

METAPHYSICAL MATHEMATICS

Jole de Sanna

The metaphysical act imposes an identity that requires a terminology dealing with opposites. Dedicated to the geometric functions of metaphysical painting, the following study demonstrates how, from two extremities of history, Pythagorean harmony and modern mathematical physics come together in de Chirico's work, upholding the space of the painting.

At the dawn of the last century, for the young "Faust" descendants of Goethe, space was the valet of time. In 1906, de Chirico and his adolescent peers in Munich enclosed interiority and psychic flow inside "time". Oswald Spengler writes that "one's own", destiny and time are mutable terms.¹ De Chirico appropriates the perception of cosmic rhythm as a "voyager in time and within himself". In the paintings, the natural science of the past – Pythagorean harmony – reaches the frontiers of modern physics in a unity of time constituted as "one's own". With fixed attention on "his" epoch, the artist superimposes two different phases of history and visions of the universe. At the beginning of the twentieth century, the concentration of energy focused on art was parallel to the expansion of mathematics and theoretical physics. To the trained eye, the connection between these endeavours is evident.

The paintings analysed here trace out a genealogy of space in this order:

- the fulfilment of harmony and the Golden Ratio in a Pythagorean and Platonic context (from *Timaeus*) in the first metaphysical paintings (1910-12) situated in relation to the Universe or Infinite, as well as the rediscovery of the scenography of Ancient Rome and the use of modern theatre technology to define the metaphysical piazza (town square) inside the uniform polyhedron;
- the adaptation of the Platonic solids and Leonardo da Vinci's polyhe-

¹ O. Spengler, *The Decline of the West* (1923), Copyright Alfred A. Knopf, Inc, New York, 1926.

dra in relation to the mathematical physics of J. H. Poincaré in the paintings of the initial French period, in conjunction with the exhibitions at the Paris Salons of 1912-1913;

- the conic constructions of Euclid's *Optics* and the use of the curved space of spherical geometry in the context of modern physiological optics and the resulting effects of retinal reactions through optical stimuli (Gestalt);
- the adoption of non-Euclidean geometry (hyperbolic) within solids that describe the piazza in relation to astronomical time;
- the study of the classic canon and Dürer's canon in the definition of the human body; the adaptation of the classic canon to non-Euclidean spherical geometry.

Using identical cognitive premises this analysis identifies the correlation between two paths, the Infinite and the human being.

Divine Proportion - Hyperbolic Geometry Two Measures

Florence - Paris 1910-1912

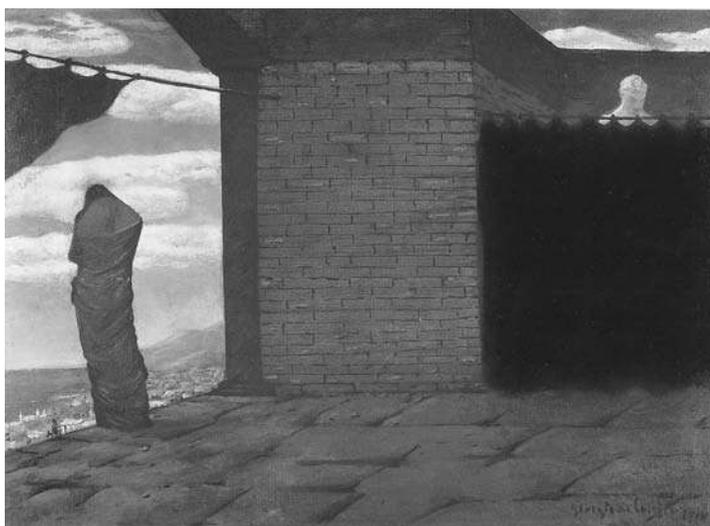
For modernity, Goethe's Faust is a myth of consciousness. The early de Chirico is generated from a Faustian consciousness and an Apollonian notion of nature. In the study of this artist, the scholar gets accustomed to a scenery scattered with the simulacrum of the Delphic cult and to incursions into scientific activity. If for Hermann von Helmholtz, an author of reference for physiological optics studies on de Chirico, "*the final goal of natural sciences is to discover the movements at the root of every change and to interpret them through mechanics*"; the artist takes the *seen* image of nature to the *represented* image with a numeric order of a measurable structure. The transposition of Pythagorean thought to Albert Einstein is a proposition of the spiritual possession of nature by means of measurement. De Chirico's maturation is documented in the paintings of 1910 in Florence:

L'énigme d'un après-midi d'automne, 1910

L'énigme de l'oracle, 1910



L'énigme d'un après-midi d'automne, 1910



L'énigme de l'oracle, 1910

The height to width proportion of both paintings is 0.75. Prior to a description of the works it is to be taken into account that both are constructed on the Golden Ratio. In *L'énigme d'un après-midi d'automne* (fig. 1) the temple is in the Golden Ratio width-wise to the sides of the painting, while the frontal brick wall in *L'énigme de l'oracle* (fig. 2) is a Golden rectangle. The work is organized according to classical proportion. At second glance, the first *Enigma* presents the Florentine piazza in a way that is completely different from the perspective view of a town square. It is more like a construction of volumes set in a spatial box – a polyhedron – delimited by a wall, the other side of which the sails of a boat unfold, a motion achieved

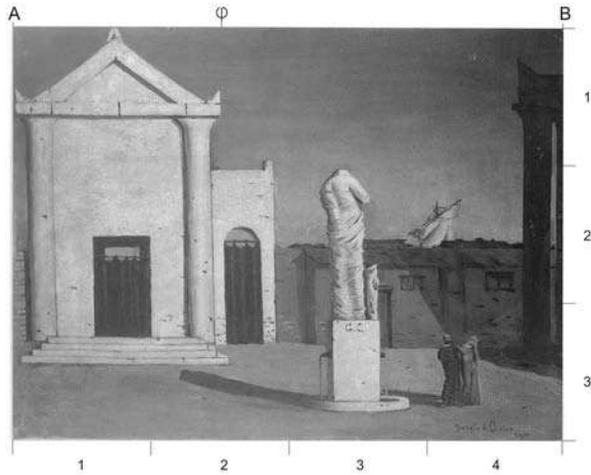
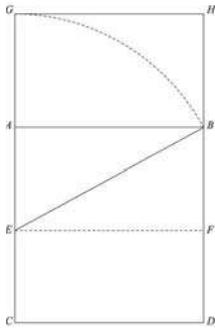


fig. 1



A rectangle is a Golden rectangle when its length and width are in the Golden Ratio. The square ABCD in the figure is cut in half at points EF. With E as centre, an arch is drawn with a ray equal to EB that meets the prolongation of side CA of the square in point G. The rectangle with base CD and height CG is a Golden rectangle.

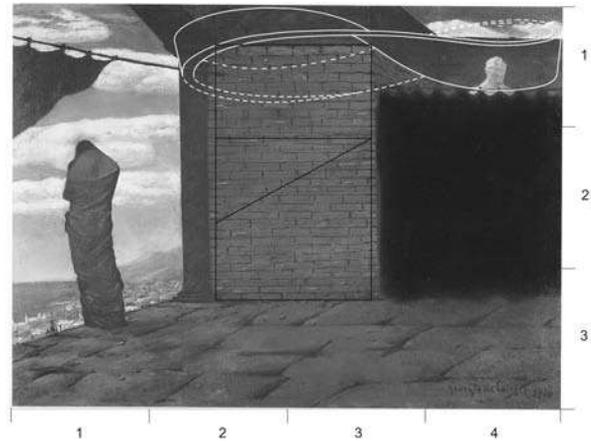


fig. 2

with respect to the position of the box. Clearly, the artist is working within a lexicon of spatial motifs that exemplify celestial movement by means of proportion and polyhedra² (fig. 3).

Shown at the Salon d'Automne in Paris in 1912, the structure of the second *Enigma* is an evolution of that of the first. The enigma is a mathematical one. Observe the dark strip of bricks at the top of the frontal solid, a hexahedron, with the two rods that hold the curtains: two spatial states and two levels of time are achieved. The ceiling can be perceived either as a ceiling or as the vertical continuation of the solid. It seems to flip-flop from one position to the other. Continuing to the right, it turns the corner into the other solid to vertically delimit the wall against the sky behind the oracle. It moves from left to right, first as a perspective angle on the valley, then as a covering, then as a background. And yet it is always the same band. It is a so-called Möbius strip, a topological model elaborated in the 1800's to

² Kepler represented a series of spheres and polyhedra alternatively inscribed one inside the other and supposed a proportionality between the radii of the spheres and the radii of the planetary orbits.

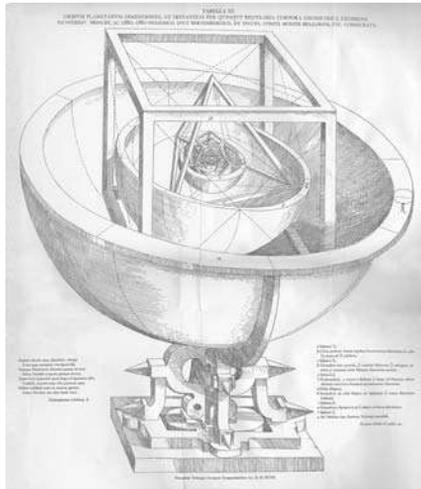


fig. 3: Johannes Kepler *Mysterium Cosmographicum*, 1596

achieve the “inversion” function necessary for the illustration of celestial mechanics³ (fig. 4). The two rods at different heights mark two temporal states fastened in unity to the same scene. The functions of internal and external fuse together in an inverse double movement that enchains the scene to its own evolution. The “enigma” of the oracle is a mathematical enigma (or paradox). On its own it suffices to explain de Chirico’s toil in uniting the remote foundations of celestial mathematics – Pythagoras – and his own scientific period. The iconography of the

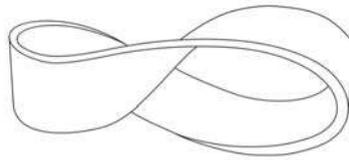


fig. 4

first two *Enigmas* is complimentary: in one, Ulysses-Dante⁴ raises the anchor in Piazza Santa Croce in Florence and in the other, pays a visit to the oracle. During the Renaissance, Florence reaped the heritage of Pythagoras and Plato through Marsilio Ficino and Leonardo da Vinci (fig. 5). The following analysis will show how young Giorgio’s choice of Florence as the birthplace of Metaphysics – meditated on during the years from 1906 and 1909, between Monaco and Milan – is a result of destiny (de Chirico’s father was from Florence). In *Memorie della mia vita* (*The*

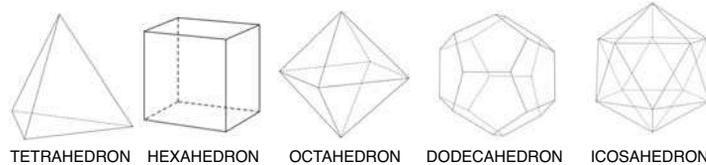


fig. 5: *The Platonic Solids*

³ The non-orientable surface discovered by astronomer and mathematician August Möbius in 1858 (*De computandis Occultationibus Fixarum per planetas*, 1815), commonly known as the Möbius strip, was independently discovered and published by Johann Listing. The study of polyhedra makes use of non-orientable surfaces.

⁴ Böcklin’s Ulysses in *The Isle of the Dead* substitutes the statue of Dante in Piazza Santa Croce, Florence.

⁵ Upon exiting the cave of meditation he left Samos for Egypt with a letter of presentation from the tyrant Polycrates for Amhes II (570-525 b.c.). He visited the sanctuaries and was admitted to the mystery cults of Isis and Osiris in Diospoli. He travelled through the land of the "Barbarians" (the Persians) while receiving the Zoroastrian (magician and vaticinator) teachings (F. Nietzsche), on the *Division and reuniting of opposites* (the sun-shadow dialectics of the god Ohrmazd). At the age of forty he left Samos, which was under tyrannical rule and set sail towards the new world, Italy, where he instituted a teaching method for higher knowledge and moral institutions for the free man, in the area surrounding Crotona and Taranto. In Italy, Pythagoras is known for his voyages to Crete and Delphi. Resembling Apollo, he is known as a Hyperborean Apollo "from the golden thigh" (A-pollo, the affirmation of the *One* and negation of the multiple). As Oracle he listens to the disciples of his oral doctrine, *acusmatotai*, from behind a curtain. In the same way as the *Upanishad*, he assimilates voyages, departures and returns with death and rebirth. Plato (*Philebus*, 16c) incarnates Prometheus in him, who transmitted the divine knowledge to man (see de Chirico's painting with this title). The infinite (innumerable) begins with the division of one and two and designs the cosmos (order) in the bipolar separation of contrary pairs (hot-cold, wet-dry, etc.).

⁶ See de Sanna, *Analisi della forma III. Tempi. Iconografia*, in *De Chirico, Metafisica del Tempo*, edited by J. de Sanna, Ediciones Xavier Verstraeten, Buenos Aires, 2000, p. 23.

⁷ "Thus spake Nicomachus", author of Pythagoras' biography. The Pythagorean school had two levels: moral, legislative and political teachings for the *acusmatotai* listening in front of the curtain; and *matemata*, a body of scientific studies based on demonstration (see Pythagoras' theorem). The *acusmata*, Pythagorean moral, is based on arithmology. Virtue is the balance between opposites; it is measure. One. One is the point of departure for an explanation of the physical constitution of the cosmos. Multiplicity is contained in a double path of 1-2 that fulfils itself in the Decade, which is All, God and Earth. The Pythagorean Tetraktys is

Memoirs of G. de Chirico), while describing his first moments in Paris after Florence, de Chirico draws a similarity between Pythagoras and Schopenhauer: "*The painter Laprade did not hold for Metaphysics and the mystery of dreams, the interest of a Pythagoras or an Arthur Schopenhauer.*" Pythagoras is the first Wanderer of the West, the archetype of the metaphysical binomial: knowledge-voyage (movement); he designs astronomical space (the *apeiron* of his master Anaximander) by means of Number. ⁵

The Metaphysics of the voyage are passed on to de Chirico through the Romantic doctrine and the "sublime". ⁶ The iconography of the first two metaphysical paintings brings the Pythagorean theme to light. At this date the full iconology of Metaphysics can be considered complete and definitive to the same degree as the content. All that follows (1910-1978) is really demonstration, *matemata* (Ωζ φησι Νικδμαχος). ⁷ Prior to harmony and proportion, is the secret of construction and root of eternal nature: the Tetraktys (Delphic Oracle), ⁸ a combination of the tetrad and the decade. We become aware that with this numerical function and its extension – the tetrahedron –, de Chirico throws angular perspective to the sides of the piazza. The Italian piazza is a box in which the entire Pythagorean and Zoroastrian ⁹ universe distinguishes light and shade in two principles: male (father, good, light, Ohrmazd) and female (mother, bad, darkness, Arimane: Ariadne). ¹⁰ More precisely: a region of light, reason and a region of darkness, the unconscious.

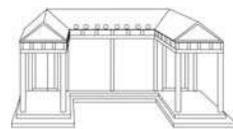
Georgio de Chirico

The paintings from the first period that seek a balance between the Divine Proportion of the past and modern mathematics carry the Latin signature "Georgio de Chirico". De Chirico arrived in Paris in July 1911, from the old Renaissance capital to the new. His well orchestrated steps left nothing to chance, as the coincidence with the anniversary of the French Revolution. The arrival in the new Athens brings to mind Plato's Pythagorean dialogue, *Timaeus*. Timaeus, the astrologer in the dialogue who reveals the structure of the universe (man and world) comes from Locri, a Pythagorean city. In the French Manuscripts de Chirico explains how "space", as treated in *Timaeus* and also evident in both Leonardo and Raphael's work, has a hold on him, though it is in Rome that he situates the inspiration of metaphysical space. ¹¹ *L'énigme de l'heure*, painted after the 1911 trip to Rome makes use of the background of

The School of Athens,¹² (fig. 6) proposing it in a double play on the culture of Rome during the Renaissance and Roman antiquity. The use of the “classical” system of harmony precedes reference to the statues of antiquity (*La méditation matinale*, “Georgio de Chirico”, 1912) and the statue of Ariadne. The third fundamental aspect concerning spatial structure is Roman scenography. Entering de Chirico’s space, along with Raphael, is the Vitruvian model (*De Architectura*) of fictitious valance walls taken directly from the frescoes of Roman cubicles and Pompeian scenography: the *thyroma* (entrance) and the *periaktoi* (lateral wings). Painted architectural screens on a base imitate a palace propylaeum that faces the peristyle of a court.¹³ His painterly illusionism passes initially through a Hellenistic-Roman phase in which the dimensions of the room are amplified by the image of a colonnade beyond which a second area exists. Vitruvius describes this as a model for *frons scenae* (proscenium). Under the scenic illumination of Aldophe Appia,¹⁴ the scenic box acquired by de Chirico from the erstwhile painters carries a double classical meaning.



An etching derived from a Pompeian fresco



Roman stage-set



fig. 6: Raphael, *The School of Athens*, 1510

It makes sense to reposition the encounter with Guillaume Apollinaire in Paris in a Pythagorean light. According to the *Memorie* this meeting took place around the time of the exhibition at the Salon d'Automne of 1912, where de Chirico was exhibiting the first two *Enigmas* and the self-portrait *Et. quid. amabo. nisi. quod. aenigma. est?*. Three enigmas, the third of which is a self-portrait and is constructed on the conic forms of Bernhard Riemann and Jules Henri Poincaré. A coincidence not to

the form of All. The Pythagorean dogma are: a) the immortality of the soul; b) metempsychosis or metempsychosis; c) the universal relationship between all living beings; d) the universal cosmic cycle. The principles of the Pythagorean science of nature are: One, the origin of number (Arithmetic); Two, the origin of line (Music); Three, the origin of the triangle (geometry); Four, the origin of space (Astronomy). Through Nietzsche (Thus spake Zarathustra) de Chirico unites Pythagoras (Thus spake Nicomachus) and Zoroaster.⁸ The Pythagorean sciences Astronomy (the sphere) and Music (harmony) are based on the Tetraktys.⁹ Pythagoras defines space as a system of ten spheres including: the seven planets, the sphere of fixed stars, the earth, and the anti-earth.

⁸ The Cretan Ariadne of Angra Mainyu (Arimane) in Sanskrit.

⁹ See Jole de Sanna, *Analysis of form. Theory. in De Chirico and the Mediterranean*, edited by J. de Sanna, Rizzoli, Milan, 1998, p. 11-32.

¹⁰ Ibid.

¹¹ Propylaeum are entranceway constructions of Minoan and Mycenaean palaces. They are also used for the entrances of sanctuaries, palaces and town squares.

¹² See New York, 1982.

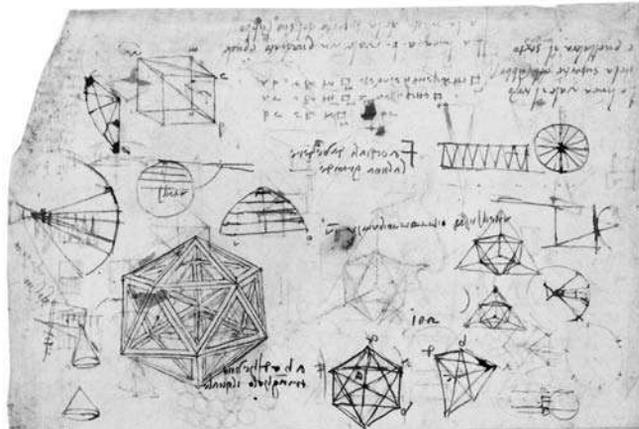
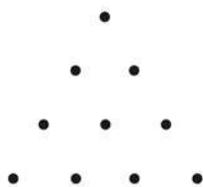


fig. 7: Leonardo da Vinci, *The Atlantic Code*, 1513-1514



The Tetraktys

be overlooked is that the Salon d'Automne (October 1st to November 8th) was contemporaneous to the *Section d'Or* show at the Gallerie La Boétie (October 10th - 30th) presented by Apollinaire. The entire Cubist formation was present, in particular the Duchamp brothers (Marcel, Jacques Villon, Raymond Duchamp-Villon), who were also seduced by non-Euclidean geometry and Poincaré. In the name of Leonardo da Vinci's *Sectio aurea*,¹⁵ Paris celebrated the return of Plato and Pythagoras (fig. 7). *La Section d'Or* was a blow to the exuberance of the avant-garde in favour of order. "Cubisme écartelé"¹⁶ (quartered Cubism) recalls Leonardo da Vinci's *Sectio aurea*, science of Divine Proportion, the universal principle of art and the foundation of Greek culture. At this point in time an understanding already existed between de Chirico and Apollinaire.¹⁷ Sar Péladan's translation of Leonardo's *Trattato* in 1910 and a conference he held in Florence in 1910 reinforces this thought.¹⁸ The paintings composed with the Golden Ratio that de Chirico brought to Paris proved to be an unprecedented experience for the artists who were active in the French capital at the time. He mentions his participation in the Saturday meetings organized by the review «Les Soirées de Paris» founded by Apollinaire in 1911. From this we can deduce that the first article written by Apollinaire, which regarded de Chirico's exhibition at the 1913 Salon des Indépendants, was the result of an understanding that had matured between them (it was Apollinaire who suggested he exhibit there, as de Chirico tells it).¹⁹ At any rate, de Chirico's painting was a firm demonstration of harmony and not merely the simple "adherence to a principle" found at the *Section d'Or* exhibition.

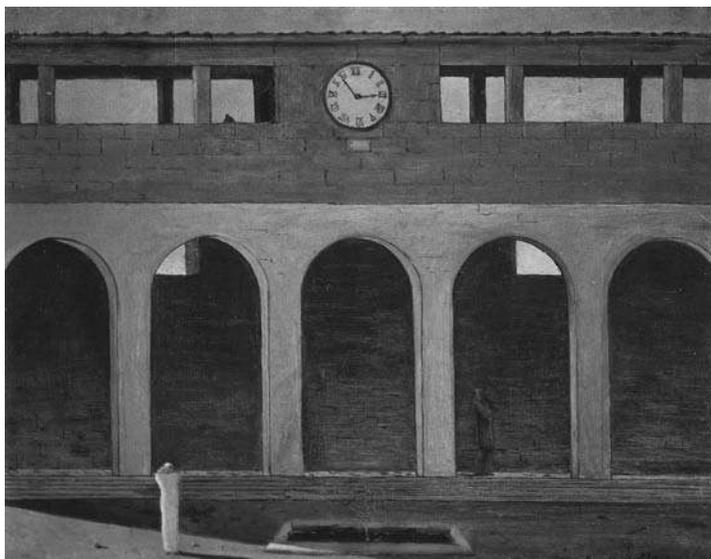
¹⁵ Joséphin Péladan translated Leonardo's *Trattato della pittura* (Treatise of Painting) in 1910. He attributes great mystical value to the geometrical configurations.

¹⁶ The title of Apollinaire's introductory conference to the show.

¹⁷ See Willard Bohn, De Chirico's early years in Paris, «The Burlington Magazine» London, Sept. 2003.

¹⁸ Sar Péladan, Leonardo da Vinci, conference in Florence, Milan: Treves, 1910.

¹⁹ See G. de Chirico, *The Memoirs of Giorgio de Chirico*.



L'énigme de l'heure,
1911-1912

The height to width proportion of the painting is approximately 0.77. As well as defining harmony in *Timaeus*, Plato defines time. Golden Proportion (auric) and the geometry of solids compose the “heart” of western Metaphysics: “*This cosmos, visible living being in whom all visible creatures are held, intelligible God, made in the image of the intelligible, great and good, beautiful and supremely perfect, thus born, unique, only-begotten sky*” (*Timaeus* XLIVc).²⁰ Time is the “moving image of eternity”, its body a sphere; its circular motion is similar to human intelligence and thought: “*And while putting order to the sky, creates eternity – which remains as one – an image of eternity proceeding according to number, which we call time*” (*Timaeus*, X, c)²⁰. The spatial clarity in *L'énigme de l'heure* distances itself from the remnants of late 19th century Symbolism present in the first two *Enigmas*. Similarly to the other two paintings, this one is signed “G. C.” under the clock and also “Giorgio de Chirico”. Giorgio: from Latin, or his name in French. The first enigma. The second concerns the date: 1911 or 1912? Was it executed in Italy or in France? It was shown at the Salon des Artistes Indépendants in 1913.²¹ The painting is a harmonic paradigm constructed around the pentagon, a Platonic solid (fig. 8). The spatial presentation reveals a pentagonal construction that unites the composition. The building's façade is divided in the Golden Ratio by a line that separates the luminous area of the portico below and the dark area of the gallery above. The vertex of the pentagon is positioned above the clock, which is cut in half by the painting's median line and is on axis with the fountain's jet (a topos of “rebirth” and of circular

²⁰ The function of Platonic proportion and geometry is to create agreement between the *prime elements* of reality (earth, air, fire, water) and movement (of light and time) in unity. To this end the *prime numbers* of arithmetic are used. If there were only two elements and the universe was two dimensional (a plane), a single mean would suffice for the reciprocal correspondence and identification of the elements; but as the world is solid, a system of *mean proportions* founded on the *prime numbers* equivalent to the *prime elements* is necessary to bind the various solids together.

²¹ Paris, March 13th - April 30th 1913. Also shown: *L'énigme de l'arrivée et de l'après-midi* and *La mélancolie du départ*.

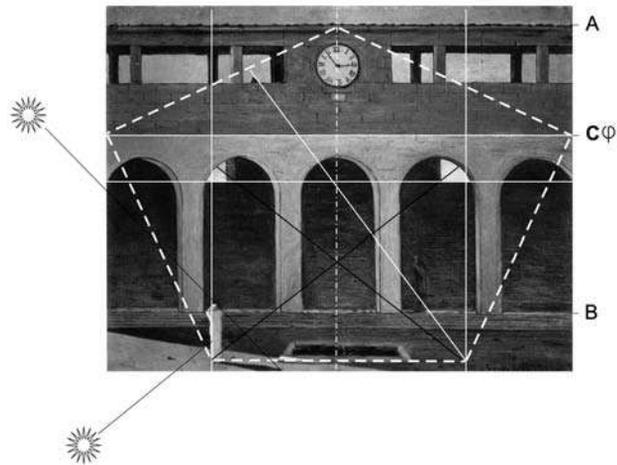
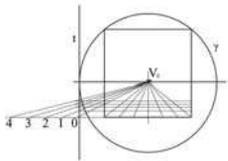


fig. 8



Decio Gioseffi: a pseudo-perspective scheme of Pompeian wall paintings of the II style.

return). The geometric centre of the painting falls in the middle of the spring line of the intrados of the central arch, in line with the bases of the two internal windows.²² The exact indication of the centre and the position of the iconological elements in relation to this point gives a decisive axiomaticity to the composition. As the centre of the painting falls along a clearly defined axis, it appears to be a perspective of Leon Battista Alberti. Care is needed here to discern that although all the inward lines should converge upon this centre, it acts instead as a reference point for “other” convergences. Alberti’s symmetrical perspective subsists with other optical effects. We have before us two different forms of logic that must be separated to be identified. It is the binary logic that de Chirico is getting us accustomed to.

A demonstration of pentagonal symmetry (harmony):

This first demonstration deals with the painting’s relationship to harmony. The line that separates the two areas of the building height-wise is in relation: $AB:CB = CB:AC$ (where A is the upper margin, C is the confining line between the two sections, B is the lower margin). The upper sides of the pentagon lie between the vertex above the clock and the two extremities of the median-proportion line. From this point the two sides are lowered: on the left to the foot of Ulysses positioned as a gnomon, an instrument for measuring light (time) and to the right of the fountain at the end of a diagonal line that runs between the two figures in shadow (which face away from each other), one in the gallery above and one under the portico. This line passes through the darkness of the two shadowed levels of the building. A line traced from a column on the far side of the gallery passes through a window to connect with the gnomon on

²² The geometric centre of a painting is not always the geometric centre of the framed canvas. When de Chirico left Paris in 1915 these paintings were left rolled up in less than perfect conditions for years. Re-framing may slightly alter the original set-up of the work. Photography can not be considered a perfectly reliable source either.

the piazza. This window is on an angular perspective towards the outside left in the direction of a light source, which is the same light source that casts the gnomon's shadow. The gnomon is also illuminated from the side. The corresponding window at the right diverges and points upwards in a reversed or rotated position, with respect to the left part. In regard to the light-shadow relationship, this perspective conversion grants shadow a greater advantage as far as quantity: two figures in shadow, intimately joined, compared to just one in light. The jet of water, the fountain's "spring of life" is almost completely in shadow. Nothing further is required to conclude that the Platonic pentagon carries symbolic weight. Like a hieroglyph, this polygon brings together numerous meanings: the clock and the gnomon (elements of time), the fountain and the figures in darkness.

With this, the Platonic lesson is solemnly affirmed. There exist in fact five regular polyhedra, with corresponding symmetry, known as the Platonic solids: the tetrahedron, the cube, the octahedron, the icosahedron and the dodecahedron. The structures of solid-state crystals are based on these solids. The five solids are inscribed in the same sphere with harmonic ties to the pentagon (fig. 9).

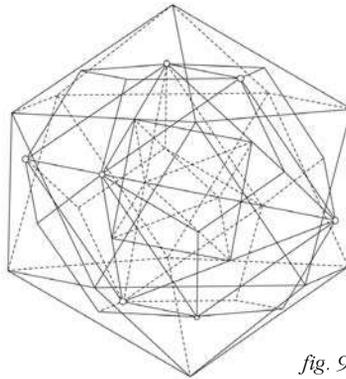


fig. 9

A second demonstration (Relativity):

L'énigme de l'heure contains the first metaphysical X, formed by the axis of the painting with the diagonal that touches the two figures in shadow, one in the hallway facing out to the sky and the other under the portico. I would like to make it known that the "X", a device found throughout de Chirico's *Metaphysics*, unites the human being and space in a harmonic and perspective relationship. The artist acquired it from Albrecht Dürer's *Treaty on the Symmetry of the Human Body* (fig. 10).

An X is formed by the diagonal that passes through the planes in shadow, exalting the firm preponderance of the quantity of shadow (the unconscious) with respect to the quantity of light distributed in the painting. The second X is formed by the two windows inside the portico, which are oriented in such a way as to cross one another perspectively.

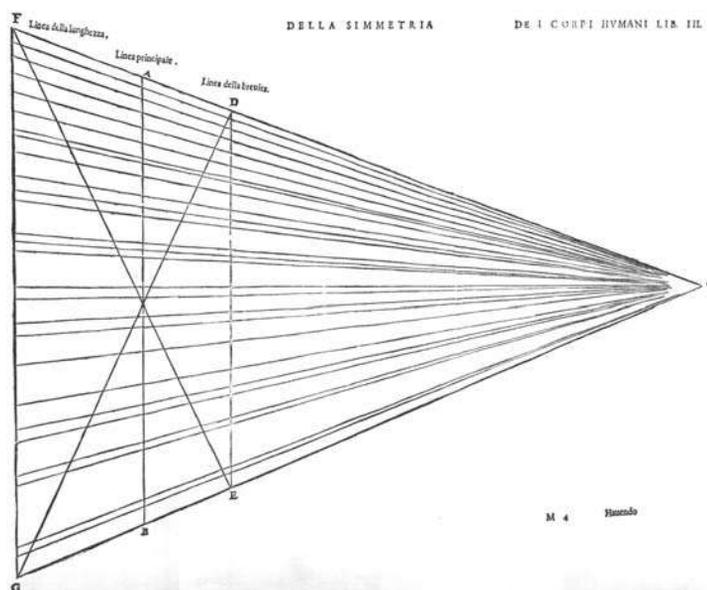


fig. 10: Albrecht Dürer: *Vier Bücher von menschlichen Proportion*, 1528

The scene encounters two different states of light and therefore two different moments in time in relation to a spectator on the other side of this double phenomenon, as is the gnomon-Ulysses. Ralph Schiebler ascertains the correlations between de Chirico's paintings *La récompense du devin* and *Les plaisirs du poète* (1913) and Albert Einstein's theses from 1905 to 1916 (*The Special and General Theory of Relativity*). He interprets the metaphysical X as the Greek syllable "Ch" of Chirico.²³ When all is said and done, X is the presence of man in the emptiness of the piazza.

The third aspect of Metaphysics is space as a form of the psyche. Spatial structure reunites reason and the unconscious. De Chirico *discovers* through reason that dreams and the unconscious do not obey the linear functions of logic, but rather relationships which are transferred to different and discordant levels and he strives for an associative rule (Cantor's set theory).²⁴ *L'énigme de l'heure* shows the artist in the act of demonstrating the dynamics of the unconscious. The space of the conscious is not three-dimensional but multidimensional. The psyche can be comprehended in a structure such as Cantor's logic of infinity. The psyche's meanderings form mathematical sets that foreshow the theme of the labyrinth and Ariadne in the piazza.²⁵ In a metaphysical painting, ancient and present cultures live side by side. Metaphysics is a double game: concerning space, between Platonic solids and non-Euclidean geometry; and con-

²³ In the novel *Il Signor Dudron* (1930-1978, Florence: Le Lettere, 1998, p. 85), the notion of X is understood as a moment of perfection reached by the individual. The bottom half of the divided X is the sacred A, in this case the delta of a river. The set-up of the painting *L'énigme de la fatalité* (1914) is a A.

²⁴ See de Sanna, *Mathematical Ariadne*, to verify a structuralist analysis of Sigmund Freud's psychology, in this periodical, p. 257. Previously published in Hans Henrik Brummer, *Kleopatra blir Ariadne, Identitet och Förvandling*. Den Matematiska Ariadne: Labyrinten, Stockholm, Carlssons, 2003.

²⁵ *Ibid.*, p. 257-258.

cerning logic, bivalent logic (Aristotle) and symmetrical logic or bi-logic (Cantor), a symbol of infinity for modern man.²⁶

The painting's date is in question. The "1911" in the painting corresponds with de Chirico's arrival in Paris. Stretching out towards the most advanced frontiers of contemporary science and at the same time a devoted tribute to classical harmony, *L'énigme de l'heure* is a testimony of de Chirico's relationship with the current artistic culture in Paris. De Chirico shared an interest with the area of Cubism concerned with the Golden Section. This specific group of artists is called *La Section d'Or*.²⁷ It is on this occasion that Cubism weighed all of its contradictions. Apollinaire carried out a second deviation after that of Orphism, of which he was the founder and held a conference (since lost) entitled *Le cubisme écartelé* (quartered Cubism).²⁸ The implicit relationship between de Chirico and Apollinaire was founded on the shared attraction of the young Italian and the Cubists to the classical norm. The nature of the Golden Rule is esoteric as well as metaphysical. In this context, Marcel Duchamp has a role of primary importance in the fusion of the fields of research regarding the esoteric and the fourth dimension. The same can be attributed to de Chirico as he had already established the theory of Metaphysics when he arrived in Paris and it could in fact be for this very reason that he was there. He did not follow the orchestrated lines of Apollinaire's "Soirées de Paris" passively, but made a higher bid of which Apollinaire was aware. (It was he who suggested that de Chirico exhibit his work at the Salon des Indépendants the following March).²⁹ The difference between de Chirico's paintings and those of the Cubists is remarkable. While Duchamp with *Nu descendant l'escalier II* (1912) and Juan Gris with *La montre* (1912) apply the Golden Section to the description of objects (Juan Gris, literally), de Chirico applies his ability to the vision of the mind. The link to Apollinaire is Henri Rousseau the Customs Officer. For the da Vinci cult, the Golden Section is the guiding line connecting Florence and Paris³⁰ (Apollinaire was arrested in 1911 as the presumed thief of the *Mona Lisa*). As de Chirico and Apollinaire were in communication from the beginning, the article written by Apollinaire in the «Intransigeant» for the Salon in 1913 was the result of, and not the beginning of, an understanding. The harmonic rule (Apollo's head, the fish) in the *Portrait* of Apollinaire is proof of this.



Marcel Duchamp: *Nu descendant l'escalier II*, 1912



Juan Gris: *La montre*, 1912

²⁶ For the Infinite in de Chirico, see the French Manuscripts, the poems in *de Chirico* (Fagiolo) 1985 and especially the structure of Hebdomeros (1929).

²⁷ The *Section d'Or* exhibition was inaugurated on October 9th 1912 at the Galerie La Boète in Paris. It included 31 artists and 180 works. A one-number-only edition of a bulletin was released on the same occasion with a foreword by René Blum and texts by Apollinaire and Maurice Raynal, among others.

²⁸ Conference at the Galerie La Boète, Paris, October 11th, 1912.

²⁹ De Chirico introduces himself into Apollinaire's "Soirées" around the time of his exhibition at the Salon d'Automne in 1912, as written in his memoirs (G. de Chirico, *Memorie della mia vita*, 1945-1962, Milan: Bompiani, p. 86).

³⁰ See the magazine «Leonardo» and Giovanni Papini.

*L'énigme de l'arrivée et
de l'après-midi, 1912*



The painting is divided in the Golden Ratio height-wise (at the top of the wall) and width-wise (on the boat) (fig. 11). Like the aforementioned painting, it was shown at the Salon des Indépendants in March 1913 and is signed “Georgio de Chirico”. The purpose of the Golden divisions is immediate: 1. To emphasize the wall as a metaphor of the labyrinth (the brick wall symbolizes the labyrinth of the modern city, derived by the artist from Romantic literature).³¹ 2. Show the means of transportation that carry the Wanderer through the oceans of space and time. The double thematic pivot is in place: the Voyage-Labyrinth (one and the same for the psyche). In the Platonic solid of the piazza, the distance between the

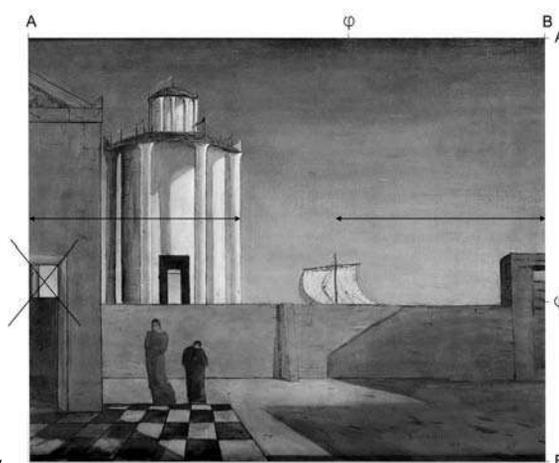


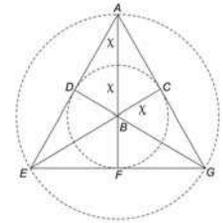
fig. 11

³¹ See de Sanna, *Analisi della forma III. Tempi. Iconografia*, in *De Chirico, Metafisica del Tempo*, edited by J. de Sanna, Ediciones Xavier Verstraeten, Buenos Aires, 2000, p. 23-52.

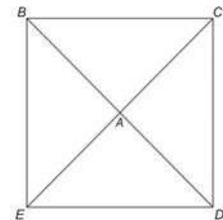
left margin and the last column of the temple is the same as the distance between the mast of the boat and the right margin.

Light and shadow draw scalene triangles on the wall and on the plane. In *Timaeus*, the scalene triangle as the face of a solid demonstrates the composing and recomposing of things from the four bodies that solids represent in abstract form, “which, through dissolution are capable of generating one from the other” (*Timaeus*, 53d). Scalene triangles give form to an infinite number of triangles (54a). Derived from the elementary scalene triangle are: fire (tetrahedron), air (octahedron) and water (icosahedron). The square and the cube derive from the union of four isosceles right triangles (55b). The cube is the form of the earth.

The broken line that separates light from shadow on the wall and on the ground draws alternating scalene triangles that encounter a shadow on the wall that is analogous to the truncated pyramid of the staircase in *La méditation matinale* (“Georgio de Chirico”, 1912) (fig. 12). In the labyrinth delimited by the wall, the inner geometry of the Platonic solids are drawn. A checkerboard on the ground announces the heraldic motif of the era between ancient and present times (Medieval). A protagonist of metaphysical space as an element of the *infinite*, the scalene triangle enters into the tetrahedron that establishes the perspective of the portico at the sides of the piazza. By means of Platonic geometry, celestial space inhabits the piazza: the triangle of infinity and the tetrahedron that represents fire, the sun.



Timaeus (54a)



Timaeus (55b)

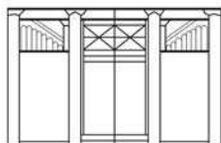


fig. 12: *La méditation matinale*, 1912

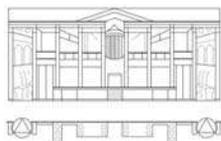


The Elements

Roman Scenography



Thyromata



Scenae frontes



*House of the Labyrinth,
Pompeii*

In 1936, at the same time as de Chirico's show at Julien Levy's in New York, the archaeologist A. M. G. Little published a reconstruction of the *thyroma* from Vitruvius' scenography in «The Art Bulletin».³² The archaeologist compares *scenae frontes* and *periaktoi* with painted *thyromata*. The two orders fuse together in wall painting when a propylaeum faces a columned courtyard from where the facade of a building is seen with a foreshortened view or from where a circular temple (*tholos*) is perceived. This fusion allows the staging of a double representation.

The *tholos* of *L'énigme de l'arrivée et de l'après-midi*, the round building with columns and an entrance on the left of the painting,³³ is an exact replicate of the *tholos* of the *House of The Labyrinth* in Pompeii. Of the Pompeian frescos this one appears to have the most rational perspective composition, where the majority of lines that converge toward the altar (over forty) differ greatly from a group (of about six) that diverges by a couple of centimetres.

The painting has a frontally positioned aedicule (small building) on the left like the *thyroma* of the *House of the Labyrinth*, from which a foreshortened door and window allow a view of the “second course” of the story. It all comes together coherently when an X is drawn from the crossing of the two different perspectives of the door and window frames. In *L'énigme de l'arrivée et de l'après-midi*, the concomitant citation of the wall as an urban labyrinth in accordance with the Romantic *Wanderung*, (*Voyage-Labyrinth*) significantly amplifies the vocabulary of Metaphysics.

Salon d'Automne 1913. Immersed Painting

La mélancolie d'une belle journée, 1913; *La tour rouge*, 1913
Nu, 1913; *Potrait de M.me Gartzén*, 1913; *Aurore*

The piazzas on show at the 1913 Salon d'Automne³⁴ are alike in their modular subdivision and symmetrical set-up on a central axis. The surface, in tune with the curvature of physiological optics (cone-shape) allows for the co-existence of plane and curved perspectives in a unity of space. In the portrait *Nu*, a tetrahedron with two windows in central conical projection inclines in three point perspective towards the spectator.

³² A. M. G. Little, *Scaenographia*, «The Art Bulletin», vol. XVIII, n. 33, New York, Sept. 1936, p. 407-418.

³³ It is interesting to note that the real function of the *tholoi* in Greek architecture remains a mystery, as long as they are not confused with the *tholos* funerary architecture.

³⁴ November 15th, 1913 to January 15th, 1914.



Nu, 1913

La mélancolie d'une belle journée, 1913

A central axis divides the surface of the painting symmetrically in modules: Ariadne is on the right, in front of the portico that contains the labyrinth (fig. 13). The Wanderer turns his back to us in the second module. The foreshortened perspective of the architecture on the left is in parallel or cylindrical projection. The convergence point identified by lengthening the depth lines, creates the horizon of the landscape F1, in correspondence to Ariadne's elbow. On the right, the convergence point of the foreshortening falls on the fourth module F2 (the horizontal median line of the painting), in line with Ariadne's eyes, on the scenic backdrop. The voyager Ulysses measures time like a gnomon on a sundial in the middle

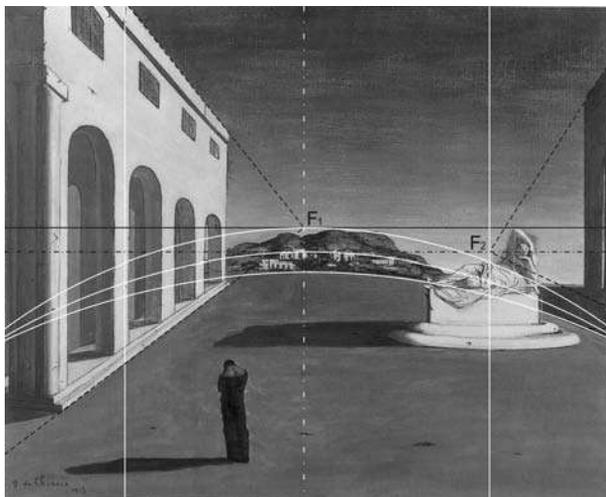
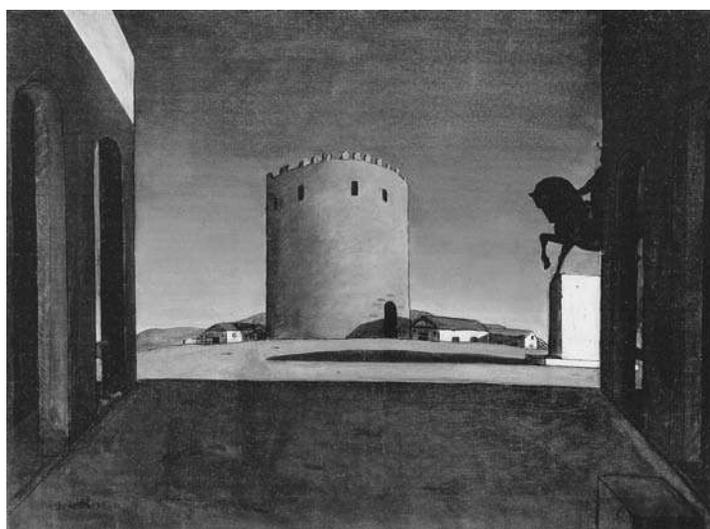


fig. 13

of the second module. The plurality of the points of convergence activates an invisible dial on which the points run like hours on a clock face. This preliminary description is useful to set the space over a lower, more real conic space (physiologic-optics) that descends on the elliptic profile, in rotation on the coordinates. Observe the upper profile of the piazza moving along the curves of the landscape. The surface generated on the piazza is spherical. Erwin Panofsky will theorize it one day as angular perspective construction.³⁵ Therefore we have two curved surfaces that can not be superimposed, the scenic backdrop and the piazza; a third is that of the landscape, immersed below the horizon. The radii of the circumferences of these arcs fall on the prolonged median axis of the painting. This is an attempt to stage an astronomical correlation of translations on the curved surface of the piazza, an event which will become more evident further on.

La tour rouge, 1913



The surface is divided into two modules and two submultiples of the module towards the sides (fig. 14). The central vertical axis passes through the tower but not at its centre. The line that creates the submultiple of the module corresponds to the column closest to the piazza on the right, in line with the edge of the cube, which for Plato is the earth. The module on the right is in line with the monument's pedestal. If we prolong the depth lines of the building on the left, at their point of convergence we obtain the horizon of the landscape F1. As the upper

³⁵ E. Panofsky, *Perspective as Symbolic Form* (1924-1927).

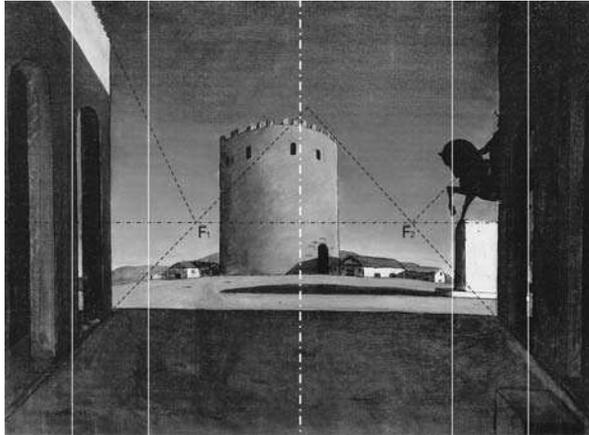


fig. 14

margin of the portico on the right is out of the picture; there is no line to indicate the perspective of this building and thus no convergence can be defined. What we have instead is the statue filling the ideal space of this convergence. If we use the horseman's arm as an additional convergence line, we obtain a vanishing point F2 that not only falls on the same axis, but is also symmetrical to that on the left. The curvature of the piazza has its centre on the continuation of the median axis line outside of the painting. The reconstruction of the modules provides a number of geometric meanings. As a language, geometry gives order into the iconography of Metaphysics. A lot had already been said on this subject when a definite and I would say astounding, revelation presented itself. De Chirico articulates the significance of geometric forms, not only on the surface, but also between the surface and the field under the perceived surface: *meta*



fig. 15

tà fusicà, under that which is seen. A photograph taken under infrared light shows an underlying composition: Ulysses, seen from behind, looks towards Ariadne, who is lying down (fig. 15). With respect to the central axis, he is positioned in the first module, in the same space he occupied in the painting just examined, *La mélancolie d'une belle journée*. This is the first evidence of the existence of underlying Metaphysics in the heart of the works considered as

“The First Metaphysics” executed in Paris between 1911 and the return to Italy. After *L'énigme de l'heure*, the continuity of the Ulysses-gnomon resides in both *La mélancolie d'une belle journée* and *La tour rouge*. The three paintings evolve an identical physical-geometric theme – and do so, as it seems to me – in chronological sequence.

Up to this point we have discussed the modular set-up and the scenic perspective. Another spatial support system comes from the conic constructions of Euclid's *Optics*, the base of modern optics (H. von Helmholtz). Observe the cylindrical tower and the parabola defined by the landscape on which the tower is raised.

Euclid's XXIII theorem dictates: “*In whichever way a ball is looked at with only one eye, only less than half of the ball will be seen and the part of the ball that is seen is contained within the circle.*”

To demonstrate this theorem a circle is drawn, with centre C (which represents the sphere on a plane) and observation point O. A second circle is drawn on line OC, with diameter OC. The intersection points of the two circles define A and B, which are the contact points on the tangent visual rays that determine the *apparent contour* of the sphere from point O and therefore a circle of lesser diameter than that of the first, with centre K and diameter AB (fig. 16).

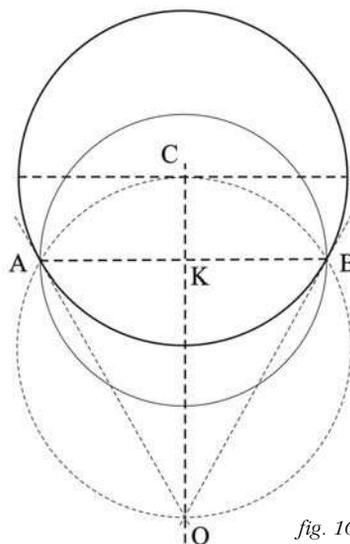


fig. 16

This is what is taking place in *Le tour rouge* where the area of the piazza in sunshine corresponds to the great circle with centre C. The contact line AB between the area in light and the area in shadow defines the axis of a circle with a smaller diameter, which is indeed the sphere we perceive (fig. 17). The closing-in of the two porticos reduces the visual angle producing an effect that supports Euclid's VI theorem: “*Things seen under a lesser angle appear lesser*”. The reduction of the visual angle (VI theorem) and the circle created between the tangent visual rays (XXIII theorem) produce a double parallel projection that balances above the landscape, also seen through a visual cone.

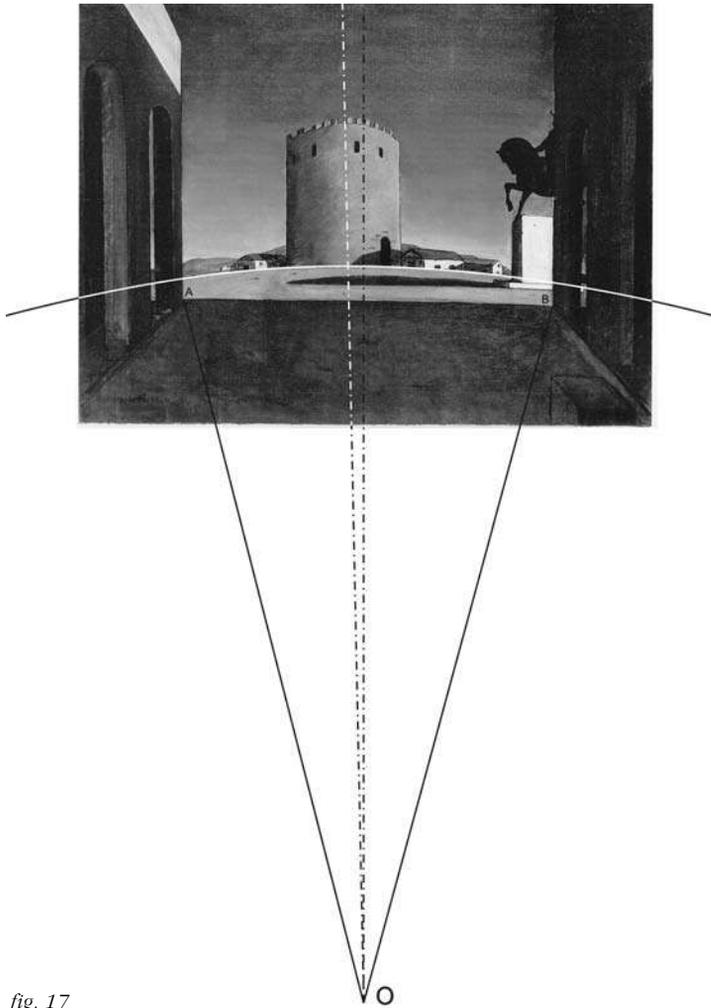
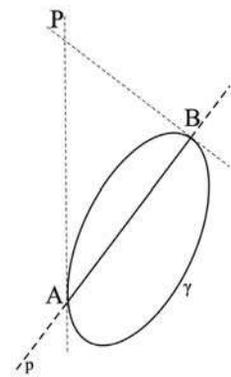


fig. 17

The image is a sphere in rotation. The change in the visual angle in relation to the rotation of the sphere is measured according to the phase-displacement of the cylinder with respect to its centre and to the position of the architectural foreshortening on the right that is not geometrically achieved. Similar to other towers of the period, a sensation of on-going motion is created by the tower, which slides with respect to the axis of the painting; the horse in mid-stride above its base strengthens the feeling of unstoppable motion. The sketched cube at the lower right is in line with the portico and presents non-Euclidean volumetric sections. The result is achieved by means of optical stimuli through retinal reaction (Gestalt).



Polarity with respect to an ellipse



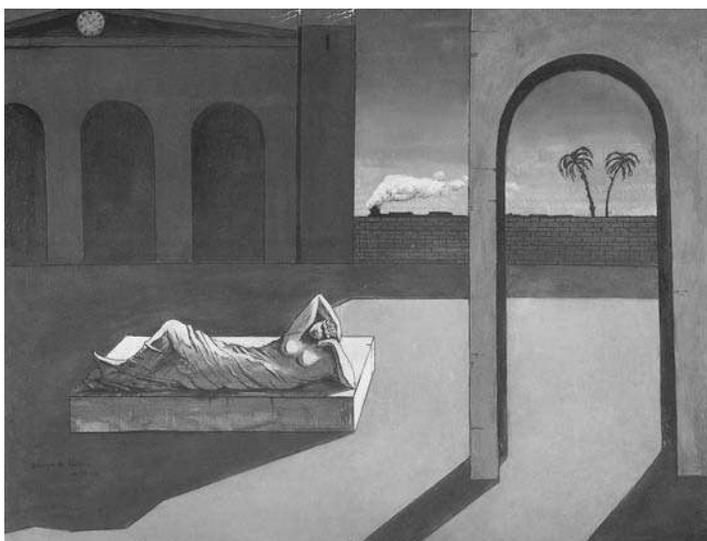
The Panthéon, Paris

The Italian Piazza in Place du Panthéon

Forms of Relativity

The height to width proportion of the painting is 0.75.

In the sequence I am following, this painting exhibits precise traits that identify the iconological and spatial character of the system.



La récompense du devin, 1913

Analogous to the *House of the Labyrinth* in *L'énigme de l'arrivée et de l'après-midi*, in this painting there is a frontally-positioned propylaeum, which functions as a *thyroma*; an aedicule on the right reverses the scene. Ariadne is a point of light in the shaded half of the painting, the focus of the labyrinth theme: she is the Lady of the Labyrinth. It is legitimate to assume that it was executed immediately after the exhibition of the two paintings *L'énigme de l'heure* and *L'énigme de l'arrivée et de l'après-midi* at the Salon des Indépendants in March 1913. The double structure of the *thyroma* observes Platonic cosmology. An enterprise concerning time in relativistic terms provides an ulterior dimension, as illustrated by Ralf Scheiber in «Metafisica» 1-2. Of late, additional discoveries made by Giovanna Rasario in the Florentine archives have put to rest the general conviction that artists had no knowledge of Einstein's theory before its disclosure in the "Times" on November 7th, 1919.³⁶ De Chirico's work bespeaks this theory and demonstrates an evolution of his own with respect to its principles, even concerning mathematics. The paintings referred to were in fact executed prior the 1916 date of *The General Theory of Relativity*.

³⁶ See G. Rasario *Giorgio de Chirico pendant Bellini*, in this periodical, p. 290-298.

³⁷ The example of a train in motion with respect to an observer and the Special Theory of Relativity was taken from Ralph Schiebler, Giorgio de Chirico and the Theory of Relativity, «Metafisica», n. 1-2, p. 211-222.

Description:

The painting is signed “Giorgio de Chirico”. Its surface is subdivided into modules. The module’s base is equal to the distance from the left margin of the aedicule to the centre of the archway; the height is the distance from the shadow under the wall and the lower margin of the painting, divided in two (fig. 18). The sculpture of Ariadne (from elbow to base)

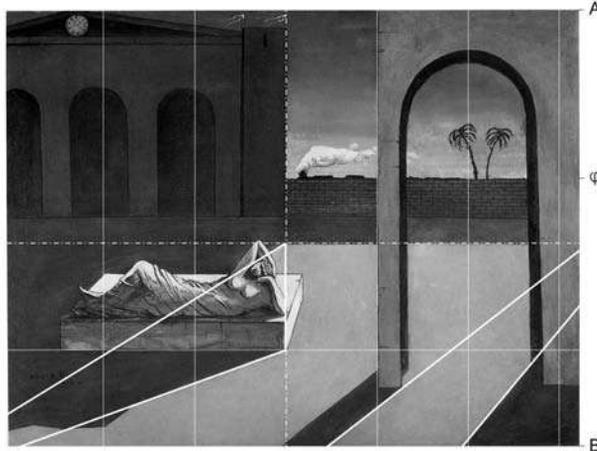
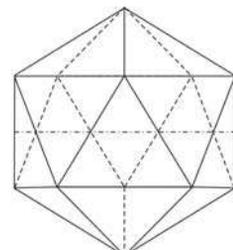


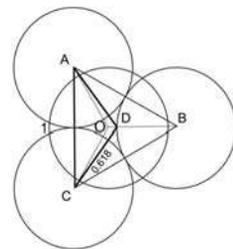
fig. 18

fills a module. The painting is divided height-wise in the Golden Ratio at the top of the wall. A platonic polyhedron that occupies all of the area in shadow, including Ariadne, has its vertex at the right corner of the base on which Ariadne lies. The saw-toothed edge of the shadow is an indication of other polyhedra in this area. A vertical line continuing from the right margin of the propylaeum onto the plane encounters a diagonal line that crosses Ariadne in the middle. This diagonal composes a scalene triangle with the shadow of the statue’s base. The scalene triangle formed by the shadows of the aedicule on the right, is symmetrical and reversed. Both scalene triangles are faces of an icosahedron . At this point the entire piazza materialises within an ideal crystal formed by the solid. The vision of a celestial body in orbit (harmony of the sphere) is palpable. The “relative” evolution is declared through the different times indicated by the clock and the shadows, the train’s movement and the two palms bending to different winds.³⁷

The diagonal that begins under the lower right corner of the propylaeum, as visible in the infrared light image, is traced across the entire scheme of the painting (fig. 19). It is the most eloquent line of the painting as it sets the direction in which the composition proceeds: in the centre it meets the vertical line that divides the painting width-wise in two and the



The icosahedron



Spheres in space: three spheres on an orthogonal plane form an angle of 120° and are connected at their respective centres by a equilateral triangle.

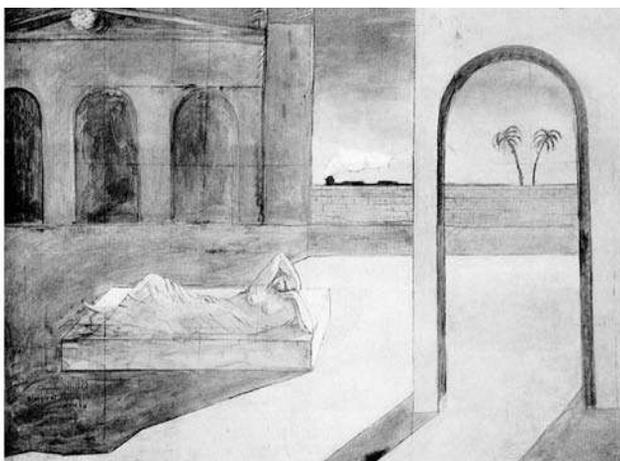
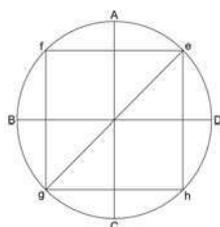
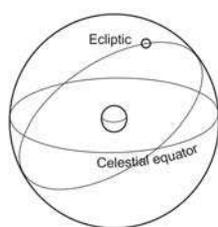


fig. 19



Timaeus (36d)

horizontal line that divides the painting height-wise in two. When read in light of *Timaeus*, the geometric centre of the painting is the intersection point of the equator (the painting's median line) and the ecliptic (the diagonal that passes through Ariadne). The junction of the lines bespeaks the movement that orchestrates the order of the skies, the harmony of celestial spheres. And it is an X:

“This entire compound God divided length-wise into two parts, which he joined to one another at the centre like the letter X and bent them together into a circular form, connecting them with themselves and each other at the point opposite to their original meeting point and comprehending them in a uniform revolution upon the same axis he made one the outer and the other the inner circle. Now the motion of the outer circle he called the motion of the same and the motion of the inner circle the motion of the other or diverse. The motion of the same he carried round by the side to the right and the motion of the diverse diagonally to the left. And he gave dominion to the motion of the same and like, which he left single and undivided, but the inner motion he divided in six places and made seven unequal circles having double and triple intervals, so there were three of each and bade the orbits proceed in a direction opposite to one another.” (Timaeus, 36d)

The double movement of the X holds the axis still. The lines of the painting express this in more than one way: the position of the inverted scalene triangles and the palm trees, etc. The alternating triangles in the metaphysical piazza express the divisions of celestial movement. In this aspect, *La récompense du divin* is a milestone in that it helps us to understand de Chirico's subsequent evolution. In fact, the orbits that

cross each other on the heads of the mannequins set celestial movement in a uman frame of mind.

A fake drawing circulating on the art market, made by tracing the infrared reflectography of the painting, indicates the celestial mechanics incorrectly by misinterpreting the crossing points of the segments and the shadows (fig. 20). Now let us consider the two halves, one in light and one in shadow. If we observe the shadowed area as if it were part of a face of a pentagon, we can immediately establish the sunny area as settling itself around the pentagon like two faces of a dodecahedron. This dodecahedron "box" is also set in the icosahedron

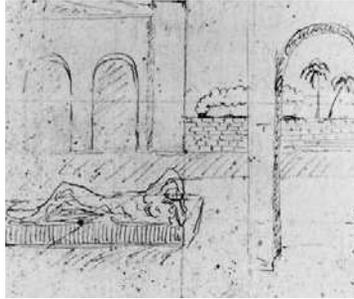


fig. 20

of a dodecahedron. This dodecahedron "box" is also set in the icosahedron

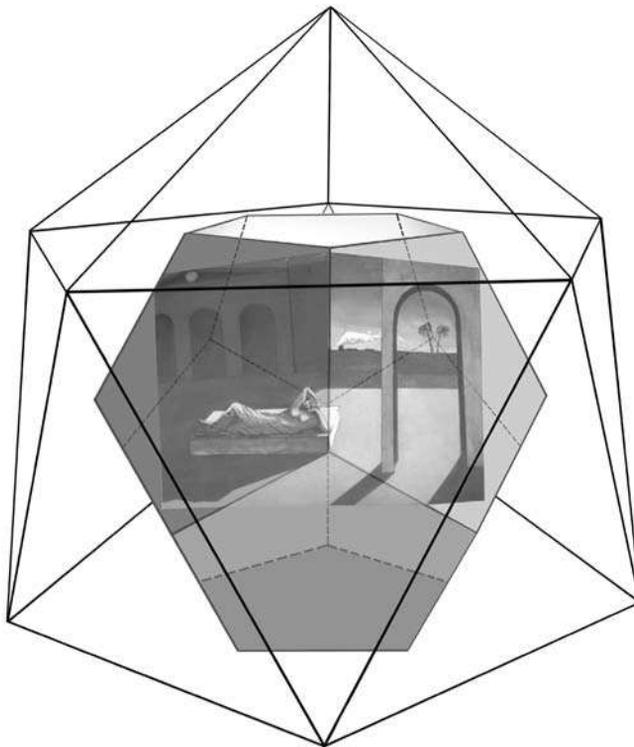


fig. 21

described by the scalene triangles (fig. 21). The division of the lighted areas raises the quality of the numerical calculation. Conceived inside the solids inscribed in the sphere, the work floats in a space that is absolute.

Deformation of the solid. N. I. Lobačevskij models

Les plaisirs du poète,
1913



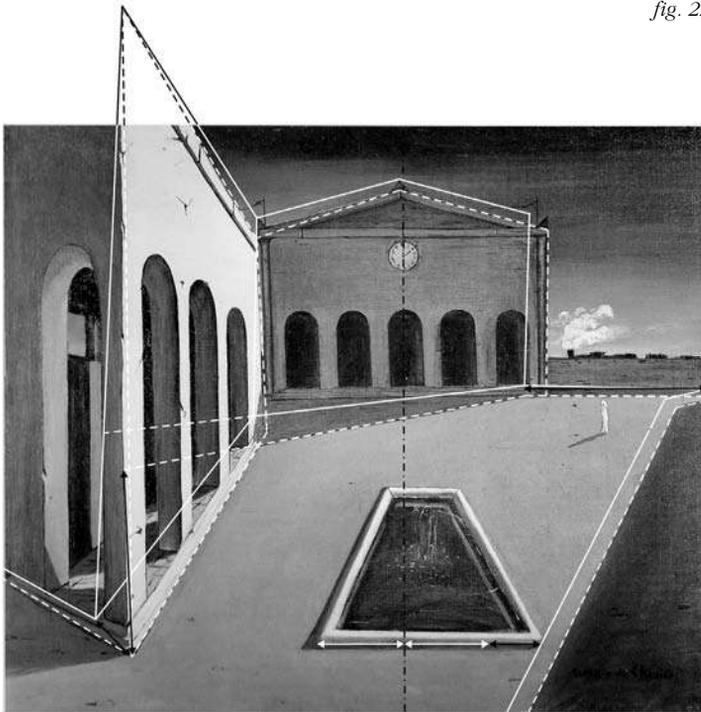
Signed “Giorgio de Chirico”.

The tetrahedron on the left that reproduces a scale image of itself on the inside, makes this painting a prototype: a mathematical labyrinth is inserted into the portico, in the piazza as a metaphysical box. *Les plaisirs du poète* is the first Platonic solid that actually deforms time.

Description:

There is no longer a geometric centre indicated in the painting; all its measurements are elastic, they slide both forward and to the right. The degree of this compression, announced in *La tour rouge* by the distance of the tower from the painting's central axis, can be measured on the fountain, which is not divisible in symmetrical parts: the lower corner stretches out to the right (fig. 22). The perspective of the portico on the left is the centre of action: in central conic projection, it is, in fact a tetrahedron that opens into itself in three-point perspective while a second foreshortening that diverges towards the horizon occurs on the inside. The foreshortened portico is a Platonic tetrahedron inserted into a Platonic sphere, seen from above. The viewpoint is doubled and time is doubled by multiple indicators: the clock, the shadows, the water clock and the gnomon.³⁸ The spatial structure modifies itself with respect to time. The quantity of time is measurable by tracing an imaginary line down from the peak of the roof, along the clock's hand set on

³⁸ Ibidem.

fig. 22

XII that divides the fountain into two non-symmetrical parts. We will identify the difference between the left and right sides as the unit of measurement of the compression of the portico. The angle created between the line we have traced and the bottom edge of the fountain indicates the degree of the painting's rotation (90°).

The measurement we have gathered on the plane is only a clue. The significant measurement lies within the Platonic sphere. It is therefore necessary to dismantle the painting by looking at its construction as a spatial box. We discover that what we have open before us is an authentic polyhedron. The polyhedron is composed of pentagonal faces, the profile of which – the propylaeum with the clock – faces us. Similarly to the tetrahedron on the left, it can be inserted into a cube and then a sphere. However, it is a cube that is deformed. The deformity can be measured as we have done on the fountain; by lengthening the propylaeum's shadow until it meets the edge of the tetrahedron, the distance from this point to the corner of the tetrahedron is the same as the distance between the right side of the propylaeum and the edge of the painting. Ideally, one could fold the sides together and it would form a cube. The significance is now clear: the cube that stands for the earth moves with respect to the solid that stands for fire, (the sun), the tetrahedron.

What has been seen empirically up until now is actually the result of a trigonometric calculation on an imaginary sphere (a sphere with a radius of an imaginary number). The use Poincaré made of N. I. Lobačevskij's theory (*Principles of Geometry*, 1829-1830, *Pangeometria*, 1855) nourished de Chirico's evolution in dealing with the task at hand: the evolution of celestial bodies in space. The parallel axiom that confutes Euclid's fifth postulate (two parallel lines never meet) supports "imaginary" geometry.³⁹ De Chirico puts this to use by having the faces of a flattened polyhedron slide – and meet imaginarily – with a pseudosphere. To get an approximate idea of this procedure, one must consider how a surface shifts at a certain point and begins to curve. We shall proceed with Gauss's theorem that looks at the curvature of a surface in the section of a plane that passes through the perpendicular to the surface at stable point P. There exist three fundamental kinds of points whether the curvature is zero, positive or negative. They are called parabolic, elliptic and hyperbolic points. In imaginary geometry they are called cylinder, peak and saddle points. This is the direction de Chirico takes with *La tour rouge* (zero), *La mélancolie d'une belle journée* (positive) and *Les plaisirs du poète* (negative); paintings in which the curvature create cylinders (towers), hills (landscape) and parabola (the profile of the piazza) (fig. 23).

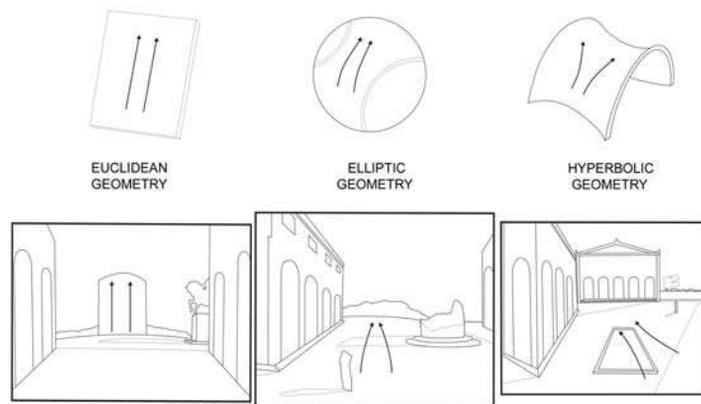


fig.23

The tetrahedron from chapter V of Lobačevskij's *Principles* can be applied to the portico of *Les plaisirs du poète*, concerning the solid angle it contains (fig. 24). The development of a solid angle is configured according to Euler's formula in hyperbolic geometry. Euler's formula is valid for the decomposition of spherical polygons in triangles and the decomposition of rectilinear polygons, where a third line joining the extremities of two

³⁹ Lobačevskij called his new geometry "imaginary geometry" in his treatise on hyperbolic geometry *Principles of Geometry* (1829-1830).

sides creates a triangle (this is what occurs on the fountain to the left of the axis), as well as and for solid angles in polyhedra (fig. 25). The polyhedron in Lobačevskij's diagram is obtained from a sphere through continuous deformation without interruptions or duplications.⁴⁰

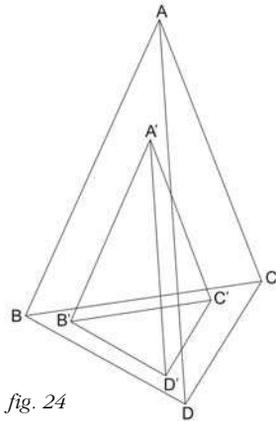


fig. 24

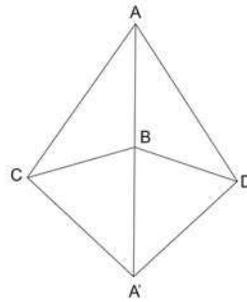


fig. 25

The forward position of the tetrahedron's corner (three-point perspective) acts as an introduction to the mathematical labyrinth inside the portico. Ariadne, whose statue de Chirico says he saw in Versailles, heralds the Labyrinth theme. To have seen a Hellenistic statue that was well known to him from Florence and Rome, near Paris, carries new significance. The acquisition of the mathematical labyrinth took place in Paris.⁴¹ The Golden Ratio with which Metaphysics came into being in Paris was nourished by Poincaré's lesson.

De Chirico arrives gradually at the dimension of complexity illustrated in *Les plaisirs du poète*. In the experimental paintings *Méditation matinale* and *Méditation automnale* (1912) signed "Georgio", de Chirico used Euler's formula independently from the parallel postulate, therefore on the brink of hyperbolic geometry. The case taken from Euler is called the tiling problem $n = \infty$ (n is the number of faces). Here, it provides for the tiling of the plane by using only equilateral triangles, squares or hexagons as "tiles" and does not permit any empty spaces or overlapping. The Euclidean plane can be tiled with regular polygons by using equilateral triangles, squares or hexagons. In hyperbolic geometry the problem is more complex. In these two paintings the adoption of hyperbolic geometry is rendered imminently by the phase-displacement of the two lateral perspective wings that continue to strive empirically to bridge the gap of two-fold time, while the pavement of the piazza looks to the "second"

⁴⁰ Lobačevskij writes: if the surface of a body consists of six complete triangles: ABC, ABD, ACD, A'B'C, A'B'D', A'C'D' and one non-complete triangle BCD (the resulting triangle, B'C'D' indicates the inner contour of the body) Therefore, in this case the numbers $p = 12$, $n = 7$, $t = 8$ do not correspond to the equation $p = n + t - 2$ (where n is the number of faces, t the number solid angles, p the number of edges), as the resulting polyhedron is not convex.

⁴¹See de Sanna *Mathematical Ariadne*, in this periodical, p. 258.

way of adopting Euler's formula by deforming triangles, squares and hexagons in relation to a sphere or pseudosphere.

Ariadne in Place du Panthéon **Jules-Henri Poincaré**

Let us get to the point. The previously mentioned text, retrieved by Giovanna Rasario from the archives of gallery owner Luigi Bellini,⁴² revalorizes de Chirico's interest in, or connection with Albert Einstein, which up until now had been an inductive hypothesis elaborated from the paintings. The text, edited by de Chirico (which we know almost always means written by de Chirico and then veiled under another name), was intended for the Acquavella gallery exhibition in New York in 1947.

The relationship between the two worlds of art and science has never been thoroughly examined. Just after the Second World War, Einstein was annoyed by the allusions made by Siegfried Giedion, Alexander Dorner and Paul M. Laporte concerning an eventual connection of his work with the painting of the moment. Although his letter on art only dealt with Picasso and Cubism, he did not deny a relationship between art and science, he merely called for the specification of respective "coordinate systems".⁴³ The confrontation of "systems" becomes increasingly intriguing with the writings on de Chirico by Carl Einstein (of Einstein parentage).⁴⁴ The linking of facts, paintings and concepts becomes increasingly easy at this point. It is between Italy and Paris (1911-1912) that "Georgio acquires the mathematical instruments to make space". The Italian piazza evolves in the sphere of Apollinaire, steeped with Jules Henri Poincaré.⁴⁵ In the first chapter of *Raisonnement mathématique* (1908) Poincaré writes: "*It is impossible to represent empty space. All our efforts to imagine pure space, from which the changing images of material objects are excluded, can only result in a representation in which, for instance, highly-coloured surfaces are replaced by slightly coloured lines. By continuing in this way everything would disappear and end in nothing. Hence arises the irreducible relativity of space.*"⁴⁶

⁴² See G. Rasario *Giorgio de Chirico pendant Bellini*, in this periodical, p. 290-298.

⁴³ Quoted by Paul M. Laporte, in *Cubism and Relativity*, in *Art Journal*, XXV/3, New York, spring 1966, p. 246-248.

⁴⁴ See Carl Einstein in this periodical, p. 485-488.

⁴⁵ See earlier in this text, la *Section d'Or*.

⁴⁶ H. Poincaré, *Science et méthode* (1908), Paris: Flammarion, 1947, p. 95.

By contemplating *L'énigme de l'oracle* one can imagine that Poincaré had something to do with the move to Paris. The mathematician passed away in 1912 right at the time of the mathematical gestation of the piazzas. In the Piazzas with Ariadne of 1913 it is quite impossible not to notice Poincaré's assumption that *excludes* "absolute" space: "*I am at a precise point in Paris, in Place du Panthéon for instance and I say: "I will come*

back here tomorrow.” If asked, “Do you mean that you will come back to the same point in space?” I should be tempted to answer “Yes”. Yet I would be wrong, since from now until tomorrow the earth will have moved, carrying with it the Place du Panthéon a distance of more than two million kilometres... This two million kilometres has been covered by our globe in its movement in relation to the sun and the sun in turn moves in relation to the Milky Way and the Milky Way itself is no doubt moving without our being able to recognise its velocity. So that we are, and shall always be, completely unaware how far the Place du Panthéon moves in a day. In fact, what I mean to say is “Tomorrow I shall once again see the dome and pediment of the Panthéon” and if there was no Panthéon my sentence would have no meaning and space would disappear. This is an utterly simple explanation of the relativity of space.”⁴⁷

It comes back to the same question: was it the Ariadne in the park of Versailles who inspired the Piazzas with Ariadne, or was it the publications and the discussions held by Poincaré at the Académie des Sciences? Time commands a space that ceases to be absolute. The clock in all its forms (gnomon, quadrant, etc.), the temple’s pediment and roof (the propylaeum on the piazza) and the differences in the shadow’s measurements, are all exact quotations from Poincaré. These indicate two different paths of relativity, one regarding the mathematical lines and one regarding colour. Being a mathematician, Poincaré does not explore the second. De Chirico does. In order to follow his line of thought it is necessary to go under the portico and into the labyrinth where his inseparable mathematical and painterly study intensifies. There under, a geometric labyrinth awaits us, as revealed by *Le voyage émouvant*, and a labyrinth of colour, evident in the porticos from *La lassitude de l’infini* to *L’après-midi d’automne*. The collocation of Prussian blue and vermilion red side by side under the porticos is analogous to the geometric meandering of the tetrahedron. The coinciding of the three aspects of the problem is hidden by de Chirico below the surface. It is necessary to “look underneath” all of the paintings of this period. On the same canvas, a new kind of painting is superimposed on an existing painting, in order to produce relativity and to intensify the labyrinth. Michael Taylor reproduces an x-ray image of the underlying painting of *La surprise* in the Philadelphia catalogue: a precise representation of a piazza with a clock in a predominant position.⁴⁸ The painting underneath *L’après-midi d’automne* is one of the artist’s oldest and brings us back to the start of his research with the portrait of a classmate from the Monaco Academy (fig. 26). The inner labyrinth of the

⁴⁷ Ibid. p. 96.

⁴⁸ See Michael Taylor, *Giorgio de Chirico and the myth of Ariadne*, Philadelphia Museum of Art, 2002, p. 42-43.



L'après-midi d'automne,
1913

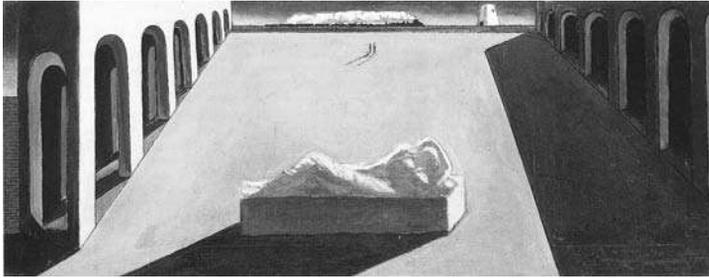
artist's operation is, to start with, a labyrinth of memory.

De Chirico's revolution is not simply the actualisation of Pythagorean and Platonic harmony in mathematical physics: it is accomplishing this by endowing colour with a mathematical-physical personality. Upon his return to Italy he demonstrates this by investing his effort in the conquest



fig. 26

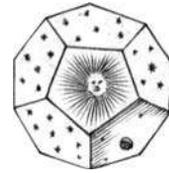
of colour in the metaphysical interiors. The world deciphered through celestial mechanics is no less than the journey of light waves through ether. The turning point of the Piazza's with Ariadne occurs when the artist takes on this theme. The theme is the shape of the cobalt blue lunettes in *La lassitude de l'infini* and the double transparency of the vermillion red in *Les joies et les énigmes d'une heure étrange*, shown at the Salon des Indépendants in 1913. De Chirico brings the results of a frenetic mathematical-physical activity to the Salon. The X's found throughout the production of 1914 focalise his presence as a man undertaking great toil. Light (colour) imposes itself upon the mathematical artist as a measurement of the heat received by the sun's movement and the heat produced by the artist's own movement.



La lassitude de l'infini,
1913 (1912)

Description:

The painting is divided into modules defined by the width of the portico on the right (fig. 27). The height of the module divides the painting in half and passes above Ariadne's elbow. The statue occupies the two lower central modules. The spatial language of the painting grants Ariadne a central role in a piazza that has a non-Euclidean labyrinth in the tetrahedron (portico) on the left. Ariadne is in line with the tetrahedron. In other words: Ariadne enters the piazza in a rational state, which will save Theseus (her second state is bacchanalian). The piazza puts two structures in place: the modular division with Ariadne centrally positioned and the Metaphysics of the solid with the top half of the spatial box open in the section of a dodecahedron. The pentagon, the face of the dodecahedron, displays only its bottom half with its vertex pointing down. Its shape is completed below, outside the painting. The base of the pentagon is the line that joins the perspective convergencies of the two tetrahedra. This side undergoes two diversions that indicate the deformation of the solid



*The dodecahedron: ether,
the quintessence*

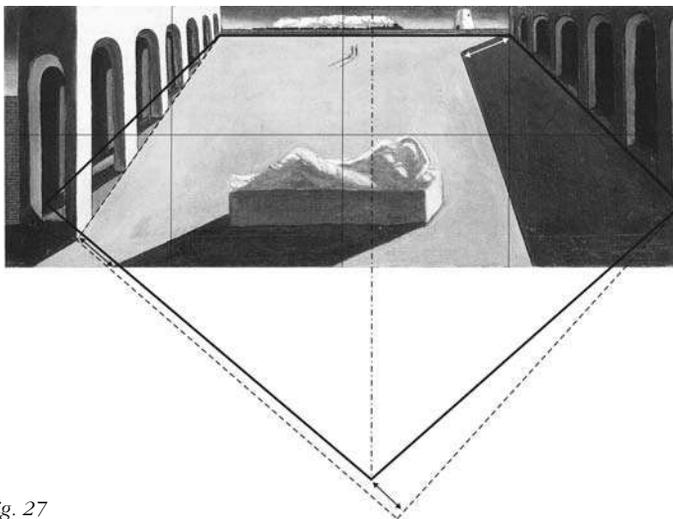


fig. 27

(relativity). Even in this case the quantity of movement can be measured by taking the length of the upper margin of the shadow created by the portico at the right, which forms a scalene triangle with the base of the wall. This triangle is Ariadne's true thread in the portrayal of the infinite in the piazza. The length of this edge is the same as the distance between the corner of the tetrahedron at the bottom left and the point where Ariadne's shadow coincides with the painting's margin. In brief: the painting flattens in two directions, towards the right and downwards. The piazza is suspended on two celestial orbits, which is the true subject of the painting. Theoretically, one could verify the relative movement by conjoining the extremities. For those who have seen the painting, the vision perceived is that of "a tipping-over", which gives the impression that the yellow ochre plane in light is on a high and immeasurable frontal elevation.



Salvador Dalí, *The Sacrament of the Last Supper*, 1955

In the theme of the twelve apostles, Leonardo's Last Supper evokes the mystical translation of the dodecahedron. Salvador Dalí rendered this structure after Surrealism.

The quantity of light that floods the piazza in *La lassitude* is proportionate to the force of colour within the portico's shadow. Poincaré writes: "Attraction is not absorbed by the bodies it encounters, or it is minimally. The light produced by Newton's attraction must be considerably different from ordinary light and must have, for example, a very short wavelength. Without taking into consideration the fact that if our eyes were sensitive to such light, the entire sky would appear much brighter to us than the sun and the sun would emerge as black. Therefore the light that could explain this attraction would be much closer to Röntgen's x-rays than to ordinary light."⁴⁹ The piazza as the mirror of celestial mechanics takes a central position in the 1920's. Sitting mannequins, Nus antiques, Horses at the Seashore and the Gladiators all are generated by light, their entire substance a result of layers of colour. The materiality of light in these works detaches itself from the iconography (mythology) of the sun disc and the terrestrial globe in order to calculate the physics of light. The dilemma of sunshine (light) and attraction (absorption, black) is captured intelligibly by the black-colour relationship of the Mannequins and the Gladiators etc. The same happens during the Neo-Metaphysical period.

⁴⁹ H. Poincaré, *Science et méthode* (1908), Paris: Flammarion, 1947, p. 268.



Piazza con Arianna,
1913

Presumably consecutive to *La lassitude de l'infini*, *Piazza con Arianna* corresponds to the area at the upper right of that painting, which a geometric verification can confirm (fig. 28). The portico on the right and the solid on which Ariadne lies are in parallel and oblique axonometric projection. The vanishing point of the portico's perspective touches the tower. The tower leans backward away from the wall and is centred between the opposite movements of the train and the boat.

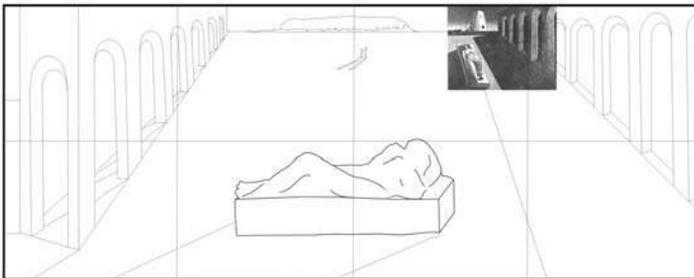


fig. 28

The painting, like *La statue silencieuse* with its white portico and “white” shadow, develop a group of questions. The tower understood as time compressed upon itself with respect to a zero instant is equivalent to that which is taking place between the portico and its shadow: the planes are super-imposable (fig. 29). Ariadne's bed, her shadow and the folds around her body can also be made to coincide into a repetition of shapes. In the non-Euclidean metrics of Felix Klein's model of collineation, the biunivocal correspondence between the points of “superimposed” planes is a bi-

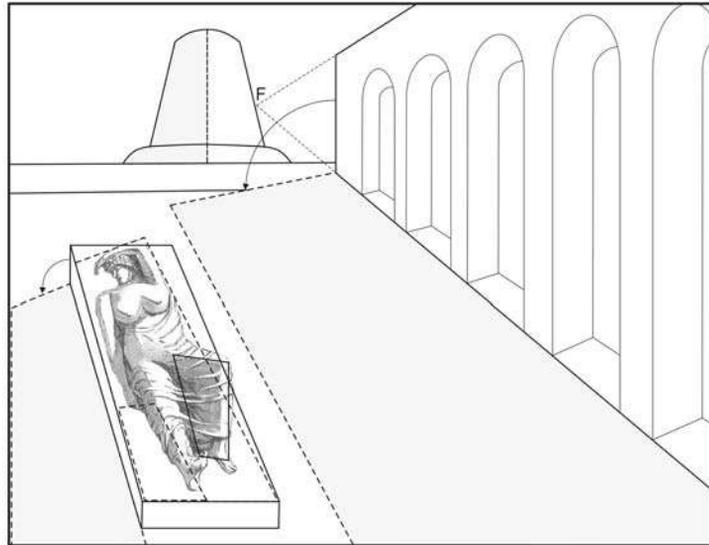
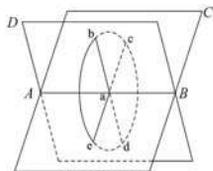


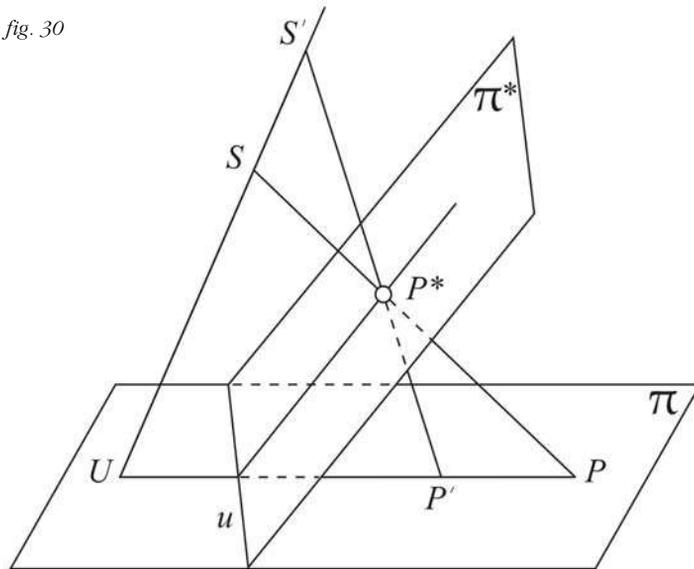
fig. 29

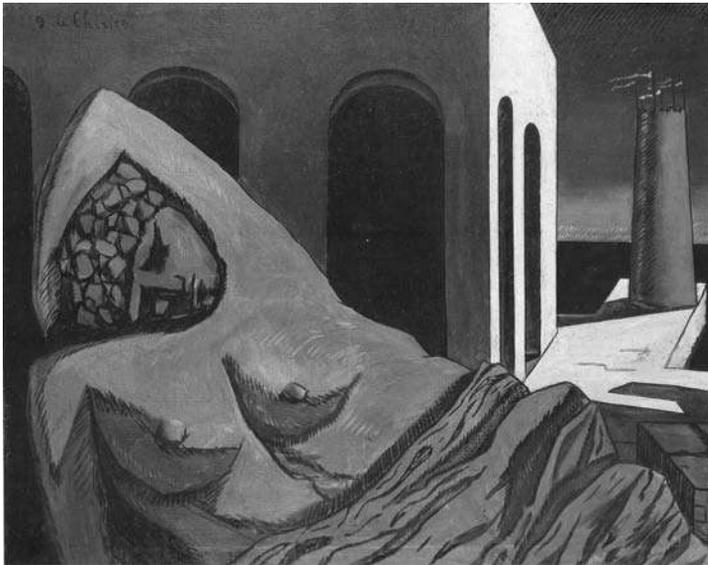
nivocal representation of the plane itself. Klein's model uses a transparent plane and a π plane that moves it (fig. 30). One of the possible point-by-point correspondences on the plane associates each point on the plane with only one point on the moveable plane. Conceived as the bi-univocal representation of a plane, the movement maintains the alignment of the points.



Lobačevskij: a dihedral angle is equal to the rectilinear angle between the perpendicular planes.

fig. 30





La statue silencieuse,
1913

Ariadne's shoulder marks the Golden Ratio height-wise in the painting (fig. 31). We have seen that the dimension in which de Chirico moves and the dimension *that* he moves is on the inside of solids moving in space. If we draw a diagonal across *La statue silencieuse* we obtain two scalene triangles, faces of an icosahedron. The solid materializes when we prolong the lined of the polygons and reconstruct the other faces of the polyhedron (fig. 32). With respect to the ideal sphere in which solids and their planes are represented, non-Euclidean geometry is a necessary instrument as it is, by definition, the geometry of solid bodies. The primitive entities, point, line and plane have physical significance.

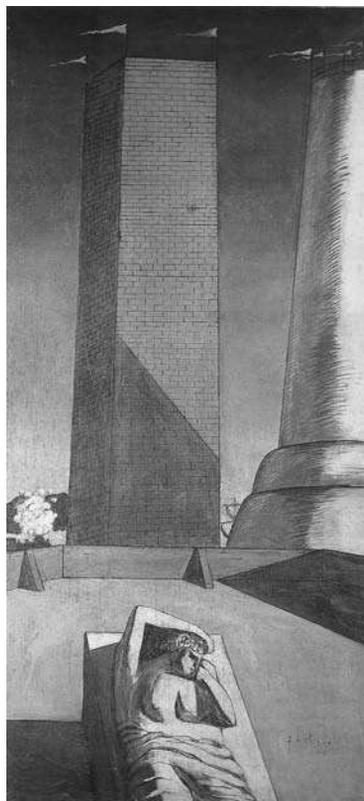


fig. 31



fig. 32

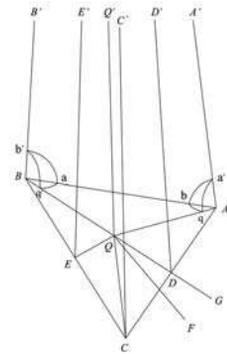
L'après-midi d'Ariane,
1913



In a sequence orientated on Lobačevskij's *Principles*, *L'après-midi d'Ariane* forms a group with the Ariadne's that precede it. This system is founded axiomatically, in that the geometric entities assume a position, not on a plane but on an orisphere (a sphere with a constantly changing radius). Thus a line is no longer a line on a plane, but an "oricycle on an orisphere". In this case, movement is considered to be that which changes the orisphere itself. Concerning the axiomatization of non-Euclidean geometry, as for example David Hilbert's work (*Grundlagen der Geometrie*), the axioms of motion were evidently a point of interest in de Chirico's research. The artist arranges

objects in his paintings in a non-conventional order. As de Chirico states in all his metaphysical writings, conventional logic is inadequate in describing the sudden movements of the conscience and unconscious. It is to be remembered that it is as *form* that the interior universe and the Universe itself come together in de Chirico.

Axioms of movement can be found in the sheaf of the rays that joins the corners of the tower and the surface of the chimney to Ariadne and are adopted under a primitive concept of equality (or congruency) by introducing as postulates the formal properties of equality between segments and angles (see the wall abutment in front of the chimney). If the horizontal axis of the painting is lowered in line with the artist's signature, Ariadne's body, cut through the centre, expresses the rotation with the movement of her arm (fig. 33). The tower sits on a curved plane and moves along a circumference that touches the first flags on the tower and the chimney. The tower reveals itself as a plane that wraps its movement around the central axis of the painting, which passes through the third corner from the left (fig. 34).



Lobačevskij: a plane intersects an orisphere either in an oricycle, or in a circle, depending on whether it passes through a line parallel to the axis or not.

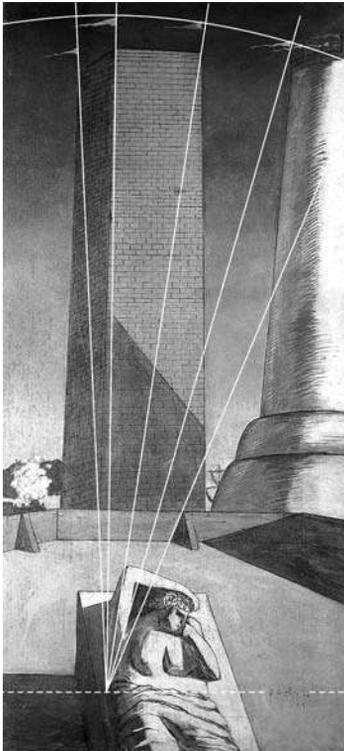


fig. 33

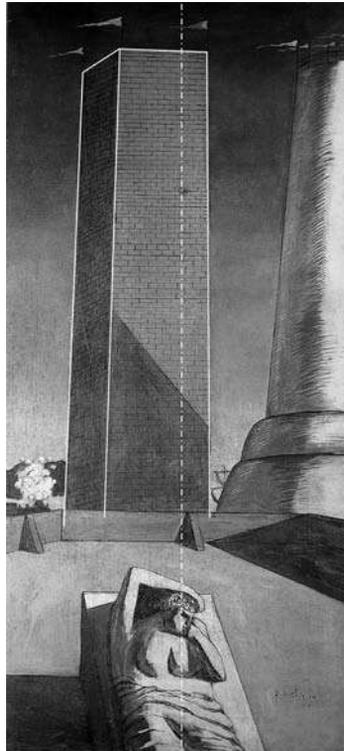
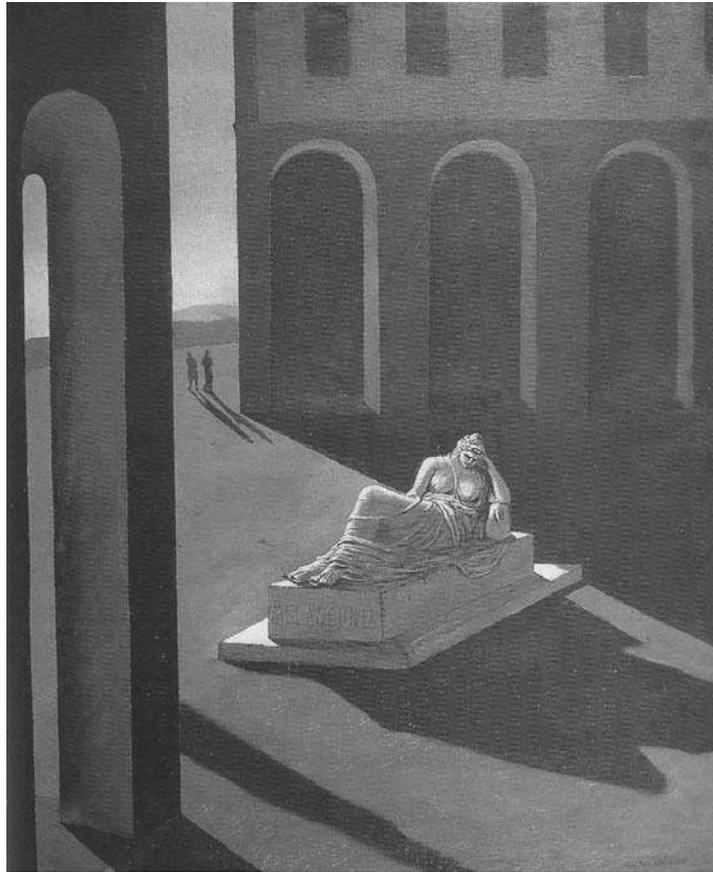


fig. 34

Hyperbolic Geometry and its Effects on the Retina

Melanconia, 1913
(1912)



⁵⁰ Lobačevskij introduces the way (or direction) of parallelism. If AB is a line and point C a point on a plane on which all lines coming from point C must intersect AB, as does the perpendicular CD to AB, or not intersect AB, as for example the perpendicular CE to CD. Commencing from the position of CD, a ray can describe a section of lines in two directions, counter clockwise and clockwise; the first corresponded to the course DA on line BA and the second to the opposite course, DB.

⁵¹ V. M. Matjusin wrote a review in the 1913 Russian translation of the book of the two *Section d'Or* Cubists, A. Gleizes and J. Metzinger, *Du Cubisme* Paris 1912, published in the n. 3 issue of the *Unione della Gioventù*. Taken by the current interest in the Fourth

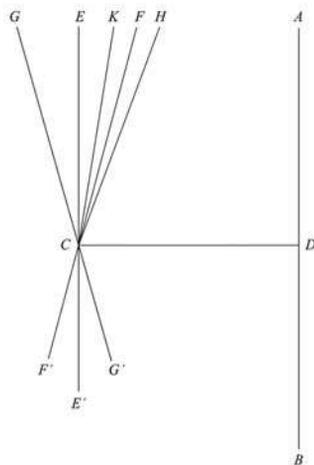


fig. 35

The painting is signed “G. de Chirico 1912” and seems to attest the geometry work done between Salon d’Automne 1913 (*La mélancolie d’une belle journée*) and *La Nostalgie de l’infini*, shown at the Salon des Indépendants in March 1914. Lobačevskij’s parallel theorem is enacted in the arch (fig. 35).⁵⁰ The perspective lines of the three arches in the portico at the back all converge exactly on the curvature of the horizon, generating a rotational movement in the painting (fig. 36). *Melanconia* is a distinct exercise in hyperbolic geometry and a

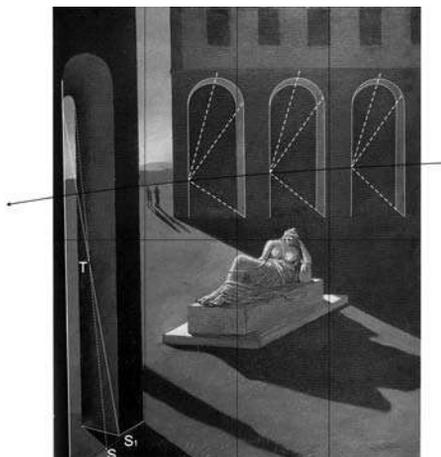


fig. 36

milestone to the possibilities it offers. Acting directly on a mechanism of visual accommodation of the retina, the linear conformations of the arch in the foreground produce a virtual rotation of the corner pilaster. The pilaster's base is twisted with respect to the arch. The torsion is evident if we consider the "original" position of the base as the point where the shadow and the line of the pavement meet in S and the actual position S1. The focal point of this torsion falls directly on the median axis of the arch T. Ariadne's body further expresses this twisting motion. The bust turns in one direction and the lower body in another; the left foot is contorted on the leg, while the elbow of the right arm twists outwardly. *Melanconia* takes experimental research in art to its farthest reaches since the "decomposition" of Cubism. Marcel Duchamp produces the impression of movement cinematographically, instant by instant, through the repetition of limbs in *Nu descendant l'escalier II*. However it is only with *Apolinaire enameled* (1916-17) that the possibility of the retina's ability to generate movement under optical-geometric stimulus is grasped. De Chirico is the first to experiment with new system of Gestalt in art. And it will be with Casimir Malevič, one of the Russians influenced by the *Section d'Or* (V. M. Matjusin)⁵¹ and his optical polygons (*Black Square*, 1915) that the empirical method of movement used throughout international Futurism is finally surpassed.⁵²

Translation and torsion. The origins of Gestalt

In the volume *La science et l'hypothèse* (1902) Poincaré explains the use of Riemann and Lobačevskij's geometry in astronomy. "Curved" geometry exists alongside Euclidean plane geometry without suppressing it. As it is impossible to obtain through experience absolute proof of the properties of

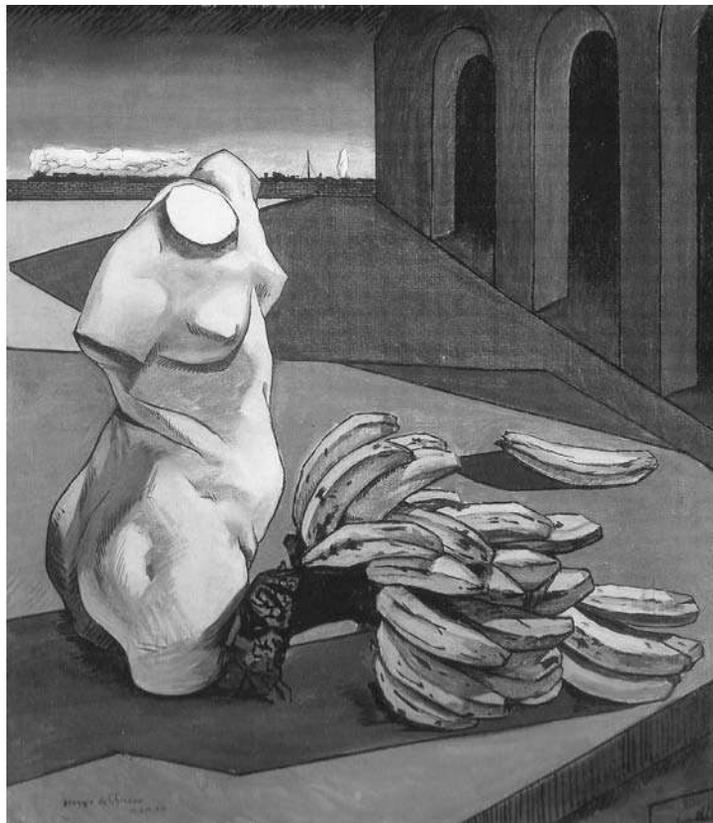


Marcel Duchamp.
Apolinaire enameled,
1916-1917

Dimension and the spiritualism of P. D. Uspenskij, he asked Malevič to design the scenery for *La Vittoria del sole*, in which the first idea for the *Black Square on White Background* appears.
⁵² Malevič exhibited *Black Square on White Background* in the *0.10 Ultima mostra futurista* (Last Futurist Show) in December 1915. The abandoning of Futurism in favour of "a pure planar development" follows the artist's new metaphysical moment, where he oriented his work to the representation of the divine through the separation from earth and the interpretation of Universal laws. Malevič upheld the Suprematist pursuit with the use of Lobačevskij's geometry, to which he had access through the mathematician's successors. The bridge between de Chirico and Malevič must be the group of Russians in Paris that were linked to the *Section d'Or*.

a line in Euclidean space or in non-Euclidean space, he acknowledges: “*In astronomy, a straight line is simply the trajectory of a light ray... No experience will ever be contradictory to Euclid’s postulate; on the other hand, no experience will ever be contradictory to Lobačevskij’s postulate.*”⁵³ This conclusion heralds a turning point for de Chirico. This turning point is the human body: experience responding to tactile space: “*For each position of my body my finger determines a point and it is that and that only which defines a point in space.*”⁵⁴ The artist aims at translating the state of permanent traction in which space and things co-exist. All objects and states suffer a modification during translation where signs of pressure, traction and compression are evident. The Lorentz-Fitzgerald hypothesis supposes that when a body moves through space it experiences a compression in the direction of the movement, while dimensions perpendicular to this movement are not altered. This contraction is the same for all bodies and is very weak.⁵⁵ I suggest that Lorentz and Fitzgerald’s hypothesis be considered in regard to the group of work dealing with torsion: the Torsos and the Artichokes of 1913-1914.

L’incertitude du poète,
1913



⁵³ J. H. Poincaré, *La science e l’ipotesi*, Paris: Flammarion, 1909, p. 95.

⁵⁴ *Ibid.*, p. 107.

⁵⁵ *Ibid.*, p. 238.

Signed “Georgio de Chirico MCMXIII”, this painting is a work that experiments with astronomical physics in a sequence of translations. As we will see, each of the objects, the bust, the bunch of bananas, the cube on which they are placed, the portico in perspective and the piazza’s plane, all turn on a rotational path of 12° (fig. 37). The portico’s shadow on the plane also

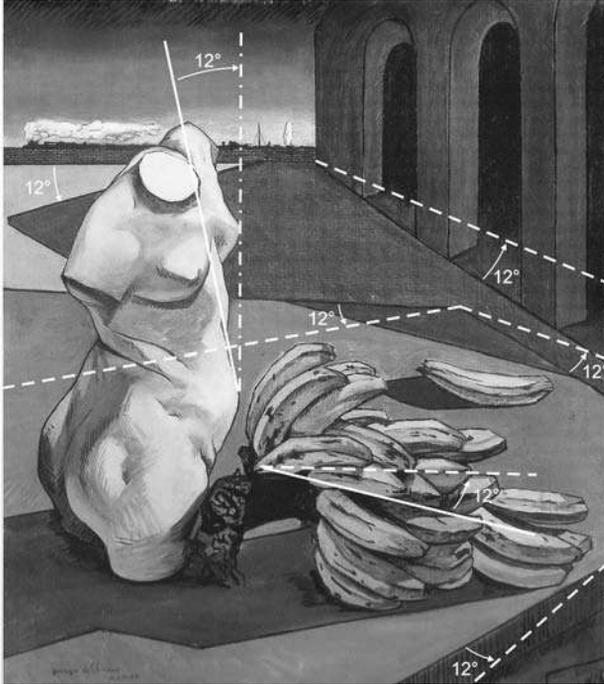


fig. 37

turns to this degree. Our reference point is the axis of the torso. By rotating this axis to the right and drawing a line perpendicular to the painting’s edge, we discover an angle of 12° . The area in light defined by the portico’s shadow on the plane and the base of the wall in front of the train also creates a 12° angle. By rotating the shadow lines (that form half an X) that define the two scalene triangles in light behind the bust by 12° , they form a “Klein plane” (fig. 38): a set of points and straight lines defined by a secant P Q on a circumference, as well as external non-secant lines and tangent lines within the same circumference (fig. 39). Poincaré’s model, another example of a hyperbolic plane, can be used in reference to the painting. The elements in the painting “mount” a spherical surface

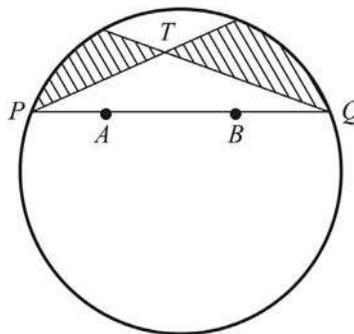


fig. 38

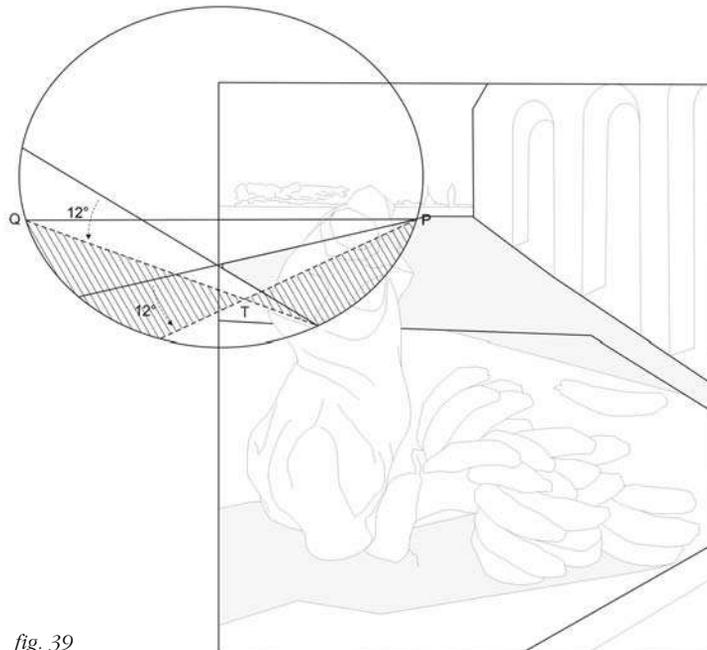


fig. 39

of hyperbolic metrics. In hyperbolic geometry, the sum of the interior angles of a triangle is always inferior to 180° . The evolution and angular metrics of

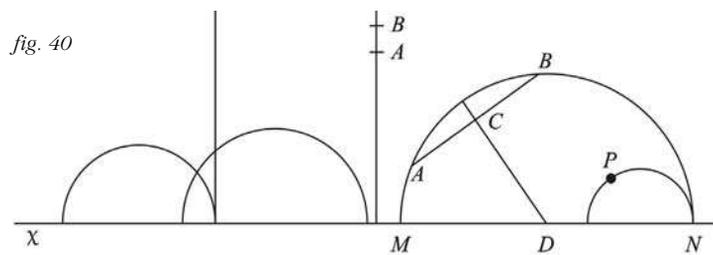


fig. 40

this painting obey Poincaré's model, which represents a hyperbolic plane on a Euclidean plane (fig. 40).

*Nature morte avec
Jupiter et bananes (Le
rêve transformé), 1913*



For de Chirico, this painting was the object of a controversy regarding its title.⁵⁶ Similar to the *L'incertitude du poète* in spatial concept and in the use of 'twisting', the ambiguity of Gestalt has become evident. The bilateral positioning of the two bunches of bananas is greater; they turn away from each other and from the pineapples. The two pineapples lean away from each other, as do the palm trees in *La récompense du devin*. The cube is the base on which a space-time leap takes place between these two bunches of bananas. In addition to the multidirectional placement of the fruits, we have a painting with two titles and two dates: 1908 is written beside the signature, though we know that 1913 is the real date. Just as Lobačevskij's geometry sustains translation curvature, Poincaré, in the chapter dedicated to Quanta in *Dernières pensées*, seems to determine time. In order to connect the visual language de Chirico attributes to the *time atom*, it is necessary to emphasize this *jump*: "The universe takes a sharp leap from one state to another, but remains immobile during the interval. The different instances in which it remains unchanged are not recognizable from one to the other; in this manner we arrive at a discontinuous variation of time, the *time atom*."⁵⁷ Published posthumously, Poincaré's text carries the same date as the painting. The self-portrait *Et. quid. amabo. nis. quod. aenigma. est?* (1911-1912), also carries the date 1908 beside the signature and is part of the group signed "Georgio de Chirico".

Labyrinths

The labyrinth and the enigmas it contains concern human conscience and to a further extent, the body. Under the metaphysical arches, a stupefying observation awaits the visitor. A drawing, entitled *L'énigme cavourien* depicts a virile head with glasses that resembles the Italian statesman Cavour (fig. 41). The uncovered head is tilted forward. It seems to be an anatomic inquiry. It is in fact a anatomic-harmonic study on the model established by Albrecht Dürer in his treaty *Vier Bucher von menslicher Proportion (Treaty on the Symmetry of the Human Body)*⁵⁸ (fig. 42). The drawing consists of a horizontal section of the human head, as in Piero della Francesca's



fig. 41



Camillo Benso, Count of Cavour, 1810-1861

⁵⁶ Paul Guillaume or possibly Apollinaire entitled the painting *Le rêve transformé*. The name was then taken up by Breton. See *«Metaphisica»*, n. 1-2 p. 78.

⁵⁷ J. H. Poincaré, *Dernières pensées*, Paris: Flammarion, 1913, p. 188.

⁵⁸ Nuremberg, 1528. Italian translation, Venice: Domenico Nicolini, 1591.

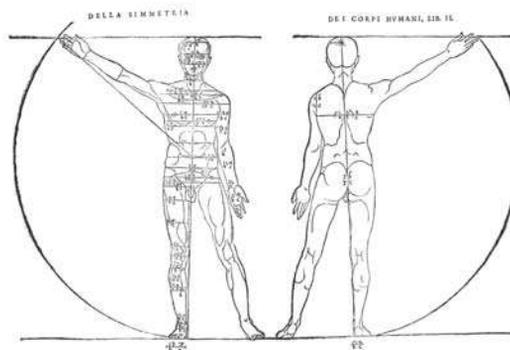


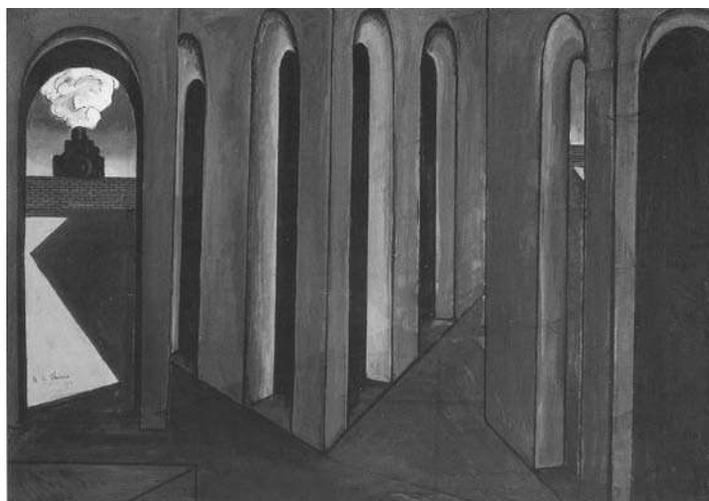
fig. 42

De prospectiva pingendi. Dürer took on the task of reducing the totality of the human body in each of its parts, in a system expressed through geometric models. Dürer's system of human movement in geometric order is an absolute and fundamental achievement: an atlas of human architecture at rest and in movement. The date of the Cavour drawing is unknown. The date of the painting *Le voyage émouvant* on top of the head of Cavour (the extension of the father figure as the Self returning to the father) is certain: 1913. The spatial edifice constituted as the human body is about to be revealed by de Chirico. His tutor was Albrecht Dürer.

Le voyage émouvant, 1913; *La surprise*, 1913; *L'après-midi d'automne*, 1913
Le départ (La conquête du philosophe), 1913-1914

I have grouped these four works together in order to open a path to the senses. In all four paintings, the labyrinth represents a voyage within the self.

Le voyage émouvant,
 1913



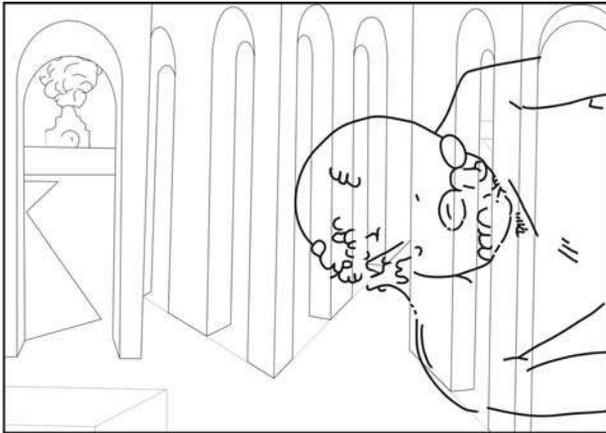


fig. 43

In the fundamental essay published in «The Burlington Magazine» in 1988, Matthew Gale showed Cavour's head, as revealed by x-ray, tilted to one side and perpendicular to the arches painted over it.⁵⁹ The painting presents the inside of a labyrinth in the form of a portico facing onto an Italian piazza. The head is positioned so that the top of the skull corresponds with the centre of the painting thus acting as an entrance point to the labyrinth or the centre of the labyrinth itself (fig. 43). Gale points out that by rotating the painting to the right, it becomes a portrait. It is in fact a portrait. It is not only Cavour's underlying figure that makes reference to a head. The arches in the painting on top are a geometric representation of the head's *movement on the neck*. De Chirico makes a direct reference to Dürer's diagrams of polygons and polyhedra that describe the possible movements of the neck and head. The labyrinth-portico describes the head's movement on the neck in the proportions established in the treaty on harmony (symmetry)⁶⁰ (fig. 44). The different volumes of the neck are visible on the surface of the painting; the head's movement takes place inside the painting. The painting develops from the outside to the inside with two distinct movements: one from right to left, the other up and down (by rotating the painting onto its right side). The movement of the head follows the rhythm of the perspective

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Questi quadrangoli periscono al capo.

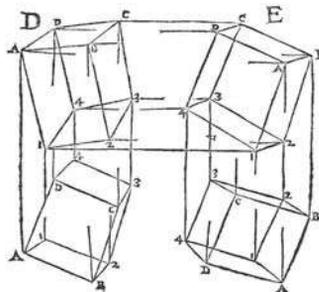


fig. 44

⁵⁹ M. Gale, The Uncertainty of the Painter. «The Burlington Magazine», vol. 130. London, April 1988, p. 272.

⁶⁰ Differing from today's language, in classical vocabulary 'Symmetry' is synonymous to 'Harmony'.

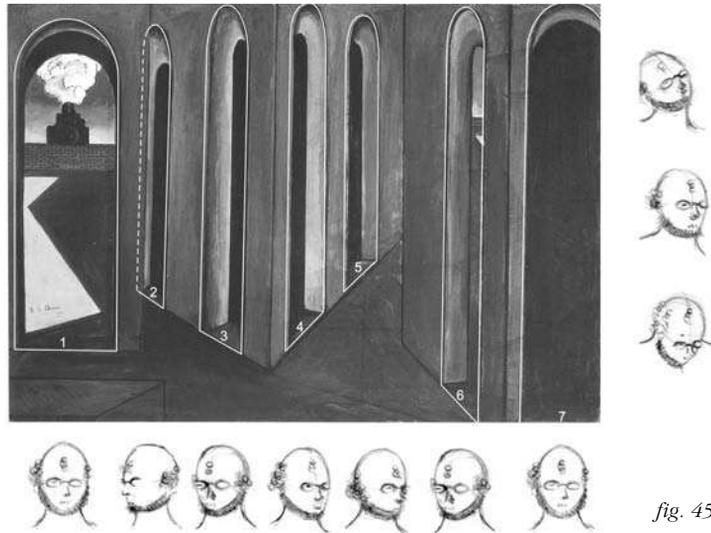
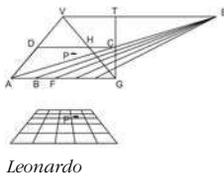


fig. 45



Leonardo

arches (fig. 45). The movement articulated by the human limbs reflects celestial mechanics through the replication of the *time atom*. The “leap” in time expressed as distance on a plane is measured in the double yel-

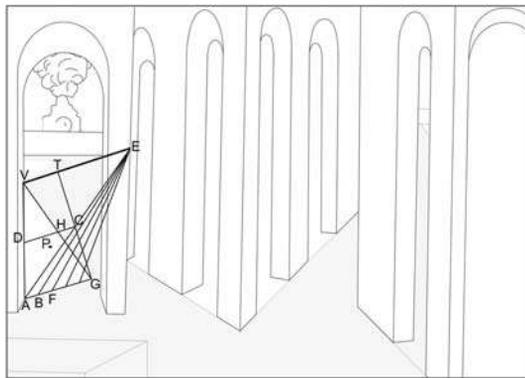


fig. 46

⁶¹ Leonardo da Vinci's method for determining the distance of a given point on a foreshortened plane: Point P is on a foreshortened square. Prolong segments AD e GH until they meet at point V. Prolong segment DH until it meets point C, to create CG perpendicular to AG. Prolong diagonal AC to point E, in correspondence to the continuation of VT. Join points A, B, F, etc. to E. Create horizontal divisions at the intersection points of AE, BE, FE, on the vertical TG, to make a grill on which point P can then be localized.

⁶² A line between each planet and the sun sweeps or traces an equal area in an equal time. This signifies that each planet travels faster on its orbit closer to the sun and travels slower when the orbit is more distant.

low triangle on the extreme left of the painting, which enacts a) Leonardo's method of defining the distance of a given point on a foreshortened plane;⁶¹ (fig. 46) b) Kepler's second law: the comparative speed of a planet's orbit in regard to its distance from the sun;⁶² (fig. 47) c) Klein's model, as seen in the illustration of *L'Incertitude de poète*.

Proceeding to the man's right ear, what looks like a curl is actually a spiral-shaped bone called the cochlea. Resembling a snail shell, this small bone is called cochlea for its spiral shape, which is the archetype of the labyrinth. On the “man target” in the background of *Portrait de Guillaume Apollinaire* there is a circle drawn around the seat of the auricular labyrinth. Through delicate aesthetical surgery, de Chirico

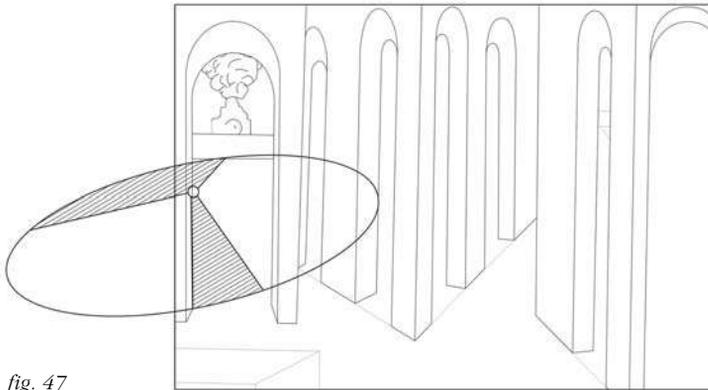
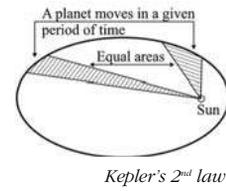


fig. 47

unites the architectural labyrinth, the movement of the labyrinth and the actual anatomical labyrinth in man's head.



Le voyage émouvant sums up: a) a psyche “folded up like a fan” in an actual and concrete space (fig. 48); b) the lowering of the second perspective angle with respect to the ground line indicates relational steps or layers inside the conscience;

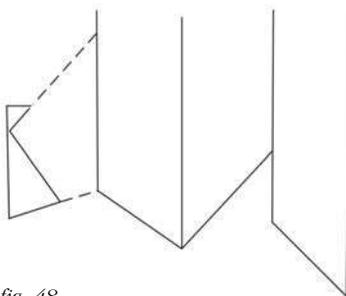


fig. 48

are compressed “underneath” the level of consciousness (Cavour’s head). De Chirico uses the Roman cryptic-portico with its underground existence as a likeness to the unconscious. Through the use of hyperbolic geometry, the collection of “folds” in the cryptic-portico enact another dimension

of transfinite logic (Cantor Set Logic) (fig. 49).⁶³ In this painting however, instead of separating the two states of conscience with a median line, de Chirico solves the problem perspectively.⁶⁴ The painting’s space is a hyperbolic planimetry. It verifies: a) the difference of levels

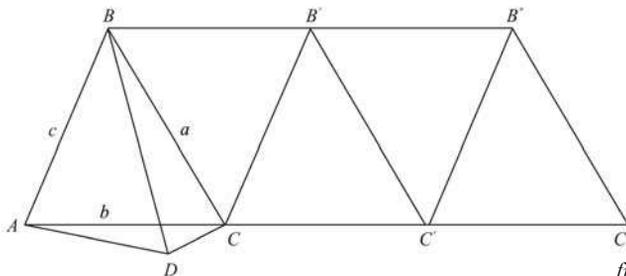


fig. 49

⁶³ In *Eléments de Géométrie*, Legendre demonstrated that the sum of angles in a triangle can not be greater than two right angles. The various perspectives of the portico puts fourth the hypothesis that the sum of the interior angles of a triangle can be greater than two right angles if Riemann’s elliptic geometry is taken into consideration, where a line is a great circle of finite length such as a circumference. An angle increases along with the lengthening of its opposite side.

⁶⁴ *Ibid.* Concerning the transfinite logic of the tetrahedrons.

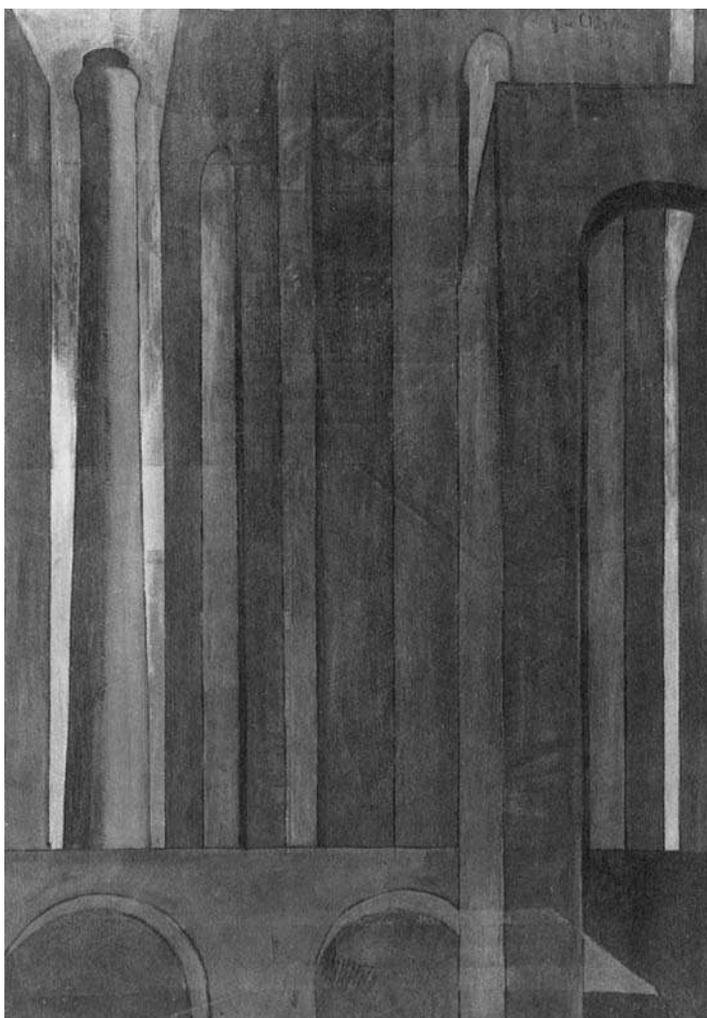


The Mysterious Traveller, 1968

La surprise, 1913

between the fan-like openings of the edges of the Platonic solid in the portico; b) the outward projections onto the piazza that emphasize point, line and plane conically on an ordinary Euclidean plane.

The final result: space and conscience exchange *form*.⁶⁵ The delightful path wrapped around the head is as endless as a labyrinth. In the shadow of the portico it thickens and evolves into a chromatic labyrinth of cobalt blue and vermilion red.⁶⁶



⁶⁵ See de Sanna *Mathematical Ariadne*, for the relationship of the labyrinth, the psyche and the Set Theory in this periodical, p. 258.

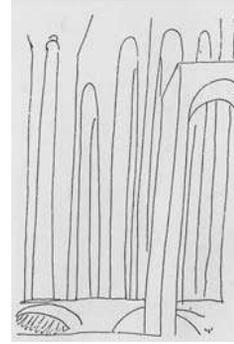
⁶⁶ See the work on the *Voyage émouvant* theme in the later years of his career.

The Labyrinth represents a voyage within the self. If we look at the stratification of the labyrinth's genealogy we find the labyrinth of Crete, which is primarily an expression of the cave. *La surprise* builds upon

this stratification, by adding the cryptic Roman portico, an architecture that is half buried and half illuminated (the conscience). *La surprise* superimposes an upper portico on an underground portico with respect to a median line. The labyrinth sits on the underlying portico, which is visible by x-ray “under the visible” painting (Metaphysics): at the side of a piazza with a pantheon-propylaeum and a fountain, a portico at an angle encloses the labyrinth (fig. 50). Near the centre a pentagon presents, once again, the absolute challenge: harmony, the Golden Ratio. The double Metaphysics of this painting sheds light on the characteristics it unites.

Now that the piazza has been created, the focus is on the “sides”: the portico, the cryptic-portico and the dense meaning they carry. Apollinaire’s account of the artist’s despair at the sight of the “destroyed harmony” of one of the most beautiful modern piazzas, the square in front of the Gare Montparnasse, in an article in “Paris-Journal” on May 25th 1914, is testimony to the significance it held for de Chirico.

Before it was transformed, this piazza was de Chirico’s second choice, after Place du Panthéon, as a French source for the inspiration of the Italian Piazza’s.



*Study for 'La surprise',
1913*

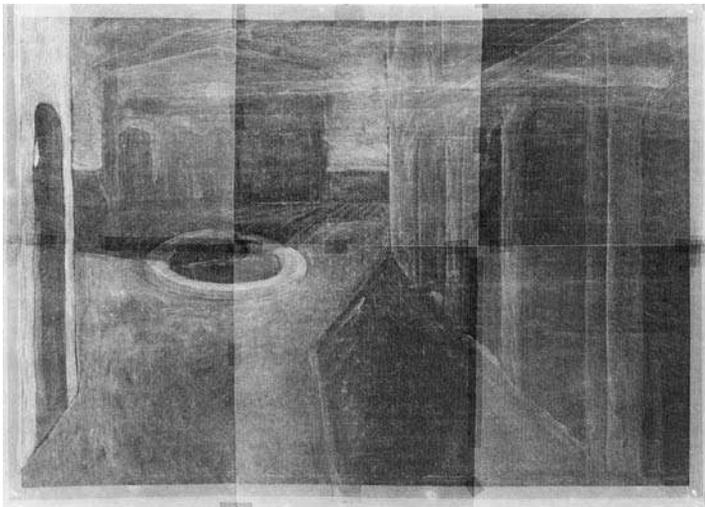
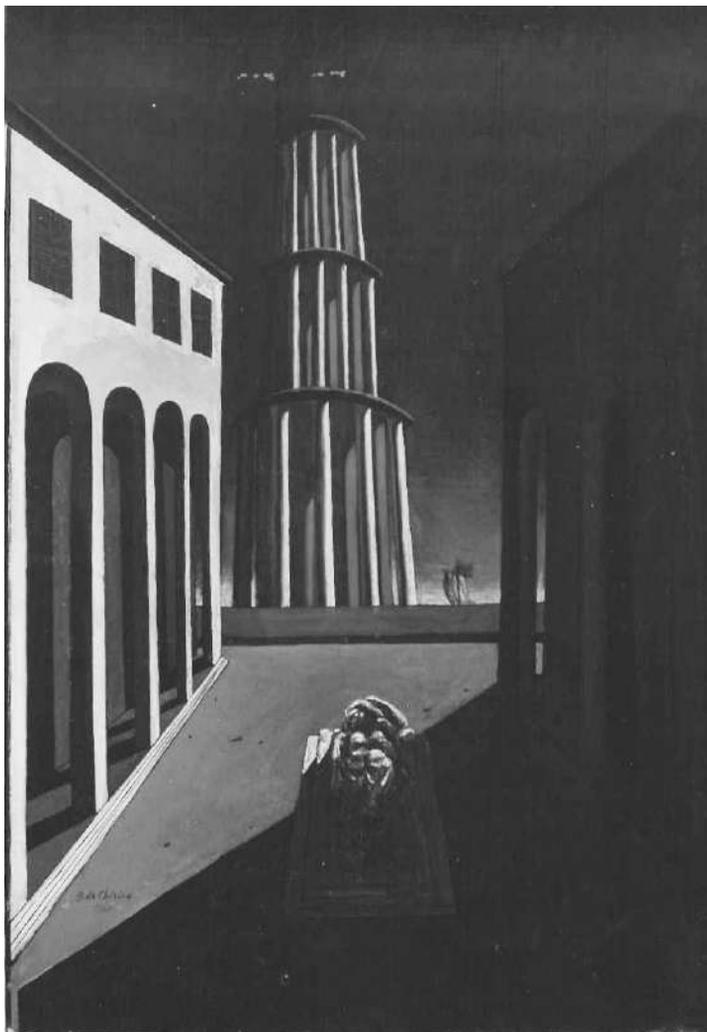


fig. 50

*L'après-midi
d'automne, 1913*



⁶⁷ In a letter to Simone Breton dated February 23rd, 1924, de Chirico writes: "I would like to know if you are still interested in buying the painting entitled *La partenza dell'avventuriero*, the other painting, *L'après-midi d'automne* no longer belongs to me. See *Metaphisica* n. 1-2, p. 151. This letter seems to attest that Breton was familiar with the painting, therefore it is presumable that the painting was executed in Paris before de Chirico's return to Italy in 1915.

⁶⁸ Michael Taylor, *Giorgio de Chirico and the Myth of Ariadne*, Philadelphia Museum of Art, 2002, p. 44.

The piazza's composition is still closely tied to the mathematical myths and therefore it is likely that its execution took place in 1913-1914.⁶⁷ *L'après-midi d'automne* was first worked on horizontally, then turned and re-worked in a vertical position (fig. 51). The underlying painting is a portrait of a classmate that de Chirico painted when he was studying at the Monaco Academy of Art (made visible by x-ray image; see p. 142). When de Chirico painted on top of a previous painting he did so to document the end of a particular cycle of work in order to indicate the essential elements of the theme. In *Le double rêve du printemps* of 1915, a framed space in the centre of the composition seems to be the synopsis⁶⁸ of the Piazzas with Ariadne, of which *L'après-midi d'automne* clearly appears to be the final execution and synthesis. Considering this painting a model

of the Ariadne poetics, carried out over the course of time, helps to explain why de Chirico kept it with him as a model of his work on the Piazza – a kind of memorandum kept by the artist for his personal use.⁶⁹ The structure of the painting designates it as a mathematical document.

Projecting outwardly from the base and distancing itself towards the top, the tower's prominent entrance maintains a game of balance, giving the painting the complex convexity that originates in

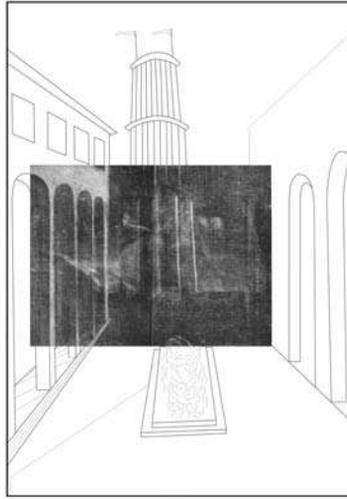


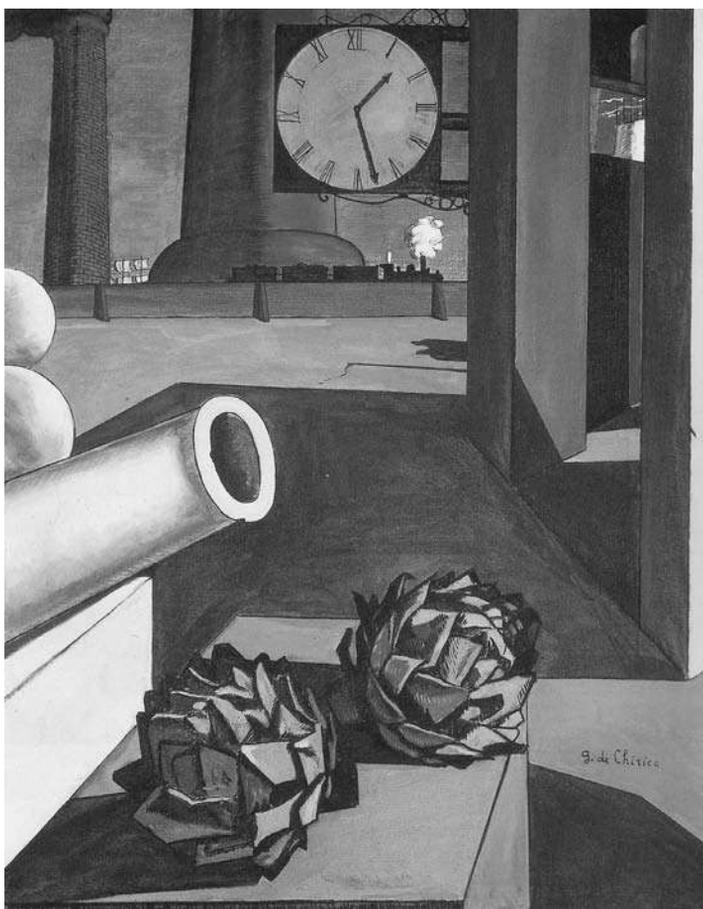
fig. 51

the paintings of 1913. The geometry is different in each of the three conic sections of the tower's construction, which indicates a mathematical equation of the third degree. With regard to the perspective study undertaken by the artist starting in 1913, the inner construction of the portico in light constitutes a masterpiece. Its significance lies in the rotation of light that moves the perspectives under the portico, with a further rotation taking place within the blue light – a very important characteristic of the painting –. In the portico on the left there is a labyrinth of colour in the blue, starting with turquoise blue in the first portico, continuing with blue cobalt and then Prussian blue. In the labyrinth the blues are transparent, like a folding over of colour, on a mathematical basis. Furthermore, this painting can be seen as an explicit example of the poetics of the tower, a true protagonist of the composition. The shuffling and lowering of the shadows in the Dusseldorf museum's *La grande tour* (1913) can be considered a precursor in this study. The tower in *L'après-midi d'automne* came into being as a prolongation of the portico labyrinths. Built like a portico in a mathematical-optical sense, it reveals a labyrinth of colour within its columns. It differs from the other towers, where the light wraps around each of the registers (the floors of the tower). Here, the light wraps around itself in the deep lacquer red, it moves up and down and forms three labyrinths. Therefore, there are five labyrinths in this painting: the blue portico on the left, the darkened portico on the right (Theseus's shadow, death, the afterlife) and the tower with its three levels of labyrinths. Ariadne is in axial perspective at the painting's centre and points directly at the tower and is surrounded by the five labyrinths.

⁶⁹ The painting was exhibited in the exhibition held in Hannover, 1970.

She is not like the other Ariadne's: she is not a merciful Ariadne, nor a suffering Ariadne. This Ariadne is without a face, she is all stomach, she herself is the bearer of a labyrinth. Her stomach is a labyrinth, it is the description of the intestine.⁷⁰ The only point of reference is the centre of Ariadne, as the light is moving and so is the tower. An astronomical translation is in course, the sun is moving on the ecliptic and thus the things we see are also moving.

*Le départ (La conquête
du philosophe),*
1913-1914



The title *Le départ* 1913, inv. 462, was written on a photo pertaining to Paul Guillaume's "Magasin" with the instruction to mention this title along with the second title with which the painting was known. The painting launches the labyrinth towards a second hypothesis: the chromatic labyrinth. The piazza is a system of Platonic solids. On the right-hand side, the portico with the clock is a tetrahedron that contains another tetrahedron.⁷¹ The inner tetrahedron is coloured cobalt blue. The colour is

⁷⁰ See de Sanna, 'Myth and Body in Metaphysical space', *Mathematical Ariadne*, in this periodical, p. 256-258.

⁷¹ Ibid. in *Morphology. A Series of Metaphysical Labyrinths*, p. 258-260.

poised as a mathematical entity of infinity (sky blue). The entire space shares the coefficients of a spherical surface according to intervals of time translated into angles that grow outwardly from triangles (fig. 52). The portico's shadow opens on the piazza like a book and strikes the cube (the earth); it encounters a sharp turn in the shadows of the two artichokes, which are oriented in divergent directions. The temporal interval expressed as a leap shows us that the diverging artichokes are really one artichoke, one unique point, or *time atom*

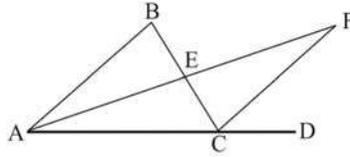


fig. 52

on the hyperbolic surface. Together, the cube and artichoke undergo a distortion towards the left, aided by the pseudo-elliptic shadow on which they seem to slide (fig. 53). The clock at the centre of the painting “perforates” the tower and takes the relative velocity of certain material bodies in relation to others with respect to a “local time”. For example, the train and boat that travel in opposite directions with respect to the clock tower. The painting executes continuous contrac-

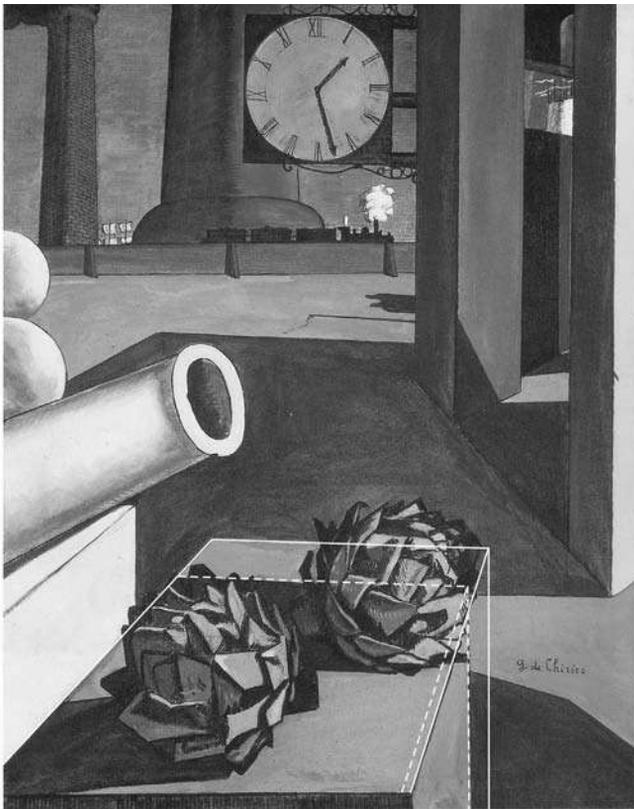


fig. 53

tions through movement. Other the details in the painting recall the conic theme: the base of the tower, the mouth of the cannon, the flattening of the balls. Spherical and ellipsoidal figures bespeak the surface of light waves as illustrated by Poincaré (Michelson's Experiment).⁷²

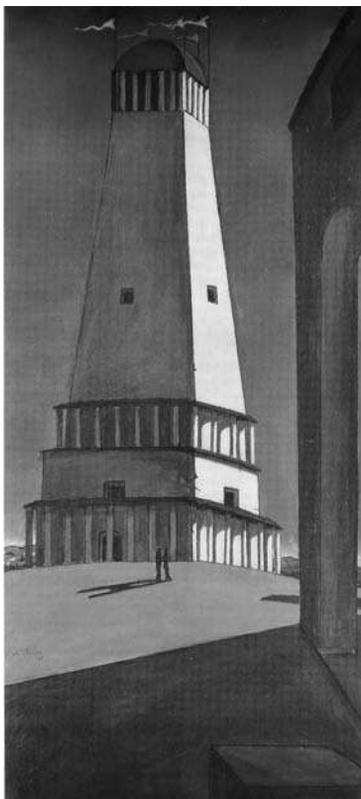
Back and Forth. Pathways in the Solid.

Let us move on to 1914.⁷³ The investigation into space that imitates celestial bodies is coming to the end of a full revolution regarding the ecliptic. The ellipsoid is one of two models that result from this: the head of the mannequin. The egg is a box. The second model is the volume of the piazza, which encloses its walls in the shape of a cube above itself. De Chirico's geometric program reaches its apex in the virtual rendering of movement on the retina (Gestalt). Artists who overcome the empiricism employed in the Futurist movement acquire the ability to use ophthalmic relationships with mathematical agents of transformation. Duchamp was among the first to do this.

La nostalgie de l'infini, 1913-1914

⁷² "Supposing an observer and a light source are pulled together into a translation: the surface of the waves emitted by the light source will be spheres with centres that are positioned in succession from the light source; the distance of this centre from the actual position of the light source will be proportional to the time passed from the emission [...]. For our observer, because of the contraction, all the spheres will seem to be elongated ellipses; the eccentricity of these ellipses is always the same and depends uniquely on the earth's speed" J. H. Poincaré: *Science et méthode*, cit, p. 237.

⁷³ *La nostalgie de l'infini*, *L'énigme d'une journée* and *Les joies et les énigmes d'une heure étrange*, were shown at the Salon des Indépendants (March 1st - April 30th 1914).



The painting summarizes the axioms of movement. The cube (the earth) is in axonometric projection on the right. The tower is a *tholos* of a more ancient kind than the Hellenistic-Roman *tholos* in *L'énigme de l'arrivée et de l'après-midi*. The funerary building has the form of Mesopotamian constructions with an alveolar or blunted cone-shaped roof and African monumental funerary constructions with stairs (Carthage). The two floors in shadow are aligned and tilted, as is the tower. Lobačevskij's problem of the rotation of a plane around two poles is dealt with here: when the centres E, F exchange places, the spheres that surround them pass from one side to the other of the

plane, each covering one another's position (fig. 54). As a result, the plane's surface in this new position coincides with that of its former position. Turning on an axis, the planes flip over in space.

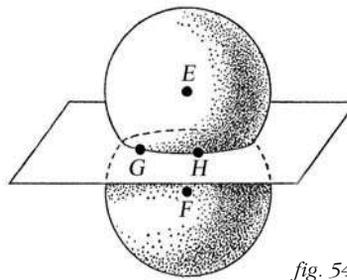


fig. 54



L'énigme d'une journée, 1914

Ideally, the front of the portico and the lighted ground on the piazza are super-imposable. Though turned in different directions, the two polygons are the same. The problem seems to be the following: a plane carried

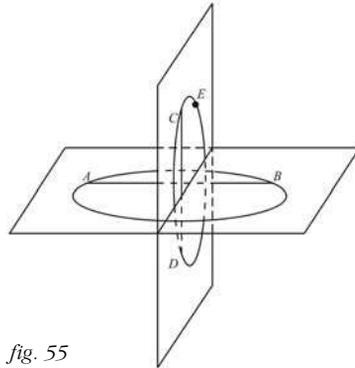


fig. 55

through space by two points that act as the poles of the plane (Lobačevskij) (fig. 55). Consider points C and D, which are at an equal distance from A and B, as the axis of the portico on the left and points A and B as the poles of the painting's horizon (fig. 56). By rotating the generating circle CED in which the scalene triangle (the portico) is set until it overturns completely and then enacting a rotation

of the plane, the new plane corresponds to the sun-drenched plane (fig. 57). This is equivalent to creating a hyperbolic X or an X in space. As we know

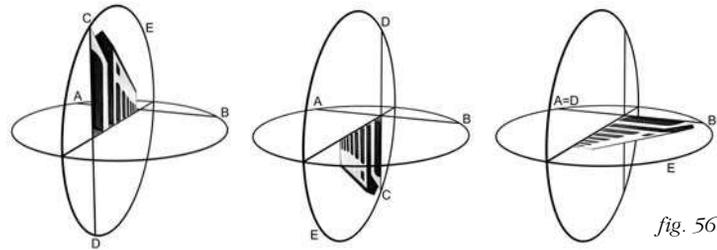


fig. 56



fig. 57

from *Timaeus*, the letter X indicates the ecliptic's point of encounter with the celestial equator. In the painting it is repeated all along the upper profile of the portico. On the lower right, positioned in an oblique axonometric position, a sectioned cube describes *contact* according to Lobačevskij (fig. 58).

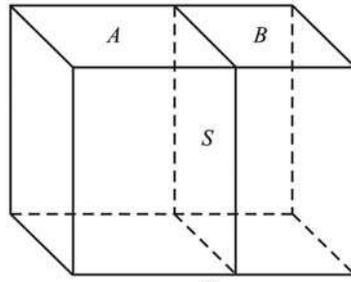


fig. 58

This is the central concept of non-Euclidean geometry: the decomposition of a body in two parts that touch one another. Lobačevskij states: “*In this way we can understand all bodies in nature as parts of one global body that we call space.*”⁷⁴ (fig. 59). The cube and the X's on the façade are clues about the composition of the solids that we are encountering: they carry a message about the secrets of metaphysical space.

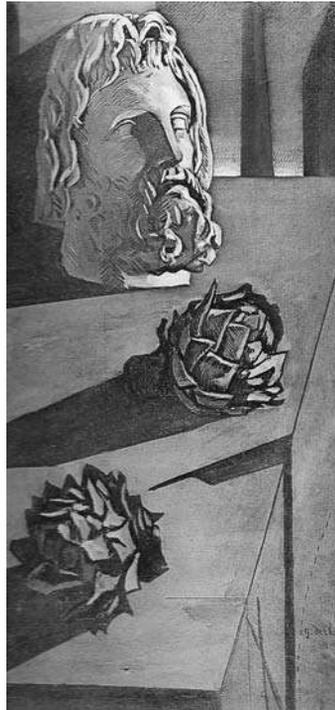


fig. 59

⁷⁴ N. I. Lobačevskij, *New Principles of Geometry*, edited by L. Lombardo Radice, Turin, Einaudi, p. 73.

La promenade du philosophe, 1913-1914; *La gare Montparnasse*, 1914
Nature morte. Turino printanière, 1914; *Le jour de fête*, 1914

La promenade du philosophe, 1913-1914



Given a Platonic solid and a topological determination, a series of possible translation times and points follows. A mathematical game invented by Sir William Rowan Hamilton in 1857 applies a calculation of plotted courses on the surface of the five Platonic solids. One of the games uses the dodecahedron and proposes a journey around the earth starting at one of the vertexes of the solid (fig. 60). Let us consider *La conquête du philosophe* with its other title *La tristesse du départ*. Departure for where? Let us observe the artichokes in *La promenade du philosophe*: they have moved further away from each other compared to those in *Le départ (La conquête du philosophe)* although they have maintained an

identical divergence. The same artichokes, the same symbol: vegetables of the Savoia. The cube (the earth) is lifted off the ground level with an upward tilting of its plane. It bears a surveyor's cross – an instrument used to divide plots of land geometrically – beside a blade-shaped mark: the shadow of the tower and the portico in the background swung around onto the side of the box. The earth has accomplished a journey along half of the ecliptic causing the objects to position themselves opposite one another at a distance, as do the artichokes.

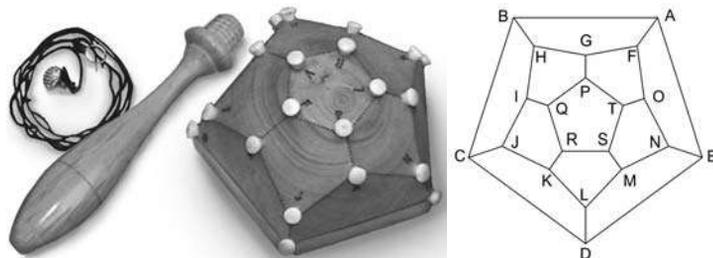


fig. 60: *The Traveller's Dodecahedron*, 1857

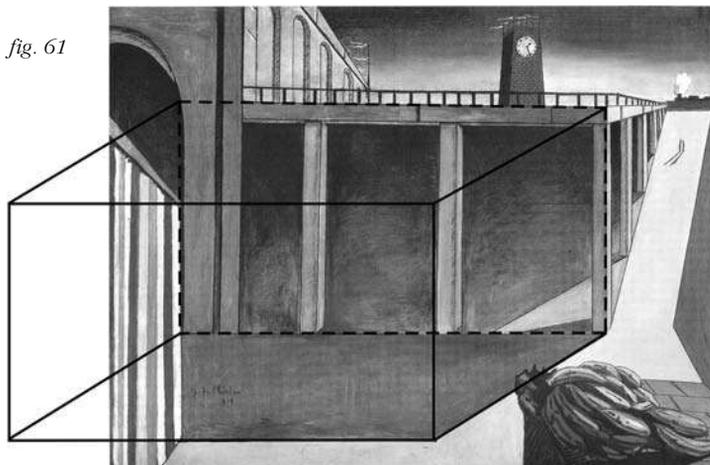


La gare Montparnasse,
1914

La gare Montparnasse revealed itself to me through a fortunate accident: I saw it upside down. In this position the building in the centre and its shadow are a cube in a parallel projection with the facade in a frontal position (fig 61). It is the same cube found in the paintings of 1913. The entire painting is a solid that spreads its sides out on a plane. The space defines itself as *actual*, real and concrete. Ideally, by cutting the sides, one could construct a paper box out of it and turn it over to obtain a cube in its usual position on the ground. Observe the bunch of bananas: it rests quietly on its own. Elsewhere (*Nature morte avec Jupiter et bananas - Le rêve transformé*, 1913), the two bananas are placed at a distance and are independent, here they touch the bunch. The plane on which they rest is a brick wall, it is the same wall as the tower on the horizon. This is what



Gare Montparnasse, Paris



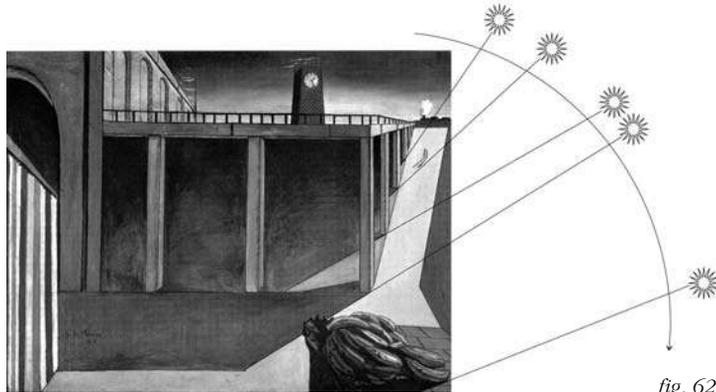


fig. 62

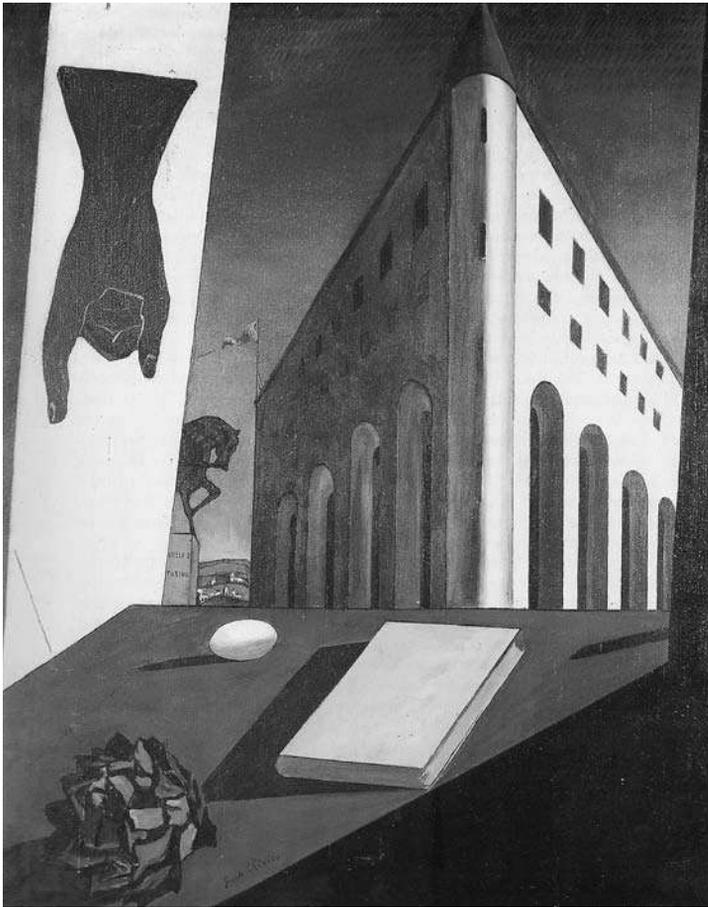
has happened: the painting has accomplished a complete revolution upon itself. The sun's movement reveals this passage by the shadows it casts, (fig. 62). Two opposite positions on the epicycle coincide in the *time atom*. In the contour of the objects and the areas in light, the painting supplies the coordinates of a Platonic solid.

In his 1988 study, Matthew Gale proposes a stratigraphic vision of a virile portrait for this painting as well, which he called *Montparnasse self-portrait*⁷⁵ (fig. 63). The portrait lies "on the other side of the visible painting" with the head placed between the pillars of the station, like the portrait of Cavour under the varying perspectives of *Le voyage émouvant*. As with the other painting, this painting was turned 90° onto its longer side after having been worked on vertically. The presence of the head in the shadow supports the labyrinth principle while the rotation on the side confirms the perpetual movement of the harmonic objects of which the painting consists.



fig. 63

⁷⁵ M. Gale, The Uncertainty of the Painter. *The Burlington Magazine*, vol. 130. London, April 1988, p. 275.



Nature morte. Torino printanière, 1914

Nature morte. Torino printanière has only one artichoke at the edge of the painting; the red plane is the top of a cube in perspective, elevated with respect to the ground line. On the front of the white polyhedron tilted towards the cube, a hand indicates a rotation: three fingers are curled up while the other two are stretched out, all of which are shown on the same plane. The white tetrahedron descends towards the hexahedron (cube), which is also in a state of movement (fig. 64). The topological fluidity of the movements feigns a movement that is only apparent to the retina, although Gestaltpsychologie is still

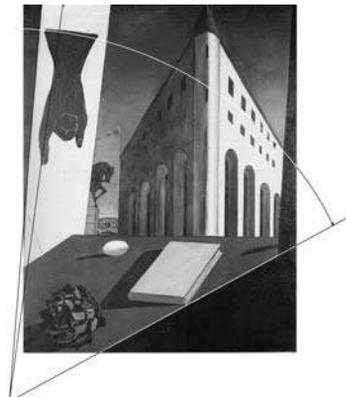
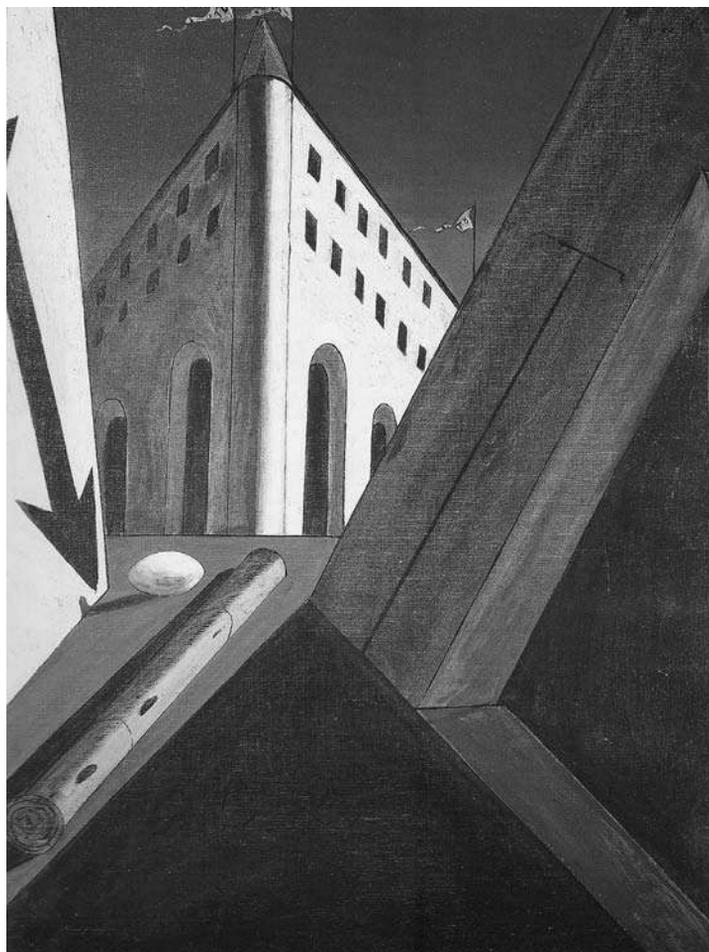


fig. 64

at a pioneering stage.⁷⁶ As well as the psyche's "underground", de Chirico investigates visual experience as an entity of the psyche, or a system of optical-psychic relationships. The result is a false movement, or virtual movement as "produced by the mind". As per usual, de Chirico's first awareness on the subject is presumed to have originated in Monaco: all the mathematical-scientific disciplines which nourish Metaphysics have their origin in Monaco. The artist sets himself as *pars construens* with respect to his art and not merely as a user of modern science. It is only in the mid-twenties that a true literature on the psychology of form makes its appearance.⁷⁷

Le jour de fête, 1914



⁷⁶ *Gestaltpsychologie*, the area of Psychology of form which deals with research in plastic form according to structural laws, begins in 1911 with the work of M. Wertheimer, W. Köhler and K. Koffka. It deals with the possibility of apparent movement when stimulation reaches the central nervous system (Köhler's physiological hypothesis) through the optical system.

⁷⁷ D. Katz, *Zur Psychologie des Amputierten und seiner Prothese*, Leipzig 1920; E. Rubin, *Visuell wahrgenommene Figuren*, Copenhagen 1921; M. Wertheimer, *Drei Abhandlungen zur Gestalttheorie*, Erlangen, 1925.

Le jour de fête is clearly a work executed immediately after *Nature morte. Torino printanière*: the red cube rises and with it, the perspective angle. The reclining of the portico on the right strengthens the effect. The resulting solid contains evolutions in its interior. Substituting the hand in the previous paint-

ing, the rotation in accordance with hyperbolic geometry is marked by an arrow, which indicates precisely the direction of the sliding (fig. 65).

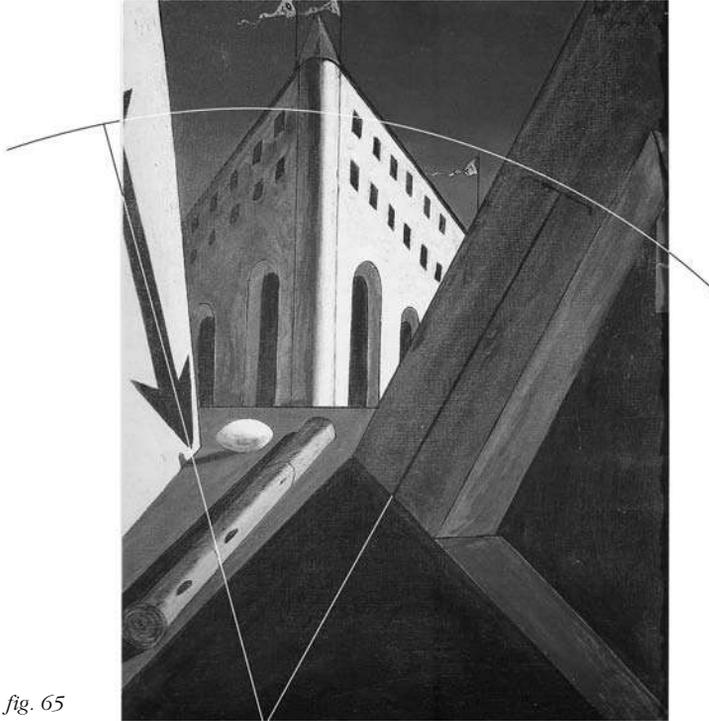
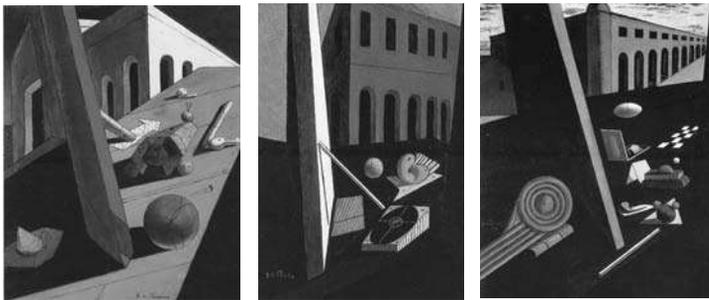


fig. 65

Marked on the portico's facade, a "T", the upper portion of a measuring instrument whose lower portion is not visible, is another indication of the rotation. By turning the painting onto its left side (with the arrow at the bottom), the portion of a dodecahedron framed by the painting is perceived without difficulty.



Le mauvais génie d'un roi, 1914

La maladie du général, 1914

Le caserme dei marinai, 1914

The three paintings exasperate the translation of volumes in the dodecahedron. If viewed when turned on their longer side, they show different sections of a solid, portrayed by the artist as the "interiors of a box". Groups of mathematical elements pertaining to the spatial system reveal themselves:

calculations cover the surface of the toys, which are in fact mathematical objects, such as the cone at the bottom left in *Le mauvais génie d'un roi* and the base of the overturned tower, which has the facets of a solid. Once again we are dealing with the dodecahedron game invented by Sir William Rowan Hamilton for tracing paths on the faces of the five Platonic solids.⁷⁸ At this point de Chirico inserts the pre-eminent Platonic mathematical object: the sphere. It is the earth seen from above as we find in Plato's *Phaedo*: "The earth, seen from above, is in appearance similar to one of those leather balls which have twelve faces and is streaked with various colours (...). There is a purple of wonderful lustre, a part of it is a radiant gold, (...) the rest is a sight of gleaming iridescent light (...)." (*Phaedo*, LVII-LVIII)

The introduction of a nautical instrument, the sextant, is an indication of further interest towards the theme of the voyage. In *Le caserme dei marinai*, it appears on its round rocking base. Maritime instrumentation is employed in the Ferrara Still-lives and Interiors (1915–1917).⁷⁹

Canon: The Body

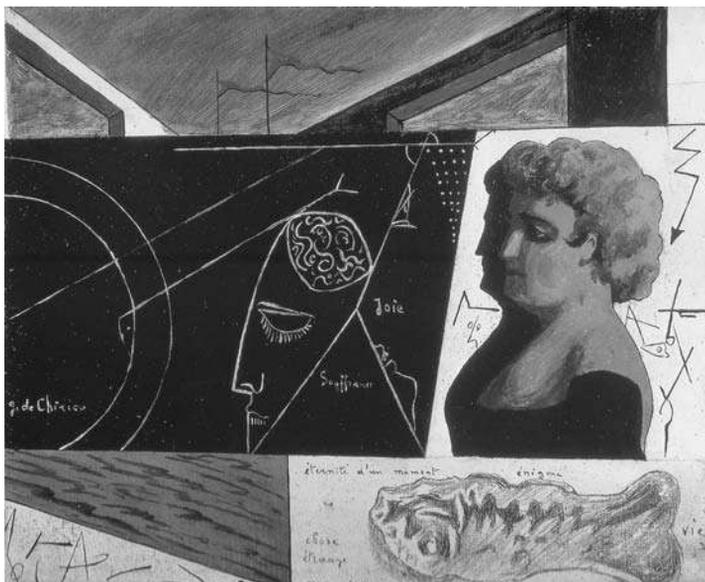
Le temple fatal, 1914; *Portrait de Guillaume Apollinaire*, 1914

La nostalgie du poète, 1914; *Portrait de l'artiste*, 1914

L'arc des échelles noires, 1914; *Le voyage sans fin*, 1914

J'irai... le chien de verre, 1914

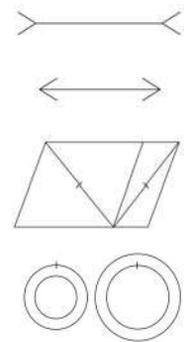
Le temple fatal, 1914



⁷⁸ The quaternion theory is the forerunner of modern vectorial analysis.

⁷⁹ See de Sanna, for the Maritime Code in *Analisi della forma III. Tempi. Iconografia. De Chirico, Metafisica del Tempo*, edited by J. de Sanna, Ediciones Xavier Verstraeten, Buenos Aires 2000, p. 46.

The apex of this investigation of space generates the definition of its inner axis: the human body. I will position *Le temple fatal* as a frontispiece for the theme of human proportion, not because I am certain that it was the first executed in the group – it most probably was the last⁸⁰, but because in some way this painting encompasses all of the elements present at this stage of Metaphysics. In Gestalt psychology, the theme treated in this painting is defined as *field theory* (David Katz). That is to say, the organism reacts to mass stimulus with a global process. Basically, physiology borrows Maxwell’s field theory from Physics, which considers traction and pressure phenomena as forces transmitted from point to point. Comparable to that which occurs in a magnetic field, each process of the nervous system is determined by the totality of processes connected with it. The field’s various areas are in a dynamic correlation. With the open cerebral mass at the centre of the painting, *Le temple fatal* illustrates the centrality of the nervous system with regard to the dynamics of this exchange. Robert Fludd spoke of this in the profile of man.⁸¹ The head, seen in a horizontal section as in the drawing *L’énigme cavourien*, repeats Dürer’s lesson from *The Treaty on the Symmetry of the Human Body* (fig. 66). The head is just a starting point for the sounding of the harmonic proportions of the whole body and each of its parts. In a certain sense, the living organism functions as a “field” of correlations held together by a rule of harmony. The “globality” of Gestalt emerges with Rubin’s “ambiguous figures”⁸² and in the correlation between circumferences, ether and the head on the black surface of the polyhedron, compared to



Rubin

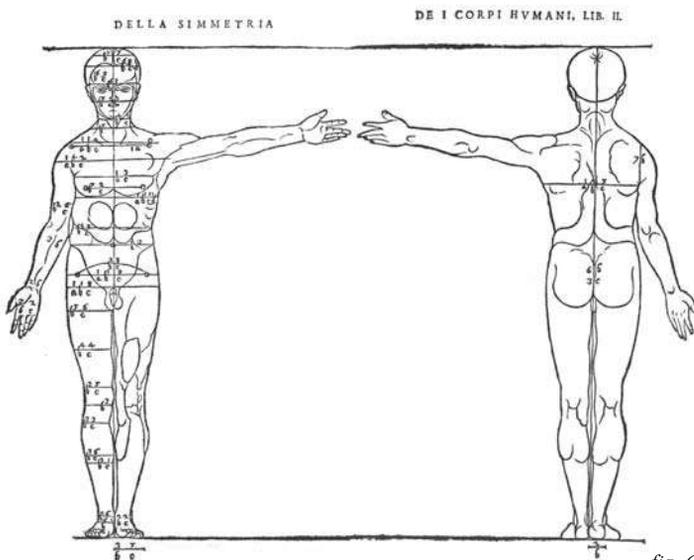


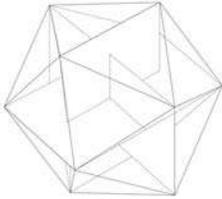
fig. 66

⁸⁰ A letter sent by de Chirico to Gallatin in 1927, attests to its execution in 1914.

⁸¹ Maurizio Calvesi made this reference to Fludd.

⁸² E. Rubin, *Visuelle wahrgenommene Figuren*, Copenhagen, 1921.

the white surface beside it, with the woman's face. It is possible to perceive the profiled figure as being either in the foreground or as in the background. I would like to highlight the fact that Rubin's research on the relationship between figure and ground took place in 1921.



The vertexes of three Golden rectangles coincide with the vertexes of an icosahedron.

The spatial form of *Le temple fatal* exhibits rectangles whose vertexes coincide with the vertexes of an icosahedron (fig. 67). The Platonic solid

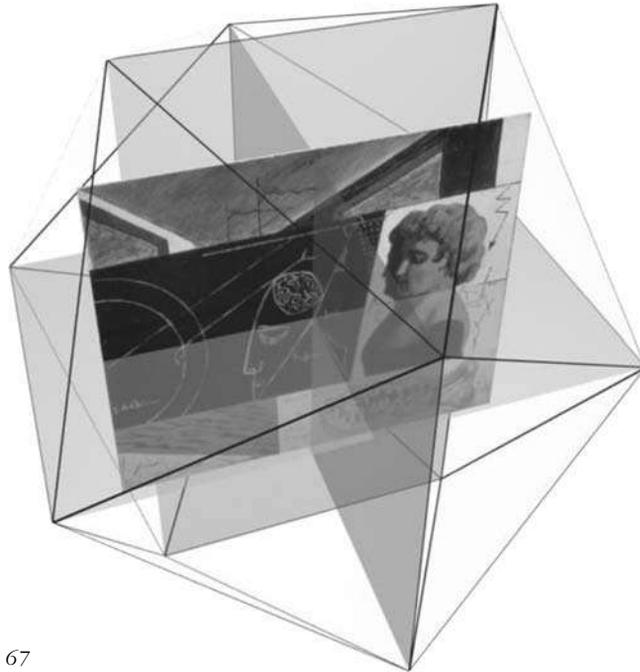


fig. 67

travels in ether, charged with magnetic force; the translation is ascertained by turning the painting on its left side. The sides of the polygon are perceived through "continuity", a principle of Gestalt.

The intersection of three Golden rectangles and their division in squares and triangles produces a logarithmic spiral (fig. 68), a measurement of growth in nature illustrated by the seashell (fig. 69). On the border between

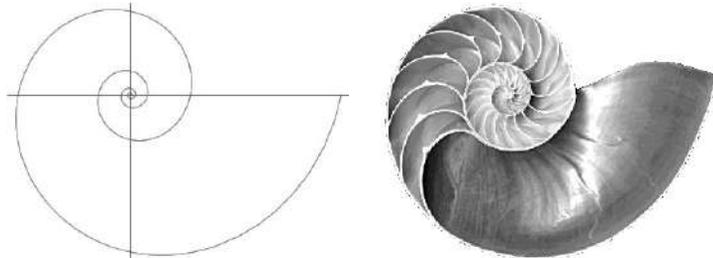


fig. 68. The logarithmic spiral and the nautilus seashell

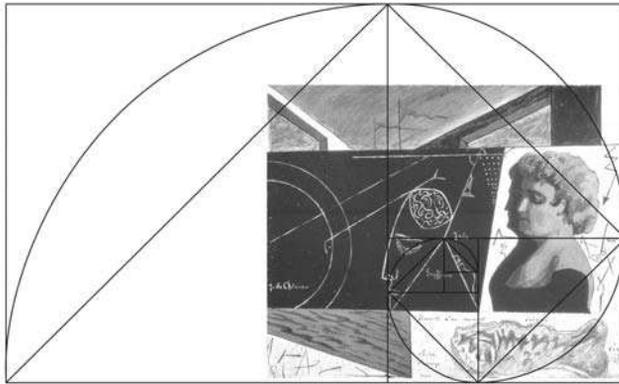


fig. 69

Astronomical Physics and Organic Physics, the painting doubles its subject matter with the symbolic functions of fish and the human body. A “packed solid” is visible in the tilted cube consisting of scenic wings with windows that converge towards the sky in the background⁸³ (fig. 70).

On the upper band of the polyhedron there is a male figure with an open skull and a female figure doubled in the style of a Roman cameo. Both portraits cite the source of this study, which has concentrated on spherical geometry in the harmonic proportions of the face: Leonardo, an intermediate step between Piero della Francesca and Dürer (fig. 71). On the lower faces of the polyhedron we find a fish, a piece of

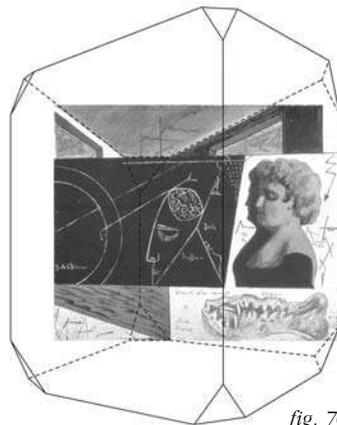
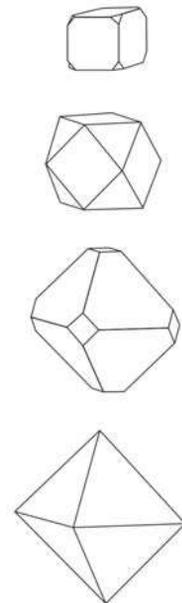


fig. 70

material (wood) and a group of ideograms. The harmonic axis of the fish is in line with the centre of the woman’s bust. The woman is de Chirico’s mother. The bosom follows a double saddle-shaped curvature (from Poincaré). The canon of proportion regarding the mother’s profile is measured on this axis. The protuberances on the black shadow are used to mark the distances on the canon. The scanning of the intervals on the male profile along the 130° angle that props up the open head is symmetrical, though inclined by a temporal disjunction. The man is the father. The open skull offers a view of innumerable spirals (as in the drawing *L’énigme cavourien*). They are fragments of labyrinths, an element that unites this painting to the other labyrinths of 1913-1914. On the mother’s face, the Golden Ratio is found at the level of the nose and divides the total height from chin to hairline. The forehead, nose and chin are equidistant. The scanning of the father’s face



Dual polyhedron: the cube and the octahedron. The cube-octahedron (the second figure) allows the densest layering of spheres in a packed solid.

⁸³ The cube and the octahedron are dual polyhedron. The cube has 6 sides and 8 vertices and the octahedron has 8 sides and 6 vertices. Inserting one into the other, the vertex of one corresponds to the midpoint of the other’s side.



Roman cameo, 1st Century AD

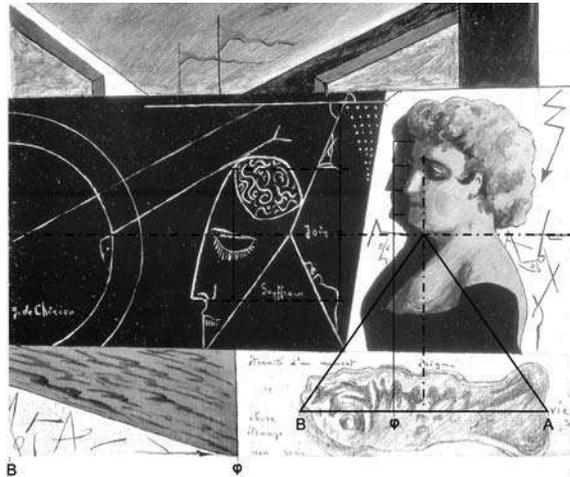
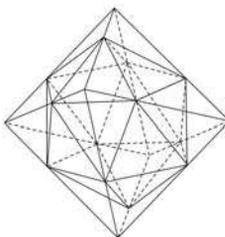


fig. 71



Leonardo

unites the eye and the vertex of the triangle inserted in the icosahedron: the distances from the vertex to the chin and from the eye to the hairline are the same. On the profile that lies along the open angle of the skull, the distance is the same from the vertex to the eye and from the vertex to the chin. The temporal breach makes the profile rotate invisibly along the lines of the polyhedron. Theoretically, if we closed the faces of the crystal, the head would take shape on the inside and at the same time would result on the inside of the one that contains the mother. We see them open on the plane. The vertical median line of the fish, which for Christians represents the “son” (Ichthus, Jesus Christ, etc.), is in line with the mother’s bosom and eye. A line drawn from each of the end points at the fish’s horizontal median line converge to a point on the mother’s neck. This point is exactly at the height of the vertex of the 130° angle of the father’s head. It suffices to join the harmonic triangles in order to see father, mother and son united in a kind of trinity. In Metaphysics the icosahedron represents water and is the dual of the dodecahedron, the quintessence. The phase-displacement of the father’s profiles and the doubling of the mother’s bust are a measurement of time, which together are proof of the psychic-optical action (Gestalt) that reunites them as one + one.

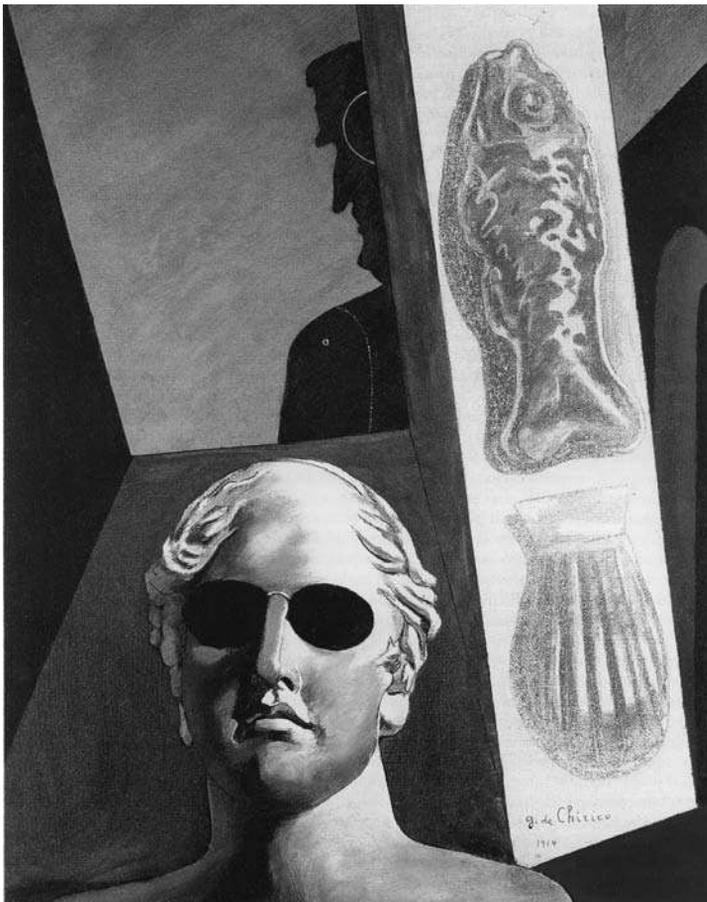


The icosahedron inscribed in the octahedron: the octahedron’s edges are divided according to the Golden ratio.

With Gestalt now manifest, the Platonic polyhedron is simplified: observe the works exposed at the Salon des Indépendants of 1914 (*La nostalgie de l’infini*, *Les joies et les énigmes d’une heure étrange*, *L’énigme d’une journée*) and *La Gare Montparnasse*. *Portrait de Guillaume Apollinaire* e *La nostalgie du poète* can also be considered, although their volumes are somewhat more elementary and they are bound to the canon of man. De Chirico is in the

midst of a close anatomic investigation in accordance with the canons of Polycletus, Leonardo and Dürer, which takes into account the investigation of logarithmic measurement in organic nature that takes place around 1915 (D'Arcy Wentworth Thompson).

Heading down the final stretch on Metaphysics: is space objective or subjective? Which brings us back to Poincaré: “*When we say that space has three dimensions, what do we mean? Internal changes are not perceived by muscular sensation*”.⁸⁴ Poincaré’s challenge resounds when the artist composes the celestial world with humanity. Generation (mother and father), endearment (the poet) and sensations, reverberate with infinity. “*Experience responds only to tactile space,*” wrote Poincaré. “*For each position of my body my finger determines a point and it is that and that only which defines a point in space*”.⁸⁵ Undeniably, the mastery of psychological optics announces the hardest task of all: human countenance.



Portrait de Guillaume Apollinaire, 1914

⁸⁴ Poincaré takes up the query, which had been treated in *Revue de Métaphysique et de morale* in ‘Science et méthode’, cit., p. 105.

⁸⁵ Ibid. p. 107.

The solid that frames the head leans to the left and forward, similar to the lowering and turning of the god Apollo's right shoulder with respect to the left; the white tetrahedron in the forefront with a fish and a seashell "presses" against the box where the head is. By turning the painting like a steering wheel onto the right, a set-up analogous to *Le temple fatal* reveals itself. Vice versa, turned onto the left-hand side, it recalls the head of Cavour "inside" the portico of *Le voyage emouvant*. The polyhedron that contains the poet's Apollonian likeness is "packed" within a solid (a piazza) of which we can distinguish only one wing (on the right with an archway) and where the "other" Apollinaire is positioned as a man in a labyrinth – unconscious, darkness – with a circle drawn around the cochlea, a temporal bone – a so called "target". By hypothetically uniting the walls of the solid that contains the head, a 25° angle results. The width of the fish increases with its shadow towards the left, to the same degree as the inclination of the tetrahedron:

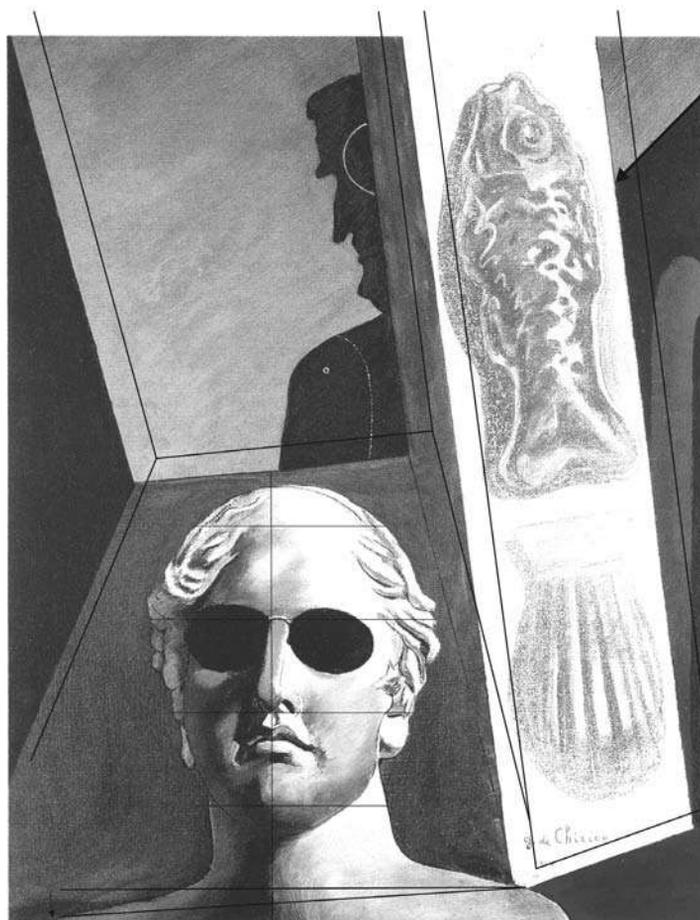


fig. 72

the shell rises off its shadow, carried by the translation of the solid (fig. 72). Part of an exterior polyhedron, the darkened portico on the right contains an obscure meandering, which together with the indication of the auricular seat of the labyrinth situates the painting in the family of labyrinths. The angle of the portico's roof, 45° with respect to the edge of the canvas, indicates the direction of the translation of the solid. The painting's iconology separates two zones, one in light and one in shadow. Night is death, but it also represents the unconscious. The symbols that represent shadow, the sunglasses and the box, are brought together by the figure of the labyrinth, the ancestral cavern, the depths enclosed within the human psyche, to which the small bone situated in the ear makes reference. By following the labyrinth which pulsates through the painting, one's attention is taken by the different harmonies: the solids, the canons, the seashell and the fish. The last two echo the work of D'Arcy Wentworth Thompson. At the same time as the painting of *Portrait*, the organic forms, the head, fish and seashell, undergo mathematical codification. In 1914 D'Arcy Wentworth Thompson held the famous series of conferences on *Morphology and Mathematics* at The Royal Society of Edinburgh. De Chirico had already painted *Portrait* when D'Arcy, who also was acquainted with the Renaissance treaties on proportion (Albrecht Dürer), revealed the relationship between the Golden Ratio the transformation and growth of shells and leaves on December 7th.

D'Arcy, explains how to achieve the transformation, without enacting it on a Cartesian diagram, with coaxial circles or more precisely, a confocal system where the rays are substituted with ellipses or confocal hyperbolas (fig. 73) (again, Poincaré): “The straight line $Y-AX=c$ will correspond to the logarithmic spiral $\Theta-A \log r=c$. The beautiful and simple transformation allows us to convert, for example the vertical conic seashell of a *Pteropus* or an *Orthoceras* into the logarithmic spiral of the *Nautilus*.”⁸⁶

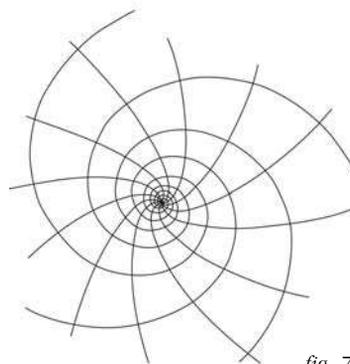


fig. 73

Apollinus is a poet, by name, as well as his resemblance to the *Apollino* in the Uffizi Gallery and by the harmonic division of his face that adopts the harmony set down by Leonardo and of Dürer. From this time onwards, the logarithmic spiral upholds the evocation of Apollo and poetry in de Chirico's work: the logarithmic spiral marks the mannequins and holds the chords of

86 D'Arcy Wentworth Thompson, *Morphology and Mathematics*, Edinburgh: Robert Grant & Sons, 1915, p. 867.

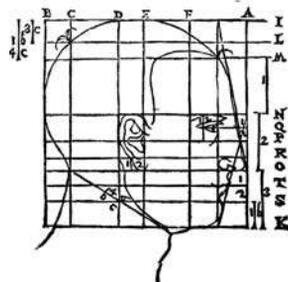
Apollo's instrument, the cithara. In *Portrait*, the logarithmic spiral of the shell sets the labyrinth in focus once and for all.

La nostalgie du poète,
1914



The poet's profile follows Polycletus' canon of the head. In this painting, Leonardo and Dürer's canon (fig. 74) as well as the Uffizi's *Apollino* are brought to light, as well as Polycletus' *Diadumeno* (fig. 75), which constitutes a founding reference. According to the Canon the subdivision of the face starts at the forehead, coinciding with the handle of the little "crank" (the crossed lines that form an X) that operates an invisible "wheel" at the centre of the painting. The painting develops three harmonic or "symmetrical" fields: the head, the fish and the mannequin's body. The mannequin's silhouette sets the harmonic measurement of the body according to Dürer's *Treaty on the Symmetry of the Human Body*.

Above the head, the fish is raised on an axis on which the measurements of the face and the body are subdivided (fig. 76). The mannequin manifests its true essence: a scheme of relationships pertaining to the human body. In Greek, *Κανών* means stick, square, ruler and by extension "rule", norm and measure (of beauty). In a crescendo, the canon of man takes possession of the paintings and upholds the tools that implements it: squares, frames, drawing pens, protractors, as



Queste sieno le larghezze del corpo in faccia.

Per lo giro de i capelli .	0480
Per la fronte .	0640
Per li sopraccigli .	0580
Per le orecchie .	0620
Per lo naso, e bocca .	0480
Per lo collo sotto'l mento .	0390
Per la fommitta delle spalle .	0950
	1180

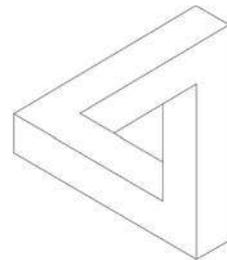
fig. 74

well as sticks and poles, in the Mannequins and Ferrara Interiors. They are set in a lexicon that weaves the infinite and human. The *Grande metafisico* of 1917 will celebrate the transubstantiation of the mannequin into an astronomer. The terrain that hosts *La nostalgie du poète* is marked with a topologic diagram: a secant on two “ambiguous” (Gestalt) rays, the extremities of which widen outwardly towards the bottom in opposite directions and set a “wheel” in



fig. 75

motion. Previously it was necessary to turn the paintings on their side, now a “wheel” has been activated on the inside. If we look at the three main elements of the painting, only the head in the foreground seems to be set on a fixed plane. The mannequin’s body, which we would like to read as being in front of the column, sinks into the background confusing our understanding of the planes and the fish is “pushed” forward as a result. In the *Theory of Perception* Lionel Penrose’s “impossible triangle” is well-known. Penrose is the father of Roger, the mathematical physicist author of *The Emperor’s New Mind*. Roland Penrose, a close relative of the two optical illusion theorists, avidly collected de Chirico during the Thirties. He owned *Portrait de l’artiste* of 1914, previously owned by Paul Eluard, and many of the Ferrara Interiors (*Composizione metafisica, Mélancolie du départ, L’ange juif, La révolte du sage, Le regret, Interno metafisico*). He was a friend of Marcel Duchamp, author of *Apolinaire enamelled*, (also of 1916-1917), which is another example of an *impossible figure*. The Penroses’ theory on optics brings to mind de Chirico’s “unstable equilibriums” of 1912-1916.⁸⁷



Impossible triangle

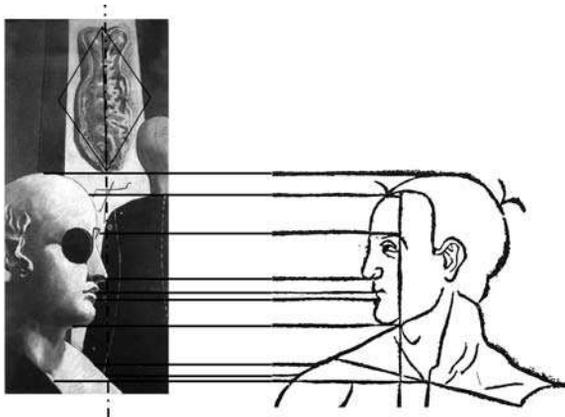


fig. 76

⁸⁷ Lionel and Roger Penrose’s article *Impossible Objects: A Special Type of Illusion* appears in *The British Journal of Psychology*, n. 49, London, 1958, p. 31-33.

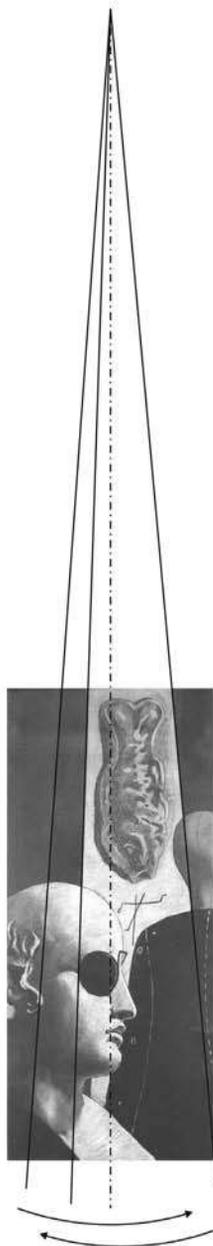
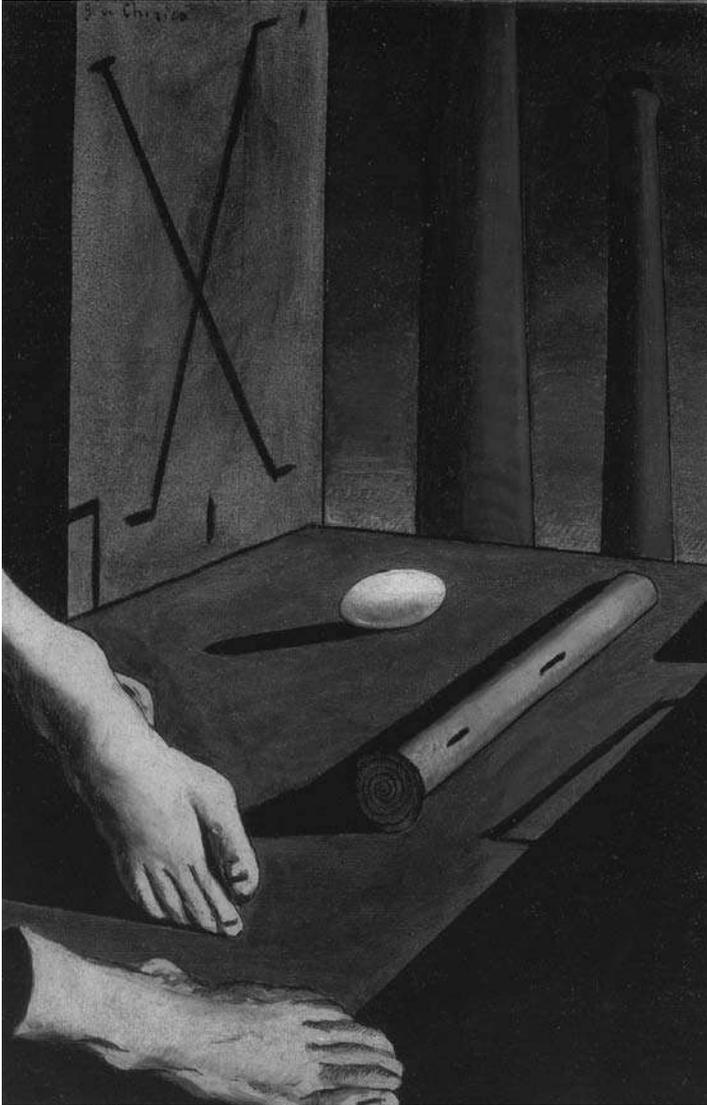


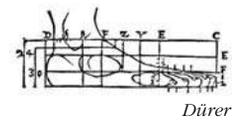
fig. 77

The painting possesses a greater *gravitas* than the *Portrait de Guillaume Apollinaire*: the weight falls and settles at the base with reduced oscillations with respect to the axis, which is the median line of the painting (fig. 77). This greatens the sense of celestial harmony given off by the human being. The entire Canon is contained in this fragment of the absolute.



Portrait de l'artiste,
1914

The supreme metaphysical self-portrait pays homage to the human measure most commonly known to builders: the foot. This painting is the principal synthesis of the norms explored during the course of this essay: the legs of the X with diverging angles at their extremities turning “ambiguously” (double movement), the letter X as an extension of de Chirico (Ch is X in Greek) and the scroll, balanced precariously on a hyperbolic cube, indicated by the transfer of the line above the edge. A drawing divided into modules is conserved at the Picasso museum in Paris. The painting is a Golden rectangle, which confirms a close mathematical tie to the clas-



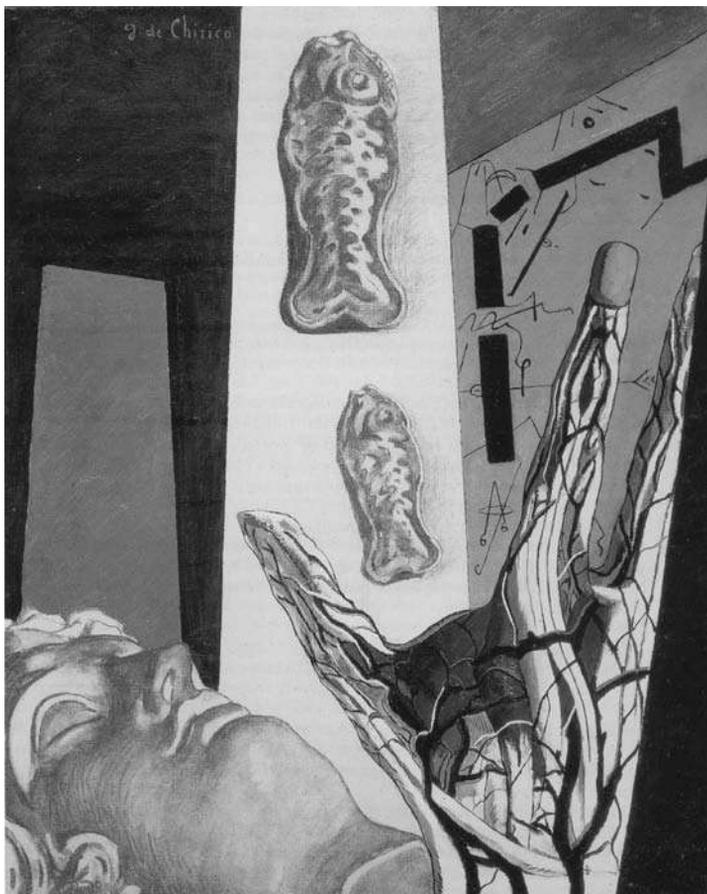
Dürer



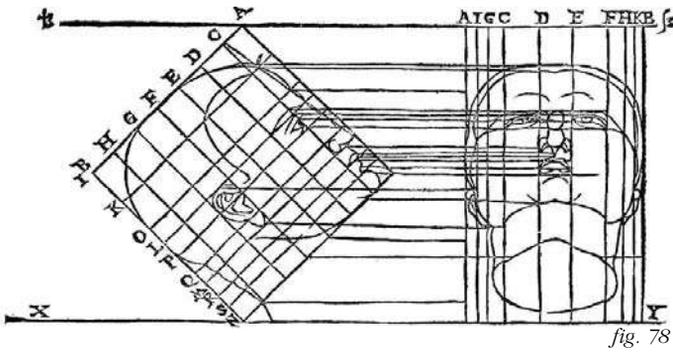
Leonardo

sical canon. The two cylinders of the chimneys are a reiteration of the module of the classical column. The extreme metaphysical value of this self-portrait is in the fact that all the details with which it is composed lead to the positioning of the artist himself as a measure and canon. The plate in *Vier Bücher* establishes the X as a pivot of the composition's focal lines. The painting accomplishes this in relation to the other elements.

*L'arc des échelles
noires*, 1914



Vitruvius sets as canon (*εμβαστηρ*) a *rata pars*, a greatest common denominator. The canon of the painting sets the hand and head as modules. The foreshortening of the head in particular, comes from Dürer's intensive study *Vier Bücher* (fig. 78). With Leonardo, the author of *Melancholia* is now consolidated as the primary source of de Chirico's "human mathematics". The hand raised in front of the head seems to throw forward the perspective of the fish, which differ in size and position. "Beyond the skin", this hand tells of a metaphysical mystery, the venous system of the body. A Gestalt test on the ochre-yellow face of the polyhedron leaves



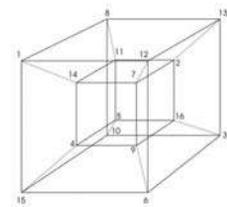
one stupefied by the *coniunctio* activated by the artist regarding the two opposites, Classic-Gestalt. A hatched line refers to the interior path of Dürer's magic square. In the fourth-dimension it is defined as a hypercube.⁸⁸ Once again, *Melancholy* is the epicentre (fig. 79).



fig. 79: Albrecht Dürer: *Melancholy*, 1514

1	8	13	12
14	11	2	7
4	5	16	9
15	10	3	6

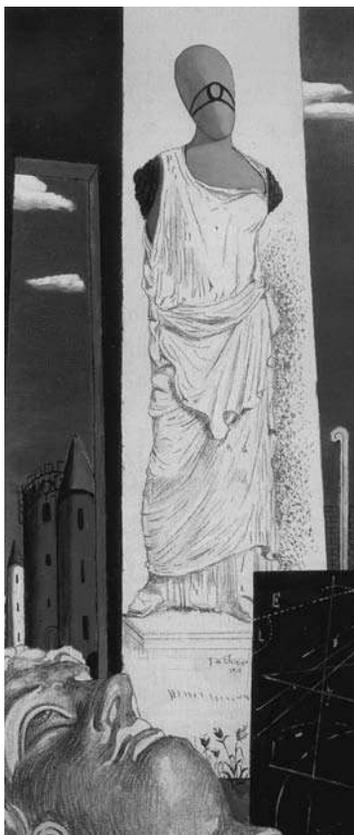
A magic square



A hypercube

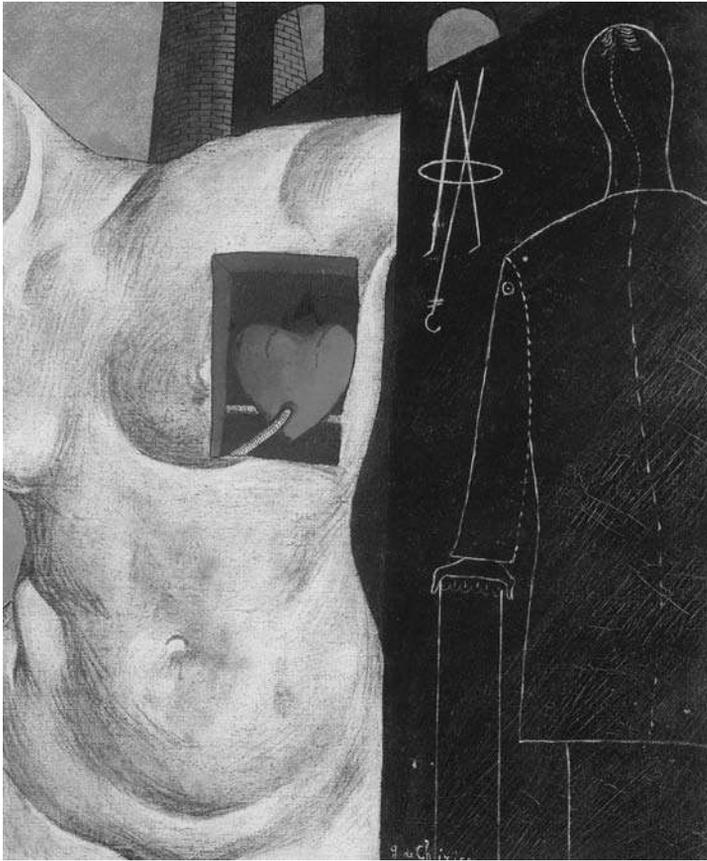
⁸⁸ A magic square (as seen in Dürer's *Melancholy*) is magic with respect to five transformations: rotation, reflection, line transfer, column transfer and redistribution of cells. Modern mathematics has performed the transfer of the magic square's properties to the four dimensions of the magic-cube.

Le voyage sans fin,
1914



This painting is similar to *L'arc des échelles noires* in its use of the head as a module. Real sky and clouds are inserted in the window frame. A symbolic gesture (the absolute present) is preformed by the merging of different epochs: a medieval castle, the mannequins draped in the style of ancient Greece and the mannequin with topological rings around the ellipsoid. The head, a milestone of measurement (a module), proposes itself as a measurement of time. It is presumable that it is *bis* head, the head of the voyager (Wanderer: the voyage without end is the *Wanderung*). From all the four corners of this domain, he moves forward incessantly under his many vests; his countenance reigns.

On the blackboard, astronomical calculations begin to disburse new information from that of the previous paintings. Self-reflection proposes itself as a supplementary technique at the end of one cycle and the commencement of the next. One tour completed, the next is set in motion with parts from the recently experimented mechanisms. Pieces of mathematical space on the blackboard conjure up the framework of the piazza by exhibiting indications of “compression” and the inclination of the polyhedron’s angles .



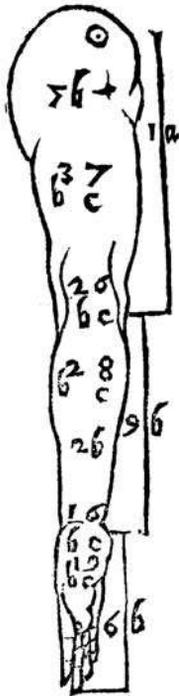
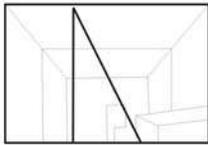
J'irai... Le chien de verre, 1914



*Polyclitus. The Doriforos
basalt bust*

After the investigation of the venous circulation in the *L'arc des échelles noires* the open window on the heart “beyond the breast” focuses on man’s physiological foundation. The body, of which we see the whole bust, defines the canon according to unquestionable ancestry: Polyclitus. From the Uffizi’s archaeology collection in Florence, de Chirico produces the umpteenth model: the basalt bust of Polyclitus. As a Pythagorean, he reunites the female (the breasts) and the male (a tailcoat) in one body as an indivisible hermaphrodite or primitive (primogenial). The mannequin on the right marks metrical divisions and ascertains once and for all Dürer’s *Vier Bücher* as the source of the calculations on the human being. The painting follows a metric system that is both masculine and feminine. On the blackboard, a spring with “ambiguous” endings performs rotations and reflections, another Gestalt variation on the “wheel” and on Dürer’s magic square. I would like to call to mind that the astrologers of the Renaissance linked magic squares of the fourth order to Jupiter and believed they fought melancholy. This was the starting point of the meta-

physical journey. The work foretells its fulfilment. With the head, the bone of the forearm, a human module, makes its appearance in one of the later works, *Les jeux du savant* (1917) (fig. 80). The two modules, the head and the arm, are subdivided into sub-modules that illustrate the relationship between the head and shoulder in one and the relationship between the forearm, palm (another module) and shoulder in the other. To be considered as general summary of the Golden Ratio, a series of Golden rectangles in a receding perspective is set in the background of the painting and creates a sensation of Gestalt.



Dürer

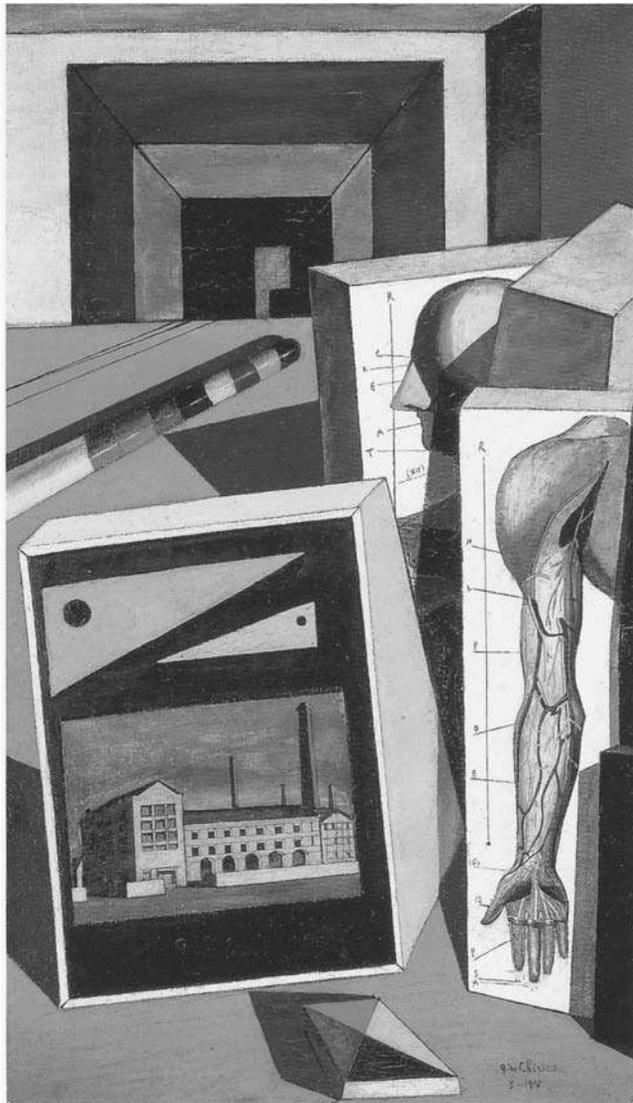
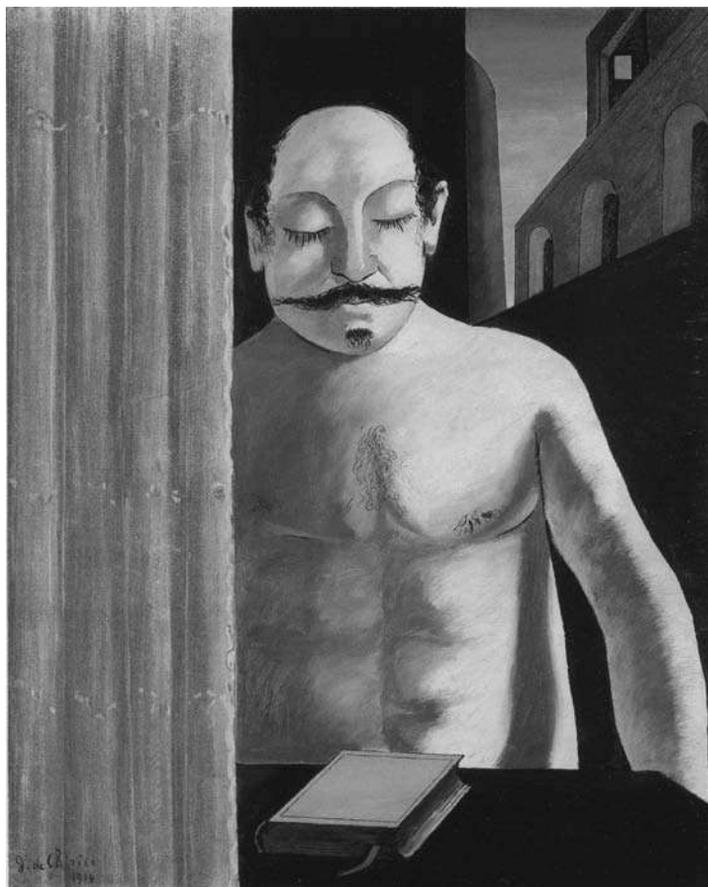


fig. 80: *Les jeux du savant*, 1917

Act III. A Reprise

Like a sonata, the third movement repeats the theme at the end of a development-section. The theme is always harmony.



*Le revenant I
(Le cerveau de
l'enfant), 1914*

The title makes reference to a return to the founding definition. We are at a checkpoint on the journey, awaiting a new *departure*. The curtain marks the Golden Ratio width-wise (fig. 81). The painting's inner surface converges on the body in linear perspective. The frontal set-up of the painting flattens the entire composition, with a brief exception in the foreshortened portico high up on the right. The linear perspective of the book on the table shares, despite a slight divergence, the static position of the figure, which is presumed to be a triple portrait: a self-portrait, a portrait painted by heart of his father, whom he portrayed as Napoleon III. The inner proportions of this work lead away from the anatomic canon. The face is poised on the median axis, although the right side differs noticeably to the left. The eyebrow,

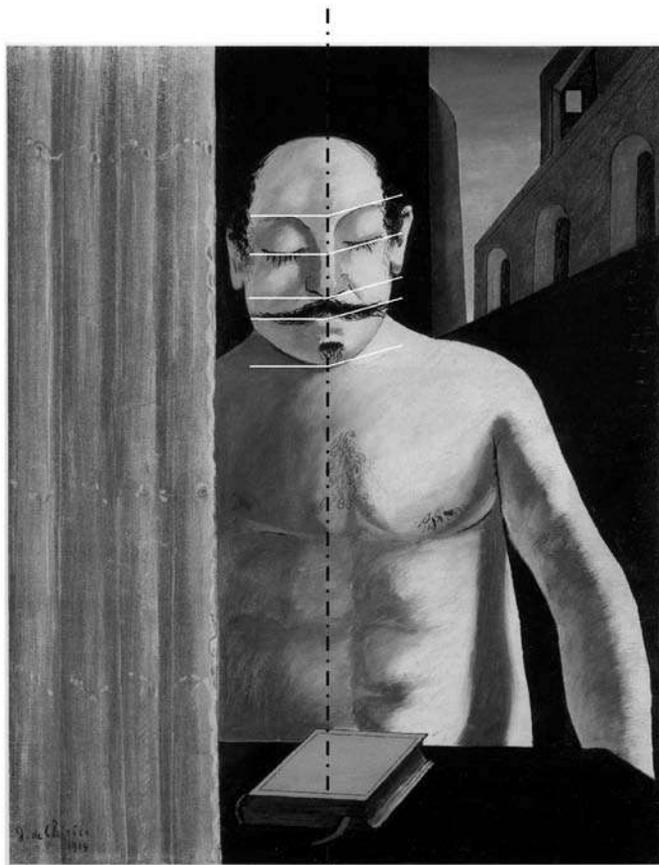


fig. 81

the eye, the ear, the moustache and the mouth have undergone an upward sliding movement. The torso is also off-axis, it shifts to the right. The title *Le revenant* was changed to *Le cerveau de l'enfant*.⁸⁹



Leonardo

The Spherical Polygon

In 1914, the sphere that resides in the forefront of *Le chant d'amour* – the same position that the poet's apollonian head occupies in the portrait of Apollinaire – announces a theme. The hatched lines on the surface of the ball draw spherical triangles. The center of a sphere is the vertex of a solid angle; its three planes intersect the surface in three great circles forming a spherical triangle. In 1915, de Chirico effectuates numerous incursions into Lobačevskij's theory in his description of solid angles. In the case of "Euler" triangles, the triangle's spherical area is related to the sum of its

⁸⁹ See «Metafisica», n. 1-2, p. 69.

angles. Lobačevskij's spherical triangles represent the halfway point between those examined by Euler in *Trigonometria sphaerica* (1779) and the spherical triangles of Möbius. Euler's spherical triangles have three sides (arches of a great circle), each of which is no greater than a semi-circumference. Therefore, three points not belonging to the same great circle define only one spherical triangle. For Möbius on the other hand, no limitations exist for the classification of the spherical triangle.



Le chant d'amour,
1914

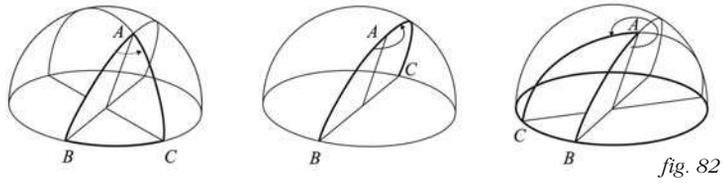


Leonardo

The “metaphysical isolation” theorized by Matthew Gale in the works of 1914⁹⁰ encircles the head of Apollo Belvedere, which floats in emptiness. It consecrates the head as a unit. According to the classical canon, the head is a module, the palm of the hand is a module (the glove) and the sphere is a module (for Plato, the world seen from above and, in Dürer's engraving, the ball on the ground in front of the melancholic figure). Behind the modules, the face of an icosahedron during translation is positioned in relation to the

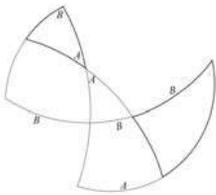
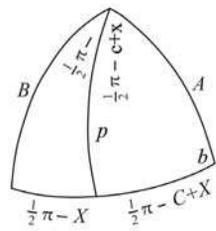
⁹⁰ See Gale 1988, for the strong forward position of the head in *Le revenant I (Le cerveau de l'enfant)* and *Le chant d'amour*. The Uncertainty of the Painter. ‘The Burlington Magazine’, vol. 130. London, April 1988, p. 273.

head according to a topological diagram: head and polygon are oriented in a double reciprocal movement with respect to the globe which is the transformational axis as well as the central module.

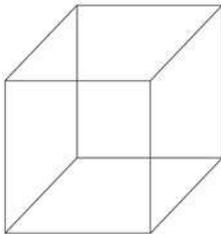


The subdivision of the sphere results in the third side of a spherical triangle being less than, equal to or greater than a semi circumference, according to whether the opposing angle is measured by a central dihedral angle that is less than, equal to or greater than a semi-sphere (Lobačevskij) (fig. 82).

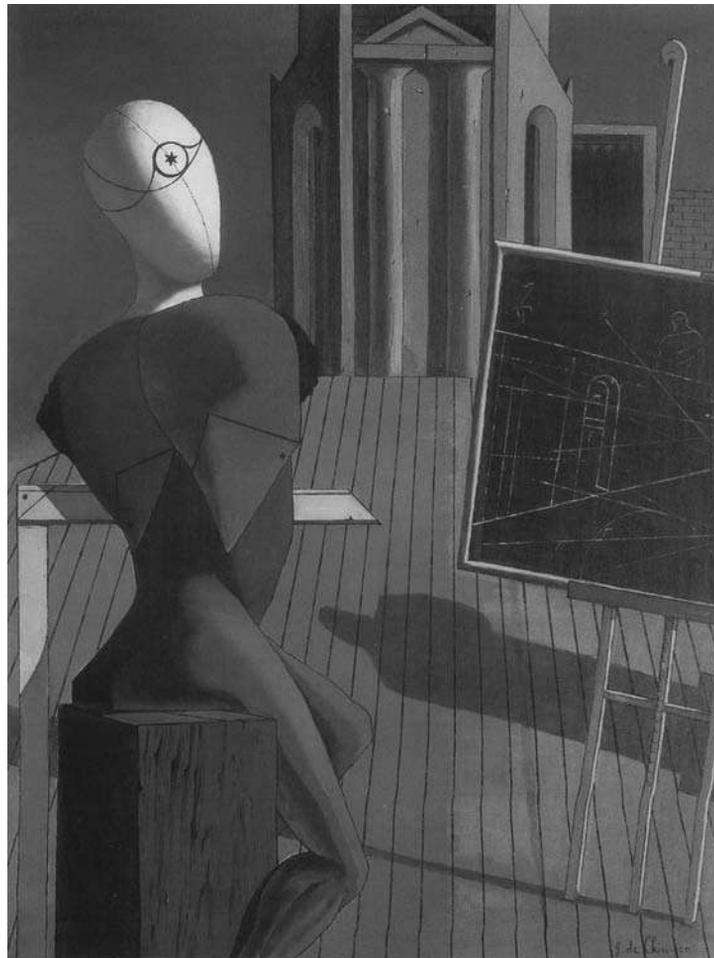
Le Vaticinateur, 1915



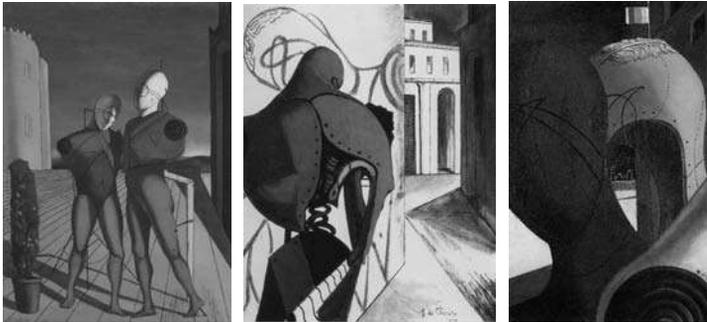
Lobačevskij



A Necker cube



The title evokes Chaldean astronomical mathematics. The vaticinator has a star for an eye. In light of Modern Physics, we need to understand the body of this emblematic being who studies the celestial sphere using himself, his body, as an instrument for investigating problems pertaining to spherical geometry. The body, obtained through the unfolding of a spherical polygon into spherical triangles, sits upon a Necker cube. The Necker cube is a model of the ambiguity of vision where an identical observation point furnishes the mind with two different ‘objective’ realities of one image. We can see this cube as either being convex or concave. The contour of the head is an ellipsoid, from elliptic geometry. The ecliptic and the celestial equator cross at eye level. In front of the man, a geometric drawing on the blackboard explains the relationship between a portico and the inclination of the celestial box (the Italian Piazza) during translation.

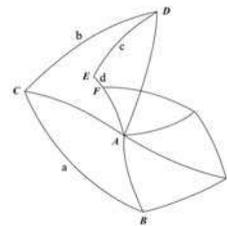


Le duo, 1915

Les contrariétés du penseur, 1915

La lumière fatale, 1915

Mindful of Euler, Lobačevskij and Cauchy, the universe harvested by de Chirico in the human being reflects the Platonic universe of polyhedra. With the mannequin, man sees celestial movement distributed over his own body. Starting with the first definition, which measures solid angles with dihedral angles, de Chirico rapidly adapts the entire theme to arms, legs and busts. The theme is the rotation of the triangle around a point, the continual deformation of the polyhedron and the articulation of the polygonal faces etc. It seems that the artist combines an infinite number of regular polygons by taking into consideration the number of faces and the way they fit together and forms a group of solids according to non-Euclidean geometry. *Les contrariétés du penseur* takes up the investigation of the heart in the painting *J'irai... Le chien de verre*. What's inside? The problem suggested is how to measure *the inside angle of a regular solid*. In chapter V, paragraph 71 of *New Principles of Geometry* (1835-1838), concerning solids as bodies, Lobačevskij defines a solid angle as *the inside angle of a regular solid*.⁹¹

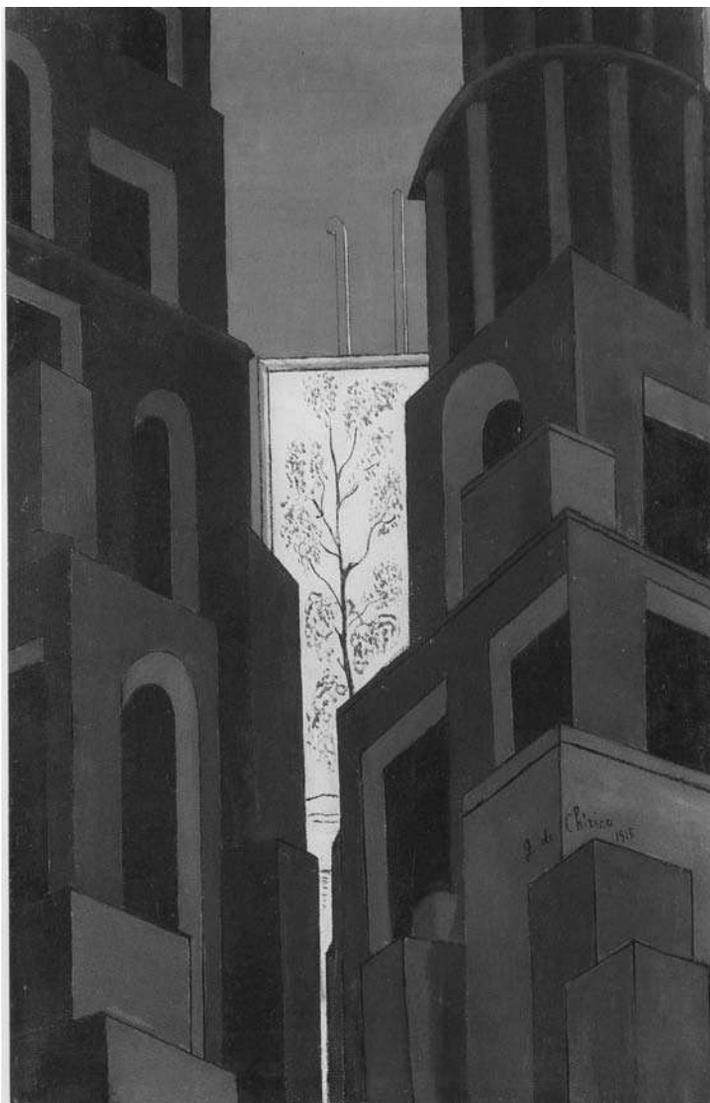


Lobačevskij

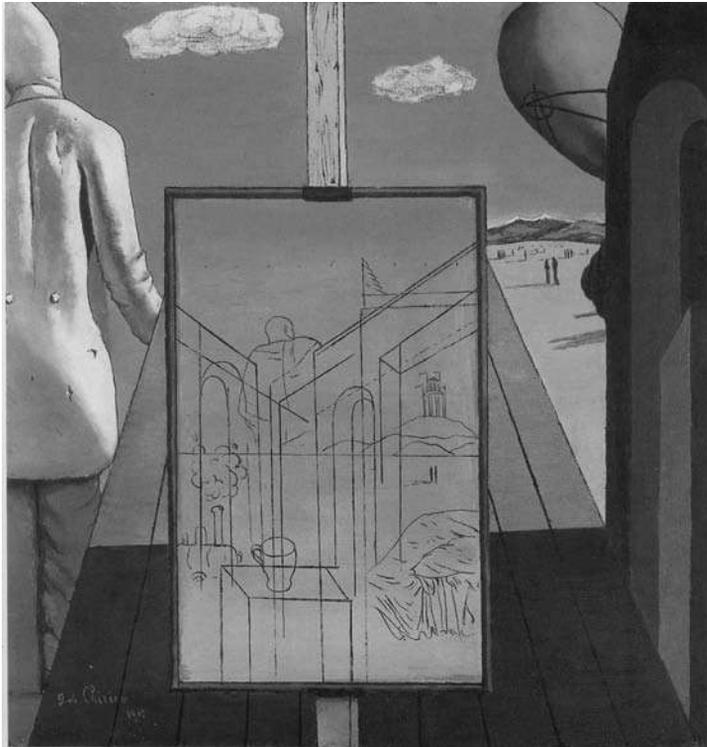
⁹¹ “Imagine a spherical surface on which arcs are traced, the centre of which is the centre of a polyhedron, the vertexes of which coincide with its circumference. The sphere is divided in n equal parts by n faces of the regular polyhedron, and therefore the centre angle is $2\pi/n$ ” L. Lombardo Radice in Lobačevskij 19, cit. note 1, p. 170

Axial Composition

La pureté d'un rêve,
1915

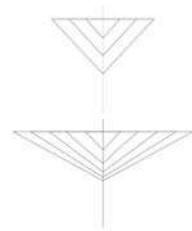


The precise axial set-up of the two paintings is an event of certain importance. It signifies the transposition of the compositional structure onto a perspective plane that is still classical, though taken directly from Pompeian painting. In one case a tree and in the other the staff of an easel mark with evident iconographic force the painting's axis. This means there is no choice but to unite the perspective lines at the two sides of the axis. The degradation of the measurements does not take place depth-wise, but from above to below (fig. 83). This is a further demonstration of de



Le double rêve du printemps, 1915

Chirico's maturation of form, before his move back to Italy as a result of the war. I find it useful to place *Le revenant I (Le cerveau de l'enfant)* with these works as a precursor, as it also leans forward as if pushed upon us and for its set-up according to the Golden Ratio, which is impossible to ignore. This forward movement is explicit in *Double rêve du printemps*: it is the palimpsest of the Italian Piazza positioned so that it leans forward in an overbearing way. The meaning it holds is the actualization of its most recent past. De Chirico places it at the front to demonstrate, once again, just what an Italian Piazza is made of. It shows Theseus in the labyrinth looking onto the piazza where Ariadne lies: it explains the relationship of the cube with the universe of forms, etc.



J. Kern, pseudo-perspective scheme with vanishing points on a principal axis, 1938.

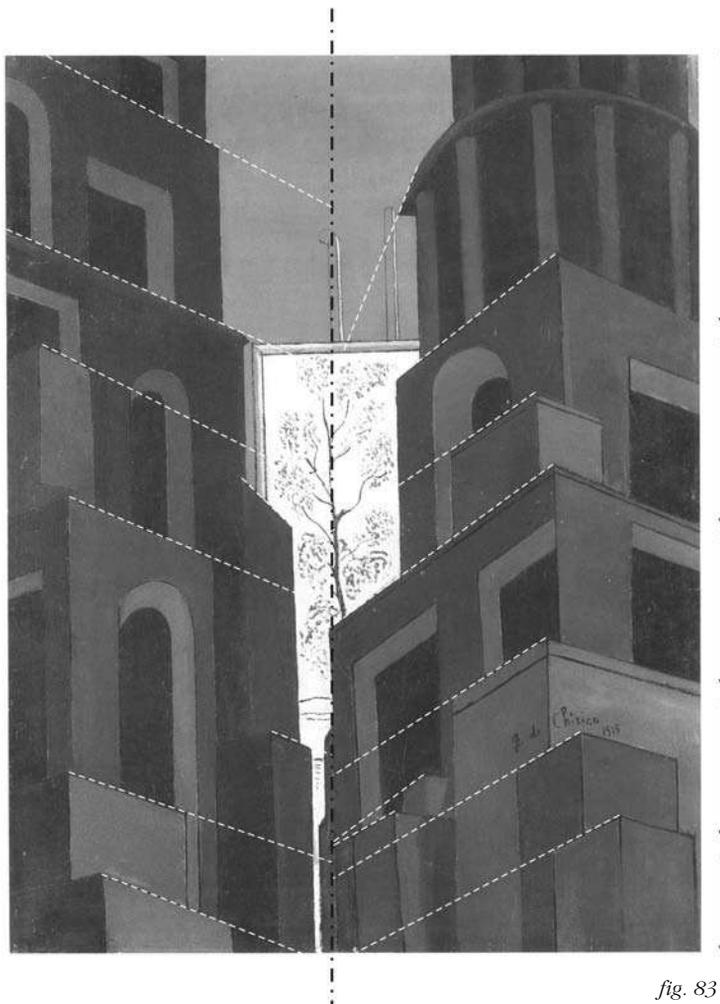


fig. 83

Translated by Katherine Robinson