

Luhmann's secret diamonds

New entries for the Zettelkasten

Rudolf Kaehr Dr.phil. @

Copyright © ThinkArt Lab ISSN 2041-4358

Abstract

A kind of a similarity between Luhmann's concepts of sign, system, difference, distinction, operation and re-entry and the main figures of diamond theory is observed. It turns out that Luhmann's diamonds are well hidden and often covered by sandstones of postmodern masonry.

1. Where are Luhmann's diamonds?

1.1. Citations

"When a communication constitutes a previous communication as a communication, it simultaneously distinguishes it from all those other things in the world that are not communication. In this sense, all operations of autopoietic systems always constitute the difference between the system and its environment.

"Distinctions, however, are observations that constitute a difference between two sides and thereby relate these sides to each other. Observations, which are thus the application of distinctions, 'open' the system for conditions of the environment, but as internal operations they 'close' the system by distinguishing it from its environment (1997a page 92 ^ 108). An observation relates and differentiates: it is a unity of difference.

"Its main cornerstones are a conception of space as the possibility of drawing distinctions, and an analytical focus on accessibility systems and organisations."

Martin Gren, Wolfgang Zierhofer: The unity of difference: a critical appraisal of Niklas Luhmann's theory of social systems in the context of corporeality and spatiality.

<http://www.cjsonline.ca/pdf/luhmann.pdf>

Self-referentiality of distinction

Social systems are constituted as 'self-referential objects. We can observe and describe these as systems only if we accept that they refer to themselves in every operation' (Luhmann, 1995, page 437).

Components of distinction: indication and distinction

"However, there is a fourth point that will occupy us at least for a short while. I have already alluded to it. Spencer Brown's theory design contains a well-hidden paradox. It is constituted by re-entry itself or--if we refer to the beginning of the calculus, the first injunction 'Draw a distinction!'--by the fact that the distinction must be and is drawn merely in order to distinguish one side. Thus, every distinction contains two components: indication and distinction. The distinction contains itself, but apparently in a very specific form: namely as the distinction between distinction and indication, and not merely some juxtaposition such as of large and small, or anything else that could be conceived of as a distinction." (Luhmann, p.19)

Consecutivity as a reason for time and memory

"When a system constitutes itself, it draws a difference between system and environment by carrying out two subsequent operations: distinction and indication (Rasch and Wolfe, 2000, page 36).

First it distinguishes two sides and then it indicates one of these sides as the system (or the observer). As these operations are consecutive they constitute or 'consume' time. All observations are thus temporal: one cannot be on both sides of a distinction at the same time. Introducing a difference in time is one of the operations that autopoietic systems use in order

to 'unfold' (or solve) the paradox of reentering distinctions (or the self-application of a code)." (Martin Gren, Wolfgang Zierhofer, ibd)

"To cope with these consequences of a re-entry of the internal/external difference in itself, the system needs and constructs time. It needs a memory function to discriminate forgetting and remembering. Its past is given a highly selected present and, in this sense, a reality" (Luhmann, in Rasch and Wolfe, 2000, page 37).

Binary codes

"From the point of view of the system, its binary code is universally valid because it may be applied to all its objects: for example, to all statements (science) or to all actions (law). Binary coding excludes third possibilities, and, as soon as the code is applied to itself, either tautologies ('true is true') or paradoxes ('true is not true') are produced. Therefore, the binary code must not regulate its own application. This is instead the task of programs (Luhmann, 1989, pages 37, 39 ^ 40, 45)." p.5

1.2. Interpretation

It seems to be more fruitful today to thematize and formalize Luhmann's distinctions with the help of *diamond* theory instead of the *Calculus of Indication* of George Spencer Brown.

A key notion in Niklas Zettelkasten, obviously, is *self-reference*.
The other crucial notion is the self-referential concept of *difference*.

With that all kind of connections to logical, methodological and epistemological considerations are provoked. A strange connection to Spencer-Brown was inaugurated, mainly by the influence of Heinz von Foerster. The re-entry figure became a *machina creativa*, albeit nobody had a training in formal languages at all.

Difference and relation; *différance*

But Luhmann's work is about social theories and not about logic. Neither is Luhmann's theory of social systems a semiotic or semiological theory. This point is not yet well understood. Semiotics, but the french "sémiologie" too, are based on *relations*, triadic for semiotics and dyadic for semiology. But Luhmann's concept of a self-referential and "therefore", paradoxical concept of difference isn't based on relations but on difference (Unterscheidung). Relations are presupposing difference, and are thus secondary to the paradox concept of difference. Relations are logical and not paradoxical or parallax.

Derrida has given strong deconstruction of the semiological and semiotic sign concept and its relational foundations in logocentrism. With his radicalized interpretation of de Saussure's semiology, he transformed the concept of difference to the paradoxical non-concept of *différance*. The difference of the difference, the *différance*, is not in a relationship to relations.

Similar, Gotthard Gunther's non-concept of *proemial relationship*.

Hence, Luhmann's insistence on self-reference might well be reformulated in different ways. One, which I proposed for many years, is interpreting self-reference and its circularity in the framework of a polycontextural understanding of *chiasms*, i.e., technically, as proemial relationships. This is a highly complex and operative approach and is not irritated by the phantasms of the *circulus creativus* of second-order cybernetic self-referentiality.

Now, after this chiasmic theory got some maturity, albeit not much recognition, it is time to introduce the *diamond* approach to difference and circularity of system and environment. Diamond strategies are a further radicalization of the earlier approach of polycontextural chiasm.

Also Luhmann's work is not well known in the Anglo-Saxon world, it isn't a wrong feeling to observe that also the themes and topics, and their highly reflected treatment by Luhmann, has no real existence in the world-leading sociological literature of the super-power theoreticians.

2. Supplementing the Zettelkasten

It doesn't seem too risky to risk an interpretation of Luhmann's theoretizations out-side or beyond second-order cybernetic figures and metaphors.

In other words, is there a strict necessity to understand Luhmann's adventure in terms of the entries of his own Zettelkasten?

Is it possible to 're-construct' his constructivism and re-enter into it without its terminology and jargon of difference, distinctions, re-entry and self-referentiality?

Luhmann's theory is self-referential, thus it could refer to itself in different terminological modi, and still keeping its adventures strategies and networks of constructing a de/constructive theory of social systems alive.

Hence, I will take the risk to supplement the Zettelkasten by smuggling in some non-contents of diamond boxes into this, now electronic, Zettelkasten.

By re-reading the passage with its introduction of the difference of *system* and *environment*, I think that I'm observing, or as I prefer to say, hallucinating, some features not yet been recognized and mentioned, neither explicitly by Luhmann nor by his followers.

Self-referentiality without referentiality?

The rhetoric figures of Luhmann's texts are not necessarily determined by the frameworks of the used technical weaponry. The cage of the jargon is not necessarily incarcerating the dynamics of the gesture.

Technically, I try to understand Luhmann's theory of social systems from the viewpoint of polycontextural and diamond systems. Hence, I try to avoid to go into the litany of second-order cybernetics, systems theory and Spencer-Brown's Calculus of Indication and its extensions.

Even more technically, my interpretation of Luhmann's gestures with the introduction of his rhetoric figures is due to a morphogrammatic subversion, abandoning any jargon and terminological content, as crucial as it might be, and conceiving the dynamics of the patterns, only.

After this new diamond approach is introduced, experienced and further developed, a renewed lecture of Luhmann's work as involved with the above mentioned second-order trends, might happen again.

The term "diamond" refers to itself, only. There is no reference to exposed marketing labels necessary.

2.1. Binaries

Communication/distinctions
 system/environment
 Observations: open/close
 relate/differentiate
 space/time
 Open/close are inverse operations

First, the system is the difference between system and environment.

Second, the system can be defined through a single mode of operation.

Third, every (social) system observes internally (i.e. within the system) its own system/environment distinction; there is a re-entry of the system/environment distinction into the system.

Fourth, every social theory is part of the social domain and as such part of what it describes.

Systems exist.

Obviously, this is a paradoxical formulation. And only academic blindness can deduce that it is a confession for ontological realism.

2.2. Uncovering Luhmann's diamonds

Statement

When a communication constitutes a previous communication as a communication, it simultaneously distinguishes it from all those other things in the world that are not communication. In this sense, all operations of autopoietic systems always constitute the difference between the system and its environment.

How can this happen? If an operation of an autopoietic systems is producing by its action, i.e. operation, both, the intended operation and at the same time, the operation of distinguishing the system of the first operation from its environment, then it "*constitute[s] the difference between the system and its environment*". How is an autopoietic operation simultaneously operating in its domain (system) and producing an environment of the domain? Or in other words, how is an operation operating that it is able to operate and thereby by such operation constituting (operating) its own environment?

The first answer, which might be given by Luhmann is the hint to Spencer Brown's Calculus of Indication: "Draw a distinction!" With this distinction, the 'world' is 'divided', i.e. 'distinguished' into two parts, the *inside* and the *outside* of the 'world' or 'space'.

But what is given by the CI? Two 'equations'!

In this formulation, no world appears. The world or space is presupposed and realized by a sheet of paper or another medium of inscription. This might be interpreted cognitively by a user of the CI. And this interpretation will become a meta-theoretical environment of the calculus. But nevertheless no part of the calculus in question.

Again, *"When a communication constitutes a previous communication as a communication, it simultaneously distinguishes it from all those other thing in the world that are not communication."*

Interpretation

"When a communication constitutes a previous communication as a communication"

This is involving several procedures:

1. *"communication constitutes a previous communication"*, this might be naturally understood as a *composition* of two communications.
2. *"as a communication"* means, that the composition has to be realized as a composition of communications and nothing else. But this condition is exactly what is called the *'matching conditions* for compositions'.
4. With this formulation we get a clue to understand what could be meant by the consequence: *"it simultaneously distinguishes it from all those other thing in the world that are not communication."*

This consequence of the composition of communications is following *consecutively* the 'assumption' of the operation of composition albeit it states its *simultaneity*.

Diamondization

Luhmann's communicational statement, the 'axiom' of communication, interpreted as a categorical composition of communications offers a natural introduction of the otherness of communication, i.e. the simultaneous environment of communication by the saltatorial hetero-morphisms.

It needs two communications to realize communication and its environment as the singular otherness of communication. This asymmetry is directly covered by the saltatories of diamond theory, which are complementary to the categories of communication.

Because of the operativity of the diamond interpretation of Luhmann's conception of communication, communication might now be studied operatively on all levels of complexity and complication necessary, together with their interplay.

This diamond interpretation is not reducible to the indicational calculus and its use for autopoietic and communicational systems.

Again, what are the conditions for communication? Communications have to be *"anschlussfähig"*, i.e. they have to fulfil the conditions of connectivity.

In category and diamond theory, such conditions are exactly the *matching conditions* of composition.

Now, there are two possibilities opened up.

One insists that the conditions of the possibility of something are not identical with such a conditional something.

The other position could take a highly formalistic turn towards self-referentiality and postulate that there is no logical difference between the conditions of something and such a something.

Without doubt, the latter position leads quite directly to logical paradoxes. But who cares?

Why should we use logic? And which logic anyway?

It also could be mentioned that the comparison itself is too much restricted by logic and alternativity.

The first position sounds harmless if we take the statement in a hierarchical way, i.e. if we postulate a sequential order between the conditions and the entity. But why should we accept this decision as the only working possibility?

The diamond approach, obviously is postulating a simultaneity of both thematizations, the conditions of the possibility and the characteristics of the entity.

It might be a question of taste which of both positions has to be considered as more crazy: the ultra-formalistic or the diamond approach.

Re-entry and in-sourcing

"To cope with these consequences of a re-entry of the internal/external difference in itself, the system needs and constructs time." (Luhmann)

Again, in-sourcing:

"The idea of in-sourcing the matching conditions into the definition of diamonds seems to be in correspondence with the two main postulates of "Chinese Ontology", i.e., the permanent change of things and the finiteness or closeness of situations. That is, diamonds should be designed as structural explications of the happenstance of compositions and not as a succession of events (morphisms)."

The figure of re-entry tries to correspond to the device to include *"the internal/external difference in itself"*. This happens in *"consequences"* and needs/constructs time. Hence, the idea of a simultaneous realization of the difference of system and its environment gets lost in the infinit delirium of self-reference.

In-sourcing the matching conditions of composition is a finite and simultaneous constellation of categories and saltatories. It is the interplay of both, categories and saltatories of a diamond constellation, which is realizing the figure of re-entry in a finite and differential manner.

Both strategies, the re-entry and the in-sourcing, seems to correspond to a similar gesture.

3. Diamonds

3.1. Constellations

The advantage to enter the adventure of diamonds is twofold: ultra-paradox and trans-operative, at once.

Diamonds are paradox and pataphysical.

The disadvantage of the calculus of indication is its low paradoxality and its hermetic narrowness towards operativity.

The relationship between difference-theory and the calculus of indication, *Laws of Form*, is parasitic. Difference theory is not contributing anything to the development of the calculus. It is solely interpreting some simple situations and transferring some terms into its jargon and Zettelkasten. There is no direct *modeling* between difference theory and indicational calculation.

The situation appears radically different in the case of diamond theory. Diamonds are per se defining the differential relation of system and environment immanently and intrinsically to their basic constructions (terms, notions, operations). Diamonds are build as an interplay of categories and saltatories.

Luhmann's difference theoretic relationship to the CI is interpretative. There is no operative counterpart in the CI which is directly and operatively supporting his difference theoretical interpretation. Historically, it was notorious, that the Bielefelder had been chasing prefaces to the Laws of Form. With an operative correspondence, this wouldn't have motivated so many chaser.

3.2. Diamond features

"The diamond modeling of the otherness of the others is incorporating the otherness into its own system. An external modeling of the others would have to put them into a different additional contexture. With that, the otherness would be secondary to the system/environment complexion under consideration. The diamond modeling is accepting the otherness of others as a "first class object", and as belonging genuinely to the complexion as such.

"Again, it seems, that the diamond modeling is a more radical departure from the usual modal logic and second-order cybernetic conceptualizations of interaction and reflection. The diamond is reflecting onto the same (our) and the different (others) of the reflectional system.

"In another setting, without the "antropomorphic" metaphors, we are distinguishing between the system, its internal and its external environment. The external environment corresponds the rejectional part, the internal to the acceptanceal part of the diamond. Applied to the diamond scheme of diamondized morphisms we are getting directly the diamond system scheme out of the diamond-object model.

Thus, a diamond system is defined from its very beginning as being constituted by an internal and an external environment." (Kaehr, Diamond 2007)

"No system can perform operations outside of its own limits. If new operations are integrated it means that the limits of the system have to be extended. Consequently, the system cannot use its own operations to connect itself with its environment since this would require that the system operate half within and half without the system." (Luhmann)

CI

The repetition of a distinction, $\llbracket \rrbracket = \llbracket$, is a *composition*, hence, like all compositions, the composition of *Laws*

of *Form* (also called Calculus of Indication, short CI) has to fulfil some matching conditions. They are well hidden in the *Laws of Form*, because there is not much content involved in the CI composition. But as I have shown in a slightly cabaret-like performance, there are matching conditions to be accepted.

"Axiom1. The law of calling

"*The value of a call made again is the value of the call.*" (Spencer Brown, laws of form, p.1)

This is explained as: "That is to say, for any name, to recall is to call."

Initial1: Number $\left| \right| = \left| \right|$

Draw a distinction, mark it! Fine. Now, the same again! Draw a distinction, mark it!

But *where* should I draw and mark it? Behind the blackboard, at the scribble board of the toilet? *When* should I mark it? *How* should I mark it, with a different color upon the first mark? And so on!

Obviously, it is supposed that I mark the mark bravely, one after the other on a strict line of a linear writing scheme. Therefore, the matching conditions are internalized in the mind of the distinction drawer and not yet inscribed at the blackboard (B. Brecht).

When I played this game together with Luhmann 1993 at a research seminar in Hamburg, I didn't have the simple technical term of "*matching conditions*" at hand. But the message was clear and I got the feeling that the figure was well received.

But then, what's next? Waiting for a new preface from George?

In other words, the claimed self-evidence of the two *Axioms* and the two *Initials* of the *Laws of Form* are not as self-evident as Spencer-Brown pretended to make people believe. There is a whole cosmology of endless continuity and unique coherence presupposed that has to be believed in and that is not thematized for the acceptance of the evidence necessary for the use and understanding of *Laws of Form*.

Things are not more clear with *Axiom2*. One nice point is the "*again*". Who guarantees that the situation hasn't changed fundamentally and that a repetition isn't possible anymore. Hence, the "matching conditions" are implicit in the "*again*" or the "re-" in "recross" of the law of crossing.

Axiom2: The law of crossing

"*The value of a crossing made again is not the value of the crossing.*" (ibid, p.2)

This is explained as: "*That is to say, for any boundary, to recross is not to cross.*"

Initial2. Order $\top \left| \right| = \left| \right|$

A decisive discussion of the *Laws of Form* might be read anew with "*Neue Tendenzen in der KI-Forschung*" at: <http://www.thinkartlab.com/pkl/media/DISSEM-final.pdf>

Interplay of categories and saltatories

For diamond theory, the identity of objects of a category is defined by the hetero-morphisms of a saltatory. And complementary, the morphisms of a saltatory are defined by the objects of a category. Hence both distinctions, objects and morphisms, as basic starting concepts of category theory, have to be introduced at once. Both have, for their introduction, to be considered as being in a heterarchic order. This can be done without circularity only if there is conceptual space for the distribution of the concepts "object" and "morphism" accessible. The heterarchy of the "*at once*"-figure is neither temporal nor topological but *graphematic*, i.e. scriptural.

For diamond theory, the second-order concept of self-referentiality is deconstructed towards the *interplay* of categories and saltatories in diamonds. Such an interplay isn't involved with relations and relational logic.

As mentioned in other papers, like *Web Mobility. Web computing between semiotic and kenomic spaces*, the *Laws of Form* are profoundly deviant from classical semiotics. Nevertheless, they are based on a specific form of *combination* (concatenation and enclosure) of the "*Cross*", therefore they are accessible to diamondization. Obviously, the results of such a diamondization of combination (concatenation, enclosure) delivers different interplaying constructions in contrast to the known diamondization of the (concatenative) composition of morphisms in category theory.

http://www.thinkartlab.com/pkl/media/Web_Mobility/Web_Mobility.pdf

In Laws of Form, there is a special semiotic atom, called the Cross", which can be combined with other terms in two modes: by concatenation or by enclosure. This is an obvious deviation from standard semiotics, where concatenation is the only mode of combination. Combination by enclosure is also the basis for the "reentrant forms", another semiotic innovation. A third deviation from classical semiotics is less obvious: the commutativity of the concatenation operation. For any two terms "a" and "b" the terms "ab" and "ba" are identical. Rudolf Matzka, Semiotic abstractions in the theories of Gotthard Günther and George Spencer Brown

<http://www.rudolf-matzka.de/dharma/semabs.pdf>

The system-paradox of "*A system is a system and its environment*" is transposed to "*A diamond is an interplay of categories and saltatories. And saltatories and categories are a diamond of an interplay of categories and saltatories.*"

A system (diamond) is a system (category/saltatory) and an environment (saltatory/category) of a system. And an environment is a system as an environment of a system. And a system is an environment as a system of an environment.

This paradox formulation doesn't require Luhmann's forbidden half/half-strategy of "half" within and half without *the system*.'

3.3. What's the sacrifice

Diamonds are doubled, split and antidromic from the very beginning, which in itself is doubled and therefore neither a beginning nor an origin.

As a consequence, the hegemony of singular identity has to be given up. Such an identity is derivational. Singularity of identity, its uniqueness, hence, is a gravitational obstacle for flexible, metamorphic and heterarchic thinking and acting.

"First it distinguishes two sides and then it indicates one of these sides as the system (or the observer). As these operations are consecutive they constitute or 'consume' time. All observations are thus temporal: one cannot be on both sides of a distinction at the same time."

Such a necessity for consecutivity appears as a relict of old-European tradition, i.e. Western culture. This obsolete hegemony is the source of the Western concept of time.

In a diamond world, there is no need for such consecutivity, and therefore for an understanding of time based on it.

This achievement of Western culture, its hegemony and its double blind spot, has to be sacrificed. It anyway always was an illusion/allusion.

Because the operations are consecutive in time, because "one cannot be on both sides of a distinction *at the same time*", time is based on the identity of observations and distinction is based on the temporality of observation. Time is timing itself.

If such circularity is accepted, why not to accept simultaneity? Neither circularity nor simultaneity has a privileged relationship with absurdity.

But there is no obstacle to find the direct opposite or even complementarity to the consecutivity thesis or observation in Luhmann's writings:

"Das Überschreiten der Grenze erfordert Zeit. Insofern orientiert die Operation sich an einer Differenz von vorher und nachher.

Andererseits sind in ihr die beiden Seiten der Unterscheidung gleichzeitig gegeben.

Die Operation befindet sich nie an zwei Zeitstellen zugleich, sie ist keine Göttliche Aktualität, aber sie setzt die Gleichzeitigkeit der beiden Seiten der Unterscheidung und damit die Gleichzeitigkeit der Welt voraus, um sich in einer vorher/nachher-Differenz bewegen zu können.

Sie aktualisiert gleichzeitig Gleichzeitigkeit und Ungleichzeitigkeit." (Luhmann, p.80-81, 1990)

This distinction of the preconditions of distinction as simultaneous and as consecutive distinctions demands themselves for a new characterization, i.e. distinction of the term distinction.

Probably a third-order distinction. And so on.

Take a risk! Draw a distinction!

Reject "time+space"-distinctions!

Try it with "zugleich" instead of the time absorbing "gleichzeitig"!

Therefore, the primordial distinction for distinctions is the simultaneity of the distinction of "before/after"; and the primordial distinction for distinctions is the consecutivity of the distinction of "before/after".

Hence, the distinction of simultaneity/consecutivity is primordially simultaneous and - at the same time - primordially consecutive.

As a consequence, *primordially* is at once consecutive and simultaneous and, therefore, neither simultaneous nor consecutive. And the same game is played for the characterization of "time" in "Gleichzeitig" and "Ungleichzeitig". This game has to be played until all terms involved in the thematizations are deconstructed.

[This figure is historically well known from Hegel's "identity of identity and non-identity"; and "non-identity of identity and non-identity".]

The risk-concept of the theory of social systems is not only risky but adventurous, and, as it becomes more

obvious, deemed to cause catastrophes. Simply because it doesn't take the adventurous risk to get rid of old-European distinctions.

4. Beyond economy

Time production as a result of a singularity of observation, which needs and produces, produces and consumes, time and memory. For diamonds, no such implications have to be observed.

Hence, diamonds are more observer independent, are getting more radically rid of anthropological, egological and subjectivistic inheritences of old-Europaen philosophy and science.

Hence, diamonds are deliberating difference-analytical limitations for system-thinking and are more open for a general theory of (social) systems.

There is no time for time production and consumption.

It, therefore, can be stipulated, that the time-structure of diamonds with its interplay of dromic and antidromic horizons, is independent of the economy of production and consumption.

Happenstance and duration

"The idea of *in-sourcing* the matching conditions into the definition of diamonds seems to be in correspondence with the two main postulates of *Chinese Ontology*, i.e., the permanent change of things and the finiteness or closeness of situations. That is, diamonds should be designed as structural explications of the *happenstance* of compositions and not as a succession of events (morphisms). More exactly, diamonds are contemplating the interplay of acceptional and rejectional thematizations. Thus, morphisms with their matching conditions and composability are in fact of secondary order for the understanding of diamonds." (Kaehr)

"Cognitive systems, therefore, have only a monometallic existence, as a result of the burden of simultaneity which keeps them on the ground. [...] They experience world , therefore, with future and past - that is, *duration* - only in the form of *non-presentness*." (Luhmann)

5. Graphematics: From difference to différance

If a sign is defined, introduced and characterised by differences and not by relations, i.e. differentially and not relationally, and difference/différance is staged on an ontology-free arena as an interplay between categorical and saltatorial gestures, then diamonds are designing and inventing not semiotic but graphematic horizons (systems).

Semiotic systems appear in such situations as frozen diamonds.

6. Diskussion of the traditional view

6.1. Comments

There is, despite the massive multitude, a kind of an established view on sign theory, semiotics or sémiology, especially in its meta-theoretic formulations, conceptualizations and jargon.

First, a sign is a *relational object*: dyadic for Saussure, triadic for Peirce, tetradic for some other semioticians. As a consequence, signs are constituting a *system* of signs. Hence, signs tend to be characterized as systems and not as (relational) objects.

Second, despite all the onto-logical topics and inherited problems, signs are *self-referential*, they are able to refer to themselves by definition.

Third, there are many other characteristics for signs, like sign classes, sign relations, sign thematics, etc.

Fourth, signs are iterable. Independent of specifique forms of identity and linearity of whatver media, the iterability of signs is the main characteristics of semiosis.

Endless

"A Sign does not function as a sign unless it be understood as a sign.[...]"

Thus there is a virtual endless series of signs when a sign is understood; and a sign never understood can hardly be said to be a sign." (Peirce) 6 - v. 1902 - MS 599 -Reason's rules .

<http://www.cspeirce.com/menu/library/rsources/76defs/76defs.htm>

The "*virtual endless series of signs*" is well understood and used for endless referencing manoeuvres, linear and self-referential, to support the myth of the infinity of the semiotic space, i.e. the endlessness of resources in matter, space and time.

Such an approach is not yet considering the reflectional, i.e. second-order status of the sign concept. The endless series of signs are representing a kind of a link-structure in a semiotic space, where signs appear as irreflexive entities.

Reflection

But, Peirce' sentence has a second part: "*and a sign never understood can hardly be said to be a sign.*"

Therefore, even at the very beginning of semiotics, prior to any referentiality and self-referentiality, i.e. iterability, signs are conceived as reflectional. Hence, signs as reflexional events are not relational.

"Every sign stands for an object independent of itself; but it can only be a sign of that object in so far as that object is itself of the nature of a sign or thought. For the sign does not affect the object but is affected by it; so that the object must be able to convey thought, that is, must be of the nature of thought or a sign. [...]" 18 - 1903 - C.P. 1-346 - Lowell Lectures: vol. I, 3d Draught .

Signs are, therefore, second-order objects, i.e. reflexive, and cannot be handled properly as irreflexive objects, entities or things: "*but it can only be a sign of that object in so far as that object is itself of the nature of a sign*".

In other words, paradoxically, a sign is a representation of an object and such an object to fit a sign is in itself a sign. Hence a sign is a sign of a sign, which might be an object for a sign of a sign. Hence, a sign is an object for a sign. Which is a sign for an object, endlessly.

As a result, a mathematics of semiotics is missing the point of reflexivity. Objects in mathematics are entities, defined by identification and is-abstraction. Second-order objects are thematized in the mode of as-abstractions. An object is not a sign and a sign is not an object. But an object thematized *as* a sign is a sign; and not an object.

All that might be obvious and well known, at least in the context of *philosophical* sign theory but it seems to be forgotten by all the technical applications of computational semiotics, Web semantics, etc.

<http://www.dca.fee.unicamp.br/~gudwin/compsemio/>

6.1.1. Relationality

Charles Sanders Peirce

One is: Peirce' semiotics is tradic-trichotomic and relational, hence based on triadic relations.

What is a sign? A sign is a triadic relation.

As every student of math knows: Each n-adic relation might be represented by a succession of dyadic relations. Hence, n-adicity is reducible to dyadicity.

Well done! What is a relation? A relation is a subset of a set, i.e. a product set, a Cartesian set. Therefore, a sign is a subset of a set.

But what we are not told is that a relation is understood as a set and a relation as a set is a representation of a set. Hence, there are no genuine relations, because all relations are sets.

Furthermore, a sign is a representation. And a relation is a representation of a set, hence a sign is a relation of a relation. A sign is not simply a relation, triadic or else, but a second-order relation, i.e. a relation of a relation over a set. And therefore a set of a set.

More technically, after the Kuratowski-Wiener intervention, a relation is an ordered set. And an ordered set is based on the *pair axiom*, which is guaranteeing ordered pairs, necessary for the definition of relations as sets of ordered pairs, which are themselves sets. But the idea of order, i.e. an ordered set, is a relational idea, based on a relational intuition, and is not presupposing the notion of sets.

Sign

"My definition of a representamen is as follow:

A REPRESENTAMEN is a subject of a triadic relation TO a second, called its OBJECT, FOR a third, called its INTERPRETANT, this triadic relation being such that the REPRESENTAMEN determines its interpretant to stand in the same triadic relation to the same object for some interpretant."

20 - 1903 - C.P. 1-541 - Lowell Lectures: Lecture III, vol. 21, 3d Draught .

<http://www.cspeirce.com/menu/library/rsources/76defs/76defs.htm>

Thirdness

"[...] In its genuine form, thirdness is the triadic relation existing between a sign, its object, and the interpreting thought, itself a sign, considered as constituting the mode of being of a sign. A sign mediates between the interpretant sign and its object. Taking sign in its broadest sense, its interpretant is not necessarily a sign. [...]"

A sign therefore is an object which is in relation to its object on the one hand and to an interpretant on the other, in such a way as to bring the interpretant into a relation to the object, corresponding to its own relation to the object. I might say similar to its own for a correspondence consist in a similarity; but perhaps correspondence is narrower."

28 - 1904 - C.P. 8-832 - Letter to Lady Welby dated "1904 Oct.12 .

<http://www.cspeirce.com/menu/library/rsources/76defs/76defs.htm>

Triadomania

I fully admit that there is a not uncommon craze for trichotomies. I do not know but the psychiatrists have provided a name for it. If not, they should. "Trichomania," [?] unfortunately, happens to be preempted for a totally different passion; but it might be called triadomania. I am not so afflicted; but I find myself obliged, for truth's sake, to make such a large number of trichotomies that I could not [but] wonder if my readers, especially those of them who are in the way of knowing how common the malady is, should suspect, or even opine, that I am a victim of it. ('On trichotomies', CP 1.568, 1910)

<http://www.helsinki.fi/science/commens/dictionary.html>

Ferdinand de Saussure

The other approach is: Sémiologie (semiology) in the sense of Saussure is *dichotomic* and *relational*, hence based on binary relations, which are building together a *system*.

A sign is the basic unit of language (a given language at a given time). Every language is a complete system of signs. Parole (the speech of an individual) is an external manifestation of language."

"In language there are only differences, and no positive terms

"L'idée fondamentale de Saussure est que le langage est un système clos de signes. Tout signe est défini par rapport aux autres, par pure différence (négativement), et non par ses caractéristiques propres ("positives") : c'est pourquoi Saussure parle de "système". (Wiki, fr)

A relation, especially a dyadic or binary relation, is a relation between entities, i.e. between positive terms. Again, a relation is a set and a set consists of elements which are positive terms.

What's about Saussure's *kenome* (Kénôme)?

Why should a difference be a relation? And why should a difference be dyadic?

There are a lot of dyads and dichotomies in Saussure's semiology.

<http://www.revue-texto.net/Saussure/Saussure.html>

6.1.2. Self-reference of signs

"Such an object (or referent) of the sign can be a sign itself; and in this sense, self-reference becomes possible as a mode of a sign referring to a sign." (Peirce)

If a sign is defined as a triad of (object, representant, representamen), i.e. as a triadic relation, then there is no definition given and no operator introduced, which would define such a self-application of a sign as referring to a sign, hence to itself. What is missing is a definition of an *operation* which is ruling the composition of signs.

Semiotics thus is not simply about signs but about the *composition* of signs.

Bense, and later Toth, introduced 3 modes of primary compositions for signs: the *iterative*, the *adjunctive* and the *superivative*. None of them are well defined, especially the matching conditions for the composition of signs are left in the dark. Without a clear definition of the composition rules, the semiotic characteristics of the composed sign are not accessible.

In between, *matching conditions* for semiotics had been studied by Alfred Toth in a series of recent papers, e.g., Triadische und tetradische Bi-Zeichen, 11.7.2009.

[http://www.mathematical-semiotics.com/pdf/Triad u. tetr. Bi-Zeichen.pdf](http://www.mathematical-semiotics.com/pdf/Triad_u_tetr_Bi-Zeichen.pdf)

"Why must one avoid this circle? Can't one simply say: Knowledge is what knowledge takes as to be knowledge?" (Luhmann, The Cognitive Programm of Constructivism)

6.1.3. System theory of signs

Signs are not appearing as entities but as elements of a system. To understand signs, which themselves need to be understood to be signs, a theory of systems is required.

"Every language is a complete system of signs." (Saussure)

Hence, to understand signs we have to understand systems. And without surprise, to understand systems we have to understand signs. And as there are hundreds of definitions for systems there are even more definitions for signs. And vice versa.

"What we call "environment" today had to be thought of as the state of being contained and carried (pericheon): and what we call "system" had to be thought of as order according to a principle." (Luhmann, ibd.)

6.2. Citations

Nina Ort and Markus Peter, A Comment, Niklas Luhmann: 'Sign as Form'

Abstract: 'Sign as Form' is Niklas Luhmann's attempt to combine systems theory with sign theory by trying to integrate George Spencer-Brown's 'Laws of Form'. Systems theory operates with two sorts of metaphors representing either the meaning of inside and outside of a form (asymmetry) or both sides of an complementary couple (symmetry) which determine the subsequent arguments. The integration of an included third term, that would complete a semiotic sign, cannot be achieved by operating with dyadic distinctions however. This contribution discovers difficulties that arise from that combination and tries to show how the use of n-valued logic helps to overcome these problems."

http://www.imprint.co.uk/C&HK/vol6/v6_3-ort.html

Winfried Nöth, Self-Reference in the Media

"Even though self-reference is the topic of the present study, its basic assumption is neither a naïve theory of reference nor the structuralist or constructivist theory of the signs that have no referents. Our study will be based on Charles S. Peirce's semiotics, in the framework of which reference is the relationship of the sign to its object. However, the object to which a sign refers back is not a piece of the so-called real world, but something which precedes and thus determines the sign in the process of semiosis as a previous experience or cognition of the world. Such an object (or referent) of the sign can be a sign itself, and in this sense, self-reference becomes possible as a mode of a sign referring to a sign."

<http://www.uni-kassel.de/iag-kulturforschung/projektbeschreibung.pdf>

Søren Brier, CBS, Cybersemiotics

"Luhmann's systems theory is based on Spencer-Brown's dualistic philosophy of differences. This seems to make it incompatible with American pragmatic semiotician C. S. Peirce's triadic semiotics that seems to offer that trans-disciplinary theory of meaning and signification that the cybernetic functionalistic informational approaches are missing. But in his seminal work A calculus of [for, rk.] self-reference, Varela sees that the necessity of a third element in autopoiesis theory and second-order cybernetics has been overlooked and adds that to the system in a way that makes it compatible with Peirce's semiotics and still keeps the connection to cybernetics and autopoiesis."

<http://www.brier.dk/SoerenBrier/DoctoralSummary.pdf>