



TRIBELON

RIVISTA DI DISEGNO  
UNIVERSITÀ DEGLI  
STUDI DI FIRENZE

VOL. 3 | N. 5 | 2026  
SEGNI SIGNIFICANTI  
SIGNIFYING SIGNS

**Citation:** R. Guy, *Geometry for an architecture of the mind*, in *TRIBELON*, III, 2026, 5, pp. 70-79.

**ISSN (stampa):** 3035-143X

**ISSN (online):** 3035-1421

**doi:** <https://doi.org/10.36253/tribelon-4070>

**Received:** March, 2026

**Accepted:** May, 2026

**Published:** July, 2026

**Copyright:** 2026 Guy R., this is an open access peer-reviewed article published by Firenze University Press (<http://www.riviste.fupress.net/index.php/tribelon>) and distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Data Availability Statement:** All relevant data are within the paper and its Supporting Information files.

**Competing Interests:** The Author(s) declare(s) no conflict of interest.

**Journal Website:** [riviste.fupress.net/tribelon](http://riviste.fupress.net/tribelon)

## GEOMETRY FOR AN ARCHITECTURE OF THE MIND

RAYMOND GUY

Independent researcher, Canada  
[raymondguy11@gmail.com](mailto:raymondguy11@gmail.com)

*Zanis Waldheims (1909–1993) devised a system of geometric abstraction to create units of meaning that together form an architecture of the mind. His geometrization of thinking is grounded in five geometric shapes that function as signifiers, encoding words and their conceptual meanings. Units of meaning emerge through the convergence and synthesis of opposing or complementary concepts, which are unified in a central thematic meaning represented by a third geometric shape. Waldheims assembled these triadic combinations as building blocks of a two-dimensional map designed to orient thought. The sample unit of meaning – Art + Science = Knowledge – represents one of many such building blocks for mutual understanding. Drawing on both Euclidean and non-Euclidean geometries, he developed the flexibility required to construct the Noosphere: an architectural model of the mind, its thinking processes, and the evolution of consciousness. When first conceived in the late 1950s, Waldheims intended this geometrization of thought as the basis of a cybernetic system, that can retrospectively be read as anticipating aspects of contemporary artificial intelligence. The project quickly evolved into a distinctive art form. He claimed that for such a system to genuinely benefit society, it must rest on firm foundations in ethics and aesthetics. To this day, his art challenges viewers to move beyond the limits of personal perspective and to explore geometric pathways through the dilemmas generated by disinformation.*

**Keywords:** Geometric abstraction, Unit of meaning, Ethics and aesthetics, Waldheims, Cybernetics.

<sup>1</sup> Guy, *Zanis Waldheims: une interprétation géométrique de la société*.

<sup>2</sup> Baris, *Geometric Abstraction and Visual Metaphor (A Thought Experiment) in Discursive Geometry and More*.

<sup>3</sup> Abler, *The Human Mind: Origin in Geometry*, p. 413.

<sup>4</sup> Guy, *Une pensée exhaustive dans un monde binaire*.

<sup>5</sup> Malloy, *Dimensionism: Modern Art in the Age of Einstein*, pp. 1-14.

<sup>6</sup> Dalrymple Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, pp. 1-100.

<sup>7</sup> Jeanson, *Zanis Waldheims' abstract and geometrical art*. Psychology and Aesthetics into the Future: 20th Biennial Congress, International Association of Empirical Aesthetics (IAEA), Chicago, United States.

<sup>8</sup> Jeanson, *Zanis Waldheims' abstract and geometrical art*. Aesthetics and Design: 21st Biennial Congress of the International Association of Empirical Aesthetics (IAEA), Dresden, Germany.

<sup>9</sup> Jeanson and Guy, *An Abstract and Geometric Art - Zanis Waldheims*. Presentation at *Mathematics and Aesthetics*, Fields Institute for Research in Mathematical Sciences, Toronto, Canada.

<sup>10</sup> Jeanson, *Zanis Waldheims - An abstract and geometrical art*. 15th International Conference on Geometry and Graphics (ICGG), McGill University, Montréal, Canada.

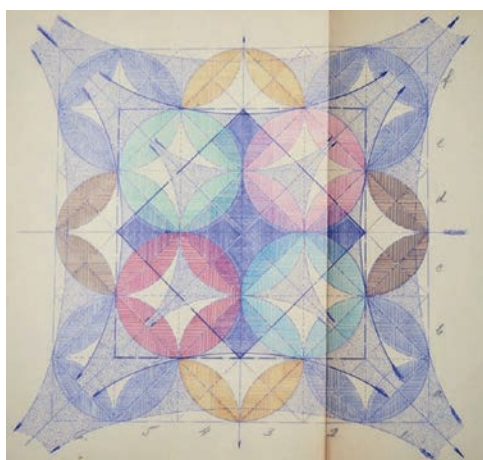
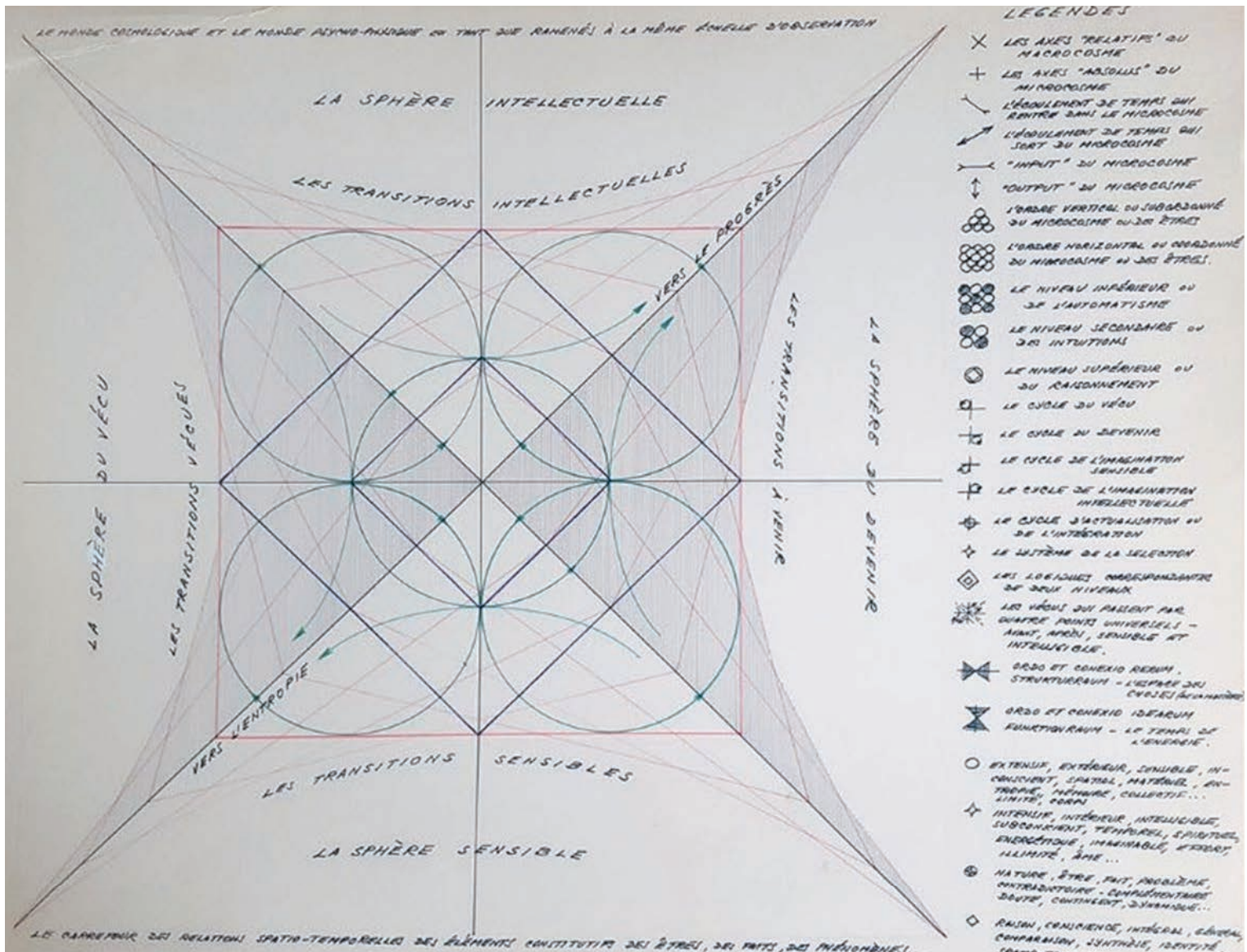
### Introduction

Zanis Waldheims (1909–1993) developed an artistic philosophy that engages the individual in a process of unifying the dual nature of human existence through principles drawn from science and aesthetics. After surviving two World Wars and immigrating from Latvia to Montréal, Canada, he embarked on a quest for justice by examining the errors of societies throughout history. He decried the instrumentalization of scientific and social institutions by political strongmen who exploited polarizing rhetoric. As a counter measure, he sought logical and objective answers in the theories of physics, mathematics, and geometry. He designed a map to orient thinking by integrating the principles of structuralism and phenomenology into an architecture for a systematic approach to ex-

haustive thought in the search for remedies to human failings and their amplification through disinformation and propaganda<sup>1</sup>.

Waldheims adopted geometric abstraction, a style using geometric primitives over naturalistic forms<sup>2</sup>. He is driven by a quest for Truth, drawing on the idea that geometry, reaffirmed more recently by Abler,<sup>3</sup> underlies symmetry, language, and the detection of truth through its properties<sup>4</sup>.

Waldheims rejected the Automatiste movement in favour of Structuralism as his guiding framework, while selectively drawing from the Plasticiens – a prominent Montréal art group of the 1960s, when he began producing. Their influence is visible in his use of geometric form and colour to create visual rhythm, symmetry, and complementarity. Waldheims's thinking also aligns with Sira-



1 | Legend of the Schema of understanding (1963) and Le système de l'entendement from Description du schema de l'entendement (1963).

11 Jeanson, Zanis Waldheims' Geometrical Art, Baltgraf: 12th International Conference on Engineering Graphics, Riga, Latvia.

12 Exhibition - Portable Landscapes: Exhibition of Latvian Exile and Émigré Artists. Curated by Inga Lace, Latvian Centre for Contemporary Art (LCCA), Riga, Latvia. April 27 - June 17, 2018.

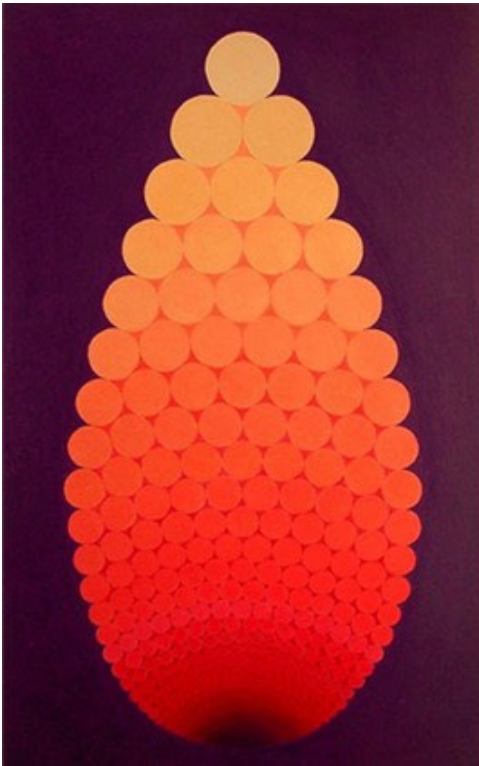
to's Dimensionism, a framework positing that each successive dimension (N+1) embodied the scientific principles inspiring early twentieth-century French abstractionists<sup>5</sup>. Central to this was engagement with Einstein's and Minkowski's space-time continuum and non-Euclidean geometries<sup>6</sup>. These scientific foundations demonstrably shaped Waldheims's artistic thought. Waldheims's art has received little academic attention during his lifetime. He made personal efforts to exhibit his work locally in Montréal between 1976 and 1992. Since 2008, his art and philosophy have been presented at conferences of the *International Association of Empirical Aesthetics* (IAEA: 2008,<sup>7</sup> 2010<sup>8</sup>) and the *International Conference on Geometry and Graphics* (ICGG: 2012,<sup>9</sup> 2013<sup>11</sup>). His artwork has been included in museum exhibitions in Latvia (2016,<sup>12</sup>

2018<sup>14</sup>), Poland (2020<sup>15</sup>), Toronto (2020<sup>16</sup>), and Montréal (2025<sup>17</sup>).

Much of this scholarship has been made possible by the legacy of manuscripts, journals, notes, sketchbooks, and drawings Waldheims kept over the forty years he devoted to this project. These materials are being processed for transfer to the *Fonds d'archives Zanis Waldheims*, approved in 2023 for addition to the *Bibliothèque Kandinsky* in Paris. This archival collection serves as the primary source for the present investigation into Waldheims's use of geometry as a signification system for thinking.

### The Schema of Understanding

Waldheims developed his *Schema of Understanding* (fig. 1) as a geometric framework for a universal visual language aimed at fostering peace through com-

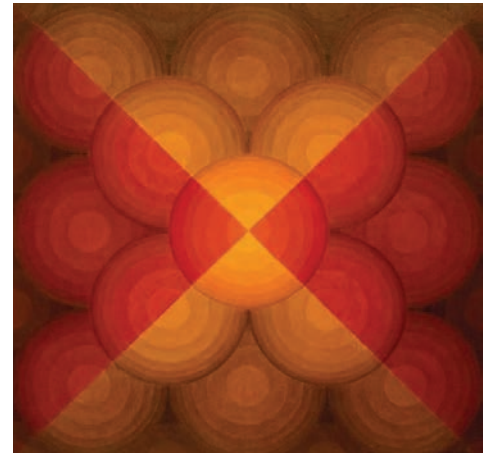
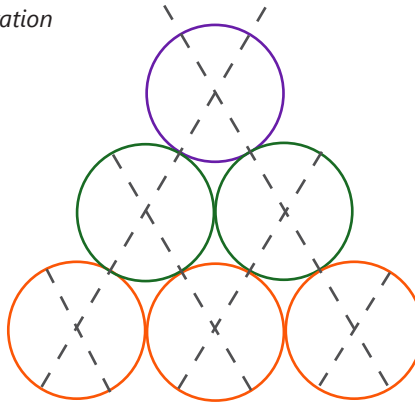


2 | *The Noosphere* - #142, Zanis Waldheims (1967); Glass sculpture, Yves Jeanson (2001).

3 | *A cybernetic set - Top tier of the Noosphere*. #7 (1963); #96 (1965); Elevation and plan views with corresponding significations.



Elevation

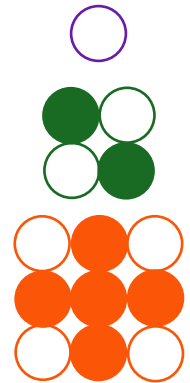


Plan

Primary level  
Consciousness  
Entendement

Secondary level  
Subconscious  
Experience

Third level  
Unconscious  
Reflexes and instincts



plementarity of ideas. While inspired by Leibniz, Descartes, and Spinoza's application of mathematical and geometric reasoning to universal laws, he found each philosopher lacking in one key respect: none offered a comprehensive visual framework. The resulting schema fits the premise of Duch's *Geometric Model of Mind*, which treats concepts as geometric objects structured to reveal their properties and relations<sup>18</sup>.

In 1960, Waldheims began a decade-long self-directed research project culminating in a copyrighted thesis containing 314 geometric figures forming his system of geometrization.<sup>19</sup> He then spent twenty more years refining his visual lexicon – even completing a philosophy degree at 79 – ultimately reaching a level of complexity capable of describing sociological groups and their interactions<sup>20</sup>. This body of thought is further embodied in over 650 artworks exploring human thought, relationships, and the pursuit of truth and justice.

The Schema extends well beyond a simple diagram. Waldheims conceived it as an instrument capable of illustrating the full range of human thought as the

framework for a cybernetic model to orient thinking<sup>21</sup>. Drawing inspiration from Ruyer, who built on the work of early cyberneticists Wiener, Ashby, and Shannon, Waldheims incorporated structure, homeostatic processes, and feedback loops into his design, orienting the whole toward ideals of peace for both the individual and humanity<sup>22</sup>.

The *Schema* also draws upon the Hegelian dialectic, seeking a reconciliation that transcends the tension and appeasement between two poles by incorporating them at a higher level. In Waldheims's own words:

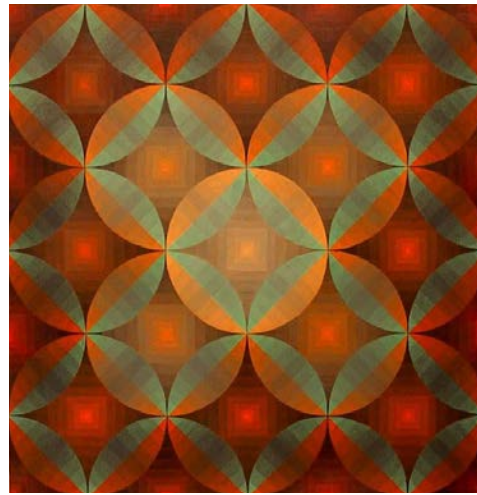
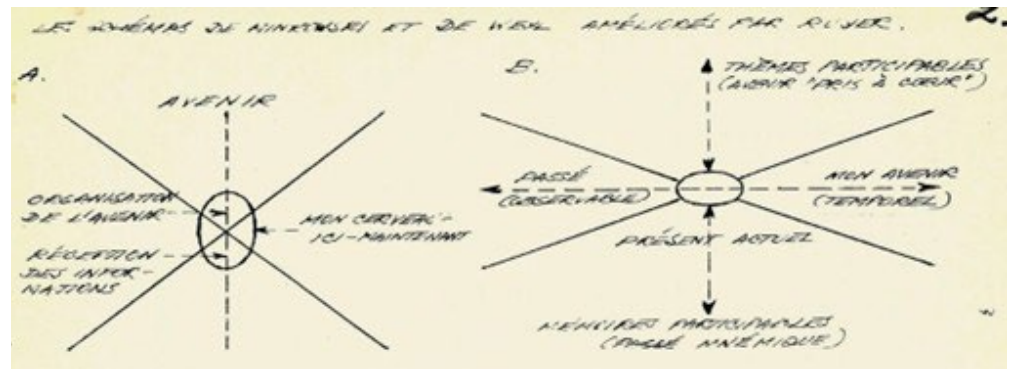
«Consider that every problem is represented by the totality of relevant opposite and complementary aspects that concern living beings, individually and collectively. The generalization of the entire totality, using the geometric shapes, is likely to symbolize the remaining aspects in such a way as they pertain to our existence<sup>23</sup>.»

Geometric abstraction integrates the principles of diachronic linguistics where relationships between successive terms change over time<sup>24</sup>. This approach respects Saussure's precepts where a lin-

4 | Integration of Minkowski's light cone to Ruyer's cybernetic being from Z. Waldheims's manuscript: Quelques explications sur les dessins p. 47.

5 | Plan view of the three levels of consciousness (#164, 1968) and the five geometric shapes (#139, 1967).

“ These concepts support the development of relationships between geometric shapes as signifiers and the ideas they signify, constructing signs that hold the totality of meaning in a quest for truth.



guistic entity can only exist through the association of the signifier and the signified. Gärdenfors proposes that natural categories form convex regions in conceptual space, where any object lying between two members of a category likely belongs to it as well<sup>25</sup>. These concepts support the development of relationships between geometric shapes as signifiers and the ideas they signify, constructing signs that hold the totality of meaning in a quest for truth. Waldheims's system mirrors this through its triadic "unit of meaning", a convex operation linking two concepts via an intermediate position that illustrates the thought process visually. By translating words into ideas and ideas into shapes, combinations of signs, signifiers, and signified become unified symbols that orient thinking on a conceptual map. Notably, Waldheims conceived this schema in two dimensions in the early 1960s, before computers or three-dimensional modelling tools were available to him.

### The Noosphere

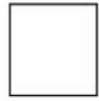
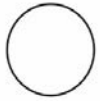


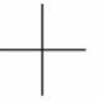
Waldheims modelled his system on Teilhard de Chardin's concept of the Noosphere, rendering the architecture of mind and reasoning as a three-dimensional model of consciousness (fig. 2). Built on the sequence of perfect squares ( $a_n = n^2$ ), the structure adds spheres at each successive level, forming an ovoid construct – also realized in Pyrex glass beads – in which raw, material, biospheric energy at the base converges toward a singularity at the summit. The reflections and refractions of the glass spheres suggest the amplification and transformation of ideas as they circulate through the structure, while the tapering from a dense base to a few large spheres at the top mirrors the emergence of higher consciousness, the Omega Point. The model's most significant region occupies its three upper tiers, where the architecture of mind intersects with the schema, visual signs, and units of meaning in what Waldheims calls the cybernetic set of elements that schematize human thought (fig. 3). The single sphere at the apex represents consciousness, the

<sup>13</sup> Exhibition - *Survival Kit 8*. Curated by the Latvian Centre for Contemporary Art (LCCA), Riga, Latvia. September 8-25, 2016.  
<sup>14</sup> Guy and Jeanson, *Zanis Waldheims' Portable Landscape*, Latvian National Museum of Art, Riga, Latvia. 2018.  
<sup>15</sup> Exhibition - *Riga Notebook. Following the lines of Waclaw Szpakowski*. Muzeum Sztuki w Lodzi, Poland. Joint exhibition curated by Inga Lace (LCCA). October 23, 2020 - February 28, 2021.  
<sup>16</sup> Exhibition - *Zanis Waldheims - The extensive thought*. Solo exhibition curated by Xenia Benivolsky, University of Toronto, Canada. November 28 - December 18, 2020.  
<sup>17</sup> Exhibition - *Le confort et l'indifférence*. Musée des Beaux-arts de Montréal. Curated by Marc Lanctot, Musée d'art contemporain de Montréal (MACM). April 11, 2025 - May 3, 2026.  
<sup>18</sup> Duch, *Concept Representation and The Geometric Model of Mind*. *Studies in Logic, Grammar and Rhetoric.*, pp. 151-154.  
<sup>19</sup> Waldheims, *La géométrisation de la pensée exhaustive*. Unpublished literary work certified by the Copyright office at Ottawa, Canada 1970.  
<sup>20</sup> Guy, *Zanis Waldheims: une interprétation géométrique de la société*.  
<sup>21</sup> Guy, *La montée de conscience d'une intelligence artificielle*.  
<sup>22</sup> Ruyer, *La cybernétique et l'origine de l'information*.  
<sup>23</sup> Waldheims, *1975-1981 Sketchbook*, p. 115.  
<sup>24</sup> Saussure, *Cours de linguistique générale*. 1916.  
<sup>25</sup> Gärdenfors, *The Geometry of Meaning: Semantics Based on Conceptual Spaces*, pp. 21-25.  
<sup>26</sup> Ivi. pp. 39-41.



*A linguistic entity can only exist through the association of the signifier and the signified.*

6 | Table 1. A semiotic classification of geometric shapes and their symbolic meaning.

Geometric shapes as signifiers					
Nomenclature	Square	Circle	Rhombus	Astroid	Axes
Signification system	Signifier		Sign	Signified	
Units of meaning	Extensive		Singularity	Intensive	
Signified meaning	External representations of the senses or physical perception		Synthesis of thought	Internal representation of the imagination or intuition	

site of thoughts, perceptions, feelings, and deliberate decisions. The level below corresponds to the subconscious, where learning and information processing occur, forming the core of his map for orienting thought. The third tier houses the unconscious, evolutionary reflexes and instincts from which behavioural and cognitive patterns travel upward, forming the foundations of human awareness as it ascends toward consciousness.

In his plan and elevation drawings, Waldheims incorporates Ruyer's interpretation of diagonal lines through each sphere's centre to evoke Minkowski's light cone marking the present moment in the space-time continuum (fig. 4). When the three-dimensional structure is flattened into plan view, astroid figures emerge from the voids between spheres (fig. 5), with Gestalt principles of Prägnanz, figure-ground, symmetry, and continuity generating additional constituent shapes.

Waldheims then adds a regular rhombus and Cartesian axes by connecting the four points of the astroid with diagonal and perpendicular segments. These points serve as compass bearings orienting thought toward truth, beauty, personal good, and universal justice – establishing the structural foundation upon which the architecture of mind is built across five geometries.

**The Dynamics of Geometrization**

Geometry has long served as a universal tool for describing the universe, from its physical state to the mathematical laws of topology that govern it. Any shape can be isometrically stretched or contracted into any other, representing an infinity of conceptual gradations between them.

Gärdenfors applies these topological principles to map convex regions of conceptual space, from which grammatical categories can be derived. He extends this into a geometric theory of compositionality, defining domains through mathematical transformations applied to word compositions and metaphors<sup>26</sup>.

Waldheims challenges the linearity of written language by elevating it into a two-dimensional visual language. He employs five basic geometric shapes, to decode the world and develop the consciousness and relationships that orient thinking toward peace and harmony. These five fundamental degrees of the unit of meaning, read left to right, form a continuum stretching from quantity to quality, from the measured to the calculated, and from the sensed to the felt. This spectrum is divided into three components corresponding to Saussure's system of signification (table 1).

Waldheims uses the term "extensive" to describe the square and circle, signs conveying concrete meanings and the physical world, the macrocosm. They function as equivalents of Saussure's signifier. At the opposite end, the "intensive" shapes, the astroid and axes, convey abstract meanings and the concepts of the signified, representing thought over time and the microcosm. Between them sits the rhombus as a point of singularity, integrating the complementary aspects of extension and intension across time and space.

The parallel between Saussure's triad (signifier, signified, and sign) and Waldheims's unit of meaning (extensive, intensive, and singularity) establishes geometric abstraction as a linguistic system. By translating phenomenology into geometric symbols through a spa-






tial-temporal algorithm, this relational framework applies Saussurean semiology with geometrization into a fully operative system of signification.

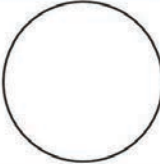
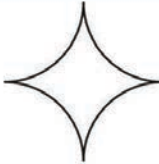
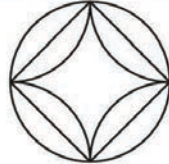
A further applicable semiotic framework is Aiello's, who draws from Barthes's two-tier model where denotation operates at the first level and connotation is culturally and ideologically inflected at the second, positing that these two levels carry social and cultural meanings.<sup>27</sup> Waldheims deploys his five shapes at the denotative level while codifying the connotative essence of five associated geometries, transforming them into a normative lexicon for ethical thinking that bridges the topological continuum between physical reality and mathematical truth. By applying topological principles to his schema, he enables an infinite range of isometric transformations between each archetypal shape as signifier, representing the limitless possibilities of denotation and connotation available within the complex process of exhaustive thinking (table 2).

Waldheims grounds his system in Euclidean geometry – built on axioms and self-evident truths – as the foundation upon which all other geometric systems rest, with Cartesian geometry at the opposite pole as its analytical complement, bringing algebra to bear on visual problems. Between these, he isometrically contracts the square and expands the axes toward non-Euclidean geometries: Riemannian spherical geometry, accommodating dynamic relationships on a positively curved surface, and Lobachevskian hyperbolic geometry, exploring negative curvature as found in the astroid. At the centre of these four geometries lies the point of singularity, where all geometric principles converge to explain natural phenomena. Geometrization thus becomes the process by which an individual establishes relationships between shapes as signifiers within a visual system applied across the spatial, aesthetic, linguistic, and narrative dimensions of human experience.

Each of Waldheims's five shapes carries an aesthetic dimension corresponding to an artistic discipline (table 2).

The square as architecture constructs the inhabited world, a three-dimensional space where the sacred is instantiated,

					
Geometry	Euclidian	Riemanian	General	Lobatchevskian	Cartesian
Topology	Topography	Surface	Line	Point	Colour
Aesthetic	Architecture	Sculpture	Bas-relief	Painting	Drawing
Narration	Myth	Religion	History	Rhetoric	Grammar
Linguistic	Discourse	Sentence	Word	Letter	Number

Extension		Intension		Convergence
	+		=	
Them	+	Us	=	Humanity
Art	+	Science	=	Knowledge
Individual good	+	Universal justice	=	Comprehension
Knowledge	+	Comprehension	=	Entendement

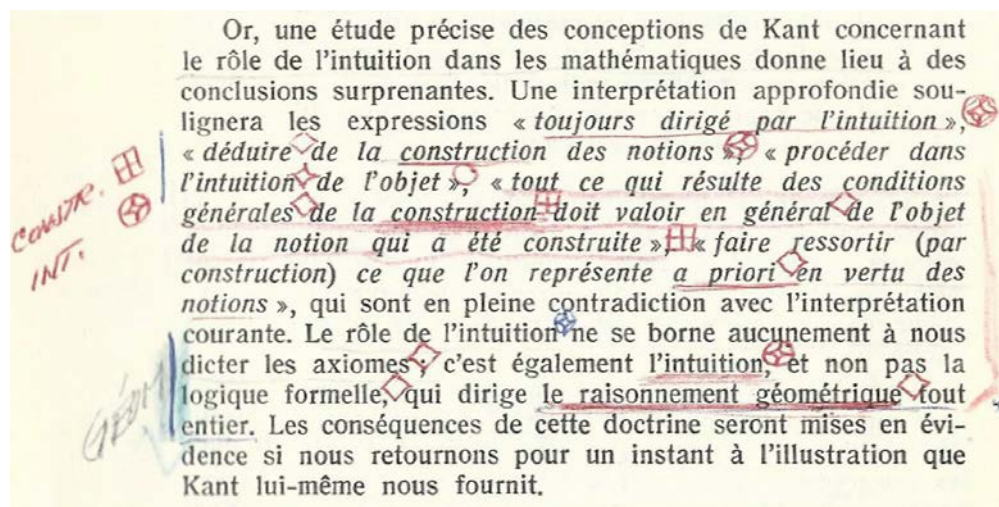
power embodied, and ideas manifested through structure. The circle as sculpture liberates form from function, creating physical presence within that space. The rhombus as bas-relief occupies the threshold between worlds, marking the retreat from physical volume into the two-dimensional plane and from objective perception into inward subjectivity. The astroid as painting then conveys the illusion of space, depth, light, and atmosphere through figuration or abstraction. Finally, the axes as drawing reduce everything to the pure line, expressing the energy and movement of the hand guided by imagination.

Geometrization allows movement in both directions along this continuum: between matter and idea, space and surface, presence and representation, the built world and the imagined one. Physical qualities are surrendered as expressive freedom is gained. These dynamics reverse when the signs are read in the opposite direction. Geometrization extends equally to the

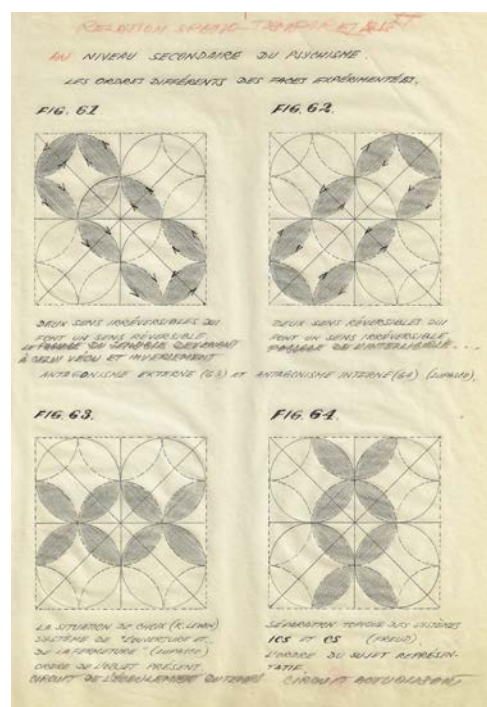
7 | Table 2. A geometric framework for classifying fields of human communication and knowledge.

8 | Table 3. Key units of meaning of the art of thinking.

<sup>27</sup> Aiello, *Visual semiotics: Key concepts and new directions*, p. 369.



9 | Sample of geometric annotations by Waldheims of a passage his personal copy of E.W. Beth et J. Piaget, *Épistémologie mathématique et psychologique*. Presses Universitaires de France, 1961, p. 13.



10 | *Relations spatio-temporelles au niveau secondaire de la pensée : Les ordres différents des faces expérimentées*, in *Géométrisation de la pensée exhaustive*, 1970.

linguistic dimension of thought, moving from the most intensive to the most extensive (table 2). At the intensive end lies the number – the fundamental mark of mathematical abstraction, binary at its simplest (1 and 0), establishing existence or absence and opening the door to invention and discovery. The letter follows as the atomic unit of verbal communication, the simplest convention agreed upon by a community. The word occupies the transition point where matter becomes meaning — treated in semiotics as a sign carrying significant meaning, just as shapes do in geometrization. Moving toward the extensive, the sentence advances the word into a proposition testable as true or false, governed by grammatical rules. Finally, discourse represents the full complexity of ideas communicated across time and space, carrying the power to shape the world through knowledge and identity.

A third dimension of geometrization operates through narrative (table 2), spanning from the extensive act of storytelling to the intensive unfolding of meaning across time. Myth anchors the extensive end, providing archetypal stories that transcend individual belief systems and convey unified, universal visions of the world. These myths are shaped by religion and politics, rallying groups around shared worldviews. History stands as the objective singularity between belief system and rhetoric – morally instructive, binding stories in time. Crossing into the intensive domain, rhetoric becomes the art of persuasion through language, while grammar provides the underlying tools and rules upon which rhetorical discourse draws.

These examples reveal how thought moves directionally along a *continuum*. Yet, linear geometrization between two opposing poles is insufficient on its own. Waldheims proposes that fully developing the thought process requires considering all geometric shapes simultaneously, in what he calls thinking on the surface, or exhaustive thinking based on the *Unit of Meaning*<sup>28</sup>.

### The Unit of Meaning

Complementary shape pairs, such as the circle and astroid, or the square and axes, function as signifier-signified combinations within the geometrized system (table 3). They surrender their individual states to integrate extension and intension into a singularity conveyed by the rhombus or converge into a more comprehensive structure across time and space. Waldheims constructs most units of meaning around non-Euclidean geometries, as these imply dynamic transformation<sup>29</sup>.

The geometrized unit of meaning can be read as an instance of Hjelmslev's connotative semiotics: at the denotative plane, content (circle) and expression (astroid) stand together and converge into the connotation plane, where the rhombus emerges as a new, inseparable point of substance and form<sup>30</sup>.

These units of meaning are also analogous to the Greimas semiotic square, where the dialectical movement – extensive (S1) + intensive (S2) → singular (S) – mirrors the square's progression from two primary contrary terms through their negations to a complex or neutral synthesizing term<sup>31</sup>.

Waldheims used his semiotic system to annotate texts he read, building a geometrized lexicon of symbol-word associations and their meanings (fig. 6). The hundreds of units of meaning he compiled were intended as the defining elements of his cybernetic system's language model with an objective view of the world capable of resisting and prevailing over the manipulative rhetoric of propaganda.

To understand how these units of meaning operate within a living system of thought, Waldheims extends the system of signification onto the surface of the *Schema of Understanding*, treating each

<sup>28</sup> Waldheims, *La géométrisation de la pensée exhaustive*. Unpublished literary work certified by the Copyright office at Ottawa, Canada.

<sup>29</sup> Waldheims, *Introduction au schéma de l'entendement: L'art topique ou l'art de penser*. Documents for a patent proposal submitted to Robic and Bastien engineering, Montréal. Unpublished work.

<sup>30</sup> Hjelmslev, *Prolegomena to a Theory of Language*.

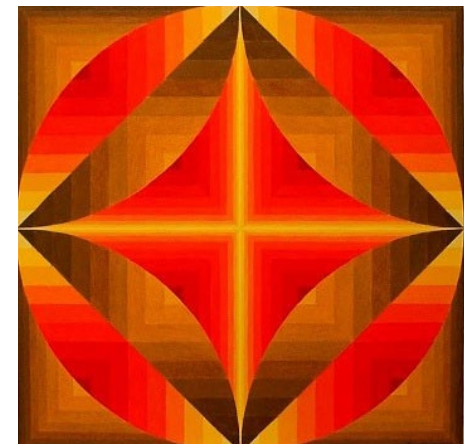
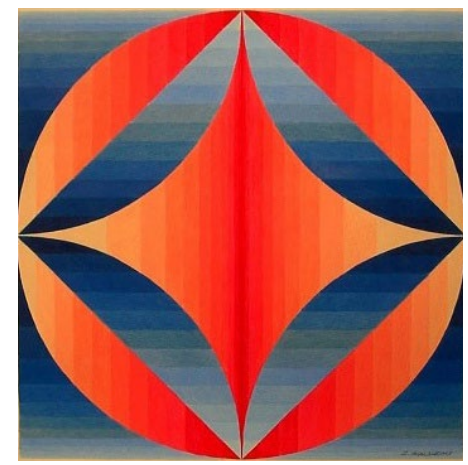
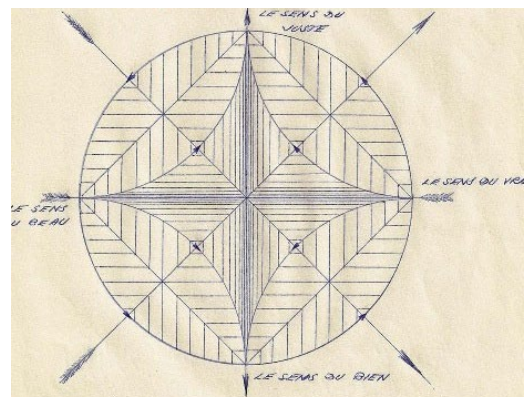
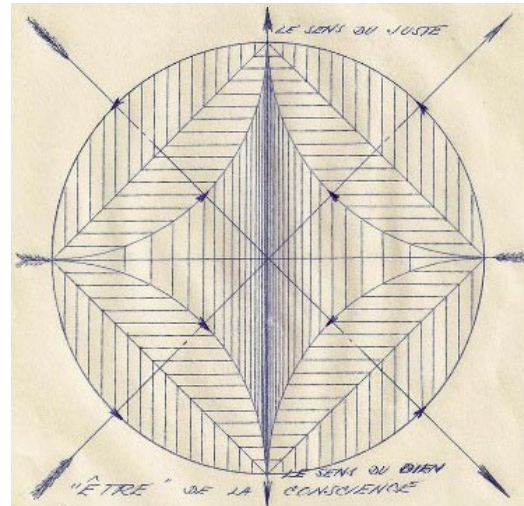
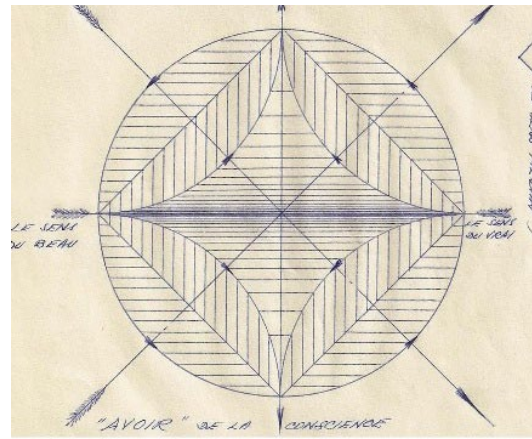
<sup>31</sup> Tarasti, *The semiotics of A.J. Greimas: A European intellectual heritage seen from the inside and the outside*, pp. 33-53.

<sup>32</sup> Lupasco, *Logique et contradiction*.

axis as a site of semiotic exchange. The schema's two diagonal axes function as feedback loops, dynamic circuits through which opposing cognitive processes engage in reciprocal signification (fig. 7). The first, the axis of matter, links sensory perception in the lower right quadrant with memory in the upper left, tracing the movement from extensive perceptual input functioning as signifier toward its consolidation as retained meaning. It is the path by which new information is validated and used as a foundation for knowledge construction. The second, the axis of energy, runs along the opposite diagonal between the emotional and the rational, enabling the convergence between logic and intuition. The horizontal and vertical axes complete the structure, spanning past and future, and sensory experience and cognitive abstraction respectively. Waldheims annotates these diagrams with reference to Lupasco's logic of antagonism,<sup>32</sup> Lewin's theory of choice,<sup>33</sup> and Freud's topographical model of the psyche,<sup>34</sup> confirming that he conceived the schema as a dynamic model of the mind in signifying action, a geometric form of critical thinking in time and space<sup>35</sup>. Waldheims recognized that the system's full potential required an ethical foundation as its essential complement.

### The Three Arts of Thinking

Waldheims embedded units of meaning within his cybernetic model, and in a 1965 patent application codified his art of thinking according to three units of meaning inspired by Couturat's work on Leibniz's *Dissertatio de Arte Combinatoria*, envisioning the systematic combination of known truths to derive new ones<sup>36</sup>. Together these constitute the architectures of thought, providing both the space and the method for a more comprehensive vision of the world through geometrization as an art of thinking. Where the computational dimension of his project did not materialize, Waldheims devoted the following thirty years to converting his system into a visual art form. In a 1992 manifesto, he argued that the individual must experience an aesthetic shock – a moment of astonishment – to break free from linguistic rhet-



oric and think critically<sup>37</sup>.

Waldheims's art shares a structuralist sensibility with Barthes's semiological model, in which social semiotics treats ideology as the premise for meaning making. In doing so, it recovers Abler's principles of using geometry and algebra to discern between truth and falsity<sup>38</sup>. It also echoes Fowler's analysis of the Greimas veridictory square as a tool to investigate binary propositions to determine truth/falseness in a semiotic act<sup>39</sup>. The first of these arts is the *Ars disserendi* – the art of discovery (fig. 8).

Waldheims associates it with the unit of meaning that combines art and science

11 | The three arts of thinking: a) *Ars disserendi* – Knowledge - #67 (1964); b) *Ars inventiendi* – Comprehension - # 62 (1964); c) *Ars combinatoria* – Entendement - #63 (1964).

<sup>34</sup> Freud, *Métopsychoanalyse*, 1940.

<sup>35</sup> Waldheims, *La géométrisation de la pensée exhaustive*, Unpublished literary work certified by the Copyright office at Ottawa, Canada 1970.

<sup>36</sup> Couturat, *La logique de Leibniz*, 1901.

<sup>37</sup> Waldheims, *La philosophie plastique*, Unpublished literary work, 1993.

<sup>38</sup> Abler, *The Human Mind: Origin in Geometry*. 2010, pp. 420-421.

<sup>39</sup> Fowler, *A Taxonomy of the Greimas Square*. 2025, p. 8.

in the construction of knowledge, yielding a first moment of ethical thinking: the art of seeing clearly, free from ideological distortion and the selective perception cultivated by disinformation. It rests on the horizontal axis, where beauty on the left and truth on the right are held as worthy pursuits.

The second art is the *Ars inveniendi* – the art of invention. It balances wisdom between individual good at the base and universal justice at the extents of the vertical axis, developing an understanding of the world (fig. 8). This unit of meaning yields a second moment of ethical thinking: the art of creating what the situation demands. It requires incorporating a range of perspectives, from the individual to the collective, and challenges one to recognize that others' needs are as real and as legitimately claimed as one's own – a critical step in the development of solidarity. The third art, the *Ars combinatoria*, is the art of generating all possible combinations and mapping logical space to systematically explore every possibility – the art of exhaustive thinking. It is the quest for the *entendement*, built from extensive knowledge and understanding into a single unified act, it embodies the creation of ethical singularities: new principles and possibilities of justice not previously considered or conceived.

This resonates with Tarasti's account of Greimas's model, in which syntactic and semantic columns operate as parallel phenomena through isotopies, smaller elements constructing deep-level structures, a combinatorial logic not unlike the one Waldheims sought to operationalize through geometrization<sup>40</sup>. This fits with the premise where Sonesson proposes that the schema is the structured successor of isotopies<sup>41</sup>.

The triadic architecture, grounded in the geometrization of the extensive, intensive, and singular, unites the analytic power of the *Ars disserendi*, which clarifies contradictions and reveals truth and beauty, with the ethical power of the *Ars inveniendi*, which fosters understanding of complementary positions and respect for both individual and collective needs. These culminate in the *Ars combinatoria*, orienting thought toward solutions beyond the current cognitive horizon.

Together, the three arts lead to the *entendement* – the sovereign faculty of understanding, seeing clearly, discovering wisely, and creating justly – forming the foundation of an ethical worldview in which peaceful coexistence becomes possible.

### Conclusion

The foregoing analysis demonstrates how the *Schema of Understanding*, while conceived as a prescriptive and artistic instrument rather than a purely theoretical one, nonetheless maps onto a range of established semiotic frameworks – from Saussurean semiology and Hjelmslevian connotation to the Greimas semiotic square and Gärdenfors's conceptual spaces. This convergence is worth approaching with interpretive caution: the parallels identified here are retrospective alignments rather than documented influences, and the Schema's primary ambition was ethical and aesthetic rather than semiotic in any formal sense. What distinguishes Waldheims from the theorists cited alongside him is precisely this prescriptive dimension. His system was designed not merely to describe how meaning operates but to redirect how thinking proceeds. This overview offers only a brief introduction to the broad ramifications of the forty years Waldheims devoted to schematizing the mind and constructing a map to orient thinking – work underwritten by a profound philosophy. The six objectives of his *Philosophie plastique* are as follows:

- Visualize cognitive representations through geometric diagrams;
- Develop an appreciation for aesthetics, especially through drawing;
- Manage astonishment as the ethical force that manifests itself in solidarity with others and with nature;
- Present the unit of meaning as a model of cognition;
- Adopt the unit of meaning to reduce cognitive antagonism between individuals and the collective;
- Limit the primacy granted to linear (verbal) thinking<sup>42</sup>.

These working principles outline a new architecture of the mind, combining the extensive objectivity of mathematics and geometry with the intensive constructs

of affectivity and intellect. The analysis and synthesis yielded by this plastic philosophy seek justice and security, offering a potential counter to the negative consequences of a civilization dominated by linear thinking and the unidirectional verbal manipulations of propaganda and disinformation, forces that run counter to democratic and humanitarian values. Further structural and functional investigations of Waldheims's geometrization on both the semiotic and philosophical levels will help qualify its relevance as a means of engaging ethical reflection in the face of society's ever-changing dilemmas.

<sup>40</sup> Tarasti, *The semiotics of A.J. Greimas: A European intellectual heritage seen from the inside and the outside*, p. 43.

<sup>41</sup> Sonesson, *Greimasean Phenomenology and Beyond: From Isotopy to Time Consciousness*, p. 2.

<sup>42</sup> Waldheims, *La philosophie plastique*. Unpublished literary work.

## Bibliography

- W. Abler, *The Human Mind. Origin in Geometry*, in *Science Progress*, XCIII, 2010, 4, pp. 403-427.
- G. Aiello, *Visual Semiotics. Key Concepts and New Directions*, in L. Pauwels, D. Mannay (eds.), *The SAGE Handbook of Visual Research Methods*, SAGE, London 2020, pp. 367-380.
- W.R. Ashby et al., *Perspectives cybernétiques en psychologie*, Presses universitaires de France, Paris 1951.
- S. Baris, *Geometric Abstraction and Visual Metaphor (A Thought Experiment)*, in *Discursive Geometry and More*, Goldenmark Publications, Poland 2023.
- L. Couturat, *La logique de Leibniz*, Ancienne librairie Germer, Baillièrè et Cie, Paris 1901.
- W. Duch, *Concept Representation and The Geometric Model of Mind*, in *Studies in Logic, Grammar and Rhetoric*, LXVII, 2022, 80, pp. 151-167.
- M. Fowler, *A Taxonomy of the Greimas Square*, in *Axioms*, XIV, 2025, 3, art. 207, 24 pp.
- S. Freud, *Métapsychologie (1915)*, Gallimard, Paris 1940.
- P. Gärdenfors, *The Geometry of Meaning. Semantics Based on Conceptual Spaces*, The MIT Press, Massachusetts 2014.
- R. Guy, *Zanis Waldheims. Une interprétation géométrique de la société*, in *M@GM@. Revue Internationale en Sciences Humaines et Sociales*, XVII, 2020, 2.
- R. Guy, *Une pensée exhaustive dans un monde binaire*, in *M@GM@. Revue Internationale en Sciences Humaines et Sociales*, XIX, 2021, 3.
- R. Guy, *La montée de conscience d'une intelligence artificielle*, in *M@GM@. Revue Internationale en Sciences Humaines et Sociales*, XXI, 2023, 3.
- L.D. Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*, MIT Press, Massachusetts 2013.
- L. Hjelmslev, *Prolegomena to a Theory of Language*, The University of Wisconsin Press, Madison 1969.
- K. Lewin, *Principles of Topological Psychology*, McGraw-Hill, New York 1936.
- S. Lupasco, *Logique et contradiction*, Presses Universitaires de France, Paris 1947.
- V.V. Malloy, *Dimensionism. Modern Art in the Age of Einstein*, Mead Art Museum and MIT Press, Massachusetts 2018.
- R. Ruyer, *La cybernétique et l'origine de l'information*, Flammarion, Paris 1954.
- F. de Saussure, *Cours de linguistique générale*, Grande Bibliothèque Payot, Paris 1916.
- G. Sonesson, *Greimasean Phenomenology and Beyond. From Isotopy to Time Consciousness*, in *Semiotica. Journal of the International Association for Semiotic Studies*, 2017, 219, 21 pp.
- E. Tarasti, *The Semiotics of A.J. Greimas. A European Intellectual Heritage Seen from the Inside and the Outside*, in *Sign System Studies*, XLV, 2017, 1/2, pp. 33-53.
- P. Teilhard de Chardin, *Le phénomène humain*, Éditions du Seuil, Paris 1955.
- Z. Waldheims, *Description du schéma de l'entendement*, unpublished manuscript, Montréal 1963.
- Z. Waldheims, *Introduction au schéma de l'entendement. L'art topique ou l'art de penser, proposal for patent application*, unpublished manuscript, Montréal 1966.
- Z. Waldheims, *La géométrisation de la pensée exhaustive*, unpublished manuscript certified by the Copyright Office at Ottawa, Canada 1970.
- Z. Waldheims, *1975-1981 Sketchbook*, unpublished manuscript, Montréal 1980.
- Z. Waldheims, *La philosophie plastique, unpublished manuscript*, Montréal 1993.