Mereology

Parts and Wholes in Phenomenology and Semiotics

In Peircean diagrams as well as Husserlian categorial intuitions, part-whole relations thus play a foundational role. Strange as it may seem, though, mereology - the theory of parts and wholes[i] - has only rarely caught the explicit attention of semiotics.

Semiotics, as a study taking signifying phenomena in general as its object, is faced with the issue of the signification of wholes in relation to the signification of its parts as a completely everyday phenomenon, and the recognition of distinct levels or layers of signification is also a well-known idea in most parts of semiotics. Taking the prototypical case of a text as an example, semiotics is faced not only with the traditional linguistic question of the organization of phonemes and morphemes into words, and in turn, words into sentences by means of syntax, but also, in turn, the successive integration of sentences into more extensive wholes of transphrastic discourse, periods, scenes, scripts, narrations, genres, systems of ideas, etc. As is the case in the sciences more generally, this mereological problem gives rise to two typical approaches; the one, reductionist, takes a compositional attitude to the signification of wholes which is consequently seen as some kind of sum of its elements, so that an algorithmic syntax of some sort is supposed to make it possible to derive the whole's signification directly from the knowledge of the signification of its parts. The second, holist, stance takes the signification of the higher levels as irreducible, relying on their own phenomenological motivation, and, correlatively, the parts as being an analytical result of a partitioning of the whole, expanding the possibilities of the whole and making its signification in the single case more precise.[ii]

In this chapter we shall briefly discuss the mereological implications in four major trends of semiotics with different degrees of connection to the Brentanian tradition in philosophy from which modern mereology originate,

namely Husserl, Jakobson, Hjelmslev, and Peirce. Husserl, of course, is a Brentanian, and in his famous 3rd Logical Investigation, he outlines a theory of parts and wholes as a part of formal ontology. The second, Jakobson, has direct connections to this tradition, primarily via Husserl; the third, Hjelmslev, displays striking similarities with the tradition without any direct influence admitted; the fourth, Peirce, working simultaneously with Brentano, has no relation at all to the tradition but still structural similarities are found.

Husserl

It is strange to so small extent Husserl's work is recognized or even known in the semiotic world. As hinted at in the previous chapter, most of his work either explicitly deals with or at least touches upon issues central to semiotics. In his early work, around the period of the *Philosophie der Aritmetik*, he even uses the word himself[iii], and later, in his first chef-d'oeuvre *Logische Untersuchungen* (1900-01), he investigates a whole series of central semiotic questions. *Logische Untersuchungen* ought to count as a classic of semiotics. Its long *Prolegomena* contains a detailed attack on psychologism in logic and semiotics - in so far it constitutes a major contribution to the fundamental anti-psychologism of general semiotics alongside Peirce's strongly related position. The first investigation draws a distinction between two sign types, *Ausdrücke* and *Anzeichen*, respectively: signs conferring meaning to an object vs. signs merely indicating an object. The second investigation is a critique of empiristic abstraction theories attempting to make induction the source of abstract knowledge - and it points instead to a phenomenological change in conception modus as responsible for abstraction's grasp of ideal objects. The third investigation, to which we shall return below, constructs the foundations for a formal ontology of wholes and parts which forms a basis for all phenomenological and semiotic investigations in so far as it makes possible to distinguish proper parts from non-proper parts, the last including what is usually called properties. The fourth investigation takes the mereology of the third as the foundation of a pure, that is, a priori grammar, mapping dependency relations between linguistic entities; nouns and sentences are taken as independent primitives upon which other linguistic entities are dependent. The fifth investigation is the first sketch of Husserl's intention theory, also constructed with the part-whole toolkit of the 3rd LU, distinguishing between the quality, the matter, the representative content, and the object of an act, respectively. The quality is in our days' terms a speech act category; it refers

to the act's character of being propositional, imperative, wishing, etc. The matter of the act is the way its object is presented in the act, and the representative content, finally, is the degree of fulfilment with which the object is presented (perception representing the highest degree of fulfilment, and linguistic representations ("signitive acts") and imaginations ("imaginative acts") like phantasies, pictures, dreams, memories, etc. being act types with different lower degrees of fulfilment). All these aspects of the act are presented as moments, that is, "unechte Teile", in the terminology of the third investigation. Finally, the sixth investigation takes up epistemology on the basis outlined in the former investigations; as we have just seen, the central problem of categorial intuition (how categories, among them linguistic categories, possess their own type of intuitive fulfilment) is discussed.

As is evident, most of the issues discussed in the *Logische Untersuchungen* lie at the heart of semiotics, and the mereology of the third investigation forms a crucial piece of formal ontology for the description of all these subjects. The main idea is that all objects may be described in terms of parts and wholes, and that two types of parts may be distinguished. Proper parts and non-proper parts, or, parts versus moments, respectively. Parts - "echte Teile", or "Stücke", or concrete parts - are parts which may be separated from the whole they constitute, while moments - "unechte Teile", or aspects, or abstract parts - are parts which may not be so separated. This sparse definition may be extended to relative autonomy and dependency, respectively, so that one object is relatively dependent on another if that content may only exist in connection to the other or parts of it. This idea makes possible the crucial structure of three possible dependency relations between parts:[iv]

> If we consider any pair of parts of a whole, the following possibilities obtain:
> 1. There is a relation of foundedness between both parts.
> 2. There is no such relation. In case 1, the foundedness can be:
>   *(a)* reciprocal
>   *(b)* one-sided ... (LI, 466)[v]

Husserl's mereological investigations includes further points of interest - so as for instance the difference between wholes requiring a moment of unity and wholes not requiring it. Smith 1994 (236) summarizes Husserl's ideas in a small taxonomy. Between wholes, Husserl distinguishes those which do not require additional objects to exist (such as nut and bolt), opposed to

those that require additional unifying objects such as nails or glue. The latter category yields two subtypes, depending on whether the unifying object is a concrete part or an abstract moment. In the latter case, the moment of unity will correspond to von Ehrenfels's "Gestaltqualitäten".
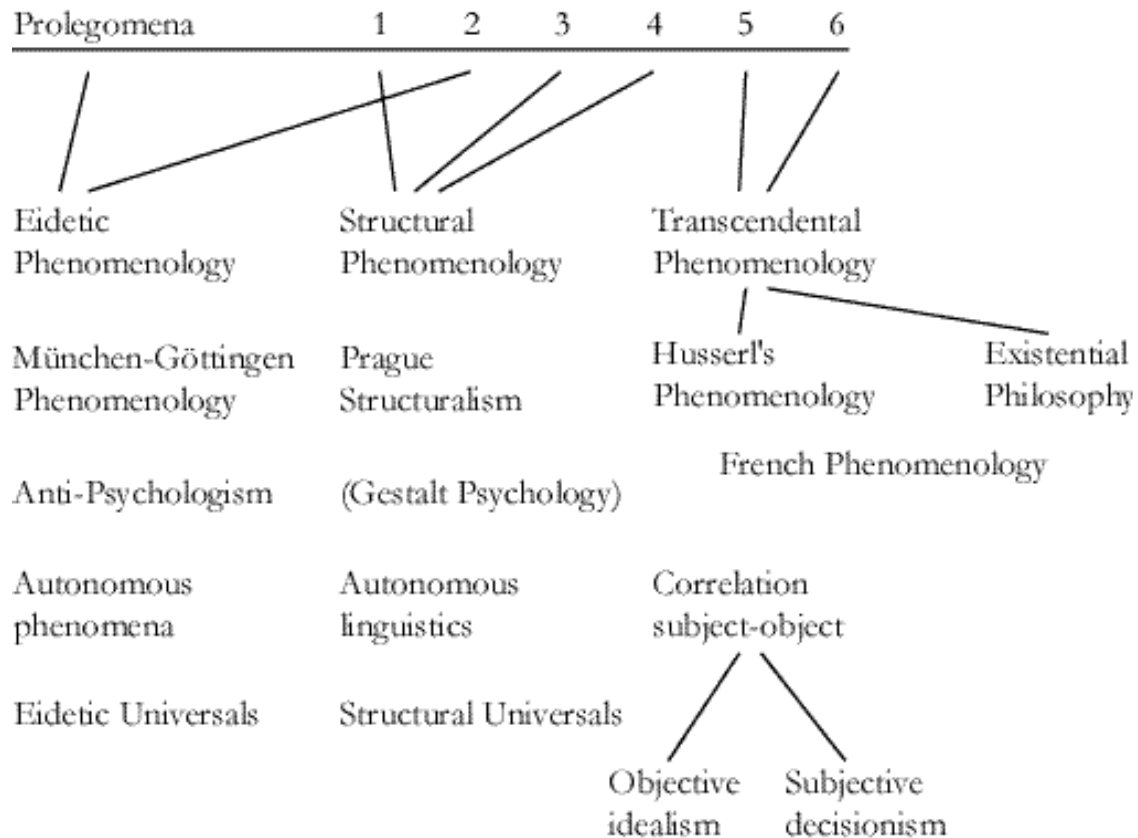
   This distinction is related to different versions of Gestalt theory, cf. Barry Smith's recapitulation of the Austrian Gestalt school's "production theory" requiring such a moment of unity in addition to the parts, as opposed to the Berlin Gestalt school's claim that no parts of a gestalt are genuine and all parts are moments only accessible by abstraction. (Smith 1994, ch. 8). Both schools' theories have their advantages and flip sides. The Graz school has the advantage of distinguishing between a part and the role played by that part in the gestalt in question, while the Berlin school tends to blur this distinction and thus opt for holism. The Graz school, on the other hand, tends to come close to Helmholtz's old idea of Gestalt-like phenomena being the result of "unbewusste Schlüsse" – unconscious inferences - so as to make them an additional feature added to sense data by the intellect - while on the other hand the Berlin school does not follow this subjectivist idea: its holism has the merit of integrating both subjective and objective determinants as responsible for the Gestalt, and so the Berlin school will find Gestalts not only in the physiology of the gestalting subject, but also in the purely objective, even physical surroundings. Smith's conclusion is not unanimous, but it seems as if the two schools correspond to different gestalt possibilities on a continuous scale rather than being mutually exclusive, so that both very subjective and very objective gestalts as well as a large range of intermediate types are possible. We can not go further into this vast discussion here, but a further clarification of types and subtypes of Gestalts and their relation to their parts will no doubt enrich the semiotic discussion of mereology. Husserl's mereology further forms the basis for his reinterpretation of the a priori, see the next chapter.

   Finally, Husserl's fourth *Untersuchung* should be considered. Here, he outlines a pure, a priori grammar using the mereological tools of the third Investigation - an idea, as a matter of fact, closely related to Hjelmslev's idea (cf. below). In contradistinction to Hjelmslev's empiricist idea of using mereology as a descriptive metalanguage for linguistics, Husserl's idea is to base the mereological description of language on certain ontological presuppositions, namely the privileging of the noun and sentence, respectively, as independent entities (after the Scholastic distinction between categorematica and syncategorematica, respectively; the former possessing an autonomous signification). Furthermore, Husserl defines the important distinction between *Widersinn* and *Unsinn*, respectively - logical and

grammatical nonsense, respectively, where the latter depends on irreconcilable syncategorematica being combined, while the former is grammatical correct while semantically contradictory. Husserl's sketches of a pure grammar received more interest in logic than in linguistics: they became important for Ajdukiewicz, Lesniewski and the development of categorial grammar. But even so, a volume like the brillant *Rational Grammar* by Jean-Louis Gardies not only outlines the *Wirkungsgeschichte* of the fourth Investigation, it also gives a detailed account of its possible implementation in linguistics.
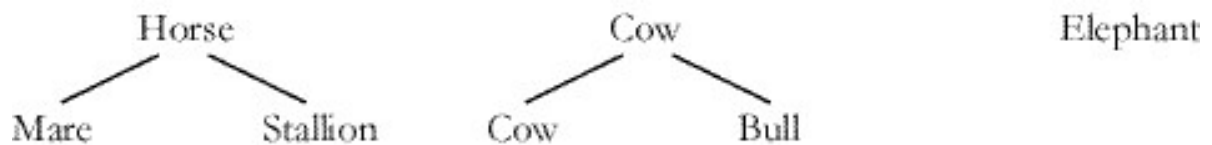
Jakobson

The fact that Jakobson's version of structural linguistics involves strong influences from Husserl's *Logische Untersuchungen* is clearly stated at several occasions in Jakobson's oeuvre, but it has only received general recognition after the work of Elmar Holenstein who, in a period of relative phenomenological oblivion during the fifties-sixties-seventies, never ceased to underline the crucial lines of connection between structuralism and phenomenology (Holenstein 1975, 1976). He even traced three or four variants of phenomenology taking each their characteristical departure in the LU, and thus setting the premisses of much 20 C thought, as follows[vi]:

Prolegomena		1	2	3	4	5	6

Eidetic
Phenomenology

Structural
Phenomenology

Transcendental
Phenomenology

München-Göttingen
Phenomenology

Prague
Structuralism

Husserl's
Phenomenology

Existential
Philosophy

French Phenomenology

Anti-Psychologism

(Gestalt Psychology)

Autonomous
phenomena

Autonomous
linguistics

Correlation
subject-object

Eidetic Universals

Structural Universals

Objective
idealism

Subjective
decisionism

In this respect, the first, third, and fourth Investigations, on the sign, mereology, and pure grammar, respectively, become a founding part of for structural semiotics with its emphasis on the possibility of unfolding a set of a priori foundations for the study of semiotic phenomena.

As early as a young member of the Moscow Linguistic Circle, Jakobson was acquainted with the *Logische Untersuchungen* through the Russian Husserl disciple Gustav Spet[vii]; the Prague Circle which he joined in the twenties was influenced by Husserl through its founder Vilém Mathesius[viii], and to the end of his life, Jakobson did not cease to emphasize the central role of Husserl in the development of semiotics[ix] and structural linguistics[x]. As a main figure in the Prague Structuralism, Jakobson placed a great emphasis on the 3rd and 4th LU especially, and several times he underlined his view of linguistics as a science investigating a hierarchy of wholes and parts[xi], and he envisioned language as a whole as a "pattern of relations". In one of his major accomplishments as a linguist, the definition of the phoneme, he used Husserlian concepts not only to underline the anti-psychological character of the phoneme[xii], but also to describe the phoneme as composed of inseparable aspects. Jakobson never made one over-all

theory of language, convinced as he was that linguistics must be made up of pieces taken from widely differing sources, ranging from anthropology to mathematics, but the mereological issue is also to be found in his most well-known contribution to the formal research of language, his notion of the "marked" versus "unmarked" units of language. His main idea here is that language at many levels makes use of a paradigmatic opposition between parts which are defined by asymmetric dependency.[xiii] Markedness is defined as follows: "One of the essential properties of the phonological correlation consists in the fact that both members of a correlation pair do not enjoy equal rights: one member possesses the mark in question, the other one not; the former is called *marked*, the second *unmarked* ..."[xiv] The opposition between these two is contradictory, in so far the unmarked term does not imply the absence of the feature implied by the marked term, it only implies the absence of any reference to that feature, be it positive or negative. Later, a correlated idea is presented in the theory of *zero-signs*, referring to the "opposition de quelque chose avec rien", with a Saussure quote.[xv] The marked term is dependent on the unmarked, not vice versa. This asymmetry implies that the unmarked term may play the role as the more general term of which the marked term forms a part. A semantic example will serve:

In the two extremes, horses and elephant, symmetry prevails; there is a mutual dependency between "mare" and "stallion" and a one-sided dependency of both on "horse", so here markedness is used to erect co-ordinate subclasses of a class. In the elephant case, English does not admit special terms for the sexes (except for a duplication of the cow-bull distinction).

With respect to cows, however, "bull" is the marked term, while "cow" is unmarked. This implies two different meanings of "cow", general and specific, respectively. This is to say that in neutral contexts, the unmarked term is used; when you for instance see a field with cows and bulls on it, you can indicate them all by pointing to them and stating: "See the cows", while if one of your children points to a bull and adds: "See the big cow", you will answer: "That's no cow, it is a bull." So the term "bull" is unilaterally dependent on the term "cow". The unmarked term, so Jakobson,

has a zero-meaning (in this case, with respect to gender) in contrast to the marked term, but it is characteristical that the semantics of the unmarked term now oscillates between referring to the marked feature being absent on the one hand or referring to the absence of any marked feature on the other. (Cf. the specific and the general use of the word). "Cow" consequently oscillates between entertaining a one-sided and a mutual dependency with "bull". This feature is, of course, not only found in at many levels in language structure, but also for pragmatic reasons in use, when you want to single out some (small) marked subset of a set:
"All linguists are stupid, except for cognitive linguists":

In short, this distinction may be invoked when you want to express that something is part of a larger whole, but yet an atypical part.

Thus, the linguistic distinction between marked and unmarked corresponds to a cognitive and phenomenological relation pertaining to prototypicality. If you take as a basis a prototypical case, then the appearence of a non-typical case will possess an ambiguity: it is, on the one hand, part of the category, but, on the other hand, it differs from the prototypical case at the center of the category. Hence, there is a motivation to distinguish this case from the prototypical case, so that a seemingly symmetrical opposition is constructed. Yet, the prototypical case's categorizing power still extends to the marginal case, so that will still be subsumed under its main category. Thus, the marked category is at one and the same time in opposition to the unmarked category and constitutes a subtype of it - the core characteristic of the marked/unmarked relationship. This corresponds to the fact that in semantics, the tendency is that the case considered most normal, widespread, prototypical, stereotypical (or any other typicality measure) case is referred to by the unmarked term, while the less typical case is referred to by the marked term, the marked term's expression typically being longer, more complicated, and more rarely used than the unmarked term.[xvi] Thus, the marked/unmarked distinction finds its foundation in a phenomenological mereology.

Hjelmslev

A much more ambitious and reflective theory is Louis Hjelmslev's glossematics (partly conceived in cooperation with Hans-Jørgen Uldall). It is probably not very well known that this theory is founded almost unanimously on a mereology. In oppositon to Jakobson, however, this theory's relation to the central European phenomenological mereology is much less clear. Glossematics takes as its point of departure the necessity of basing the cultural sciences taken as a whole on a relation as unanimous as the concept of quantity in natural sciences. This relation is taken to be quality, measured in dependencies. The dependency of one phenomenon on another is taken to be the very basis of the theory in Uldall's *Outline of Glossematics*. In his magistral introduction to the glossematic project, *Prolegomena to a Theory of Language* (Danish *Omkring sprogteoriens grundlæggelse*, 1943)[xvii], Hjelmslev takes the central object of the theory of language to be the sign, which he analyses as follows:

	expression	content
form		
substance		

(matter)

The idea, now, is that the central object of the study of language as a system are the two boxes of form. Form of expression and form of content, respectively, are the two areas which may be grasped by glossematics, and even the sign, correlating units from those two domains, does not belong to the linguistic system, but to the use only. This implies that not only the matter of expression and content, respectively, that is, phonetic matter and the phenomenological world referred to is left out of scope, but also expression and content in so far as they are substances formed by linguistic form. As the central object left, the respective systems of form of expression and form of content are now made the objects of linguistic analysis. This is pursued by beginning with the discourse as an undivided whole, and analysis now is supposed to partition this object into invariant parts, named functives, registering the internal function relationship between them. Having exhausted this description at a given level, analysis goes on to repeat the procedure as to the internal structure of the elements, and the procedure is

supposed to go on until a bottom of "figurae" are reached on each of the two domains. Thus, Hjelmslev adheres to what Langacker calls the building block metaphor. The first partitioning is supposed to give the two functives expression and content, thereafter follows (e.g.) periods, sentences, morphemes, etc.

Here, the idea of a glossematic algebra of dependencies finds its place. Between two functives on a given level, three so-called functions may be discerned, defined by types of dependency. Three possible dependencies may hold between two functives: dependency, interdependence, and correlation (which is the absence of dependency). Dependency occurs when one part requires another for its presence (but not vice versa), interdependence occurs when two parts mutually require each other and consequently only appears together, while constellation occurs when the occurrence of two parts is free, and both, one, or none of them is equally possible. Hjelmslev now distinguishes between dependencies in the domains of linguistic linearisation and system, defined by both-and relations and either-or relations, respectively, which in his vast terminological system are christened selection, solidarity, combination, and specification, complementarity, autonomy, respectively. (37) We can illustrate Hjelmslev's idea with an example from the syntactic field. Selection, one-sided dependency, is at stake, for instance, in the relation between main clause and relative clause (a relative clause may not occur without a main clause, while the opposite is not the case). Solidarity, two-sided dependency, occurs for instance at the sentence level between noun phrase and verb phrase, and combination, zero dependency, is found e.g. between the two functives of a compound noun.
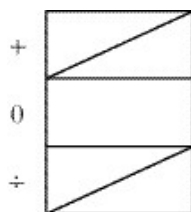
It is striking that Hjelmslev here as the basis for his theory of language takes three mereological types of dependencies very well known in the Brentanist tradition. We find them in Brentano, for instance, and at a prominent place in the 3rd LU which we have already seen the identical distinction between "gegenseitige", "einseitige", and no relation, respectively (264-65, cf. above).

There is not, however, any mention in Hjelmslev as to where he is inspired to his triad of dependencies which he merely "predicts" for purely formal reasons. While his co-founder of the Copenhagen circle and enemy Viggo Brøndal refers to Husserl, just like their common disciple Paul Diderichsen does decades later, there is no mention of any phenomenological inspiration in the *Prolegomena*.[xviii] At several occasions, Diderichsen remarks upon the complete similarity between the dependency calculi of the *Prolegomena* and *Logical Investigations*, but no further

explanation is given.[xix] The reasons for this is hard to guess, but three possibilities (at least) are at hand. One is, of course, that Hjelmslev simply came upon the idea of a mereological grammar independently; another is that the absence of references is due to the very radical and autonomy-claiming linguistics he is about to found. Unlike his companion Brøndal, much more Jakobsonian in spirit in his reference to the philosophical tradition and to a multiplicity of sources for his version of structuralism, Hjelmslev wants to free himself from any metaphysics, inspired as he is by logical positivism, especially in Carnap's version. Maybe he saw too much metaphysical heritage in references to the phenomenological tradition? A third possibility is influence via an intermediate (so as for instance Anton Marty[xx]; both Jakobson and Brøndal seem unlikely in that role) or from a common source of inspiration (Brentano).

If we go into the history of glossematics in more detail, an even more complicated relation to mereological considerations shows up. In addition to the dependency calculus of the *Prolegomena*, Hjelmslev has a further concern with mereological issues in his calculus of so-called "concept zones" (on the content side, approximately corresponding to "semantic domains") and their parts. This idea appears as early as 1933, in the context of the semantic motivation of grammatic categories and in direct discussion with Jakobson's markedness concept (Hjelmslev 1985, 35ff). Jakobson's binarism of course implies that paradigms with three terms must be analyzed as degenerate versions of four-term systems obtained by the combination of two two-term systems. Arguing against binarism, Hjelmslev proposes - probably with inspiration from Brøndal - a tripartition instead of a bipartition of the zone of a given conceptual substance, yielding two opposed parts with a neutral domain between them. (To see which use Hjelmslev makes of these ideas, let us mention his analysis of grammatical numerus which is seen as founded on the concept zone of discrete versus compact, including a neutral zone between them. Hjelmslev 1972, p. 94f). Interestingly, Hjelmslev calls this calculus "sublogical"; it is inspired by Lévy-Bruhl's idea of "participation" in primitive thought where opposed terms may share content. Thus formal logic is supposed to be but one possible derivate from this sublogical basis, an idea not unrelated to Husserl's idea of a phenomenological foundation of logic (Husserl 1985).

Such a three-part zone now may be occupied by different terms, defined by placing each their emphasis on differing combinations of the three parts of the zone, this emphasis indicated by a slash in the relevant part(s) of the concept zone:

So a term of a paradigm is now seen as a specific combination of the three parts of the paradigm's concept zone. Thus, Jakobson's markedness-unmarkedness distinction corresponds to two of these possibilities only, namely the term occupying only one of the opposed terms (markedness), together with the term indistinctly occupying the whole concept zone (unmarkedness). Thus, unmarkedness is no longer the mere absence of the marked term, unmarkedness is reconstructed as the vague presence of the whole of the concept zone. But the distribution of the emphasis/non-emphasis over the three-part concept zone yields seven possibilities (with the exclusion of the case without any emphasis at all) instead of two. Later in the development of glossematics, this calculus is further complicated by the introduction of two emphasis degrees (already in 1934, cf. Hjelmslev 1972), and in the elaborated technical presentation of glossematics in the "Resumé" of the early forties (Hjelmslev 1975), a new set of seven possible emphasis patterns over three-part concept zones is established. These different emphasis terms now combine pairwise to give twelve possible different polar opposites within one and the same concept zone (Hjelmslev 1975, p. 42), just like systems with from two up to six internally opposed terms appear as a possibility of different emphases of a concept zone (ibid. 31-32). It must be said, though, that the implicit constraints preventing free combination to give an even larger set of possibilities are never made explicit, and neither of two recent and very thorough reconstructions of Hjelmslev (Gregersen 1991, Rasmussen 1991) make clear the nature and role of these constraints. In our context, it must be added, though, that the concept zone calculus in its "bound" variant is argued to give exactly the three dependency types as a corollary (Hjelmslev 1975, 60). Thus, it might be said that just like in Husserl, an explicitly mereological calculus (the partitioning of the concept zone it into three parts and their possible combinations) results in a dependency calculus - even if the route of derivation is much more labyrinthine in Hjelmslev's case and necessitates further research surpassing the scope of this chapter.[xxi] As to the influence question, there seems to be a thin thread leading from the 3rd investigation via Jakobson's markedness concept to Hjelmslev's complicated three-value markedness calculi and further on to his three dependency types - but

without any explanation as to how exactly the same dependency calculus appears at each end of the thread.

Anyway, the radical purism in Hjelmslev's dependency calculus as well as in his concept zone calculus also have other consequences which is my main reason to bring him into the discussion in this context of actual mereological thought. Hjelmslev's purism namely displays some dangers in a too consequent mereological approach. To see this, take Hjelmslev's mereological treatment of linguistic tradition. The whole inventory of morphology and syntax, of distinctions between syllables, words, flexions, sentences, hypotaxis, parataxis, etc. must be given up completely in favor of a purely mereological description. We are not supposed to distinguish preposition and government, e.g., in any other way than by knowing that one selects the other, the whole complex of the two again being independent of the clause as a whole on sentence level. The same goes for semantics where the shortcomings of the theory were most easily felt; the consequent mereological approach prohibited any phenomenological semantics in so far the elements of meaning were allowed to receive purely arbitrary denominations only.[xxii] Being functives, they were to be referred to by algebraical letters, and their semantic content was supposed to be read off their mereological dependencies only.[xxiii] In semantics, the theory restricted itself to banalities such as that the meaning of "bull" was dependent on the meanings of "ox" and "male", respectively.

What is to be learned from the partial failure of Hjelmslev's grand mereological project? The set of restrictions the theory admits deliberately cuts it off from possible insights, first in the letting out of sight language's reference to any context ("matter"), and second in its dogmatic decision that any relation between expression and content is arbitrary merely. Both these ideas have been excellently attacked by the cognitive semantics tradition.[xxiv] The main implication in this context, however, to be drawn concerns the consequences of the idea of a purely mereological dependency calculus used as a descriptive metalanguage. Such a calculus so to speak conceives its object from outside, sees it constructed by discrete building-blocks holding a highly restricted set of dependencies between them. To describe language and other semiotic phenomena (which is, implicitly, the ambition of glossematics, the matter of expression being of secondary importance) it is necessary not to delimit oneself beforehand to one selected calculus (even if it is a fertile one) of description. Moreover, Hjelmslev's use of it repeats some of the Berlin School's less lucky consequences without gaining its advantages: Hjelmslev ceases to use traditional linguistic terminology, so that for instance morphology versus syntax should be mereologically

reinterpreted. But doing so, the Graz School advantage of being able to distinguish a part (a word's morphology) from the role played (in sentence syntax) in a gestalt, is lost.

Another drawback is the extremely discontinuous character of the calculus, given by the definition of the dependency calculus to hold between well-defined units of a lower level (which is not a necessary implication by dependency calculi). All continuous phenomena in signification is a priori bracketed by the choice of so restricted a metalanguage (on the linguistic expression side intonation, prosodic features, gestures; on the content side the whole question of continuous schemata and their (continuous) eidetic variation in semantic description.)

Finally, a drawback is a fact which Barry Smith has often referred to: mereology's explicit and admitted weakness. In Lesniewski's version, this was even picked as a special privilege of the theory, making it independent of ontological assumptions. The flip side of this is that mereology's weakness makes it unfit to describe most empirical wholes without further formal equipment. In linguistics, this further equipment is most often tacitly presupposed - in for instance the idea of co-existence of terms in a sentence. But dependency relations does not in any way imply the existence of parts in the same place. A whole consisting of the tone A, my left shoe and the contour of England is perfectly admissible. Contiguous wholes thus require at least additional topologies for their description, making it possible to distinguish connected and non-connected wholes - and they may require metrics, spatio-temporal embedding and much more in order to map further properties of interest; this goes for objects in general as well as for objects of semiotics specifically. Mereology and its dependency calculi do remain a very important formal part of semiotics, but we have no reason to assume that they exhaust the formalisms necessary, just like a considerable work in formal ontology will be required to yield a more refined taxonomy of gestalt types.

In Husserl, mereology forms a crucial part of formal ontology, relevant for any ontological domain whatsoever (but not necessarily with any claim for being exhaustive for formal ontology), and it subsequently plays a central role in his pure grammar. In Hjelmslev, exactly the same calculus is supposed to be the formalism relevant to describe all possible formal properties in semiotic systems as a presuppositionless metalanguage deprived of any of the ontology-like ambitions of phenomenology. Yet, Husserl's refusal that "vague morphologies" may be formalized may approach him to Hjelmslev, and their strong reliance on dependendy calculi may probably have its reason in their reliance on the former's weak,

methodological reliance upon logic, and the latter's strong methodological reliance upon language, respectively, both being discontinuous systems. Jakobson, on the other hand, makes a less theoretical use of mereology, but his theory points towards a pragmatical grounding of mereology in prelinguistic, phenomenological perception of wholes with atypical parts - generalizing an experience of discovery: the sudden appearance of a new, strange phenomenon within the bounds of the supposedly well-known.

As A Whole

Consequently, a much more liberal stance must be taken with respect to which forms may count as significant. It comes as no surprise when we claim that an outline may be found in Peirce's diagram concept. But it is noteworthy that the diagram is connected to mereology in two ways.

The diagram is a stylized picture of its object - and this stylization involves two kinds of abstractions. One is the so-called "prescission", the second of Peirce's three distinction types, dissociation, prescission, and discrimination, respectively. These separation types, in fact, form the equivalent in Peirce to the dependency calculi we isolated in the other three semioticians (see ch. 18). Dissociation separates independent objects; prescission separates objects which may be supposed to exist separately; discrimination separates objects which may only be represented separately. The precise relation between these distinction types and the dependency calculi of Husserl and Hjelmslev has not been established yet, but the following is a first attempt: dissociation is the distinguishing ability corresponding to constellation in Hjelmslev and independence in Husserl, while prescission seperates a founding part from a founded part and discrimination vice versa (so that interdependent parts may only be discriminated, while unilaterally dependent parts may be prescinded (the independent part) or discriminated (the dependent part).
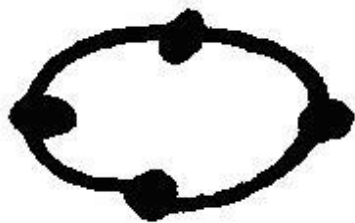
When making a diagram, we must prescind it from the particular token drawn on a piece of paper so as to grasp it as an ideal object. Furthermore, the activity we may picture with a diagram by manipulating it may itself be made the object of a higher-order diagram. This is "hypostatic abstraction" in Peirce's system, to be sharply distinguished from the distinction types: it makes a noun out of a predicate and thus makes it possible further to investigate the properties of this predicate. Prescission thus is a focussing mechanism, leading to the predicative isolation of still more general properties of an object - while abstraction is an objectifying

mechanism, making an object of thought out of a predicate, or, as Peirce puts it sloganlike, it makes a thing out of a thought.

Now, the second mereological feature of the diagram is that it - be it pure or applied – forms in itself a whole consisting of interrelated parts. Murphey, in his 1961 classic survey of Peirce's development, writes on Peirce's continuum concept: "Indeed, the very idea of the continuum as that every part of which is similar to the whole so obliterates the distinctions between class and member, individual and general, concrete and abstract that it is impossible to make the notion precise without running into contradiction." (343). Maybe this was exactly Peirce's intention. The vanishing of the element/subset distinction was a defining feature of Lesniewski's mereology, and it is correct that Peirce's continuism repeats it. For to what does a diagram refer – a continuous field of cases which may not be sorted in elements and subsets – it s herein its generality resides.

The character of the interrelations in the diagram makes certain experiments possible, and these experiments are now interpreted as holding also for the object depicted:

> Deduction is that mode of reasoning which examines the state of things asserted in the premisses, forms a diagram of that state of things, perceives in the parts of that diagram relations not explicitly mentioned in the premisses, satisfies itself by mental experiments upon the diagram that these relations would always subsist, or at least would do so in a certain proportion of cases, and concludes their necessary, or probable, truth. For example, let the premiss be that there are four marked points upon a line which has neither extremity nor furcation. Then, by means of a diagram,

> we may conclude that there are two pairs of points such that in passing along the line in any way from one to the other point of either pair, one point of the second pair will be passed an odd number of times and the other point an even (or zero) number of times. This is deduction. (Untitled manuscript, c. 1896, 1.66)[xxv]

An important diagrammatical operation is the working together of prescission of abstraction, that is, a diagram property is selected as an object which may itself be subject to rule-governed manipulation (cf. ch. 11). Abstraction permits the diagram to be recursive and embed one diagram with its whole set of procedures as an object in a more abstract diagram making it possible to investigate the first one. To stay in the map example, we can for instance generalize from the single map and abstract the subject of "mapness", leading to the question of possible projections giving rise to maps with various properties. In Husserlian slang, this makes possible to investigate still more abstract moments as if they were *Stücke*. In a diagram, thus, mere aspects of the object may appear objectified as autonomous parts. This is, as a matter of fact, a crucial means in diagrammatically making implicit information explicit.

The strength of the diagram category is that it - in contrast to the dependency calculi of the early Husserl and of glossematics - displays an open variety of continuous and discontinuous mereological devices used in the construction of meaning. In any case, namely, a diagram analyses its object into a collection of interrelated parts, the relations of which may be specified in many terms in addition to dependency: connectedness, boundedness, quantity, locality, form, metric relations ... In short all relations giving possibly rise to necessary reasoning[xxvi] which is a set the extension of which we may not be in a position to determine beforehand. Husserlian mereology may, however, contribute to an aspect of diagrams only marginally hinted at in Peirce: their connection to the issue of the synthetic a priori. Husserl's doctrine of dependency and foundation in the 3rd LU was, in fact, intended as defining the analytic and synthetic a priori anew – as the disciplines of formal and regional ontologies respectively. Both were to be charted by mereological calculi, the former in a pure, the latter in a material version. In the next chapter, we shall attempt to extend Husserl's brilliant insight to the continuous mereology representations in Peirce: the diagrams.

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[i] "Mereology", from Greek *meros*, part. As a matter of fact, it might have been called "merology", but after the Polish logician Lesniewski the form quoted has become ubiquitous. Lesniewski, in his works from the 20's and 30's, considered mereology to be one out of three basic branches of philosophy, "protothetic", "ontology", and "mereology", respectively. Protothetic is a doctrine of propositions and their interrelations and it forms the logical basis of his theory; ontology is based on a distributive rendering of class membership, so that distributive class expressions are

identical with general nouns applicable to individuals. Mereology, then, considers collective class expressions understood as being composed of parts. By the distinguishing of the two latter branches of philosophy, Russell's paradox is avoided, and mereology is weaker than set theory because it only admits one relation of inclusion (part of), opposed to the two in set theory (membership relation and subset relation, which in Lesniewski's thought are separated as belonging to ontology and mereology, respectively). Mereology in this sense of the word thus has the advantage of being "bottomless", the compositional foundation of a class upon the existence of ultimate *Ur-elemente* being avoided. This implies that mereology is "phenomenological" in so far as it may describe a given level of phenomenal existence without recourse to a bottom level of atomistic ontology, a crucial aspect of the semiotic perspectives in mereology. This implies the possible affinity of mereology to strongly nominalist positions claiming mereology to be without any ontological presuppositions whatsoever (as in Lesniewski's case, and after him, Goodman) - even if this is no necessity, and mereology may as well be connected to neutral (the younger Husserl) or strong realist positions (Smith). Lesniewski was influenced by the part-whole reflections of the Brentanian tradition: Husserl's 3rd and 4th *Logische Untersuchungen*, in turn influenced by Brentano's *Deskriptive Psychologie* (1890), and Carl Stumpf's *Über den psychologischen Ursprung der Raumvorstellung* (1873). For further accounts for these developments, see Smith 1982, 1994. In this context, we shall stick to mereological aspects of decidedly semiotic currents of thought.

Even if none of the authors discussed here use the word, I have chosen it as a shorthand for "doctrine of whole and parts" and similar complicated expressions.

[ii] Of course, these two alternatives display, each of them, a host of subvariants of more and less sophisticated types, ranging from a completely compositional logicist theory in the one end and to almost mystical insistances on the autonomy of wholes in the other. Moreover, there is not necessarily a contradiction between the two; it is perfectly possible to imagine compromises, so as e.g. an emphasis on the primacy of the holist level giving rise to motivated, iconic syntaxes governing its parts - combined with a recognition of the possibility for these syntaxes of assuming, once established, an autonomous status involving local compositionality.

[iii] Cf. Hua XII which contains among other writings "Zur Logik der Zeichen (Semiotik)".

[iv] Husserl's disciple from the 1910s, Roman Ingarden, has probably developed the most ambitious further detailing of dependency theory, distinguishing no less than four different ontological species of dependency: autonomy/heteronomy, originality/derivation, self-sufficiency/connectivity, independence/dependency which may further combine into eight types of signs (Ingarden 1965-74, 123). It seems evident that dependency is in need of further subdistinctions (a head is an independent part of the body, as an autonomous part, but it is a special part because the body ceases to function as a body if it is in fact cut off). Ingarden's suggestions have not, however, yet given rise to a fertile further development.

[v] Fassen wir irgendein Paar von Teilen eines Ganzen ins Auge, so bestehen folgenden Möglichkeiten:

    1. Zwischen beiden Teilen besteht ein Verhältnis der Fundierung.

    2. es besteht diese Verhältnis nicht. Im ersteren Falle kann die Fundierung

        a) eine **gegenseitige**,

        b) eine **einseitige** sein ... (LU II, 264-65)

[vi] After Holenstein 1976, p. 58

[vii] Jakobson 1985, p. 281.

[viii] Jakobson 1971b, p. 713.

[ix] Jakobson 1985, p. 203.

[x] Jakobson 1985, p. 189. Here, he claims that the 3rd Logical Investigation is "... one of the milestones for the initial advance of structural linguistics ...".

[xi] . Like in "Parts and Wholes in Language" where he begins: "In the second part of Edmund Husserl's *Logische Untersuchungen* - still one of the most inspiring contributions to the phenomenology of language - two studies devoted to "Wholes and Parts" introduce the philosopher's meditations on "the Idea of Pure Grammar". In spite of manifold aspects of interdependence between wholes and parts in language, linguists have been prone to disregard this mutual relationship." (Jakobson 1971b, 280), and further "The structure of the verbal code is perhaps the most striking and intricate example of whole-part relations that are built hierarchically." (282-3).

[xii] Jakobson 1971a, 314.

[xiii] It is a strange fact that Jakobson does not explicitly refer to the *Logische Untersuchungen* in his definitions of the zero-sign or the markedness/unmarkedness distinction. Holenstein 1975, 1976 does not mention any such direct influence either.

[xiv] "Eine der wesentlichen Eigenschaften der phonologischen Korrelation besteht darin, dass die beiden Glieder eines Korrelationspaares nicht gleichberechtigt sind: das eine Glied besitzt das betreffende Merkmal, das andere besitzt es nicht; das erste wird als *merkmalhaltig* bezeichnet, das zweite - als *merkmallos* ..." Jakobson 1971b, p. 3, with reference to Prince Troubetzkoy.

[xv] Jakobson 1971b, 213.

[xvi] Even politically correct language politics, eager to avoid the assymmetry inherent in the markedness-unmarkedness distinction, can not avoid this, cf. long marked forms like "African-American" vs. short unmarked forms like "African" or "American".

[xvii] For a comparative discussion of the bases of Hjelmslev's theory in relation to Brøndal's, see Jørgensen and Stjernfelt 1987.

[xviii] The only reference to Husserl found in Hjelmslev is in the early *Principes*, but even if it refers to the 4th investigation, it is pejorative: "... la théorie étrange du philosophe HUSSERL" (p. 40). None of two recent comprehensive investigations on Hjelmslev mentions any possible relation to Husserl (Gregersen 1992, Rasmussen 1992)

[xix] Diderichsen returns over and over again to the fact that linguistics in general tends to focus upon "three main types of grammatical connexion", and at several occasions he mentions in that context Husserl's mereological analyses from *Logische Untersuchungen* as strikingly similar to structural linguistics (Diderichsen 1966, p. 107 (1947); 137 (1948); 207 (1952)) but he yields no indication as to the possible relationship between Husserl and Hjelmslev.

[xx] Marty, whose 1908 *Untersuchungen zur Grundlegung der allgemeinen Grammatik und Sprachphilosophie* refers to the *Logische Untersuchungen.* Hjelmslev refers to Marty at several occasions, but not directly in connection to the dependency algebra.

[xxi] So, it seems like mid-20 C mereology has left behind some interesting ruins – or drafts for impressive new constructions? – in Ingarden's and Hjelmslev's complicated mereologies, hopefully to be developed by future research.

[xxii] Here, Diderichsen is admirably clear in his early insistence that formal glossematic description is impossible without a prior phenomenological sensibility for identities and differences (Diderichsen 1966, p. 123 (1948).

[xxiii] This consequence is still visible in Greimasian semiotics, having inherited the whole of its metatheoretical apparatus from the *Prolegomena*. In the semiotics of the Paris school, the orthodoxy teaches that denominations of theoretical as well as metatheoretical terms are completely arbitrary; still they are invariably chosen so they are relatively easily understandable with reference to ordinary language or linguistic tradition.

[xxiv] For instance Ronald Langacker at the "Wholes and their Parts" conference in Bolzano, where a first draft of this chapter was given as a paper.

[xxv] The shortest presentation is probably: " 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, showing that these relations will hold for all such diagrams, and in formulating this conclusion in general terms. All valid necessary reasoning is in fact thus diagrammatic." ("Lessons from the History of Science", 1896, 1.54) The object of mathematics will be pure diagrams of any kind, while ordinary reasoning as well as the empirical sciences will use diagrams applied in being constrained by existing relations as well.

[xxvi] .Maybe this very general notion of diagram - parts with unspecified interrelations being open to abstraction to classes of interrelations - makes Peirce's schema an early forerunner of category theory. Finally, I imagine Peirce's very wide concept of diagram may not only generalize Kant's idea of a schema, but also serve as a unifying concept for the various schema-like ideas that prevail in present-day cognitive semantics (image schemas, force dynamics, landmark-trajectory, frames, scripts etc.). If so, then the semantic processes charted in this tradition - metaphorical mapping, blending, conceptual extension etc. - would be understandable as specific variants of diagram manipulation.