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Symbol and Schema in Neo-Kantian Semiotics

The philosophies of Cassirer and Peirce: contributions to a semiotics implying an epistemologyⁱ

Kant was no philosopher of language, and yet his thought has given rise to a strong tradition for deliberations upon the status of language, sign and meaning: most recently, the various traditions within cognitive semantics and cognitive linguistics could be said to build on a Kantian insight, in so far as they agree in giving schemata a decisive role in semantic descriptions (Lakoff/Johnson (“kinaesthetic image schemas”), Langacker (“landmark/trajjectory”), Talmy (“force dynamics”) - etc.)ⁱⁱ The schema is seen as a formal whole which can not be exhaustively described by merely logical means because to some extent it implies intuitive ideas. The schema has an abstract and general character, and consequently it may be instantiated in a whole series of different variants. The same schema is thus supposed to be able to organize a long range of widely differing semantical phenomena, in so far as they may be understood as referring to different parts of, different functions in or different points-of-view on one and the same basic schema. The schema’s role as an organizing figure for semantics thus gives it a decisive role in any rationalist description of language. How is the sign’s character of being a symbol - and this notion’s affinity to theories of language and of literature - connected to schematic description with its strong affinities to epistemology?

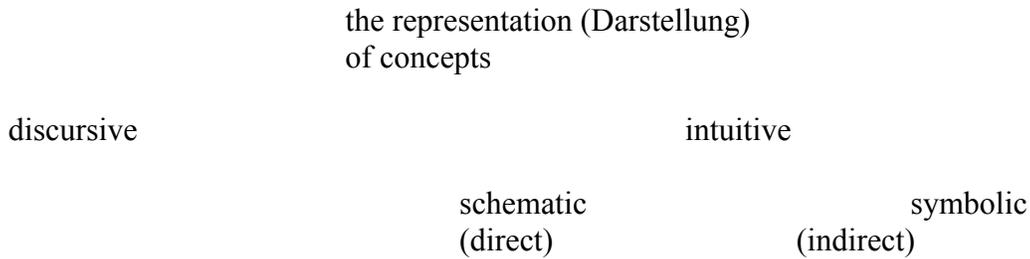
My task in this paper is to map the relation between symbol and schema in this Kantian tradition, and to this end I shall present selected features of the theories of two central semiotic neo-Kantians, in American and European modus respectively: Ernst Cassirer and Charles Peirce.

But let me begin by considering the relation between schema and symbol in Kant. It is probably well-known how the schema plays a very central role for Kant in the *Kritik der reinen Vernunft*: the function of the schema is no less than making possible objective science as such, mediating between the concepts of understanding and the forms of intuition time and space: the schema thus guarantees the Kantian compromise between wild rationalism - dogmatism in Kant’s jargon - and a wild empiricism. Concepts without intuitions are blind, intuitions without concepts are empty - so Kant’s famous formulation of his criticism of the two extremes.ⁱⁱⁱ As the mediating third, the point of possible meeting between the two, he now posits the schema which thereby becomes the transcendental condition of possibility for knowledge and prevents the mind from disintegrating into wild speculation on the one hand and singular sensations on the other. The schema is an intuition (KdU, 254), but a very special intuition under the jurisdiction of rules; it is constructed by the *Einbildungskraft*, and a decisive feature in it is the fact that it is not a

synthesis of the concept with any single intuition, “sondern die Einheit in die Bestimmung der Sinnlichkeit allein zur Absicht hat” (KdrV, 179). This implies that it must be distinguished from the image which is connected to one single, concrete sensation. Rather than being an image, the schema is thus a method to construct images from a certain concept (KdrV, 179). Kant’s main example is the concept “a triangle” which may be connected to as many different images as there are possible particular triangles; the schema connecting the concept and this set of images may exist nowhere but in thought (KdrV, 180) and is to be understood as a rule for the synthesizing process of the *Einbildungskraft* - because the concept triangle in itself of course can not be exhausted in any single image; the concept of a triangle is not, for instance, isosceles, rectangular nor three inches high. While the image is a product of the productive *Einbildungskraft*’s empirical powers, then the schema is a product of the pure *Einbildungskraft* a priori and as such it is the condition of possibility for the concrete, conceptually understood image. The concept of schema comprehends ordinary language as well as scientific, which is evident from Kant’s other example: the dog whose schema allows my *Einbildungskraft* to imagine such a quadrupede in general without being restricted to any single, concrete image of a dog (KdrV, 180). This type of schema for sensual concepts has character of a “monogram” (KdrV, 181) for the pure *Einbildungskraft* a priori - while the schema for the pure concepts of understanding is a transcendental product unable to be expressed in any image or picture at all. This schematism of the concepts of understanding, the categories (quantity, quality, relation, modality) is to Kant defining for science and provides their determination in relation to the forms of pure intuition, space and especially time. Kant’s arch-example of a schema for a concept of understanding is *number* which is the schema for all *sizes* and defined by the idea of successive addition. The schema of the concept of cause is the idea of something real which must always be followed by something else. The schema of the concept of necessity is a thing’s being at any time (KdrV, 182-84). Apart from the first example which is decisive for Kant’s determination of the quantitative sciences of nature as being objective, Kant does not make much ado about the definition nor the exemplification of the concept of schema - in a striking contrast to the central place it occupies in his argumentation. It remains a double creature - partly intuition, partly governed by rules - and this double nature of it have often made interpretations of it “fall out” to one of the sides (the Marburg school, for instance, making it a mere tool for understanding; Lakoffian cognitive semantics on the other hand, making it pure intuition). How the actual functioning of the schema takes place, remains obscure in Kant, as he puts it in a famous and often-quoted passage: “Dieser Schematismus unseres Verstandes, in Ansehung der Erscheinungen und ihrer blossen Form, ist eine verborgene Kunst in den Tiefen der menschlichen Seele, deren wahren Handgriffe wir der Natur schwerlich jemals abraten, und sie unverdeckt vor Augen legen werden.” (KdrV, 180-81), and he thus abstains - unfortunately - from a “trockenen und langweiligen Zergliederung” of the concept of schematism. But the decisive point remains that the concepts of understanding are “Die wahren und einzigen Bedingungen, diesen eine Beziehung auf Objekte, mithin *Bedeutung* zu verschaffen ...” (KdrV, 185). This signification may now be attended as well from empirical concepts (the corresponding intuitions are elsewhere coined “examples” - the concrete picture of a dog as an example of “dog”) as from concepts of understanding. Still, another indirect way of representation is possible, without any direct meeting between understanding and intuition, without the severity of schematism: the symbol.^{iv}

This possibility is investigated by Kant in the *Kritik der Urteilskraft*, where he discusses the beautiful as a symbol of morality. Here, he makes the possibility of a symbolic representation parallel to the schematic representation so that they are the two generic ways of intuitive representation - this in turn being defined by consisting of intuitions constrained by concepts a

priori, indirectly and directly, respectively. □ Both of them are now, being intuitive, in contrast to discursive representation which has no corresponding intuition at all and is based only on concepts (and which consequently is deprived of the access to any objective knowledge (Kdrv, 747)):



The symbolic representation is first determined in relation to the concepts of reason (Ideas) which according to Kant may not be represented, that is, they can not be exposed in any corresponding intuition. Here, the work of the power of judgment is “bloss analogisch” (KdU, 255) which implies - rather obscurely - that is just corresponds to the form of reflection, to the rule for the schematization, and not with its content. Of course, this hints at the determination of the sublime as the representation of the unrepresentable in the KdU, but is immediately expanded also to comprehend the representation of ordinary concepts of understanding (that is, not Ideas), in so far as these are represented analogically: “... vermittelst einer Analogie (zu welcher man sich auch empirischer Anschauungen bedient), in welcher die Urteilkraft ein doppeltes Geschäft verrichtet, erstlich den Begriff auf den Gegenstand einer sinnlichen Anschauung, und dann zweitens die blosse Regel der Reflexion über jene Anschauung auf einen ganz anderen Gegenstand, von dem der erstere nur das Symbol ist, anzuwenden.” (op.cit. 256). The analogy first represents one concept in an intuition, which, in turn, is used about another concept. Kant’s example is monarchy which on the one hand may be represented as a body equipped with a soul, on the other hand as a machine - depending on whether it is governed by internal “Volksgesetze” or by one single, absolute will. Not that there is any similarity between these two versions of the state and the corresponding pictures, but there is a similarity between the type of causality governing them. These matters deserves, Kant thinks, a further investigation, but as usual, unfortunately, “allein hier ist nicht der Ort” (257) - probably because these deliberations only form part of the introduction to the analysis of the symbols of beauty. Language, to Kant, is full of analogies of this kind where an expression takes the role as a symbol for the reflection. Kant here mentions central philosophical concepts (Grund, abhängen, fließen, Substanz) which are in fact nothing but mere symbols (today we would probably rather say metaphors).

In the Anthropology, finally, Kant makes a draft to a theory of meaning which is also based on this concept of symbol. Here, he states as an introduction that “Das Vermögen der Erkenntnis des Gegenwärtigen, als Mittel der Verknüpfung der Vorstellung des Vorhergesehenen mit der des Vergangenen, ist das *Bezeichnungsvermögen*.” (§ 35). Once again, the symbol is defined by its “figürlich” form of knowledge: “Symbole sind bloss Mittel des Verstandes, aber nur indirekt, durch eine *Analogie* mit gewissen Anschauungen, auf welche der Begriff desselben angewandt kann, um ihm durch Darstellung eines Gegenstandes Bedeutung zu verschaffen.” (108) The concept is given meaning through the representation of an object, the intuition of which possesses an analogy to the concept. As a contrast to this symbol, Kant here places “character”, that is, letter-signs etc. which are but mediate, indirect signs, for which it takes reference to intuitions and through them to concepts in order to achieve meaning.^v This leads

Kant to erect a taxonomy of signs, arbitrary, natural, and wonderful, respectively. The last of these three categories is dealt with only shortly (sceptically, but surprisingly enough not critically) as events, wherein the order of nature has been reversed: signs of the heavens as signs predicting pest and war, etc - things which seem to announce for the shocked mob the end of the world, as he says. The first two categories corresponds to what we today would call arbitrary and motivated signs, respectively; under the former, Kant gives eight (not exhaustive) subtypes^{vi}, under the latter, he counts three classes after their orientation in time, demonstrative, rememorative, and prognostic, respectively. Examples are the pulse as a simultaneous sign of fever; mausoleums and geological formations as signs for past events; astronomical and medical predictions as sign for future events. It is interesting to note that Kant in a few comments connects these ideas to his philosophy of history. He says of the “primitives” that their lively representations, so often admired, are due to conceptual poorness; they are constrained to talk about burial of war axes because they do not possess the abstract idea of “peace”. In the same manner, Swedenborg’s teachings which makes of the sensuous world a symbol for a deeper, hidden but understandable world, is characterized as “Schwärmerei”. These primitive states, however, may be dissolved during the process of Aufklärung which in moral questions (including religion) and pure reason distinguishes the symbolic from the intellectual in order to substitute an idol for an ideal. “Dass alle Völker der Erde mit dieser Vertauschung angefangen haben, und dass, wenn es darum zu tun ist, was ihre Lehre selbst, bei Abfassung ihrer heiligen Schriften wirklich gedacht haben, man sie alsdann nicht symbolisch, sondern *buchstäblich* auslegen müsse, ist nicht zu streiten ...” (108-09), Kant remarks, adding that one must, however, read these sacred writings on the symbolical level in order to catch their value of truth and their intellectual purpose.

While the schema thus is central to Kant, the treatment of the symbol which is not further enlarged from what we have presented here, not very thorough. We may conclude that to Kant, schema and symbol are related in being both intuitive representations, connected to figurative content, directly and indirectly, respectively - and both of them in contrast to the discursive, purely speculative conceptual meaning. In doing so, Kant seeks to relate science and ordinary language within one philosophical architecture, in so far as the schematisms of concepts of understanding are crucial to science, the schematisms of sensuous concepts are crucial to ordinary language, while symbols, also being based on schemata, are crucial to metaphors. Enlightenment now is the process which not so much leads from the latter to the former as it is the process allowing to distinguish the former from the latter.

This symbol theory can be said to be continued by two prominent neo-Kantians^{vii}, Peirce and Cassirer.

Symbolic pregnance between Ausdruck and reine Bedeutung.

The central place of schemas in Cassirer’s reformulation of Kant is revealed by the emphasis he places on the concept of intuition in his version of neo-Kantianism. The Marburg school, of which Cassirer is the last representative, is by contrast known to give intuition a rather minuscule role in relation to Kant, as a mere secondary illustrative device in relation to understanding and its concepts which was where the real interesting processes took place - and which hence often tended to swallow up schematism and make of it a mere process of understanding. Cassirer’s overall project in his chef d’œuvre *Philosophie der symbolischen Formen* (1923-29) could be said to enlarge Kant’s criticism of reason to a general epistemology, comprising also non-

scientific discourses (myth, language, art) as founded in one and the same symbolic activity - and here intuition and schematism are indispensable, because the main concept, the symbol, can not be dissolved into pure concepts. Within this idea of enlarging Kant into a philosophy of culture, Cassirer namely makes of the symbol the general concept able to subsume all cultural phenomena in his notion of “symbolic forms”, covering myth, language, art, and science - and lets it run through a quasi-Hegelian process of Entäusserung in three steps all through history^{viii} - in so far a grand-scale elaboration of the project we saw Kant sketch en passant with his comments on the relation between symbol and enlightenment. Cassirer’s concept of symbol, however, is of course totally different from Kant’s; in Cassirer, the symbol becomes a general notion for meaning generating forms of all kinds.

The basis for these symbolic forms now is the domain of *Ausdrücke*, which are characterized by the fact that expression and content may not be stably dissociated, with the implication that properties may drift from one onto the other, and no clear and stable signification may be isolated. The domain of *Ausdrücke* thereby constitutes, in fact, a kind of phenomenological, pre-linguistic life-world which we share with higher animals and whose symbolic forms may refer to each other through specific associative chains but which is unable to reach any higher form than the anthropological *mana*, the mythical “concept” par excellence, which all the time is changing between a substantial and a dynamical definition. A decisive consequence of Cassirer’s foundation in this life-world of *Ausdrücke* is the idea of the domain’s basic signification prior to the distinctions between form and substance, between expression and content - hereby he avoids scepticism as well as the ‘symbol grounding’ problem: the *Ausdrücke* are always-already meaningful. Cassirer insists vehemently on the fact that Husserl’s hylemorphic distinction between form and substance can not be basic but must derive from a later distinctive activity of the mind: “Es gibt auf dem Standpunkt der phänomenologischen Betrachtung so wenig einen “Stoff an sich”, wie eine “Form an sich” - es gibt immer nur Gesamterlebnisse, die sich unter dem Gesichtspunkt von Stoff und Form vergleichen und ihm gemäss bestimmen und gliedern lassen.” (PdsF III, 231). This idea Cassirer expands on in a late paper “Zur Logik des Symbolbegriffs” (1938), where he defends himself against a criticism of PdsF by Konrad Marc-Wogau. Here, he ventures into an almost phenomenological discussion of formal ontology when the precise status of the form-substance distinction is to be determined. This distinction is, of course, indispensable, it is so to speak the basic distinction which the higher forms of signs depend on and elaborate - but it does not have, unlike what Marc-Wogau attacks Cassirer for claiming, any character of being absolute (this would make impossible the later meeting of the two sides and Cassirer would have to become a sensualist claiming an autonomous level of sense-data substance, whose organization would then be incomprehensible). Substance and form are not, as he says, *Teile* but *Momente* (Cassirer 1938, 210). He does not refer to where he picks this distinction, but it is prominent in Husserl’s 3rd *Logical Investigation* (§ 17) where the parts are “real pieces”, able to be cut off from the whole in which they partake, while the moments are “abstract parts” having no autonomous character (cf. e.g. a three-dimensional part of an object in contrast to its surface); Husserl has the idea from Brentano, for whom the moments are “logische Teile”. This gives a hint of how influenced Cassirer’s Kantianism in many respects is by phenomenology^{ix}. In this connection, Cassirer invokes his concept of the sign against sensualism by stating that “Ich betone aufs schärfste, dass die ‘blosse’, die gewissermaßen nackte Wahrnehmung, die frei von jeder Zeichenfunktion wäre, kein Phänomen ist, das uns unmittelbar, in unserer “natürlichen Einstellung” gegeben ist.” (Cassirer 1938, 214). Any phenomenon is generally experienced as a sign, and only in abstraction is it possible to

imagine a sense impression devoid of meaning. The “Gesamterlebnisse” of the *Ausdrücke* thus also serve to guarantee that empiricism and ideas about sense data, sensuous raw material, and the like never are possible - and thereby blocks the question of how the mind is able to organize the amorphous matter of the senses. Cassirer therefore sides with Gestalt Theory in this point: organization is inherent in the senses and is not an addition resulting by some kind of “unbewusste Schlüsse” like it was Helmholtz’s assumption (and as it is very often presupposed in various attempts at softening a too absolute distinction between form and substance in psychology of perception).

Cassirer even lends the basic idea of his “symbolic pregnance” from Gestalt Theory^x when the task is to explain how the mind can be able to make distinctions in the fluid world of *Ausdrücke*. Symbolic pregnance constitutes the way in which a “sinnliches” Ergebnis zugleich einen bestimmten nicht-anschaulichen “Sinn2 in sich fasst und ihn zur unmittelbaren Darstellung bringt.” (PdsF, 235), by means of a “eigenen immanenten Gliederung” (ibid.). There are proto-stabilities in the world of *Ausdrücke*, where the mind so to speak can take departure and work out a distinction between the sensuous part of the given and its not-sensuous implications due to Gestalt-qualities in the organization of the material sensed. In the above-mentioned paper, the discussion of the sign-character of any phenomenon leads Cassirer to exemplify the notion which may be difficult to grasp from the very tight presentation of it in the PdsF. The blush of shame here serves as an example: it is not a mere aggregate of the perception of red on the one hand and an imagined shame on the other: “Hier herrscht nicht blosses Beieinander, sondern jenes Verhältnis, das ich mit dem Ausdruck der ‘symbolischen Prägnanz’ zu bezeichnen versucht habe. Aber so stark wir das ‘Ineinander’ gegenüber dem blossen Beieinander auch betonen mögen, so kann doch dieses Ineinander niemals als vollständige Kongruenz und Koinzidenz gefasst werden. Das Ganze, das wir hier vor uns haben, weist vielmehr von selbst eine innere Gliederung auf; es ist ein artikulierte Ganzes und wird erst durch diese Artikulation zu dem, was es ist. “Schamröte” ist sicher nicht ein blosses Aggregat von Röte und Scham; aber ebensowenig ‘ist die Röte die Scham, oder die Scham die Röte.’” (Cassirer 1938, 222-3). In this, Cassirer has really taken a phenomenological step further than did Kant who in the Anthropology writes about the demonstrative subtype of the natural sign: “Ob aber das *Erröten* das Bewusstsein der Schuld, oder vielmehr ein zartes Ehrgefühl, auch nur eine Zumutung von etwas, *dessen* man sich zu schämen hätte, erdulden zu müssen, verrate, ist in vorkommenen Fällen ungewiss.” (Kant 1968, p. 110-11). Cassirer’s choice of example cannot be by pure chance; as the annotating editor of the collected work edition of Kant’s writings he of course knows the *gesamtwerk*. Kant states that the blush may have several different causes and that it for this reason is undecided which cause it has in the concrete case - and this might lead Kant’s theory of signs in the direction of falling apart into sensualism and rationalism, respectively, because the example is chosen amongst the so-called natural signs (the fact that artificial signs may be arbitrary can of course hardly be shocking). As against this, Cassirer points to the fact that the *Ausdrücke* - which forms a part of the natural signs - never fall apart into two sides but always appear in a phenomenological *Verschmelzung* to use a Husserlian concept, in a “gegliederte Einheit”, to use his own. It becomes rather the responsibility of the subject if it shows unable to decipher the sign correctly; the sign in itself, as an “Urphänomen” is a part or moment of an articulated totality. A propos the discussions of “embodiment” in recent cognitive semantics, it is appropriate that Cassirer’s examples of symbolic pregnance have often bodily character: the blush of shame or the smiling face which only in turn may be segregated into expression and content.

Via symbolic pregnance, then, the mind is able to rise to the next level in Cassirer’s three-step structure: the *Darstellung* of language where the stable expression allows for a similar

stabilization of content - thus a *nomen* refers to the unchangeable, stable object which in the same movement allows for *accidenses* - properties - to be separated as that which may now change and henceforth find its expression in verbs and adjectives. On the other hand, time and space becomes autonomous as the substrate in which the stable thing finds its place. Yet, one should probably not read this idea - that the metaphysical notion of substance is an implication of language's analytical articulation of the life-world - as equivalent to a claim that children's learning of object constancy is a result of language acquisition^{xi}, a hypothesis which since Cassirer's time has been definitely rejected. Object constancy is the fact that objects continue to exist even if they disappear from perception; substance constancy refers to the very split between substance and its properties which is perfectly possible already among *Ausdrücke* but which is only stabilized in *Darstellung*. The sentence as the unity of proposition, as the possibility of referring to *Sachverhalte*, is the frame for the successive articulation which distinguishes ever more details in the object in the course of language evolution, phylo- as well as ontogenetically. The continuity of this development is granted by the fact that the world of *Ausdrücke* may never be completely left behind; the *Darstellung* does not break with the *Ausdrücke*; it is rather a continuous analysis and "Gliederung" of them. The stable sign - or symbol - is thus something which crystallizes in an always-already meaningful world; Cassirer does not hesitate to anticipate Hjelmslev when he ascribes these stable signs a *Zeichenfunktion* ("Das Symbolproblem", p. 20) connecting the sign to a meaning - without which the sign would "zu einem blossen *Dasein* herabsinken" (ibid.). This referring function, this "Greifen in die Ferne" is the prerequisite of the *Darstellung* and breaks with the always local associations of *Ausdrücke*. In the *Darstellung*, schematism is at work by, objectively, to reunite what was dissociated into concepts of understanding, forms of intuition, and sensed properties - towards an ever greater linguistic, analytical sophistication and hence objectivity. A very special role in this context, according to Cassirer, is reserved for space as form of intuition: "Was wir "den" Raum nennen: das ist nicht sowohl ein eigener *Gegenstand*, der sich uns mittelbar darstellt, der sich uns durch irgendetwas "Zeichen" zu erkennen gibt, sondern es ist vielmehr eine eigene Weise, ein besondere Schematismus der *Darstellung selbst*." (174). The *Darstellung* makes possible the elaboration of stable spaces, not only because it distinguishes objects and properties and may describe the relations between them, but because the very schematization of space in itself constitutes a schematization of the referring act's "Greifen in die Ferne". This means that spaces of different kinds become the stable substrate for thought in general, the very space of imagination of the objective mind.^{xii}

This process of objectification culminates in Cassirer's third category, *reine Bedeutung*, where substance is left behind at the expense of function. Hereby, intuition also is threatened by being left behind, at least in the account given in PdsF, and we get pure concepts, functions defined by relations between parameters (instead of substances with properties); Leibniz's *characteristica universalis* and Hilbert's meta-mathematics may count as utopias. But when placing the *reine Bedeutung* at the pinnacle of the mind's evolution, it is difficult to see if intuition actually is left behind for the concentration of a purely symbolic algebra of concepts - even in Hilbert, intuition is only bracketed in the process of symbol manipulation, not in the metamathematical determination of axioms and rules of inference. In the article on the concept of symbol (1927) the fight against intuition seems to be assumed, triumphantly; already in the third volume of PdsF, the same idea is voiced with some care: the "reine Bedeutung" does not "directly" rest on intuition, and in Cassirer's last paper, on structural linguistics, this science's dependence upon concepts of gestalt-, organism-, and morphology is emphasized to a degree so it is hardly possible to imagine structural linguistics without an abstract space of pure intuition in

which these gestalts may find their place. As a conclusion we can say that to Cassirer, it is schematism which permits to erect *Darstellung* and language which distinguishes - and thereafter reunites - expression and content in a sign function, and in turn allows us to sophisticate language further towards science and its symbolic calculi and schematisms in a severe use of the word. The question in Cassirer then remains open, whether schematism may be left behind as a Wittgensteinian ladder after the dirty work with intuition has been done.^{xiii}

The diagram between icon and symbol

Also in Peirce, symbol and schema are interlinked in an intricate and interesting manner. Peirce's triad icon-index-symbol has, in recent years, almost become a kind of *versunkenes Kulturgut*, which everybody uses, but in many cases without corresponding to their use in Peirce's own doctrine.^{xiv} In Peirce, this "second tricotomy" (in addition to the first *tone-token-type* and the third *rheme-dicisign-argument*) not a classification distinguishing three independent subcategories of signs. The sign in Peirce may rather be compared to a Russian doll, so that the higher types of signs contain the lower ones. Thus, it is the case that any sign at all to Peirce "contains" - that is, by inference may terminate in - an icon, which is the very condition of possibility for it to contain meaning, for the interpreting process at some time to end up with something imaginable. The iconic is namely for Peirce the precondition for evidence, and without evidence no meaning. Indices, thus, contain icons (the footprint in the sand, the photography are good examples of this), just like the symbol must be connected to a procedure allowing for the translation of its general, habitual meaning into an icon in the context. As is easily grasped, a version of Kant's problem of schematism is at stake in the relation between icon and symbol in Peirce. Peirce on the one hand saw Kant as "the King of modern thought" but on the other dismissed him on many points, especially as a logician, and he conceives of his articulation of the problem of synthetic a priori judgments in the *KdrV* as one of his major accomplishments. Still, Peirce does not like the distinction analytical/synthetical, because it is founded on Kant's idea that the conclusion of an inference does not contain anything which was not already in the premisses: "Kant declares that the question of his great work is "How are synthetical a priori judgments possible?" By *a priori* he means universal; by synthetical, experiential (*i.e.*, relating to experience, not necessarily derived wholly from experience). The true question for him should have been, "How are universal propositions relating to experience to be justified?" (CP 4.92). Even if Peirce is correcting Kant's wording, he conceives of his insight as an "indispensable stepping-stone of philosophy", and Peirce's reformulation points to his own attempt at solving the problem. The possible connecting of universal judgments with experience is Peirce's version, and to appreciate this, one must emphasize the fact that to Peirce universals exist; he is a scholastic - a Scotist - realist. Even if they do not exist as something actual - all actuality is to Peirce concrete, Secondness in his terminology - they still exist as real possibilities, tendencies which may in turn be described by means of predicates. The fact that "types" (of Peirce's first tricotomy) exist at all, subsuming under them a potentially infinite series of tokens, in turn defined by possessing certain tones, certain qualities, that is the corner stone of this realism: the thirdness of a type is necessarily general, universal. These universals have qua possibilities the property of being defined as *continua* (because they potentially subsume a continuous series of tokens). A decisive part of Peirce's metaphysics consequently teach that real continua exist. To Peirce, the continuum is a primitive characterized by transgressing any conceivable multiplicity (including all of Cantor's *Alephs*). As to the type as universal, this implies that it refers to all

possible instantiations of itself, and this collection constitutes a continuum, of which the realized instantiations necessarily form but a small subset of. Defining generality by the predicate might remind one of Russell's idea, but Peirce's is not like his extensional; the predicate is not defined by the set of objects falling under it; it goes the other way around: the predicate exists as a continuous possibility (firstness) before the single actualizations of it (secondness), while thirdness maps the realizations of certain types of single actualizations form real continua. Every predicate in Peirce is thus conditionally defined; this forms the kernel of his pragmatism. To state that an object is for instance *hard*, is in Peirce equivalent to claiming the conditional expression that *if* the object were eposed to this and that test (schratching upon it with various minerals, for instance), *then* it would behave such and such (not being schratched, for instance). The very predicate "hard" is thus a mere possibility in so far as it is not metaphysically given that hard objects exist - and the symbolic statement "Diamonds are hard" refers to a universal habit subsuming a potentially continuous series of *possible* diamonds about which we know nothing further specifically (secondness). The universal, then, has the peculiar property of being vague; qua continuous its extension can not be mapped with precision.^{xv}

Kant's schematism problem, then, becomes for Peirce the problem of deciding the relation between the intuitive, universal firstness and the general thirdness of thought - an exclusively ideal question because secondness and its question about these phenomena's relation to actual reality, is placed in brackets. Peirce's original solution lies in his notion of "diagram" which in certain respects can be compared to Cassirer's "symbolic pregnance". Just like this category contains sensuous as well as non-sensuous contents "before" the splitting out of these categories, then the diagram is characterized by being at one and the same time general and imaginable. It seems to be a fact that any reasonably ambitious rationalism must possess a notion of this type, relativizing the opposition between senses and thought, an opposition that would otherwise be an insurmountable obstacle leading to scepticisms. In Peirce, diagrams form a certain subclass of icons related to a tripartition of the concept of icons, referring to which "mode of Firstness" they use in resembling their objects: "Those which partake of simple qualities, of First Firstnesses, are *images*; those which represent the relations, mainly dyadic, or so regarded, of the parts of one thing by analogous relations in their own parts, are *diagrams*, those which represent the representative character of a representamen by representing a parallelism in something else, are *metaphors*." (CP 2.277). Diagrams represent the relations between the parts of a phenomenon by means of analogous relation between its own parts - the relation being mapped as being dyadic. The reason why it is possible to think in diagrams is partly that they, as all icons, have the property of "...by the direct observation of it other truths concerning its object can be discovered than those which suffice to determine its construction." (2.279) - partly that this "more" via a symbolic interpretation of it is rendered general as to its object. The diagram is a "skeletal" icon which reduces its object to a restricted set of relations governed by a symbolic - that is, general - intention.^{xvi} Thereby, the diagram achieves the generality of a symbol, both as to its status as a general sign (any symbol is a type) and as to the generality of the object it refers to (the very definition of the symbol)^{xvii}. Its single parts receives their (general) denomination from the symbol (and for these reasons it is not possible, just like in Kant, to draw the diagram in itself - expressed in the concepts of the first tricotomy, the very diagram itself is a type, a legisign, not a token - while any concrete drawing or printed diagram is but an exemplar of a general type not directly representable) - at the same time as it is observable and it is possible to make experiments on it. This generality finds its expression in the fact that the diagram is an icon formed after certain symbolic rules and manipulable according to certain other rules (cf. the case

in Kant where the schema was precisely an intuition subjected to rules). The diagram is to put it shortly an icon formed after the rules of a symbol - just like the Kantian schema is an intuition exposing a concept.^{xviii}

Peirce's rendering of Kant's concept, however, adds a range of important features to the sparse Kantian definitions. A deduction - a necessary inference - is thus in Peirce always motivated in a diagram. The first part of the premiss allows for the construction of a diagram, the second adds an information making possible an experiment on the diagram leading to the conclusion being able to be read off of the transformed diagram. An early example in Peirce is the very transitivity of logical inference (the fact that $((A \Rightarrow B) \& (B \Rightarrow C) \Rightarrow (A \Rightarrow C))$) which can be illustrated by the following diagrama (W, vol. V, 337)^{xix}

To say that one proposition follows from another is to say that the domain of truth of the latter lies within the domain of truth of the former, as Peirce puts it. Even if Peirce in this early example talks about "illustration", his point is that the diagram does not merely illustrate a symbolic insight with a picture; the very logical inference *is* diagrammatical, and it also goes for formalized symbolic logics. The very fact that it is possible to make computations and inferences is a proof of their being icons. Another example is the following three-step inference (CP 1.66): 'If four points are connected in a circle' and 'If one moves from one extremum to another following a path on the circle', 'then any of the two other points will be passed an even and an odd number of times, respectively':

This conclusion is reached by experimenting on the diagram: one constructs a path round the circle and sees that this path suits the conclusion - and then one generalizes via the fact that any further full circle path will add one to the amount of passages in any of the two points, so that the difference between the passage number in the two points will always be one.

To Peirce, it is even the case that the diagrammatic rendering of logic is more basic than the so-called symbolical representation, precisely because it is iconic and thereby guarantees evidence for the validity of the inferences.^{xx} The pragmatist Peirce is thus more unshakeable in his belief in the ineradicability of intuition than is Cassirer. To Peirce, the diagram is the *sine qua non* of any science which thus inevitably remains tied to intuition. We must imagine that there also exist symbols containing the icon subtypes of image and metaphor (but Peirce's metaphors must also, even if not clearly expressed, contain a diagram!^{xxi}) so that not all symbols yield this possibility of thought experiments (symbols based on images pertains to general qualities (e.g. the symbol "red") - and if we want to make experiments on them, we must first embed them into a space of qualities (in this case for instance the color spectrum) - but this is the same as constructing a diagram). It is necessary to keep in mind that the symbol in Peirce is not - as is often assumed - a conventional sign based in human consciousness (even if this seems to be its preferred habitat). In Peirce's objective idealism the symbol is a habit, a tendency which might as well have its place in the human mind as in other complicated locations in the world; nothing prevents us from imagining natural diagrams. In this way, Peirce avoids scepticism by operating

wit real, existing generals; and his Middle Age realism gives his theory its peculiarity measured by the average point of view of our day, when we have got used to operate with a Russellian view letting all existing things be individuals and the generals only subsisting as extensionally defined predicates. As in the case with scholastic realists and the Austrian realists among the Brentano disciples around the former turn of the century, one is not supposed to assume that general objects exist in the same way as do individuals^{xxii}; they rather have the character of possibilities (icons), habits (symbols), *Sachverhalte* (propositions; Peircian Dicisigns), inferences (arguments).

As mentioned, Peirce does not agree with Kant in the idea that the conclusion does not contain anything not already contained in the premisses. It may be approximately true in simple syllogisms, but as to more complicated phenomena - like the ones we usually depict in diagrams - it will not be the case. The very ratio of the Diagram lies precisely in the fact that by experimenting^{xxiii} upon it something may show up which was not apparent from the directives sufficient to construe it. Logic and mathematics for this reason are experimental sciences; they map the depths of the mind by experimenting on diagrams, just like empirical experiments map nature. Peirce makes a distinction between two types of inferences from diagrams - the "corollarial" where the conclusion is reached by observation of the diagram alone; and the "theorematic", corresponding to mathematical and logical proofs where manipulation of the diagram is necessary (CP 2.267). An important commentary to add to this is the fact that it is impossible to determine beforehand how the diagram may be manipulated; the great logician or mathematician is characterized by his genius in inventing new and unforeseen manipulations. The experiment on the diagram corresponds to deducing (some of the) possible consequences of the hypothesis which the diagram illustrates. This experimentation is thus central to any process of thought in so far as thought always evaluates a hypothesis.^{xxiv} How anything possibly can be "hidden" in the object is merely presupposed by Peirce from his experience with diagrams - but just like in Cassirer's case we can see this as a "phenomenologization" in relation to Kant: the object is whole, it only displays certain aspects, but from these we may experiment us towards the insight in further aspects. This "new" can of course not be any result of the object's own development, and the "hidden" in the object must consequently have a phenomenological character: it was not initially evident to us, but may be so in the course of diagrammatic experimentation. The fact that the knowledge required for the construction of the diagram does not exhaust it^{xxv} is thus central to its character of a machine for thought - and demonstrates how far Peirce is from a pragmatism claiming that the object is nothing more than its (useful) construction. By the construction, one obtains contact with an ideal object^{xxvi} possessing its own determinations which one can try and map experimentally. The diagram is thus central, because anything going on in it, qua being an icon, is or potentially may become evident - the diagram furnishes him with the category of categorial evidence crucial to any phenomenology.

Another question in addition to the experiment upon the diagram is now its application onto concrete, existing objects. The diagram in itself is ideal, it is formed from a (symbolic) hypothesis, constructed via abduction governing its iconic construction, and just like deductions, it only portrays ideal relations. The diagram inherits by its very construction (cf. the prototypical diagram, made up from spots and interconnecting lines on a sheet of paper) the generality of the continuum; the concrete drawing is a mere token for the general type being the diagram proper (which, just like the case in Kant, can not be drawn in itself). Concrete existence and its secondness must be connected with the general and hypothetical diagram by means of induction; a first connection may be the deictic denomination of certain elements in it - the manipulation of

it then reveals (certain of) the hypothesis's possible implications, giving rise to actual claims which can be compared to actual facts.

Which specific types of signs may actually function as diagrams? Geometrical diagrams, reducing physical, mathematical, logical and other phenomena to sets of lines connecting points and figures will of course be the prototypical cases, but to Peirce, algebra is equally central as an example. Algebraic equations are also diagrams, because it is possible by the manipulation of them to learn more than what they immediately display - and consequently, they must possess similarities to the state of affairs they portray. An important affirmation is made by Peirce when he finds that also phrastic syntax is a diagram (in a polemic against logicians claiming their own discursive style to prove logic not to be diagrammatic)^{xxvii} - it is diagrammatic in so far as it has the character of consisting of general rhemes, when the saturation of them with various names are abstracted away. The diagrammatics of the sentence, Peirce's logic of relations, thus makes Peirce the inventor of valence grammar, many decades before Tesnière: a rhema like "- gives - to -" is simply a trivalent verb, in Peirce a syntactical diagram.

Peirce's elaborated theory thus expands Kant's idea of the schema and gives it a very central place in his architectonics: it becomes the very condition of possibility for the testing of abductive hypotheses by deduction and hence the central tool for hypothetical thought. Without diagrams no thought.

Neo-Kantian semiotics: the internal architecture of the signified

We already have remarked the formal similarity between the status of symbolic pregnancy and diagram, respectively, in the two neo-Kantians' theories. In both cases, a connection between intuition and understanding is at stake, in Cassirer "sinnlich" and "geistig", in Peirce iconic and symbolic - and in both cases the concepts refer to "Urphänomenen" which a continued examination might dissect further signification from - even if the difference remains, that the Peircian diagram in principle keeps its purely ideal character; it is so to speak by abduction experimentally extracted from the phenomenon depicted. Cassirer's symbolic pregnancy does not share the diagram's character of construal; it is rather a spontaneously occurring proto-diagram in perception. But a sort of extraction must always-already have taken place in Cassirer where the very concept of pregnancy indicates that it in a gestalt manner appears on an unpregnant background.

But there is a further important connection, namely between these two types of schema concepts and the two neo-Kantians' shared cultural optimism.^{xxviii} Just like Cassirer conceives of schematism as a sort of motor in the three steps of his secularized Hegelianism, so the diagram-supported symbols in Peirce are seminal for the community of scientists and their wandering towards truth; the symbol is a privileged sign, for, as Peirce says, "symbols grow". It is symbols that allow the argument's founding of new habits and hence are the prerequisite for the growth of science and, more broadly, culture; a pure icon with no symbolic support would remain a mere possibility.

Thus a great neo-Kantian meeting between the two might seem possible? - both see the symbol as the decisive tool for knowledge, making collective formation of culture possible, and in both cases the condition of possibility for this civilizing effect is its connection to schematism and its mediating function between thought and sensation. In our present, limited context we have but outlined central points in the large philosophical architectonics of both, but as a conclusion we can point out some consequences of relevance for actual semiotics.

Neo-Kantian semiotics has a decisive advantage in relation to various Saussurian ideas of semantics. Saussure's beloved structural definition of the sign, where signifier and signified are defined by the acoustic image of the expression and the imagined picture of the content, respectively, yields a poor semantics, in so far as the large problem about the definition of the signified remains obscure: even a de-psychologization of Saussure (as attempted in for instance Hjelmslev) does not help, as far as one sticks to this definition. The acoustic image of "tree" is counterposed a drawing of a tree, and this drawing contains the problem of schematism rather than solving it. For how is this supposed to explain the fact that this drawing is a *general* drawing, potentially representing millions of individual trees not identical with the drawn tree and to many respects even unlike it? This is, of course, only possible because of a schematism connecting concept and intuition, thereby treating the "double nature" of the signified. This intricate problem of categorization connected to the basic epistemological question of the objectivity of knowledge, so central to neo-Kantian semiotics, is left completely out of sight in Saussurism. Hence the notoriously insufficient semantics resulting from Saussurism (cf. for instance, Greimas' idea to define semantics by Jakobsonian pairs of opposition, in principle with arbitrary denominations, which remains Kantian "blind concepts"). Connected to this problem is of course also the Saussurist semantics' giving up of the necessity of relating semantics to the question of the possibility of science - how is it possible that certain discourses may claim to reach insights of a certain degree of objectivity? This requirement for thought is given up, often even triumphantly, by the naive apologetes (e.g. the deconstructionists) for the "arbitrariness of the sign" who dogmatically^{xxix} draws a fallacious inference from the (most often) arbitrary relation between linguistic expression and content in single words to the conclusion that all other linguistic phenomena, including the internal architecture of the signified, should also be arbitrary. This task is, again, undertaken by the neo-Kantian semiotics.

If one should raise a criticism against Kantian semiotics, it should rather come from the phenomenological side. Kant, of course, is a classical target for phenomenologists of many stripes with his substance-shy attempts at proscribing knowledge a series of categories extracted from the syllogism - far from the intention of phenomenology of a sensible description of the given. The two neo-Kantians discussed in this paper, however, are both much more sensible than their master and incorporates several phenomenological themas (Cassirer's life-world of *Ausdrücke* and his reappropriation of the substance- and thing-concepts as central categories of linguistic phenomena; his sensibility towards language, art, and myth; Peirce's wide-ranged concept of the icon and its connection to evidence; his logic of relations^{xxx} and the diagram inference drawing as eidetic variation). Rather, one could say, what is called for is an Auseinandersetzung of neo-Kantian semiotics with the series of more or less phenomenological semiotics, from Husserl over Merleau-Ponty and to cognitive semantics.

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ⁱ. The subtitle refers to René Thom's radical demands to semiotics: a theory of language which at the same time implies an epistemology: “Il n’y a guère, à nos yeux, qu’une seule possibilité: créer une théorie de la signification, dont la nature soit telle que l’acte même de connaître soit une conséquence de la théorie.” (Thom 1980, p. 170)

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- ii. Even if all these linguists generally agree in the overall American idea of pioneering and building the small lodge on the prairie all from the ground - and consequently care little about their thought's prerequisites in European tradition.s
- iii. A less known version goes that the concepts are like the prince and intuition like his people: without a prince, the people is like animals which have to make it with instincts alone; but a prince without a people is not able to do anything at all. This metaphor in fact makes intuition even more basic than understanding. (Kant 1798, p. 505)
- iv. According to Sørensen 1963 (93), Kant is the first to use the concept of symbol in this way, in opposition to Leibniz's, Wolff's and others use of it about abstract, logical signs (a use which is still current to-day, fx. in the idea of "manipulation of symbols" in the functionalist departments of AI research.)
- v. Here we find a decisive property of the Peircian symbols which taken in themselves are not iconic and consequently lack any meaning.
- vi. Namely, gesticulation, written signs, tone signs, chiffers (codes between few insiders), signs of social status (e.g. weapons), signs of duty (e.g. uniforms), signs of honor (e.g. orders), signs of shame (e.g. burnt wounds).
- vii. Of course, the everyday philosophical use of the phrase "neo-Kantian" refers to the German Kantians in the period from 1870-1930 with Cassirer as the last great representative. As a descriptive term, however, there is no reason not to extend it to cover also Peirce for whom Kant is "the King of thought".
- viii. Even if he remains a well-schooled Kantian in so far as he does not let this historical development turn into a dialectics equipped with *Aufhebung* and all the related totalitarian Hegelian consequences.
- ix. Cf. the letters between Husserl and Cassirer in 1925 (Husserl 1954), where Husserl commenting upon his reading vol. II of *PdsF* praises Cassirer for having enriched the Marburg School with a "grosse und echte phänomenologische Problematik", and even for in his references to Husserl to have shown "eine Tiefe des Verständnisses, die ich selbst bei meinen 'Schülern' selten gefunden habe", even if Husserl does not hesitate to point out that "Historische Genesis steht aber unter Wesensgesetzen". In his answer, Cassirer promises a further elaboration of the "Grundfragen der Phänomenologie" in the third volume, but unfortunately no letters about this have been preserved.
- x. The concept of "pregnance" is introduced by Wertheimer 1914 to describe forms which attract the organizing ability of perception more than others, so that perception for instance spontaneously is able to finish the perception of an only partly presented version of a pregnant form. The concept was later taken over by the other Gestalt Psychologists - Köhler, Koffka, Kanizsa, etc. and plays a central role in Gestalt Theory. At the same time, yet, it has often been criticized as one of the decisive weak points of the theory because it seems weakly or circularly defined: "The concept of *Prägnanz* or goodness is central in gestalt theory, but it is also the conceit that has offered the most frequent and best point of attack for critics." (Kanizsa, quoted from Hüppe 1984, p. 19). This double character of centrality and vagueness covers also Cassirer's use of the word: the question is if the vagueness is not an inherent quality in the *Prägnanz*, cf. the constitutive vagueness in general concepts and diagrams in Peirce, see below.
- xi. Even if Cassirer himself seems to imply this in his "Die Sprache und die Aufbau der Gegenstandswelt" where he refers to contemporaneous research into child psychology. Since then, the acquisition of object constance has been moved farther back in child development,

before language acquisition. This in turn implies some very interesting questions to Cassirer's point of view. He seems to automatically assume that his distinction between *Ausdrücke* and *Darstellung* is coextensive with the distinction between higher animal and man (even if the more primitive societies remain more immersed in the *Ausdrückswelt*). But if object constancy is pre-linguistic and might even be found in higher animals, then the sharp distinction between the two seem to dissolve, and another picture emerges, in which human language is the functioning together of a large range of competences, many of which may already be present - even if yet uncoordinated - in higher animals, in the *Ausdrücke*.

xii. On Cassirer's conception of time and space in contrast to Heidegger's, see Stjernfelt 1995.

xiii. Of course our guess would be that it is not the case: even the most symbolic algebraic calculus has to possess central iconic features in order to describe anything; this implies that the idea that symbolic calculi dispenses with intuition is simply false. The argument may be based on the expression side only, for a start: even a string of symbols requires (at the very least) a one-dimensional string, and if deletion and overwriting shall be possible (a basic requirement for any Turing machine), then an additional dimension. In order to be physically implemented, four-dimensional spacetime is of course required.

xiv. Icon-index-symbol: signs referring to their object due to similarity, contact, habit, respectively. The concept of symbol consequently does not correspond neither to Kant's use (which corresponds approximately to "metaphor") nor to Cassirer's (which corresponds approximately to "sign" in general); in Peirce, symbols are in the Leibnizian tradition a sign with an abstract, conventional meaning. Peirce's tricotomy should, of course, be seen in the overall context of his architectonic system, a presentation of which surpasses the frame of this article. Many introductions to his doctrine and his semiotics have seen the light the recent years.

xv. "But a general (fact) cannot be fully realized. It is a potentiality; and its mode of being is *esse in futuro*." (CP 2.148)

xvi. One could thus say that the diagram reduces its object to (a subset of) the intelligible relations that constitute it. The diagram in some sense *is* its object in so far as it is understandable. This is the reason why "... in the middle part of our reasonings we forget the abstractness in great measure, and the diagram for us is the very thing." (CP 3.362).

xvii. "(...) habit is a generalizing tendency, and as such a generalization, and as such a general, and as such a continuum or a continuity." (CP 6.204). For a mathematical-philosophical discussion of Peirce's theory of the continuum, see Putnam 1992 and Stjernfelt 1996.

xviii. For this reason, it simply is the very way we form concepts: "A concept is the living influence upon us of a *diagram*, or *icon*, with whose several parts are connected in thought an equal number of feelings and ideas." (CP 7.467).

xix. The three steps of the inference would be illustrated by a first step showing A contained within B, the second step being the experiment of adding D, the third the evident claim that C now contains A. The reason why we have chosen this early example is partly that its simplicity gives a clear illustration of Peirce's idea of the diagram - and partly that it allows for a direct comparison with the related idea of the schema in recent cognitive semantics. Here, George Lakoff argues on the basis of a closely related diagram that the so-called "container-schema" may account for logical inference. The following schema is supposed to account for the inference "All A are B, X is A, therefore X is B" - for instance in the well-known version "All humans are deadly; Socrates is a human being; therefore, Socrates is deadly"

- we are simply supposed to “see” that “For all A, B, X, if CONTAINER (A) and CONTAINER (B) and IN(A,B) and IN(X,B), then IN(X,B)” (Lakoff 1987, 14). (As a matter of fact, Peirce claims that the same deduction is covered by his diagram which topologically is equivalent to Lakoff’s, even if it is interpreted intensionally in contrast to Lakoff’s extensional interpretation. The intensional interpretation “mirrors” the schema so that the *outer* circle would correspond to the deadly Socrates, because this idea contains most determinations). Lakoff elsewhere claims in relation to this schema and its possible connection to connectionism versus the symbol paradigm in AI that the inference in the container schema proceeds as follows “We now ‘see’ immediately, without going through any logical deduction, that X is in B” (quoted from May 1992, 66). Michael May whose Ph.D. dissertation on diagrammatic reasoning has been an inspiration to the present paper, undertakes a fertile criticism of this Lakoffian stance: “Lakoff, here, goes to far by assuming that we directly *see*, rather than conceive, by means of a logical inference, the conclusion in a schematic structure” (ibid.). Lakoff imagines that the “syllogistic effect” may be obtained without any symbol manipulation at all. This idea in Lakoff forms part of his general strife with logical semantics in American philosophy and linguistics, but seems to be too influenced by this opposition so that he imagines that it is possible radically to get rid of any symbolicity whatever. This idea is criticized by May who in Peircian vein claims that any diagram demands symbolic definitions. The difference between Lakoff’s cognitive semantics and Peirce’s diagrammatics is consequently that the former imagines the logical level to a sort of mystifying surface which can be torn away to reveal the real inference process going on in pure schemata of imagination - while the symbolic determination in Peirce forms a crucial part of the very definition of schemata. One might therefore conclude that this determination must also be present in Lakoff, even if implicitly and unknowingly: the container schema always presupposes properties which are not described in the naked topology (f. inst. the fact that objects may not osmotically wander from A to non-A during observation) and for this reason must be assumed symbolically. Michael May proposes on the basis of this observation a fertile splitting of the schema concept into two: a logical-topological part versus a physical-geometrical part. The same distinction, he argues, may account for the difference between a schema merely stating that something is “in” something else, and one which states that this something for this reason cannot get “out”, is “protected by the limitations of the container”, etc. - because the latter intuition adds to the formal, topological container material determinations. May has a great point in this distinction, but the question is if it does not cover even subtler distinctions. For behind May’s proposal lies implicitly a Husserlian formal/material distinction which we have seen exposed to Cassirer’s criticism. One could arguably ask whether the “physical-geometrical” intuition takes (or has to take) all the physical properties of a container into account (this independent of whether we speak of scientific physics or naive physics). A schema, in which it is allowed entities to move around following arrows, must operate with movement and some force causing it - but it does not need to assume that objects are for instance not punctiform (they physically never are), just like it does not have to admit several types of forces (the fact that the container is in a field of gravity so that objects cannot fall “up” and out may be added in certain models, not in others). The same goes for the idea of a “physical-geometrical level”: it is perfectly possible to make diagrams which are only geometrical and do not add any physical assumptions (ordinary textbook geometry diagrams), just like it is possible to make physical diagrams with no or only

few geometrical assumptions (a geographical map only interested in connections and not in form or distance, for instance). It seems, rather, to be the case that each geometrical and physical constraint adds further formal describable features to the naked topological diagram. Finally, one could add, diagram features which are not geometrical-topological do not have to be physical but may be psychological, sociological etc. (f. inst. a diagram endowed with the rule that you cannot migrate across a border without a passport). So, in addition to the topological-geometrical purely formal determinations, positive, empirical determinations of many kinds may be added. Thus, we would end up with a Cassirerian “continuum” between form and substance, and we would get a plurality of types of schemata depending on “how much” and which empirical and geometrical constraints are added to the formalization. Translated into Peircian terminology: depending on which symbolic determinations are placed onto the icon.

xx. Peirce connects Kant’s demand for intuition with the logical notion of truth due to his phenomenological concept of evidence: “Now necessary reasoning makes its conclusion *evident*. What is this “Evidence”? It consists in the fact that the truth of the conclusion is *perceived*, in all its generality, and in the generality the how and the why of the truth is perceived. What sort of a Sign can communicate this Evidence? No index, surely (...) No Symbol can do more than apply a “rule of thumb” resting as it does entirely on Habit (including under this term natural disposition); and a Habit is no evidence. (...) It is true that ordinary Icons, - the only class of Signs that remains for necessary inference, - merely suggest the possibility of that which they represent, being percepts *minus* the insistency and percussivity of percepts. (...) It is, therefore, a very extraordinary feature of Diagrams that they *show*, - as literally *show* as a Percept shows the Perceptual Judgment to be true, - that a consequence does follow, and more marvellously yet, that it *would* follow under all varieties of circumstances accompanying the premisses. It is not, however, the statical Diagram-icon that directly shows this; but the Diagram-icon having been constructed with an Intention, involving a Symbol of which it is the Interpretant (...) which Intention, like every other, is General as to its Object, in the light of this Intention determines an Initial Symbolic Interpretant. Meantime, the Diagram remains in the field of perception or imagination; and so the Iconic Diagram and its Initial Symbolic Interpretant taken together constitute what we shall not too much wrench Kant’s term in calling a *Schema*, which is on the one side an object capable of being observed while on the other side it is General (...) in the usual sense of general as to its object.” (NEM IV, p. 318) Unfortunately this is not the place for elaborating upon the diagrammatic interpretation process, but it is important to note that Peirce’s conception of the diagram implies that ordinary “symbolic” logic notation must always possess diagrammatic features; otherwise it would not be possible to reach conclusions by using it. Of course, the single symbols in such an expression are completely arbitrary, but the syntax and the rules of inference must be iconic in order to reach conclusions. This implies that ordinary first order logic which has been proven equivalent to the Beta version of Peirce’s so-called Existential Graphs, is fully as iconic as these. The symbolic logicians is thus misinterpreting their own work.

xxi. Peirce’s notion of metaphor refers to a similarity between sign and object in something else, that is, the diagram it contains is localized in another sign to which it has a general connection. The concept of metaphor in Peirce is thus his corresponding notion to Kant’s symbol, while Peirce’s notion of symbol rather corresponds to Kant’s concept of concept.

xxii. Also at this point, Peirce agrees in Duns Scotus’ doctrine that the only real existing is individuals (*res*); a general object has another mode of existence as an *ens rationis* without for this reason being purely subjective; it is rather formal, cf. Scotus’ famous “formal distinction”. In

this, Peirce is affiliated with the Austrian Brentano school and its tendency towards “reism”, cf. Smith 1994.

xxiii. On this experimenting, Peirce says that “The Diagram sufficiently partakes of the percussivity of a Percept to determine (...) a state [of] activity in the Interpreter, mingled with curiosity. As usual, this mixture leads to Experimentation. It is the normal Logical effect; that is to say, it not only happens in the cortex of the human brain, but must plainly happen in any Quasi-mind in which Signs of all kinds have a vitality of their own. Now, (...) certain modes of transformation of Diagrams of the system of diagrammatization used have become recognized as permissible. (...) Some circumstance connected with the purpose which first prompted the construction of the diagram contributes to the determination of the permissible transformation that actually gets performed. The Schema *sees*, as we may say, that the transformate diagram is substantially contained in the transformand Diagram, and in the significant features to it, regardless of the accidents. (...) The transformate Diagram is the Eventual, or Rational, Interpretant of the transformand Diagram, at the same time being a new Diagram of which it is the Initial Interpretant, or signification, is the Symbolic statement, or statement in general terms, of the Conclusion. By this labyrinthine path, and by no other, is it possible to attain to Evidence; and Evidence belongs to every Necessary Conclusion.” (NEM IV, 318-9)

Thus, it is simply not correct when Derrida in the *Grammatology* claims that Peirce’s phenomenology has the advantage in relation to Husserl’s that it does not contain any idea of presence; the concept of evidence is, just like in Husserl, the condition of possibility for presence. (Derrida 1967)

xxiv. NEM IV, 314: “All necessary reasoning is diagrammatic; and the assurance furnished by all other reasoning must be based upon necessary reasoning. In this sense, all reasoning depends directly or indirectly upon diagrams.” As is evident, this diagram experiment has an essentially phenomenological character; in several respects, it corresponds to Husserl’s idea of an “eidetic variation” investigating the limits of and the implications of a given idea.

xxv. Peirce utilizes different descriptions of this point; one place he for instance says that “...new relations are discovered among its parts, not stated in the precept by which it was formed ...” (CP 3.560). Another place he elegantly claims about the truths derived from a diagram: “Everything is involved which can be evolved.” (CP 4.86) - implying that this can not be determined beforehand. Yet another version which we have already quoted yields the formula “... by the direct observation of it other truths concerning its object can be discovered than those which suffice to determine its construction.” (CP 2.279). A fourth example: “In science, a diagram or analogue of the observed facts leads on to a further analogy.” (CP 1.367). A fifth: one “... perceives in the parts of that diagram relations not explicitly mentioned in the premisses.” (CP 1.66). A sixth: “For mathematical reasoning consists in constructing a diagram according to a general precept, in observing certain relations between parts of that diagram not explicitly required by the precept ...” (CP 1.54). In any case, the idea is that the construction is an access to an object existing in its own right, beyond the construction; the construction is so to speak only a Husserlian *Abschattung* of the object which may be forced to display other sides of itself. A source of confusion is it that Peirce sometimes talk about the construction as if it were unique, as if there were only one way of construing a given diagram; we should rather imagine that there are several different ways of construing a given ideal object (with corresponding different “hidden sides”).

xxvi. In this lies, of course, Peirce's anti-psychologism which he shares with Frege and again with Husserl; the distinction between *Thinking* - as an "operation of the mind" - and the logically objective *Thought* which the thinking processes.

xxvii. CP 4.544

xxviii. A further connection between the two which might throw some light upon this, is the preoccupation with Schelling in both of them; an examination of this fact lies outside the scope of the present paper.

xxix. Thus, it is interesting to notice that the scepticist adoring of the idea of arbitrariness is based on a dogmatism - the rationalist arch-vice par excellence ...

xxx. As well as his critique of Kant's distinction analytical/synthetic which lets all wholes in intuition be the result of the mind's synthetic activity. Here Peirce claims, in perfect harmony with Cassirer, that "Kant gives the erroneous view that these ideas are presented separated and then thought together by the mind. This is his doctrine that a mental synthesis precedes every analysis. What really happens is that something is presented which in itself has no parts, but which nevertheless is analyzed by the mind, that is to say, its having parts consists in this, that the mind afterwards recognizes those parts in it." (CP 1.384).