Mathematics, Computation, Language and Poetry: The Novalis Paradox

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Once, Georg Philipp Friedrich von Hardenberg, better known under the *nom de plume* "Novalis", had provided a handy stereotype for the nineteenth-century "romantic" poet—mystical, otherworldly and fixated on death. Such a picture was largely constructed after his own death at the age of 28 around a few episodes of his life, especially the death, at the age of 15, of his fiancée Sophie von Kühn, an event reflected in his perhaps most well known work, *Hymns to the Night*.[1] More recently, however, the complexity of the actual person has come to disrupt this nineteenth-century myth, and the interests, pursuits and achievements of the hitherto "unknown Novalis" have come to be known and appreciated.[2] Among these are those interests shared with others in the circle of so-called "Jena romantics"—crucially, an intense involvement with the demanding philosophy of Immanuel Kant, occasioned by the influence of Karl Leonard Reinhold (1757-1823), the occupant of the chair of critical philosophy at the University of Jena between 1787 and 1794, and after that, with the philosophy of Johann Gottlieb Fichte, Reinhold's more prestigious successor at Jena.

Hardenberg had first encountered Reinhold after arriving at University of Jena in 1790 to study law, and although he moved from Jena to larger University of Leipzig in 1792 (and then to Wittenberg, to finish his legal education) he remained connected to the philosophical culture of Jena via personal connections such as that to Friedrich Schlegel. Beyond these philosophical interests, however, and to some extent separating him from the more literary foci of other members of the circle, were Hardenberg's substantial interests in the sciences of his day, especially those developed during the formal scientific training he came to acquire in 1797 and 1798 at the Freiburg Mining Academy. These scientific studies themselves related to the practical dimensions of Hardenberg's short adult life, given that they were meant to equip him for a managerial position at the Saxon salt mines in Weissenfels, and yet

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1 Hardenberg's personal loss had been doubled by the death of a brother, Erasmus, a month later.

2 David W. Wood, "Introduction" to Novalis 2007.

they also feed into his philosophical interests as can be seen in his unfinished notebook entries for a "Romantic Encyclopaedia" written in late 1798 (Novalis 2007).

Even when traditional stereotypes of the "romantic" have been corrected by the actual activities of the Jena romantics, there are still aspects of Hardenberg's interests and pursuits that can seem hard to reconcile with his status *as* a romantic, however. Broadly, the Jena romantics had taken Kant's critique of metaphysics as a cue to raise the stakes of areas of culture such as religion and art whose cognitive status had in many ways been threatened in modernity by, among other factors, the rise of the mathematized natural sciences. Following Kant they took it that metaphysics could not give us a theoretically determinate picture of the way the world was "in itself", but the human longing for this could be satisfied to some degree by the indirect presentations of the world and our place in it achievable within the arts and religion. This did not mean that the romantics had rejected the natural sciences, and distinctly "romantic" approaches to the sciences developed well into the first half of the nineteenth century, especially in relation to the emerging sciences of the living world. But romanticism, nevertheless, is usually understood as representing a reaction against the "disenchantment" of nature—that "reduction of circumambient nature to a mechanical system whose lineaments are provided by the immaterial forms of mathematical physics" (Bernstein 2003, ix)—and part of the attraction of the "life sciences" consisted in the fact that they seemed to demand explanatory principles not reducible to mechanical ones. However, seemingly at odds with this *anti*-mechanistic tenor to romanticism in general, was Hardenberg's interest in the project of an *ars combinatoria*,[3] the project of a proto-*computationalist* approach to thought stretching back beyond Leibniz, but associated in Leibniz in particular with the idea of a universal language of science whose component concepts were able to be manipulated in mechanical ways.[4]

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[3] For a systematic treatment of this theme in the work of Novalis, see Neubauer 1978.

[4] In general, positive reception of Leibniz's work among the romantics had centered on its quasi-*vitalistic*, anti-mechanistic dimensions (Beiser 2003, 143–4). Those aspects of Leibniz's work celebrated by the proponents of contemporary computationalist approaches to the mind seem very different.

Leibniz's speculative combinatorial or computationalist approach to the workings of the mind, inspired by Hobbes,[5] is now commonly regarded as anticipating a number distinctive scientific movements that started in the nineteenth century and gained momentum in the twentieth: the developments of symbolic logic and the formalization of proofs in mathematics and, in more practical domains, the foundational principles of contemporary disciplines of computer science and information theory (Davis 2000; Dyson 2012,) and artificial intelligence and robotics (Hausser 2011). Leibniz believed "in advance of Hilbert, that a consistent system of logic, language, and mathematics could be formalized by means of an alphabet of unambiguous symbols manipulated according to mechanical rules" and envisaged "a digital computer in which binary numbers were represented by spherical tokens, governed by gates under mechanical control" (Dyson 2012, 103–4). In Hardenberg's hands, this combinatorial approach was viewed in a very different light as a means for the "poetization" and "romanticization" of science itself. Hardenberg's envisaged "machine" is to be played like a musical instrument: "Combinatorial analysis leads to numerical imaginings—and teaches the *art of the composition of numbers*—mathematical *basso continuo*. (Pythagoras. Leibniz.) Language is a musical instrument of ideas" (Novalis 2007, 97). Indeed, Hardenberg is now associated with approaches to language and, more generally, semiotics that seem to anticipate broadly "structuralist" and "poststructualist" approaches of recent times (Gasparov 2013), approaches which seem to be anathema to computationalist approaches to the mind and the generally "representationalist" assumptions on which they draw. How then are we to square these two opposing aspects of the object of his interest?

Logic, Mathematics and the Idea of Mechanized Thought in the 17th and 18th centuries

In work that stretched and from his early dissertation written at the ago of 19, *Dissertatio de Arte Combinatoria* (1666), to his most mature thought, Leibniz had

[5] Thus Hobbes, in a work of 1656, declares that "by ratiocination, I mean *computation*. Now to compute, is either to collect the sum of many things that are added together, or to know what remains when one thing is taken out of another. ... all ratiocination is comprehended in these two operations of the mind, addition and subtraction" (Hobbes 1839, p. 3).

pursued ideas for a project for the application of mathematics to syllogistic logic, and thereby to the forms of discursive arguments whose forms syllogistic logic attempted to codify (Lenzen 2004). The *calculus of concepts* that Leibniz developed from this starting point is now seen as anticipating many of the features of the mid-nineteenth-century attempt to algebraicize logic found in the work of Boole and others, approaches that were crucial to the later development of information theory and ideas of "machine intelligence" (Knuth 2006, Nahin 2013). More than this, however, part of Leibniz's project was the construction of a "universal characteristic", the conception of which Gottlob Frege was to acknowledge as a precursor to his own "concept script" or *Begriffsschrift*, announced in 1879. Leibniz's project had been a complex one involving diverse aspects of his metaphysics and linking logic to an epistemology and a philosophy of mind, and at its heart was the idea of an *ars combinatoria* or universal characteristic—an "alphabet of human thoughts" (Maat 2004, 292). Somewhat like the way in which the idea of "analysis" functioned in the early years of analytic philosophy, the primitive concepts of Leibniz's universal characteristic were regarded as the ultimate termini of a process of analysis in which "clear and confused" ideas could be decomposed into their "clear and distinct" elements, represented in the universal characteristic in a way that showed their essential logical connections. Such analytic and synthetic transitions were determined by strictly definable mathematical rules of combination and transformation, resulting in a hierarchy of forms from simple to compound concepts to propositions and the inferential relations linking them. In this way, an inventory of all knowledge would eventually be able to be produced—a "rational encyclopedia".

The romantics were notoriously critical of system building, and of course it is difficult to appreciate the degree to which the envisaged systematicity of Leibniz's project could have been appreciated by anyone in the later eighteenth century, let alone a young polymath such as Hardenberg. Nevertheless, it is easy to exaggerate the invisibility of such issues associated with Leibniz's logic prior to the mid-nineteenth century. Hardenberg seems to have been introduced to the basics of Leibniz's plan by the work of the Leipzig philologist turned mathematician Carl Friedrich Hindenburg (Jahnke 1991). In fact, despite the unavailability of much of Leibniz's own technical papers, the basic dimensions and purport of this attempt to apply algebra to logic and language in general had been discussed within German scientific circles from about the mid 18th century, especially following the publication of Johann Heinrich

Lambert's *Neues Organon* (a work owned by Hardenberg) in which Lambert attempted to develop a Leibniz-inspired universal characteristic, applying it to contemporary science. Moreover, the publication of *Neues Organon* had been followed by a public dispute between Lambert and the Tübingen logician, Gottfried Ploucquet, over the question of precedence in the development of Leibniz's approach (Risser 1770, 277). The figure of Ploucquet is of particular relevance for the development of idealism and romanticism in the 1790s as Hegel, Schelling and Hölderlin had all becoming familiar with his logic and metaphysics while seminarians at the Tübingen Stift (Frank 2009, 36).

Thus in volume 2 of his *Science of Logic*, "Subjective Logic", Hegel sets out the key features of the Leibniz-Ploucquet approach to the structure of judgment that allow the application of algebra to logic, associating it with the reduction of thought to a mechanical process.[6] Hegel's attitude to the Leibniz-Ploucquet mathematization of logic was critical but nuanced. The "mathematical syllogisms" represents the point of collapse of the traditional Aristotelian syllogistic, which is brought down under the negative effects of its *own* dialectic. As such this mathematical logic played a necessary but purely negative role in the dialectic of logical thought generally. The mathematical syllogism is a stage through which logical thought *must* progress, but taken as anything *other* than a purely negative moment of this progression and regarded as *itself* a model of thought, the mathematical syllogism was an absurdity, and had in turn to be overcome in the characteristic move of the "negation of negation".[7]

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[6] Hegel 1989, 685–6. Rather than, like Aristotle, thinking of the judgment as the joining of a universal-naming predicate to a substance-naming particular subject, Leibniz had suggested treating the subject term as *itself* a predicate, such that "S is P" could be read as *identifying* terms "S" and "P" predicable of some (singular) "third" *not* named in the judgment. This effectively allowed Leibniz to treat categorical judgments as hypotheticals, and regard individual propositions as having one of two values (true or false). As Leibniz had already regarded the system of numbers as reducible to a binary system, this allowed the idea of computation within arithmetic to be extended to logical relations among bi-valent propositions. For a systematic reconstruction see Lenzen 2004.

[7] This transformation resulted in the traditional syllogistic being completely reconfigured into what Hegel describes as the "syllogism of reflection", which becomes made

Despite his own criticisms of romanticism, Hegel's criticisms of Leibniz's and Ploucquet's project for the mathematization of thought here are, in many ways, typical of what might be expected of a romantic. For Hegel, logic is meant to capture the dynamics of spirit or cognitive *life*, but in the *characteristica universalis* and the combinatorial approach to syllogisms, all we find are the *dead remains* of living thought.[8] In ways analogous to Hegel, Hardenberg seems to have recognized the application of a Leibniz-inspired combinatoric as integral to the higher-level romantic "poeticization" of the world, and not simply antithetical to it. Thus he seems to have thought that the consistent application of the combinatorial approach would thereby serve to undermine the sorts of assumptions more conventionally associated with it. To understand Hardenberg's thinking here we need to understand both the broader context within which these ideas were being received in the late 18th century as well as the fate that the plan to mathematize thought must have had for Hardenberg given the fact of his basically *Kantian* sympathies in philosophy.

The context for Hardenberg's engagement with Leibniz's combinatorialism

The impact of Kant's philosophy in Jena from the late 1780s through the 1790s had been roughly paralleled by the growth of interest in the empirical studies of language with the attendant philosophical reflection that had constituted what has been described as a German "linguistic turn" (Lafont 1999). The issue of the significance of language for thought in relation to Kant's philosophy had first appeared in the context of J. G. Hamann's "Metacritique of the Critique of the Purism of Reason" of 1784, where Hamann referred to language as "the first, last, and only organon and criterion of reason" (Surber 2001, 58). The "language" in question here was not meant to refer to the type of speculative universal languages theorized about in the

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up on *singular* judgments, which allow *inductive* inferences, which then become dependent on forms of *analogical* judgments, and so on. Hegel 1989, 686–95.

[8] Thus, in Leibniz "the rational is taken as a dead and non-rational thing" (Hegel 1989, 685) because thought, having been reduced to the "notionless material" of numbers, is taken to be the sort of process that can be performed by "calculating machines" (684). Hegel identifies Leibniz having reached the most extreme point in the logic of "the understanding" which works on "ossified material .., already to hand" (575).

seventeenth century, or some inner "language of thought" found in medieval logical theorists such as Ockham. For Hamann, "language" is only found as the plurality of particular and diverse natural languages found operating within actual living communities. With this appeal to social and linguistic particularism, Hamann intended to undermine the universalism of Kant's conception of the "understanding" which was supposedly universal and necessary. In fact, the general theme of the role of language in human cognition had been popularized earlier by a former student of both Hamann and Kant, J. G. Herder, in his 1772 *Treatise on the Origin of Language*.[9] More generally, the idea of a "semiotic", already mentioned in Locke's *An Essay Concerning Human Understanding*, had been made the object of a thematic study by Lambert in *Neues Organon*, and had been developed in works such as Johann Christoph Hoffbauer's *Semiological investigations* (Hoffbauer 1981), another work known to Hardenberg.

This question of the link of language or semiology more generally to thought had paired naturally to the theme of Reinhold's major revision of Kant in the context of his attempts to develop critical philosophy—the unsystematic and untheorized concept of "representation" (*Vorstellung*) that Kant seemed to simply presuppose in his *Critiques*. Reinhold's central "proposition of consciousness" stated that "in consciousness representation is distinguished through the subject from both object and subject and is referred to both" (Reinhold 1985, 70). In turn, Reinhold's representational account of conscious was attacked by the Humean skeptic Gottlob Ernst Schulze, writing under the name "Aenesidemus", who questioned how such a representation could be *known* to refer to the "object" to which it was supposed to refer, precipitating Fichte's now famous review (Fichte 1985). In this, Fichte criticized Reinhold's uniformly *representationalist* account of consciousness that made his account open to Schulz's criticism, making the subject's own consciousness of *itself* a type of *direct* rather than *representational* affair.

Among the romantics, the nature of language was theorized at a high level of abstraction in the hermeneutic project associated with the practice of translation by Friedrich Schleiermacher, and an explicit attempt at a Kantian linguistics applied to the grammars of actual language was found in the work of Wilhelm von Humboldt

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[9] Questions of who influenced whom in these regards are complex and contested. See, for example, Terezakis (2007) and Forster (2010 and 2011).

(Forster 2010, 2011). Kant himself had suggested the analogy between the architectonic of the understanding and the grammar of a language (Kant 2004, §39), although he had refrained from *identifying* the two. In this context it is natural that older conceptions of a language of thought as found in Leibniz and others would be revived, and from such a perspective the crucial question to be answered becomes whether the language *in which* one thinks is, following Hamann (and, perhaps, the later Wittgenstein), one's *particular language* or, following Humboldt (and, perhaps, Chomsky), some type of universal language implicit within each particular language. But Hardenberg, I will argue, undercut the assumption on which this dichotomy is based, the assumption that the mind is restricted to the processes of any internalized language itself. When talk of "mental representation" becomes mixed with that of linguistic representation Hardenberg avoids the Hamann–Humboldt dichotomy by denying the equation of mental content and linguistic sign, in a way that undermines the traditional view that linguistic signs somehow "express" a determinate conceptual psychological content. While for Hardenberg, traditional talk of inner concepts grasped *without* the capacity for use of linguistic signs is refused, this does not imply that thought itself was considered to be a type of inner speaking.

In his *Fichte Studies*, composed 1795–6, Hardenberg introduces some initially confusing, but, I suggest, ultimately enlightening distinctions in relation to the nature of representations [*Vorstellungen*]. One the one hand there is the *material* [*Stoff*] that is the substrate of the representation [*Vorstellung*] itself, but this must be distinguished from the *matter* [*Materie*] of "intuition" [*Anschauung*] (Novalis 2003a, #226). This is immediately confusing because "intuition" is, in Kant's account, a *kind* of representation itself—a *mental* representation, the immediacy and singularity of which distinguishes it from the other relevant kind of mental representation, *concept*. But we might start here by thinking of "representation" for Hardenberg as referring primarily to an "external" representation, such as a word—an equation that seems justified by Hardenberg's other talk of "representation" in a explicitly linguistic context (#249). Read in this way we can see Hardenberg as bringing into focus issues that have become thematic in various areas of inquiry in recent times.

External representations, such as words or, say, pictures, will count as representations because they have some kind of representational "content". A word "chair" will thus be thought to refer to worldly things, *chairs*, and often thought to so refer because it will be used to express some mental content, a concept, say (in this

case, the concept "chair") that will *itself* refer to worldly entities (actual chairs).[10] This is a view found in Aristotle's *On Interpretation* (Aristotle 1963, 1, 16a4–7), and has been referred to by Tyler Burge as the "traditional view" (Burge 1993). But clearly, external representations such as words or pictures have properties that are not necessarily connected with the objects to which they refer or to the concepts that they express. The word type "chair" rhymes with that of "pear" although chairs and pears may have nothing particularly distinctive in common. This point is often made in terms of the idea that the meanings of *words* are "conventional". Sometimes this point is expressed in terms of the idea that such representations are not *intrinsically* representational, or that they can be individuated by properties *other than* their intentional or representational properties. And this brings into focus the peculiarities of the assumed *mental* contents involved, which, on the traditional view, *are* thought to be intrinsically representational, and so as having *no* properties other than their referential ones (Burge 1993, 310). Aquinas had in this way drawn on this principle in an argument for the incorporeal nature of the soul with the claim that "whatever knows certain things cannot have any of them in its own nature; because that which is in it naturally would impede the knowledge of anything else" (Aquinas 1989, I, 75, 2). That is, the mind cannot have properties like the properties of the particular things it *knows,* as this would interfere with its capacity for *general knowledge*.

Poetry and Linguistic Computationalism

It will not be surprising that a poet might take an interest in such non-representational properties of words, such as those that allow them to carry the rhythms and rhymes that distinguish poetry as a form of speech.[11] If we then take Hardenberg's "material" to refer to such properties of external representations like word tokens, and take the "matter" of perceptual states ("intuitions") as their actual *intentional* content, then it seems uncontroversially true that the "material" of such representations are distinct from the "matter" of that to which they refer. That the word "chair" resembles the word "pear" will be part of its *material*, and nothing like this resemblance is found

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[10] In Kant's account, the application of concept to thing is never direct but always mediated by an *intuition*.

[11] Cf., "A poem should not mean / But be". Archibald MacLeish, *Ars Poetica* (MacLeish 1985, 106).

between the concepts or their worldly extensions. But similarly, these non-representational properties of words are going to be relevant to a "combinatory" or "computationalist" approach to language, as the types of "combinations and permutations" intended are meant to be applied *mechanically* to "uninterpreted" symbols. We can see how the interests of the poet and the computationalist might converge on this point, and a point of convergence can indeed be found in the strange case of the combinatorial poetics of Erycius Puteanus, a seventeenth-century humanist whose generation of multiple verses to the virgin Mary from a single eight-word poem came to the attention of Leibniz and other theorists of mathematics and language.

An eight-word, one-line Latin hexameter—"Tot tibi sund doles, Virgo quot sidera caelo (Thou has as many virtues, O Virgin, as there are starts in heaven)"—published in 1615 by the Jesuit Bernard Bauhuis formed the base from which Puteanus generated 1022 verse permutations (this number thought to be the actual number of stars in the firmament) in a work published two years later.[12] The number of *possible* permutations of the eight words is 40,320 (the number, *8 factorial*) but of course not all of these permutation preserve the poem's meter, and various attempts were made by mathematicians during the 17th century to exceed Puteanus' number. The poem had been discussed in John Wallis's *Tractatus de Algebra*, and, although Wallis had not given a number for the possible hexametric permutations, one reviewer of that work had suggested 2,580. This reviewer is thought to have been Leibniz, who had discussed this and other examples of such "proteus verses" in *Dissertatio de Arte Combinatoria*.[13] Leibniz here, however, gave no indication of how this number had been estimated, and the issue was later taken up by Jacob Bernoulli, who estimated the number at 3,312 and showed how this number could be arrived at from the classical laws governing the prosodic structure of hexametric verse (Bernoulli 2005, Knuth 2004). The problem of finding the principles for the generation of such proteus verses represents a clear example of the search for a "syntactic engine" which can

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[12] The work was, *Pietatis Thaumata in Bernardi Bauhusii e Societate Jesu Proteum Parthenium*.

[13] Donald Knuth (2006) discusses this in the context of the evolution of computer science. Neubauer notes that Novalis was interested in the similar phenomenon of "Bouts-rimé" (1978, 140).

generate an output of well-formed sentences according to entirely syntactic laws. Here the relevant properties of the units are not their semantic ones, but those non-semantic ones that determine whether or not the "output" will *scan* in the appropriate way. The convergence of computational and poetic principles here is not coincidental.

Hardenberg clearly takes the mathematical-combinatorialist account of language seriously, and draws the conclusion that *qua language* its elements cannot be regarded as "expressing" a type of determinate mental content, as is seen in the 1798 fragment, "Monologue". "Speaking and writing is a crazy state of affairs really; true conversation is just a game with words. It is amazing, the absurd error people make of imagining they are speaking for the sake of things; no one knows the essential thing about language, that it is concerned only with itself.… If it were only possible to make people understand that it is the same with language as it is with mathematical formulae – they constitute a world in itself – their play is self-sufficient, they express nothing but their own marvelous nature …" (Novalis 2003b, 214). It is this, *seemingly* "post-modern" aspect of Hardenberg's approach that denies some extralinguistic referent that is apparent in his *Fichte Studies*, especially in relation to his criticism of Fichte's account of the "I".

In Kant, the concept "I" had been thought as a special type of concept that captures the "transcendental unity of apperception". It is a representation that in the form of "I think" accompanies *all* of my representations (Kant 1998, B131–2), and that is ultimately responsible for their unification into representations of a *single world*. But the exact status of representations like this, Reinhold complained, had never been clearly spelt out in Kant. Reinhold, as we have seen, treated such mental "representations" as standing in a certain relation to both the subject and object of consciousness. Schulze (Aenesidemus) had interpreted "representation" as referring to something like a sign or image—a typical *external* representation that can be individuated *without* appeal to its representational content. The skeptical question could then be put: how do we know that such representations refer to *any* objects in the external world? As Burge points out (1993, 321), this question cannot be posed in the "traditional view" as there mental representations have no extra-representational properties that would allow them to be individuated so that this question *could be* asked. *Fichte*'s response to Schulz was then to reassert the traditional idea of the transparency of a concept, at least for the case of the "I". A thinker can recognize her own thoughts *as* her own directly without any need for some intervening "sign". Self-

consciousness does *not* depend on one's ability to represent oneself with the sign "I". But this is just the view that Hardenberg challenges in his *Fichte Studies*.

Hardenberg's notes here are nothing more than that, but the general drift of the thought is the thesis that all "signifieds" of signs, the mental contents *expressed* in signs, are, contrary to the traditional view, dependent for their identities on the signs expressing them. But at the same time, the signs themselves, it would seem, are identifiable *as the signs they are* only in that they express a mental content: "The relationship of the sign to the signified. Both are in different spheres that can mutually determine each another" (Novalis 2003a, #11).[14] Given that Hardenberg's "sign" effectively translates what Ferdinand de Saussure was to later call "signifier", Hardenberg's picture here approaches Saussure's complex holistic and differential account of language where differences among signifiers and differences among signifieds determine each other (Saussure 2011), ruling out the idea of words expressing "concepts" as understood in the "traditional view". Applied to Fichte's account of self-consciousness, this suggests that a being could only be determinately conscious of itself to the extent that it could expresses itself with the token "I", suggesting that to be capable of intentionality, of mental contents, the subject needs to be in some kind of communicative relation to *other* subjects. Over a decade later, Hegel was to draw a similar lesson from Fichte's starting point in his well-known "recognitive" theory of self-consciousness, while the romantics were to draw their own thesis concerning social existence as a condition of thought: all philosophy for them was necessarily "*sym*-philosophy".

It might be thought that with this Hardenberg has reverted to something like Hamann's idea that mental representations have the properties of "external" representations, *actual* language. However, Hardenberg's account is developed in ways that, seemingly paradoxically, *retain* elements of the traditional "transparency" view of mental content. The relation between sign and mental content (sign and "signified") will be different regarding *whose* mental state one is considering in a communicative event. The suggestion clearly seems to be that while for the *speaker*, *at least considered in a particular way*, the words somehow *do* directly express

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[14] Hardenberg's concept of "sign" effectively equates to what Saussure was to call the "signifier", i.e., the sign grasped in terms of its non-representational properties. The striking similarities between the views of Saussure and Hardenberg are pursued in Gasparov 2013.

essentially *transparent* thoughts, this can*not* be the case from the point of view of the person communicated *to*. "To the extent that the signifying person is *completely free* either in the effect of the signified or in the choice of signs, and not even dependent on his internally determined nature—to that extent, the two [sign and signified] are interrelated for the signifying person alone … [while] they are completely separate for a second signifying person" (Novalis 2003a, #11.3). What I take this to mean is that from the first-person perspective, speech must be considered as in the traditional view, with signs expressing thoughts (signifieds) that are themselves somehow transparent and directly in touch with the world, while for the other person this cannot be the case. For the interlocutor, signs uttered by the other must be regarded *first* as elements of a language, which has some sort of priority in the determination of the thought being communicated. From the external point of view, language has to be taken as a system in which the identity of each of the parts is determined by the way it functions *within* the system. Our inner states must be expressed in language to gain determinacy, but the determinacy found there can never be adequate to the *feel* of those inner states themselves.

This complex account in which both elements of the traditional view and its linguistic criticism are apparent in the later so-called "logological fragments" where Hardenberg makes this point explicit, distinguishing between concepts and words—a distinction that he describes as crucial for understanding the nature of metaphysics and logic, and for the difficulty in bringing these two disciplines together. Metaphysics, as the "pure dynamics of thinking" is "concerned with the soul of the philosophy of mind", and metaphysical concepts "relate to each other like *thoughts, without words*" (Novalis 1997, 51). Hardenberg is clearly aware as to the metaphysical strain that the idea of such wordless thoughts commits one, as is revealed in the comment from the *Fichte Studies*: "What kind of a relation is knowledge? It is a being outside of being that is nevertheless within being. … Consciousness is consequently an image of being within being". But then he corrects "image" with "sign", and the theory of signs must be a "theory of presentation, i.e., of not-being, within being, in order to let being be there for itself in a certain respect" (Novalis 2003a, #2).

The "signs" invoked here are, of necessity, characterized as "non-being"—i.e., as having *no other* properties than their presentational ones. In the logological fragments, however, he notes that the concepts of logic, which is "concerned simply

with the dead body of the philosophy of mind", "relate to each other as words do, without thoughts" (Novalis 1997, 51). Clearly, the thesis of the overall dependence of thoughts (signifieds) on material signs would render pure metaphysical thinking, in the sense suggested above, impossible—a position that one would expect from a broadly Kantian starting point. But logic consists of "words without thoughts", that is, signs considered exclusively in terms of their *non-representational* (or non-semantic) properties. It is precisely this latter claim that he has learnt from the combinatorialist tradition.

Leibniz and Hardenberg, beyond Hobbes and Descartes

We might thus see Hardenberg as bringing out the contradiction at the heart of attempts to divest the traditional view of its *immaterialism* by treating thought itself as a type of language understood on combinatorial or computational principles. The perceived contradiction is centered on the fact that the combinatorial approach itself must treat mental representations in an entirely "syntactic" way, putting out of play all the representational features of the "representations" themselves. Recently, Hilary Putnam has pointed to this problem facing "language of thought" or "lingua mentis" theories: The idea that thinking is about the manipulation of representations surely comes from our experience of the *use* of representations, but "none of the methods of representation that we know about—speech, writing, painting, carving in stone, etc.—has the magical property that there cannot be different representations with the same meaning" (Putnam 1991, 21). That is, in *no such systems* do we find the "intrinsically" meaningful representations required by *thought*. But the problem seems to be deeper than that posed by Putnam. Given that *qua* objects to which syntactic processes apply, "mental" words must be considered as uninterpreted, it might be asked how *any* semantic features of thought are re-established? That this question is not *easily* answered in the present-day "language of thought hypothesis" (LOTH) is suggested by the entry for this hypothesis in the *Stanford Encyclopedia of Philosophy* (Aydede 2010). The question of how the semantic content of propositional attitudes is inherited from that of the mental symbols computed can be asked at two levels: First, how do molecular symbols get their semantic content from their atomic components? And next, how do the atomic components represent what they do? Language of thought theorists have most to say about the former, but about

the latter it is stated that "the official line doesn't propose any theory … but simply assumes that the first question can be answered in a naturalistically acceptable way. In other words, officially LOTH *simply assumes* that the atomic symbols/expressions in one's LOT have whatever meanings they have".[15]

As has been pointed out by Jaan Maap in a study of Leibniz's universal characteristic (Maat 2004), this is precisely the problem that Leibniz faced and struggled with, ultimately unsuccessfully: he assumed that permitted syntactic transformations preserve the *semantic* features of the elements of the characteristic, and that the "syntactic and semantic aspects of the project are two sides of the same coin" (Maat 2004, 313),[16] but then had to answer the difficult question of how the atomic elements gained these semantic features in the first place (Maat 2004, sections 5.3.4–5.3.5). Indeed, the problem is signaled by his shifting between describing the characteristic sometimes as an *alphabet* and sometimes as a *language*: contrary to the way we think of words of a language, the individual elements of an alphabet, of course, do not by themselves *have* semantic properties. Historically we might view the tension as between two influences feeding in to Leibniz's project: Descartes' account of the contents of consciousness and Hobbes's computational approach to the mind.

In his fourth objection to Descartes, Hobbes had linked his computational approach to thought to a thoroughgoing materialist account of cognition and drawn from it radically non-representationalist consequences. In the suggested picture, reasoning is conceived as a "joining together and linking of name and labels by means of the verb 'be'". But such names and labels are established entirely conventionally, as there is no possible resemblance between the two that could establish anything here other than conventionally supported relationships. In this picture the mind is "nothing more than motion occurring in various parts of an organic body" (Hobbes in Descartes 1984 vol. 2, 125–6). In his reply, Descartes insists that surely *reasoning*

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15 Emphasis added.

16 C.f., "In Leibniz's view, the power of a symbolism does not reside in the individual symbols, but in the systematical relations the symbols have to each other and to the things they designate. Hence Leibniz's central concern in his efforts to construct a philosophical language is to establish a perfect conformity between its semantic and syntactic aspects" (Maat 2004, 309–310).

must deal with what is *signified* by the words, not just with the words themselves: "As for the linking together that occurs when we reason, this is not a linking of names but of the things that are signified by the names… Who doubts that a Frenchman and a German can reason about the same things despite the fact that the words that they think of are completely different?" (Descartes 1984 vol. 2, 126). That is, Descartes simply reasserts the traditional view of the "transparency" of mental contents: if we are to talk of mental representations, these representations must be the vehicles of a direct access to the world, and ultimately it is God that establishes this connection. The certainty with which we feel that ideas perceived "clearly and distinctly" present the world to us as it is, is grounded in God's goodness, which prevents the possibility of deception here.[17]

In 1677 Leibniz was to write a dialogue on this very dispute (Lagerlund 2012, 103–6; Maap 2004, section 5.4.2), accepting Hobbes's view of the existence of mental characters with no intrinsic similarity to what they signify, using the mathematical example of the lack of any resemblance between "0" and *nothing*. But he wanted of course to avoid the type of semantic skepticism of which Descartes accused Hobbes, and used a version of Descartes' appeal to clear and distinct ideas, but now such that these coincided with the final products of logical decomposition. But as Maat has pointed out, Leibniz was himself troubled by doubts about the coherence of the notion of an essentially *thinkable* atomic terminus of analysis. If a notion, call it A, is essentially thinkable, then it would seem that it must be capable of further analysis: it must be able to be analyzed into a component specific to its being A, and the concept "thinkability" which it will have in common with all other concepts (Maap 2004, 314). It would be considerations such as these that were behind later idealist critiques of what is now known as the "Myth of the Given" and that has its prototype in Kant's insistence, noted above, that all representations, in order to *be* representations, be accompanied by the concept "I", the concept of the thinker for whom they are representations (Kant 1998, B131–2).

We might think of this as just another expression of the problem discussed above. Leibniz defines his ultimate atomic units both as those for which no further analysis is possible, and those which can be known "through themselves". But to

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[17] Descartes opposition to the idea that "ideas" would have their own *non-representational* properties is, of course, consistent with his mind–body dualism.

think of some purported atomic ultimate "A" as something known "through itself" sounds like it is conceived as some ultimate phenomenal presence, like the empiricist's "sensory impression" or "sense-datum"—something known in terms of its phenomenal properties, its own "*Stoff*". But being regarded as essentially *thinkable* sounds as if it is to be regarded as intrinsically *representational*, and known through the "*Materie*" of its content.

Hardenberg's alternative to Leibniz's dilemma was to aestheticize Leibniz's picture by emphasizing the aesthetic "*Stofflich*" dimensions of the characteristic, thus, *seemingly*, giving up its purported representational dimension. Poems are not to "mean", just "be"! One is to *play* the machine like a musical instrument, the products of this play, like the notes of a melody, thus becoming "self-sufficient" in needing no reference *beyond* themselves. They "express nothing but their own marvelous nature" (M, 214). But how, then, can this conception have any relevance for activities, like those of science, where surely *some* conception of their adequacy involves the relation of their products to the world?

It is true that certain of Hardenberg's formulations suggest this dichotomization of external signs and inner thought, but such a position is contradicted by those formulae offering a more "Saussurean" alternative. Hardenberg wants the elements of Leibniz's characteristic to be understood in terms of their "*Stoff*" so that the "machine" can be played like a piano to produce patterns in which the elements, as with the notes of a melody, are not organized according to any considerations beyond those of the system of language itself—their accuracy in reflecting non-linguistic worldly structures, for example. But the elements are, nevertheless, *words*—that is, *signs*—and not mere sounds. Qua *stofflich* entities, semantic considerations must enter into the identities of words and signs in that within a language differences in sound only *count* when they function to differentiate meaning.[18] As Hardenberg articulates the point in *Fichte Studies*, "sign" (or for Saussure, "signifier") and signified are "in different spheres that can mutually determine each another" (Novalis 2003, #11). Signs do not have meaning in as much

[18] For example, some languages such as English will distinguish word-types according to whether they start with the sounds distinguished in English as "p" and "b", but in other languages this "voicing" of the consonant will not differentiate meanings at all and so be *inaudible*.

that they express "concepts" and thereby determinately apply to "things" in the world. They have meaning to the extent that *stofflich* differences among them can determine differences within the realm of meaning and use. Such words can be "played" according to their identities as signifiers so as to transform the system of signifieds. Thus the idea of poetry as "meaningless" melody does not capture the sense in which the elements are words and not notes, elements that cannot be entirely stripped of semantic properties and have *only* a syntax. For this reason we might be skeptical of those (such as Dalhaus (1989, 145)) who place "Novalis" here in the tradition of other romantics, such as Ludwig Tieck and E. T. A. Hoffman, who are seen as pointing to a conception of poetry as aspiring "towards the condition of music" (as Pater later put it (1980, 106)), and a conception of music as "absolute music"—music totally freed from the constraints of language and representation.

The acceptance of non-representational wordless music as the paradigm of art seems to be one consequence of the *skeptical* interpretation of the critique of the "traditional view" of the relation of speech to thought like that of Hobbes. Hardenberg, however, as we have seen, retains elements of the traditional view within his account of the speaker's attitude to her own thoughts: a speaker, it would seem, has no alternative but to take her expression as transparently manifesting her own cognitive states understood as veridically disclosing the world. It is only from the point of view of the *hearer* that the linguistic vehicle of the expression is considered to have *stofflich* properties that accrue from the fact that it is a fragment of a social and public language. But it cannot be that this external point of view simply "trumps" that of the immediate point of view of the speaker herself. It cannot be the source of any "real" meaning of the utterance that replaces the speaker's irreducibly private one, as it is not the source of any determinate meaning *at all*. We might say that what this external "aesthetic" point of view provides for is a constant source of challenge to the speaker's understanding as to what her words amount to—a constant possibility of provocation to the speaker to reflect on and re-evaluate the meaning of her expressions in the light of this "reflective", external point of view. In this sense Hardenberg's "mathematical" approach to language seems to point a way not only beyond Descartes' and Hobbes' opposed approaches to meaning, but beyond what is commonly taken to be the nature of "romanticism" itself.

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