, memory, sensation, cognition and behavior are closely related to each other. These concepts which derive from Aristotle's *De Anima* were well known to Scotus.

Scotus distinguishes these faculties of the soul "according to their form" but does not hold them to be separated "realities" (*realitas*) in the same way that individual souls are separated. Rather they are "little forms (*formalitas*) of the soul" acting in part as a "little person." The individual person consists of a plurality of abstract forms – vegetative, animal and human – in the order of increasing definiteness.

1.3 Being, Univocity, and Individuation.

Scotus differed with Henry of Ghent concerning the logic of predication with respect to the divine being. Contrary to Henry, Scotus held that predicates like "good" and "loving" may be applied univocally to God as well as to creatures. Moreover, in virtue of the principle of individuation (*haecceitas*), each person possesses a unique character or "little form" of humanity. This individuality is distinguished from the common nature of all persons by a principle called "formal distinction" which is discovered, not created, by the mind. It is seen to

be present in an entity as a "little form" derived from the respective common nature. Similarly, Scotus considers the will of a person as a "little form" as distinct from the common nature of volition shared by all persons. Thus, the will is an operational entity within the soul, but it is not a entity separate from it. Furthermore, a person is determined by a series of contractions of the various common natures which it possesses (Bonansea 1983:232; Wolter 1965:45).

This doctrine differs sharply from that of Ockham who rejected the formal distinction made by Scotus, and once remarked that the relationship between the constituents of a person was "as much a mystery as the Trinity itself" (Wolter 1965:45). For the same reason, Ockham rejected "faculty psychology."

1.4 Cognition

Augustine's theory of cognition based on divine illumination (*Sermon* 43.7,9; Muller 1985:86) was rejected by Scotus who appealed instead to intuitive knowledge of first principles. Scotus tried to justify this in part by referring to Augustine himself:

> That Augustine (*De Trinitate* Bk.12, Chap. 14) is speaking of eternal reasons that are really in God is proved by the fact that he says in the same passage that it is the privilege of the few to attain them. For he would not say this if he were speaking of first principles, since the latter are not the privilege of the few but [of] the many; inasmuch as first principles are common and known to all. (Wolter 1962:97-98)

In one key passage, Scotus summarizes the scholastic position on cognition:

> Where any object of science is concerned, beyond (*citra*) intuitive knowledge, it is possible to have abstractive knowledge that is most distinct; Now God as such is an object of some science.
>
> Therefore, beyond intuitive knowledge of Him it is possible to have a most distinct knowledge [...] that does not put one outside the pilgrim state, and yet would include virtually and evidently all necessary truths about God. (*Quodlibetal Questions* VII, a.2 §§19-23)

In "Intuitive Cognition," the object apprehended is present to the mind and really exists, while in "Abstract Cognition" the object may be either real or imaginary. Intuitive Cognition has a three-fold function: It provides (1) the certitude that objects actually exist; (2) the ability to pass judgment on contingent propositions; and (3) self-awareness of mental acts (Wood 1982:214).

But it was John Major (1469-1550), not Scotus, who held that believers are able to experience God intuitively when he "speaks to our soul" through some special inspiration (Wolter 1987:515).

1.5 Intellect and Will.

Within the soul there are two "little forms," the intellect and the will. Each has in part the operational power of the soul except that the will is superior because (a) it has true freedom, (b) it commands the intellect as its inferior, and (c) it acts to resolve issues of morality which are of greater significance than the difference between knowledge and ignorance. This hierarchy had been proposed earlier by William of Auvergne:

> In the human soul, the will is king, the intellect is his counselor, while the inferior powers of sensation and appetite are his servants. (Harris 1927:2.50)

Wolter (Wolter 1986) has gathered from the Scotus corpus a long series of texts which illustrate the principles of operation of the will when it acts according to "right reasons." These principles may be summarized in five points: (1) The will as a rational faculty controls thought and resists coercion. (2) The will depends on the affections of self-interest and justice to guide its choices. (3) The will determines the nature, source, and degrees of moral goodness and conformity to divine will. (4) The will is the seat of moral virtues and the fruits of the spirit. (5) The will acts in accordance with both acquired and infused knowledge in expressing love of neighbor, God and self.

In short, the will controls belief because it is free to utilize elements of intuition, experience, sentiment, sensation, memory, reason, and appetites as the basis for the behavior of a person. When it comes to the knowledge of God as it reveals itself in natural theology, that knowledge extends to God's external-nature (*quidditas*) only, not to His personal-nature (*haecceitas*) which is known through theology but not philosophy. In Protestant scholastic theology, *quidditas* was retained as a synonym for "essence" (Muller 1985:256). Peirce may be seen as standing in this tradition. But he improves upon it. This was noted by E. C. Moore:

> What Peirce meant by a habit of behavior, basically is what the scholastics meant by a quiddity and Peirce's terminology has the advantage of indicating the essential nature in a way that makes it amenable to study and observation. (Haas 1964:131)

2 *Schiller: Pure-Play, Freedom Leading Form and Matter to Beauty*

Peirce's use of Pure-Play (*CP* 6.458,465) may have been suggested by Schiller's *Spieltrieb*. Schiller's gift was creative writing – Peirce called him "the famous poet" (*CP* 5.402 n.3). Schiller made his contributions under the shadow of Kant and Goethe. In that world of thought, the soul or mind of the person was regarded as consisting of the faculties of intellect (*Vernunft*) and sensuousness (*Sinnlichkeit*). Kant and Goethe had a different point of view on the issue of artistic freedom and aesthetic appreciation. Kant assigned these to the intellect, while Goethe emphasized sensuousness. Schiller was dissatisfied with both positions, so he proposed a third entity between intellect and sensuousness, called *Spieltrieb,* "the impulse towards play." Similarly, he chose to speak of intellect and sensuousness in terms of, respectively, a *Formtrieb*, "the impulse towards reason" and *Stofftrieb* or the "impulse towards matter or limitation" (Letter 19). The German terms "Form" and "Stoff" are related to Aristotle's *morphê* and *hulê* (Latin: *forma, materia*). Schiller identified "Formtrieb" as the impulse to formulate laws, especially moral laws and the law of the state; "Stoff" he identified as the law of nature to the extent that it imposes demands on the individual.[1] Schiller sees history as the process in which man becomes gradually educated by passing through three stages: (1) obedience to natural law; (2) freedom to enjoy beauty; (3) obedience to moral law.

Peirce studied Schiller's letters when he was 18 and wrote a brief reaction. The emphasis in his notes is on Letter 11 (one of the synthesis letters), where Schiller explores the tension between "Person and Condition." Peirce noted that for Schiller, the "sensuous impulse" (*sinnlicher Trieb*) arises from Condition and that the "formal" comes from Person. He also noted that, by observing beauty, one "places the mind in a state of infinite determinabless" which gives "perfect freedom" and is fruitful for both knowledge and morality (*W* 1.10-12; *PW* 77).

In Letter 14, Schiller discusses the tensions that arise when we relate to a particular person only according to one of the impulses – the impulse of Reason or the impulse of Sensuousness – and then shows the advantage when both work in harmony: "[when] a man [...] has enlisted our affection and gained our respect [...] we begin to love him–that is, [we] play at once with

[1]Schiller presented his position in the form of "Letters." Snell (1954:1-20) has a useful introduction to these letters in which he divides them in two ways: as to date, early/late, and as to theme, three educational stages/artistic creation as synthesis. Of the 27 letters, Snell finds 15 to be early, and of those with a single theme, 6 to present the three-stages, while 18 present a synthesis, in the sense of, a resolution of opposition through "cancellation by combination" (*aufgehoben*).

our affection and our respect."

Schiller continues this theme in Letter 20 (note 1) when he refers to the effect of seeing inner beauty in another person:

> A man can be pleasant to us [...] he can instill respect into us [ldots] but finally, [apart from all rules of law] simply contemplating him, simply by his manifesting himself – he can please us. In this last-named character we are judging him aesthetically.

These descriptions of aesthetic appreciation of another person fit exactly Peirce's description of the emotions he experienced as one who mused on the "Creator of the three universes of experience" (*CP* 6.452-485).

Because *Spieltrieb* involves the exercise of the imagination which, as Peirce noted, may carry the mind astray. Yet, in spite of that,

> nothing but imagination can [...] supply him an inkling of the truth. He can stare stupidly at phenomena; but in the absence of imagination they will not connect themselves together in any rational way. (*CP* 1.46; cf. 1.47,383; 5.196; *MS* 310; Colapietro 1988)

Similarly, he noted that, in seeking God, it is instinct that needs to be "purified by meditation" (*CP* 5.496); that thoughts about God will produce "awe mingled with love" (*CP* 6.515); that walking alone at night produced "circumstances favorable to calm meditation [which] allows instinct to speak" (*CP* 6.501); and that such meditation could be called "attractive fancy" (*PW* 77; *CP* 6.465).

Peirce often employs a style which gently hides his sense of humor, and tends to poke fun at his opponents by making their arguments look ridiculous. He also makes this playfulness explicit: "a bit of fun helps thought and tends to keep it pragmatical" (*CP* 5.71); "there is an attitude of spirit that is separated only by a sword blade from fun, and yet is in full harmony with all that is spiritual and even hungers for that which is devotional" (*MS* 280:23; cf. *CP* 6.485). Those who were not his opponents also saw him in this light. In an exchange with Lady Welby he wrote: "I am [...] sending a photograph [...] I have that eternal look of preaching [...] which must be a *trait of mine,* though nobody can *detest it* more than I" (*PW* 59). Now Welby had never met Peirce and what she saw in this photograph was only what she already knew of his character and style only from his writing, and thus her innocent but candid reply: I only see in the photograph "a sense of what are fine and deep things married to a sense of fun" (*PW* 61). Could it be that Schiller or his influence during Peirce's years at Harvard set the tone for his philosophical style?

3 Peirce: Semeiotic Man, Image of a Lovable, Anthropomorphic God

3.1 Peirce's "Neglected Argument for the Reality of God."

The paper entitled "Neglected Argument for the Reality of God" (1908, henceforth N.A.). is Peirce's final public statement on traditional theism (*CP* 6.452-485; Peirce's N.A. is basically a meditation on his Three Universes of experience: (1) mere Ideas, (2) Brute Actuality of Things & Facts, and (3) everything whose being consists in the active power to establish connections between different objects [...] everything which is essentially a Sign (*CP* 6.455; cf. 8.374,376; *PW* 81). These three categories appear wherever Peirce deals with metaphysics. He likened them to the "outer, the inner and the logical worlds" of F. E. Abbot (*CP* 8.299) and later called them "Instinct, Experience and Form" (*CP* 8.374). They may be compared to Pascal's Heart, Instinct and Principles (Pascal 1941:§281). Peirce also identified the outer world with action-reaction and matter, the inner with feeling and consciousness (*CP* 6.268). With these Universes in mind, Peirce pictures the process of meditation:

> Enter your skiff of Musement, push off into the lake of thought [...] awake to what is about or within you, and open conversation with yourself; for such is all meditation. (*CP* 6.461)

Peirce makes a methodological distinction between an "Argument" as "tending to produce a definite belief," and "Argumentation" which only proceeds upon "definitely formulated premises." He is seeking to establish an Argument for God's Reality, which (1) will be obvious to all; (2) have as its conclusion: (a) direct application to life, and (b) nutrition for man's highest growth (*CP* 6.457).

The contemplation he envisages is pure play of the mind, which he compares with aesthetic contemplation or distant castle building, consists in considering one of the three universes or the connections between them. On the other hand, the inquiry must be conducted "in scientific singleness of heart" (cf. *CP* 6.493 for the heart as "a perceptive organ").

The result of such successful Musement will be an appreciation of the beauty of the idea of God's reality ... to the point of earnestly loving and adoring Him and so to shape the conduct of one's life. More specifically, Peirce insists that conducting one's life according to a hypothesis is what is in effect "believing in that hypothesis" (*CP* 6.427). A number of contemporary thinkers have favorably commented on this exceptional paper (Smith 1952; Thompson 1953:141-151; Davis 1972; Trammel 1972; Clarke 1978; Martin 1979; Rohatyn 1982; Orange 1984; Potter 1973).

In the N.A. Peirce does not spell out how his meditation on the "Three Universes" brings him to the suggested conclusion, but his line of thought may be easily inferred from his theory of signs. Human thought exists only by virtue of signs. In other words, thinking is *semeiosis* in which the mind by analysis of a sign determines its associated object, its interpretant, and the relations that are implied by the triad. Semeiosis may go through three stages which progressively determine sense, meaning, and *significance* (*PW* 110; Welby's terms) which is the "soul of the sign." All conscious human experience is a series of semeiotic steps, where experience is assigned significance through instinct and through reason based on patterns of inference.

Only living organisms make use of semeiosis. Of these, man alone is able to assign to experience its highest significance. Man is a social animal; and communities of investigators tend to carry out studies whose results converge. Furthermore, man is a creature prone to form habits so that knowledge fully interpreted results in new habits of action or of thought (*CP* 5.314; 6.267,268,322,344; 8.299,332).

As a communicating animal, man is himself a living sign; each of his creative productions is also a sign and has the character of a "little person" (*CP* 6.289). Signs are the basis of all knowledge and of the growth of knowledge: "a sign is something by knowing which we know something more" (*CP* 8.332). Since semeiotic man thinks by assigning meaning, he is bound by habit to assign some ultimate meaning and purpose to the universe. Seen in this way, the universe has meaning as a sign of the Creator's Reality; and the Creator as a living being, though higher than man, cannot be conceived otherwise than as "vaguely like a man" (*CP* 5.47 n.1,119,536; 8.262; *MS* 284).

This process of thought is not a formal argumentation but it does serve to establish a working hypothesis and one which is so attractive to man as to encourage him to model his behavior on it until possible further refinement is obtained (*CP* 1.618; 2.24; 6.497; 8.138 n.; PW 72).

Hartshorne (1941) has noted that this process of Musement does not answer the question "Does God exist?" but rather "What is God like?" From this point of view, the most interesting part of the N.A. is the conclusions it draws as to what kind of a God this is (cf. *CP* 6.268).

3.2 The Pragmaticism of a Theist.

Peirce opposed those whose philosophy allowed them to ignore the significance of the human sentiment:

> What is sentimentalism? [...] [A] doctrine that great respect should be paid to the natural judgments of the sensible heart.

> [...] [c]onsider whether to contemn it is not of all blasphemies the most degrading. (*CP* 6.292)

Peirce also provided some insight on prayer from the point of view of a Theist: "True prayer is putting oneself into an attitude of receptivity, of readiness to be loved and eagerness to learn the truth" (*MS* 434; cf. *CP* 6.515). Peirce compares spiritual prayer to a child getting "up on its father's knee and ask to be loved," while mechanical prayer is likened to the request of a child "to take it away from a certain school which the father must already know [...] to be an unfit place" (*MS* 359).

Not only did Peirce give advice to others about the practical side of Theism but he seems to consistently have made these principles his own. In two different letters to William James he wrote at a time of deep personal disappointment and distress:

> My only comfort is in religion. I am a theist – not a pagan like you. [...] [Others] have no religion at all. They are wretched atheists with no ideals. The true theist's God is balm to the Heart. It comforts one for one's own shortcomings (*MS* L224).

And again:

> It is a happy thing that my responsibility ends, and that the matter of summer school [...] is in the hands of the Author of all thought. [...] I was suffering the agonies [and] some lesser woes [...] But simply setting down these few points of [...] true theism has brought me a joy that already begins to reduce the pain. How inscrutable! (Perry 1936:2.435)

The last phrase seems drawn from the New Testament idea that "God's ways are past finding out" (Rom. 11:33). From various allusions, Peirce seems to have studied the Bible regularly but did not make its teaching directly a part of his philosophy.

3.3 Modernity and the Future of N.A.

"Modernity" in religion is a movement away from traditional dogma in the light of learning derived from modern science; in short, a departure from established religious tradition. Now if "love of God" is antique and "knowledge of God" is more progressive, then St. Thomas is more modern than Scotus or Peirce. Peirce sought to preserve the "lovable God of tradition" without sacrificing the freedom for – or the rigor of scientific investigation. He thought that opposition to traditional theism was scientifically unsound, and he considered such opposition philosophically nominalistic.

We offer one cautious prediction. In our world there is widespread intellectual opposition to traditional theism. As a result the defenders of theism may join forces to form a community of inquirers. When and if such a community forms, it will probably find suitable arguments more easily in Scotus than in St. Thomas, more in Pascal (Pascal 1941:§§76-79,281,282,432) than in Descartes, and more in Peirce than in "Process Thought." Any innovative concept of deity is really a new religion and, just possibly, man may already have sufficient choices.

Pascal's famous dictum about the "reasons of the heart" (Pascal 1941:§277) may be restated using the concepts of Peirce's N.A.:

> The intuitions of the heart yield a probable hypothesis which serves as an "Argument" for the Reality of God suited to guide the affairs of one's life, a conclusion not available through "Formal Argumentation" alone.

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PEIRCE AND DESCARTES

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My purpose in this paper is not merely to provide a historical analysis of the difference between Peirce and Descartes, but to show how present-day interpretations of Peirce's semeiotic fail to do justice to his most basic insights. In the last 50 years or so, Peirce has been frequently mentioned and quoted. The renaissance of Peirce studies is caused to a large extent by the great popularity of his semeiotic. Yet, it must be pointed out that the present view of Peirce as it is presented in numerous semeiotic studies seriously misconstrues the original sense of Peirce's concepts and theories. Without going into all the details, I would like to argue that the main difference between Peirce and his so-called followers is related to the question of the opposition between realism and nominalism, between objectivism and transcendentalism, between logic and naive experience.

All of modern philosophy since Descartes up to the present time has been primarily nominalistic and subjectivistic. As a result, Peirce is often read through the prism of this nominalistic climate and is reconstructed in the spirit of subjectivisitic transcendentalism, or of simple naive empiricism. In particular, his semeiotic is read so as to fit into empirical or historical studies of cultures and customs. Such a reduction of a theoretical discipline to a tool to be used in applied studies ultimately results in a negation of the theoretical meaning of semeiotic. While Peirce's semeiotic which he conceived as the organon of thought, is independent of any empirical generalizations and is purely theoretical, many of his superficial interpreters incorporate it into their literary studies which are often dominated by a modern anti-logocentrism which is the antipode of Peirce's rationalism and contradicts his notion of semeiotic as the "grammar of thought." Semeiotic interpretation which, in the eyes of Peirce, is a purely logical operation becomes mixed with the subjectivistic, frequently irrational belief that interpretation is synonymous with the expression of one's own mind and individual feelings. Such an approach is in total disagreement with Peirce's "interpretant" which is a sign that stands in a formal relation to another sign. For Peirce, the relation of interpretation is defined by the "grammar of thought" rather than by a reader of signs.

Because Descartes is the founder of modern thought, there is probably no better way to show how much Peirce differs from the modern tempera-

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ment, than by showing how profoundly his philosophy differs from that of the seventeenth French philosopher.

Criticism of Descartes is the leit-motive of Peirce's philosophy. This criticism is present in Peirce's theory of inquiry, in his concept of doubt and belief, and in his semeiotic. Peirce criticizes in Descartes above all the idea of methodic doubt. The central question of his polemical writings is methodological: logic and intuition are confronted as two opposite methods. To the Cartesian ideal of clarity and distinctness of idea Peirce opposes the logical analysis of continuous thought-signs, and claims that "logic shall teach us [...] how to make our ideas clear" (*CP* 5.393). Peirce rejects doubt as a method of searching for self-evident primary cognition. The whole notion of certainty, intuition and self-evident foundations, which is crucial for the Cartesian transcendental tradition, is alien to him. Peirce's thoughts on the matter are not restricted to the two articles in which he explicitly argues against the Cartesian position; they constitute the core of what makes Peirce's name a symbol of the philosophical method that is the opposite of transcendental subjectivism.

First of all, Peirce asserts that doubting cannot be the first step of reasoning. "There is every reason to suppose that belief came first and the power of doubting long after" (*MS* 288:16). The refutation of methodic doubt forms the basis of Peirce's idea of inquiry. The basic problem of inquiry is to generate belief, not doubt. Belief comes first; doubt is meaningful only in as much as it is related to a concrete belief. Doubt is no longer an instrument that leads to the *Cogito*, but it is simply a method of partial verification of cognition. Doubt is a dissatisfaction with concrete belief. It is always particular, never general; it is not a formal methodological principle, but a concrete question. Another reason for rejecting methodic doubt is, for Peirce, the fact that no certain ground for cognition can be gained from it. There simply is no absolute foundation of knowledge.

Peirce's next step consists in his criticism of self-evident intuition and self-knowledge. He rejects the Cartesian notion of clear and distinct idea. "There is no such thing as an absolutely detached idea. It would be no idea at all. For an idea is itself a continuous system" (*MS* 439:34). And: "... it is a fundamental mistake to suppose that an idea which stands isolated can be otherwise than perfectly blind" (*CP* 4.71). From this criticism emerges the doctrine of the continuity of cognition. The idea of continuity is the opposite of that of an absolute beginning. Synechism is a form of criticism of Descartes. The notion of continuity primarily expresses that no single idea has any meaning by itself. Self-evident intuition is impossible. Peirce defines intuition in terms of the lack of continuity: intuition is "a cognition not determined by a previous cognition of the same object" (*CP* 5.231). Instead of searching for a primordial cognition "we must begin with all prejudices which we actually have" (*CP* 5.265). There

is always something taken for granted. The ideal of presuppositionlessness is false. Thinking is a continuous process:

> We see thoughts determining and causing other thoughts, and a chain of reasoning or of association is produced. But the beginning and the end of this chain, are not directly perceived. (*CP* 7.337)

The sense of continuity is also presented by Peirce as a unity of belief and doubt:

> ... belief is a rule for action, the application of which involves further doubt and further thought, at the same time that it is a stopping-place, it is also a new starting-point place for thought. (*CP* 5.397)

The idea of continuity finds its culmination in semeiotic.

Another form of opposition to the Cartesian methodology is to be found in Peirce's doctrine of critical common-sensism. It asserts, on the one hand, the indispensable existence of some presuppositions (primordial truths and instincts), and claims, on the other hand, that there are no indubitable truths. All presuppositions are questionable. This common-sensism is echoed in Peirce's doctrine of fallibilism, which is also directed against Descartes. It shows that the idea of absolute certainty is futile.

Thus, methodological polemics constitute the core of Peirce's criticism of Cartesianism. However, his refutation of transcendental subjectivism also carries an ontological dimension. For Peirce, thought is neither an act of consciousness nor, of course, a thinking substance. Thought is a sign. And by virtue of its being a sign, thought is Thirdness, i.e., it is a relation independent of human mind. The notion of thought-sign implies a clear negation of the Cartesian *Cogito*. Peirce accuses Descartes of attributing to "the human mind the miraculous power of originating a category of thought ..." (*CP* 5.63).

There is yet another moment which shows Peirce's belonging to the anti-subjective trend in philosophy, viz. his interest in medieval logic and his sympathy for scholastic realism: he likes to call himself a "Scotistic realist." Indeed, Peirce considered nominalism to be one of the greatest mistakes of modern philosophy. He also saw a clear link between nominalism and subjectivism. Both were the main targets of his criticism. He considered both doctrines to disagree with logic and modern science. According to Peirce, science makes sense only if there are ideal objects or, in his words, "objective generalities." Otherwise, science would deal with mere fictions, not realities, and that would contradict its very nature. Thus Peirce claimed that, contrary to Kant's transcendental theory according to which science is a subjective

synthesis, "modern science is realistic" (*CP* 4.1). Indeed it was in the name of science and logic, neither of which deals in objectless fictions, that Peirce opted for realism and against nominalism. His main plan was to defeat nominalism. This partly explains his sympathy for scholastic realism and medieval logic, which he considered to be a great achievement of philosophy. One of his attempts at defeating nominalism was through the logic of relatives (*CP* 4.2). According to Peirce, the logic of relatives regards "the form of relation in all its generality" (*CP* 4.5), and subsequently it is to be understood as a proof of realism. Realism claims that "laws and general types are not figments of the mind but they are real" (*CP* 1.16).

Anti-Cartesianism and Scotistic realism mark all of Peirce's philosophy: they define its meaning as a significant bastion against modern subjectivism in its broadest sense, including transcendentalism and nominalism. This anti-subjectivism is also a leading feature of Peirce's positive philosophy, i.e., of his semeiotic and pragmatism.

In what follows I shall focus my analysis on the anti-transcendental sense of Peirce's semeiotic.

Peirce was a rationalist, but his rationalism differed from Cartesian rationalism in that it was based on logic rather than on evident insight. In this sense Peirce was a forerunner of 20th Century thought, when logic made a crucial impact on philosophy. The concept of thought-sign is the basis of Peirce's rationalism. It implies that thought is a continuous system organized by logic. The rules of the system, i.e., formal grammar which is "the very grammar of thought" (*CP* 4.127), constitutes rationality. This grammar is presented by semeiotic. Thus, semeiotic is the organon of Peircean rationalism. It is not a form of empirical knowledge about human thinking, but a rigorous science of signs grounded on the ontology of the triad.

Peirce's philosophy *is* an ontology of the triad. His theory of categories is intended as a full theory of being. Categories, according to Peirce, are not subjective concepts produced by the mind and imposed on being, but they are moments of being itself; they say how being is, what things are. In his words, they are "objective generalities." The categories of Firstness, Secondness and Thirdness encompass all the necessary and non-reducible features of being. Triad is an ideal object, which combines in itself all categories.

The ontology of triad emphasizes the crucial characteristics of being, such as mediation, continuity, self-reproduction and infinity. Mediation expresses what it is to be a triad: it represents the dynamic internal relationship between categories.

In Peirce's philosophy ontology (or as he calls it: phenomenology) clearly precedes epistemology. It also has precedence over the methodology of science, for any fruitful methodology must be grounded in ontology. Here again is a

doctrine that emphasizes Peirce's anti-transcendental approach.

Semeiotic, i.e., the theory of signs, is based on the ontology of triad. A sign is a triadic relation of vehicle, object and interpretant. As such, therefore, a sign is an ideal object, it is a relation of mediation. But although all signs are triads, not every triad (*representamina*) is a sign. Ontologically speaking, however, there is no significant difference between them, for both are mediating relations.

Thus there is in Peirce a sort of identity between his theory of categories and his semeiotic as a grammar of thought. The core of the sign as triad is the interpretant which both interprets and is interpreted. These two functions are necessarily united in the triadic sign. This explains the mediating function of the triadic sign. A semeiotic mediation functions as interpretation: i.e., every sign interprets another sign or, in other words, every sign translates itself into other signs. A single sign is but a moment in a continuous process of semeiosis. Because a triadic sign necessarily generates new signs as it itself was generated by signs, there is an endless continuity of interpretation.

In Peirce's semeiotic, interpretation is a way of being of signs. Sign and interpretation are equi-primordial. The relation between sign and interpretation is therefore circular in a sense, for neither one of them is first, and neither one can be by itself. In other words, no sign is self-evident; its meaning is revealed only by another sign. Consequently, no sign is possible except within a context of interpreting signs.

For Peirce, every semeiotic interpretation is thus a mediation of triad, i.e., it is a Thirdness (or "objective relation") with an inner necessity. This necessity is related to the fact that a sign interprets another sign according to the principles of the "grammar of thought." Thus, interpretation is not an external operation made on signs, or, more precisely, it is *not* a subjective act of the understanding performed by the mind. This implies a non-subjective sense of interpretation. In this respect, Peirce frequently emphasized that semeiotic analyzes *how signs are affecting other signs* without any relation to mind. Semeiosis is a logical process, not a mental one, and interpretation is a formal relation between signs, rather than a subjective act of mind. Thus, Peirce's semeiotic introduces the conception of interpretation without subject. In this sense, Peirce's notion of interpretation implies yet another form of rejecting Cartesianism.

Peirce's pragmatic maxim is, quite simply, a logical consequence of semeiotic. And thus it too is part of Peirce's anti-subjectivistic program. Pragmatism is "a certain maxim of logic" (*CP* 5.14). According to this maxim, the meaning of a concept consists in rational conduct implied by the concept itself. The ultimate meaning of thought is a habit of action. Habit of action is another form of Thirdness, i.e., another form of objective generality. Far from

making the interpretation subjective, the translation of a sign into a habit of action simply reveals some general relations and brings the agent within the realm of Thirdness, or necessity. Pragmatism does not make Peirce's philosophy subjective.

All in all, it is ironic that 100 years after Peirce so radically criticized Descartes, his own philosophy is now so often interpreted as if it were subjectivistic. In this respect, it has been the merit of Max Bense's *Basistheorie* to go against the stream, by pointing out that semeiotic is a rigorous science exactly in the sense which Peirce gave to that expression.

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PEIRCE AND BOLZANO

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1 *Introduction*

Like Peirce, whom he preceded by roughly half a century, Bernard Bolzano (1781-1848), the brilliant mathematician, logician and semiotician who taught and wrote in Prague, was little recognized in his lifetime. Like Peirce, he endured persecution for his uncompromising attitudes, in his case both in science and political-religious life: also Bolzano's teaching career, like Peirce's, was cut short, in Bolzano's case because of official displeasure of the Vatican and the Vienna court over his resolute and unwavering liberalism in religious, social and political matters and towards the relation of Czechs and Germans in the Bohemian crownlands of the Austro-Hungarian monarchy. Bolzano's principal scientific contribution was, like Peirce's, in the area of mathematics and logic; and Bolzano's logic, like Peirce's, contained major contributions to semiotics, which Bolzano called the theory of signs (*Zeichenlehre*) and *Semiotik,* though Bolzano's *Zeichenlehre* was certainly not as comprehensive and systematic as Peirce's semeiotic. Unlike Peirce, Bolzano is known primarily to logicians and to specialists in Catholic theology, while his semiotics has received relatively little attention. Although his fundamental semiotic work, his four-volume *Wissenschaftslehre* (henceforth WL) (Bolzano 1837), did see publication during its author's lifetime, it had to appear abroad since Bolzano, for political reasons, was not allowed to publish within the boundaries of the Austro-Hungarian monarchy, and thus negotiations for the publication of WL had to be carried on in secret by friends who acted as middlemen, and for a long time it was thought that the work would have to be published anonymously (Winter 1969:98-100). Even when a publisher was finally found in Germany and the work was finally printed, it elicited few serious reviews and sold so poorly that the publisher was forced to try to increase sales by offering a prize for the best scientific answer to Bolzano's theories (Winter 1969:100). Up to the present, there exists, at least to my knowledge, only one monograph dedicated specifically to his WL, a German *Habilitationsschrift,* published in 1937 (Scholz 1936/37). While the bibliography of writings on Bolzano is rich (Winter 1972), little has been written specifically on his semiotics. Bolzano is frequently mentioned as an importance precursor of Prague semiotics (Steiner

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& Volek 1978:207-210), and he certainly was a major influence on the work of Josef Durdík, professor of Aesthetics at Prague University and one of the predecessors of Otakar Zich and Jan Mukařovský in that chair.

Some of Bolzano's most significant semiotic texts have been republished in recent years by the Bense-Walther semiotics group in West Germany, and Max Bense has also written an evaluation of Bolzano's work as logician (Bense 1950). In 1971, Elisabeth Walther published a selection of some of Bolzano's semiotic theories, and provided it with a useful preface in which she presented a brief outline of Bolzano's semiotics and also contributed some comments on parallels between Bolzano and Peirce (Walther 1971); and in 1989, the German journal *Semiosis*, published by the Bense-Walther group in Stuttgart, published a photographic facsimile of three paragraphs of the fourth volume of WL (Bolzano 1837:§§637-39) which contains Bolzano's semiotic pragmatics, so far not treated anywhere in print except for a brief resumé by Walther (Walther 1971:13-18).

The philosophical roots of Bolzano's logic-semiotic must be sought in the work of Leibnitz, in fact, he has been called the Leibnitz of Bohemia (Durdík 1881:9); and there exists a small literature on the Leibnitzian influence on Bolzano including an essay by the Czech philosopher Jan Patočka (cf.Daněk 1965a, 1965b, 1970; Patočka 1958). Of course the Stoics and St. Augustine were also important influences. It is thus not surprising, because of the common intellectual ancestry of Bolzano and Peirce, that some striking parallels exist in the semiotico-logical theories of both scholars. Peirce apparently had heard of Bolzano but had not read his work. There are only scant references to Bolzano's work in Peirce's published papers. In one of them (*CP* 6.175) Peirce referred to Bolzano's *Paradoxien des Unendlichen* (1951), which he seems not to have read, and praised Bolzano's definition of *equality in multitude.* He mistakenly identified Bolzano as a Catholic priest from "Buda-Pesth" (*sic*), mentioned him as the

> ... author of *Paradoxia of the Infinite* and of a treatise on Logic in four volumes [...] [clearly a reference to WL, TGW]. In one or the other of these he certainly laid the foundations of the great modern *exact logic of quantity* .... (*CP* 6.175)

But in the same text Peirce confessed: "I have never seen either work." Peirce then speculated that it was for Bolzano's furtherance of logic that the Catholic church had visited punishment upon him, which is only partially correct.

2 *Bolzano's Sign System and Its Relation to Peirce's*

2.1 *Introduction*

I refer here only to those writings of Bolzano which deal relatively directly with semiotics. These writings are contained in two main parts of WL, namely in Volume 3, §§285 and 334-35, and in Volume 7, §§637-989. The paragraphs from the third volume, which are the ones republished in the Walthers project, deal with definitions and the fundaments of Bolzano's teachings about his sign theory (*Zeichenlehre*), including a sign taxonomy as well as some comments on the use of signs, thus pragmatics. The material contained in vol. 4 (WL 4.637-989.500-596) is of a very different kind. As the title indicates ("Zeichenlehre, oder von den, in einem Lehrbuch theils vorzuschlagenden theils zu gebrauchenden Zeichen" [The Doctrine of Signs, or about those Signs which are both proposed for a Textbook, and to be used in a Textbook]), the main concern of Bolzano in this part was the pragmatic and pedagogical use of signs or, as he put it, the investigation of signs which should be used in textbooks and how they should be utilized for the best pedagogic results.

2.2 *Bolzano's Definitions of the Sign.*

Bolzano began his consideration of signs with a chapter entitled "Designation of Our Ideas" (Bezeichnung unserer Vorstellungen), containing important definitions. It starts by saying:

> It is peculiar to our mind that interconnected ideas mutually renew each other. As a result, we use certain ideas which cannot be called up in order to produce in us and in others related ideas, more difficult to call up. An object which we use for this purpose, that is through whose idea we wish to see another idea related to it renewed in a thinking being, we call a *sign*. (WL 3:285.67)[1]

The sign was thus for Bolzano, as it was for Peirce, simply a method of translation, a path from sign to interpretant. Bolzano's sign is a concrete entity that is directed at an interlocutor, in whom, through interconnected ideas, it brings up a meaning. This common theme of Bolzano and Peirce reflects

[1]Die Eigenheit unseres Gemütes, nach der sich Vorstellungen, die miteinander einmal verbunden sind, wechselseitig wieder erneuern, gibt dazu Anlass, das wir gewisse Vorstellungen, welche sich nicht hervorbringen lassen (*sic*), als Mittel gebrauchen, um durch Erzeugung desselben andere, die schwerer herbeizuschaffen wären, aber mit jenen verknüpft sind, bald in uns selbst, bald auch in Anderen zu erzeugen. Ein Gegenstand, dessen wir uns zu einem solchen Zwecke bedienen, d.h. durch dessen Vorstellung wir eine andere in einem denkenden Wesen mit ihr verknüpfte Vorstellung erneuert wissen wollen, heisst für uns ein Zeichen.

the Augustinian tradition. Bolzano's sign that creates a certain effect upon the mind of the receiver of the sign suggests Peirce's expansion of the Augustinian definition of the sign, according to which the sign stands for someone for something under certain conditions. Peirce's sign evokes as an effect the interpretant in the mind of the thinking subject who interprets it. Thus, for Peirce, a sign represents an object only in as far as it is interpreted by its receiver. Peirce's interpretant is paralleled here in Bolzano's definition, especially in the notion of the related ideas produced in the receiver's mind by the sign. Unlike Saussure, but very much like Peirce, Bolzano's interest was in the *effect, purpose, function* of the sign. His system is thus, like Peirce's, a basically functional, teleological one, a view which later was to be developed fruitfully by the linguistics, semiotics and aesthetics of the Prague Linguistic Circle, certainly partly under the influence of Bolzano's thought, for Bolzano was very much part of the Czech scientific tradition out of which the Prague school grew.

Bolzano spoke of specific ways in which the sign signifies:

> The objective idea whose corresponding subjective idea is to be stimulated by the idea of the sign, we call the *signified* idea, or the sign's *meaning*. If the signified idea is the idea of a thing, we sometimes call the sign's *object* the *signified object* of the sign or the *meaning* of the sign. Of equal value as the word meaning are sometimes also the words *sense* and *understanding*. But one could make a difference between *meaning* on the one hand and *sense* and *understanding* on the other. Namely that we call the *meaning* of a sign only that idea for the awakening of which the sign was predetermined, and which, indeed, it usually does awaken. *Sense* or *understanding* is designated that idea which in a given case we intend to awaken. (WL 3.285.67)[2]

Meaning is thus in Bolzano's system some sort of basic cultural and conventional use of a sign (the idea which the sign was predetermined to awaken and which it usually does awaken). Here we may note certain elements of Peirce's dynamic object, which motivates the sign to select some characteristic object

[2]Die objektive Vorstellung, deren entsprechende subjektive durch die Vorstellung des Zeichens angeregt werden soll, heisst die *bezeichnete* Vorstellung, auch die *Bedeutung* des Zeichens. Ist die bezeichnete Vorstellung eine Gegenstandvorstellung, so pflegt man zuweilen auch ihren *Gegenstand* selbst den *bezeichneten*, oder die *Bedeutung* des Zeichens zu nennen. Gleichgeltend mit dem Worte: Bedeutung gebrauchen wir zuweil auch die Worte: *Sinn* und *Verstand*. Doch liese sich zwischen jenem und diesem ein unterschied machen; so zwar, dass *Bedeutung* eines Zeichens nur diejenige Vorstellung hiesse, zu deren Erweckung es bereits bestimmt ist, die es auch in der Tat zu erwecken pflegt; *Sinn* oder *Verstand* desselben aber diejenige, deren Erweckung wir in einem einzelnen Falle damit beabsichtigen.

from among the possible ones, and of Peirce's ground which stands for the object through an idea relevant to that object, as well as Peirce's interpretants, from the potentiality of being interpreted (the immediate interpretant) to the dynamic interpretant (the effect of the interpretant on the interpreter during the act of interpretation), and the logical interpretant (the full meaning of the sign when it is fully interpreted). While Bolzano did not make similar distinctions, there is a hint of different types of interpretants also in Bolzano's theory. Thus Bolzano's sign, which is concrete and palpable, does not refer directly to an object, but rather to a mental process (*bezeichnete Vorstellung* = designated idea) which it evokes. But the issue is unclear in Bolzano, one might even say that Bolzano contradicted himself. For he did not clearly distinguish, as did Peirce, between idea and object. That is, an abstract sign was sometimes called an object, rather than an idea about an object. Bolzano's sign can thus evoke a mental concept, an idea, similar to Peirce's interpretant, but it can also elicit an object directly, the object itself becoming its meaning. In those cases where the sign evokes an idea, that is not a thing, the sign evokes ideas "related" to it (the German *verknüpft* implies an intertwining), thus again a concept comparable to the interpretant. But Bolzano did not go to the next step which was Peirce's great contribution, namely to say that once such an idea is produced, it becomes itself a new sign, leading continuously to new interpretants.

Bolzano's distinction between the sense of the sign (*Sinn* and *Verstand*), that is its meaning in a specific situation, and the sign's actual meaning (*Bedeutung*), that is the idea for the awakening of which the sign is predetermined, (zur deren Erweckung es [the sign] bereits bestimmt ist), seems to suggest something iconic or universal as opposed to something arbitrary and specific.

We find contradictory statements by Bolzano also concerning the degree of openness of the interpretation of the sign, the whole issue of polysemy which was so strong a part of Peirce's system through the notion of unending semiosis. On the one hand, Bolzano made it clear that he saw a one-to-one relation between sign and meaning, a pure monosemic predetermination of the sign. He actually spoke of correct and incorrect meanings, in the sense of absolute significations:

> To examine certain signs with the aim of inferring from them the ideas which their originator wished to awaken in us, means to *read* them in the broadest meaning of the term. To truly understand from them the idea which their originator wished to awaken, means to *understand.* To imagine incorrectly that they have this or that meaning, while in reality they have another meaning, means to

misunderstand them. (WL 3.285.67-68)[3]

On the other hand, we can detect a certain suggestion of Peirce's polysemy in Bolzano's view that a sign has not only a principal meaning but also secondary meanings, which he called *Nebenvorstellungen.* Bolzano distinguished strong and weak secondary meanings, and pure (*rein*) and harmful (*schädlich*) ideas evoked through the sign, the latter being ideas which have detrimental influence on the receiver's judgement (WL 3.285.72). While this view concedes a certain plurivocality of the sign, this is done in the framework of normative views and the idea that certain meanings are somehow morally better than others. Of course Peirce did not evaluate in terms of ethical values but rather in terms of his philosophy of science, that is the valorization of increase in knowledge.

Bolzano divided signs into two classes. The first class is identified only by two examples: smoke as a sign of fire, and blushing, as "a (not quite certain) sign of guilt" (WL 3.285.74n).

> If we call smoke a sign of fire and blushing a sign of guilt, we say only that the smoking of a body or the blushing of a person is a quality from which we infer the existence of another quality, namely the burning of an object or a guilty conscience; we consider the former qualities as signs of the latter. (WL 3.285.75n)[4]

Bolzano distinguished the signs of the type of smoke or blushing from other signs by calling them *Kennzeichen* (WL 3.285.76n), a word which means distinguishing marks, a meaning close to that of indexicality.

Bolzano sharply delineated *Kennzeichen* from his second class that approximates Peirce's symbol, that is a word to which a culture has apportioned a certain meaning. Here Bolzano's example is the word God which "is in the German language a sign of the idea of a being of virtual reality" (WL 3.285.74n); we would say today that it is a sign by virtue of a cultural convention, the German language. Bolzano's system thus has only two sign classes, roughly corresponding to Peirce's index and symbol. While Bolzano did write about

[3]Gegebene Zeichen zu betrachten, um zu entnehmen, welche Vorstellungen der Urheber derselben in uns habe wecken wollen, heisst sie *lesen* in der weitesten Bedeutung. Aus ihnen wirklich zu entnehmen welche Vorstellung ihr Urheber habe hervorbringen wollen, heisst sie *verstehen.* Sich fälschlich einbilden, dass sie diesen oder jenen Sinn hatten, während sie doch einen anderen haben, heisset sie *misverstehen.*

[4]Wenn man den Rauch ein Zeichen des Feuers, oder das Erröten ein Zeichen der Schuld nennt: so will man nur sagen, dass das Rauchen eines Körpers oder das Erröten einer Person eine Beschaffenheit sei, aus deren Wahrnemung wir auf das Darsein einer anderen Beschaffenheit, nämlich das Brennen des Gegenstandes oder das schuldige Bewusstsein schliessen können; und man betrachtet die ersteren Beschaffenheiten als Zeichen der letzteren.

metaphor (cf. *infra*), Bolzano's taxonomy displays no sign type paralleling Peirce's icon.

Bolzano further distinguished universal signs (*allgemein geltendes Zeichen*) which are used by all humans under all circumstances, and specific signs, used only within a given culture (... nur bei enigen Menschen, z.B. nur bei einem gewissen Volke gebraucht.) (WL 3.285.68). Here Bolzano, like Peirce, seems to distinguish signs which are related to their object naturally, and signs which are imputed through culture. What seems particularly important here is Bolzano's view of the role of culture in the production and interpretation of his specific signs, which seem to correspond to Peirce's symbols. This idea was later to be fundamental to the Prague school while, as we know, specific cultural contexts played little role in Peirce's work. Bolzano began thus the tradition of the emphasis on cultural context of semiosis which was to become so important in the work of the Prague Linguistic Circle and later the Moscow-Tartu school of semiotics.

Foreseeing nonverbal semiotics and the problem of the relation of nature to culture, but frequently probably ascribing to nature what is culture, Bolzano further distinguished between natural and accidental signs (*natürliche und zufällige Zeichen*) and arbitrary signs (*willkürliche Zeichen*) (WL 3.285.68). The natural sign seems to be simply an involuntary bodily sign (Bolzano's example is the wringing of one's hand as a sign of despair). The arbitrary sign finds its cause in circumstances which do not occur everywhere (*nicht überall stattfindende Umstände*). Bolzano's examples for this sign type are the gesture of threatening someone by shaking ones finger at him and the thumb up or thumb down sign at the Roman gladiator games which determined whether the defeated gladiator had to die or not.

2.3 Macrosigns

Bolzano distinguished between particular signs, that is signs which consist of a single idea, and macrosigns, that is signs which refer to composite ideas, such as "ideas of complete sentences" ("*Vorstellungen, welche aus anderen zusammengestezt sind, z.B. Vorstellungen von ganzen Sätzen*") (WL 3.285.69). We see here an early suggestion of going beyond the individual sign to the sign text. Bolzano described the sequentiality of linear macrosigns, as for instance the construction of a sentence in natural language, were the proper microsign is placed next to another microsign until the entire meaning is revealed. Bolzano called such a macrosign a composite sign (*zusammengesetztes Zeichen*) (WL 3.285.70). Such macrosigns can be as large as a sentence or they can even be a larger unit; or again a composite sign may be a word which is composed of units of a lower level. ("Ein solches einzelne (*sic.*) Wort oder Zeichen kann

übrigens noch bald einfach, bald zusammengestezt heissen" [such a single word or sign can by the way sometimes be called simple, sometimes composite]) (WL 3.285.70). From the ensuing text it is clear that Bolzano was not thinking of such lower elements as phonemes, rather he was considering composite words of the type of "tigertulip" (*Tigertulpe*). While Peirce also wrote about signs that are larger than a single sign, describing the syntactical rules that determine their composition (conventional rules) (*CP* 2.280, cf. also Jakobson 1977:1028), Bolzano here clearly anticipated another inhabitant of Prague, the linguist Vilém Mathesius (1882-1945), professor of English at the Charles University in Prague in the 1920s and 30s and founder of the Prague Linguistic Circle, whose work on the structure of the sentence and of larger units (cf. Winner 1989) inspired the work of the Prague structural semioticians on the semiotics of texts that developed later into the text theory of the Moscow-Tartu School of semiotics (cf.Winner and Portis-Winner 1976; Winner 1977). Bolzano was a pioneer in the investigation of the semiotic character of signs that are larger than the word, leading to the examination of the semiotics of concrete texts.

2.4 Metaphor and Metonymy

Bolzano also discussed what he calls the metaphoric and metonymic aspects of the utilization of signs. He distinguished between two uses of the sign: Its use in its actual meaning (*eigentliche Bedeutung*) and its use in an indirect or borrowed meaning (*uneigentliche oder entlehnte Bedeutung*) (WL 3.285.71). A sign can be used in its indirect or borrowed meaning (Bolzano's examples are here the German metaphoric use of the word monkey [*Affe*] used for a person and the term "fox" to designate King Herod in Luke 10,13.) In both cases, it is the context that makes it clear that the indirect meaning (*die tropische Bedeutung*) is to be chosen in interpreting the sign. When the indirect meaning of the sign is close to the "original" meaning Bolzano called it a *metonymic* use, but he did not specify what he meant by "original meaning" and what this semantic proximity entails. About the metaphoric use of the sign, Bolzano said only that the close connection between sign and secondary meaning is absent (WL 3.285.71-72). This view of the two primary tropes, metaphoricity and metonymy, seems to distinguish semiliteral metaphors from more ambiguous ones, rather than metonyms from metaphors. Bolzano's designation of the first type as metonym only vaguely parallels the contemporary use of these terms but does suggest Peirce's interest in iconicity.

2.5 Autocommunication

For Peirce internal communication was focal, preceding all communication with the "other." Bolzano also advanced an inner-dialogic view of the sign when he wrote (WL 3.285.73-74) that even when we think to ourselves without intending to communicate our thoughts to others, we "almost always" utilize signs. In a footnote Bolzano modified this "almost always" by saying (using language as the prime example of a sign system) that "our thinking without language would be a very uncertain thing," particularly when we think about complex ideas (*zusammengestezte Vorstellungen*) (WL 3.285.78n). But thinking by signs is a strictly human characteristic. Beings who are above man, like God, do not need signs, and neither do animals (WL 3.285.80n).

3 Bolzano's Pragmatics and its Relation to Peirce's Pragmaticism

By far the largest portion of Bolzano's work on semiotics is his *Zeichenlehre* proper, also called *Semiotik*, contained in volume four of WL, where it covers paragraphs 637-698. The spirit of this part of WL is pragmatic in the Peircean sense, but it is also often rather rigidly pedagogic and normatively prescriptive. Yet this, the largest part of Bolzano's sign theory, and the only one actually so named, contains elements which can be of interest in our quest of points of contact between the semiotic thought of Bolzano and Peirce.

The *Zeichenlehre* is divided into two main parts: part one considers the use of signs for a textbook (*Lehrbuch*), and part two consists of rules for the use of signs somewhat in the spirit of a rhetoric (cf. WL 4.637.500), all based on the premise that only through a "correct" use of appropriate signs can scientific errors (*Irrthümer*) be avoided (WL 4.637.500). Here Bolzano developed criteria for the proper choice of signs, where the most important touchstone is that of comprehensibility, followed by such principles as certainty, ease of memorization, recall and location (*Auffindung*), and finally agreeability of the sign as the least important demand (WL 4.639.503). Bolzano then distinguished two principal types of signs to be used in a textbook: those that enable the reader to speak about the concept at hand (that is spoken signs) and those that help him to put his thoughts about the subject into writing (WL 4.640.504-505). Signs chosen for oral use must not be entirely capriciously selected, for instance the author must avoid neologisms, and he must avoid choosing loanwords from a foreign language from a nation from which the reader "would consider it a shame to learn." Finally the word must sound well in the context with the other signs chosen, it must not "insult the ear" (WL 4.642.5.507). The choice of the right sign will facilitate its comprehension and effectiveness. Thus the "correct" naming of Bolzano's book, will stimulate

its true reception and comprehension.

> That the choice of a title (of my book) is not a matter of indifference must be seen by everyone who has observed how much a mere name of a thing can contribute to its winning the attention of people or, on the contrary, to its being overlooked in such a sense that one is immediately engaged for or against it. (WL 4.648.515)[5]

This view of the power of the spoken word and of language suggests a Peircean value where the individual and the word are forever fused. Here Bolzano's stress on sound is a step beyond the later Saussurean emphasis on *langue* and on writing.

The largest part of the *Zeichenlehre* is devoted to written signs (paragraphs 649-698). But here we have primarily practical advice, even though a Peircean desire for clarity of language permeates these sections. Bolzano stressed that written signs must be easily and inexpensively producible so that the textbook will not be too expensive. The font must be chosen so that the text can be easily read. He talked again about signs with plural meanings, but it is not clear whether he meant polysemic signs in the Peircean sense, or simply homonyms (elsewhere he gave the example of the German word *Thor* [modern spelling *Tor*] which can mean both gate and fool). Such polyvalent signs must not be avoided at all costs, Bolzano asserted, but they must be chosen in such a manner that the multiple meanings adherent to a sign are not too close to each other, for that would be confusing (WL 4.655.523). Bolzano wrote again about sign texts that are larger than the single sign (word), that is sentences and also larger texts. He said about the syntax of such texts that their signs (words) must be arranged in their proper order, that is both words in sentences and the sequence of sentences must be such that the connection between sign and its object is clear and not subject to doubt or misunderstanding; this sequence has to follow accepted laws and conventions, that is grammatical conventions (WL 4.598.426-27; 4.657.524-25). Turning to the spatial organization of signs, Bolzano strangely called the manner in which such signs can be combined "almost entirely arbitrary." They may be arranged spatially practically *ad libitum*, horizontally, from left to right or right to left, and vertically, from up to down or in reverse ("...ob sie von der linken zur Rechten, von Oben nach unten, oder auf die entgegengesetzte Weise gelesen werden solle, ist fast ganz willkürlich...") (WL 4.657.525). Perhaps he was thinking here of different languages, such as Hebrew of Chinese. The only important stricture is that

[5]Dass nun die Wahl eines Titels (meines Buches) nicht gleichgültig sey, wird jeder glauben, der es beobachtet hat, wie viel der blosse Name einer Sache dazu beiträgt, dass sie die Aufmerksamkeit der Menschen gewinnt oder im Gegenteil von ihnen übersehen wird, so dass man im Voraus schon für oder wider sie eingestellt ist.

signs should be arranged so that proper signs are adjacent to each other so that semantic linkages are clear. All this is followed by an enumeration of recommendations for clarity: artificial expressions and neologisms must be avoided (WL 4.661), and so should pretentious "learned" expressions used only to reinforce the impression that the author is a learned man (what would today be called "academese") (WL 4.662).

An important paragraph (673) is devoted to the discussion of the utopian dream of a universal language which would unite all people in one family. Such a universal language could either be one of the established national or classical languages (French, Latin, Greek, etc.) or it could be an artificially created one. Once such a language is established all scientific textbooks should be written in it.

The section continues with various pedagogic admonitions, how to arrange sentences, how to arrange paragraphs, how to mark the divisions of a textbook, how to form the title page of a textbook.

In general, the part called *Zeichenlehre* is primarily a pedagogic "how to" prescription for the construction of textbooks so that they serve the purpose for which they were composed.

4 Conclusion

Considering how much earlier Bolzano wrote than Peirce, we must judge of great interest his consideration of pedagogy and pragmatics as an integral part of semiotics, rather than a mere abstract theory on syntactics and formal semantics. Bolzano's interest was essentially practical: how things work, how messages can be made clear; but it also had a theoretical facet, asking questions about cultural context, the relation of nature to culture, the nature of human thought and the expression of thoughts to others and to the self, – all Peircean and contemporary semiotic preoccupations. Bolzano was an important predecessor of contemporary semiotics, anchored as that is in the Peircean thought.

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PEIRCE AND WITTGENSTEIN'S *ON CERTAINTY*

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In *On Certainty* Wittgenstein remarked "So I am trying to say something that sounds like pragmatism" (Wittgenstein 1969:422).[1] It is rather difficult to determine precisely what Wittgenstein was trying to say that sounds like pragmatism. It is even more difficult to interpret the remark that immediately follows, "Here I am being thwarted by a kind of *Weltanschauung*." No matter what Weltanschauung was thwarting him, however, Wittgenstein did say several things in *On Certainty* that sound like pragmatism. He especially said several things that sound like Peirce's pragmaticism. (My copy of *On Certainty* is littered with marginal "Cf. CSP" notes). This paper will point out some of the Peircean aspects of Wittgenstein's epistemology, exploring the similarities and differences. It will be clear that Wittgenstein was not a pragmaticist, but, coming from a radically different perspective, he did reach several conclusions similar to those of Peirce. I will not be claiming that Wittgenstein was directly influenced by Peirce, nor will I be looking for evidence of historical influence. Any awareness Wittgenstein had of Peirce was probably second hand, and the pragmatism he talked of was probably a very generic variety.[2]

1 What Sounds like Pragmatism

The immediate context of Wittgenstein's remark about pragmatism involves propositions like "I am in England" and "I have never been in Asia Minor." They are propositions about which he says he cannot be mistaken, although he can't rule out the possibility that some truly strange event might occur that would call them into question. Further, these propositions were not "worked out;" they are not reached by any kind of inferential process. "Our memories tell us" these things are true. So we have what appear to be empirical

[1]Further references to Wittgenstein 1969 will be made as follows: "OC n" where "OC" refers to *On Certainty* and "n" to the paragraph number.

[2]On the historical issue, see Bambrough (1981). The one connection between Peirce and Wittgenstein is apparently F. P. Ramsey who was familiar with Peirce's works and may well have discussed them with Wittgenstein. Bambrough's essay points out a large number of striking similarities between Peirce and Wittgenstein. He pays little attention, however, to the issues I will be focusing on in this paper.

G. Debrock and M. Hulswit (eds.), Living Doubt, 171–186.

propositions which are not necessary truths, which are groundless, and about which we cannot be mistaken (OC 419). Even though he cannot be making a mistake, Wittgenstein adds that this does not mean he is infallible about the matter (OC 425). The idea that we should not doubt propositions which are such that everything counts for them and nothing against them is reminiscent of pragmatism in general. The additional claim, that we *cannot* doubt these propositions is reminiscent of the pragmaticism and Critical Common-sensism of Peirce. Peirce too held that there are empirical propositions that are both fallible and indubitable.

Wittgenstein was probably unfamiliar with this aspect of pragmat[ic]ism however, and it is probably not what he had in mind when he said he was trying to say something that sounds like pragmatism. I suspect what sounds like pragmatism lies a bit deeper. A couple of days before Wittgenstein's remark about pragmatism he was also concerned about something he was trying unsuccessfully to say. "Here I am inclined to fight windmills, because I cannot yet say the thing I really want to say" (OC 400). He went on to remark that the propositions in question, despite their empirical appearance, are unlike empirical hypotheses in that they can't simply be replaced by other propositions should they turn out to be false. He then added "und schreib getrost "Im Anfang war die Tat" (OC 402). The quote is from Goethe: "In the beginning was the deed." *That* does sound like pragmatism.

Wittgenstein was concerned with propositions of the kind G.E. Moore confidently listed as things that he knew (Moore 1925). Propositions like "the earth has existed for many years past" do seem beyond doubt, but Wittgenstein was uneasy about Moore's claim that he (and the rest of us) *knew* such things. Wittgenstein found Moore's claim to know these propositions strange because, despite their empirical appearance, they don't function like empirical hypotheses or like ordinary empirical propositions. They aren't the sort of thing that one could *not* know. If they turn out to be false, one couldn't simply substitute another hypothesis, or accept some alternative proposition. If they turn out to be false, *everything* would fall apart. It would not be only on the cognitive or theoretical level that things would fall apart. These propositions belong to the foundations of our language-games and form the basis of *action,* and "therefore" of thought (OC 411). Because they are the assumptions of all our actions, they are also the basis of thought. In the *Philosophical Investigations* Wittgenstein suggests that language-games are to be thought of as forms of life, involving actions of a non-verbal sort as well as verbal behavior. The propositions that are the foundations of our action and thought are not there because they have some infallible guarantee of truth. One can conceive of circumstances that would call them into question. But one could not overthrow them without totally disrupting one's whole life and

way of behaving.

Wittgenstein had no particular label for these propositions. He liked to say that they "stand fast." Malcolm came to label them "framework principles" (Malcolm 1975), but that term seems a bit too formal for most of the propositions, which really don't function as principles. I will simply refer to them as "certainties." Peirce, as noted, also recognized a kind of proposition with a similarly unique epistemic status. These propositions he called "indubitable." Like Wittgenstein's certainties, Peirce's indubitables do not acquire their status by virtue of having some kind of absolutely guaranteed truth. They are fallible. I wish to devote the remainder of this paper specifically to exploration of the similarities and differences between Peirce's indubitables and Wittgenstein's certainties. What we will find is that there are remarkable similarities, along with very sharp differences due to their significantly different basic philosophical outlook and methods. What they both present, however, is a challenge to some assumptions of contemporary epistemology about the need for epistemic justification.

2 *Peirce's Indubitables*

Peirce was committed to fallibilism, which committed him to the view that it is not possible "to attain absolute certainty concerning questions of fact" (*CP* 1.149). On the other hand, there are some propositions which he thought should be regarded as "practically infallible," "practical infallibility being the "only sense of the word in which *infallible* has any consistent meaning" (*CP* 1.661). "Theoretical infallibility" he characterized as "a mere jingle of words with a jangle of contradictory meanings." In this particular context, the propositions he took as practically infallible are moral beliefs of vital importance, in so far as such beliefs have the support of "hereditary instincts and traditional sentiments." The total class of indubitables contains more than deep moral convictions, however. In "Issues of Pragmaticism" (1905) three classes of indubitables are listed: perceptual judgments, original (indubitable because uncriticized) beliefs of a general and recurrent kind, and acritical inferences (*CP* 5.442). I will focus on what he calls "original beliefs," which include the deep moral convictions, in this paper since they most closely resemble Wittgensteinian certainties.

Original. Both indubitable inferences and propositions are labeled "original" and "acritical." Original beliefs are original in that one cannot, as Peirce says the lawyers say, "go beyond them." They are presumably acritical in that one does not try to go beyond them. This is what is said to make them indubitable; in some sense, they are starting points. They are not, consciously, based on any other propositions, and they are not the result of any inference

or critical inquiry. They cannot be questioned. It is not that questions are logically excluded, since it is possible that something could happen that would lead us to question, or even reject an original belief. But until some actual event leads us to doubt them, no supposed "question" will constitute genuine doubt. Any genuine question or doubt must arise from some kind of surprise, the surprise coming from an external source. We cannot create a genuine surprise by an act of will (*CP* 5.443).

Although one cannot create doubt at will, and although one cannot *really* question indubitables, Peirce also held that one cannot pronounce a belief indubitable until one has subjected it to very thorough examination. That examination might include the inventing of plans for attaining to doubt, and putting such plans into action. True indubitables must withstand such attempts at criticism (*CP* 5.451; 5.509). Thus Peirce seems to hold that indubitables are, as a matter of fact, never actually questioned, and that a proposition cannot be declared indubitable unless it has withstood questioning. I believe the inconsistency can be resolved. The process of examining alleged indubitables is not itself the creation of doubts. It is rather an attempt to see if a doubt can be created. A genuine doubt involves interference with a belief-habit (*CP* 5.510). Thus the testing of indubitables is an effort to see if the proposition/belief/habit remains unshaken through the questioning, or if some wavering occurs. Indubitables are "natural or inbred" beliefs, and "Every natural or inbred belief manifests itself in natural or inbred ways of acting, which in fact constitute it a belief-habit. [...] A true doubt of such a belief must interfere with this natural mode of acting" (*CP* 5.510). Sometimes, in the process of testing alleged indubitables, philosophers may believe they have succeeded in doubting one by finding some new behavioral manifestation for it ("perhaps by associating it with certain phrases"). What actually happens in such cases, however, is that the new behavioral pattern actually reflects the addition of some new content to the original belief. It is not actual doubt of the original belief itself. Rather, that belief, which is vague, is made more precise, and the new precise belief involves a new belief-habit. The old habits associated with the original belief remain intact. Thus to successfully doubt an alleged indubitable, one must interfere with or change the belief-habit associated with precisely *that* proposition. Peirce seems convinced this will rarely happen due to the inherent vagueness of indubitables. Peirce's insistence that a belief not be *declared* indubitable until it has withstood questioning is consistent with the possibility that there may be many indubitable beliefs which we have not questioned in any way. We just won't have declared them indubitable. Indeed, it is quite conceivable that most of our indubitable beliefs are such that we have never even framed them in propositional form. If we have, the formulation has been vague.

Vague. The vagueness of all indubitable original beliefs is a point Peirce insists on in several places (*CP* 5.498; 5.505). The vague is defined by Peirce as that to which the principle of contradiction does not apply (*CP* 5.505). This of course implies that vague propositions can be simultaneously true and false. One vague indubitable might be the proposition that fire burns (*CP* 5.498). It is both true and false, depending on how one makes it more precise, whether one is talking about oil or water, flesh or asbestos, etc. As soon as one makes the proposition more precise, one creates a new proposition which will be either true or false, but not both. The original proposition remains vague. There is a serious problem about how one can belief a proposition that is outside the law of contradiction. Peirce seems to hold (as he must) that there can be more or less vague habits of action as well as vague beliefs. At any rate, it is the vagueness of indubitables that allows them to remain indubitable through a process of rigorous examination. Doubts may be raised and resolved, but they will turn out to involve more precise propositions developed from the original vague one; the original, or a vague "residue" of it, remains untouched by doubt.

Instinctive. Peirce frequently characterized indubitables as a kind of instinct, or as like instincts, or as "inbred" or "natural" (*CP* 1.633; 5.498; 5.510). They are reflected in natural or inbred or instinctive ways of acting. Being "original" beliefs, they are not the result of inference or any kind of reasoning, at least on the part of the individual. They should not, however, be thought of as innate ideas, or as necessary truths. Peirce suggests that some of them are the result of a kind of instinctive inductive argument. At least, the "regnant system of sexual rules is an instinctive or sentimental induction summarizing the experience of all our race" (*CP* 1.633). Instinctive beliefs are (at least sometimes) the result of a kind of species-wide induction. Those beliefs that are confirmed by the experience of the human race, that enable humans, even (perhaps especially) in primitive conditions, to successfully deal with their environment and survive, become part of the instinctive heritage of all humans. Human instincts, like animal instincts, are directed chiefly toward "preservation of the stock" (*CP* 1.639). Natural beliefs enable us successfully to adapt to the environment. Indeed Peirce believed that we have a kind of natural ability or talent for imagining correct theories, without which we would never have been able to discover the beliefs that have enabled us to live successfully. Primitive humans, guessing randomly at how the forces of nature work, would never have made it except for this instinctive knowledge of the nature of physical and psychical forces. The success of the human animal leads Peirce to conclude that "it must be good reasoning to say that a given hypothesis is good [...] because it is a natural one, or one readily embraced by the human mind" (*CP* 5.592).

Hypothetical. Natural instinctive hypotheses are good; but they are hypotheses. They are hypotheses that have been so successfully confirmed by human experience that they lie beyond any immediate possibility of doubt. They rest, says Peirce, "on the total everyday experience of many generations of multitudinous populations" (*CP* 5.522). But since they are hypotheses, they are fallible, and it remains the case that some of them may turn out to be false. "While holding certain propositions to be each individually perfectly certain, we may and ought to think it likely that some one of them, if not more, is false" (*CP* 5.498).[3] One cannot question them individually, but one cannot rule out the possibility that one day something will happen surprising enough to lead us to reject something that is currently indubitable.

That the past existed, and that there exists something other than myself are things that one would expect to be among Peirce's indubitables. He once claimed that he did not know any of these things, but was "trying the hypothesis that it [the past] is real, which seems to work excellently so far" (*CP* 1.168). The suggestion is that indubitables, based on an instinctive induction, are being constantly put to the test, in so far as we continue to act on them and the success of our actions continues to confirm them. That passage also suggests that for Peirce, one cannot claim to *know* that indubitables are true. We must regard them as such, but so long as they remain hypothetical they are not known.

The instinctive induction that leads to indubitable beliefs no longer constitutes a reason for believing the proposition. There is no current conscious inference on which the belief is based, and the original one was not a genuine inductive inference for Peirce, since it could not have been "controlled." One assumes that it was of the acritical variety. The indubitable is not inferred or consciously accepted. It is simply there and remains unshaken (*CP* 5.516).

Changeable. For Peirce beliefs that are indubitable now could become dubitable tomorrow, or at least in the not too far distant future. It is less clear whether new indubitables could arise. In 1905 Peirce claimed that when he "first wrote" his "impression was that the indubitable propositions changed with a thinking man from year to year." He was now convinced that the changes are very slight from generation to generation, "though not imperceptible even in that short period" (*CP* 5.444). He further claims that we know now that "instincts can be somewhat modified in a very short time." The suggestion that changes will be slight and gradual is reinforced by the claim

[3]Peirce contends that this claim is "a striking instance of the vague's emancipation from the principle of contradiction" (*CP* 5.498n1). But the claim that some of a set of propositions that must now be regarded as certain will some day be found out to be false does not in any way require abandonment of the law of contradiction, since it does not require us to believe that some proposition is simultaneously true and false.

that "original beliefs only remain indubitable in their application to affairs that resemble those of a primitive mode of life" (*CP* 5.445). It is when old indubitables are applied to new situations that doubts may arise. New occasions may lead to the development of a derivative proposition that is more doubtful than the original, while the original belief remains intact and indubitable. The new situations may be such, however, as to call into question the original proposition itself, and render it no longer indubitable. This will happen especially as we develop "degrees of self-control" unknown to primitive humans, which lead to occasions of action in which the original beliefs have "no sufficient authority" (*CP* 5.511).

One wishes Peirce had provided more examples. Let us try to create one. Belief that nature is orderly is indubitable for Peirce, and one can easily see how that belief shows up in many of our habits. With the development of philosophy and science, attempts were made to render the instinctive belief more precise, with formulations about universal causality, or sufficient reason, or various forms of determinism. With the development of quantum physics and the uncertainty principle severe doubt was cast on many of those formulations (most of which were dubitable anyway). But the instinctive belief remains indubitable, at least in regard to our "primitive" behavior. We still act with unshaken confidence in the regularity of nature, and base our expectations on it, and have no genuine doubt that nature is orderly. That indubitable belief remains indubitable. Perhaps it could change, if something truly spontaneous and inexplicable were to occur. Other indubitables may be less secure and are more likely to be called into question.

Could the dubitable become indubitable? That is, could a new instinct arise? Peirce's close association of the indubitable with the primitive suggests that new indubitables are unlikely, since we are unlikely to become more primitive. There would have to be some kind of summary of the total experience of all of us, that has not yet been made, that would not involve any kind of controlled inference. Such an event is not impossible. It is perhaps because indubitables are closely related to primitive action hat many of them are moral convictions. Perhaps some moral convictions that have not been part of the instinctive beliefs of all humans, perhaps about racial or gender equality, could someday become instinctive. This would have happened if people no longer needed inference and evidence for such beliefs, and the beliefs were so deeply ingrained in all of us and worked so successfully that doubts could no longer arise. Perhaps such a thing could happen. However, one suspects that the changes in status of indubitable and dubitable propositions tend to be very predominantly from the indubitable to the dubitable.

True. Although some indubitables will turn out to be false, Peirce holds that it is probable that most of them are true. But if truth is defined as "that

concordance of an abstract statement with the ideal limit towards which endless investigation would tend to bring scientific belief," (*CP* 5.565) it is not clear that indubitables can be true. They cannot be the products of endless investigation, and not only because endless investigation cannot have a product. Indubitables are not the products of any investigation at all. Further, one would expect that the endless investigation will only be applied to propositions that have been made precise enough to be subject to controlled investigation. Vague indubitables won't qualify. Peirce allows that the concept of truth, as spelled out for science, works in a similar manner for morals, mathematics, and practical life. In regard to the practical,

> ... a false proposition is a proposition of which some interpretant represents that, on an occasion which it indicates, a percept will have a certain character, while the immediate perceptual judgment on that occasion is that the percept has not that character. A true proposition is a proposition belief in which would never lead to such disappointment .... (*CP* 5.569)

Indubitables then will be true if they are such that they will never produce any experiential surprises. Should we ever reach the point where endless scientific investigation has run its course, and the scientific truth is known, there will still be some indubitables. They will not have been validated by science, since they are not, as vague instincts, subject to scientific investigation. But they will have been "validated" by all our practical experience, and they will continue to guide our practical activity.

Habits. The final point to be stressed about Peirce's indubitables is that they are practical. They are beliefs and therefore they are habits of action. Action, in general, is said to be "largely a matter of instinct" (*CP* 5.499). If that action is controlled, it must be guided by instinctive beliefs. These belief habits are essential to all our action and behavior. If any of them were seriously questioned, we would be, in effect, paralyzed and rendered incapable of action. Genuine doubt of an indubitable belief would make us unable to act at all, and would have disastrous effects on our whole way of living. On Peirce's system, doubt of instinctive indubitables would be as devastating as doubt of certainties would be for Wittgenstein. It would be devastating for the same reasons in both cases. The beliefs in question are fundamentally related to our ways of acting. Indeed, for Peirce, the beliefs are our fundamental habits of action. So he can share Wittgenstein's enthusiasm for the Goethe quotation: in the beginning was the deed.

In summary, Peirce maintained that there are propositions that are empirical in character which are beyond the reach of doubt, but are not logically certain. They are ultimate premises in that they are not, for the individual,

reached as the result of any kind of reasoning, even unconscious reasoning. They are capable of withstanding active efforts to doubt them. They are vague, and when rendered more precise lead to new propositions that do not share the indubitable character. They are instinctive, although they can be said to be the result of a kind of species-wide induction, and further experience can be seen as confirming them, if one raises questions. They are hypotheses, and have the fallible nature of all hypotheses. Some of them will turn out to be false, in so far as future experiences occur that are contrary to the expectations they give us. Most of them, however, are true, in that experience is not going to produce such unexpected experiences.

One cannot take Peirce's indubitables as "foundations" of knowledge, in terms of current epistemological categories. This is because they are not ultimate premises in the sense that all other knowledge claims are ultimately derived from them. Indeed, in the area where knowledge is most self-consciously sought, science, the indubitable beliefs have little if any role to play. Science aims at greater precision. It will be the case that in science too one cannot doubt everything at once. This is because one must have a basis for action, and without beliefs there can be none. But the propositions that are, as a matter of fact, not doubted in science need not be indubitable. They *are* not doubted, for the time being. But they could be, and they could be even without the great surprise that leads indubitables to be doubted. An imaginary surprise will do. A scientific proposition may come to be doubted simply as part of the method itself.

3 Wittgenstein's Certainties

Wittgenstein would readily accept Peirce's term "practically infallible" for his certainties, and would agree with Peirce that talk of any other kind of infallibility is meaningless. There can be no genuine doubt of certainties; they do stand fast. But this does not mean that one can't imagine circumstances where they would be called into question. They have no status as absolutely certain or eternally true. In these ways they are like Peirce's original beliefs.

Certainties, however, are not expected to withstand criticism, nor are they declared to be such principles only after serious attempts to doubt them have failed. One does not make attempts to doubt them. There could be no occasion or purpose in doing so. One cannot look for reasons to support them, or question the reasons on which they are based, since they are essentially "groundless" (OC 166). Saying they are groundless is in conformity with Peirce's characterization of indubitables as ultimate premises. But Wittgenstein would certainly reject the notion of some kind of species-wide inductive argument. No reasons can be given for certainties, and they are not, in any

sense of the term, "hypotheses" (OC 52). "Here is a hand," says Wittgenstein, is not an hypothesis that is further confirmed with each day's experiences. It does look like an hypothesis, and the line between hypotheses and certainties is a narrow one; but there is a line. Certainties are not hypotheticals.

It is the fact that these propositions look so much like ordinary empirical propositions, which can be construed as hypotheses (in that they are subject to falsification by experience) that makes their precise status so mysterious. That fact is also what makes it so tempting to say that we know them with certainty. But it was precisely Moore's claim to know those propositions that bothered Wittgenstein, since it is not at all clear that we can claim to know them. The problem is not, as Peirce intimated, that the confirmation process has not yet been fully carried out. The problem is that these propositions are not the kinds of things one needs to confirm. Attempts to confirm them by experience, or claims that our experience does confirm them, reveal a misunderstanding of their purpose and status.

There is some suggestion on Wittgenstein's part that certainties function more as rules than as hypotheses (OC 98). A proposition like "Here is a hand" is not something one could test or question; but it might serve as a "rule" for testing such hypotheses as "arms are usually n times as long as hands." "Here is a hand" can help one find an appropriate object for testing. Situations can arise, however, where what is ordinarily a certainty would become an hypotheses for testing. In waking up after an accident and noticing a large bandage on the end of ones arm, "here is a hand" would be an hypothesis demanding testing. Wittgenstein uses a river/channel metaphor to try to elucidate the two kinds of "propositions of the form of empirical propositions." Some are "hardened," and serve as the channel through which the more fluid ones flow. The certainties are not exactly rules, but constitute an unquestioned backdrop against which and by means of which the fluid hypotheses are tested. But the status of the propositions is not fixed once and for all. Propositions can become hardened with time, and become part of the channel, and hard certainties can become fluid, if special conditions arise (OC 95 ff).

Here we find similarities with Peirce. Like Peirce's indubitables, Wittgenstein's certainties can change their status. But there are significant differences in the manner in which it happens. For Peirce, an indubitable becomes dubitable as the advance of knowledge creates situations in which it can no longer be applied. For Wittgenstein, certainties can become hypotheses in unusual circumstances or situations; yet one suspects they retain their status as certain in usual situations. For Peirce, it is difficult to see how a dubitable could ever become indubitable. Wittgenstein states that it can happen, but offers no example. Perhaps if an hypothesis becomes so well-confirmed that it can no longer be seen as an hypothesis then it has moved beyond doubt. For ex-

ample, that the moon is more than a few miles from us may once have been an hypothesis; now it is part of the "framework" for talking about the moon.

Wittgenstein points out that the river banks consist partly of hard rock, subject to little if any alteration, and partly of sand that is relatively easily washed away. This suggests that the line between hypotheses and certainty is a very thin one, and that many of the certainties are such only for a short time. Perhaps they can be subjected to question relatively easily. On the other hand some certainties will be rock-like and can never be seriously questioned. Peirce can allow for a similar distinction between those propositions that simply are not questioned for the time being, and those that really cannot be questioned. The latter are the true indubitables, and for Wittgenstein the rock-like propositions will be the real certainties.

Certainties, being groundless, are not based on reasons. They are not believed on the basis of inferences, nor are there reasons that could be used to support them. They "stand fast." But in standing fast, they are said to be "held fast by what lies around [them]" (OC 144). Such beliefs are always part of a system, and we begin to believe with entire systems of propositions, not with the individual components. As an example of the inter-relatedness of certainties, we can look at Moore's cluster of propositions. That the earth has existed for many years, that I have always been on or near its surface, that I have a body, that here is a hand which is part of that body, etc., are beliefs which go together to form a system. One could hardly reject any one of those beliefs and leave the rest intact. If any of them go, they all go. But it is not only other propositions that hold the certainties fast. It is also our ways of acting and what we do with the propositions. In this case, all our fundamental ways of acting in the world help to hold the whole system fast. Thus although the certainties are groundless, they are not arbitrary. In so far as they are certain, they are made certain by being integral parts of the system of thought and action they belong to. This contrasts sharply with Peirce. His indubitables also are, in a sense, groundless, in that they are not results of inference. But they are ultimately grounded in instinctive or sentimental inductions.

In addition to being groundless, they remain well confirmed hypotheses. For Wittgenstein they are simply there, as part of a system that is simply there. One suspects Wittgenstein would have had little patience with the concept of instinctive belief, even less with the concept of instinctive species-wide inductions.

The two agree in that their indubitables are part of a basic, primitive system of action in the world. But for Wittgenstein, the system is just there, we find it. For Peirce, that is too simple. We need to explain how it is that we came up with a system that works so remarkably well. That it has worked

so well is evidence that most indubitable beliefs are true. They cannot be ultimately groundless. For Wittgenstein, they must be. There can be no way to ground them.

We saw that for Peirce the bulk of indubitables are true, although it is probable that some will someday be found to be false. Wittgenstein's attitude on the question of whether certainties are true seems to be that if they aren't, then the words 'true' and 'false' will have lost their meaning. "If my name is not L.W., how can I rely on what is meant by "true" and "false"?" (OC 514-15) Of course they are true. They are, as it were, paradigm cases of truth. But Wittgenstein does not operate with as clearly defined a concept of truth as does Peirce. His comments in *On Certainty* suggest that those propositions that are part of the solid framework of a language game are true, and they do in some way operate as rules for application of a concept like "true." But there is, or at least can be, more than one language game. Each of them will have its own set of certainties. "... it seems impossible to say in any *individual* case that such-and-such must be beyond doubt if there is to be a language-game – though it is right enough to say that *as a rule* some empirical judgment or other must be beyond doubt" (OC 519). For there to be a language game, there must be certainties; but there is no one proposition that must be a certainty in any conceivable language-game. Which is to say that no proposition is absolutely true, if "absolutely true" means being a certainty in every possible language-game. If some "really unheard-of" (OC 513) things were to happen, things that forced us to abandon our certainties, we would then be forced to develop a whole new way of talking, thinking, and acting. (Wittgenstein seems to hold that we would always have the option of rejecting the unheard-of experiences and maintaining our beliefs.) But a new language-game will have new truths and falsehoods. We would not necessarily even want to say that the old beliefs were falsified by the unusual experiences. Rather a whole system for determining truth and falsity would be abandoned and replaced by a new one. The point is that for Wittgenstein the propositions beyond doubt are "true" in a very different sense than for Peirce. For Wittgenstein they are true because they are part of the supporting framework of an entire system of beliefs (language-game). For Peirce, they are built so solidly into the system because they are true.

Several times in *On Certainty* Wittgenstein presents fanciful confrontations between people from groups with fundamentally different language-games (fundamentally different in some respects; but with enough in common to enable communication). In one case he considers people who consult oracles rather than physics to guide their behavior. According to Wittgenstein, "if we call this "wrong" aren't we using our language-game as a base from which to combat theirs?" (OC 609) He goes on a bit later: "I said I would 'combat' the

other man, – but wouldn't I give him *reasons*? Certainly; but how far do they go? At the end of reasons comes *persuasion*" (OC 612). There are no rational means to settle conflicts between language-games, presumably because all criteria of rationality and truth will be internal to the respective games. It is here that Peirce would disagree profoundly. I suspect he would have no more sympathy for Wittgenstein's philosophical use of "language-game" than Wittgenstein would have for instinctive belief. For Peirce, reliance on oracles vs. reliance on physics can be put to a test; I am sure he would be greatly surprised, if the tests were carried out, if physics did not lead to many more successful predictions and many fewer frustrations and disappointments, so that the language game relying on physics would be seen to be superior. Perhaps firm believers in the oracles would have difficulty coming to see the point at first, but eventually the greater experiential satisfaction of physics would win out. The point is that physics produces more true propositions than oracles. We could give reasons for preferring physics, and would not need to rely on "persuasion."

The most fundamental difference between Peirce and Wittgenstein is found at this point. For Peirce, there is objective truth, and humans have an instinctive ability to grasp basic elements of it. For Wittgenstein there can be no truth outside a language game, and "you must bear in mind that the language-game is so to say something unpredictable. I mean: it is not based on grounds. It is not reasonable (or unreasonable). It is there – like our life" (OC 559).

4 Epistemological Upshots

The differences reflected in this differing attitude toward truth and language-games is vast. But within their differing philosophical assumptions, the two philosophers agree on a number of points that are highly important for contemporary epistemology. Both recognize "empirical" propositions that are beyond reasonable doubt. Though both seem reluctant to say that we can "know" these propositions, the propositions remain beyond doubt or question. That is as much as we could ask of propositions that we claim to "know." What Peirce and Wittgenstein agree in rejecting is the demand for some kind of grounding or foundation or rational justification for these propositions. One need not justify one's believing them by appeal to some kind of reasons, even to how well they work. They do not require justification, and believing them does not require justification. They are not necessary truths, however; their denial is not self-contradictory (although it is pointless and absurd), and there is a possibility for each proposition that it might ultimately be rejected. So both Peirce and Wittgenstein are telling us that there is no epistemic duty to restrict full belief or knowing to propositions that are self-evident or logically

derived from the self-evident. The possibility of falsehood is not a reason for doubt, and does not engender a requirement for justification.

There is a sense in which the propositions in question might be called "foundations." They are not derived from other propositions, and Peirce does use the term "ultimate premises" to represent that fact. But they are not the kind of things contemporary foundationalists are looking for. This is primarily because they do not actually work as premises from which other beliefs are rationally inferred. They may lurk in the background of reasoning, in that if they were rejected there would be no possibility of rational inference at all. But they are not premises that are used for the rational justification of other propositions. Since such premises, capable of serving as logical foundations, is what foundationalists are seeking, Peirce's indubitables and Wittgenstein's certainties will be of no use to them.

It might be thought that Wittgenstein at least seems like a coherentist, with his emphasis on a system of fundamental beliefs. But Wittgenstein's point is not to say that individual certainties are justified because of their positions in the system; it is to reject the demand for justification. Certainties don't really have any justification, and they don't need any. They provide the background against which justification can take place, but they are not themselves in need of justification.

The demand for epistemic justification in contemporary epistemology is well expressed by Laurence BonJour, who says that the core of the notion of epistemic justification is that of being epistemically responsible in one's believing. That concept is explained as follows:

> one's cognitive endeavors are epistemically justified only if and to the extent that they are aimed at this goal [truth], which means very roughly that one accepts all and only those beliefs which one has good reason to think are true. To accept a belief in the absence of such a reason, [...] one is to neglect the pursuit of truth; such acceptance is, one might say, *epistemically irresponsible.* (BonJour, 1985:8)

Both Wittgenstein and Peirce allow that there are beliefs we can, and must, accept without good reason to think they are true. At least, they would say we don't accept these beliefs because of good reasons for thinking they are true. Further, for Wittgenstein at least, and probably for Peirce, it is not simply that we don't (psychologically) base these beliefs on inferences. There aren't any propositions that would count as good reasons for the truth of certainties. Peirce, when pressed, will say that there are good reasons for believing the indubitables are (mostly) true. But those reasons have nothing to do with why we accept the propositions, and we are not in any sense irresponsible in

accepting them. Neither Peirce nor Wittgenstein would say that we accept the propositions for reasons *other* than truth, so in that way they avoid much of the sting of the charge of irresponsibility. But we don't accept them for *any* reasons.

G.E. Moore was the immediate source of Wittgenstein's reflections in *On Certainty.* He claimed to know the propositions in question, and seemed to be making a similar point in saying, in effect, that they are simply known and don't require justification. Wittgenstein was bothered by Moore's insistence on using the word "know," and I think Peirce would have been also. The point is that what we do or do not know is connected with the process of testing hypothesis that might turn out to be false. There are rules that govern the processes of coming to know and claiming to know; the certainties and the indubitables are not subject to that kind of process, and therefore are not appropriately discussed in terms of knowledge. And knowledge is not appropriately discussed in terms of the search for ultimate justifications and foundations for whatever we believe.

Contrary to BonJour, for Peirce and for Wittgenstein believing indubitables or certainties is not a cognitive activity aimed at the goal of truth, because it is not an activity with an aim at all. Both Peirce and Wittgenstein would insist that the unquestioned beliefs are true, but we don't believe them for that reason. We don't believe them, again, for any reason. We can't help but believe them. We can't help but believe them not because of our concerns for truth and our conviction that they must be true but because they are fundamental to our action. We could not live (or live doing anything) without believing them. It is action, not truth, that is fundamental. *Im Anfang war die Tat.*

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SOME POLISH CONTRIBUTIONS TO FALLIBILISM

JAN WOLEŃSKI

The most general thesis of fallibilism may be stated as (F) No beliefs are absolutely secure (Haack 1982:145). However, (F) may be supplemented by very different epistemological statements, among others: (a) anti-inductivism, (b) falsificationism, (c) the Duhem-Quine thesis (our beliefs are neither verifiable nor falsifiable), (d) conventionalism (our beliefs are based on certain conventions), (e) the view that all empirical statements are interpretative, (f) pragmatism, (g) relativism, (i) skepticism, (j) coherentism, and (k) sociologism. Each of (a)-(k) as well as other possible supplements to (F) explains that none of our beliefs are ever secure. According to (a)-(c), there are no conclusive procedures which might prove the absolute correctness of our beliefs. Conventionalism explains (F) by pointing out that, if we change some conventions, we also have to change the beliefs based on those conventions. Then, if all empirical statements are interpretative, they are correct relative to the assumed principles of interpretation; this conclusion is stated in (e). Furthermore, our beliefs are not secure because there are no absolute utilities as standards of epistemic evaluation (f) or because everything is relative (g), or because there is no knowledge at all (i), or because the coherence of systems of belief can not be established absolutely (j), or, yet again, because social contracts regarding the correctness of our beliefs may be changed (k).[1] This variety of fallibilistic epistemologies enables us to speak of various possible contributions to fallibilism even if their authors were not explicitly committed to (F). This is the case with respect to the Polish philosophy of our century. Polish philosophers made numerous contributions to fallibilism without always being inclined to defend fallibilism as a general epistemological theory; as a matter of fact, the term "fallibilism" was not used in Poland until the seventies of this century.

Historically speaking, fallibilism in Poland was not influenced by Peirce at all. Of course, Peirce was very well known in Poland as a logician, perhaps even better than in other countries. But in Poland, like in most other countries, his philosophical views were identified with a popular version of pragmatism as it had been formulated by James. Thus the present paper may be regarded

[1]Various possible additions to (F) are, of course, not mutually exclusive.

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more as a contribution to the history of fallibilism than as something strictly related to Peirce's philosophy.

My concern here is a short report on some Polish contributions to fallibilism. More precisely, I would like to concentrate on those contributions to fallibilism that were made by philosophers of the Lvov-Warsaw School. This should be explicitly stressed because I shall omit at least two very important Polish contributions to fallibilism, namely Fleck's theory of thought-styles and Chwistek's theory of the plurality of realities (Giedymin 1985).[2] On the other hand, I mention some logical ideas which may be useful in generalizations of fallibilism or in establishing its logical base. In particular, I shall discuss (1) Łukasiewicz anti-inductivism and his general theory of science, (2) Ajdukiewicz's radical conventionalism, (3) Ajdukiewicz's attempt toward extreme radical empiricism, (4) Poznański's and Wundheiler's account of truth in physics, (5) Tarski's views concerning the acceptance of scientific hypotheses, (6) Łukasiewicz's many-valued logic, and (7) some Polish works on so-called rejections and dual consequences.

1 Łukasiewicz' Anti-inductivism and General Theory of Science

Łukasiewicz regarded induction as a sort of reduction, i.e., as a reasoning in which the premises are logical consequences of its conclusion; this is the so-called inversion theory of induction proposed by Jevons and Sigwart. This theory immediately raises the problem of the justification of universal inductive generalizations from particular instances.

Łukasiewicz at first considered inductive conclusions as possible probable sentences and he saw the possibility of ascribing a degree of probability to the results of inductive reasonings (Łukasiewicz 1903). However, he then formulated an argument against any quantitative degree of probability of universal statements (Łukasiewicz 1909).[3] Assume that in order to calculate the probability of such statements we decide to use Laplace's formula $p = \frac{n+1}{n+2}$ which defines the probability of the event $n+1$ possessing the property which n events possessed. This cannot work because Laplace's formula concerns single events while we are looking for something that would be applicable to universal statements. We can appeal to a generalization of Laplace's rule, namely $p = (n+1)/(n+m+1)$, where m stands for the number of all instances covered by the generalization in question, and where n is the base of induction, i.e., the number of observed events. But m is much greater than n and

[2]Fleck's and Chwistek's views are analyzed in (Giedymin 1985). This work is also relevant for views described in the present paper. For a comprehensive treatment of the Lvov-Warsaw School see (Skolimowski 1967; Woleński 1989).

[3]For other Łukasiewicz's views considered in this section, see (Łukasiewicz 1912; 1929).

hence p is always lesser than $1/2$. More importantly however, if m increases to infinity (which holds for universal statements only), then p decreases to zero. This strictly coincides with the famous Popperian thesis: the so-called logical probability (in Carnap's sense) of universal empirical sentences is very close to zero and it cannot be strengthened by any inductive research.

Łukasiewicz completely rejected induction as a method of justifying general statements. According to him, scientists creatively look for general hypotheses in order to explain particular phenomena. Thus theories are not records of reality but creative constructions of human mind. Thus general explanatory hypotheses are the basis for deduction sentences on single events. Deduction is also an essential device in the rejection of hypotheses which are at variance with empirical data recorded by singular statements. Łukasiewicz stressed that empirical procedures are not reducible to logic, because intuition plays an important role in them. He stated his view with the help of the following metaphor: "The search for the general laws of Nature is comparable to decoding an encoded message to which we have no key" (Łukasiewicz 1929:197).

Indeed, Łukasiewicz may be regarded as an anticipator of most crucial points of Popper's fallibilism. However, there is at least one essential difference between Łukasiewicz and Popper. Contrary to Popper, Łukasiewicz held that the correctness of singular empirical statements may be established absolutely. Thus Łukasiewicz is a fallibilist with respect to general empirical statements, but he is a foundationalist when it comes to concerns singular experiential reports; his fallibilism is evidently partial.

2 *Ajdukiewicz' Radical Conventionalism*

Radical conventionalism is an epistemological view which states that:

> Of all the judgements which we accept and which accordingly constitute our entire world-picture none is unambiguously determined by experimental data; every one of them depends on the conceptual apparatus we choose to use in representing experiential data. We can choose, however, one of another conceptual apparatus which will affect our whole world picture. (Ajdukiewicz 1934a:67)

Ajdukiewicz's radical conventionalism is based on a special theory of language (Ajdukiewicz 1934b; 1935). Ajdukiewicz introduces two important distinctions, viz. the distinction between open and closed languages, and the distinction between connected and disconnected languages. A language is open if it may be enriched by new expressions without altering the meaning of its old expressions; a language which is not open is closed. A language is disconnected if it contains a class of expressions such that no expression belonging to that

class is semantically related to any expression of the language in question outside that class; a language which is not disconnected is connected. Ajdukiewicz argues that languages which are open or disconnected are logically defective and can not serve as scientific languages. Thus, a good scientific language must be both closed and connected. The class of meanings of a closed and connected language is called its conceptual apparatus. Now two conceptual apparatuses are either identical or have no common element at all. This last result is of particular importance for radical conventionalism.

Let us assume that we encounter a contradiction between statements expressed in a language in Ajdukiewicz's sense. Let us, to begin with, assume that the contradiction is question holds between an empirical hypothesis and a theoretical principle. Such contradiction may be resolved by abandoning the hypothesis without changing our original language. However, if the contradiction should hold between a principle and a statement dictated by so-called empirical rules of meaning, then, according to Ajdukiewicz, the meanings of expressions within a particular language determine rules for the acceptance of its statements. Ajdukiewicz distinguishes three kinds of such rules, namely, axiomatic, deductive and empirical rules. The rules of the first kind demand the unconditional acceptance of certain statements, for instance logical tautologies. The rules of the second kind prescribe that we should accept a certain statement on the basis of other sentences; the rules of logical inference are examples of deductive rules of meaning. Finally, empirical rules require the acceptance of certain statements in given empirical situations. The rules of meaning may be formulated for every language in which meanings are unambiguously defined, particularly so for closed and connected languages.

Now if the contradiction involves sentences that are accepted in virtue of the rules of meaning of a particular language, it can not be resolved within that same language. To resolve the contradiction, one must switch to a new language an a new conceptual apparatus which, in virtue of Ajdukiewicz's main theory, is completely different from the original one, so much so that neither one can be translated into the other. This entails some very strong epistemological theses. Specifically:

> No articulated judgement is absolutely forced on us by the data of experience. Experiential data do indeed force us to accept certain judgements if also we are based in a particular conceptual apparatus. However, if we change this conceptual apparatus, we are freed of the necessity of accepting these judgements despite the presence of the same experiential data. (Ajdukiewicz 1934a:72)

Thus, according to Ajdukiewicz, our world-pictures are essentially dependent on languages and their conceptual apparatus. What then is the main difference

between ordinary and radical conventionalism? It consists in a considerable difference of perspective regarding observation statements and interpretations of facts. According to ordinary conventionalism, the usual empirical rules (so-called primary criteria) are quite sufficient to decide which observation statements are to be accepted, whereas decisions about interpretations are made by reference to secondary criteria (conventions). Now Ajdukiewicz claims that there is no decisive difference between observation statements and interpretations because the acceptance of each and every statement is equally dependent on a given conceptual apparatus.

Finally, it should be pointed out that Ajdukiewicz's radical conventionalism is also a radical fallibilism. It connects (F) with (c), (d) and (f).

3 Ajdukiewicz's Attempt at Extreme Radical Empiricism

Even before 1939, Ajdukiewicz had come to the conclusion that radical conventionalism raised very serious difficulties. In the end he agreed that closed and connected languages were a fiction. But the rejection of closed and connected languages also resulted in the rejection of radical conventionalism. After World War II, he developed an epistemology that was intended as an interpretation of a rather extreme form of empiricism (Ajdukiewicz 1947; 1964). He defended the possibility of languages without axiomatic and deductive rules of meaning. In a language without such rules, principles of logic may be regarded as auxiliary hypotheses which are confirmed jointly with genuine empirical claims. The true consequences of empirical hypotheses may then be treated as support instances of the conjunction of those hypotheses and the logical principles that are used in a given reasoning. In the case of false consequences we may keep the principles of logic and reject the empirical hypotheses, or we may keep the empirical hypotheses and reject the assumed logic.

This view may be regarded as a generalization of fallibilism with respect to logic. Yet, while Ajdukiewicz, abandoned his radical conventionalism, he took a more foundationalist position regarding observation statements. Thus, his later views cannot be said to be radically fallibilistic in every respect.

4 Poznański's and Wundheiler's Account of Truth in Physics

Under the influence of Duhem and Bridgman, Poznański and Wundheiler developed a fairly radical version of fallibilism (Poznański 1934). In their view, no statement is justified by direct experience because every statement is related to some explicit or implicit theoretical interpretations. The classical conception of truth is useless in science. Poznański and Wundheiler argued for a theory of truth that may be described as a mixture of the coherence

theory and the consensus theory. There is no need to introduce a distinction between truth and its criteria; scientific statements are supported or not relatively to the opinions of experts and the internal consistency of scientific systems. Poznański and Wundheiler restricted the application of the axiomatic method to selected physical theories, for example theoretical mechanics. In most cases scientific theories are networks in which theoretical hypotheses are not explicitly distinguished from other statements. Because Poznański and Wundheiler think that the axiomatic structure is rather rare in science, empirical statements can be subjected neither to verification nor to falsification in the classical sense, and single hypotheses can not be falsified at all. Indeed, falsification always concerns entire theoretical systems. On the other hand, due to the network structure of theories and the fact that observation statements are burdened with theoretical presuppositions, the process of positive confirmation cannot be otherwise than cyclical and unlimited. Hence sooner or later one must refer to the criterion of *communis opinio.*

Almost every feature of Poznański's and Wundheiler's account of science is very closely related to fallibilism. They anticipated a number of views advanced in the recent philosophy of science: such as instrumentalism, methodological holism, the relativity of theories and experiences, and the role of sociological factors in accepting scientific theories.

5 *Tarski's Views concerning the Acceptance of Scientific Hypotheses*

For Tarski there is no essential difference between logic and mathematics on the one hand and empirical sciences on the other. This general view yields the following picture of science:

> I think I am ready to reject certain logical premisses (axioms) of our science in exactly the same circumstances in which I am ready to reject empirical premisses (e.g. physical hypotheses) [...]. We reject certain hypotheses or scientific theories if we notice either their inner inconsistency, or their disagreement with experience, or rather with individual statements obtained as results of certain experiences. No such experience can logically compel us to reject the theory: too many additional hypotheses (regarding the 'initial conditions', circumstances of the experiment, instruments used) are always involved. We can practically always save the theory by means of additional hypotheses [...] . Axioms of logic are of so general a nature that they are rarely affected by such experiences in special domains. However, I don't see here any difference 'of principle'; I can imagine that certain new experiences of a very

> fundamental nature make us inclined to change just some axioms of logic. And certain new developments in quantum mechanics seem clearly indicate this possibility. That we are reluctant to do so is beyond any doubts; after all, 'logical truths' are not only more general, but also much older than physical theories or even geometrical axioms. (White 1987)

Tarski's view is evidently consistent with the general claims of fallibilism. But it needs to be pointed out that Tarski does not see any real difficulty in reconciling his view about science with his semantic theory of truth. I will come back to this point in the end of the present paper.

6 Łukasiewicz's Many-valued Logic

Polish logicians have developed some ideas that may be helpful in attempts at generalizing fallibilism or in establishing its internal logic. A fallibilistic interpretation of logic was outlined by Ajdukiewicz and Tarski. Another such interpretation might find its justification in the many-valued logic that was invented by Łukasiewicz. Indeed, if we must choose from different logical systems, and if, as Łukasiewicz claimed, such choice is made by reference to experience, then even logic may not be absolutely secure.

7 Some Polish Works on so-called Rejections and Dual Consequences

Contrary to the classical view of science which emphasizes processes of assertion, every fallibilistic account of science points out that processes of rejection of statements play a very important role in scientific reasonings. Hence, the formalization of rejection is of a great interest for adherents of fallibilism. Łukasiewicz offered the first logical account of rejection. Subsequently, Słupecki and his co-workers developed the general theory of so-called rejection consequence (Słupecki 1971; 1972). Another account of rejection was recently proposed by Wójcicki in his formalization of so-called dual consequence (Wójcicki 1973). Both of these accounts formalize, semantically speaking, inferences from false premises to false conclusions or, put in another way, they formalize inferences from some rejected statements to statements which may be logically rejected on the basis of former ones.[4]

With the exception of Poznański and Wundheiler, all Polish contributions to fallibilism share one interesting feature: they all retain the classical conception of truth. This rather remarkable combination of fallibilism and the classical theory of truth was achieved by means of a very sharp distinction

[4]For an application, see (Woleński 1989).

between propositions as bearers of truth and falsity, and beliefs (judgments, convictions) as bearers of knowledge. Thus, propositions are true or false in the classical sense, but beliefs associated with them are always subject to possible revision. Perhaps this compromise is still interesting.

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PEIRCE, LAKATOS AND TRUTH

LAN ZHENG

Peirce was a great philosopher. His contributions to philosophy concerned almost every subject of philosophy. Hacking commented that "he finished almost nothing, but he began almost everything" (Hacking 1983:61). Perhaps this is why his importance and influence are being rediscovered again and again. Many contemporary philosophers take note of his insights, or, while touching – intentionally or not – upon problems which he had already frequently dealt with, go back to his works to seek instructions.

In our day, the concept of truth has faced severe challenges from several directions. Anti-realists, such as van Fraassen, totally reject the concept of truth. Some realists, like Harré, have given up the hope that truth realism can be defended. Some, like Putnam, espouse the Peircean pragmatic conception of truth. Amidst the various approaches, Hacking thought he found an interesting solution in the theory of Lakatos who, like Peirce, tried to find a surrogate for truth in the scientific method. This caught my interest because I have become convinced that, in spite of some important reservations in respect of Hacking's challenging observation, he did in fact develop a viewpoint regarding the relationship between scientific method and truth that is similar to the view of Peirce. The similarity between the positions held by two great philosophers is in itself a topic worthy of consideration.

In this paper, I shall try to explore the theories of Peirce and Lakatos regarding scientific method and truth. The first two sections will be devoted to a study of the relations between scientific method and truth in Peirce and Lakatos respectively. In the last section I shall inquire into Lakatos' and Peirce's conceptions of truth. An attempt will be made to show that Lakatos' conception of verisimilitude may indeed be a pragmatic conception of truth.

I

To start with, I agree with Hacking that Peirce tried to substitute method for truth. This unique position stemmed from his view of scientific investigation or inquiry, as he called it. For Peirce, truth is that at which inquiry aims, and inquiry is the process by which genuine doubts are overcome and firm beliefs are obtained. Doubt is an uneasy and dissatisfied state from which we struggle to free ourselves so we can attain the calm and satisfactory state of belief. As

G. Debrock and M. Hulswit (eds.), Living Doubt, 197–208.

it is a kind of mental state and the only immediate motive of inquiry, doubt has the function of stimulating our struggle to attain belief. Thus, for Peirce, the sole object of inquiry is the settlement of opinion and the attainment of belief.

If such is the sole object of inquiry, the crucial problem is that of finding the suitable method whereby beliefs can be fixed. In his famous article "The Fixation of Belief" Peirce describes three methods, respectively, the method of tenacity, the method of authority and the *a priori* method, before concluding that each of these methods fails to settle opinions and to fix beliefs because they are arbitrary and subjective. The only appropriate method of fixing beliefs therefore should be that by which our beliefs are determined, not by something human, but by some external permanence - by something upon which our thinking has no effect, but which unceasingly tends to influence thought. Such is the method of science which alone allows us to recognize the right from the wrong. Thus Peirce held that the method of science is the only appropriate method for fixing beliefs and settling opinions.

But what is the method of science? Why can it bring about, and even take the place of truth? And what did Peirce mean by the term 'truth'?

Peirce considered the notion that science is systematic knowledge totally inappropriate. For him, science is the concrete life of men who work to find out the truth by a well-considered method. By scientific method, he meant the general method of successful scientific research. According to Peirce, the first step of this method is to form a perfectly definite and consistent idea of what the problem really is, together with the attempt to develop as far as possible the mathematics of the subject in question, so that a mathematical method can be established that is appropriate to the problem at hand. The second step consists in a consideration of the logic and the methodeutic of research. The third step should be to reform the existing metaphysics. The fourth step consists in the study of the law of the relevant phenomena. Here the general order of procedure is to pick up the phenomena with alertness of observation, and to obtain clear ideas which make the new fact instantly recognizable as new. Then comes the discovery of the laws of those phenomena. It is considered, in the light of one's metaphysics, what kinds of hypotheses are worthwhile to be further investigated and, more particularly, tested. The testing of a hypothesis occurs by deducing from it consequences that are preferably as incredible as possible. When these consequences are translated into experimental predictions, it may be that the predicted results do indeed follow, or it may appear that some modification of the hypothesis is required, or, yet again, it may be that the hypothesis must be entirely abandoned. A hypothesis is not correct if it leads to an experimental result that can be refuted. A hypothesis is desirable if it is verifiable. The verification does not consist

in searching the facts for features that agree or disagree with the hypothesis, but in formulating predictions based upon the hypothesis that appear to be otherwise least likely to be true, and in establishing experiments in order to ascertain whether the events predicted do in fact occur or not. This process requires three fundamental kinds of reasoning. By retroduction, hypotheses are put forward; by deduction, consequences are derived from the hypotheses; and by induction, the hypotheses will be tested by comparing these consequences with the experimental results. This is Peirce's sketch of the method of science.

Why can the method of science bring about, or even take the place of truth? And what is truth in the Peircean sense?

As we know, Peirce considered truth as the opinion which is fated to be ultimately agreed to by all investigators, provided the method of science be used; i.e., truth is the final result of applying the scientific method by the scientific community. This thesis is unique in its correlating truth with the application of the scientific method and its idenfication of truth with the ultimate belief of inquirers. Obviously, it is an unavoidable conclusion from Peirce's premise that the method of science is the only appropriate method for establishing belief.

Peirce put foward several related arguments to vindicate his position that truth is the final opinion achieved by using the scientific method.

First, we cannot claim to have known truth unless we have known the method of knowing it, i.e., the manner in which truth is obtained. Peirce argued that truth is not something which only angels can communicate to us. If that were the case, truth would be nothing but an occult entity like a thing-in-itself, belonging to a universe totally disconnected from human intelligence. Thus, to be meaningful and comprehensible, truth must be able to be disclosed to, and expressed by, human thought. In this respect Peirce thought that Plato was quite right in saying that a true belief is not necessarily knowledge. A man may be willing to stake his life upon the truth of a doctrine which was instilled into his mind before his earliest memories without knowing at all why it is worthy of credence; and while such a faith might just as easily be attached to a gross superstition as to a noble truth, it may, by good luck, happen to be perfectly true. But, can he be said to know it? Peirce thought the answer must be a resounding 'No': "to render the word knowledge applicable to his belief, he must not only believe it [...] but must know what justifies the belief, and just WHY and HOW the justification is sufficient" (*CP* 7.49). Thus, Peirce shared the view with the ancient Greeks that the essential peculiarity of scientific knowledge consists in the method of knowing, the manner in which the truth is obtained.

Secondly, the self-correction of the scientific method ensures the final reach-

ing of truth. Peirce was convinced that reasoning tends to correct itself, not only its conclusions, but its premises as well. This feature of reasoning was praised by Peirce as the most wonderful and one of the most important philosophemes in the doctrine of science. Moreover it is to be found in all three kinds of reasoning, induction, deduction and retroduction, and it applies to all branches of science. Thus, as long as it is properly conducted and fully carried out, scientific inquiry has the vital power of self-correction and growth. No matter how erroneous our ideas may be at first, we will be forced to correct them at last. Therefore, "truth can be nothing more nor less than the last result to which the following out of this method would ultimately carry us" (*CP* 5.553).

Thirdly, the objectivity of the scientific method and the solidarity of the efforts of the members of scientific communities can guarantee that these communities reach agreement of opinion in the long run. Peirce noticed that one of the most vital factors of the scientific method is its social dimension. On the one hand, whatever a scientist recognizes as a fact of science must be open to anybody to observe, provided that he fulfills the necessary conditions. On the other hand, the scientific world is like a colony of insects in that the individual strives to produce that which he himself cannot hope to enjoy. One generation collects premises in order that a distant generation may discover what they mean. When a problem presents itself to the scientific world, a hundred men immediately set all their energies to work upon it, and make whatever contribution they can. Later generations, standing upon the shoulders of the former generations, strive a little higher, until at last the final aim is reached.

Fourthly, lessons drawn from the history of science fuel the cheerful hope that the processes of investigation, if only pushed far enough, will give one certain solution to each question to which they apply it. Peirce gave us a striking example of what he meant by referring to a lesson from the history of science, viz. the investigation of the velocity of light. Inquirers may reach the same conclusion, regardless of whether they investigate it by studying the transits of Venus and aberration of the stars; or by studying the oppositions of Mars and the eclipses of Jupiter's satellites; or by the method of Fizeau; or by that of Foucault; or by the study of the motions of the curves of Lissajoux; or by following different methods of comparing the measures of static and dynamical electricity. Peirce observed that scientists may at first obtain different results; but, as each perfects his own method and his procedures, the results are found to converge steadily toward a destined center. Thus Peirce believed that though different minds may set out with the most antagonistic views, eventually the progress of investigation would carry them by a force beyond themselves to one and the same conclusion.

Fifthly, the principle of fallibilism requires that only the final opinion

achieved by the scientific method be qualified as truth. Peirce argued that there are three things which we can never hope to attain by reasoning, viz. absolute certainty, absolute exactitude, and absolute universality. And if exactitude, certitude and universality are not to be attained by reasoning, there certainly is no other means by which they can be reached. So, "our knowledge is never absolute but always swims, as it were, in a continuum of uncertainty and of indeterminacy" (*CP* 1.171). Now, it is obvious that, if all of our present knowledge is fallible, only ultimate opinion, achieved in the end, may be called truth.

Finally: permanent reality as the object of inquiry determines that the final agreement of inquirers in respect of reality will be reached. Peirce took this as the fundamental hypothesis of the method of science:

> There are Real things, whose characters are entirely independent of our opinions about them; those Reals affect our senses according to regular laws, and, though our sensations are as different as are our relations to the objects, yet, by taking advantage of the laws of perception, we can ascertain by reasoning how things really and truly are; and any man, if he have sufficient experience and he reason enough about it, will be led to the one True conclusion. (*CP* 5.384)

Peirce made it clear in this statement that the reason why the method of science can bring about the agreement of opinions among inquirers is that the conception of reality involved in this hypothesis guarantees the external permanence which affects or might affect every man, not just one individual, so that all the inquirers can reach the same true conclusion if they have sufficient experience and if they reason enough.

Peirce realized that his identifying truth with the final result of applying the scientific method and with the ultimate opinion or belief of inquirers would be criticized as confusing the true beliefs with the false ones. This kind of criticism, Peirce argued, is groundless. For, first, as soon as a firm belief is reached, we are entirely satisfied, whether the belief be true or false. This does not mean that whatever is satisfactory is therefore true, but it does mean that truth by virtue of its being connected to other meanings such as simplicity, elegance and, of course, satisfaction etc., is co-extensive with the satisfactory in cognition. It must be noted that, by whatever is true is satisfactory, Peirce did not entail whatever is satisfactory is true. That is quite different. To say that an action or the result of an action is satisfactory is simply to say that it is congruous with the aim of that action. Now truth is defined as that which inquiry aims at. Therefore, as long as inquirers feel their inquiry has led to the aim, they are satisfied. It is this fact that happens to have made the true

and the satisfactory coextensive in cognition. Secondly, nothing beyond the reach of the sphere of our knowledge can be our object, for whatever does not affect the mind cannot be the motive for a mental effort. Therefore, the most that can be maintained is that we seek for a belief that we think to be true. This is by no means to confuse truth with subjective personal feelings.

Peirce's pragmatic conception of truth forms an interesting contrast with today's notion of truth as correspondence. It is important for us to know why Peirce did not adopt the correspondence notion of truth. It certainly was not because he was unfamiliar with the conception, but because he fully realized the difficulty involved in it. To decide whether a theory corresponds to the reality it represents requires that we know this reality before the decision regarding the correspondence may be reached. I think this is the key idea that led to his famous definition of truth and reality: "The opinion which is fated to be ultimately agreed to by all who investigate, is what we mean by the truth, and the object represented in this opinion is the real" (*CP* 5.407). The gaining of truth is guaranteed by the existence of reality, while reality is to be represented only in the final opinion. This definition ingeniously avoids the difficulty embedded in the correspondence conception of truth. Moreover, Peirce thought the correspondence notion of truth is useless, although he did not object to the formal definition. For him, science was an endless inquiry rather than a kind of systematic knowledge; and therefore, the crucial point was to find out what is the case, and how best to find out what is the case. That means we must use the scientific method. The aim and the means are tightly related to one another. Hacking was quite right when he said that Peirce tried to replace truth by the scientific method.

II

Peirce's theory of truth and scientific method was severely criticized by Lakatos as psychologism, subjectivism and historicism. It was psychologistic because it denied the existence of the third world and because it indulged in the second world of beliefs and feelings. It was subjectivist because it equated with truth as opinions and ignored the fact that different persons and communities have conflicting interests and feelings. It was historicist because it subscribed to the belief that true opinion is fated to be agreed to in the long run.

For Lakatos,

> ...the cognitive value of a theory has nothing to do with its psychological influence on people's minds. Belief, commitment, understanding are states of the human mind. But the objective, scientific value of a theory is independent of the human mind which

> creates it or understands it. Its scientific value depends only on what objective support these conjectures have in fact. (Lakatos 1978a:1)

Philosophers of science should be concerned with the objective merits of already articulated theories. They should specify a set of criteria by which the objective value of theories can be appraised so as to direct our rational choice of theories: they should inquire under what conditions a theory should be accepted or rejected. This constitutes what Lakatos called methodology or scientific method.

Lakatos' methodological rules for accepting and rejecting theories were developed mainly from Popper's ideas, and more especially from his ban on 'content-decreasing' stratagems. A hypothesis will not be allowed to be proposed, let alone accepted, unless it has novel empirical content in excess of its predecessor. That is to say, an acceptable new hypothesis must not only keep the corroborrated content of its predecessor, but it must also contain excessive consequences to be corrobarated subsequently. Upon these considerations, Lakatos proposed his system of appraisal. The basic unit of appraisal is not an isolated theory but rather a series of theories or a 'research programme.' A research programme is progressive or acceptable if it can keep producing novel predictions (theoretically progressive), and lead to the discovery of hitherto unknown facts (empirically progressive). A research programme is degenerating if it can only offer current explanations either of chance discoveries or of facts anticipated and discovered by a rival programme. The decision for rejecting a research programme is not to be based on the refutation or falsification by counter-evidence, but on the fact that it has been exceeded, and thus superseded by a rival research programme.

Roughly speaking, this is the methodology Lakatos proposed. Did he, as Hacking suggested, try to replace truth by his method? I don't think so. For Lakatos never claimed that whatever is achieved either in the long run or in the end by the scientific method is the truth. On the contrary, he condemned Peirce's long run argument as "the time-worn ad hoc stratagem of historicism" (Lakatos 1978b:238). He always carefully distinguished the progress achieved by using his methodology from truth or verisimilitude:

> In science we learn from experience not about the truth (or probability) nor about the falsity (or improbability) of "theory," but about the relative empirical progress and degeneration of scientific research programmes. (Lakatos 1978b:213)

Lakatos made it clear that his methodology was concerned with the empirical growth of science. Whether it has anything to do with truth is altogether a

different matter which we will discuss presently. The same attitude can also be seen from his characterization of his methodology which

> ... combines "instrumentalism" (or "conventionalism") with a strong empirical requirement [...] that the-well-planned-building of pigeon holes must proceed much faster than the recording of facts which are to be housed in them. As long as this requirement is met, it does not matter whether we stress the "instrumental" aspect of imaginative research programmes for finding novel facts and for making trustworthy predictions, or whether we stress the putative growing Popperian "verisimilitude" (that is, the estimated difference between the truth-content and falsity-content) of their successive versions. (Lakatos 1978a:100)

From this passage it appears that Lakatos did not identify empirical growth with verisimilitude, and that he did not seem to care about the latter as long as empirical growth continues.

But, what does empirical growth mean? Lakatos later realized that he could not avoid the problem of the epistemological significance of his methodology. The methodological rules are designed to guide our acceptance and rejection of theories. Without giving them epistemological significance, our acceptance or rejection will have no epistemological value. For we can learn nothing about the world from the pragmatic acceptance and rejection, unless we have a theory of truth and a theory of how we may recognize increasing or decreasing truth-content. Here Lakatos clearly takes truth and method as two separate things, and that is why he felt a certain relation must be established between the two. Lakatos thought that Popper's theory of verisimilitude and of the approximation of truth had provided the means for defining progress in terms of verisimilitude: a sequence of theories constitutes progress if its truth-content or verisimilitude increases. But, Lakatos argued, to recognize progress, we need an extra-methodological inductive principle which says that an increasing degree of corroboration is the sign of an increase of verisimilitude. Thereby he connects verisimilitude with corroboration, and a realist metaphysics with methodological appraisals.

But Lakatos admitted that this inductive principle is speculative, conjectural, fallible, unprovable and unreliable, because we can easily conceive of conditions that would falsify our estimate of verisimilitude by corroboration:

> The successive scientific theories may be such that each increase of truth-content could be coupled with an even larger increase in hidden falsity-content, so that the growth of science would be characterized by increasing corroboration and decreasing verisimilitude. (Lakatos 1978b:185)

It was precisely because of this reason that Lakatos always carefully avoided identifying progress with truth, and that is why what he calls progress does not necessarily mean progress towards truth.

Nevertheless, Lakatos did insist that the inductive principle is needed in order to give some epistemological significance to methodological appraisal, even though he admitted that this insistence was not based on rational grounds but was backed by mere animal belief. Thus we can see that, although he accused Peirce of appealing to objectively unestimable beliefs, although he claimed time and again that his methodological appraisals have nothing to do with beliefs, although he argued that the character of science is not rational believing but rational accepting and rejecting which should not be identified with reaching truth, Lakatos was forced to transpose his belief in the inductive principle from a methodological level to a meta-level in order to link his methodology with epistemology, and corroboration with verisimilitude. And at that point, Lakatos experienced a problem similar to that of Peirce. And it appears to me that his solution may not be any better than the solution provided by Peirce.

III

Finally, I would like to make a few additional comments on Lakatos' conception of verisimilitude and Peirce's conception of truth.

Lakatos rightly observed that 'verisimilitude' has two distinct meanings which must not be conflated. First, it may be used to mean the intuitive truthlikeness of a theory; in this sense, he held, all scientific theories created by the human mind are equally unverisimilar and 'occult.' Secondly, it may be used to mean a quasi-measure-theoretical difference between the true and false consequences of a theory. This is the sense in which Lakatos uses the term. Obviously, these two conceptions conflict with one another. For Lakatos, the former is a dangerously vague and metaphysical idea. And any confusion of the two is mistaken and misleading.

Lakatos disliked the idea of better correspondence. He thought it impossible to compare theories by their degree of approaching the truth. For example, we cannot talk as if Tarskian truth were located somewhere in a kind of metrical or at least topological space so that we can sensibly say one theory is truer than another because of its approaching more closely to the truth. Therefore Lakatos maintained that the conception of verisimilitude can only make sense in the second sense; i.e., verisimilitude, as Popper had specified, denotes the difference between the truth-content and falsity-content of a theory. The truth-content of a theory is the sum of its true consequences, and the falsity-content of the theory is the sum of its false consequences. But, by so defining 'verisimilitude' and distinguishing the conception in the first sense from the

conception in the second sense, Lakatos took a position which, he admitted, even instrumentalists would accept:

> Most "instrumentalists" are "realists" in the sense that they agree that the [Popperian] "verisimilitude" of scientific theories is likely to be growing; but they are not "realists" in the sense that they would agree that, for instance, the Einsteinian field approach is intuitively closer to the Blueprint of the Universe than the Newtonian action at a distance. The "aim of science" may then be increasing Popperian "verisimilitude," but does not have to be also increasing classical verisimilitude. (Lakatos 1978a:101)

Indeed, there is nothing in this passage that would be objectionable to instrumentalists. Everybody knows that a false proposition or theory may have true consequences. Instrumentalists do not deny this. What they object to is the possibility of a theory itself being true. Now, one of the main differences between instrumentalists and some realists is that the latter claim we can infer the truth of a theory from its true consequences, or that we can establish verisimilitude in the first sense on verisimilitude in the second sense; instrumentalists deny this. Thus, in the debate between scientific realists and anti-realists, Lakatos' position would be very dubious, even though he claimed that "scientific" theories may yet lead, in the long run, to ever more true and ever fewer false consequences, and in this strictly technical sense, may have increasing "verisimilitude" (Lakatos 1978a:100-101). This consideration arouses my suspicion that verisimilitude may be a pragmatic conception of truth. Let me make an analysis, using the means provided by Peirce.

Peirce taught us that before we can employ the method of science to determine the truth of any given proposition, we must first know what is meant by that proposition. To do this, Peirce proposed his pragmatic maxim: "Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object" (*CP* 5.402). What we mean by saying that a thing is hard amounts to the totality of the conceptions of the effects of the thing we have under certain circumstances. For our idea of anything is our idea of its sensible effects. The same applies to the conception of reality. Like any other quality, reality too consists in the peculiar sensible effects which things partaking of it produce. The only effect real things have is to excite sensations which emerge into consciousness in the form of beliefs. Our conception of reality is our conception of all the sensible effects it gives us. Now, can we determine the meaning of the 'truth' of scientific theories in the same way? I can't see why not. What do we mean when we talk about the truth in connection with a scientific theory? Let us again apply Peirce's maxim: our

idea of the truth of a theory is our idea of the truth of the propositions which are derived from the theory and are supposed to describe the sensible effects of the reality it represents. In Peirce's own words:

> ... to say that a proposition is true is to say that every interpretation of it is true. [...] Any necessary inference from a proposition is an interpretant of it. When we speak of truth and falsity, we refer to the possibility of the proposition being refuted; and this refutation (roughly speaking) takes place in but one way. Namely, an interpretant of the proposition would, if believed, produce the expectation of a certain description of percept on a certain occasion. The occasion arrives: the percept forced upon us is different. This constitutes the falsity of every proposition of which the disappointing prediction was the interpretant. [...] Thus, a false proposition is a proposition of which some interpretant represents that, on an occasion which it indicates, a percept will have a certain character, while the immediate perceptual judgment on that occasion is that the percept has not that character. A true proposition is a proposition belief in which would never lead to such disappointment so long as the proposition is not understood otherwise than it was intended. (*CP* 5.569)

From this quotation we can see that what Peirce meant by a true proposition is that all its consequences are true; and that what he meant by a false proposition is that some of its consequences are false. Peirce realized that a proposition cannot be exactly true, but the error of the proposition can be indefinitely diminished. Again in his own words:

> Truth is a character which attaches to an abstract proposition. [...] It essentially depends upon that proposition's not professing to be exactly true. But we hope that in the progress of science its error will indefinitely diminish, just as the error of 3.14159, the value given for π, will indefinitely diminish as the calculation is carried to more and more places of decimals. (*CP* 5.565)

I find Peirce's idea is extremely similar to the ideas of Popper and Lakatos in its claim that we can advance toward the ideal limit of truth by indefinitely diminishing the error, with this exception that he did not make use of the word 'verisimilitude.' Were he still alive, he might well have welcomed the concept in its Popperian sense.

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LOGICAL INTENTION AND COMPARATIVE PRINCIPLES OF EMPIRICAL LOGIC[1]

E.M. BARTH

> There is also such a thing as a general logical *intention.* (*CP* 1.609)

1 *Another Approach to "Knowledge Representation"*

In this paper I shall offer a connected set of notions by which Peirce's vague notion of *logical intention* may be freed from its context of willfulness by connecting it instead with the representation-talk of our time. I shall do this by viewing logical categories and the expressions ('particles') they stand for, as *representamens* of most general and fundamental logical intentions. I shall name these fundamental logical intentions *representational functions.*

The best way of introducing the idea of this paper probably is to start from an example. It is well known that human beings significantly restricted their power of representation, and thereby their logic, by imposing upon themselves the principle of monadic predication, which is reflected in initial scientific theory formation as well as in the Noun Phrase/Verb Phrase sentence constitution of "natural language." Every philosopher is familiar with this fact and with the results of the change in logical representational theory on this point wrought by modern science, and by Frege and Peirce. What is not generally understood is that before that change took place mankind had invented certain forms of *imaginal compensation* (or perhaps we should say: "symbolic" compensation) for this restriction. Left to itself, the restriction to monadic predication makes it impossible logically to account for the relatedness of things in this world. Reflective minds have tried to compensate for this in two quite different manners:

1. by representing relatedness in connection with negation, i.e., by giving pride of place in the theory of negation to *relative negations:* contrariety and contradiction (subcontrariety never was all that popular),

[1]The present paper may be read as a sequel to my paper (Barth 1985).

G. Debrock and M. Hulswit (eds.), Living Doubt, 209–224.

2. by representing relatedness in connection with essentialist philosophy, as in the "romantic" understanding of differential quotients in the Calculus.

By introducing and using these cognitive patterns in non-trivial thought one could feel, not entirely without justification, that one did follow modes of thought that allowed one to account for the obvious connectedness in the world and elsewhere, even though ordinary predication was taken to be a monadic (one-subject, i.e., non-relational) phenomenon. That those cognitive patterns were not optimal for the purpose of developing a theory of logical inference is another matter, albeit a serious one. I shall call the first of these two compensatory phenomena *negational relatedness* and the second *essential relatedness* or *relatedness via infinitesimal quotients.* So much at this moment for this example.

2 *Delineation of Functionally Comparable Systems and of their Associated Systems of Logic*

Human beings have problems of different *types.* Among them are problems of thought as well as of language, that I shall call *logico-intellectual problems.* Briefly, these are the problems of constructing a logic. We need not only to make observations but also to draw inferences from them. This requires a suitable cognitive apparatus and a linguistic apparatus as well. There are major differences between the various cognitive (and linguistic) apparatuses that are developed and used for logical purposes – the existence of a possible common nucleus will not be discussed here – and in so far as they do differ, they evidently are not given (innate). They have first been constructed as solutions to human problem situations, and then learned.

For the purpose of comparison of such systems[2]– sets of solutions to logico-intellectual problems – an adequate delineation of the terms of the comparison is of the greatest importance. The philosophical literature leaves much to be desired in this respect. If the delineation fails to pay attention to *intent* and *purport* of the constructors and their constructions, the latter cannot sensibly be compared at all. The relative merits of Aristotelian syllogistics, Hegelian "dialectical" logic and Fregean or modern formal logic were usually discussed as if these systems by themselves constituted functionally comparable sets of rules. On that assumption one misses out on the most interesting aspects of the human adventure of creative logical representation. The said systems are not functionally comparable.

In order to sensibly compare systems that have logical import, the systems themselves must therefore be defined along different lines. For the purpose of

[2]Here "system" is short for "system of basic representational forms with logical import."

demonstrating this it suffices to mention three broad historical systems of (cognitive and linguistic) logical representation which in the opinion of the writer are functionally comparable, being invoked as solutions of partly the same logico-intellectual problems, and to show what the comparison reveals. These systems will be called:

I. The Aristotelian system, which here by definition includes the *representational forms* of his physics and his metaphysics, and which incorporates his so-called *syllogistic* as the overt part of his philosophy of truth-conserving "deduction."

II. The extended Neoplatonic-Fichtean system, being the system of thought and argument consisting of the romantic interpretation of the so-called "infinitesimal calculus" in combination with the Neoplatonic-Fichtean theory of inference (Nelson 1970); that complex was made famous by Hegel and his followers and became influential, even dominant, in large parts of the world. We may call this system: NPF^{+}.

III. The modern system: this will be short for the system of logical representation consisting of the Cauchy-Weierstrass understanding and development of the Calculus, in combination with vector algebra (and analysis) and with post-Fregean and post-Peircean deductive inference.

These three systems, or *methods* of thought, of which there are many variants and intermediary forms, are so delineated that overall comparison and evaluation becomes a possibility. In other words, it is maintained here that the clusters sub I, II and III are adequate groupings for precisely this purpose.

3 Imaginal/Symbolic Functional Compensation

Many interesting phenomena relevant to the assessment of old and the construction of new systems of logic may be studied by comparing the sub-systems of these comprehensive systems. One of these is a phenomenon that we may call Imaginal functional compensation, or "IFC," for short. It might also be dubbed "The Durkheim-Beth Principle," on account of the perspective on human attempts at constructing modes of thought that was offered by Durkheim (Durkheim 1912) and Beth (Beth 1970:131ff). We shall attempt here to develop and elaborate their idea, or insight, so as to make it sufficiently precise in operational terms to serve us as an analytical instrument in empirical logic.

Under no circumstance should this principle be called simply a principle of "cognitive compensation." Such a vernacular would suggest that systems that

are at all comparable as to *intended functioning* are also logically equivalent, and this they certainly are not. The principle concerns the forms of reasoning and discourse that are current in a certain period in a certain (sub)culture. At this moment it is not yet possible systematically to distinguish

1. the "real" representational forms in language that the persons in a given (sub)culture inherit, and what they do with it, and to it,

from

2. what authors among them write about the representational forms they have inherited. I shall use the following terminology:

Let S_1 and S_2 be systems of *logical* representation, human or artificial, and let the variable "**f**" range over the cognitive functions for which symbolic representation is needed, or is thought to be needed. That a representational principle R is assumed in order to fulfill the function **f** in a system S_i may be abbreviated as: rep(R, **f**, S_i).

Let S_1 contain or presuppose the use of a representational category or principle R, cognitive or linguistic, that may be said to be *restrictive as compared to* some more liberal category or principle R*, or set of such, in another system S_2:

$$S_1: \begin{matrix} R \\ C \end{matrix} \qquad S_2: \quad R^*, \text{ where } rep(R^*, \mathbf{f}, S_2)$$

The letters "R" and "C" are chosen as abbreviations of "restrictive" and "compensatory," respectively. (A distinction between *categories* and *principles* here would seem to be premature).

DEF. 1. A representational principle/category C of S_1 may, from the point of view of an adherent to S_2, be said to yield (some) imaginal **f**-functional compensation for the conceptual restriction enforced by R, *iff* C is – to all "intents" and purposes – superfluous for **f**-representational purposes in S_2 and in all other systems containing R* (briefly, if C is **f**-superfluous in such systems).

We could also say (S_1, S_2 and R being as before):

Let R* be a liberalized representational principle/category of S_2. A representational principle/category of S_1 yields (a certain amount of) imaginal/symbolic compensation, as seen from the point of view of an adherent to S_2, for the absence in S_1 of R*, on the same conditions as above.

In such cases we may also say that R and C together form an *imaginal/symbolic* **f**-*equivalent* ($IE^{\mathbf{f}}$) *in* S_1 *to* R* *in* S_2. This psychological-semiotical

relation may be defined in terms of **f**-imaginal functional compensation:

DEF. 2. $<R_i, C_i, S_1 > IE^{\mathbf{f}} <R_i^*, S_2 >$ *iff* C_i yields, from the point of view of an adherent to S_2, (an, some) imaginal **f**-functional compensation for the conceptual restriction in S_1 enforced by R_i (or, for the absence of R_i in S_i).

It goes without saying that older logic systems, being as informal as they are, may contain compensating principles which have no evident *formal* counterparts that allow for a formal decision of the question of their independence of the other categories/principles of S_2. We shall therefore have to keep the notion of superfluousness (in S_2) an open notion; it is nevertheless a notion of great efficacy in the comparative understanding of human logics, and of their differing representational bases.

For the empirical study of human logics I would suggest the following heuristic principle:

Heuristic principle Let a principle/category C, taken from system S_1, be conjoined to system S_2. If this cannot be done without an increase in the dialogical and inferential opacity of S_2, then it is reasonable to assume

(a) that C mainly functions, in S_1, as an imaginal functional **f**-functional compensation for the reliance upon some **f**-restrictive principle/category R in S_1; and

(b) that C is superfluous with respect to S_2.

This last clause should not be taken to mean that we should be able to "prove" the independence of C from the categories and principles of S_2.

I do not offer this as an inductive principle of justification but rather as a heuristic principle that should lead us to the discovery of the restriction implicit in and enforced by R, and for which C offers imaginal compensation.

I shall discuss some conspicuous cases which take us towards one general methodological principle for comparative empirical logic – that of awareness of imaginal/symbolic functional compensation. Taken together with the results of applying the other principles mentioned at the outset (but not discussed in this paper), these cases amount to an inductive defense of a thesis of commensurability[3]– partial, at least – of intellectual paradigms, a thesis

[3]For a review of the French and English literature concerning the discussion of (in)commensurability, the revision of logic, the plurality of logics, and the possibility of

that I want to defend against what has become the received opinion. Most of these principles refer to two of the three systems of logical representation we delineated in Section 1.

4 The Similarity Set

The Similarity Set of logical categories will be outlined by examples.

(1) Greek geometry emphasized *congruences* and *similarities.* For that reason, as Salomon Bochner puts it,

> ... inwardly, the Euclidean Space that underlies [Newton's] *Principia* is mathematically not quite the same as the Euclidean Space that underlies Greek mathematics (and physics) from Thales to Apollonius. (Bochner 1962: 301-302)

Two thousand years later Leibniz still attempted to base a fruitful "geometry of situation" (*analysis situs*) on the relation of *congruence* of sets of points. His failure to improve on the weak and vague theory of "oblique syllogisms" as a proto-theory of relations is well-known; as to geometry, he "failed to see that AB and BA (for example) can be viewed as distinct entities and that $-AB$ could have a significant meaning" (Crowe 1967:4).

Those among us who tend to think that science and philosophy at any point in time necessarily represent the best of human thinking so far, are in all probability quite wrong. In his *A History of Vector Analysis,* Michael J. Crowe quotes the following memorable lines from Heaviside:

> And it is a noteworthy fact that ignorant men have long been in advance of the learned about vectors. Ignorant people, like Faraday, naturally think in vectors. They may know nothing of their formal manipulation, but if they think about vectors, they think of them *as* vectors, that is, directed magnitudes. No ignorant man could or would think about the three components of a vector separately, and disconnected from one another. That is a device of learned mathematicians, to enable them to evade vectors. The device is often useful, especially for calculating purposes, but *for general purposes of reasoning* the manipulation of the scalar components instead of the vector itself is entirely wrong. (Crowe 1967:172f; my italics)

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real conflicts, see Gochet's work (Gochet 1986) which includes a discussion of (Destouches-Février 1951), (Haack 1974), and (Dalla Chiara forthcoming). See also (Barth 1972) which, regrettably, does not include a discussion of (Destouches-Février 1951).

The "device of learned mathematicians" is the method of Cartesian coordinates, attacked by P.G. Tait in 1890 as an artificial encumbrance retarding the progress of mathematical physics. Vector algebra, later vector analysis was a nineteenth-century development – the most easily detectable break with the Symmetry Set in the science of that century, but not the only one.

On chronological grounds we may draw the following conclusion. The new elements of thought that went into the logic of relations, viz. *direction* and *order* among individuals, with the sub-categories Ordered Pair, Ordered Triple, and so on, are not a direct consequence of the introduction of the simple Cartesian plane (with real numbers as values of both x and y). The cradle of vector algebra itself was rather the problem of giving a geometrical representation to complex numbers.[4] On chronological and on systematical grounds it is possible to draw the conclusion that the category of the direction (or, as Russell said, of the *sense*) of a relation, and the category of order among related individuals, owe their presence in contemporary academic logic to the development of vector algebra.[5]

(2) The second half of the nineteenth century adds to the fundamental cognitive categories of inorganic chemistry and of the budding organic chemistry a new category, that of chirality (handedness). Objects that cannot be brought to cover their own mirror image are called "chiral." This is a property that belongs both to a left and to a right hand. The asymmetric relation between them is called *enantiomorphy.* Human beings are, then, well acquainted with anatomical enantiomorphous-asymmetrical phenomena.

This is not the simple linear symmetry (with respect to a point) of vector algebra, but spatial asymmetry (with respect to a plane, or to a straight line), whereby a right hand is distinguished from a left hand. Or, a right glove from a left glove – for the fact that a right hand, as against a right-hand glove, is normally tied to the body of a human being who can distinguish it as his or her *right* hand is not important here. This "difference" is, just as in the case of simple asymmetric relations, not reducible to a *property* that belongs to the one hand but not to the other. It is also not a symmetrical relation, hence it should preferably not be discussed in terms of "difference" (difference being a symmetrical relation).

[4]This was carried out in *Om Directionens analytiske Betegning*, presented to Det Kongelige Danske Videnskabsakademi by the Norwegian mathematician and surveyor Caspar Wessel in 1797 and published by that Academy in 1799. In 1831 Gauss published an influential publication exposing the same (independently developed) ideas. – At the Peirce Congress (1989) I learned that Frege did read Grassman; see also next note.

[5]Ernest Nagel draws the same conclusion in (Nagel 1939; see also Dalla Chiara 1985:303).

In the nineteenth century (Pasteur and) Van 't Hoff discovered and described the phenomenon of *enantiomers,* or enantiomorphous isomers, in organic chemistry.[6] The phenomenon of Life is now understood to depend on enantiomers in a quite fundamental and essential manner.

(3) Until Darwin, biological thought was construed in terms of the following (onto)logical categories: Identity, Similarity, Species and Genera, Reproduction, Heredity, Parentage. Let us call the set of these categories the *Similarity Set,* for short.[7] *Variation* (Variety, Variability) is an (onto)logical category that did not – and does not – belong to the Similarity Set at all.[8] In his assessment of the fundamentals of Charles Darwin's thought Richard Lewontin points out that Darwin was the first thinker to introduce the category of Variation (among individuals) (Lewontin 1983). Darwin's greatness consisted not in his emphasis on the struggle for survival but in his changing the prevailing *ontology* (of scientists, but also of people in general). In our terminology, what Darwin did was to break the chains that tied and restricted biological thought to the Similarity Set of *logical* categories.

Still other examples of emancipation from the Similarity Set in the science of the nineteenth century could undoubtedly be given, but the three mentioned here certainly are among the most influential ones and have probably been among the most effective in bringing about, at the end of the century, the much-celebrated change in the set of categories of formal general logic.

(4) It seems to me that the mode of conceptualization known in the computer sciences today as *default reasoning* belongs under the same heading. In the present paper I shall not attempt to justify that hypothesis.

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[6] L. Pasteur (1848); J.H. van 't Hoff (1875).

[7] *Knowledge* is a category related to what we here call the Similarity Set. It is probably quite safe to say that the idea of Knowledge as a most fundamental philosophical category is *tied* to the Similarity Set. This hypothesis goes well together with Rorty's discussion of the "theory of Knowledge" (Rorty 1980).

[8] There is an analogy here with Sacks and Wasserman's reaction to the philosophy, represented by Land, Zeki and Marr, that aspects of vision should be conceived and investigated in terms of the *computation* of images. Sacks and Wasserman subsume this under the general philosophy of "robotics" (roughly: "If one wants to acquire optimal insight in any aspect of any process whatsoever, one should start from a conception of order - here: of perfect vision - and try to arrive at a theory for that state"). They believe this starting point will no longer do, that at least it is not the only one. They point instead to the insights into the workings of visual perception that can be had from a study of vision *disorders* (Sacks & Wasserman 1987). Notice that when opposed to "disorder," "order" is probably assimilated by most people to "orderliness" (rather than to ranking) and taken as a sign of some symmetrical arrangement that can be reconstructed by means of elements of the Symmetry Set of cognitive categories (see below).

5 *The Symmetry Set*

We have seen that the Similarity Set does not allow for the following categories of modes of thought and language: direction and vectors; chirality and enantiomorphy; variation. The Similarity Set is part of a wider categorial set that may be called the *Symmetry Set.* Where the Similarity Set could, if one so wished, be called a set of ontological categories, the Symmetry Set definitely is a set of *logical* categories in the narrower sense. The Symmetry Set includes certain (cognitive and linguistic) syntactic categories such as Conjunction and Disjunction and excludes non-symmetrical Implication and unary Negation.[9] *Difference* does belong to the Symmetry Set, while Asymmetry and Anti-symmetry do not.

The chemical notion of *Enantiomorphs* as well as Mandelbrot's recent mathematical notion of *Fractals* (Mandelbrot 1975:44), en vogue in the newest theoretical physics, clearly fall outside the Symmetry Set. Fractals are mathematical entities designed to represent complexity, as a basic notion.[10]

Does the biological category of Variation overstep the traditional Symmetry Set, too? Variation is not a simple relation between to (or more) items, hence the question: "Is Variation symmetrical?" is meaningless. But there is more to be said. I think the answer to our question as formulated depends on whether or not one takes Darwinian Variation to be somehow reducible to, or based on, the category of Difference. In my opinion, to do so would be a mistake. From the point of view of most official logic at Darwin's time, Difference of any kind was conceived privatively, as an absence of Identity. Hence the assumption of such reducibility assumes that variation, too, is merely a privative category.[11]

In Darwin's thought variation is clearly no longer a privative category. It is the category *par excellence* related to the fullness or plenitude of being (to use an earlier vernacular). In this function (of symbolizing the fullness of being) traditional Identity is dethroned, hence variation cannot very well be characterized as "nothing more than" the (privative) category of Difference.

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[9] Computer supported corpus analysis of proceedings of the Parliament of the Netherlands shows a higher frequency of conjunctions in parliamentary monologues than in dialogues, whereas implications and negations occur more frequently in dialogues than in monologues (Everts 1988). This seems to indicate that confidence in the Symmetry Set and the Similarity Set is inspired by a monological outlook on cognition and language.

[10] "We are beginning to see complexity as a natural state of affairs rather than an aberration" (Davies 1987).

[11] In biology before Darwin, "all members of a species were held to share unalterable properties that were intrinsic to the organisms, while *differences* between individual members were accidental consequences of environmental modification and *were subordinate to the constant features*" (Lewontin 1985; italics mine).

Several dramatic recent developments in physics, in particular in atomic physics and in cosmology, concern phenomena of asymmetry: the refutation, in 1957, of the Law of Parity, "symmetry breaking" and recent speculations about "super-symmetry" (Gardner 1964; Pagels 1985; Adar 1987; Adar 1988).

As we have seen, the increasing awakening to (a non-hierarchical representation of) non-symmetrical phenomena is no less conspicuous in research into the foundations of life, to wit in organic chemistry. That awakening has an interesting history:

We said above that Leibniz wanted to base his *analysis situs* on symmetrical categories (relations of similarity), and for that reason *could not* succeed. The intellectual canvas from which even a Leibniz could not liberate himself still had a firm grip on the thought processes of Immanuel Kant, but in Kant the beginnings of an emancipation process may be discerned. They become visible in the interest he demonstrates, in his inaugural address *De mundi sensibilis et intelligibilis forma atque principiis* (1770), for the difference between a right and a left hand. The extent to which he is still tied to the restricted old set of categories of logical syntax can be gleaned from his thesis that this "difference" cannot ever be formulated in clear terms. In Kant's opinion it cannot be described in any language, which for him is to say that it is a "qualitative" difference, by definition inaccessible to systematical analysis (Bennett 1970). Contemporary physics and chemistry have shown this to be false.

6 *Some IFC Case Studies, Schematically Described for the Purpose of Comparison*

In the comparisons below, at least one, and, most often both of the compared features R_i, R_i^* will be an element of some logic system in the narrower sense.

Case 1

NFP+		Modern	
R_1:	restriction to monadic predication: *S is P*	R_1^*	polyadic predication: $F(s_1, ..., s_n)$
C_1:	negation as a relative notion: the relation *contrad (A, B)* [Aristotle: also *contrary (A, B)* and *subcontrary (A, B)*]		negation can therefore be restricted to unary negation: *not p*

This compensation for the restriction to monadic predication remains safely within

the Symmetry Set – in fact all of the three dyadic Aristotelian relations: contradiction, contrariety and sub-contrariety are symmetrical in A and B (though not all of them are symmetrical in Truth and Falsity).[12]

Case 2

NPF+		Modern	
R_2:	particularly strong emphasis on symmetric relations, as expressed by the predicative *is*: *If S is P, then P is S*	R_2^*:	due emphasis on non-symmetric relations: vector analysis; ordered couples and n-tuples; *F(a, b)* not interchangeable with *F(b, a)*
C_2:	polarity, with "+" and "–" ("positive" and "negative")		(polarity can be discarded as a category in logic, and the +/– vernacular as well)

Case 3

Aristotle; NPF+		Modern	
R_3:	restriction to exclusive disjunction: *B aut C*	R_3^*:	inclusive disjunction (veljunction): $p \vee q$
C_3:	potentiality, potency: *A is potentially ("en puissance") B and C* (The potential genus, with conjunction of species.)[12]		(potentiality can be discarded as a category in logic) Notice that $(p \vee q) = (p \text{ aut } q) \vee (p \wedge q)$

Case 4

Aristotle		Modern	
$R_4 = R_1$:	restriction to monadic predication and simple (non-iterated) quantification: *Every A is B, No A is B, Some A is (not) B*	$R_4^* = R_1^*$:	polyadic predication
C_4:	hierarchical connectedness of individual objects (and of species) through participation in a (potential) *genus*		C_4 can be discarded: lateral connectedness of individuals *Lateralization of formal logic*

[12]Discussed in (Barth 1974:417).

Case 5

Post-Aristotelian tradition		Modern	
R_5:	restriction to lateral symmetries: *congruence, equiformity, equality, identity, heredity, parentage,*[13] *reproduction, similarity, species and genera:* the Similarity Set	R_5^*:	lateral asymmetry and vector algebra; enantiomorphy
C_5:	vertical asymmetry: hierarchical logical order, reflected in the theoretical assumption of the graded copula *(is)*		

Case 6

NPF+		Modern dynamics and its mathematics	
R_6^*:	the physics and metaphysics of potent 'infinitesimals'; the romantic understanding of the Calculus.[14]	R_6:	restriction to finite magnitudes Δx, Δy and their ratios; Weierstrass' def. of *limit.* (Hence no emphasis on hierarchical logical order and vertical asymmetry.)
		C_6:	*The lateralization of the world picture*

The last case can just as well be put like this:

Dynamics of the *Naturphilosophie*:

R_6' :	restriction to C_5 (no vector analysis)	R_6' * =	R_6 above
C_6' :	powerful infinitesimals (cf. the *potential* genus)		

[13] "In other worlds, all *likeness* was originally represented as *kinship*" (Cornford 1957:86).

Case 7

Pre-Darwinian logic		Darwin	
R_7:	restriction to the Similarity Set	R_7^*:	variation

(*no imaginal compensation; or:*)

C_7:	Identity as representative of the fullness of Being

7 *(Partial) Commensurability*

The "partial" is put in here merely for reasons of hedging. No limitation of the degree of commensurability is implied.

A thesis which is not yet attacked is not (yet) in need of systematic defense. What is more, it cannot be effectively defended since (unless one remains within the confines of tautology and deduction) an effective defense must be related to the specific attacks in question. And it is hard to imagine an informed twentieth-century thinker who will not opt for the "systems" on the right as more adequate, efficient, better suited for purposes of discussion, and as more easily allowing for the refutation of theories. From a pragmatical point of view – and what other point of view is there in the long run – our thesis of partial commensurability follows directly from the recognition of each of the sub-systems on the right as in some sense preferable to that on the left. If A and B are incommensurable, A cannot be better or worse than B, in whatever respect. But in order to elicit (as I hope I have done) the usual judgments of preference, it was necessary first to delineate the systems with some care, which meant that we had to go outside the boundaries of "formal logic" so called, and, second, to be aware of the motivational phenomenon of imaginal functional compensation (for the absence of categories of thought present in other systems of "knowledge" representation).

[14]The romantic understanding of the "infinitesimal calculus" is the philosophical fundament of (Cohen 1883). A striking testimony to its wide dissemination and significance for cognition outside mathematics is found it a letter that Friedrich Engels in 1881 wrote to Karl Marx: "The matter is as clear as daylight ... it is clear that dy/dx can be the pure expression of a process preceding x and y only when the last trace of the quantities x and y has disappeared, so that solely the expression of the processes of change that take place in them remains, with no quantity whatsoever." See also (Boyer 1959).

8 *Projective Logic and Semantics*

A representational analogy – syntactic as well as semantic – to projective geometry is much needed. Such a projective logical linguistics should be erected on the basis of a new, empirical component of the science of logic and will presumably contain theorems on certain forms of representational duality, or n-ality. Furthermore, the theory will contain theorems on semantic projective invariants (corresponding to, e.g., the cross-ratios of projective geometry).

Such a projective theory of logical representation will be of particular value for the purpose of *automatic translation.* There can be no success in automatic translation until we master the rules of what may be called projective syntax and projective semantics. This is a necessary condition, but it is not sufficient; for it will forever remain mandatory to study also the non-projectible properties of systems of logical representation.

Full mastery of what may be called *representational* or *epistemic translations* would yield two benefits: it would clarify and solve our qualms and problems about entities *vs.* artefacts, and – more importantly – about necessary *vs.* eliminable and hence superfluous artefacts; and it would help us enormously on the way toward automatic translation.

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PEIRCE'S PUZZLE AND PUTNAM'S PROGRESS: WHY SHOULD I BE REASONABLE?

R.W. SLEEPER

William James began his Lowell Institute lectures (1906-1907) with a quote from Chesterton's *Heretics:* "There are some people – and I am one of them – who think that the most practical and important thing about a man is still his view of the universe." Concurring, James said: "I think with Mr Chesterton in this matter" (James 1907:3). With the stipulation that the word 'man' not be taken amiss, I join their thinking.

The admission explains, perhaps, why it is that Professor Putnam's elucidation of "Peirce's Puzzle" (in his recent Carus Lectures) seems so far off the mark (Putnam 1987:80-6). He misses both the importance and the practicality of Peirce's 'view of the universe' by a margin of error that calls his own alternative and "contrary" view into question.

In barest essentials, according to Putnam, "Peirce's Puzzle" comes down to this: given the fact that I am faced with an *unrepeatable* moral choice, what justification is there for saying that I have an obligation to act rationally? Putnam reads Peirce's solution as both altruistic and 'Rule Utilitarian' in character. He thinks that Peirce is saying that, in choosing to act rationally, "I am supporting, and helping to perpetuate, a rule which will benefit mankind (or the community of rational investigators) *in the long run*" (Putnam 1987:83-4).

Putnam is puzzled by this solution and rejects it, appealing instead to what he calls "unformalized reason." "The fact is," he goes on to say,

> ... that we have an *underived,* a *primitive* obligation of some kind to be reasonable, not a 'moral obligation' or an 'ethical obligation', to be sure, but nevertheless a very real obligation to be reasonable, which – contrary to Peirce – is *not* reducible to my expectations about the long run and my interest in the welfare of others or in my own welfare at other times. (Putnam 1987:84)

We might ascribe this construal to some latent taint of 'Deconstructionism' (*cum grano salis*) were it not for Putnam's portrayal of Peirce's view as "one of the sources of inspiration for the views of Habermas and Apel" (Putnam 1987:83). The trouble is that *this* suggests a reading of Habermas and Apel

G. Debrock and M. Hulswit (eds.), Living Doubt, 225–235.

as – at least in *some* sense – as fellow 'altruists' of Peirce, on similar grounds; i.e., grounds that might be described as 'Rule Utilitarian'. But, surely, that *cannot* be what Putnam implies; it cannot be that we have reached "bedrock" here, whatever *that* means (Putnam 1987:85).

Here the Chesterton-James way of thinking becomes relevant. The most 'practical and important' thing about Peirce *is* his 'view of the universe'. But, if any of the three views supports 'altruism' (I moot the point), it is surely *not,* in any 'practical and important' sense, for what anyone would be likely to call 'Rule Utilitarian' reasons!

Still, there may be *some* sense (if not that just now rejected) in which Putnam *is* correct to lump Peirce's 'view of the universe' together with the views of Habermas and Apel. In terms of James' famous distinction between the 'Tender-minded' and 'Tough-minded' (drawn in the lecture alluded to above) one might be tempted to think that all three are among the 'Tender-minded' of this world. All three go by 'principles' and are "Intellectualistic," "Idealistic," "Optimistic," "Freewillist," "Monistic" and "Dogmatical"; at least in the senses that James intended (James 1907:12). But there is still trouble, for all three *also* have "Empiricist" inclinations and want to go by the 'facts' a trait ascribed by James to the "Tough-minded." Moreover, at least one of them may be, in James's sense, "Fatalistic!"

Scrapping these traits as less than apt for the task at hand, why not try one, unmentioned by James, but clearly attuned to his frequency and (perhaps) to Putnam's? Why not lump them together in light of their common 'Messianic' or, at least, 'Millenarian' tendencies? (I owe the suggestion to Isaac Levi who refers to both Peirce and Popper as "Messianic Realists.") It is this, perhaps, along with their 'Transcendentalist' propensities, that may most usefully link their 'views of the universe'; if they are to be linked at all.

Karl-Otto Apel, it seems, goes all the way with his "transcendental pragmatics"; a path which reaches a stunning apogee in the transcendentalist 'view of the universe' which he ascribes to the result of Peirce's progress from pragmatism to pragmaticism (Apel 1981:158-96). However, as Klaus Oehler has deliberately and painstakingly pointed out, though the views of Peirce and Jürgen Habermas may have been partly responsible for Apel's trajectory of transcendentalism, Habermas, at least in his later work, restrains the tendency (Oehler 1987:48). Moreover, Apel's interest in Peirce is distinctly *not* in his "characterizations of the *a priori*-method and the doubt-belief theory," says Oehler, but is evidence of "[T]he modern German predilection for 'pragmatism' (which) is motivated not by the spirit of the pragmatic maxim, but the age-old German longing for the Blue Flower of ultimate foundations" (Oehler 1987:57). It is a striking image for the transcendental turn and the 'Messianic' temperament under discussion here. But wait! It *may* be apt for Apel and, to

a lesser degree, Habermas, but what about Peirce? Can the sage of Milford be caught up in the "age-old German longing for the Blue Flower of ultimate foundation"?

Not likely, when one recalls his delicious 'send-up' of Kant's "occult transcendentalism" (*CP* 3.422), and his general scorn of "Teutonic" logic. Still, it may be protested, Peirce's *ultimate* line, his "objective Idealism," while it may not be "transcendental," is given a "Transcendent" foundation.[1] True. But, since that foundation is in *mathematics,* it seems hardly to qualify as the "Blue Flower" that Oehler invokes. Nor is it at all like what Strawson has called the "imaginary" and/or "transcendent" psychology that is sometimes (perhaps by Apel) ascribed to Kant (Strawson 1989:77).

So the protest fails, for what is sought for in Peirce's 'view of the universe' as well as in the others, in keeping with James's intent, is a matter of 'temperament' that shows itself as a common tendency (or propensity) to take what I've called a 'transcendental turn' in the matter. As Habermas does not go *all* the way with "transcendental foundations," neither, apparently, does Peirce.

Let's clear things up with respect to Peirce by a look at the doctrine of "Synechism," his theory of the 'continuum of inquiry,' which best expresses his 'view of the universe.' Two articles that Peirce published in the *Monist* of 1905 display the turn of mind in question; the shift in perspective that occurs from 'pragmatism' to 'pragmaticism' that so inspires Apel (*CP* 5.411-36; 5.438-57). What is commonly noted about these two pieces, called "What Pragmatism Is" and "Issues of Pragmaticism," is Peirce's disavowal of the competing forms of pragmatism that were developed by James and others. But what is not so commonly noted is that they announce Peirce's commitment to what he calls "the doctrine of a real Modality, including real Necessity and real Possibility" (*CP* 5.457). Yet this commitment to 'modal realism' is what is most important and practical about Peirce's pragmaticist 'view of the universe'; it announces the intention to ground his theory of inquiry ("Synechism") in the logical structure of "real Modality." This is not just a transcendental turn, but logical realism in the guise of "objective idealism" (*CP* 6.12). In effect, it is the announcement of the transcendent importance of mathematics as the "acritical" foundation, not just of logic but of inquiry across the board. Unfortunately, for Peirce, the project was never to be realized; the 'transcen-

[1] I have in mind, here, Strawson's pungent characterization of Kant's exercise in "the imaginary subject of transcendental psychology" which, chastened by Paul Guyer, he subsequently corrects to read "transcendent" rather than "transcendental" (Strawson 1989:77). In this same volume, see both Guyer's examination of the question "Is Kant's Deduction Psychological?" and Dieter Henrich's elucidation of the methodological background of the deduction, to which Strawson is responding here. One wonders what Strawson would think of Putnam's notion of the "transcendence" of reason.

dental turn' was taken, but the "Blue Flower" was never reached, as Fisch, Murphey, and even Apel, concede (Fisch 1986:196; Murphey 1961:406ff; Apel 1981:162-3).

Apel's suggestion is that we should have been thinking of Peirce's continuum of the logic of inquiry *all along* as a *transcendental* logic. Not, of course, one grounded in Kant's "occult" psychology of the "transcendental unity of apperception" but, in "transcendental pragmatics" as foundational to the "speech community," a view which Apel links with Wittgenstein's conception of "language games" and "forms of life." But it is far from clear that this is what Peirce had in mind at all in his characterization of logic as a "normative" science.

It is, of course, generally accepted that Peirce placed logic in a trinity of "normative sciences," along with ethics and aesthetics, but there has been considerably less acknowledgment that Peirce gave to logic the controlling role in the triad; that it is *primus inter pares* in the doctrinal context of synechism. The difficulty in acknowledging this, it seems likely, stems from the fact that Peirce's conception of logic *and* mathematics, stands, in a crucial respect, outside of, and radically opposed to, what we have come to understand as the mainstream logic of the period.

In that conception, stemming from Frege and Russell, the foundations of mathematics are thought to be found in the principles of logic. Peirce, both early and late, held to the contrary; like his father, he held that the foundations of logic are to be found in the principles and *practices* of mathematics, and "we ourselves create" them (*CP* 2.191; 5.166). The 'practices' are, in fact, the *origins* of the 'principles' on Peirce's account; we *produce them.*[2] It is important to be clear about this, for it is essential that we do not make the mistake of thinking of Peirce's logic in simplistic *"a prioristic" terms* (*CP* 3.527-31; 3.554-60; 4.86-910; 6.595). It is *especially* important when we deal

[2]It seems that Peirce did *not* think of mathematics in anything like Russell's early 'Platonic' sense, *or* that its principles are purely a priori. It does not seem that he thought of it as an empirical science either, though it does employ experimental methods. It is for that reason that I have suggested that he regarded the 'practices' of mathematics as prior to its principles; possibly they are 'abstractions' from mathematical experience. But that would be to take Dewey's line.

I once made the mistake of writing that Peirce did not think of logic as the "theory of inquiry," or as a "logic of experience," because I had not taken into account that his mathematical theory is grounded in the *experience* of mathematical practice; a feature which makes it necessary to think of his logical principle as constructions *deriving* from experience, rather than as *simply* a priori. (I am grateful to Vincent Colapietro for calling me to account in this matter.) I had merely wanted to make the point that Peirce's early "doubt-belief" theory *was* "psychological" whereas his logic was *not* (Sleeper 1986:49). It now occurs to me that Peirce may have been anticipating something like the "pragmatic a priori" of C.I. Lewis.

Mathematics

↓

Phenomenology

↓

Normative sciences:

(i) Aesthetics

(ii) Ethics

(iii) Logic

(a) Speculative grammar

(b) Critic

(c) Methodeutic

↓

Metaphysics

Figure 1: The hierarchy of sciences according to Peirce

with the natural and social sciences in connection with Peirce's theory of signs. As Oehler puts it: "Formal semiotics, as the logic of signs, is the logic of experience" (Oehler 1987:60).

The hierarchy of the sciences, which Peirce began to set forth in his "Illustrations of the Logic of Science" in 1878-9, and was still working on in the form of the "existential graphs" toward the end of his life, makes clear that he viewed all of the "general" and "special" sciences as logically (and methodologically) dependent upon the science of mathematics which was, alone, independent and "acritical." Mathematics, *alone* among the sciences, *transcends* logical criticism and requires no logical foundations. But it is *itself* "foundational" only in a methodological sense. It is, as it were, the "pure practice" of intelligent experiment.

I have borrowed Christopher Hookway's diagram to illustrate the point (see Fig. 1). "See (*CP* 1.176-283) for detailed discussion" (Hookway 1985:78).

Following Hookway, I think it clear that (as the diagram indicates) Peirce not only gets his final justification for pragmatism (as methodeutic) from *within* the context of pragmaticism (synechism) but that he gets his final *metaphysics* from within that same context as well. Hookway has suggested the role and derivation of metaphysics this way:

> Metaphysics discharges a number of regulative loans that have been taken out at different stages during the investigation: it provides a specification of how reality must be if the various regulative hopes that are introduced at different stages of the investigations are all to be fulfilled. Rational autonomy depends upon those hopes: metaphysics tells us how reality is if they are absolutely true. Thus, it provides an account of reality which allows for our rational autonomy. (Hookway 1985:79)

Max Fisch puts the point, characteristically, historically:

> At least from the summer of 1859 onward, one of Peirce's main metaphysical concerns was to establish that, contrary to what some metaphysicians were saying, we *can* reason mathematically and logically about infinity and therefore about continuity. On that assumption, synechism became a regulative principle first of logic and then of metaphysics. (*CP* 6.17ff; see Fisch 1986:396)

Here, it seems, is Peirce's best shot at the solution to the puzzle, and at Putnam's problem with it. The argument is this: the reason why we have an obligation to be reasonable, even in an *unrepeatable* situation, is not, as Putnam claims, that we, as a community of inquirers, are more *likely* to arrive at the truth "in the long run" (Putnam 1987:84), but that we shall arrive there "in the long run" as a matter of logical and ontological *necessity.* The outcome of our rational choices (i.e., the "absolute truth"), as Peirce wrote in 1906, is a "predestined result" (*CP* 5.494). It is not that it is more "likely" (or probable); it is that there is just no other way.[3]

In Dewey's early (1893) attack on what he called "The Superstition of

[3]In this unpublished manuscript of 1906, commenting on James's and Schiller's versions of pragmatism, Peirce wrote: "I call my form of it 'conditional idealism.' That is to say, I hold that truth's independence of individual opinions is due (so far as there is any 'truth') to its being the predestined result to which sufficient inquiry *would* ultimately lead." He then went on to say: "and this, I believe, agrees with the opinion of M. Poincaré, except that he seems to insist upon the non-existence of any absolute truth for *all* questions, which is to fall into the very same error on the opposite side" (*CP* 5.494). Peirce means, in speaking of the "opposite side," to refer to the notion that *every question will have an "absolute truth" for an answer.* I take this to mean that the question 'Why should I be reasonable?' may *not* have an "absolute truth" for its answer, but that it is very "likely" to. This is *not* the same as what Putnam claims is Peirce's "own solution."

Peirce became rather testy in his correspondence with Dewey in the same period as the above (*CP* 8.243-4; cf. Sleeper 1986:44-9; Hickman 1986:178-89), but over some very different and, possibly, more important matters. It is unfortunate that he did not discuss them in this manuscript.

Necessity" (EW 4:19-36),[4] he makes the potent claim that there is nothing to the doctrine of logical necessity that cannot be explained by conceiving it simply as an emergent *consequence* of inquiry, a *product.* It is a "tool" or "instrument" – in keeping with the ethics of *Dewey's* terminology (Ketner 1981:*passim*) – but it is a 'construction' as well as a 'convenience' in a literal sense. It is what we *need* to work out our mathematical and formal systems of reasoning. It is this claim, which in other contexts he also directs against James's doctrine of the "necessary truths" of reason in the final passages of the *Principles of Psychology,* that puts the lie to Putnam's criticism of Peirce's solution to the puzzle. And, perhaps, to Peirce's solution as well.

The problem with Peirce's solution to the puzzle of why we have an obligation to be reasonable is *not,* as Putnam suggests, the *contrary* fact that "we have an *underived,* a *primitive* obligation of some kind to be reasonable [...] a very real obligation to be reasonable ..." (Putnam, H. 1987:84). For that, it would seem if it is not *just* what Peirce *himself* holds, is at least its kissing cousin in the extended family of *a prioristic* principles. It is an intrinsic feature of the doctrine of synechism in terms of which our "obligation to be reasonable" is a logical, hence ontological, necessity, which is to say that it is a feature of our "destiny;" a feature of what it is to be the kind of creatures that we are in the world that is as it is.

Putnam does not, in the context from which I have been quoting him, concede as much, but elsewhere suggests that a case can be made for the "transcendence" of reason (Putnam, H. 1983:247; 1988:119). In this, his own 'transcendental turn' Putnam seems bent upon tracing Peirce's trajectory; planning his own progress from pragmatism to pragmaticism. But wait!

If we follow Ruth Anna Putnam' reading of Dewey here (at Hilary Putnam's own suggestion) the 'obligation to be reasonable' is more a matter of "need" than "predestined necessity;" a need of an organism that evolves, or emerges, is culturally conditioned; but a need that is neither "primitive" nor "underived" (Putnam, R.A. 1985, cited in: Putnam, H. 1987:79).

What is interesting about *this* suggestion is that, in pursuing it, Dewey may be seen as consciously reconstructing Peirce's synechism, retaining the idea of the continuum of inquiry, including the conception of logic as *the* theory of inquiry (i.e., the logic of experience), but rejecting Peirce's "transcendental turn" altogether. In fact, it would seem, Dewey *condemns* the "transcendental turn" as *"the* philosophical fallacy;" it is the false move that you make when you get your ontology from your logic, rather than getting your logic from your ontology. Or, as he puts it in *Experience and Nature,* the fallacy of

[4]All references are to the collected works published under the editorship of Jo Ann Boydston. These are cited in the standard way, with the initials of the series followed by the volume and page numbers.

the "conversion of eventual functions into antecedent existence" (LW 1:34; cf. Tiles 1988:*passim*; Sleeper 1986:137,159,179 & 185).

More than one reader of Dewey's 1938 *Logic* has been baffled by Dewey's claim that he owes to Peirce his conception of the "continuum of inquiry" (LW 12:3). This condition may be partially relieved by the suggestion that what Dewey is getting at is that *his* logic, like Peirce's, is designed to serve a normative function; that ethics for Dewey, is a logical sequel to the theory of inquiry and wholly continuous with it. But the bafflement really begins to subside only when we come to see that Dewey's theory of inquiry, and the conception of formal logic and mathematics which is an eventual consequence (or function) of that theory, is a theory of experience that reconstructs Peirce's doctrine of synechism as it might have looked had Peirce's 'transcendental turn,' his turn toward "objective" (or "conditional") idealism and "absolute truth" never been taken.

There is barely room even to hint at the line that Dewey takes in the 1938 *logic* when construed as a "reconstruction" of Peirce's synechism. Not enough, most likely, to convince anyone. But enough, perhaps, to suggest that another look at it might be worth the candle.

It pays to begin where Dewey did, in the place where he first invokes the name of Peirce, and what he calls "the principle" of the continuum of inquiry. The passage in which that invocation occurs stands also as an invocation for the entire work and the conception of the logic of experience which it expresses. Dewey sets the context by remarking that the present book is a development of ideas concerning the nature of logical theory that he first set forth in the 1903 *Studies,* picked up again and expanded in the 1916 *Essays in Experimental Logic,* summarized "in reference to education" in *How We Think,* and has used in relation to "the problematic situation" all along. The work is an application, he says, of these "earlier ideas to interpretation of the forms and formal relations that constitute the standard material of logical tradition." The text then reads:

> In this connection, attention is called particularly to the principle of the continuum of inquiry, a principle whose importance, as far as I am aware, only Peirce had previously noted. Application of this principle enables an empirical account to be given of logical forms, whose necessity traditional empiricism overlooked or denied while at the same time it proves that the interpretation of them as *a priori* is unnecessary. (LW 12:3)

Perhaps the most shocking feature of the "empirical account" of logical forms that Dewey gave, at least most shocking from the mainstream perspective, and *perhaps* to Peirce, is the emergent, *a posteriori,* account of mathematics, an

account which challenges not merely the mainstream Frege-Russell assumptions about the foundations of mathematics, but Peirce's reversely parallel account as well.

By that I mean that Dewey challenges not just the validity of the view of the autonomy of logic expressed in Frege's contention – to the effect that "logic gives us, not the laws of nature, but the laws of the laws of nature" (Kneale and Kneale 1984:448 & 739) – but also Peirce's reversely parallel contention that logical necessity (mathematics) is the foundational "antecedent" to the logic of inquiry, rather than one of its "eventual functions."

But Dewey's acknowledgment of his indebtedness to Peirce's theory of the "continuum of inquiry" is indeed sincere, and we continue in our failure to grasp the character of that debt so long as we continue to view Dewey's *Logic* as having little or nothing to do with "mainstream logic" as Ernest Nagel did, or (and this is even worse, in my view) as having little or nothing to do with Peirce's doctrine of synechism, as Richard Bernstein has repeatedly made out (Nagel 1954:101-49; Nagel 1986:ix-xxvii; Bernstein 1966:180; Bernstein 1971:165-229). In the sense of "necessity" that Dewey maintains, it is a necessary fact that we *do* have an obligation to be reasonable. It is among our deepest needs. It is, indeed, an emergent fact of nature; but in no sense is it *a priori,* "predestined," "primitive" or "underived."

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PEIRCE AND DAVIDSON: MAN IS HIS LANGUAGE

KUNITAKE ITO

I

It is generally well known that the most characteristic feature of the philosophy of mind in the 20th century is its anti-cartesianism. Descartes thought that the mind is a substance which introspectively sees the "ideas." The ideas were supposed to exist privately in the mind. Many contemporary philosophers argue against this private picture of the mind. They say that the mind is essentially a language user or that the mind is itself composed of language. And language is an essentially public and social being. For example, Wittgenstein said:

> When I think in language, there aren't 'meanings' going through my mind in addition to the verbal expressions: the language is itself the vehicle of thought. (Wittgenstein 1953:§329)

In a different vein, Heidegger wrote: "Something which in itself, by its essential nature, is pointing, we call a sign. As he draws toward what withdraws, man is a sign." (Heidegger 1972:9)

Now, one of today's leading philosophers who advocate this sort of "mind *as* language" theory is Donald Davidson. He argues that the mind or the self is to be considered as a system of sentences. His argument for this thesis is sophisticated and tight. In this paper, I would like to compare Davidson's theory with that of Charles Sanders Peirce. Peirce was one of the originators of this mind *as* language theory, and he was arguably the most systematic theorist among them. I propose to make a comparison between Peirce and Davidson, because I think there are some overlapping theses between them but there is also an important difference. They share the theses that the mind is the language it uses, that the mind is fundamentally indeterminate, and that truth and communication are conceptually interconnected. What I take to be their difference is their treatment of "self-consciousness."

Peirce thought that the self-conscious aspect of the mind is its essential feature, and he sometimes characterized it as "retroconsciousness," i.e. the mind's awareness of itself seen from the viewpoint of others. There is no

G. Debrock and M. Hulswit (eds.), Living Doubt, 237–245.

explicit reference to such an aspect of the mind in the Davidson's picture of mind. I shall suggest that this absence of self-consciousness in Davidson is, in a sense, a natural consequence of his anti-cartesianism. I shall then try to analyze the reason why Peirce could include this aspect in his system in spite of his similarly strong anti-cartesianism.

II

First, let us look at the theory of Davidson. According to him, the interlocking of man's thought and talk is so close that we cannot get the idea of a knowing subject without the notion of a user of language. We can attribute rationality to an agent only when we can attribute a certain propositional attitude to him, and we can do so only within the framework of a viable theory of his beliefs, desires, and intentions. This framework becomes accessible only through a formally strong, theoretical lattice, and this lattice is constituted by means of the formal technique of the "theory of truth" which was first invented by Tarski. Because of the resulting holistic character of the cognitive field, and because of the empirical conditions for the construction of this theory of truth, our understanding of an agent is always under the constraint of the indeterminacy of translation. And this constraint is applicable both to the case of interpreting foreign languages and that of interpreting one's own language. Therefore, not only is man's language as seen from without indeterminate, but the mental field itself, the language itself should be regarded as essentially indeterminate.

Davidson's own argument for this interconnection of mind and language goes as follows:

> We have the idea of belief only from the role of belief in the interpretation of language, for as private attitude it is not intelligible except as an adjustment to the public norm provided by language. It follows that a creature must be a member of a speech community if it is to have the concept of belief. And given the dependence of other attitudes on belief, we can say more generally that only a creature that can interpret speech can have the concept of a thought. Can a creature have a belief if it does not have the concept of belief? It seems to me it cannot, and for this reason. Someone cannot have a belief unless he understands the possibility of being mistaken, and this requires grasping the contrast between truth and error – true belief and false belief. But this contrast, I have argued, can emerge only in the context of interpretation, which alone forces us to the idea of an objective, public truth. (Davidson 1984:70)

There is also a slightly different argument for this thesis:

> If I were bolted to the earth I would have no way of determining the distance from me of many objects. I would only know they were on some line drawn from me toward them. I might intersect successfully with objects, but I could have no way of giving content to the question where they were. Not being bolted down, I am free to triangulate. Our sense of objectivity is the consequence of another sort of triangulation, one that requires two creatures. Each interacts with an object, but what gives each the concept of the way things are objectively is the base line formed between the creatures of language. The fact that they share concept of truth alone makes sense of the claim that they have beliefs, that they are able to assign objects a place in the public world. The conclusion of these considerations is that rationality is a social trait. Only communicators have it. (Davidson 1985:480)

And his version of the indeterminacy of translation thesis is stated in the following way:

> My general strategy [...] depends on emphasizing the holistic character of the cognitive field. Any effort at increasing the accuracy and power of a theory of behavior forces us to bring more and more of the whole system of the agent's beliefs and motives directly into account. But in inferring this system from the evidence, we necessarily impose [normative] conditions of coherence, rationality, and consistency. These conditions have no echo in physical theory, which is why we can look for no more than rough correlations between psychological and physical phenomena. (Davidson 1980:231)

These arguments show that Davidson's position is strongly anti-cartesian in the following two senses. First, Descartes's ego was an introspective and self-conscious being, and thus it was detected inwardly. Davidson's knowing subject is seen from without by its communicator. It is the "object" of interpretation. Its existence is "être pour autrui," or "being-for-the-other."[1] It is the self seen by the other, or speaking more strictly, the self heard by the other. This is the cartesian ego turned inside out. And secondly, while Descartes's mind was supposed to be epistemologically the most certain being in the world, Davidson's subject is an indeterminate being. It is a secondary being because it is

[1] I borrowed this characterization from (Saarinen 1985).

constituted through an interpretation, and every interpretation is, on Davidson's view, based on the interpreter's preceding understanding of an objective world and human rationality. Its constitution is vulnerable to skepticism, because it needs the "principle of charity." Epistemologically, this principle has no founding power. It is rather a pragmatic principle for interpretation.

Now, because of this anti-cartesianism, Davidson's system seems to be placed in a dilemma. As is shown in the above quotation, Davidson states that the objectivity of factual knowledge is given by the triangulation between plural knowing subjects. And the truth of this knowledge is to be judged by referring to the "base line" of triangulation. Because the objectivity of beliefs in general is constituted by this base line of "massive agreement" among communicating subjects, the peculiarity of certain idiosyncratic beliefs is also revealed against the background of this base line. And because each subject can be identified as a separate individual only as a holder of these peculiar beliefs, the individuality of person itself is constituted as a site of deviations from the base line of communication. In other words, the self's identity consists not in the true beliefs which it has, but rather in the ignorance and error from which it suffers. Just as in the case of Peirce, Davidson's self is fallible and its identity comes from those negative properties of ignorance and error. We can thus understand the indeterminate construction of one interpreted subject by a radical translation of another interpreting subject, as the product of calculating a certain set of deviations from the objective truth, by means of another set of deviations.

But is it possible for one subject, who is a system of deviations from the objective truth, to recognize itself as such a being? That seems to be impossible in Davidson's system. For, in the actual performance of radical interpretation, an interpreter interprets a certain speaker's utterances by means of his own understanding of truths. He cannot have gotten the standpoint of objective truth beforehand and assess truth values of his own bundle of beliefs from this standpoint. An interpreter is a free agent because he has the freedom to interpret someone else's speeches on the basis of his own understanding of the world. But just because of this asymmetrical relationship between the interpreter and the interpreted, in respect of the truth and freedom of interpretation, the possibility for the interpreter to be conscious of his own defects in his belief system is excluded from his freedom. And that is, in a sense, a natural consequence from Davidson's anti-cartesianism. Just as the cartesian ego cannot in principle encounter other thinking subjects in the world as long as it is seeing the world by the mediation of ideas which exist privately in the mind, Davidson's ego cannot, insofar as it can exist only within the context of interpretive communication, be for-itself, or be self-conscious. Davidson's knowing subject has, of course, beliefs about the outer world, and it has beliefs

about the beliefs of other minds. But is has no awareness of itself. It cannot have reflexive consciousness. It is a conscious being without self-consciousness.

III

Let us now turn to the theory of Peirce and see how he dealt with this dilemma of anti-cartesianism. He thought that man is a sign, or man himself is a language. The text in which he declared this thesis is well known.

> ... the word or sign which man uses *is* the man himself. For, as the fact that every thought is a sign, taken in conjunction with the fact that life is a train of thought, proves that man is a sign; so, that every thought is an *external* sign, proves that man is an external sign. That is to say, the man and the external sign are identical, in the same sense in which the words *homo* and *man* are identical. Thus my language is the sum total of myself; for the man is the thought. (*CP* 5.314)

On the other hand, Peirce insisted that the consciousness of selfhood emerges from that of error and ignorance. The text expressing this thought is also well known, and it appeared in the same series of papers as the above quotation:

> The child learns to understand the language [...] he begins to converse. It must be about this time that he begins to find that what these people about him say is the very best evidence of fact. So much so, that testimony is even a stronger mark of fact than *the facts themselves,* or rather than what must now be thought of as the *appearances* themselves. [...] Thus, he becomes aware of ignorance, and it is necessary to suppose a *self* in which this ignorance can inhere. So testimony gives the first dawning of self-consciousness. [...] Moreover, he has reason to think that others, also, have such judgments which are quite denied by all the rest. Thus, he adds to the conception of appearance as the actualization of fact, the conception of it as something *private* and valid only for one body. In short, *error* appears, and it can be explained only by supposing a self which is fallible. Ignorance and error are all that distinguish our private selves from the absolute *ego* of pure apperception. (*CP* 5.232-235)

Later, Peirce coined the term "retroconsciousness" for the mind's awareness of the possibility of its own defects seen from the perspective of others. This term appeared in the context where Peirce was talking about man's conformity to and dissociation from the "norms" in general. By "norm" Peirce meant both

the ethical and cognitive variety. So retroconsciousness includes consciousness of conformity to and deviation from the norm of systematic objective truths.

> Cannot a man act under the influence of a vague personification of the community and yet according to a general rule of conduct? Certainly: he so acts when he conforms to custom. [...] Conformity to a norm may take place by an immediate impulse. It then becomes instinctive imitation. But here the man does not vaguely personify the community, but puts himself in the shoes of another person, as we say. I call this putting of oneself in another's place, *retroconsciousness.* (*CP* 1.586)

Now, as is shown by these texts, Peirce held simultaneously both the idea that man is an external sign and the idea that man has retroconscious awareness of himself. How could these seemingly incompatible ideas coexist in his theory? The answer lies in the principle, from which both of these ideas are derived. The principle is that every thought is a sign, and it means that every thought inevitably evokes another thought.

> From the proposition that every thought is a sign, it follows that every thought must address itself to some other, must determine some other, since that is the essence of a sign. This, after all, is but another form of the familiar axiom, that in intuition, *i.e.*, in the immediate present, there is no thought, or, that all which is reflected has past. [...] To say, therefore, that thought cannot happen in an instant, but requires a time, is but another way of saying that every thought must be interpreted in another, or that all thought is in signs. (*CP* 5.253)

The sum total of my thoughts can be identified as one language because each thought evokes another thought and thereby forms a chain of thoughts. The identity of chain is the identity of mind. But what forms this chain is not the transcendental *I*, but rather the power of each thought or each sign to evoke an interpretation. The chain of thoughts need not be a single-track one. It branches into several trains, and it intersects other trains of thought. Thus, one mind and another mind can interpret each other, and they can educate each other. Or, one mind and one sign can educate each other. By branching into several tracks of thoughts, the mind produces the alternatives of its future development. And by assimilating one of them to some part of another chain of thoughts, it gets the wider perspective of this alternative. The mind's "putting oneself into the shoes of another person" is nothing but this assimilation. And by putting itself into the shoes of another mind, one

mind can see other parts of its previous thoughts from the viewpoint of another mind. This is the mind's reflexive consciousness of itself. Thus, the awareness of the defects of one's language is both the recognition of another system of beliefs and the anticipation of one's new language.

Peirce emphasized the possibility of reciprocal education between one mind and another mind, or, one mind and one word, in many places of his texts. The following two passages are the most explicit with regard to this point.

> The man-sign acquires information, and comes to mean more than he did before. But so do words. Does not electricity mean more now than it did in the days of Franklin? Man makes the word, and the word means nothing which the man has not made to mean, and that only to some man. But since man can think only by means of words or other external symbols, these might turn round and say: "You mean nothing which we have not taught you, and then only so far as you address some word as the interpretant of your thought." In fact, therefore, men and words reciprocally educate each other; each increase of man's information involves, and is involved by, a corresponding increase of a word's information. (*CP* 5.313)
>
> A man denotes whatever is the object of his attention at the moment; he connotes whatever he knows or feels of this object, and is the incarnation of this form or intelligible species; his interpretant is the future memory of this cognition, his future self, or another person he addresses, or a sentence he writes, or a child he gets. In what does the identity of man consist and where is the seat of the soul? It seems to me that these questions usually receive a very narrow answer. [...] A word may be in several places at once, [...] because its essence is spiritual; and I believe that a man is no whit inferior to the word in this respect. (*CP* 7.591)

In these passage, Peirce revealed the particularity of his picture of human mind. It is an open and publicly accessible mind. It stands in contrast to the cartesian mind in its denial of the closed and private picture of mind. However, the dimension of its openness is not the spacious one. Rather, the Peircean mind is temporally open, that is, it is open-ended. It is not the romantic mind which is breathing with the world. It is open to other minds and other signs, because it wants to get more information, and in this wanting it is appealing to the future self. The self can be self-conscious by putting itself in the shoes of another person. And by taking another person's perspective, it is appealing to a future self, i.e., the self which will have integrated that person's information into oneself. From another person's perspective, the self sees itself as something which has some cognitive lacunae. But because this

seeing is at the same time appealing to its future self, this seeing becomes also the consciousness of its own openness. The mind can, just in its being open to other minds, be aware of its own openness. Peirce could include the reflective aspect of mind in his anti-cartesian conception of mind, because he interpreted its openness and publicness as temporal. In his system, the externality of the mind is the very condition of its possession of self-consciousness.

IV

Thus, though both Davidson and Peirce hold the "mind *as* language" theory, the conclusions they draw from their anti-cartesianism are different. Davidson says that the mind is indeterminate. Peirce said that the mind is open to the future. Because of this difference, the latter talked about retroconsciousness, while the former keeps silent. Now, if theirs are different theories, should they be also mutually incompatible ones? It seems to me that they need not be so.

Davidson insists that rationality is a social trait. Peirce would have completely agreed to this dictum. The question is only what is meant by saying so. Davidson postulated the principle of charity and requires an interpreter to assume that the object of radical interpretation is as rational as the interpreter himself. According to Davidson, if the interpreter has no reason to so assume, there is no point in trying to interpret that object. But, on the other hand, if an interpreter does assume that his neighbor or a foreigner is as rational as himself, why should he try to interpret that person, or communicate with him? Davidson would be forced to say but that the interpreter himself wishes to get new information, which is tantamount to saying that he is conscious of the possibility of his own errors and ignorance. Just as, in Davidson's words, "a creature cannot have a belief if it does not have the concept of belief," it cannot have rationality if it does not have the concept of rationality.

And it cannot have the concept of rationality if it cannot have the concept of openness to other systems of ideas. Therefore, the principle of charity is to be supplemented by the principle of openness, which is articulated by Peirce's theory.

On the other hand, because it is rationality itself that is at stake, the mutual education between communicators could be more global than what is suggested by Peirce's example of the word "electricity." Indeed, my language is the sum total of my thoughts, and its change involves holistic relocation or reordering of my previous ideas. Peirce was one of those who first emphasized this holistic character of human knowledge. And he laid stress on the mind's flexible nature by characterizing it as the system of "habits." But he did not explicitly connect the holistic nature of the mind with the plasticity of cognitive field. Davidson's ideas of "radical interpretations" and the indeterminacy of translation shed much light on the mechanism of this connection. Peirce

said that rationality is the self-control of self-control. But this is possible only if the mind can be reflectively aware of itself. Peirce explained how it can be so. But self-consciousness also requires that the mind should be a system of elements which could be totally relocated to each other. Davidson's indeterminacy thesis explains the theoretical foundation of this possibility.

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Part III

KNOWLEDGE, LANGUAGE AND SEMEIOTIC

PEIRCE'S SEMEIOTIC NATURALISM

TIANJI JIANG

In this essay I shall argue for two theses: first, Peirce was a justificationist in epistemology, but, contrary to the classical or rationalist model of justification, he denied that individual consciousness is the source of justification or certainty. In fact, he inaugurated the semeiotic model of justification or certainty. Secondly, Peirce was a naturalist in epistemology. For him, man's thinking and inquiring, asking and answering, asserting and denying, doubting, believing, expecting and explaining are actions and reactions which can be observed, described and understood like actions and reactions of other higher animals. He was neither an empiricist nor a rationalist in the classical sense.

I

As a justificationist, Peirce advocated a sharp distinction between science and other human activities. He emphasized the scientist's "purpose [...] to look the truth in the face, whether doing so be conducive to the interest of society or not" (*CP* 8.143). Science implies a desire to learn, and a desire to learn implies a dissatisfaction with existing opinions. Scientists always subject the received opinion to the test of experience with the passion to avoid errors. Science progresses through the correction of erroneous hypotheses. Thus the scientific attitude is characterized by a bold, critical, essentially radical attitude, the persistent passionate endeavor to avoid error. Peirce thought that, if science is to progress, it must be kept free from pursuing practical goals, even the worthiest ones. He regarded engineering, political authorities and conformist educational institutions as three threats to the spirit of science. As a result, he advocated a demarcation between science and all non-scientific knowledge: common sense, religion, metaphysics, ethics and the humanities.

In his search for a justification of scientific claims and for a guarantee of scientific progress Peirce worked out a detailed logic of inquiry. In his view thinking is an activity especially subject to normative evaluation. This activity is essentially governed by the notion of truth as an ideal. Thinking is evaluated according to whether or not it conforms to norms leading us towards that goal. "In reasoning [...] we have the singular phenomenon of a physiological function which is open to approval and disapproval" (*CP* 2.152).

Scientific claims are to be justified by the logic of inquiry and experimental verification. But surely, observation does not logically compel us to accept or

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to reject a hypothesis. Thus scientific reasoning involves something more than mere experience and logic. According to Peirce's logic of scientific inquiry the process of scientific inquiry includes three stages. The first is the stage of the formation of an hypothesis: trying to guess at a true or plausible hypothesis by means of "abduction" or "retroduction." The second stage is that of induction, which is marked by experimental testing of predictions resulting from the hypothesis. Once the predictions are verified, the hypothesis is to be taken on probation. In the third stage, the degree of trustworthiness of several competing hypotheses is determined by the use of rules for theory-choice. But Peirce did not give any such rules. On the contrary, he believed that science is committed to entertaining on probation a host of "unreliable and probably false conjectures which it would be entirely irrational to believe in" (see *CP* 1.120;1.635).

Peirce realized that the logical forms of abduction did not in fact lead him very far, and that abduction could support induction only if certain factual conditions were to hold. Thus, as Peirce himself concludes in about 1896, inductive self-correction is possible only if there is in fact a natural tendency to guess the truth (see *CP* 1.811; 1.121).

Successful induction, then, is dependent upon the assumption of a natural tendency to make correct guesses. The rules of scientific inquiry are thus to be grounded in a biological optimism, and ultimately, in an affinity between the human soul and the soul of nature. To explicate this somewhat mysterious affinity, we must develop a bit both the idea of the human semeiotic process and the idea of the semeiotic process in the world.

In Peirce there is both a methodological commitment to scientific progress in the long run and a denial of the measurability of such progress in the short run. He undeniably had a stake in the reliability of the scientific method as a road to truth. But how is the possibility of convergence towards truth to be explained?

Truth is to be characterized by the eventually ultimate consensus of an infinite community of scientific investigators. Peirce's conception of truth is not that of the classical theory of "correspondence," which has been the crux of difficulties confronting metaphysical realism. Yet it was very much a conception of *objective* truth.

In Peirce's view, knowing is an inherently semeiotic process: it is not the result of a static confrontation of a subject with an object as traditional epistemologists would have it. In his own words:

> ... whenever we think, we have present to consciousness some feeling, image, conception, or other representation, which serves as a sign. But it follows from our own existence [...] that everything

> which is present to us is a phenomenal manifestation of ourselves. This does not prevent its being a phenomenon of something without us, just as a rainbow is at once a manifestation both of the sun and the rain. When we think, then, we ourselves, as we are at that moment, appear as a sign. (*CP* 5.283)

His answer therefore to the question "What is man?" is that he is a symbol (*CP* 7.853), i.e. man's mode of being is that of a living process of semeiotic activity. For Peirce, every state of consciousness is a sign, and no sign is determined immediately by its object. Signs refer to objects via other signs. This involves the important distinction between the object or referent, and the meaning of a sign. According to this distinction, a given sign has a simultaneous and dual function, one in respect of its object, and the other in respect of its interpretant.

Peirce is committed to a potentially infinite series of signs, any member of which is related to its object by way of antecedent signs, even though one may not be aware of these. No reality appears to us unmediated, since there is no 'privileged' first cognition, no 'intuition' of an object that would be unrepresented or unmediated by some antecedent sign. Mediation is the essence of a thought which it itself a sign. All we have to work with are intepretations, opinions. Yet, Peirce was convinced that we do have ways to distinguish between illusory and true opinions, and that the object of true opinions is indeed the real.

In Peircean metaphysics, individuals exist, but are not real. "Whatever exists [...] act[s] upon other existents" (*CP* 5.429). Reality consists, not in the individual reactions themselves, but in the regularities or laws of nature they instantiate, and which are "general principles really operative in nature" (*CP* 5.101). These real generals constrain our semeiotic activity, our symbolization of our experience. Under the pressure of experience, sensations of brute reactions urge themselves upon our minds; but generally we adapt ourselves to the regularities or laws of nature. These multi-faceted regularities which we discover about things make up the content of what we then say about the world.

The independently real for Peirce is mainly the reality of generals or thirds, active general principles in nature that really do constrain our thinking. Moreover, Peirce identified thirdness with representation. "Representation is precisely genuine thirdness" (*CP* 1.532). And again,

> ... it is proper to say that a general principle that is operative in the real world is of the essential nature of a Representation and of a Symbol because its *modus operandi* is the same as that by which *words* produce physical effects. (*CP* 5.101)

This means that the life of such active principles consists in mediation, i.e. by bringing together otherwise disparate elements they create new regularities or habits which in turn enable us to successfully predict that possible future events will have certain characteristics.

Thus Peirce's solution of the difficult problem of whether or not an opinion corresponds to what is real consists in showing that the real generals or laws that are at work in nature are representations or signs and that they do constrain our semeiotic activities. There is a symmetry between the "thoughts" of nature and our thoughts, between the semeiotic process of nature and the semeiotic process that constitutes man.

In this context it is appropriate to touch upon Peirce's thesis of man-sign.

> We have seen that the content of consciousness, the entire phenomenal manifestation of mind, is a sign resulting from inference. [...] [w]e must conclude that the mind is a sign developing according to the laws of inference. [...] The man-sign acquires information, and comes to mean more than he did before. But so do words. [...] In fact, therefore, men and words reciprocally educate each other; each increase of a man's information involves, and is involved by, a corresponding increase of a word's information. [...] [I]t is sufficient to say that there is no element whatever of man's consciousness which has not something corresponding to it in the word; and the reason is obvious. It is that the word or sign which man uses *is* the man himself. For, as the fact that every thought is a sign, taken in conjunction with the fact that life is a train of thought, proves that man is a sign; so, that every thought is an *external* sign proves that man is an external sign. That is to say, the man and the external sign are identical. [...] [T]hus my language is the sum-total of myself; for the man is the thought. (*CP* 5.313-314)

Peirce's train of thought finds its expression in his notion that a thought or symbol is a "special habit [...] [which] consists in the fact that [...] [it] will have certain effects on the conduct, mental and bodily, of the interpreter" (*CP* 4.431). In other words, our habitual conduct, mental and bodily, is constrained by the real relations which constitute the regular processes and events of nature. Thus, the question of the adequacy of our representations or thoughts about nature amounts to the question in what sense it may be said that the habits of nature are present to us by way of our symbolic representations. Peirce in fact re-establishes the remarkable affinity between the world and our semeiotic existence, an affinity made possible by the fact that the cosmos is itself a semeiotic process.

But Peirce did not really clarify how it is that we can distinguish illusory opinions from correct guesses. He did believe that we have evidence for a general trend towards truth in the history of science. This is however entirely different from the claim that, when we are confronted by two rival theories, we can unambiguously determine which of these is nearer to the truth. Even though Peirce could not provide rules for theory choice, he was committed to the notion of scientific progress as a result of the continuous use of the scientific method which would guarantee truth in the long run. For Peirce, the scientific method is not a set of rules for immediately distinguishing a true hypothesis from a false one, nor is it an algorithm for ascertaining the degree of the relative trustworthiness of each of them. On the contrary, science is not in a hurry to know the truth. Its method consists in gradually approaching the truth in the long run through the meticulous avoidance of error in the short run "... provided that each guess is checked by comparison with observation. It is true that agreement does not show the guess is right, but if it is wrong it must ultimately get found out" (*CP* 1.121). Thus, Peirce's model of scientific rationality is somewhat similar to falsificationism without the Popperian notion of verisimilitude. Moreover he does not deny justification in the long run. He seemed to imply that the historical process of scientific progress itself justifies our tentative belief in some scientific hypothesis in the short run, regardless of whether it is true or false. It takes quite a long time to solve such problems, and they certainly cannot be solved by logic-plus-experience alone.

It may be concluded in Peirce's own words that

> ... it is well to remember that every single truth of science is due to the affinity of the human soul to the soul of the universe, imperfect as that affinity no doubt is. (*CP* 5.47)

Our capacity for distinguishing true from false opinions rests ultimately upon the intrinsic relation between thought and the independently real, and upon the natural continuity of our semeiotic activity with the semeiotic processes of the cosmos.

II

Why should Peirce's epistemology be characterized as naturalistic, and not as empiricist or rationalistic? There are at least the following reasons:

Peirce was greatly influenced by the Darwinian theory of evolution, seeing "the idea of evolution" as a turning point in the history of philosophy (*CP* 5.18). His logic of scientific induction was based on a prior abductive inference which he thought was grounded in man's natural tendency to make correct guesses. For Peirce, the method of abduction, of guessing at plausible hypotheses, is a product of our biological evolution. Man has evolved with a special

faculty for divining the ways of nature, the knowledge of which would have an immediate survival value. This is our only way of explaining the plausibility of hypotheses and the limited range of permissible hypotheses. Without such faculty man must search for explanations in the dark, blindly groping without the benefit of natural clues that successfully evolved within nature itself. If we had "to search blindfold for a law which whould suit the phenomena, our chance of finding it would be as one to infinity" (*CP* 6.010).

Induction presupposes the ability of self-correction. Peirce argued that the success of inductive self-correction is dependent upon an assumed natural tendency to guess the truth:

> It is certain that the only hope of retroductive reasoning ever reaching the truth is that there may be some natural tendency toward an agreement between the ideas which suggest themselves to the human mind and those which are concerned in the laws of nature. (*CP* 1.81)

The importance of abduction stems from the circumstance that induction is impossible without prior abduction, but also that inductive self-correction is impossible unless the abductions are made in such a way as to converge towards truth.

Self-corrective induction tends towards the truth in part because our mental habits and instincts have naturally evolved so that we can survive in the world in which we happen to live. Therefore, induction is, in Peirce's view, at least partly grounded in a natural tendency or natural faculty of man. "... all human knowledge, up to the highest flight of science, is but the development of our inborn, animal instincts" (*CP* 2.754).

The naturalism of Peirce consists in the fact that he attributes to man an insight into the ways of nature; and he calls it insight

> ... because it is to be referred to the same general class of operations to which Perceptive Judgments belong. This faculty is at the same time of the general nature of Instinct, resembling the instincts of the animals in its so far surpassing the general powers of our reason and for its directing us as if we were in possession of facts that are entirely beyond the reach of our senses. (*CP* 5.173)

The logic of inquiry is therefore ultimately grounded in the faculty of instinctive reason, "a natural bent in accordance with nature's." In this regard, as a philosopher of induction Peirce is much more akin to Wittgenstein than to Hume. All three seemed to agree that inductive reasoning is something instinctive or habitual, even something animal. While Hume had denied any

justification to such habits, Wittgenstein insisted that such habits are precisely the grounds we accept for induction. Peirce would agree with Wittgenstein that induction is thus biologically grounded, but he also provided reasons for the convergence of such inductions towards the truth in the long run.

But Peirce's reasons for such convergence have been challenged by many contemporary philosophers, most notably by Quine who argued against the idea of infinite inquiry yielding a unique result in the long run, for

> ... we have no reason to suppose that man's surface irritations even unto eternity admit of any one systematization that is scientifically better or simpler than all possible others. [...] Scientific method is the way to truth, but it affords even in principle no unique definition of truth. Any so-called pragmatic definition of truth is doomed to failure equally. (Quine 1964:23)

Quine's argument is based on his verification theory of meaning and his nominalistic ontology. If words and sentences possess only verificational meaning, then, with "a chapter length of observational language" (Quine), the end of inquiry still remains simply the production of practical effects (individual reactions) and cannot serve as the representation of reality, that is, the development of true theories. But, in Peirce's view, the real objects are not individuals as Quine assumes in his ontology, but the laws and generalizations they instantiate. To say that reality is the same because the same empirical consequences verify the generalization is not to say that reality consists in these consequences or that what it is can be expressed in terms of them. For only the verificational meaning and not the ultimate meaning of the generalization can be expressed in these empirical consequences.

Starting from Peirce's realistic ontology and his semeiotic or general theory of meaning, a distinction between verificational meaning and ultimate meaning can be maintained and Quine's charge of phenomenal reduction can be rebutted. Different theories that are empirically equivalent would contain equivalent generalizations and, therefore, represent the same reality. This is, for Peirce, how sufficient inquiry ultimately yields a unique result and attains convergence towards final truth.

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PERCEPTION, CONCEPTION AND LINGUISTIC REPRODUCTION OF *EVENTS* AND *TIME:* THE CATEGORY OF VERBAL ASPECT IN THE LIGHT OF C.S. PEIRCE'S THEORY OF SIGNS

NILS B. THELIN

> The elements of every concept enter into logical thought at the gate of perception and make their exit at the gate of purposive action; and whatever cannot show its passports at both those two gates is to be arrested as unauthorized by reason. (*CP* 5.212, 1903)
>
> ... thinking is essentially the activity of operating with signs. (Wittgenstein 1958:6)
>
> ... the structure of time depends on the conceptual framework that is employed in the determination of the events which [...] form the basis of that structure. (Kamp 1979:391)

1 *Language as Sign Operating System*

Recent developments towards cognitive-procedural models of linguistic functions and their integration with pragmatic conditions (cf. Thelin 1985) may, in important respects, be said to have been anticipated by Charles S. Peirce's theory of signs. Representing in essence a pragmatically based *theory of cognition* (Fitzgerald 1964), Peirce's teleological, triadic understanding of *semeiosis* (Savan 1976; Parret 1983; Shapiro 1983), and more specifically, his concept of INTERPRETANT as a mental activity of interpretive translations mediating between SIGN and OBJECT, expressed indeed an advanced hierarchical-operational view of the systemic relations between expression-form and content-form in language.

Although proceeding primarily from the interpretive 'effect' of signs upon the interpreter, which rather applies to processes of linguistic *decoding,* Peirce's dynamic, hierarchical-componential understanding of thought-signs (*CP* 1.284-289; 5.284; 7.351ff.) allows for a corresponding treatment also of the opera-

G. Debrock and M. Hulswit (eds.), Living Doubt, 257–273.

tions underlying the processes of *encoding* (i.e. linguistic *signification* proper). Thereby it suggests a general basis for semantic theory. This evaluation of Peirce's semeiotic is supported by the fact that it also includes in a coherent way a component of *perception* (*CP* 5.115; 151; 182) which was only recently recognized by linguists for its impact on the structure of meaning (Miller & Johnson-Laird 1976; Jackendoff 1978; Bierwisch 1980a; Bierwisch 1980b; Thelin 1985:162ff.).

Against this background, it appears meaningful to investigate to what extent empirical support for current linguistic theory formation may be established by referring to its systematic equivalents in Peirce's semeiotic distinctions. As an alternative to the dominating verb-semantic and semantico-syntactic understanding of verbal aspect in the Aristotle-Ryle-Kenny-Vendler-Dowtyan [...] tradition, the following treatment proceeds from an outspoken temporal-perspectival view and intends, therefore, to shed some light on the cognitive-pragmatic correlates of the semantic distinctions realized by this category. Accordingly, we have chosen to base the following observations of the aspect category - in traditional grammar represented by the distinction between *perfective* vs. *imperfective* verbs - on an integrated understanding of grammar, embedding language as a sign operating system in the continuum of human perception, conception and action/interaction (including verbal action/interaction).

For this purpose let us assume that the path of sense-making thought can be likened to an infinite process of sign production and reception, that is generated by human needs and desires, and by the satisfaction of these, and that is pursued by activities of individuals within a community on the basis of present and past experience. More specifically, this process may be assumed to have the shape of a hierarchically ordered, goal-oriented succession of evaluative decisions mediating between *signans* and *signatum*, and interpreting in this way the relation between the latter in terms of *binary* choices. The idea of conceptual oppositions had, as a matter of fact, been suggested by Peirce himself as "a very pivot of thought" (*CP* 1.324ff.), albeit that he restricted the idea to the universal category of 'Secondness.' In its broader application, binarism is thus understood here to be based on cognitive components of oppositional nature functioning as abstract (deep structure) signs and determining one another through the principle of (minimal) *resemblance* (*CP* 1.566-567; 7.349; 5.162; Wittgenstein 1914-16/1969:183). In other words, binary features define linguistic signs by way of *inclusive differentiation* (Thelin 1987:106-107), reflecting thus the 'asymmetric nature' of linguistic signs as suggested by Karcevskij (1929).

One basic feature of sign interpretation appears to be its constant operational access to past signitive experience in treating current signitive ex-

perience. This feature allows for the hypothesis that sign interpretation (in decoding as well as encoding) may be modelled adequately in the form of a cyclic feed-back process of constructive, pattern-fitting search operations (Thelin 1985). The latter would be based on cognitive *decomposition* as the decisive strategy for handling the reception, storage and retrieval of signitive data: "A large, and maybe the biggest part, of the business of our understanding consists in the *decompositions* of concepts ..." (Kant 1787/1899:47).[1] It appears resonable that the principle just assumed for every-day signitive life of verbal communication should allow for an abstraction so as to apply also to the meta-level of signitive life represented by the historical process of theory formation in language semiotics, as vehicle of any epistemology. Indeed, the latter process is reflected in part by the former assumptions. Therefore I consider it useful, also for the restricted purposes of the present discussion, to provide at least a certain degree of feed-back from the past experience of meta-signitive life.

2 *On the Cognitive-Pragmatic Nature of Peirce's Interpretant*

It is no secret, thus, that Peirce's operational concept of *interpretant* as the important basis for his dynamic-creative view of language was criticized for "making logic a question of psychology." This criticism was refuted by Peirce himself (*CP* 5.110) who (in harmony with his view of pragmatism as a logical and semeiotic doctrine) maintained that "logic does rest on certain facts of experience among which are facts about men, but not upon any theory about the human mind." It is remarkable, therefore, that Morris (1946: 27,287ff.) also after having refined - under the very influence of Peirce - his original simplistic behaviorist approach to semeiotic (in its pragmatic aspect; cf.Morris 1938/1971:44ff.), found it meaningful to continue this criticism by giving explicit preference to Peirce's "emphasis upon behavior" as distinguished from his "more mentalistic formulations."

Proceeding from his "bio-social" understanding of psychology, Morris (1946:230) apparently did not fully recognize the cognitive status of logical-abductive operations implied by Peirce's concept of *interpretant.* Although Morris adopted this term, as well as Peirce's general pragmatist framework (cf.Parret 1983:11,103), he still reduced its inherent dynamism to a matter of "disposition to respond," accommodating it rather to the static two-term relations between *stimuli* and *responses* (1946:30,288) than acknowledging its nature of hierarchical-processual mediation fulfilling, by way of cognitive op-

[1] "Ein grosser Theil, und vielleicht der grösste, von dem Geschäfte unserer Vernunft besteht in *Zergliederungen* der Begriffe ...".

erations, the function of goal-oriented, creative-evaluative interpretation.

It is true that Morris (1946) introduced a descriptive framework "for the differentiation of modes of signifying in terms of differences in interpretants," which he conceived of as "tendencies to respond" (Morris 1946:62). The latter formulation could, indeed, be compared to Peirce's concept of *habit* (and 'Thirdness') applied to interpretants, but it is important to note that (except for a few cases where hierarchization in interpretants is indeed suggested (Morris 1946:157, 165)), Morris' approach to semiotic relations remains static-structural rather than processual-analytical. This restriction remains, in spite of his important endeavor to integrate here his previously distinct aspects of semiotics in terms of *pragmatics, semantics* and *syntactics* (Parret 1983:11,103). Although Morris does make use of the concept of 'sequentiality,' he restricts its application to superficial responses (Morris 1946:12). It seems, indeed, as if the hierarchical-processual nature of signification is in a way latent in Morris' conceptual framework, although suppressed by his tacit avoidance of any explication of the concept of *mediation* that might be related to a chain of sign interpreting operations and thus identified with the 'mentalist' concept of *associative thought* (*CP* 5.284).

Against this background, Morris' criticism of Peirce's 'mentalism' could probably be reduced to a matter of terminological dispute, although it may also reflect an objectivist attitude originating in remnants of logico-empiricist philosophy (Parret 1983:103). As pointed out by Parret (1983:105), "as against mentalism and psychologism, the interpretive aptitude is recognized only as finality or as action. [...] Indeed, pragmatically based semiotics is, in fact, a logic of action, especially the action in thoughtful discourse."

3 Peirce's Logic of Action and the Development of Functional Grammar

Understood thus as "a logic of action by interpretation" (cf. Parret 1983:93), Peirce's conceptual framework, indeed, anticipated recent developments in linguistics, that have moved away from the staticity and immanentism of *axiomatic structuralism* (represented by the Saussure-Hjelmslev tradition) towards the dynamism and hierarchical coherence pursued by *truly functional structuralism* in processual models of language based (as distinguished from TG) on the structural primacy and cognitive-pragmatic dependency of semantics. One of the earliest and most courageous advocates of this orientation was Chafe (1970).

It is important, however, to recognize that - parallel to the suppression of corresponding tendencies with Morris - these developments were preprogrammed already in American as well as European structuralism by the idea of *hierarchization* introduced, for example, by Bloomfield's concept of 'ar-

tificial basic forms' and Trubetzkoy's 'archiphoneme' within predominantly taxonomic-distributional frameworks.

The decisive step from 'item-and-arrangement' to 'item-and-process,' however, was never taken by classical structuralism. Even Jakobson (1948, 1957/-1971), although his postulation of abstract underlying morphonological units and corresponding rules for the analysis of the Russian verb indeed presupposed processuality and thus was a challenge to traditional distributionalism (Thelin 1975:152ff.; 1978:243ff.), seemed to hesitate as to the consequences of his proposals for the further development of linguistic theory formation. Although the concepts of *hierarchy* and *process* were present in his writings (Jakobson 1936/1971:35; 1957/1971:143), he never applied them in any coherent fashion in his descriptive models. The latter circumstance is evidenced, for example, by the fact that his rules remained *unordered* (Thelin 1987:92). The reason for this ambivalence may - similar to the case of Morris - have been the tacit avoidance of a possible association of hierarchically ordered 'grammatical processes' (cf. Jakobson 1957/1971:43) with an assumption of corresponding cognitive operations.

However, "... hierarchy is possible only through construction, through operation. Operation is the transition from one element to another in a sequence of forms. Operation and sequence of forms are equivalents" (Wittgenstein 1914-1916/1960:164,174),

One of the first linguists to express more explicitly a corresponding idea of language was, in fact, Benveniste. He maintained that

> ... nothing prevents us from believing [...] that linguists in language structures will find laws of transformations (compare Peirce's 'habits;' NBT) similar to those which allow one - in the operational schemes of symbolic logic - to proceed from one structure to another derived structure and establish constant relations. (Benveniste 1954:50)

Long before Benveniste, scholars like Wilhelm von Humboldt (1876:79-80; 99-100), Sapir (1921:138) and Brunot (1926/1936:XII,XX) certainly had expressed in various ways the dynamic understanding of language as the translation of concepts into linguistic symbols. Indeed, not unlike Peirce, Humboldt had seen language as purposive, creative action.

While acknowledging the importance of Jakobson's 'discovery' of Peirce and his prediction of the epochal role to be played by his semeiotic thought for the development of linguistic theory (Jakobson 1965/1971:346; Shapiro 1983:6ff.), we must not overlook the fact that Jakobson's rather modest interest in Peirce's distinction between *icon, index* and *symbol,* and, particularly, his preoccupation with the concept of *iconicity,* was bound to neglect the

CREATIVE, HIERARCHICAL-PROCESSUAL VIEW OF SIGN INTERPRETATION so essential to Peirce's semeiotic thought and so crucial to the current development of linguistic methodology.

The latter view was conveyed, I believe, in a pertinent way already by Wittgenstein's (1914-1916/1960:183) statement that "the concept of operation is, in general terms, the one through which signs can be formed according to a rule."

4 On the Status of Iconicity in the Category of Aspect

Against this background it is not surprising that the very first attempt to connect Peirce's semeiotic with temporal meanings relatable to the grammatical category of *verbal aspect* was undertaken by Jakobson (1965/1971:350) precisely in terms of *iconicity* (cf. Hopper 1979:214; Shapiro 1983:4; Haiman 1985:4,89-90,100-102). By applying the concept of icon to the overt correlation of temporal order between speech events and narrated events (his example *Veni, vidi, vici*), he suggested that the latter are 'mirrored' by the former, i.e. that "the relations in the signans correspond to the relations in the signatum."

This observation of Jakobson is important, and it is supported by his reference (Jakobson 1965/1971:350) to Peirce's general statement that "the arrangement of the words in the sentence [...] must serve as icons, in order that the sentence may be understood." However, the iconic function observed appears to have a restricted validity. If one overlooks the complications caused by typological and language-specific differences in word order, one may agree that syntactic order as icon of temporal-logical order certainly is no coincidence. It is dependent, however, on the imperative linearity of speech. Due to the latter, syntactic order must prevail also where no corresponding temporal-logical order is at hand, for example, in cases of simultaneous events. Here iconicity is ruled out, at least in regard to temporal relations.

More serious, however, is the fact that this kind of inductive application of Peirce's semeiotic (i.e. in terms of a static one-to-one relationship) - although understandable especially in regard to iconicity - misses the crucial relation of signans and signatum to the dynamic concept of *interpretant* in his triadic system of sign function. Without the assumption of a corresponding interpretive-transformational history of such linguistic expressions as *Veni, vidi, vici*, the latter remain conceptually unrelated to their broader, situationally motivated temporal-perspectival function in discourse and corresponding semantic essence; i.e., from a pragmatic-semiotic point of view, - to the very heart of aspectual distinctions (Kamp 1979:381,401,407-409). Now, Jakobson's analysis was certainly not intended to contribute to aspectology, but *de facto* it made the suggestion that aspect, since unambiguously conveyed by overt

temporal succession of events, involves in some non-trivial way the concept of icon. That this idea is not a mere hypothetical construction is evidenced by its appearance in recent aspectological work (Hopper 1979:214; 1982:15).

Haiman's (1985:4,100-102) attempt to associate (by referring to Hopper) simultaneity (understood as aspect) and backgrounding along a second axis of prominence (in addition to the axis of time) does not, apparently, justify his conclusion that "languages may also iconically display simultaneity." On the contrary, (as observed by Haiman himself, p.89ff.) some languages in cases of simultaneity will even formally 'deny' iconicity. Haiman's conclusion overlooks two important conditions, viz. that a) simultaneity is not itself aspectual but rather contextually derived from aspect proper and is just one of the possible meanings implied by backgrounding (and is so only in cases of time-related, so-called actual background; see below), and, b) prominence (i.e. according to Haiman, simultaneity rather as 'non-prominence') is conveyed, thus, in such cases not by way of any mirror-like linguistic projection of 'real' events (as suggested by his application of icon here), but rather by the subject-dependent perspective, i.e. aspectual status, assigned to them by the speaking subject. What Haiman suggests is, in fact, that his application of icon to 'tense' (in cases of succession; p.89) should be expanded also to aspect (in cases of simultaneity).

However, the concept of icon does not seem to grasp in any straight-forward sense the more essential semantic relations between aspect expressions and their underlying content of temporal-perspectival analysis as an integrated part of the broader situation analysis and reflected thus by temporal-causal coherence (Kant 1787/1899:218-226) in discourse. How, for instance, could the concept of icon help us to deduce (Figure 2a) in a corresponding, logically associative way, temporally successive events from their underlying function of *situational change-of-state* (von Wright 1963, 1967) and corresponding *foreground function in discourse* and predict their typical realization through *perfective* aspect forms in Slavic, *simple* forms in English and *passé simple* in written French?

5 *Aspect as Temporal Perspective: the Distinction between Symbol and Index*

Apparently this condition can only be handled adequately if we assume that the capability of events to be ordered conceptually is determined by a distinctive component (or abstract sign) ascribed to them on the semantic level in logical-interpretive agreement with the superior perceptual-conceptual distinctions operated in the integrated situational-perspectival analysis. The qualification for such an aspect-semantic component is not implied by the concept of icon, but rather - as we shall see - by the indexical concept of *totality*, viz.

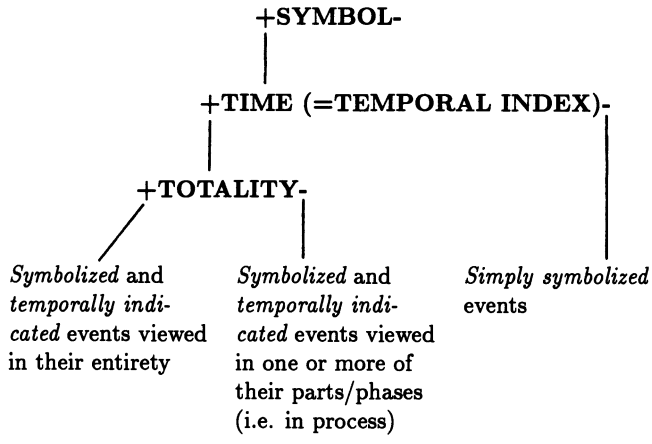

Figure 1: The simple tree of deductive interpretation

as means of delimitation.

Indeed (Figure 1), while iconic relations seem to be restricted in the grammatical category of verbal aspect, one would rather expect its perspectival nature to favor *indexical relations* (Parret 1983:124). In agreement with the theory of aspect underlying the present observations (cf.Thelin 1978; 1980; 1984a; 1984b; 1985; 1986; 1990a,b), the basic conceptual-semantic distinction of temporal perspective would thus determine whether events are either *symbolized* AND *indicated* as existent *in time* (+TIME) or *simply symbolized* (-TIME). The latter non-time-related perspective is typically realized in propositions of a general nature, pertaining to events simply stated or described as habits, backgrounded iteration, generic or gnomic features, etc.[2] If viewed as existent in time, however, events are analyzed further in a rather localistic way reflecting their perception in terms of wholes and parts (Gestalt theory). That is, reference is made to them either a) in their *entirety* (+TOTALITY) and thus delimiting them from each other as a prerequisite for their being sequenced, or b) in one or (potentially) more *parts* or phases of development (-TOTALITY or 'partiality'), conveying in the latter case the sense of ongoing process.

Realizing thus the distinction between Peirce's concepts of *symbol* and *index* (as well as their coexistence, here in time-related events) rather than *icon,* the simple tree of deductive interpretation in Figure 1 is assumed indeed to comprehend the conceptual-semantic essence of aspect understood as temporal-perspectival device in a universal sense and reflecting thus - especially in the distinction ±TOTALITY - Kant's "Anschauung *a priori*," mediat-

[2]For some interesting observations in this connection, see Wittgenstein (1969:216-17).

ing in the form of "transcendental scheme" between immediate perception and rational categorization of time (Kant 1787/1899:73,79,88,92,98ff.,173). Typological and language-specific variation is treated, accordingly, as pertaining merely to surface conditions such as different strategies for balancing situational/contextual predictability and formal redundancy (Thelin 1986:219-21) as well as to the morphosyntax of (very often polysemic) aspect expressions (compare in Figure 2 the corresponding conditions adduced for Slavic, English and French).

6 Towards a Cognitive-Pragmatic Model of Aspect

As indicated already and now developed further by Figure 2, the process of aspect-semantic interpretation of individual events (according to Figure 1) has to be integrated into the broader cognitive-pragmatic process of situation analysis and the corresponding temporal-perspectival organization of discourse (for a detailed account, see Thelin 1990a). This process is assumed to be based on the distinction between *phasal* and *non-phasal* situation (i.e. motion vs. rest, or, in conventional linguistic terms, activity vs. state) and a subsequent set of change-of-state distinctions (somewhat simplified in this presentation). This yields a tentative reinterpretation, by change-of-state distinctions, of the traditional discourse functions of temporal perspective, correlated in turn with the aspect-semantic features ±TIME and ±TOTALITY, viz. *foreground* and *background,* in the latter case differentiated as *actual* and *proper background.* As can be seen from the examples, these perspectives are represented here by the phasal situation (non-stativity) of 'smoking' and the two non-phasal situations (stativities) of 'being' and 'knowing.'

For practical reasons, the application of the model illustrated here is restricted to the past tense, but it can certainly be extended to the present and the future tense, as well. From the basically free combinability of *aspect* features and *tense* features (±PAST, ±FUT) there is one single exception, viz. the well-known incompatibility of +TOTALITY and the present tense (i.e. -PAST, -FUT) meaning. This incompatibility may be explained in a natural way by the underlying pragmatic-perceptual condition that events taking place simultaneously with the moment of speech are *not* as a rule surveyable in their entirety, but can be referred to only in regard to that very part or phase of their development that coincides with the moment of speech (i.e., in terms of aspectual partiality: -TOT). That is why English (aspectually polysemic) simple forms in the present tense normally express non-time-related (-TIME) meanings (such as, for example, habituality) and are capable of expressing time-relatedness and totality (+TIME, +TOT) only in cases of so-called 'temporal transposition,' such as the *reportive* and *performative* uses (Thelin 1982;

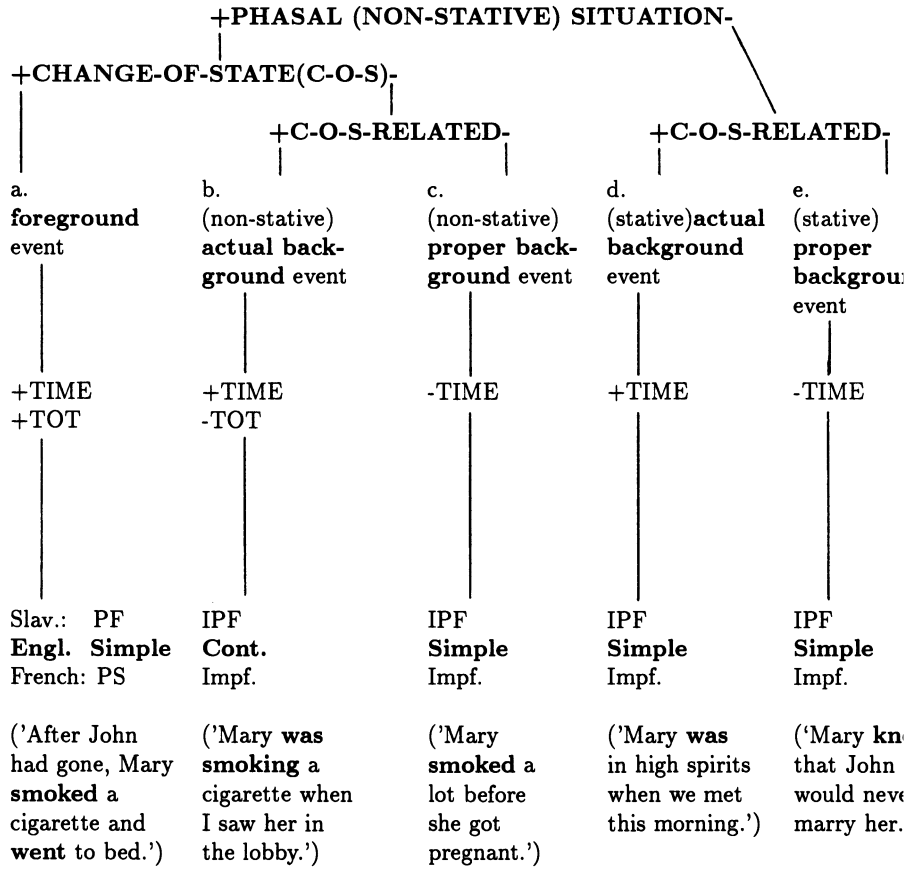

Figure 2: Deduction of aspect expressions for Slavic, English and French

1990a; 1991).

Furthermore, this model can easily be integrated with the temporal category of *taxis* (i.e. the oppositions ±ANTERIORITY, ±POSTERIORITY), realized in the so-called 'perfect' system by the feature +ANTERIORITY in the combined tense-taxis meanings of the pluperfect, the present perfect and the future perfect (Thelin 1991).

By extending the range of application from simple to complex text structures, the model naturally allows for the hierarchical embedding of superficially contradictory feature combinations, as in cases of non-time-related (-TIME) events when realized, for example, in Czech habitual expressions or Russian proverbs by perfective aspect forms (conveying +TIME, +TOT) thus assigned an aspectual meaning of concrete exemplification subordinate to the contextually given meaning of non-time-relatedness: [-TIME (+TIME, +TOT)] (Thelin 1985:189ff.; 1990b).

Whereas the superior situational distinction ±PHASAL SITUATION is conceptually *independent*, change-of-state conditions are conceptually *dependent* on the perspectival organization of discourse and the corresponding aspect-semantic interpretation (according, in turn, to the underlying cause-effect analysis and its intentional dependency). For example, what to someone may appear to be a state-changing foreground event, to someone else could very well appear to be just part of a process related directly to the foreground, but not qualifying for a new state of affairs (i.e. rather actual background), or, it may even be viewed as a proper background condition only indirectly related to the foreground. Under these circumstances, it may very well be possible to fuse change-of-state distinctions and discourse-perspectival distinctions, but before we can answer this question, future research must explore more closely the latter distinctions and, in particular, the broader concept of background (Thelin 1990a).

7 *Concluding Confrontation of the Model with Peirce's Trichotomies of Categories and Signs*

On this basis it appears possible now to conclude that an aspect theory such as the one suggested by Figures 1 and 2 is supported not only by Peirce's distinction between *symbol* and *index* (as well as their coexistence) but, as we shall see, also by his trichotomy of universal categories in terms of 'Firstness,' 'Secondness' and 'Thirdness.' The conception of events according to the distinction ±PHASAL SITUATION - itself a transitional (Kant 1787/1899:173) discriminating device and 'Second' - can be said to be determined (at least in some sense) by their physical nature or, according to Peirce (*CP* 1.302ff.; 7.625ff.),

by the independent 'Qualities' of 'Firstness' in immediate perception.[3] The analysis of change-of-state conditions and the temporal-perspectival organization of discourse, however, have been shown to involve those higher degrees of conceptual dependence ascribed by Peirce to 'Thirdness.' Such delimitation is not absolute, of course, but hierarchical in nature.

Furthermore, Peirce's understanding that 'Firstness' is "without parts" and that 'Secondness' implies "modification" (*NEM* 4.332) perfectly agrees with our assumption that *phasality* (i.e. motion) as undivided, continuous 'First' is subjected to *partitioning* (in a wider sense of segmentation; Bergson 1911:32;30 Thelin 1990b) only by the aspect-semantic analysis in terms of the opposition ±TOTALITY as 'Second.' As subsequent specification of the superior interpretion +TIME (= +TEMPORAL INDEX), the features +TOTALITY and -TOTALITY conform further to Peirce's concept of 'Pairedness' as synonym to 'Secondness,' viz. "which belongs to one subject in one way and to the other in another way" (*NEM* 4.332-3). In addition, Peirce said of one of the two modes of 'definiteness,' which he ascribed to the *percept* (as distinguished from the *perceptual judgment*), that it is "perfectly explicit." This explicitness is conveyed precisely by the perceptually based but conceptually dependent distinction ±TOTALITY as representing 'Secondness.' The superior distinction ±TIME, however, as the result of further generalization conforms rather to Peirce's concept of *perceptual judgment* and thus qualifies for his category of 'Thirdness.' This condition would, as indicated already, pertain also to the change-of-state distinctions.

If we return now to the level of events resulting from their being interpreted by the preceding perceptual-conceptual operations, which correspond to Peirce's trichotomies of categories and signs (in their relations to their objects), i.e. if we consider the resulting narrated events (compare our English examples in Figure 2), we may correspondingly ascribe to them regularities, or, in the terms used by Peirce, 'final interpretants' in conformity with his universal categories and his corresponding trichotomy of signs, considered now as they are in themselves, viz. as *qualisigns, sinsigns* and *legisigns.*

Accordingly, time-related events, appearing in the foreground and the actual background of discourse, represent 'Secondness' and function as *sinsigns*, i.e. they typically convey such concrete meanings as contiguity, limitation, singularity and actuality (*CP* 1.24-25; Shapiro 1983:30,34). Applicable directly to this interpretation is Peirce's definition of sinsigns as "an actual existent thing or event which is a sign" (*CP* 2.245).

Under these conditions, non-time-related events that appear in the proper

[3]For a discussion of the controversy between 'echologists' and 'intentionalists,' see (Thelin 1985:162ff.)

background of discourse, most naturally conform to Peirce's category of 'Thirdness' and function, accordingly, as *legisigns,* i.e. they typically convey such meanings of abstraction as universality, generality, law, rule, permanent state and habit. Peirce's formulation "Action is second, but conduct is third" (*CP* 1.337) may thus be equalled to the classical distinction between *narratio* and *descriptio* as the two basic modes of literary design, correlated in turn to the two temporal perspectives of *foregrounding* and *backgrounding,* respectively (Thelin 1984b).

Another important conclusion we may draw is that Peirce's concept of icon is not apparently constitutive of aspect-semantic distinctions as such, but involved here only in the elementary sense of 'Firstness' expressed by him (*CP* 5.119) so that "every symbol must have its Indices of Reaction and Icons of Quality." In our case such iconicity would pertain then to *the relation between* the primitive perception of events as 'Firstness' and their perceptual-conceptual discrimination assumed by our 'transitional' distinction ± PHASAL SITUATION as 'Secondness.'

The framework sketched above for a theory of aspect in terms of temporal perspective (rather than in terms of verb-semantic or semantico-syntactic conditions) may, consequently, be said in non-trivial ways to be evidenced empirically by the very core of semiotic distinctions postulated by Peirce. The systematic nature of this evidence follows thus from the condition that his observations of relevance for aspect semantics originate in these basic distinctions rather than in his sporadic occupation with the concept of time. Time is of concern to Peirce mainly as constitutive of the process of thought itself (*CP* 7.346-353), including thus the important concept of change. His understanding of time as true continuum in a sense anticipated Bergson's important distinction between intuitive and spatialized time (Bergson 1911:32), and is perfectly consistent with the process of partitioning is cases of phasal situations by way of totalization/partialization as suggested above.

To sum up, it appears reasonable to establish that the above application of Peirce's semeiotic to the grammatical category of aspect as one central issue of current linguistic research (Thelin 1990a) has revealed important equivalents of basic, epistemological nature in the aspect-theoretical framework considered. It would be encouraging if these observations were to receive some attention that would go beyond aspectology. Thus they would corroborate - in more dynamic ways than could be foreseen by Jakobson - the qualities of Peirce's semeiotic thought as empirical guidance for the present development of the cognitive-pragmatic foundation of linguistics.

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A SURVEY OF THE USE AND USEFULNESS OF PEIRCE IN LINGUISTICS, IN FRANCE IN PARTICULAR

JOËLLE RÉTHORÉ

> The general impression of the state of the art one gets from reading the various contributions is that the pendulum of linguistics in the USA has swung once more. After the theory-oriented 60's and 70's, the current, pragmatically and data-oriented linguistics is rather critical of generative theory.
> [T]he problem of linguistic methodology is not to affirm the priority of the theory – or data – oriented approach, but to find a balance, a dialectic cooperation of both ... (Ramat 1987)

1 *An Assessment of Linguistic Research as it appears in the Literature published in French in the 80's, based on the Selection of Five Relevant Articles*

1.1 *C. Hagège*

The work of C. Hagège (Hagège 1984) offers a fairly good assessment of the debates that are currently raging within the community of linguists in France. Those debates primarily concern the various linguistic epistemologies that are presently prevailing. One of the major issues in those debates, from which the name of C.S. Peirce is conspicuously absent, is that of the gap between the linguistics of "langue" and the linguistics of "parole." Hagège, who deplores that the debate is waged in terms of the opposition between these two linguistics and who points out that the interdependence of "langue" and "parole" argues against such separation, proposes the elaboration of *prolegomena* to a "socio-operative" linguistic theory. He introduces the concept of "psychosocial utterer," i.e., a concept reflecting the activity of "parole" against the background of a system which, while adopted by society, must nevertheless be seen as being constantly and dialectically remodeled by the individual speakers that make up society. Such theory would provide a global description of "faits de langue" in a manner such that these be connected with "faits de parole" within one vast linguistic "territory."

G. Debrock and M. Hulswit (eds.), Living Doubt, 275–288.

From reading Hagège, it would appear that there is no reason why the opposition between the semiotic and the semantic domains should be maintained (Ducrot 1979);[1] i.e., why the sign should be the semiotic unit and the sentence the semantic one. I will not insist on this point which I have already dealt with in another paper (Réthoré 1988). Suffice it to say that Peirce provides us with enough good reasons to drop this ill-conceived opposition.

If we are to believe Hagège's references, the history of the science of pragmatics begins with the work of Austin and Searle (1962), and then continues in the work of Ducrot (1972), Grice (1975), Récanati (1979) and Berrendonner (1983). But even then, he thinks these studies are not clear in respect of the limits of pragmatics.

1.2 M. Grochowski

In 1988 Grochowski (Grochowski 1988) published an article on semantic conventions, referential conventions and explanations for the naming of artefacts, all of which he subsumes under the set of what he – rather vaguely – calls "linguistic conventions relatively to different domains." But, so it would appear, these various conventions roughly coincide with the dimensions which were brought to light in Peirce's categorial analysis, but with one major difference, viz. that Grochowski's model of relation is fundamentally dyadic. Although, strangely enough, nothing that is important in the field is forgotten or discarded in Grochowski's analysis, the fact remains that his method does not and cannot provide the means to clarify the semiotic nature of the whole, as Peirce's methodology does.

Grochowski does correctly realize that there exists (i) a system of *formal* relations between linguistic units. These relations are called "grammatical conventions" and they may very well be seen to correspond to Peirce's analysis of the representamen as priman. There also exists (ii) a system of *significant* relations between linguistic units, which Grochowski calls "semantic conventions." This is the domain of the analysis of what Peirce calls the immediate object. Thirdly there is (iii) a system of relations which are called *referential* relations, i.e., relations between linguistic signs and the classes of extra-linguistic objects and states of affairs to which the signs refer. This clearly corresponds to the relation between what Peirce calls the representamen and the dynamic object, i.e., the secundan element in the sign. Fourthly (iv), Grochowski attributes some importance to a system of pragmatic relations which hold between the different types of linguistic behavior of the users of a language (types which are of the nature of speech acts), and the types of extra-linguistic states of

[1] Ducrot, for his part, discusses the opposition between the semantic and pragmatic domains (Ducrot 1980).

affairs that are "formed" by such behavior. This may very well be seen as a parallel of the dyadic relation between the dynamic object and the logical interpretant, provided there is a justification for raising it to a specific level of analysis. It might be more fruitful, so it would seem to me, to consider this relation as triadic, i.e., as the result of the interpretant apprehending the relation between the sign and its real object, for in that case it encompasses the three dimensions of semiosis all at once.

All in all, it would appear from this brief survey of Grochowski's suggestions, that he is not far removed from a Peircean point of view. But, clearly, he is not aware of this, since Peirce does not appear in his list of references.

1.3 Barbara Stanoz

In the very same issue of *Langages* (Stanoz 1988), Barbara Stanoz re-opened the debate regarding the primacy of oral versus written language. Following Ronald Langacker (Langacker 1973), she considers writing as a secondary mode of representation of language. By doing this she runs against the tide of both the structuralist and the Chomskyan traditions. J. Lyons, for instance, views writing as a language of its own, not as the mere transcription of a language, his argument being that a perfect isomorphism between writing and speaking is impossible. Moreover, following the Prague Linguistic Circle and the glossematicians, Lyons also thinks that written languages, in spite of their being derived from oral language, are both structurally and functionally autonomous.

Contrary to this, Stanoz essentially tries to show that, in practice, it was always the written aspect of language that constituted the real object of linguistics, and this in spite of all programmatic statements to the contrary. Useful as her point may be, the discussion certainly is not particularly new, although her article may serve as a reminder that linguists have a tendency to lose track of their professed object.

1.4 J.-J. Courtine and C. Puech

Later in the year 1988, Courtine (Courtine 1988) and Puech (Puech 1988) each published an article on Glossolalia in the journal *Langages*. Courtine defines glossolalia as "mock-language, a façade, an appearance of language" (Courtine 1988:8); Puech speaks of "enthusiastic communication," the inspired speech of Plato's *Ion*: "As long as they are carried away in harmony and rhythm, they are overcome by Bacchic transport" (Puech 1988:28).

Apparently neither one of them is acquainted with the work of Peirce, and in particular with his views on successful communication between quasi-

minds in a space suffused with signs, nor do they seem to be familiar with David Pharies' analysis of the iconic dimension of baby-talk (Pharies 1985). Nevertheless it is reasonable to assume that, had Puech known of them, he might have thought it useful to examine Peirce's conception of communication in relation to the glossolalic situation. For instance, Puech writes:

> In enthusiastic communication, as in the creation of 'quasi'- or 'pseudo'-languages, both the enunciating circumstances and the interaction of the viewpoints of speaker and interpreter are carried to the point of identity. (Pharies 1985)

I shall say no more on the analogy between the theories mentioned and the doctrine of Peirce, for glossolalic performance typically excludes meaning even though it may arouse the listener to the possibility of meaning.

1.5 C. Puech

Like Stanoz, Puech devotes part of his paper to the proper object of linguistics, though his angle is somewhat different. At the end of the nineteenth century, scientists tried to establish a ground of objectivity that would no longer be governed by a religious or moral ideal, but by the ideal of pure science and truth. An interesting illustration of this change of perspective may be seen in the convergence of the interests of psychology and those of the sciences of language.[2] This took place at a very crucial time in the development of theories of language, viz. when a general linguistic theory was formed that would no longer deal with *languages* (as was the case with historical and comparative linguistics) but that would focus on *language* (Puech 1988:30).

The question of determining the complete and concrete object of linguistics, which originally had been asked by Saussure, and the elaboration of the answer to that question, which according to Puech, is not a mere epistemological gap, presupposes "la linguisticité," i.e., *"l'un* des langues," the oneness of languages (Puech 1988:30).

Puech supports and continues the efforts made by Saussure to define the limits of synchronic linguistics, i.e., to isolate in linguistic 'matter,' the province of objectivity that falls within the new science and the distinctions that should mark the border between an inside and an outside. The latter issue constitutes a task that Peirce failed to tackle.

Another important divergence from Peirce concerns the issue of the origin of language. In an effort to set up a sort of ethics of scientificity that was meant to supplant all speculative attitude, the Société Linguistique de Paris, in one

[2]See the case of Hélène Smith in (Flournoy 1900).

of the articles of its statutes, explicitly forbids its members to deal with either the origin of language or the creation of universal languages. The reason for this decree was to discourage the community of scientists from pursuing those subjects, because it was assumed that all the answers that could possibly be given were either equi-probable or impossible. Puech correctly points out that there is an ambiguity in this formulation of the norms of scientific activity. For, surely, if it is impossible to discover the origins of language or to create a universal language, does it make any sense at all to forbid what is impossible? Although such assumptions may perhaps have made sense within the context of the debates of 19th century philosophy and linguistics, they have, according to Puech, never ceased to be examined. Indeed, the debates have taken two directions: a) there are those that center around the arbitrary nature of the sign (Pharies 1988:30); and b) those that focused the attention on the projects of creating artificial, and universal languages (Couturat & Leau 1903; 1907).[3]

The discovery, around 1880, of the blind nature of phonetic laws (the fact that they have no determined teleological orientation) on the one hand, and, on the other hand, the progress of anthropology (which extended the origin of mankind beyond any possible attestation regarding the presence or absence of language) played a decisive role in the decision to abandon the question of the origin of language. Now all research, which concentrates on laying bare the actual, observable working of language starts from the assumption that language is a continuous, creative process, and that the conditions of its present development do not essentially differ from what they may have been originally (Normand 1973:38). If we are to believe Puech's conclusion, the one and only remaining task is the study of the relation between language and thought. Perfect. But surely, had linguists condescended at an earlier time to examine Peirce's contribution to this matter, they might have found some interesting clues regarding the nature of that relationship.

Conclusion

This survey may appear all too brief. Yet its brevity is simply due to a lack of competitors in the field. Peirce's name is hardly ever mentioned by well-known French linguists (with the notable exception of O. Ducrot (Ducrot 1972:113ff) and F. Nef (Nef 1980)), and when it is, the work of the American philosopher is curtly dismissed, presumably because his work is considered to be irrelevant and/or outdated, or sometimes, – and worse – too obviously American!

Whenever one comes across a more serious reference, disappointment is

[3]37 species were registered between 1832 and 1902, by Couturat and Leau.

quick to follow. The scope attributed to Peirce's possible contribution is hastily reduced to a minimum. There are two primary reasons for this: (i) insufficient knowledge of his writings, which leads to seriously wrong interpretations, and (ii) an almost total absence of any acquaintance with the abundant secondary literature on the work of Peirce that has been published in different languages, including French, during the past twenty years. Generally speaking, the only French author named in references that deal with the work of Peirce is Deledalle. References to works in English do not go further than mentioning, once in a while, Greenlee's work on *Peirce's Concept of the Sign* (Greenlee 1973). One generally concedes the usefulness of the Peircean triadic concepts of Representamen, Object and Interpretant, and sometimes the Ground. But obviously, this makes the triad seem "paradoxical" because it implies (and falsely so) that the fourth notion (of Ground) contradicts the definition of the sign as an epitome of thirdness.

Now, it goes without saying that, whatever one's opinion may be about Peirce's possible contribution to the advancement of semiotic studies, any useful application of his concepts is contingent upon a competent understanding of the many (not just three or four) interrelated concepts he introduced. Similarly, a serious debate of the relevance of his work for semiotics demands as absolute prerequisite a correct understanding of his theory.

Having reached the inescapable conclusion that the foremost task of French Peirceans is to better acquaint French scholars with Peirce's views on language and its pragmatics, I shall try and assess what, in my view, are the most interesting aspects of his work that linguists of all persuasions should at least take into consideration, whatever they decide to do next.

2 *The heuristic Value of Peirce's Triadic Model when applied to Dyadic Models*

2.1 The Dimension of Interpretation

Peirce's semeiotic methodology can be used to bring to light some of the deficiencies and logical dead ends in which structuralist as well as generative concepts sometimes finally end up. For instance, I believe that any attempt to force pragmatic data into a dyadic theory of signs, which moreover serves as mere background, can only meet with failure. Pragmatic linguistics can hold only if the theory integrates the dimension of interpretation, i.e., both the interpretant and the interpreter, the latter being understood as both a subject and a social being, so that the interpretant and the interpreter form a logical locus where subjectivity and society intersect and merge with one another. Here, the term 'Interpreter' of course implies the presence of what,

for want of better words, we must call resp. the encoder and the decoder.[4]

2.2 The Theoretical Necessity of the Sign

Though I am by no means (have never been) a follower of Chomsky's, I must say he is one of the few linguists who, in my view, has found a good reason for not integrating the 'sign' into his grammar. Generative theory works without encoders, or interpreters, or signs, and thus has no need for a definition of a concept - the sign - on which it is not based; this is perfectly legitimate, within the bounds of such a theory.

But the position of those who, with Saussure, make a point of defining the sign as the indissoluble relation between 'signifiant' and 'signifié,' signifier and signified, and who therefore theorize on the basis of these two concepts, but then reject the legitimacy of the concept of sign on the grounds that it exceeds the limits of linguistic description proper, is more difficult to accept. Indeed, Saussurean linguistics does use the concept of 'valeur linguistique' ('linguistic value') which goes hand in glove with the sign.[5] Moreover, the notion of referent, which has played a central part in the development of structuralist theories by virtue of the reintroduction of an extra-linguistic dimension, would have been put to better use if it had served as a constant reminder that semiosis is a cognitive process. After all, the referent is what the sign *as a whole* represents; it is never the prerogative of, nor is it within the power of the individual signifier. So why should the concept of sign be left out, if it is the whole of the sign (not just its constituents) that justifies the theoretic conception of the referent?

In short, one might say that, by encompassing a broader field of reality, Peirce's triadic system lays bare a certain incoherence in the view of those structuralists that reject the sign while attributing a non-negligible functional importance to both referent and value, which can only be defined relatively to the sign, and to semiosis as the process that brings into play one or several individuals, each of whom is a cross-section of the society she lives in.

2.3 The Concept of 'Continuum'

In the 70s, a number of socio-linguists, in an attempt to break away from the clear-cut binary oppositions between +/- defended by the Prague School,

[4]The words 'encoder' and 'decoder' have a ring of communication theory to them, and as everybody knows, communication theory is heavily dyadic. But they are conveniently short and encompassing: the alternative is the awkward use of terms referring to specific concepts such as speaker, writer, actor, painter, etc.

[5]I do, by the way, agree with the Peirceans who interpret '*la valeur*' as a type of Interpretant.

Jakobson and his followers made an extensive use of the concept of 'continuum.' They[6] argued their case during a conference that was held in Paris in 1979. The concept of 'continuum' is of considerable interest, especially when used in relation to the concept of 'Interlanguage'[7] in Second-Language Acquisition, because it can be used to approach the concept of semiosis as an endless process of interpretation.

Unfortunately, it turned out that the idea that learning a second language should be seen as a 'continuum' was apparently to be taken for granted because none of the speakers apparently thought it necessary or convenient to provide a definition of the concept. Thus, although the term was repeatedly used, the concept was never put to use during the debate. Indeed, it was left out of print in the *Proceedings* of the Conference.

2.4 Peirce versus Saussure

Any attempt to reconcile Peirce with Saussure faces the problem of fitting a triadic theory into a dyadic theory.

In my dissertation, I have touched upon the comparison between Peirce and Saussure (Réthoré 1988a:597-604). More specifically, I have defended the view that the Saussurean concept of the signifié (signified) corresponds more to the Peircean conception of Immediate Object or Object "in the sign" than to his conception of immediate interpretant (Réthoré 1988a:599-600; 1988b).

Although this view differs from that of Jakobson, Greenlee, and probably a few other Peircean scholars, it is difficult not to see that the Peircean concept of Immediate Object comes nearest to what Saussure had in mind. Indeed, the signified which Saussure had previously called 'concept' and which he later would repeatedly call an 'idea' is as psychical as the signifier, to which it is united in our brain by association (Saussure 1979:98). Concepts such as 'house,' 'white,' 'see,' etc. taken by themselves, belong to psychology; they become linguistic entities only after they are linked to acoustic images by association (Saussure 1979:144). Now, this is exactly how Peirce defines the Immediate Object: it is "the Object as the Sign itself represents it, and whose Being is thus dependent upon the representation of it in the Sign" (*CP* 4.536); "it is the Object such as it is cognized in the Sign, and hence an idea" (*CP* 8.183). Compare this with the view of Saussure when he writes:

> ... a sequence of sounds is linguistic only if it is the physical medium through which an idea is expressed; taken in itself, it is merely the

[6]More specifically: N. Dittmar, from Berlin, J. Delofeu from Aix-en Provence, C. Perdue and J. Arditty, from Paris.

[7]'Interlanguage' was defined by L. Selinker (Selinker 1972), redefined as a natural language by C. Adjemian (Adjemian 1976), and as a vernacular by E. Tarone (Tarone 1979).

> subject matter of a physiological study. The same goes for the signified, as soon as it is separated from the signifier. [...] a concept is a quality of the phonic substance, as a specific voicing [sonorité] is a quality of the concept. (Saussure 1979:144-5)[8]

Peirce's Immediate Object is the concept which arises in the mind as the 'vague' predicate of all assertion, in need of the interpretant which will relate it to the haecceity (i.e., Dynamic Object) which has determined the representation. The immediate interpretant, on the other hand, is the "meaning" of *the whole* of the assertion (not only of the predicate that gave birth to a concept): it is the Ii which implements the mediating relation between sign and object; and this of course, cannot be done by the Oi, nor by the signified, because it is only an image of the predicate, i.e., a concept or idea. In this respect, it may be useful to remember that for Peirce, any constituent of the sentence (i.e., the grammatical subject as well as the actual predicate) may have a predicative, i.e., a semantically general function: and that is exactly what is meant by the signified. This means that to utter a 'pro'-position comes down to filling one or several blanks with pronouns endowed with an indexical value: e.g. <*Socrates is a man*> will best be analyzed as the conjunction of the two following predicates: "*what is spoken of*/IS SOCRATES" and "*which (=copula) is spoken of*/IS A MAN" (*CP* 2.354; Réthoré 1988:590). Another illustration of the same descriptive method, applied to a sentence with two subjects, yields the following results: <*Every man loves a woman*> analyzed into "WHATEVER *is a man loves* SOMETHING THAT *is a woman.*"

Surely, this shows how the concept of predicate is central to understanding the role of the immediate object relatively to the immediate interpretant, and how the Oi (as well as the signified) are purely passive while the I is active.

There is yet another good reason for questioning Jakobson's understanding of the signified as immediate interpretant. He defines the symbol as "essentially acting through the learnt, instituted contiguity of signifier and signified." This would indicate that, in his view but expressed in Peircean terms, the symbol acts through the contiguity between sign and immediate interpretant. This interpretation, however, is far removed from Peirce's conception of the symbol as one of the possible relations between a sign and its dynamic object. Indeed, according to Peirce, a symbol refers to its object by virtue of a law, generally an association of general ideas, and that law acts in such a way that the sign be interpreted as referring to that object.

Finally, I would like to examine a last reason that is given for translating Peirce's immediate interpretant into Saussure's 'concept' (or signified). The passage on which the reasoning is based is extracted from (*CP* 5.475), which

[8]Translation by J. Réthoré.

centers upon the word "significate" in a passage supposedly defining the immediate interpretant as "le signifié propre du signe." But in fact, in this passage Peirce is actually trying to define the interpretant relatively to the "problem of what the 'meaning' of an intellectual concept is," a problem which "can only be solved by the study of *the interpretants*, or proper significate effects, of signs" (the emphasis is mine). The Saussureans have conveniently overlooked the fact that, in this particular text, Peirce does not even mention the immediate interpretant. Indeed, what he is trying to define is the emotional interpretant: "The first proper significate effect of a sign is a feeling produced by it. [...] This 'emotional interpretant,' as I call it, may amount to much more than that feeling of recognition" (*CP* 5.475). Thus, not only is the immediate interpretant nowhere to be found in this passage, but there is nothing in Peirce's reference to the emotional interpretant that would suggest that he actually meant to refer to something resembling the immediate interpretant, and therefore to the "signifié saussurien."

This calls for one last remark on the topic of Peirce's epistemological position versus Saussure's: the dimensions of the interpretant as well as of semiosis are definitely lacking in the Saussurean and post-Saussurean conceptions of the sign.

Conclusion

One of the axioms of the phaneroscopy of the world of signs proposed by Peirce bears upon the essentially triadic character of all representation, which K.O. Apel (Apel 1988:37) has called the "three-place topicalization." This roughly corresponds to the three-place valency of the structure of external thought, which Peirce expressed in terms of the logical loci of Representamen, Object and Interpretant.

Such an axiom precludes any attempt at rescuing a binary conception of the sign by forcefully fitting a third element to it. This is, in my view, one of the reasons why, for instance, the concept of 'continuum,' is theoretically weak when it is merely superimposed upon the pair signifier-signified. This strategy cannot provide any serious answer to the problems raised by the failure of structuralist and generative epistemologies in their attempt to tackle sociolinguistic issues. But it *is* possible to validate the concept of continuum, by linking it to the synechist view of semiosis as process. Although this process may be said to be individual and discrete from an empirical point of view, because it is convenient to do so, it would be more proper to conceive of it as a process that is at once qualitative, dynamic and social.

3 Some Possible Uses of Peirce's Model in the Field of Pragmatics

Peirce's theory of assertion, which is a grammatical theory of judgments that is compatible with a triadic theory of signs, encompasses all three major current fields of research in what is called pragmatics: the first degree of indexical pragmatics (generally referred to Benveniste or Bar-Hillel), second degree pragmatics, which concerns the variety of possible interpretations of the same utterance (for instance, Grice), and third degree pragmatics or speech act theory pioneered by Austin and Searle. I shall limit myself to a discussion of the third one.

Although Peirce is not particularly prolific in terms of discourse analyses, or in the descriptions of continued semioses involving context-bound assertions, he is quite clear in expressing what should come first in the course of analysis. For instance his model grants a certain primacy to the illocutionary force of an assertion. This refers to the fact that, the speaker, in the very act of speaking, is conscious of thus immediately inducing a juridical transformation of the context of his utterance, in the sense that the words he uses will compel one of the protagonists at least to follow suit: it will be the addressee in the case of a question or a command, and the speaker himself, in the case of a promise.

The prominent place attributed to illocution needs to be justified. Now, it would appear that the only sort of model that can do this with some chance of success is a triadic one, such as Peirce has suggested: one in which there is a place and a function for the protagonists of the context of utterance, for their non-linguistic environment (material and abstract), for the material and non-material aspects of the utterance, for the logical and temporal process of encoding and decoding it, and for the description of its effects. These effects may be that (i) a series of representations is triggered off, each of which interprets the preceding one, and that (ii) the psychological and social status of the protagonists is modified ever so slightly each time.

I believe that any serious attempt at establishing a firm basis for pragmatic models must somehow recognize and discuss Peirce's phaneroscopic categories of firstness, secondness and thirdness. Indeed, the analysis of any semiotic act, i.e., of the process of the representation, the communication and the interpretation of a sign, reveals a complex of three distinct acts of consciousness, each of which belongs at one point or another, to one of the categories. Roughly speaking, there is the phaneron that represents, the phaneron that is represented, and the phaneron that refers one to the other. The representing datum (or sign) is a priman in its material characters, the represented datum (or object) is a secundan in the sense that it only is in as much as it is relatively to another, reacting to it. The relating datum (or interpretant) is a tertian,

because it mediates between the other two, gives a content to their relation and evaluates that content. A representamen is what represents, a representation is the relation between this representamen and its object as capable of determining a third, the interpretant, to apprehend that same relation (*MS* 491; Réthoré 1988:61).

Although consciousness is not fundamental to the correct apprehension of a sign (*MS* 599), no sign can be a sign unless it is interpreted, i.e., unless it in its turn determines a further sign (the interpretant) of the same object of which it is itself a sign. This new interpreting sign will itself function as a sign only if it too is interpreted. Consequently, no sign may be considered to be understood unless it gives rise to a virtually infinite series of signs *in futuro*.

General Conclusion

Now what can be the advantage of this model for the study of language and languages? The first and most fundamental advantage is that the model is synechistic, and thus clarifies the dynamic nature of language. Secondly, by being largely teleological, it acts as a permanent reminder of the presence, in semiosis, of human beings who each function as a crossroad of the society s/he lives in. For Peirce, this society is, despite all the conflicts of interests, driven by an agapastic purpose. That perhaps explains why he so repeatedly studied the same two sentences: <Cain killed Abel> and <Ezechiel loveth Houlda>.

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COLOR AS ABSTRACTION

JOSÉ F. VERICAT

Peirce was a man of obsessions. And, although his whole style of thinking and writing was non-systematic, it was never erratic, as it has sometimes been argued. Fundamentally it was obsessive, and only apparently diffuse and disperse. His enormous curiosity often leads us astray. But, no matter how esoteric or capricious his interest may appear, his work always sheds an unexpected light on some basic and enduring issues. The *synthetical* dimension of reasoning is one of them. Another, closely linked to it, is the issue of vision and color.

Color was one of Peirce's main obsessions. This fact is little known probably because most of his writings on the subject are still in manuscript form. But there is no doubt that during his entire life, color was one of the main points of his continuous reflection, research, and theoretical elaboration. It was a central theme in his chemical, physical and photometrical investigations; the basic paradigm in his conception of feeling and sensation; and a key logical and theoretical category in the development of his graph system. And – last, but not least – color was an object of his linguistic and aesthetical curiosity as well as an important source of metaphorical argumentation.

The most important of his writings on color were written between the late eighties and the first years of the twentieth century. Some of them formed the background to his article "color" in *The Century Dictionary* (1891-94). And, though apparently he entertained the project of writing a extensive treatise on the subject, as usual it did not get to see the light (*MS* 1022).[1]

The scientific framework of his approach to the problem of color consisted of Newton's triangle of spectral light divided into seven colors, Maxwell's theory of the sensation of colors on the basis of the wave lengths of the primary colors (red, green, and blue), Young-Helmholtz' theory of the three different nerves in the retina reacting to the three fundamental sensations of color (red, green and violet), and Fechner's law which stated the relation between the intensity of a sensation and the logarithm of the strength of the excitation. Fundamental also from an experimental and theoretical point of view, are

[1] "Memorandum of studies to be made on color."

I am indebted to the Houghton Library and the Harvard University Archives respectively, for the citations of Peirce's manuscripts and other archival sources.

G. Debrock and M. Hulswit (eds.), Living Doubt, 289–302.

O.N. Rood's *Modern Chromatics* – reviewed by Peirce for *The Nation* (1879) – and his own experiments carried out together with J. Jastrow "On small Differences of Sensation" (1884).

1 Color, Feeling and Sensation

As a matter of fact, we come to possess the quality of color through vision. And vision is a fundamental instrument of cognition. Now, cognition – in Peirce's conception – is an on-going process. When I perceive something I initiate a movement of merging with a reality which is already there in its process of being and becoming. Thus my perception and knowledge of this reality is not a static perspective from without, but rather from within, for both are at once part and product of this moving reality. And although cognition, of course, does follow laws, these are not constitutive but rather regulative. Thus, what we *immediately* perceive are not bodies or things, but *qualities.* This is why *feeling* and *sensation* are terms much more apt to explain the process of cognition than, for instance, matter and form, or analysis and synthesis. Cognition starts with *feeling.* At the very beginning of perception there is something *immediately present* in consciousness, something that "is wholly present in any one moment and endures without coming or going" (*MS* 16:7). Its being is simply what it is at the very moment of being felt. The question whether it is remembered or dreamt is here entirely irrelevant.

Sensation is something altogether different. Sensation is *awareness* of feeling; i.e. it is to feel oneself *compelled* to feel, the *assertiveness* of feeling, or, in Peirce's terms, to *sense* a feeling (*CP* 7.543). Feeling is the matter of consciousness. Sensation is the consciousness of compulsion, – the consciousness of what a feeling was. Feeling is basically an indistinct *nowness*, or *suchness*, and nothing more; sensation is *reaction*, the struggle between me and an object in front of me, something that happens *hic et nunc.* Feeling, though not a *general* in the sense we call general a predicate, is *generalizable*, i.e., it can be identified and compared through different occasions. Sensation, however, is *anti-general*, i.e. a *hic et nunc.*

In his article "Color" in *The Century Dictionary,* Peirce clarifies those aspects of color from a slightly different pont of view:

> ... [o]bjectively [color is] that quality of a thing or appearance which is perceived by the eye alone, independently of the form of the things; [... and ...] subjectively [is] a sensation, of the class of sensations, peculiar to the organ of vision, and arising from stimulation of the optic nerve.

Accordingly, color is *objectively* a feeling without form, and *subjectively* a sensation, a physiological reaction. As a quality of feeling, a *certain* green is something in itself; there is no need of a contrast at all, of an object to which it be attached or related. It is simply in itself: pure suchness. Sensation, on the other hand, is the green as existent, – for instance in a bottle – as the *thisness* of the bottle that stands in front of me.

But, what is then the relation between that feeling and this sensation, between the green quality and the concrete existence of green? Or, put in a different way: "what is there, then, in color which is not relative, what difference which is indescribable, and in what way the pure sense-element enter into its composition?" (NA 1:59)[2] Here begins the specific problem of color. In a first approach, we can postulate a sort of synchrony, and say with Peirce, "that it is something without us like [green] within us" (*MS* 4:46).

Let us take again Peirce's argument. The *feeling* of green is some sort of oneness, a total feeling which – as Peirce says – would "usurp [my] whole consciousness." Green is a quality of color perfectly simple (*CP* 7.530). The *sensation* on the other hand, instead of presenting a certain green color, *breaks into* the feeling, producing thereby a two-sided consciousness: me and the green in front of me. This is an occurrence in virtue of which green is assigned to an object – to the bottle. As a matter of fact, the sensation of green is the experience of green as object, as *this* object, and nothing more. My experience now is the *thisness* of the green as *thingness,* as something there over against me. The quality of the feeling of green has gained *existence* both in this green thing, here and now, and at the same time, in my consciousness. Strictly speaking, it is at this point that I start *seeing.* Sensation is vision. It is *this* green that I am seeing: *thisness* as *thingness.* The difference between the green of the feeling and the green of the sensation is the difference between green as quality and green as existent – established through vision.

2 *The Elements of Color*

Now, vision is only possible through light. The light that is reflected irregularly from the surface of a body onto the retina is color, or more exactly, the *sensation* of color. Peirce defines color-sensations as "the peculiar sensations of which we become conscious when the optic nerves are excited" (*MS* 1154). But color-sensation is to be distinguished from the color-property of the body; for the same body-color excites different color-sensations, depending on the character of light. Besides, the color-sensation changes with the

[2]From a review of Ogden N. Rood, *Modern Chromatics.* New York: D. Appleton & Co. 1879. The review appeared in *The Nation,* 29 (Oct. 16, 1879), p. 260.

intensity of light, while the color as the body-property remains the same. A color-sensation is therefore a mode of consciousness, and as such it is part of the process of consciousness. This is a question just as complex as the very nature of color:

> The simplest colour is almost as complicated as a piece of music. Colour depends upon the relations between different parts of the impression; and therefore, the differences between colours are differences between harmonies; and to see this difference we must have the elementary impressions whose relation makes the harmony. So that colour is not an impression, but an inference. (*W*1:516)

From the standpoint of light, Peirce distinguishes three fundamental aspects of color: *hue, chroma,* and *luminosity. Hue* is the *qualitative* mode of a color-sensation; or, "the respect in which the sensations excited by the different parts of the spectrum of light most strikingly differ;" i.e. the different hues coincide exactly with the spectral colors: red, orange, yellow, green, blue, violet, and purple. *Chroma* is the *decidedness* of the hue of the color-sensation, i.e. the *fullness* of the color as "its departure from a neutral tint or grey." *Luminosity* is the *intensity* of a sensation; that is to say, "the degree of difference of a color-sensation from black;" for black is darkness, privation of sensation (*MS* 1154).

Peirce offers here a double scheme of definition of color-sensation. He articulates the sensation of color, first according to its *quality, fullness* and *intensity,* and secondly, according to the position of the color within the spectrum of light on the one hand, and relatively to the background of black on the other, i.e. relatively to the white of light, as clarity, and to the black as no-sensation. The peculiarity of this is that both modifications of color, blackness and whiteness, obscurity and clarity, are filtered through the color of grey. The former shows the shades of color as the expression of the dynamic of consciousness itself; the latter, as the modifications of the color of a body through light.

This latter scheme presents two important facets: the *grey* of the chroma, and the *white* luminosity of light. Peirce observes that "[A]n artificial ultramarine has a most intense chroma, though its luminosity is small; the sky in dry weather, however, has a strong luminosity but little chroma" (*MS* 1154). Now, if we continue to increase the intensity of light, the effect will be the addition of a certain yellow-sensation to the color. Thus, a tendency appears towards the uniformity of color, which Peirce calls the *color of brightness.* It means that all very bright light tends to yield the same color: yellow. In

a "Note on the Sensation of Color"[3] Peirce writes that this color represents a point of the spectrum, "which [no color] will [ever] cross" (NSC 248). He observes that, under these conditions, the *red* will appear *scarlet*, the *green*, *yellowish*, the *blue*, *greenish*, and the *violet*, *blue*. But if we then gradually reduce the brightness, the different elements of sensation will disappear one after the other. This means, that "when [the luminosity is] very faint, [it] will exhibit only one primary color." These primary colors are of course, the *red*, the *green*, and the *violet* of the spectrum. They, will not, however, be perceived in their purity. A quality of feeling can never be observed as pure, and therefore it is meaningless to affirm that a sensation is simple. *Pure* belongs strictly to the terminology of the analytical methodology. Peirce's problem, however, is synthetical, for what is pure must be a mere hypothetical. Peirce concludes therefore "that the classification of light into three kinds, according as the *violet*, the *red*, or the *green*, is contained in the smallest proportion, is one which has a relation to the natural powers of discrimination" (NSC 251). This is clearly a pragmatic definition, if we remember that Peirce understands 'pragmatism' as a doctrine according to which "assertions mean no more than they can possibly come to."[4]

Dissociation, discrimination, and abstraction or *precision* are mechanisms of synthetical reasoning, which determine the perception of color; but which, at once, are possible through it. In fact, this means that our perception of colors operates on the basis not of three, but of at least four colors. Indeed, Peirce observes "that if we take any three colors a fourth can be found such that no mixture of any three of the four will produce the fourth." But this will not be the case for any fifth. We will see that this rule is related to the four-color problem by map-coloring – bordering the topology of a non-Euclidean space. Another conclusion is that the *pure* white of the light really "is simply due to the fatigue of the retina" (*MS* 1154). Thus white, like black, is not properly a color. We will see later the graphical meaning of this.

Another significant conclusion may be drawn up now. In the process just described of the formation of the *color of brightness*, it is to be observed that the primary colors are experiencing a peculiar modification in the transition from high to low luminosity, owing to the special position of the color of grey. The state of *faint* luminosity in some way makes up a sort of imaginary barrier of neutral grey, through which – in the example used by Peirce – the color blue has to pass on its way from the highly chromatic blue-marine to the high luminosity of the blue sky; both colors appearing as such only at the opposite extremes of this way. Between both extreme modifications of color – the high

[3] "Note on the Sensation of Color." *The American Journal of Science and Arts*, 1877, 247-251, henceforth NSC.

[4] Letter to H. Norris Jr. (May 28, 1912).

chromatic and the high luminous – rules an imaginary state of faintness, in which colors seem to find their ground and reality, and also their limit of versatility and purity. Peirce's description of the functional correspondence between the state of faintness and the neutral grey, reminds us of the *skieron* (*shady, shaded*) of Goethe, for whom the basis of defining the very essence of color is to be found in the idea of *lumen opacatum.* In fact, Peirce derives the word 'color' from the Latin *celare, occultare*, which mean covering, hiding, concealing; which meaning he associates to the Greek *croia,* surface, skin, color.

Peirce's theoretical position on color agrees pretty well with Goethe's statement about the two-sidedness of color in his introduction to the *Farbenlehre*:

> ... we observed that all nature manifests itself by means of colours to the sense of sight. We now assert, extraordinary as it may in some degree appear, that the eye sees no form, inasmuch as light, shade, and colour together constitute that which to our vision distinguishes object from object, and the parts of an object from each other. (Goethe 1981:323)[5]

Things appear through color, and, at the same time, are concealed by it. And this is precisely the unavoidable and ambiguous starting point of vision and cognition. It is simply not possible to obtain knowledge on knowledge by prescinding form from color. For color is itself a constituent of the representative nature of cognition. This is a primary assumption underlying Peirce's theory of signs. Wittgenstein, similarly, writes:

> It is not correct to say that a *picture* white must always be the lightest colour. But it must be the lightest one in a flat pattern of coloured patches. A picture might show a book made of white paper in shadow, and lighter than this a luminous yellow or blue or reddish sky. But if I describe a plane surface, a wall-paper, for example, by saying that it consists of pure yellow, red, blue, white and black squares, the yellow ones cannot be lighter than the white ones, and the red cannot be lighter than the yellow. – This is why colours were shadows for Goethe. (Wittgenstein 1977:24)

Apart from the fact that a picture and a wall both are painted things, and both are thus 'pictures' – the white paper 'in shadow' as much as the 'pure'

[5]The translation by Ch.L. Eastlake (London, 1840, p. lii) was used by C.S. Peirce. Peirce's father borrowed Goethe's *Theory of Colours* from the Harvard College Library on Feb. 28, 1856, and CSP himself on Feb. 22, 1858 (Harvard Univ. Archives).

white, – and that to 'describe' colors is itself a metaphor – a picture –, the main point here is that color itself is a painted thing, and thus of the peculiar sort of the represented and at once representing things – in short, of the nature of signs.

3 Color, Collections and Signs

Up to now we have examined color as a sort of feeling and sensation. But sounds, tastes, smells are also constitutive of feelings and sensations. Color, however, as a quality of vision has a clearly cognitive and theoretical preeminence. Peirce's strategy of regression from knowledge to perception cannot hide Schiller's influence on him from his early reading of the *Aesthetic Letters*; since Schiller's *Spieltrieb* is precisely that of the emancipation of vision. In fact, the preponderance of color over other feelings and sensations is manifest in Peirce's extensive use of the language of color. As we saw, he makes use of modalities of color, such as *quality*, *fullness*, and *intensity*, to state the general characters of the modes of consciousness: *feeling, sensation,* and *form.* Peirce speaks also of the *tone* of feeling, of the *vividness* of the reactive character of sensation, and of the *suggestiveness*, or intensity, of the clustering of ideas as form. Similarly, he describes the idea *iconicity* by reference to the nature of color in an exhibition of paintings; of *existence,* by reference to the visible thisness of the fullness of chroma; and of *form* by reference to clustering through luminosity. It is true that such terms do not have an unequivocal meaning. But in fact, they take most of their meaning basically from the world of color.

However, Peirce's interest in color was not merely theoretical or experimental; it was also a linguistic one. He spent a considerable amount of energy patiently gathering a number of terms relating to colors. He classified them into three classes: color-names, adjectives, and verbs. The color-names were listed alphabetically – though the list is not complete. The adjectives were clustered in four groups: according to light in general, as well as according to hue, chroma and luminosity. Each of these lists of terms, especially the last three, were articulated under various headings such as, terms indicating "high chroma with great luminosity," "high chroma with small luminosity" and so on. The verbs were listed according to their different meanings, such as "verbs expressing low degree of self luminosity," "verbs expressing sudden increase of emission," and so on. There were also two lists of color-terms in Greek and Latin, and a curious list of graphical signs, each of which, added like an icon to the different color-terms, indicates whether the term is *common, jovial, depreciated, slang, women's word, scientific*, or *poetic* (*MS* 1154). However, he did not attempt to give a definition of any of these. Like Wittgenstein, Peirce too thought that colors elude all definition. His obsessive drive to classify

implies that classification seemed to him the only adequate method to grasp the elusive (representative) reality

Peirce worked out a more complex interpretation of color at the level of the third category of consciousness, – *form.* A *developed mind* – he says – perceives in a *feeling* an *objective intensity,* that is, the mind distinguishes between a *dull* red and a *bright* red. Similarly, in a *sensation* it perceives a *subjective intensity,* that is, the contrast between the dull red that is there, right in front of its eyes, and the bright red that is stored in its memory (*CP* 7.555). Now, what is it that the mind perceives as *form*? Peirce introduces us to the third category of consciousness in the following way:

> The force of reaction is capable of degrees. These degrees form a continuous series. This continuous serial order is itself neither a quality of feeling nor a reaction, but belongs to the third category of elements of experience. (*MS* 154:7)

This third category of elements of experience is *form.* In Peirce's conception, a "continuous serial order" is a *collection. Collection* is one of the most fundamental of Peirce's concepts. A collection is "any definite whole of ultimate integrant parts" (*MS* 154:2). The whole is an individual different from its parts or members. Each part, however, represents in itself the whole of the collection. In fact the collection exists in its parts, which are called *replicas.* The connection between the parts however, is not dependent upon the nature of the members, but upon the whole (*CP* 4.210). *Forms* are therefore, says Peirce, the "intelligible, rational, order-bringing elements of experience" (*MS* 154:7).

Now, Peirce distinguishes two basic kinds of forms: *general* and *abstraction.* The term *general* does not imply a generalization, in the sense that, for instance, feelings are generalizable. *General* primarily means *possibility.* And possibility does not refer to that in virtue of which a concept applies to a limitless variety of singulars, but to that which primarily is as a *conditional compulsion. General* rather than a concept is form as formel. Thus, a *general,* whether real or fictitious, has the *forceful* character of a conditional compulsion, i.e. the *need* to be applied to something, to be realized. A typical general form is what Peirce calls a *relative rheme,* a *blank form* filled up with dashes, after demonstratives and names (pro-demonstratives) have been removed. This general character of a form is more apt to express qualities than collections. A *general* simply says that red is something in itself, redness, a reality, but not an existent. Red is a general in the same way that Beauty is, or Pitifulness – something to be predicated of a subject. Abstraction is a form of a very different nature. Abstraction is one of Peirce's favorite terms. It is the key constituent of his synthetical conception of knowing and reality.

Abstraction is *hypostatical* abstraction. An *abstraction* is different from a *general.* It is form, "since its being consists in the possibility of something else" (*MS* 154:10). It is, however, different from a general as far as it is an individual. A collection is an abstraction. It is a whole, an individual object which, though distinct from its parts, determines its parts; so that the whole is to be seen – and shown – through the parts. The parts, i.e. the ultimate parts, may be many, one, or none. But in any case they constitute a collection, because collection means possibility: the possibility of the relation of the "many [one, or no one] objects as constituting a single object" (*MS* 154:6). Thus, a collection of nothing, is "a relation in which nothing stands to something" (*MS* 154:4). In fact, says Peirce, the non-members of a collection determine the collection "almost as much as the members" (*MS* 114). A general is a quality, and as such something in itself; a collection as an abstraction is however always *related* to another collection (or sub-collection), from which it is to be distinguished in some general respect. And in this sense collection is *which-ness.*[6]

Now, the question arises whether or not it is correct to speak of a collection of color – or of some color? Strictly, not, says Peirce; and this because colors are not in themselves susceptible of enumeration. No color is in itself an irreducible part of the spectrum, just as no area of a sphere is an irreducible part of the sphere; unless of course, we attach arbitrary names to the parts of the spectral light, like Newton did; or unless we mark the different parts of an area. A collection does not depend upon the truth of a general predicate, but "upon the existence of independent concrete objects" (*W* 2:181). We can, it is true, in a sense constitute a collection out of a thing and a color; for instance, the collection of the blue horses. But the blue color is here conceived as pertaining to an ideal world, independently of its being attached to any thing (*MS* 142:2). The outcome is an individual, but by *attribution*, not by *supposition.* And, as Peirce writes in a "Note on Collection," only the latter expresses the individual nature of a collection (*MS* 690b:6).

In what sense then could a color possibly be a collection? We first need to examine further what Peirce means by a *collection.* The very point of a collection consists in the seriality of its replication by the members or the ultimate parts of that collection. The members of a collection are strictly replicas of the abstracted character of the collection. A collection is the possibility of something else. Now, this something else is to be understood specifically as "the possibility of something relatively concrete," i.e. as "the possibility that every existing object of a class should independently contribute to the

[6]This term as abstract noun is, as far as I know, used by Peirce only once, in a letter to his friend, the judge F. Russell, of Chicago (July 14, 1905); reprinted in *NEM* 3:2.966-67.

construction of one *effect*, or should have a common relation to one correlate" (*MS* 143:3). This is in fact a definition of replica. The relation between collection and members is like the relation between sign and replicas. The sign is embodied in the replicas, so that the sign relates to the abstracted character as part of its object, though without being itself that character. In other words, a sign is the *force* needed to cause precisely this connection between replicas and collection – i.e. the interpretation. And this is exactly the nature of sign as symbol.

A collection has thus the reality of a symbol. This insight allows us to state now the relation between color and sign, to grasp color as the *interpretative force* of the sign.

4 Color and Representation

Wittgenstein writes: "When we are asked "what do 'red,' 'blue,' 'black,' 'white' mean?" we can, of course immediately point to things which have these colours – but that's all we can do: our ability to explain the meaning goes no further" (Wittgenstein 1977:29).[7] Peirce says the same, and more: "When we say 'this is red' we make a judgement of perception. But not much different as when we write 'A is A.' In both cases is simply an attempt to formulate part of what we perceive that we mean by 'is' " (NA 1979:127).[8] The point here is the interpretation of the copula. It is known that for Peirce the copula does not express identity, but relation in the sense of *sibi-relation*, something continuous – a *Continuant*.[9] So that what the parallel between 'this is red' and 'A is A' shows is the monstrativeness of color as the graphical or iconic expression of the *sibi-relation* signified by the copula. This helps us to disclose the main features of Peirce's algebra of color.

The phenomenon of color exhibits two primary facets. The first is that colors insist upon *clustering* together. The whole of Peirce's terminological classifications, as well as his theory of the *color of brightness* and of the basic colors, are in fact parts of a theoretical description of the clustering of colors. The peculiarity however is that the *cause* of the clustering remains an *occult power*, and this is itself a fact (*MS* 16). Indeed, the clustering of colors turns out to be may be more a matter of *testimony* than of explanation. Wittgenstein's *Remarks on Colour*, for instance, are in this sense testimonial.

The other facet is contrast, or, in Peirce's words, the *otherness* of the color qualities. Redness and blueness "differ without differing in any essential

[7] I have slightly corrected the English translation.

[8] Review of *Personal Idealism: Philosophical Essays by Eight Members of the University of Oxford*. Ed. by H.C.S. Macmillan, 1902, in *The Nation* 76 (June 4, 1903, 462-63).

[9] In fact, its destiny is to get absorbed by the 'whichness' relation.

character which one has but the other lacks." That is, they do not differ in the sense that two collections may be said to differ in some general respect, but in the sense that "[t]he otherness of them is as irrational as the qualities themselves, if not more so" (*MS* 70:7).[10] Irrationality seems to be at the bottom of the algebra of colors. visuality, instead, appears as its recovered graphical rationality.[11]

The form, the peculiarity of colors consists in this irreducible manner in which colors possess the visuality of both characters. Colors thus derive their interpretative *force* from the fact that they manifest themselves visually as the representativeness of both clustering and otherness; that is to say as much as that color displays the *iconicity* of generals and collections. In other words, as far as it represents the abstractiveness of abstraction. This is its iconical force.

Because there is no general, no collection of color in the strict sense of the word, there is no color *form*. What then is its proper categorial level? Color answers rather to what Peirce calls an object of *second intention*. An object of second intention is not an object of representation, but a representation of the representative understanding, i.e. of signs. It is thus the possibility of a graph about graphs by displaying however not directly a language of vision, but of pre-vision, of visuality. A sign is neither matter nor form; it consists merely in being represented. And thus, the most perfect of signs are those in which the iconic and the symbolic characters "are the most equally blended" (*CP* 4.448). To illustrate this point, Peirce refers to the *line of identity* scribed on the *sheet of assertion*. The iconicity of the line expressing a continuous *sibi-relation* cannot be understood without the abstractiveness of white and black which determine the field of distinct vision of the graphical replica. In geometry, no doubt, we prescind shape from color. Now, this "is precisely the same as to abstract color from shape" (*CP* 5.534). The outcome is a sort of color-neutral *blank* graph, or replica. In fact, the very contrast of white and black *represents* the grey – *skieron* – as absence of color. Thus, we do not really prescind from color, for pure white and black are not really colors. It is their representativeness that constitutes the iconicity of the logical neutrality of the absence of color, as a field of distinct vision of signs as such. Thus Peirce states, as the first axiom of his theory of graphs, that it is of "the nature of every symbol to be blank in part" (*MS* 4:26).

Exactly the same applies when, in order to represent *modalities* we must

[10]Wittgenstein similarly writes: "Among colours: Kinship and Contrast – (And that is logic)" (Wittgenstein 1977:23).

[11]This is so because "the points of the boundary do not exist. [...] it is only as they are connected together into a continuous surface that the points are colored" (*CP* 4.127). A similar argumentation is developed by N. Goodman (Goodman 1988:83f.).

scribe thick black spots, lines, or areas, besides thinner ones, on the *sheet of assertion*; here the black clearly focuses the attention upon the white background of the blank graph. This is basically the case of the alpha and beta parts of the existential graphs. These represent a discourse about the properties of the mutual relations between *individual* objects, and of their existence in relation to one another. The negative iconicity of color is needed here only as a representation of the neutrality, or absence of color. In fact, Peirce begins to realize the need of a positive logical iconicity, only when he starts to reason about qualities and relations, about thoughts of second intention, – about graphs. This is the gamma part of the existential graphs. Here he needs to represent modalities as such – *actuality, possibility, intention* – and, specifically, the *relation* between possibility and actuality. Thus, in the process of improving the graph representativeness, the affirmative iconicity of the *recto*, and the negative of the *verso*, of the sheet of assertion gradually merges with the need to color the surfaces, as iconic improvement of the algebra of colors. The cream white is reserved for the *recto*, for the finite actualities, and the bluish-grey, – or may be, says Peirce, yellow, or rose, or green – for the *verso*, for the infinite possibilities or objects of ignorance. A contrast of colors which is interpreted by Peirce as a *heraldic representation* of the difference between a waking experience and a dream: between reality and fiction. The only way, says Peirce, to *picture* the reality of modalities, albeit under the assumption that "the dream [is] to be ever so detailed, reasonable, and thoroughly consistent with itself and with all the rest of the dreamer's experience." The dream may not be as *vivid* as the waking experience, but it certainly can be more chromatic (*CP* 4.553n1).[12] Precisely, as Goethe observed, the art of painting "has the power of producing on a flat surface a much more perfect visible world than the actual one can be" (Goethe 1981:LIII).

A next step will be to develop the *sheet of assertion* as such into a *map*, in order to represent the plasticity and complexity of a multidimensional continuum. At this point, Peirce introduces the iconicity of three clearly distinct *Modes of Tincture*, which represent the three classes of modality. These tinctures, resp. of color, of fur, and of metal, represent the *provinces* of the map. To these he adds four tinctures for each one of the modalities. This trend towards a logical and topologized improvement of the existential graphs merges with Peirce's old interest in the *problem of map-coloring* with four colors, which he had already examined long before. We enter here a non-Euclidean space. For the point behind the four-colors conjecture is "to extend the problem to maps drawn upon any kind of surface whatsoever" (*MS* 154:1).

The problem of map-coloring is [to] determine demonstratively the

[12] See: Letter to Lady Welby (March 9, 1906).

> smallest number of colors that will suffice so to color any map whatever which can be drawn on a given surface, that no two confine regions [...] shall have the same color. (*MS* 154)

From experience it was thought that there must be four. The problem was to demonstrate the proposition. Peirce said he got it.[13] The problem, in fact merges with his need to develop the logical iconicity of the gamma part of the existential graphs. Thus he wrote that

> ...in order to represent [...] the relation between the universe of possibilities and the universe of actual existent facts, [which is the central point of the gamma part] if we are going to think of the latter as a surface, we must think of the former as three-dimensional space .... (*CP* 4.514)

From the point of view of his principle of the four fundamental colors, this is formally the same as to say "that all colors form a three-dimensional system." Such a *system* however "is not itself a color, nor a class of colors. It is something over and above color whose being consists in the ways in which colors can differ." This is a classical expression of the problem in terms of quaternions.[14] This is, says Peirce, an *abstraction,* but not a pure abstraction, "since it involves an element of feeling" (*MS* 154:10). In short, suchness, thisness, and whichness of color constitute *iconicity* of/and abstraction. They are the way and reality through which minds are contacted and communicated.

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[13] Peirce said that "sometimes in the early sixties [the four-color problem] was mentioned by De Morgan in The Aetheneum," but not resolved. He said he presented shortly thereafter his own solution in a session of the Mathematical Club at Harvard University (*MS*S 153 and 154). See *NEM* 3:1.VIII-XII. I was unable to locate such a mention in *The Aetheneum.*

[14] The quaternions theory, developed by Sir W. Rowan Hamilton, was adopted by the Peirce family (Benjamin, James Mill and Charles), and integrated into the standard teaching of mathematics at Harvard University. K.O. May locates the first written formulation of this problem in a letter from De Morgan to Hamilton (Oct. 23, 1852). Peirce is not mentioned at all, neither is De Morgan's notice in *The Aetheneum.* In his reply to De Morgan's question Hamilton calls it "a quaternion of color" (May 1965:348).

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