DIAGRAMMATOLOGY

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DIAGRAMMATOLOGY

AN INVESTIGATION ON THE BORDERLINES OF PHENOMENOLOGY, ONTOLOGY, AND SEMIOTICS

by

Frederik Stjernfelt
Learning Lab Denmark
The Danish University of Education
Copenhagen, Denmark

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PREFACE

This treatise is the result of some years of work, not least because work on it was several times disrupted for university reasons, personal reasons, but probably most of all because my curiosity temporarily took me elsewhere.

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Special thanks to Mette Stjernfelt for life-long assistance, and more than thanks to Agnete and our daughters Agnes and Karoline for never-ceasing support of any conceivable sort.

Copenhagen, September 2006

INTRODUCTION

This treatise deals with the sign types of icons and diagrams. Icons understood as those signs whose function as signs is due to some sort of similarity between them and their objects – and diagrams as that special sort of icons which represent the internal structure of those objects in terms of interrelated parts, facilitating reasoning possibilities. Thus, the treatise develops the idea that signs cannot, in general, be understood after the linguistic model of the Saussurean tradition as an arbitrary coding relation connecting pre-established expression and content, but that, quite on the contrary, the sign in most interesting cases is based on a structural similarity between signifier, signified, and the sign's object. A corollary to this idea is that signs should not, in general, be understood with the isolated linguistic word as the prototype – rather, the prototypical sign is an argument mirroring part of the structure of the states-of-affairs to which it refers.

This counterrevolution in semiotics holds important implications for the very foundations of that discipline as well as for its relation to other domains. It immediately raises the question of the sign's own foundation – which are the phenomenological prerequisites to sign use? This foundational task leads in two directions which appear not to be so diverse as may seem at a first glance: one is towards a reinterpretation of Charles Peirce's semiotics and its relation to the phenomenology, logic, and metaphysics as envisaged in his sketches of a philosophical architectonics;[1] another leads in the direction of Husserlian semiotics and phenomenology founded in the same period. In Peirce's philosophy it leads, more specifically, to an appreciation of the central role played in his mature thought by the sign type of *diagrams*, connecting the reasoning process, Peirce's logical realism, and his metaphysical doctrine of the primacy of continuity. In Husserl, it leads, more specifically, to a reinterpretation of his notions in and around *Logische Untersuchungen* of 'categorial intuition' and whole-and-parts as well as the related ideas of 'eidetic variation' and 'Wesenserschauung'.

The critical comparison of unnoticed parallels in these two classics of semiotics and phenomenology leads to a semiotic realism, emancipating semiotics from the anti-scientific tendencies inherent in the merely conventionalist sign approach and its possible affiliations with all sorts of quasi-religious vitalisms to explain which forces might be responsible for sign coding when no inner relation between sign and object are presumed to be possible.

The fact that the diagram displays the interrelation between the parts of the object it depicts is what facilitates its use in reasoning and thought processes, thus taking the concept of sign far from the idea of simple coding and decoding and to the epistemological issues of the acquisition of knowledge through signs.

Let us immediately take an example in order to illustrate this basic issue in diagram reasoning. It is well known that Pythagoras already in the fifth century BC was able to

prove the insight that for right-angled triangles, the square of the hypotenuse equals the sum of the square of the two short legs, the so-called cathetes – algebraically expressed as $x^2 + y^2 = z^2$. It is interesting, however, that this proof may also be made with diagrammatical means. A well-known illustration may serve to geometrically show the size of the squares of the three sides of the triangle, respectively:

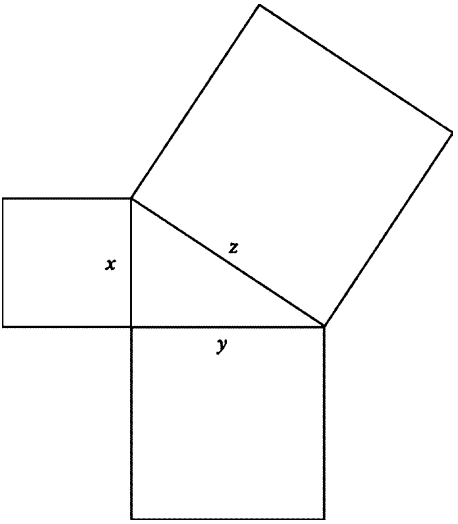

Figure 1.

The size of the large square upper right evidently corresponds to z squared, while the two lesser squares left and bottom correspond to x and y squared, respectively. Already at this stage of understanding, before any proof of the theorem is attempted, a series of important diagram reading conventions have been tacitly observed. One is the abstraction from arbitrary aspects of the figure given in order to focus upon the aspects relevant for the question discussed – an act of abstraction so ingrained and automatized that most readers perform it without thinking about it as a sort of tacit knowledge. This involves, for instance, abstraction from the fact that the triangle presented consists of ink on a sheet of paper. It goes without saying that the same relations as depicted here hold for a continuum of other triangles with different material support. It also involves the abstraction from the particular black-and-white color of the drawing – the size issues discussed are evidently independent of color. Moreover, it includes the abstraction from the fact that the drawing presented is made of lines with a physical breadth – while the figure they represent is supposed to be composed of lines with zero breadth. The same goes for the imprecision of the figure – given the granularity of paper and ink, the lines of the figure only seem straight at a macrophysical level – we know that not very strong magnification would suffice to reveal that the lines are not, as a matter of fact, really straight lines. Abstracting from these contingent aspects of the drawing in order to grasp an idealized figure, we also perform a generalization

of a stunning extension: we understand that the figure does not portray only a triangle of the precise size shown, but also the same figure in all possible sizes. Even more so: we understand that the continuous deformation of the two small angles of the triangle, letting the right angle and the straight lines of its sides remain, will take it into an infinity of other rectangular triangles. Thus, the very understanding of a diagram like the given presupposes a whole series of cognitively complicated operations giving the result of an idealized figure which is not exhausted by the diagram token on the page but which involves a general continuum of other triangles satisfying the requirements given. On that basis, we may construct the following diagram:

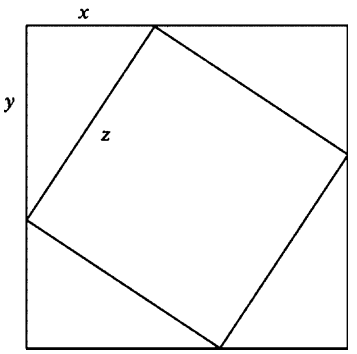

Figure 2.

The large square has as its side $x + y$, and the oblique square in the middle of the larger square is, of course, still the area corresponding to the square of the hypotenuse. The area of the total square is easy to calculate geometrically, because it corresponds to the square of the hypotenuse plus four times the area of the triangle. Now consider the next figure:

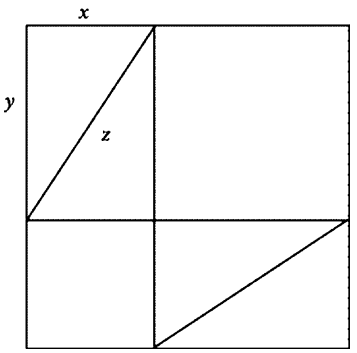

Figure 3.

The size of the large square remains the same, having the side $x + y$, and it also, just like the former square, includes four copies of the triangle. But this implies that, when comparing the two figures, we may subtract the four triangles in both of them, and now the remaining area must, in the two cases, be the same. And the two small squares remaining in the second diagram correspond exactly to the squares of the two cathetes in the triangle which is obvious from the fact that they have, each of them, one of the cathetes as their side. So, from this mental calculation with diagrams, it is evident that the large inner square in the former figure – equal to the square of the hypotenuse – must have the same area as the sum of the two small squares in the latter – equal to the sum of the squares of the hypotenuse. Thus, $x^2 + y^2 = z^2$. As was the case in the first diagram of the triangle, this diagrammatical proof also bases its generality on a possible continuous experiment with the diagram. For why is it not the case that the proof given holds only for the exact triangle represented in the drawing? This is because in the last figure, we may let the meeting point between the two small squares slide along the dotted diagonal of the large square, giving rise to a continuum of triangles with gradually changing sizes of *x, y*, and *z*:

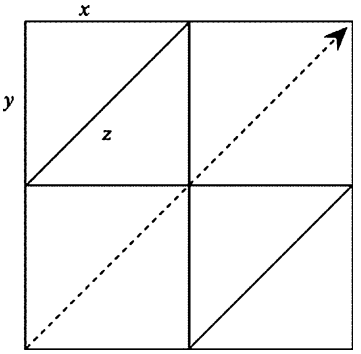

Figure 4.

With the changing of the meeting point between the two small squares, the triangles will change shape and run through a continuum of different values of the two small angles. By this means, we grasp the fact that the diagram experiment holds not only for the specific triangle represented on the page, but for all other triangles as well. If we let the meeting point approach one of the corners, the triangle will become still thinner and the square of the larger cathete will converge towards the square of the hypotenuse and indeed towards that of the whole larger square, while at the same time the area of the triangle will converge towards zero. If we let the meeting point hit the middle of the diagonal – approximately as in the diagram above – then the triangles will become isosceles and the area of the two squared cathetes will equal the area of four triangles, as can easily be seen from

the figure. The continuous manipulation with the figure thus makes possible further reasoning about special cases – but not the other way around: no sum of single special cases will give us the general law which is only proved by holding for the whole continuum of possible right-angled triangles.

I have tried to go slowly through these elementary diagram reasonings – thereby boring some readers – in order to show a very important point about diagram reasoning, namely that here the generality of the states-of-affairs represented is depicted by the continuum of variations to which it is possible to subject the diagram without essentially changing its conditions. We begin this introduction with this example, thus, in order to grasp what is highlighted in Peirce's close connection between diagrams, continuity, and generality – a relation which is also intended in a related way in Husserl's idea that in order to grasp ideal objects, a continuous deformation of the object must be performed in an 'eidetic variation' thought experiment. The visually supported proof may, of course, be given further algebraical support: the area of the large square in Fig. 2 is evidently $z^2 + 4xy/2 = z^2 + 2xy$. The area of the large square in Fig. 3 is $x^2 + y^2 + 4xy/2 = x^2 + y^2 + 2xy$. But as the two large squares in Figs. 2 and 3 are equivalent, it follows that their area is the same: $z^2 + 2xy = x^2 + y^2 + 2xy$. But then $z^2 = x^2 + y^2$. To Peirce, such a proof is no less diagrammatical. Here, the generality of the proof is granted by the fact that it holds for any values *x, y* determining a unique *z*. But a variable *x* in an algebraic formula is so to speak a sign that a whole continuum of different values may be inserted here. The seminal insight in Peirce is that diagrammatical reasoning representing generality by continuous shapes provides the general form of necessary and hypothetical inferences in thought. This gives the basic corollary that logical understanding is not, as it might seem to be the case, deprived of observation. It is, rather, the meticulous observation of general diagrams. As Peirce puts it:

> The first things I found out were that all mathematical reasoning is diagrammatic and that all necessary reasoning is mathematical reasoning, no matter how simple it may be. By diagrammatic reasoning, I mean reasoning which constructs a diagram according to a precept expressed in general terms, performs experiments upon this diagram, notes their results, assures itself that similar experiments performed upon any diagram constructed according to the same precept would have the same results, and expresses this in general terms. This was a discovery of no little importance, showing, as it does, that all knowledge without exception comes from observation. (MS CSP L75 C, 1902, 91–92)

We may add the psychological observation that many scientists use diagrams not only in the process of justification of their results, but also in the process of discovering them – see e.g. the classic investigations of Hadamard (1954).[2] For semiotics, this central role of the sign type of diagrams implies a basic realism. It is indeed possible to acquire and develop knowledge about different subjects by the construction and manipulation of diagrams charting those subjects – based on the fact that the structure of these diagrams are, in some respects, similar to the structure of their objects. This similarity does not have to be evident for a first glance – as the difference between the geometrical and the algebraical diagrams of the Pythagorean formula just presented shows. The recognition of the foundational role of diagrams

in thinking thus immediately implies the recognition of the iconicity in thought and signs – the similarity between sign and object which is especially developed and constrained in the diagram case. The development of a semiotics based on iconical realism is the issue of this book.

The first part of the treatise thus has as its aim to articulate the basic tenets of such a semiotic realism. The central node of this part – and indeed of the whole book – is the fourth chapter, on Peirce's doctrine of diagrammatical reasoning. The three chapters preceding it prepare the ground by discussing Peirce's metaphysics of continuity, the 'extreme realism' of his sign theory, and his general doctrine of iconicity as prerequisites to his diagrammatology. The fourth chapter discusses the central idea: diagrammatical reasoning as central to the study of thought processes – encompassing far more than the usual scope of logic (as for instance represented in Peirce's logical graph systems). The four chapters following it discuss different aspects of Peircean diagrams, comparing them to other semiotic traditions with emphasis on the phenomenological tradition culminating in the early Husserl. Peirce's diagram concept is compared to Husserl's idea of 'categorial intuition', leading into a discussion of mereology – the doctrines of part and whole – in semiotics as a natural consequence of the diagram being a sign analyzing its objects in related parts. Husserl's mereology is, at the same time, a doctrine of the synthetic a priori which is discussed, based on the idea that diagrams form a major road of access to a priori structures in Husserlian formal and material ontologies.

The second part of the treatise is, in comparison, applicative – although perhaps in a special sense of the word. It consists of three major parts, one dealing with biosemiotics, one with pictures, and one with literature – in all cases referring to foundational issues with respect to these three domains. As to biology, thus, it aims at participating in the rational foundation of the emerging science of sign use in biology, the so-called 'biosemiotics'. The basic observation here is that the basic stock of concepts in biology never ceases – even in the most reductionist versions – to involve a host of semiotic concepts (genetic information, DNA code, messenger-RNA, etc.), the constant use of which can not be without any scientific reason. It thus continues the basic semiotic realism outlined in the first half of the treatise by investigating the ontological implications of this occurrence of biosemiotic vocabulary – and thus, by the same token, contributing to a biological foundation of semiotics. While the Peirco-Husserlian foundation of semotics envisaged in the former half rests on a structural, a-temporal argument, what is investigated here is the empirical and thus genetic, temporal foundation of semiotics, aiming at understanding the gradual appearance of still more complicated sign types in the course of biological evolution. In that sense, it attempts at understanding the phylogenetic instantiation, within the regional ontology of biology, of the realist semiotics developed at a principal level in the former half of the book.

To conclude, two more specific – but still general – applications follow. One deals with pictures – given that the sign type of icons figures prominently in the phenomenological as well as in the biological part, the basic iconicity of the sign provides new insights in the diagrammatical understanding of pictures proper with

implication for the analysis of paintings and other pictures in art history. The experimental approach to diagram reading is exemplified in analyses of figurative and abstract art, a Husserlian picture theory is developed, and a theory of the sketch is sketched. The last application deals with literature and interpretation – the continuist and diagrammatic understanding of semiotics maintained is seen to be ripe with consequences for the understanding of the interpretation process and for the schematic aspects of the very notion of 'literary work'. The very process of literary interpretation is analyzed in terms of Peirce's abduction-deduction-induction cycle, the basic types of iconicity in the literary work are discerned on the basis of a Peircean interpretation of Ingarden's theory of literature, and finally, the spy novel is investigated as an exemplary case.

The title 'Diagrammatology' thus refers to two issues: one specific and one more general. The former deals with diagrammatical reasoning and Peirce's central idea that diagram manipulation forms the prototype of a wide class of thought processes which has not earlier been recognized as such. The latter deals with the more general status of iconicity – of which diagrams, in turn, form a central case – in sign use, which is exemplified in the three applied sections in the second part of the book, thus connecting the philosophical discussions of the first part with the special sciences of biology, of art history, and of literary theory. Let us present the overall course of the book in a little more detail to clarify the relation of the broad field discussed to the central issue of diagrammatology.

Chapter 1 briefly presents the mature Peirce's intense involvement with continuity which is taken to be the basic idea underlying his whole attempt at a philosophical architecture in the years around the turn of the century (a more thorough presentation of the detail of his mathematical and metaphysical arguments may be found in the Appendix). Thus, the chapter ends by introducing and discussing Peirce's three fundamental phenomenological categories, First-, Second-, and Thirdness, on the basis of his continuum metaphysics. Chapter 2 discusses Peirce's sign theory with reference to this continuum metaphysics which gives his semiotics its 'extreme realism'. The basic outline of Peirce's sign theory – the 'three trichotomies' – is presented with constant reference to continuity, and the Scotist inspiration for Peirce's realism is discussed. Metaphysically, Peirce's realism involves the existence of 'real possibilities', which are here compared to actual discussions of 'dispositions' and 'powers' – they form the ontological connecting link between his continuity doctrine on the one hand and diagrammatical iconicity in his epistemology and pragmatic theory of science on the other. Chapter 3 presents Peirce's theory of iconicity. In recent semiotics, a controversy on iconicity has raged, and two main anti-icon proponents, Nelson Goodman and the early Umberto Eco, are presented as contrast, while the later Eco's hesitating acceptance of basic iconicity is taken as a step in the right direction, even if still marred with culturalism. The different aspects of iconicity in Peirce are discussed – in addition to the ordinary definition of iconicity by similarity, Peirce's overlooked but non-trivial, operational icon definition is discussed: icons as signs it is possible to manipulate in order to learn more about their object than what is explicitly present in the sign – a property

which may be purified for explicit and controlled use in the diagram. Chapter 4 forms the key chapter of the book. Here, Peirce's general diagram doctrine is analyzed in detail from a long quote from an overlooked 1906 paper, 'PAP'. A bouquet of central themes are discussed: the diagram as type; the diagram as the heir in Peirce's system to Kant's notion of 'schematism'; the diagram as a skeleton-like icon of parts interconnected by relations; the diagram as a vehicle for thought experiments; the diagram's connection to deduction and mathematics; the wide extension of a Peircean diagram notion, comprising algebra, logic, grammar, graphs, etc.; maps as a diagram example; a comparison of a Peircean diagrammatical reasoning process with Hilbert's superficially wholly different idea of a 'formale Redeweise', a formal reading mode; Hintikka's discussion of Peirce's distinction between two kinds of diagram reasoning, simple 'corollarial' reasoning versus more complex 'theorematical' reasoning involving auxiliary constructions not mentioned in the formulation of the theorem proved; the connection of diagrams to the pragmatic maxim, synthetic a priori structures, and 'real possibilities'.

Chapter 5 takes its departure in the idea that diagram transformations form the core of diagram use and takes an overview over types of transformations in some existing semiotic theories, taken in a broad sense. Lévi-Strauss' and Greimas' semiotics, D'Arcy Thompson's morphological biology having inspired Lévi-Strauss, Klein's Erlangen program as a deeper inspiration with its interdependent concepts of transformations and invariants, cognitive semantics, recent picture semiotics, leading up to the introduction of the Peirce-Husserl comparison. Chapter 6 introduces this comparison by making an overview of the two's mutual knowledge of each other, concluding that each of them mistook the other for falling prey to psychologism in logic, and that Peirce probably inherited his intense use of 'phenomenology' in the fertile years 1902–04 from Husserl. Husserl's doctrine of 'kategoriale Anschauung' – categorial intuition – from *Logische Untersuchungen* claims that grammar, syntax, and other ideal, categorial stuff may in some sense be directly observed in analogy to perception – evolving later into his doctrine of 'Wesensschau' – and this idea is compared to Peircean diagrammatology which in many respects are parallel, even if Peirce's favorite example, that of construction in geometrical diagrams, differs widely from Husserl's favorite example, syncategorematical expressions in language. Chapter 7 extends the comparison to mereology – doctrines of parts and wholes – where the two are seen in wider semiotic perspective by comparing them also to Jakobson's and Hjelmslev's semiotic mereologies. The foundational role of Husserl's mereology of the third investigation, also (explicitly) for Jakobsonian structuralism and maybe even (implicitly) for Hjelmslevian structuralism is discussed. The restriction to discrete dependency relations in Husserl's and especially Hjelmslev's mereologies is criticized in favor of Peirce's more generous acceptance of what may appear as diagram wholes and be experimentally used as such by the manipulation of their parts. Chapter 8 concludes the first part of the book with the placing of Husserl's mereology and its redefinition of the concept of the synthetic a priori within a larger framework, that of Austrian philosophy. Barry Smith's charting of this tradition, including the a priori concept in Austrian

economics, is introduced as a prerequisite to Smith's own 'fallibilist apriorism'. The investigation of the interpretation of synthetic a priori propositions by Wojciech Zelaniec of the same tradition is presented, and these ontological a priori theories are compared to Michael Friedman's Neo-Kantian attempt at redefining the a priori from studies in recent history of science. The chapter concludes by discussing Peirce's position which is explicitly enmical towards a Kantian a priori, but the conclusion opts for diagrammatical reasoning to be a royal road to a Peircean synthetic a priori along Husserlian lines, supposedly comprising the metaphysical bases of the special sciences along with the 'theorematical' parts of mathematics. So, the chapter sets the scene for the three different regional ontologies selected for investigation in part two: biosemiotics, picture theory, and literature theory.

Chapter 9 introduces biosemiotics as a recent brand of semiotics (Thomas Sebeok, Jesper Hoffmeyer, etc.) taking the involvement of semiotic expressions (genetic information, DNA code, etc.) in biology at face value. An interpretation of Kant's critique of teleological judgment from his third Critique leads to an idea of the role of such expressions: they are indispensable, but not quantitatively formalizable. The neo-Kantian Cassirer's idea of necessary 'mediate concepts' in the special sciences are taken as an extrapolation of that idea, and the middle part of the chapter attempts at isolating a whole cluster of such 'mediate concepts', interpreted in an Austrian a priori framework – beginning with the analysis of an example, the bacterium E. coli's semiotic ability to detect sugar and act accordingly, pointing to 'categorical perception' as a primitive semiotic process in biology. The last part of the chapter discusses the extension of this biosemiotic material ontology and concludes that it may serve, also, as a formal ontology for higher domains than biosemiotics, thus giving rise to a subtypology of the ontological 'niche' concept proposed by Barry Smith. Chapter 10 investigates the basic assumptions in one of the central 'rediscoveries' of biosemiotics, the theoretical biology of the German-Estonian father of ethology Jakob von Uexküll. His theory about the 'functional circle' defining a species correlatively to the 'Umwelt' constituted by its schematic sign use in shape of perceptions and actions, is built on the idea of extrapolating Kant in two directions: towards the body, towards the animal world. This naturalized Kantianism, it is argued, implies a tension between naturalized subjects and the constitutive power supposedly inherent in transcendental subjects: you cannot preserve both. Uexküll's attempt at doing so leads him to exaggerate the perfect fit between animal and Umwelt as well as between different species – and leads him, moreover, to a pessimist idea of human culture as having broken with such perfection. Other currents in Uexküll – such as his idea that higher animals have 'neutral' objects, not exhaustively defined by their functional circle, point in sounder directions, as does the categorization idea inherent in his musical metaphor of nature as a symphony. Such categorization is proposed as a basic semiotic process in nature, supported by the notion of 'categorical perception' originating in phonetics. Chapter 11 introduces Terrence Deacon's idea that the Peircean symbol forms the main semiotic transition between animal and man. Deacon's idea, however, redefines Peircean symbols as more specific and complex than they are, and a more restricted version of Deacon's hypothesis is proposed: that the decisive semiotic 'missing link' is rather the special

symbol subtype named by Peirce 'hypostatic abstraction'. Peirce's abstraction theories are introduced and discussed: while 'prescission', corresponding to Scotus' 'formal distinction', allows for isolating aspects of a phenomenon, 'hypostatic abstraction' allows for making such isolated aspects into thought objects in their own right to be investigated. These abstraction types are intimately connected to diagrammatical reasoning and the ability to construct diagrams as well as meta-diagrams taking simpler diagrams as their object. Chapter 12 takes up the alamodic notion of 'embodiment' in recent cognitive semantics and cognitive linguistics and charts the role of it in various actual semiotic currents. Husserl's influence on Merleau-Ponty is well-known: in his late notes on nature, the functional circle is definitely opened, and Uexküll is phenomenologically interpreted alongside Lorenz and other contemporary biologists. Stuart Kauffman's complexity theory interpretation of the origin of life involves a diagrammatical notion of a network of catalyzing chemicals which form the first, simple biological metabolism – his theory even makes biology itself an example of how such ontologies come in packets of interrelated concepts. The chapter ends the biosemiotic section by proposing a task for biosemiotics to construct an evolutionary ladder of still more complex sign types correlated with still more developed body types.

Chapter 13 argues that diagrammatical experiment is ubiquitous, also in picture viewing, both in the ordinary sense of the word and in the art historian's and picture theorists sense of the word. The chapter takes two examples, the Danish 'Golden Age' painter Eckersberg's altarpiece in Frederiksberg Church and Malevich's well-known white square on white – in order to show diagrams at work in figurative as well as in abstract art. Diagram experiment in Eckersberg reveals an intricate use of triple perspective in an apparently normal realist painting – connected to the biblical references of the depicted Last Supper scene. In Malevich, on the other hand, it is argued that even the understanding and interpretation of a work as seemingly 'empty' and simple as this, necessitates diagram experimentation. Chapter 14 returns to Husserl, now in a presentation of his picture theory as it appears in the many scattered papers and notes on fantasy, memory, and pictures from around 1900–20. Husserl's development is outlined, and the many connections between Husserl's picture concept and Peircean iconicity are discussed. Husserl provides, inter alia, for a foundation of picture consciousness already as a limit case *within* ordinary perception, and taking its point of departure in this observation, a new distinction between two picture types, accessible and non-accessible, respectively, is proposed – a distinction independent of that between figurative and abstract. The interplay between these two distinctions is illustrated by ten commented pictures. Chapter 15 is a short discussion on the notion of 'sketch', taking its point of departure in the Belgian semiotician gang 'Groupe μ' and their concept of transformation and the correlative concept of a pure visual type – as against the linguistic imperialism of French picture semiotics. The sketch is seen as a special sort of diagram, supporting certain transformation types.

Chapter 16 takes literary interpretation as a basic process taken as prerequisite by all the many competing sorts of more or less irrational 'theory' dominating the contemporary comparative literature domain. This process is seen as a special case of general

Peircean interpretation leading from abduction over diagrammatical deduction and to induction, and, via trial-and-error, back again. The place for the introduction of theory in that interpretation process is argued to be restricted to the diagrammatical phase, and the literary specificity of the process is argued to lie in the closedness of the literary artwork text as opposed to ordinary prose. Finally, a home-made interpretation example from Peirce's unpublished papers is discussed. Chapter 17 makes a reinterpretation of a classic piece of literary theory, Roman Ingarden's Husserlian doctrine of the four strata of the literary work. Special attention is given to the diagrammatical level of 'schematized aspects' showing the represented objectivities of the work as seen with respect to selected aspects, in turn allowing for completion because of the unsatiated character of schemata. Ingarden's doctrine is extrapolated to the extent that such 'schematized aspects' need not be restricted to structures close to perception but may also comprise many sorts of more abstract diagrammatical structures. Thus, this extension of Ingarden gives rise to the distinction between no fewer than five different sorts of schematic iconicity in the literary work – one of them being the fulfilling of certain regional ontological structures in the literary work. Chapter 18, finally, finds a specific example of this mirroring of regional ontology in the literary subgenre of the spy novel. On the basis of Greimas' semiotics, an ontological molecule of espionage is outlined, and with background in some observations in Carl Schmitt's controversial brand of political science, different regularities in spy novels are attempted explained. Drawing in a host of material from the world of espionage and spy novels, this chapter forms an example of how the charting of diagrammatical structure necessitates the involvement of both semantic presuppositions and structure abstracted from the body of empirical knowledge of the domain in question.

An Appendix presents in more detail Peirce's complicated discussion of the continuum involving both mathematical and metaphysical argumentation. It sets out from a discussion of his 1892 'Monist' papers, and leads into a discussion of Peirce's own – in some aspects fallacious – version of set theory around the turn of the century. Peirce's set theoretic formalization attempts are seen as deep down metaphysically rather than mathematically motivated: his main idea is that the continuum must be taken as a primitive, transgressing any formalization attempts. Peirce's continuum notion is compared to a series of actual philosophical and mathematical positions, to some extent supporting his idea of the inexhaustibility of the continuum. The Appendix may be read, thus, as a further substantiation of the more immediate presentation of the first chapter.

Thus, the overall course of the 18 chapters of the book leads from the more to the less general. As is evident, this book goes a long way from Peirce's continuum doctrine and to the spy novel, and along the line it involves many different continents of phenomenology, ontology, and semiotics as well as results from several different special sciences. Still, the book constantly focuses on the main topics of diagrammatical schemata and access to regional ontologies and thus attempts a synthesis of domains most often widely separated. The central notions of diagrams and diagrammatical reasoning are taken to integrate a whole series of 'schema' concepts in current philosophy, linguistics, biology, literary studies and elsewhere:

diagrammatic schemata seem to form a basic and economical tool for understanding and thought experimentation.

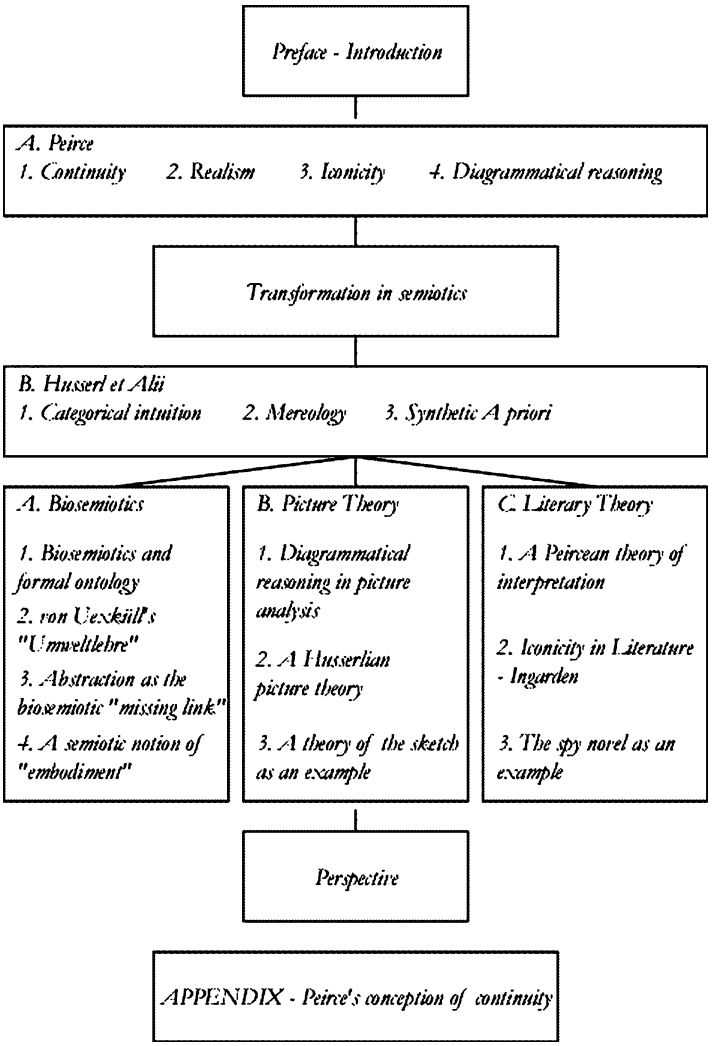

Figure 5.

The overall disposition of the book may be outlined in the diagram over the content structure (Fig. 5).

I have, for the title of the book, chosen the rarely used and maybe somewhat strange notion of 'Diagrammatology'.[3] It may seem slightly misleading, as the book is not only about diagrams. Still, diagrams form the core of the various

issues covered by the book. The term 'Diagrammatology' is taken to refer to the investigation into the general status of diagrams in reasoning, in logic, theory of science, and in heuristics, on the one hand, and into the basis of diagrams in metaphysics and ontology, on the other. The notion is chosen with reference to the central role played by diagrams in Peirce's semiotics where it covers all kinds of deductive reasoning with the emphasis on the 'creative', experimental, so to speak strategic aspect of such reasoning. Peirce's idea is that the manipulation of diagrams forms the prototypical core of these areas rather than being a marginal phenomenon on its fringe – and thus goes against a strong tendency in the sciences as well as the humanities in the last 150 years for skepticism against the role of iconic representations. Thus, the central reasoning process in all these areas – as well as in the special sciences – is taken not to be best represented, necessarily, by means of formal, symbolic languages, but rather by means of diagrammatical representations governed by more or less explicit rules (of which formal, symbolic languages turn out to form a special subset). Thus, the idea is not to oppose symbolical and iconical representation with a preference for the latter – the idea is rather to reinstate iconical presentation and representation in its proper, more general position of which symbolic representations form a rich and important species.[4] If the notion of 'diagrammatology' is opposed to anything, then, it is not formal, symbolical representations, but rather 'grammatology' as a headline for all sorts of deconstructivist, vitalist, social-constructivist skepticisms against the possible reliability of iconically represented information.

As a substitute for the neologism of 'diagrammatology', the title might equally well had been 'diagrammatical reasoning'. But two things argued against such a choice: (1) a book with that title already exists (Glasgow et al. 1995, on the reemergence of diagrammatical representations in computer science), and, consequently, (2) the close association of that title with diagrams in computer science specifically. My aim here is more general. It is an attempt at reconstructing Peirce's original idea in his last large burst of philosophical creation almost exactly a hundred years ago, with its pinnacle in the years 1905–06, to appreciate and develop the many fertile parallels of that explosion in the birth of European phenomenology in the very same period – and trace the actual implications of this idea in ontology and epistemology as well as in biosemiotics, picture theory, and literary theory.