A Peirce for the 21st century

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Review of *Peirce's Speculative Grammar: Logic as Semiotics* by Francesco Bellucci. New York, London: Routledge, 2017, 388 pages.

Francesco Bellucci's new book *Peirce's Speculative Grammar* is great news to those many who take interest in Peirce's semiotics, be they intellectual historians, Peirce scholars, logicians, philosophers, semioticians, pragmatists. It constitutes a great leap forward in understanding the intricacies, depths, problems, and possibilities of that doctrine.

This is a point where the amount of work that Hartshorne and Weiss put into Peirce's *Collected Papers* (CP) in the 1930s has really become a source of confusion rather than enlightenment. The semiotics chapters of Volume 2 of the CP focus upon the icon-index-symbol distinction especially, and in the paragraphs from §2.219 to 2.308, they mix up numerous shorter and longer definitions ranging from 1893 to 1910, Peirce's most explosive period of theory development, as if those text bits obviously referred to one and the same thing. What is worse, the representation of Peirce's classic articulation of his sign theory – three trichotomies of sign aspects, resulting, by combination, in ten classes of signs – developed during the composition of the 1903 *Syllabus* manuscript, is cut up and disseminated over no less than three volumes of the book, namely §§ 2.219–226, 2.233–272, 2.274–277, 2.283–284, 2.292–294, 2.309–331, 3.571–608 and 4.394–417. What is particularly troubling is that the two substantially different *Syllabus* drafts of the very same theory, otherwise known as "Sundry logical conceptions" (§§ 2.274–277, 2.283–284, 2.292–294, 2.309–3) and "Nomenclature and divisions of triadic relations" (2.233–272) appear in this mix with the *more* developed version (the "Nomenclature" with the three trichotomies) placed *before* the scattered parts of the less developed version ("Sundry ..." with its two trichotomies only). Surely, the publication of the CP was pioneering work making a wealth of valuable material

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available for the first time, and many scholars were able to gather a rough idea of the three-trichotomies-ten-signs theory from the jigsaw puzzle of the *Collected Papers*. But what they could not get at all – or at least not without a considerable amount of work – is any idea of how that theory quickly developed in the course of Peirce's *annus mirabilis* 1903, nor the larger issue of how it had evolved out of Peirce's many other semiotic sketches and speculations, all the way down from his early ideas of the 1860s, and how it fed into the grandiose, unfinished draft vistas of the post-*Syllabus* years of the 1900s. This state of things has been the root of many unfounded or even mistaken uses of Peirce's semiotics where – to put it bluntly – readers have been able to project their own prejudices and folk theories about signs into some selected crumbs of text about icons and indices from Vol. 2 of the CP, rather than striven to understand what that theory, as a whole, really aims at, namely the analysis of propositions and inferences.

This condition considerably improved, however, with the publication of the two chronological volumes of *Essential Peirce* by the Indianapolis Peirce Project (EP1, EP2) in the 1990s which brought together large parts of the central *Syllabus* in Vol. 2, Chapters 18–21, making it considerably easier to get a good grasp of the classic theory. Still, the obvious selection pressure on the two volumes naturally precluded them from giving any clear picture of the overall development of the sign theory. This condition only really improved on the publication of Tom Short's monograph *Peirce's Theory of Signs* in 2007 with its more-than-30-pages second chapter on "The development of Peirce's Semeiotic" covering the whole period from 1865 to 1907. The Peirce Project's grandiose chronological project of publishing Peirce's *Writings* has, since its inception in the 1970s, covered the period up to the early 1890s only and will not reach 1903 and beyond within any conceivable timeframe.

Many of these problems evaporate, however, with the recent publication of the Italian scholar Francesco Bellucci's magisterial monograph *Peirce's Speculative Grammar*. Bellucci picks Peirce's systematic definition of his semiotics – 'Speculative Grammar' – as the first, semiotic part of logic dealing with the description and analysis of sign aspects and types necessary to understand, in turn, the composition of propositions, their interrelations in arguments and their truth conditions, which are studied by Formal Logic or Logic Proper, finally to form the basis for Speculative Rhetoric or Methodeutic studying the philosophy of science issue of how actually to put into use logical structure in pragmatic scientific research with the aim of gaining new knowledge. Bellucci focuses upon the development during Peirce's lifetime of the first part of this trichotomy of logic, that is, Peirce's semiotics.

I have no reason to hide that I find Bellucci's endeavour going in the same overall direction as my own 2014 book *Natural Propositions: The Actuality of*

Peirce's Doctrine of Dicisigns – in the sense that both of us insist upon the narrow ties between semiotics and logic in Peirce, so that the whole of Peirce's enormous work with sign definitions is directly intended to serve the analysis of propositions and arguments, which remained the primary analytical target throughout his career. So, all of his definitions of icons, indices, and much more, are intended to make reasoning processes understandable in an overarching "Physiology of Arguments". In my book, I focused upon the generalized proposition doctrine of Dicisigns as developed by Peirce in and after his classic 1903 doctrine – attempting some further developments of actual semiotics on that basis. Bellucci, of course, paints a much broader picture of the whole development of Peirce's theory over his more-than-40-years period of scientific activity, giving us an understanding of the detail of that development which sets new standards for scholarship.

Bellucci's overall argument claims that there are basically eight phases in the development of Peirce's semiotics, the "classic" and most well-known 1903 phase constituting number seven among them, and he devotes a whole, detailed chapter to each phase in his chronological and systematic charting of the development of Peirce's semiotics.

The phases are not of equal importance. The first phase is that of the 1860s when a surprisingly large bundle of Peirce's basic and original ideas as to Speculative Grammar was articulated with the aim of analysing and understanding assertions and arguments. By comparison, the second phase of the 1870s around Peirce's never published 1873 logic book introduces medieval realism, the idea that the proposition separately represents its object, and the basic ideas of pragmatism, which only marginally belong to Speculative Grammar. The third period brings another large step forward in the Speculative Grammar repercussions of the important Algebra of Logic formalizations of the early 1880s, particularly the idea that all propositions need all of the three sign types of symbol, index, and icon in order to be expressed. The fourth "How to reason" period of the early 1890s again appears as a minor period, even if both the *Short Logic* and the book of the chapter title, also nicknamed *Grand Logic*, were worked on then. The fifth, mid-to-late 1890s saw crucial discoveries like the Existential Graphs and the metaphysical category of "would-be's", but again appears as a minor period in the development of Speculative Grammar, even if the development of certain problems now makes the early theory unstable. The sixth period, centred upon the "Minute logic", appears as fairly important, characterized by the emergence of Peirce's new idea of defining sign types via a combination of simpler sign aspect types – signalling what Bellucci calls the *First Reform* of Speculative Grammar. Still, it is dwarfed by the seventh period, Peirce's *annus mirabilis* of 1903 when he seems to have been virtually boiling – writing both the Pragmatism Lectures, the Lowell Lectures,

and the various *Syllabus* sketches to accompany the latter. It is charaterized by Bellucci's *Second Reform* of Speculative Grammar – arguably the most important phase since the founding period of the 1860s. The final, eighth period introduces the *Third Reform* of subdividing the Object and Interpretant categories and is characterized by Peirce's further attempts to extend the three-trichotomy theory of 1903 to first six, later ten trichotomies (and with 28 and 66 combined signs as the result, respectively). Much of that work exists in unfinished sketches only, particularly in his letters to Lady Welby; so, even if bubbling with new ideas, this final phase impresses with its imaginary utopias rather than the finalized system with established results of the preceding period.

Let us run through these phases. The first phase is that of the 1860s with the Harvard papers and the American Academy papers, including the famous 1868 "New list" article with the first presentation of Peirce's three categories. Surprising it is to find how many of the central semiotic issues of the later years are introduced already here – yet it may appear even more surprising that the evident root of the whole of Peirce's semiotic programme is found in the basically logical issues of how to analyse propositions, inferences and types of arguments. The classic Aristotelian *term-proposition-argument* triad – numbered the third trichotomy in the 1903 "classic" semiotics doctrine – emerges here as Peirce's starting point, rather than the *icon-index-symbol* trichotomy often considered basic. Bellucci quotes Murphey for the two parts of that base: (1) the elementary identification of the notion of inference with that of sign – so that the premises function as a sign of the conclusion, and (2) the strive for generalizing the types of syllogism to a distinction between types of arguments in general. These two combine to give the idea that types of arguments should really be described as types of signs. This classification, in turn, was what gave rise to the abstraction of Peirce's three categories in the "New list" paper.

Already from the beginning, Peirce's anti-psychologistic stance informed the notion of the sign: he saw no difference between external and internal signs, the two of which incarnate but one and the same logical structure. It is in this context that the *icon-index-symbol* distinction makes its first appearance, here *not* as a classification of signs or of sign aspects, but as types of *truths,* in the guise of a trichotomy between *copies, signs, and symbols.* They thus refer to different workings of propositions, copies (icons) use "sameness of predicates", signs (indices) are individual objects denoting other individual objects, and are thus defined by reference, while symbols are *general* and thus the only properly logical type among the three truth types, and the logical study of *terms-propositions-arguments* is a study of symbols with respect to their logical properties, "objective symbolistic". This is the only of the three which may *embody* truth or falsity. Not much later,

they are defined in terms of different logical quantities using concepts inherited from the Port-Royal school, '*denotation*' (Peirce also: 'breadth') and '*connotation*' (Peirce also: 'depth'), respectively. Thus, copies (icons) are pure connotations without denotation; signs (indices) are pure denotations without connotation; while full, logical symbols have both and denote by connoting. From this, it also already follows that icons and indices can form parts of full, propositional symbols, performing in that frame their connotative and denotative functions, respectively. And already here, we also see the root of the later symbol concept defined as *general* signs, natural or acquired – thus *not* defined by convention, as indexical "signs" may also be conventional, and not all symbols need to be. It is as subtypes of symbols, then, that the classic Aristotelian *term-proposition-argument* triad is originally conceptualized. Already here, a proposition is a rudimentary argument, and a term a rudimentary proposition.

In the classification of arguments, the central goal of this early theory, the *leading principle* of inferences becomes central. It is the ineliminable basis of the argument and should be expressed as economically as possible. The leading principle of an argument is isolated when, if used as a premise in a further argument, that argument will have the same leading principle as the first one. As arguments are signs, and as there are three kinds of truths, the classification of leading principles must also be triadic and be defined in terms of these truths. The very ratio for constructing the first version of the *icon-index-symbol* triad is thus to *serve the typology of arguments*, of symbols, so that, expressed in the later terminology, hypotheses (abductions) are arguments which function iconically, inductions are arguments which function indexically, and deductions are arguments which function symbolically. So, the *copy-sign-symbol* triad is used, in turn, to subdistinguish the argument subtype of the symbol category. Already here, remarkably, Peirce insists that the generality of symbols – that is, of terms, propositions, and arguments, cannot be reduced to any sum of singulars as presumed by Aristotle. And already here, then, lies the root of Peirce's "extreme realism" which teaches that the extension of general terms comprises also all merely *possible* things to which they may apply – an idea which would later lead Peirce's vast interest in the mathematical continuum as an entity larger than any finite or infinite set, even transgressing the Cantorian transfinite hierarchy. As to logical proof, Peirce also already had the essentially computational idea that all steps of a proof take place by the substitution of signs. Thus, a hypothesis (abduction) is the substitution of a conjunctive term (uniting several predicates) with a symbol of which it is an icon. Induction is the substitution of an enumerative term (uniting several subjects) with a symbol of which it is an index; deduction is the substitution of a symbol with another symbol of the same object. These results are what gives

rise, in turn, to the three metaphysical categories by the use of the central Kantian principle of metaphysical deduction eternally dear to Peirce: the hypostatic abstraction of logical forms to metaphysical regularities – in this case, the three basic ways of "reducing sensuous impressions to unity", to express it in Kantese. *Quality, Relation,* and *Representation*, later generalized to Firstness, Secondness, and Thirdness, were the result of that abstraction, and from their interrelations also Peirce's triad of distinction types – *dissociation, prescission,* and *discrimination* – was derived. On this basis, §15 of the 1868 "New list" emerges as Peirce's first systematic version of the Grammatica Speculativa, presenting taxonomies of signs, symbols, and arguments. But – as Bellucci concludes – the categories were reached only from the division of signs and the division of arguments; Peirce's standard procedure of derivation, from logic to metaphysics.

The second phase, focused upon the planned logic book of 1873, brings less surprise, if not by its relatively small focus upon semiotic and speculative grammar issues. As so often in his career, Peirce wished to bring his different results in logic and philosophy together in one volume. One book plan enumerated five chapters, on doubt and belief; inquiry and reality; the categories; signs; and inference, respectively. Another plan added more chapters, e.g. on space in logic, breadth and depth, probabilities, maxims of reasoning, but not all of these chapters seem to have been written (Bellucci 2017: 81). As is evident from these chapter titles, the book plans focus more upon logic proper and especially on what was later called rhetoric or methodeutic, that is, on philosophy of science and inquiry. Some of the ideas seem to have been discussed in the Metaphysical Club in the early 1870s and, as the logic book never coalesced, central sections actually written finally flowed into the important series of *Illustrations of Science* papers of 1878, among which are "The fixation of belief" and "How to make our ideas clear", the birth certificates of pragmatism. Bellucci quotes Max Fisch for an explanation of the almost absolute absence of theory of signs in these papers: they were aimed at a more popular audience. He adds the further reason that the semiotic issue was already thoroughly dealt with in the 1868–1869 papers. An important generalization occurring in this phase is the generalizing step from considering all reasoning as taking place in signs to considering all *cognition* as taking place in signs. The groundwork of this idea lies in the anti-Cartesian papers "Questions concerning certain faculties claimed for man" and "Some consequences of four incapacities" of 1868–1869, refusing intuition and introspection as well as thoughts-without-signs and the existence of an incognizible *Ding an Sich* reality. The latter gave rise to the first thorough articulation of Peirce's "medieval" realism (that is, realism as to universals) in the 1871 review of Berkeley, to reappear in the 1873 logic. In that

planned book, the semiotic focus would be on symbols exclusively. Here, a stable feature of Peirce's analysis of propositions appears, namely that they *separately* represent an object – a first germ of Peirce's later, complicated "deduction of the Dicisign" in the 1903 *Syllabus*:

> A representation is such only so far as it is conceived to be one. It is represented as representing a certain object. This object must therefore be indicated in the representation independently of that part of the representation which represents it to exist in a certain way. Or we may express ourselves thus: There must be connected with any representation of an object another representation which represents that object independently & there must be a representation that the one represents whatever the other represents. (Peirce 1873, quoted from Bellucci 2017: 95)

A representation – a proposition – is thus *complete*; a term *incomplete*, while the argument is *perfect*. Both term and proposition are thus "wanting" versions of the full-blown argument, anticipating Peirce's doctrine of degeneracy. But overall, the logic of 1873 brought little new in speculative grammar, leaving the effects on that doctrine to Peirce's progress in the logic of relations from around 1870 to his 1880–1885 formalizations of propositional and predicate logic.

The third phase, then, is that of these algebras of logic, here called "the Johns Hopkins years" after Peirce's position there from 1879–1883 and his collaboration with a number of illustrious students to produce those important steps, the first linear formalizations of propositional and predicate logic, respectively (Frege famously was the first, of course, to formalize both in a graphical, non-linear formalism in 1879). They particularly provide a new analysis of propositional logic as a whole and, spectacularly in the meta-theoretical introduction to the formalization of predicate logic in 1883–1885, a bundle of new results in speculative grammar. As to the former, Peirce takes the relation of inclusion or inference as the basic notion of logic – as opposed to Boole's choice of equality which Peirce analyses as bidirectional inclusion. Here Peirce distingushes illation, the drawing of a conclusion, ("*P*, therefore *Q*") from the leading principle, the controlled, truth-preserving character of certain inferences. Leading principles may be expressed as conditional propositions ("If *P*, then *Q*"), which is why they are now taken to be fundamental, and categorical propositions but a derivative form of conditional propositions. As Bellucci (2017: 103) says, Peirce's first algebra of logic is, for that reason, simultaneously "[...] an algebra of classes (inclusion), an algebra of propositions (implication), and a system of logical consequences (illation)". This is why he prefers the asymmetrical and transitive notion of inference as basic to his

logic, rather than other possibilities like Boolean equality or "joint denial" which he discovered in 1880 (30 years before it become known as "Sheffer's Stroke"). This will shape Peirce's many analyses of propositions for the rest of his career. Peirce's second Algebra of Logic – predicate logic using quantification – builds on explicit influence from his talented student O. H. Mitchell who formalized existential and universal quantification as well as proposed the reduction of all illative operations to two: erasure and copulation: "Take the logical product of the premises and erase the terms to be eliminated" (quoted from Bellucci 2017: 110). Peirce generalized this idea to the first version of the prenex formula where the quantifiers assemble at the left (sometimes called the "Hopkinsian" part of the expression) while the proposition with free variables which they quantify over (the "Boolean" part) is isolated on the right-hand side of the expression. It is this system which is presented, within a speculative grammar framework, in Peirce's second "On the algebra of logic" paper in 1885. In that frame, called "Three kinds of signs", Peirce develops a new version of his Speculative Grammar. As Bellucci insists, that doctrine is a result of the many new logical results of the 1880–1885 period, while it is presented as a prolegomenon to the final fruit of it, his predicate logic formalization. In the new speculative grammar, the notion of degeneracy is introduced, borrowed from the geometry of conic sections where generic sections like ellipses and hyperbolas are bordered by rarer, singular, degenerate cases where one or several variables vanish, like parabolas, circles, points and intersecting lines. This principle is now generalized to relative predicates, of which Peirce counted 0-, 1-, 2-, and 3-valent relations; all higher plural relations may be reduced to combinations or products of these predicates (Peirce's famous "reduction theorem" analysed by Robert Burch). Thus, dyadic relations come in genuine forms which cannot be expressed in the combination of two monadic ones: "*A* is the benefactor of *B*", as well as degenerate forms which can be expressed like: "*A* is taller than *B*" which can be reduced to monadic statements of the respective heights of *A* and *B*. "*A* gives *B* to *C*" is a genuine triadic relation, while there are two levels of degeneracy for triadic relations. One is a combination of genuine dyadic relations, "*A* parts with *B* and *C* receives *B*", another of degenerate dyadic relations: "*A* is taller than *B* and than *C*".

This doctrine of degeneracy is now applied to Speculative Grammar. Signs as such are genuinely triadic, but they admit of two degrees of degeneracy. One degenerate triadicity is the genuine dyadic relation of sign to object – which corresponds to indices; another is the degenerate dyadic relation of resemblance – which corresponds to icons. The non-degenerate sign, then, is a symbol which is truly triadic, and it is general in that it represents whatever it is represented to represent. Having presented this structural analysis interconnecting symbols,

indices, and icons, Peirce proceeds to the next step: to show that every assertion and logical argument *must make use of all these three sign types*. Symbols make possible the generality of propositions; indices make possible the proposition's indispensable direct reference to its object, and icons are necessary to depict logical relations in order for them to be reasoned about. The latter may come as a surprise to many who conceive of icons as implying immediate visual resemblance. It is the reason why algebra counts as a prime example of iconicity in Peirce: in order for relations to be reasoned about, they must be represented iconically, "for reasoning consists in the observation that when certain relations subsist others are found" (quoted from Bellucci 2017: 117), and such observation requires that relations must be iconically accessible. This is simultaneously the reason that this is the birth place of Peirce's diagrammatology: the manipulation of diagrammatic icons is the road to logical proofs. The notion of 'iconicity' would not be developed until 15 years later, but its root, the discussion of which logic representations captures most iconically logical structure, is planted here.[2] As Bellucci says, these results come from Peirce's appropriation of F. A. Lange's spatial interpretation of Kant's idea that mathematical concepts must be constructed – this must take place in spatial icons, potentially to be manipulated temporally.[3] Consequently, Peirce calls his five algebraically expressed axioms of predicate logic 'icons'. As Bellucci succinctly sums it up, "We *interpret* symbols and we are *referred to* objects by indices, but the form in which symbols and indices are connected (the syntax of a formula) can only be *observed* in iconic signs" (Bellucci 2017: 123). The requirement of these three sign types in the expression of all propositions is thus a main Speculative Grammar result of Peirce's logically fertile Johns Hopkins phase.

The fourth phase occurred in the mid-1890s after Peirce's strongly cosmological period around 1890 of "A guess at the riddle" and the "Law of mind" series of *Monist* papers. Here, Peirce rewrote a number of early papers, including "New list" and "Fixation", to go into a planned book titled *How to Reason: A Critick of Arguments*, also sometimes called the *Grand Logic*. It was refused by the publisher Ginn & Co. in 1894, after which Peirce planned a *Short Logic*, the only extant chapter of which is a summary of the grammatical parts of *How to Reason*, titled "Of reasoning in general" – which was not accepted for publication either. It is here that Peirce for the first time consistently uses his early 1860s terminological proposal of 'Speculative Grammar' about that part of logic which analyses propositions and arguments into their constituent signs, the '*modi significandi*'

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2   See Stjernfelt 2015b on the origin of the 'iconicity' concept.
3   Covered in more detail in Bellucci 2013a.

of the scholastics. Chapters I, II and VI of the first book of *How to Reason* treat Speculative Grammar issues, particularly *Chapter* II "What is a sign?". Here, Peirce gives a new rendering of the *icon-index-symbol* triad, now called *likeness-indication-symbol*. Symbols are defined after Greek '*sym-ballein*' as conventional signs or signs by habit, but Peirce simultaneously puts emphasis on his difference *vis-à-vis* Aristotle in taking such habits to embrace both external and mental signs, of which the former are imputed, but the latter natural. Here, the important insight dawns that symbols are not only general signs in that they have a general meaning and thus are applicable in true assertions about many objects, but also in the sense that they are *themselves* general objects (a first germ of what was later developed into the *qualisign-sinsign-legisign* trichotomy). Based on the 1885 realization that reasoning needs all three kinds of signs, Peirce now articulates his "Symbols grow" doctrine – in the process of research, symbols may grow in extension by becoming applicable to new objects or in comprehension by acquiring more detailed meaning.

As to assertion, Peirce now sets out to analyse the difference between signs such as 'monkeys speak' and 'speaking monkeys' which obviously cannot be an issue of composition only. Influenced by the hieroglyphic assertion sign meaning 'which', Peirce gives up the standard idea of an assertion as consisting of saturated terms interconnected by the 'is' copula. Instead, what used to be terms are now reanalysed as unsaturated 'rhemes' incorporating the copula ('_is red'), able to be saturated by being somehow attached to an object, either directly or by means of an intervening index which points out the object. So the assertion now combines an indicative and a symbolic sign, and pointing figures, pronouns and quantifiers may, in different ways, perform the indicative function. The symbolic signs of the assertion, in turn, are capable of invoking an idea characterizing in some way the object or set of objects indicated.

Finally, the analysis of inference highlights that it necessitates some kind of 'monstrative' sign of illation meaning 'follows from'. Even if we make explicit an inference's leading principle and add it among its premises, as Bellucci says, that will never free us from stating explicitly what the drawn conclusion is. Such monstrative signs must be icons, because they *show* the relation between premises and conclusion, even in such simple cases as spatial juxtapositions of propositions. This develops Peirce's 1885 idea that all deductions are diagrammatic, for monstrative, "showing" signs are essentially diagrammatic. As Bellucci summarizes it: indices only indicate objects, but it takes icons "to demonstrate or show what is true about those objects". Even if in many senses an intermediary phase which sums up and details the 1885 achievements, the mid-1890s phase sets the table for the ensuing explosive development of Existential Graphs and all the new semiotic reflections connected to this.

The fifth phase is characterized by precisely that. Bellucci argues that this phase takes its beginnings with the two reviews which Peirce wrote of the German logician Ernst Schröder who had become influenced by Peirce's 1880s Algebras of Logic and published his own further developments in the monumental three-volume *Vorlesungen über die Algebra der Logik*. In October 1896 and January 1897, Peirce reviewed Volumes 1 and 3 of Ernst Schröder's work (from 1890 and 1895, respectively). In these two papers, Peirce restates his Speculative Grammar *vis-à-vis* Schröder and embarks on his first graphical logic system, the 'Entitative Graphs'. The first paper, "The regenerated logic" again focus upon the analysis of assertions, with particular emphasis on semiotics in its draft version "That categorical and hypothetical propositions are one in essence" which Bellucci makes central to his analysis of this phase. Here, Peirce argues against Schröder's psychologistic idea (from Sigwart), that deductive necessity is one of *thinking*, a "*Denknotwendigkeit*", claiming it is rather a necessity *of fact.* How is such necessity to be analysed? The task of Grammatica Speculativa – as against Logic Proper and Speculative Rhetorics – is to investigate the nature of assertions. The logical truth of assertions is the subject of Logic Proper, but before that, Grammatica Speculativa should investigate the *meaning* of assertions which is the precondition for their possible truth. Thus Grammatica Speculativa must be the study of the significations, the "*modi significandi*" of assertions – both Latin terms stemming from the title of Thomas of Erfurt's treatise which was believed, in Peirce's time, to be by John Duns Scotus (*Grammatica speculativa sive de modis significandi*). In the accompanying Manuscript 787, Peirce sketches a double investigation strategy of assertions: one is *a priori*, deducing consequences of the theoretical determination of assertions; the other is *a posteriori*, based on empirical cases of conceived assertions and working its way "upwards" toward theory by means of abstraction, thus testing the *a priori* results. The assertion is a communication to a receiver, stating that, on a certain occasion, some idea is compulsory, truth being defined as "definitive compulsion of the investigative intelligence" in the objective, non-subjective sense mentioned. From this assumption, three elements are deduced as being needed in an assertion: "a sign of the occasion, a sign of the idea, and a sign of the fact that the idea is applicable to the occasion for the scientific intelligence" (Bellucci 2017: 157).

First, the *idea* must be communicated by a sign able to call up a similar sign in the receiver, that is, an icon. This icon may be communicated by means of a symbol, but then this symbol must, originally as well as effectively, be *connected* to an icon, picture, or diagram which it is able to conjure again, in the interpreter. The predicate of an assertion, then, must communicate the idea either directly, through an icon, or indirectly, through a symbol (Bellucci 2017: 158). Icons, again, may be of first intention, directly presenting some qualities of an object, or they

may be second intention, regulating other icons, such as logical conjunctions. So icons of first intentions may be synthesized into composite icons by means of second intention icons. This *a priori* analysis is then corroborated by *a posteriori* examples in "rhetorical" evidence (Schröder). So all languages must contain an iconic fundament of predicates, including the important iconic device of *syntax*, juxtaposing signs to make composite signs (such as assertions). The resulting assertion, then, is iconic for the important reason expressed as follows: "[...] for a great distinguishing property of the icon is that by the direct observation of it other truths concerning its object can be discovered than those which suffice to determine its construction" (CP 2.279; Bellucci 2017: 160). Assertions allow for deductive inferences, which is exactly the procedure for making such discoveries.

Second, the *occasion* must be communicated by a sign of the compulsory event happening here and now – which is why that sign must be an *index*, able to point out that individual event or object. Indices, again, may be direct, such as pointing fingers, demonstrative pronouns, etc., or they may be indirect, such as spacetime indications or quantifiers and related instructions of how to locate or delimit such objects. Assertions, then, may be compounded from two complexes: one is a Predicate complex, a set of First Intention Icons interconnected by Second Intention Icons, another is a Subject complex, a set of Indices selecting and constraining objects about which the Predicate speaks. This is a meta-semiotic description of the Algebra of Logic formalization of 1885.

Third, neither the Predicate nor the Subject suffice to constitute an assertion, which is why a third sign is needed. Here, Peirce identifies that sign with the classic copula, analysed as a symbol (he should later give another analysis of the third sign, e.g. in the Syllabus "Deduction of the Dicisign"). It is the compulsion not of the occasion, but of the assertion sign itself. In formalized utterances, it is the main logical connective which undertakes the general, symbolic copula function (an 'and' or an 'implies', etc.) in addition to its iconic meaning. But this function may be implicit: in many languages, the mere juxtaposition of Predicate and Subject may suffice to constitute an assertion.

As a result, Peirce makes an explicit revision of the old Speculative Grammar account of the "New list": the trichotomy of qualities, references and representations should be generalized to "non-relative characters, dual relations, and plural relations" (MS 787, 30; Bellucci 2017: 164), failing in 1868 to recognize the latter's irreducibility to dual relations. Only those triadic relations are representations which bring the interpretant not only into a relation with the object, but also with "*some representation of the object*" (Bellucci 2017: 165; emphasis in the original). The recipient must know the object but also a representation of it. This is why weathercocks, photographs, maps, etc. now are considered symbols, for they may

be true and thus able to state assertions. For that same reason, the definition of symbols as general habits can no longer be co-extensive with the definition of them as conventions which must be insufficient. "[...] some indices assert, and some symbols indicate", as Bellucci (2017: 166) says, and that is not accounted for by the state-of-the-art of Peirce's 1896 semiotics, as he adds, having no taxonomic distinction between symbolic indices like the weathercock or photograph and indexical symbols like a quantifier or demonstrative pronoun. Bellucci makes a strong argument that this broadening and resulting unclarity of the mid-1890s Speculative Grammar lies beneath the vast refurbishments of the doctrine in the ensuing sixth and seventh phases.

In the article mentioned, this forms the backdrop of Peirce's argument against Schröder's distinction between categoricals and hypotheticals. They are really of the same essence, cf. Peirce's title, because a categorical assertion can be seen as a hypothetical argument deprived of its inferential assertiveness: thus every assertion is, at bottom, conditional. Categorical propositions like "All men are mortal" is expressed, in Peirce's algebra, hypothetically: "If a man exists, then he is mortal".

Also Peirce's second Schröder review holds implications for Speculative Grammar. Here, Peirce introduces the notions of adicity of relations: 'medads', 'monads', 'dyads', and 'polyads', for relations with 0, 1, 2 or more slots to be filled in with indices referring to Scotist 'hecceities', that is, existing individual events or objects. Full propositions, then, are 0-valent medads, like a logical atom where all loose ends or bonds are saturated. Based on this analysis, he goes on to develop his first complete graphical logic formalization, the Entitative Graphs, by adding the oval of negation to his first 1882 sketches of graphical representation of relations – and immediately after the publication of the review, he inverted the Graphs to the dual notation of Existential Graphs which he preferred for simplicity and developed further for the rest of his career. Peirce immediately thought the Entitative Graphs with their emphasis on the conditional were the "more philosophical" of the two, Existential Graphs being built on negation and conjunction. Later, however he took the 'scroll' sign of implication, combined from two nested negations, to be fundamental of the latter so it was deemed equally conditional, hence "philosophical". As Bellucci says, many of Peirce's ensuing presentations of the Existential Graphs take their departure in an introductory sketch of Speculative Grammar motivating what would follow. In MS 484(1898), Peirce realizes that no pure Icons nor Indices may exist; the former would be a "pure sense-quality" without any parts; the latter would be a "pure sense-reaction" of complete individuality, but all such reactions are but instances of general patterns. So the two are limit cases only. An icon represents its object as a "mere dream", an index as an "active, existent thing", and a symbol integrates these two in

representing its object as having both the capacity of being iconized and of being indicated (from Bellucci 2017: 175–176). All signs, then, are more or less symbolic, and all symbols assert. The subtypes of symbols, *terms-propositions-arguments*, then, do *not* differ in their assertion, but rather in the "vagueness or explicitness of their parts" (Bellucci 2017: 177) – in a term, the "representative and reactive" aspects are left vague; in a proposition, the representative, reason, is left vague, but the reactive is made explicit.

The problems gradually developed in this phase, with the almost imperial rule of symbols understood as assertions, would make Peirce's early system finally explode in the sixth and seven phases.

The sixth phase is centred around the drafts of *Minute Logic* of 1901–1902, comprising four chapters – which were left unfinished and never published, after Peirce's unsuccessful application for Carnegie support in the summer of 1902 in which Speculative Grammar issues are also developed. Planned chapters on the three branches of logic never materialized but the introductory synopsis of the book contains a new representation of them. Here, a complete reform of Speculative Grammar was proposed, that of taking the trichotomies of Term-Proposition-Argument and Icon-Index-Symbol no longer as classification of signs, but of semiotic parameters, simultaneously opening the new issue of how such parameters combine. This initiative solves the riddle of the "symbolic indices" such as the weathercock and the quantifier: the former now becomes an indexical proposition and the latter an indexical rhema.

The new theory is developed on the basis of a changed conception of the logic-semiotic relation – earlier, logic was the objective part of the study of symbols, in itself a part of semiotic: logic as a branch of a branch of semiotics, as Bellucci says. Now, the two are all but identified: Logic as formal semiotics. Consequently, the related sign definitions dispenses altogether with any reference to the human mind, broadening Peirce's thoroughgoing anti-psychologism in logic to cover all of semiotics. Now, icons and indices become fully-fledged objects of logic, even if symbols remain the over-arching concept because arguments, resting on general leading principles as they are, must invariably be symbols. Furthermore, the analysis of inference types in terms of signs is changed, and finally, propositions other than symbols must be acknowledged: "Arguments are symbols that represent that certain icons (in abduction), indices (in induction), or symbols (in deduction) represent (and thus can be substituted by) certain other symbols" (Bellucci 2017: 193).

In *Minute Logic*, Speculative Grammar is preceded for the first time by a section on Phenomenology (the new generalized, hypothetical doctrine of the categories)

providing the formal tools for the division of signs; now the three categories appear as *Originality-Obsistence-Transuation*, the latter two with one and two degenerate versions, respectively. The central reform of *Minute Logic* is to pass from seeing *Term-Proposition-Argument* as a subdivision of Symbols from the *Icon-Index-Symbol* trichotomy, to taking instead the two to be independent classifications *of all signs*. Only then will combinations like 'indexical propositions' become possible. What is at issue now is the extent to which icons and indices may be terms-propositions-arguments:

> A proposition may either be a Symbol or an Index, but its Subject must either be an Index, or a Symbol referring in a particular indexical manner to an Index. A Rhema may be either Symbol, Index or Icon, but if not an icon, it must, at least, refer to Icons. Consequently, since Arguments are composed of Propositions, and Propositions of Rhemata, it follows that for a Proposition, Icons and Indices are required, and for an Argument Icons, Indices, and Symbols. (MS 425, quoted from Bellucci 2017: 198)

Thus, the two new independent trichotomies are not so independent as to combine freely. Yet, only *ad hoc* rules are considered (such as: icons are too simple to function as propositions or arguments). Thus, six combined classes become the result: (1–3) rhemes – iconic, indexical or symbolic; (4–5) propositions – indexical or symbolic; (6) arguments. As to the subdivision of arguments, that task is double, their justification and strength is a matter of critical logic; only their purely semiotic definition belongs to Speculative Grammar. Here, an important inversion takes place: in 1867, induction was indexical and deduction was symbolic – now the two change places; a conundrum that would keep occupying Peirce for the rest of his career. In 1867, deduction went from symbol to symbol, induction from index to symbol, and abduction from icon to symbol. Now he claims that his original conception of Abduction had confused two ideas: abduction proper and qualitative induction (induction from a sample to a whole, but regarding characters and comprehension rather than objects and extension). In 1901, he had introduced the idea that *Ab-De-Induction* were not only types of inferences but also *stages of investigation*, in that order. In the same period, he had developed his bipartition of deduction into corollarial and theorematic, of which he boasts in the 1902 Carnegie application, as the direct and indirect, more complicated, formal-experiment-driven, drawing of consequences, respectively. Simultaneously, induction is now of three kinds, *crude-qualitative-quantitative*. The semiotic interpretation of the three now claims that they are Originary, Obsistent, Transuasive arguments, respectively. Abduction (cleansed for qualititative induction) remains iconic in the sense that it proposes a hypothesis so that the fact of the premises is an icon of the fact of

the conclusion. Deduction is now indexical, because it forces its conclusion upon us (when we would finally find that conclusion, as it were): the diagram of the premises is an index of the diagram of the conclusion. Induction now becomes symbolic: the premises in terms of a sample of observed data are symbols of their conclusion which follows by a (fallible) habit rule of thumb governed by the general conception of the (abductive) hypothesis they are built on. This inversion of the places of Deduction and Induction is further corroborated by the development of the mentioned binary-ternary subtypologies of the two. Already in the following year, however, Peirce expresses doubt as to this new order of things, and from 1905 he is back to the 1867 position again. The *First Reform* step from trichotomies of signs to combinatory trichotomies of sign aspects, however, came to stay, and would play centre stage in the last two phases of Bellucci's narrative.

With the seventh phase, we reach the "classic" doctrine of the 1903 *Syllabus* mentioned in the beginning – with three trichotomies combined into ten sign classes, now guided by an explicit set of combination rules. This and the final, eighth, phase are extensively covered by Bellucci in the last two, almost book-length chapters of the book. The *Syllabus* originated as an accompanying text to be disseminated to the audience of the Lowell lectures given by Peirce in Cambridge in the autumn of 1903, and the printed version contained a classification of the sciences, ethics of terminology and an intro to the Existential Graphs. Yet it did not contain what Peirce had struggled with the most, namely the new version of Speculative Grammar after the 1902 reform principles. As already mentioned, it was worked through twice, first in "Sundry logical conceptions" (SLC), then in "Nomenclature and divisions of triadic relations" (NDTR), with the latter adding the new trichotomy of *Qualisigns-Sinsigns-Legisigns* to give the "classic" ten-sign combinatory. As mentioned in the beginning, these papers would assume status of classics of semiotics through their central use in Vol. 2 of the *Collected Papers* in the 1930s. Bellucci's long chapter on the *Syllabus* provides an account of the origin and compositional history of these central documents which is unprecedented in detail. The former text seemingly took a long time to compose and exists in two parallel versions, while the latter, more slender and definitive, was composed on a short notice in November 1903. We shall not here go into the fascinating intricacies of this story; suffice it to summarize its Speculative Grammar results.

The first version of the SLC begins, as *Minute Logic*, with a discussion of the categories in phenomenological terms including a restatement of the degeneracy theory and a presentation of the mature classification of the sciences: Mathematics-Phenomenology-Normative Sciences (Esthetics-Ethics-Logic)-Metaphysics, where each of the three normative sciences has a physiological, classificatory, and

methodical part – among which Speculative Grammar forms the physiological part of logic. In its presentation of the icon-index-symbol triad, already here it is emphasized that symbols exist in *replicas* only, a foreshadowing of the new trichotomy developed in the NDTR. As to the *term-proposition-argument* triad, Peirce now realizes that its generalization after the *First Reform* necessitates a new terminology, now that it is no longer a tripartition of symbols only: *sumisign-dicisign-suadisign* is the new proposal, with one-two-three parts respectively – and of which 'dicisign' should survive longer than the other two terms. Already here, it has the main focus, and the first version of Peirce's "deduction of the dicisign" applies the *a priori* method to elucidating why it is that dicisigns must have two parts. This is the case, because in order to represent the objects as real and independent of itself, the sign "represents a Secondness of its object, and represents it in the form of a Secondness" (MS 478, quoted from Bellucci 2017: 220) – which requires two parts of the dicisign, one representing the object and the other representing the sign's own relation to the object, something which can be achieved only by representing it by an index. This analysis seemingly was not deemed sufficient, for it was considerably extended in the second version of SLC. What is further elaborated here is the proposition's new-found necessity of representing itself. The second deduction of the Dicisign belongs to the most complicated parts of the Speculative Grammar in the whole of Peirce's work, and Bellucci's detailed and illuminating analysis forms a high point of his book and brings our understanding of Peirce's fertile analysis of propositions much further.[4] I shall not go through all its details here. The proposition is not only a sign that can be true or false, it is a sign that *professes* to be so, Peirce had said already in 1896, and it does so by means of *referring to its own relation to its object*. The proposition sign *claims* about itself that it is *actually* connected to the fact which it represents as true. Thus it represents itself as an index of its object. Here, the *object*, the thing or event indexically *referred to*, importantly differs from the *fact* which the dicisign *represents*. It is true that the dicisign depicts the fact that it represents and that the structure of the fact is the syntax of the dicisign, but this is the *result* of a deeper meta-structure, namely the dicisign's reference to its own object-reference. This is possible because of the dicisign's interpretant, which claims that the dicisign is an index of its object. But as Bellucci observes, this immediately adds new complexity to the notion of interpretant whose object, standardly, was the very same as that of the original sign. Now, the interpretant's object is *the sign's relation to its object*. This leads Peirce to a new distinction between the *primary* and the *secondary* objects of the dicisign – the former being

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4   I myself give a presentation of the Deduction of the Dicisign in Chapter 3 of Stjernfelt 2014.

the standard object, the latter being the sign's indexical relation to that object. Here, Bellucci claims that this distinction, never to appear again in this wording, is later solved by Peirce's ensuing distinctions between kinds of interpretants. In the final SLC version, this is begun by the distinction between (1) interpretants of a proposition which may be anything which logically follows from it, and (2) the essential intepretant which interprets it *as* a proposition. This analysis of the dicisign as a sign whose interpretant represents it as an index of its object is now taken as the premise of a proof that such a sign must be internally structured in two parts: this is because the sign can only be represented as an index if it is, in itself, structured like an index (if not, the interpretant could not represent it as such). Hence, it must have two parts, corresponding to the index and its object. The secondary object's double structure is, as Bellucci (2017: 232) says, *projected* onto the dicisign itself. And as the secondary object's two parts are the primary object and the sign itself, respectively, the dicisign's two parts must represent those two parts. Thus, what is called in brief the Predicate of a proposition is really "*the representation of the way in which the proposition itself represents its object*" (Bellucci 2017: 232, emphasis in the original). While the former part must be an index, this latter part must be or contain an icon, for that is the only sign which does not clearly distinguish its object and interpretant – but an icon of the dicisign itself. This accounts for the double structure of predicate rhemata, including an iconic core branching into unsaturated slots. The predicate, then, is an icon of the character which this sign attributes to its objects (referred to by subject indices in the slots). Peirce now subjects this complicated a priori deduction of the dicisign to the *a posteriori* – rhetoric – confirmation test, finding it to hold for categorical and hypothetical, dis-, and conjunctions, informational symbols as well as dito indices, etc. A final, important question here addresses the *syntax* of the dicisign:[5] what keeps Subject and Predicate together in order to form a proposition? Peirce's answer here is that this is the very *juxtaposition* of the two parts – a syntax more general than linguistics since dicisigns now embrace also non-symbolic material.[6]

All in all, Bellucci's detailed analysis of Peirce's deductions of the dicisign surpasses all existing efforts pertaining to this in Peirce studies – and, more general, it also goes to emphasize the centrality of propositions-assertions-dicisigns in the whole of Peirce's semiotics. There is no "deduction of the icon" nor of the index – why? Because propositions and their interlinking in arguments simply form the central explanandum of the whole of Peirce's semiotics, and all the subtle distinctions of Speculative Grammar serve the purpose of explaining them and their structure.

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5   Bellucci treats this under the headline of the 'unity' of the proposition in his 2014.
6   See Stjernfelt (in press b) for a further elaboration of this idea.

Still, the most important innovation of the seventh phase awaits elucidation. The final SLC version is the locus also for the introduction of *hypoicons* and *hyposemes* (or *subindices*), that is, signs which are *primarily* icons or indices (given that no pure icons or indices exist). The disappearance of these terms in the final NDTR text signals that the existence of such general icons and indices is considered to be explained by the addition of a new third trichotomy. In the Lowell lectures manuscripts worked out in the course of summer and fall 1903, Peirce began systematically distinguishing e.g. Symbols and Graphs as such from their individual Replicas. In the NDTR, this observation is theoretically elaborated into an autonomous, new trichotomy, that of *qualisign-sinsign-legisign*, on a par with the two standard trichotomies playing centre stage in the Speculative Grammar ever since the 1860s. Bellucci interestingly shows how the introduction of this triad was prompted by Peirce's ongoing development of the Gamma part of the Existential Graphs, the part transcending the propositional and predicate logics of the Alpha and Beta parts.[7] Gamma graphs, among many other things, should be able to represent hypostatic abstractions, that is, the deductive creation of new, higher-level subjects out of predicates (e.g. 'Redness' out of 'red'). This involved a whole series of new abstract meta-signs able to characterize signs and their relata, such as "*A* is a medad" (a full proposition); "*B* is in the dyadic relation *A* to *C*", and many more. In MS. 467 of Nov. 1903, such a list includes a special sign for the second-order proposition "A is a legisign", further developed in MS 508 with the distinction between a graph as a legisign and the individual replica instances of the same graph. The ambiguity of the term 'graph' in Gamma thus necessitated the distinction between graphs *formaliter* (as repeatable legisigns) and graphs *materialiter* (as individual sinsigns or replicas). This distinction is now developed in NDTR and its draft in MS 800 – amounting to Bellucci's *Second Reform* of Speculative Grammar – and it is also present in the later versions of some of the Lowell lectures. NDTR thus forms the final word on Speculative Grammar of the *Syllabus*; it was intended to replace SLC rather than continue it, and Bellucci finds indications it was meant to be printed as a final result of investigations. The two quick reforms – the 1902 combinatory of sign aspects, and the 1903 addition of a third trichotomy (numbered the first) – now necessitated the elaboration of a set of principles for trichotomy combination, which first appeared in NTDR. It has to do with the sequence of trichotomies which are meticulously presented in the

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[7]   After developing the Alpha version of EGs which formalize propositional logic, Peirce added new signs in order to capture predicate logic in Beta. Gamma became the headline of a whole bundle of unfinished further additions aming to cover temporal logic, speech act logic, second order logic, three-value-logic, abstractions, etc. Pietarinen (in press) is collecting all Peirce's writings on the EGs.

order I. *qualisign-sinsign-legisign*; II. *icon-index-symbol*; and III. *rheme-dicent sign/ dicisign-argument*. For their combination machinery, Bellucci cites and simplifies Robert Burch's instructive summation in three rules: (1) each trichotomy has three consecutive, numbered members 1–2–3; (2) trichotomies are linearly ordered (like the I-II-III sequence mentioned); (3) combinations of the 3x3 sign aspects are allowed if they satisify the ordering rule: *first element ≥ second element ≥ third element,* where the ordinals of elements refer to I-II-III, respectively, and the "greater than" sign refers to the number of the element in its trichotomy. This calculus results in the famous 10 combined signs of the *Syllabus* which Bellucci lays out and interprets in great detail. As these 10 signs have often been presented and discussed elsewhere, we shall not go further into them here.[8] Important subdivisions *not* caught by this new *a priori* net of ten, however, include the three kinds of arguments (which started the whole Speculative Grammar crusade almost 40 years earlier) or their recently developed subtypes, nor rhemes distinguished after valency, nor the distinction between a proposition and its assertion, etc.

After this demanding *tour de force*, both on the part of Peirce and of his intellectual biographer, the panoply of ideas of the last and eighth phase 1904–1908 almost feels like a piece of relaxing entertainment. It is inaugurated by Bellucci's *Third Reform*, the introduction of further subdistinctions between two types of Objects – Immediate and Dynamic – and three types of Interpretants, Immediate, Dynamic, and Representative, respectively (the term chosen for the latter varies; Eventual, Final, etc. are also used). Just like the three 1903 trichotomies are based on (1) the sign itself; (2) its relation to its object; (3) its relation to its interpretant, respectively, further subdivisions of the two latter ones naturally will form bases for further trichotomies. This takes place in two steps, up to six in 1904–1905 and two stabs at ten in 1905–1906 and 1908, respectively. Ordering these trichotomies linearly seemingly is the premise for combining further sign types from them, potentially resulting in 28 or 66 classes of signs, respectively.[9] Many interpreters have revelled in fantasies of the fertility of so many new sign types which were never listed, much less described by Peirce; fewer have looked into the difficult definitory problems of the proposals which received far less groundwork than the 10-classes *Syllabus* taxonomy. Among those few count Murphey, T. L. Short – and, of course, Bellucci.

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8   Here, I disagree with Bellucci on a fine point, namely the interpretation of the seventh of the ten Syllabus sign classes, the 'Dicent Indexical Legisign', see Stjernfelt (in press a).
9   Queiroz and Stjernfelt (in press) collect a set of investigations on the "Extended Peirce" of Bellucci's Phase Eight.

The six-triad model of 1904 adds to the three Syllabus trichotomies referring to the sign itself, its relation to its object, and its relation to its interpretant, respectively, three new divisions, referring to the sign's relation to its immediate object, to its immediate and its dynamic interpretants, respectively. Particularly the former occupies Bellucci who makes a controversial but as far as I can see correct interpretation of it.[10] Part of the problem is to determine what the "immediate object" is that defines the relevant trichotomy. Bellucci does a beautiful job in tracing the appearance of this term in Peirce, and Peirce's definition of it as the object "as it is represented by the sign". What in the world does that mean? – as Bellucci asks. Here, he is a staunch defender of the point that the Immediate Object has to do with the *identity* of the object, not with any sort of *description* of it. I perfectly agree in this – as against many Peirce scholars who have taken the Immediate Object to be some sort of preliminary *description* of the Object.[11] But such a thing would be an *Interpretant* category, not an Object category. The Immediate Object has to do with how the sign identifies and claims to establish contact with its real, Dynamic Object.

Here, Bellucci runs into a minor problem, I think. He refuses that the distinction has anything to do with the Primary/Secondary Objects of the SLC discussed above, saying that the Secondary Object is "the representation *that* the sign is a sign [...] of its object" while the Immediate Object is "that *part* of the sign that indicates the dynamic object" (Bellucci 2017: 288). I am not convinced the difference between the two is so crucial as to prevent the former from being a first stab at the latter. Moreover, the latter is also not a quite correct description, as far as I can see. Bellucci builds this on Peirce's explanation of immediacy: "to say that *A* is *immediate* to *B* means that it is present in B" (Bellucci 2017: 291). From this, Bellucci concludes that "to be present in a sign" can mean nothing else than to "be part of a sign" (Bellucci 2017: 291). Can it not? Could it not mean to be *presented*, or even "represented" in or by a sign, which Peirce says many times about the Immediate Object? 'Represent' in Peirce is a reference relation, not a signification relation, so the idea that the IO is the Object as "represented by the sign" could be paraphrased as the Object as "referred to by the sign", highlighting the indexical reference relation playing centre stage in the "Deduction of the dicisign".

Actually, Bellucci's own interpretation of the resulting trichotomy also points in this direction. That trichotomy is the one sometimes (among other terminological attempts) called 'vague', 'singular', and 'general' signs. Bellucci rightly interprets

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10   See also Bellucci 2015.
11   I make a similar argument in Chapter 3 of Stjernfelt 2014.

this as the introduction of the age-old distinction between particular, singular, and universal propositions (present in e.g. Kant's first Critique). This gives the implication that this new distinction only holds between propositions, and that the Immediate Object is an issue of their quantification – existential, singular and universal, respectively. The counterintuitive result follows immediately that only propositions have immediate objects – fitting well with Peirce's old idea that propositions make their object reference explicit, by means of explicit Subjects such as indices, proper names, quantifications etc. I think Bellucci is completely correct in these conclusions – strangely, he does not stop to consider their implications for the resulting 28 signs of the six-triad taxonomy combinatory. If a whole trichotomy only pertains to propositions, the resulting amount of combined signs will be less than 28, depending upon its place in the linear ordering of divisions. This interpretation also relativizes Bellucci's idea that the Immediate Object is simply "part of" the sign. It is correct, of course, that Subject signs like pointing fingers, proper names or quantifiers are part of propositions, but Peirce does not *identify* the Immediate Object with the Subject. Rather, he says, time and time again, that the Immediate Object is something which is "represented" by the sign. The Immediate Object is something referred to by the sign, but in another way than its external, dynamic Object – I think it is nothing but the famous claimed, indexical connection of the sign to its Object (so central in the Deduction of the Dicisign). Peirce sometimes described quantifiers as retrieval recipes – they describe how to get from the sign to the object (via the selection by the sign utterer or by the receiver, as Bellucci repeats). I would say it is this indexical connection, retrieval or identification process terminating in a Dynamic Object, claimed possible by the sign, which constitutes its Immediate Object.

Be that as it may; as to the two additional interpretant trichotomies, the Immediate Interpretant gives rise to the trichotomy *of Feelings, Experiences, Thoughts*, while the Dynamic Interpretant has the subtypes of *interpretation by definition, by action, by submission*, respectively. In general, the three interpretant categories should come to be interpreted as follows: the initial interpretant is how the sign itself demands to be interpreted; the dynamic interpretant is how it is *actually* interpreted in a situation of use; the representative (or final, or normal, or eventual) interpretant is everything which the sign may ultimately be interpreted to mean in the final analysis (echoing Peirce's convergence-to-truth epistemology). Bellucci interestingly discusses Short's idea that the Dynamic Interpretant trichotomies may be used to distinguish the expression of and the assertion of a proposition and, more generally, the possibilities of generalizing to a series of other speech acts mentioned by Peirce in the 1904 *Kaina Stoicheia* article. In any case, the discovery of the distinction between a proposition and the assertion of

it, presented in that article, is one motor driving the new division attempts, for it was not derivable from the three-division theory of the *Syllabus*.

Bellucci does not present a table of the six trichotomies nor spends much time on their rules of combination, maybe because he hastens to continue to the first 10-trichotomy theory of 1905–1906. A revised table of October 1905 shows six trichotomies, now with a seventh (*abstract-concrete-collective*) added as a subdivision of the middle, Singular sign category of the Immediate Object trichotomy and the dynamic interpretant trichotomy reformulated to signs interpreted by *sympathy, compulsion, reason*, respectively – and on the same day, he makes a note that four further divisions must be considered. So, that forms the start of the first ten-trichotomy period. The four further divisions result from an extension based on the subdivision principle saying that Seconds admit one degenerate version while Thirds admit two. Thus, there should be two divisions according to the Dynamic Object, two divisions to the Dynamic Interpretant, and three to the Representative or Final Interpretant, all in all seven, which is four more than when each of these instances had only one division. Several drafts are developed in October, adding new ideas such as a speech act trichotomy of *Interrogative-Imperative-Significative* pertaining to the Immediate Interpretant.

A central problem should remain, however, over all the ten-division attempts up until 1908, namely that the rules for combination of divisions are never amended to fit the new more complicated situation, and even the canonical linear sequence of trichotomies, required to establish their combination, are never settled upon. As Bellucci says, this has the elementary reason that the six- and ten-division schemas depend upon the degeneracy calculus which gives a hierarchical tree structure whose linearization is never satisfactorily addressed. This is a main reason why all the six- and ten-division attempts of 1904–1908 remain an unfinished quarry of – very interesting, to be sure – hypotheses.

Interpretants now account for no less than six of the ten trichotomies, and as interpretants are all concerned with various types of sign effects, Bellucci reasonably interprets the ten-division crusade as one primarily concerned with or even driven by the introduction of speech acts into the sign taxonomy. Thus, the terminological change from the established *rheme-dicisign-argument* to *seme-pheme-delome* is not one of mere substitution, but of generalization, realizing that there are other speech acts to be performed on the basis of propositions than asserting dicisigns – thus, dicisigns remain as a prominent subcategory of the more general 'pheme' category, also comprising other speech acts than assertions. Bellucci ingeniously finds equivalents to Austin's famous locuationary-illocutionary-perlocutionary distinction pertaining to speech acts in the ten divisions: the locutionary aspect corresponds to the well-known *rheme-dicisign-argument* of the representative

interpretant; the illocutionary to the mentioned *interrogative-imperative-indicative* of the immediate interpretant; the perlocutionary to the two dynamic interpretant divisions of resulting *feeling-fact-sign* and *sympathy-compulsion-representation*. In this reconstruction, four of the ten divisons are really speech act trichotomies, effectively refusing Austin's famous quip that "With all his 66 division of signs, Peirce does not, I believe, distinguish between a sentence and a statement".[12] An early 1906 version again changes terminology and clarifies the two new among the Normal (Representative, Final) Interpretant divisions: *Strange-Common-Novel*, and *Monadic-Dyadic-Triadic*. A later 1906 version, after the famous *Monist* "Prolegomena" paper, makes many terminological changes, most notably *Tinge-Token-Type* for *Quali-Sin-Legisign* (later *Tone-Token-Type*) – but also moves trichotomies around and introduces the *Ab-In-Deduction* division, the mother of the whole speculative grammar adventure, as number 10, the final among the three Eventual Interpretant divisions – now remarkably revising its order back to the 1867 original.

In the pragmatism papers of around 1907, a new division of interpretants, *emotional-energetic-logical*, is introduced, and Peirce scholars have argued over whether it is but a terminologically new version of the standard *initial-dynamic-final* division; here Bellucci sides with Short (correctly, I think) in claiming that it is indeed an independent and non-conflicting division adding new speech acts dimensions to Peirce's late semiotics, as a further division of perlocutionary effects. It is also in those papers that Peirce makes explicit his important notion of 'collateral observation': the interpreter of a proposition must have some sort of previous experience, directly or indirectly, with the object of the proposition's subject – otherwise the interpreter would not know at all what is talked about, and the interpretation effectively shrinks to an unsaturated rheme. Finally, in the same papers, Peirce clarifies that the Final Interpretant cannot be a sign itself, but nothing but a "habit of action"; it cannot be just another conception in an infinite semiotic sequence of conception interpretants. That habit, of course, may concern both external action habits and thought habits.

The final push forward of Speculative Grammar takes place in the 1908 rearticulation of the ten-division schema in a December letter to Lady Welby. Particularly the trichotomy pertaining to the Immediate Object undergoes surprising changes, prompted by Peirce's development of his doctrine of "continuous predicates".[13] Peirce's idea is that predicates may be subjected to an analysis hypostatically abstracting all unanalysed stuff in them so that what

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12   Austin 1961: 87n1; see also Stjernfelt 2014: 101.
13   Bellucci treats this issue also in his 2013b; see also Stjernfelt 2016.

remains is but a naked, continuous, relational structure. The example is that "Cain kills Abel" may be hypostatically abstracted to "Cain stands in the relation of Killing to Abel", effectively substituting the triadic relation '_stands in the relation of_to_' for the dyadic relation '_kills_', simultaneously creating the new hypostatic object of 'killing'. Such an analysis can only be performed a limited number of times until a rock bottom is reached because '_stands in the relation of standing in the relation of_ to_' means the same thing (cf. Peirce's beloved quote "*Nota notae est nota rei ipsius*", the property of the property is a property of the thing itself). Such a predicate is "continuous" in the sense that adding further relations adds nothing, just like adding a point or a line segment to a continuous line adds nothing to its continuity. Now, in the 1908 ten-division scheme, the Immediate Object is redefined in the following manner: the sign must indicate the Dynamic object "[...] by a hint; and this hint, or its substance, is the *Immediate Object*" (Bellucci 2017: 336). A hint, of course, is an index. The corresponding division of signs is now changed into *designatives-descriptives-copulants* where designatives are normal subjects of propositions, descriptives are normal predicates – while copulants are continuous in the sense given. They are signs like '_possesses the character_', '_stands in the relation of_to_', '_ occurs concurrently with_'; other candidates could be '_is identical to_', '_is teridentical to_and_', '_implies_', '_is co-localized with_', etc. Of such signs Peirce says that "These signs *cannot be explicated*, they must convey Familiar universal elementary relations of logic. We do not derive these notions from observation, nor by any sense of being opposed, but from our own reason" (Bellucci 2017: 337, italics in the original). Whether the *vague-singular-general* division is abandoned or should be resurrected as some additional subdivision of the new Immediate Object division, remains unclear. It must be admitted that some of the final 1908 versions of the ten-division schema, such as the polished and stark version of MS 795, assume a clarity and seeming definitivity which is indeed alluring, even if some of the trichotomies remain virtually unexplained and the solution to the issue of their composibility would remain wanting.

Bellucci's final chapter on the eighth phase is rich and bewildering, as its subject matter itself, but still it provides us with an orientation structure for understanding the intentions and aims taking Peirce to develop his final systems, primarily the experienced need for including speech act aspects into the taxonomic system.

I have here presented Bellucci's results in some detail. The reason is that a mere lauding of the book, however well-deserved, would convince no-one about the character of its qualities. It goes without saying that the much more fine-grained presentation in the book itself is as indispensable as it is rewarding. In summarizing

its main results, I hope to convince the reader that there is no way around, for serious Peirce scholars, to get acquainted with the detail of Bellucci's argument.

If it gives us a Peirce for the 21st century it is not only because it presents the motivations for Peirce's semiotic development in a new level of detail and with many hitherto unrecognized connections and motivations charted, but also because it convincingly rearticulates that semiotics in its proper place: as a tool box, unprecedented in detail, in order to analyse and understand propositions, arguments and reasonings. Doing so, it indirectly gives us, simultaneously, a picture of the world in which such logical structures play a far more prominent role and have a much more widespread appearance than normally assumed, in human as well as non-human nature.

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