

Dalí's surrealist activities and the model of scientific experimentation¹

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Abstract

This paper aims to explore relationships between Salvador Dalí's practices at the end of the 1920s and during the 1930s, and models of scientific experimentation. In 1928 Dalí took a growing interest in André Breton's automatism and elaborated his first conception of surrealism which was based on the model of the scientific observation of nature. Dalí's writings of this period mimicked protocols of botanic or entomological experiments and reformulated in an original way Breton's surrealist project: they simulated the conditions and practices of scientific observations of nature. Paradoxically, this documentaristic and hyper-objective attitude led to a hyper-subjective and surrealist description of reality: objects were taken out of their context, they were broken up and no longer recognisable. When Dalí officially entered Breton's group and conceived the paranoiac-critical method, he focused his attention on another scientific model: Albert Einstein's notion of space-time. Dalí appropriated a concept which defined the inextricable relationship between space-time and the object and which became, in his view, the mental model of the interaction between interiority and exteriority, invisible and visible, subjectivity and objectivity. Significantly, the Catalan artist almost rewrote one of Einstein's own papers, by pointing out the active dimension of Einstein's space-time and by conferring new meanings on his notion of the space-time curve. I will track down the migration of this concept from physics to Dalí's surrealist vision by considering its importance in writings where the artist uses his method to interpret the most varied phenomena, from the myth of Narcissus, to English pre-Raphaelitism and the architecture of Antoni Gaudí.

Might scientific investigations actually be 'giant paranoiac daydreams,' as Salvador Dalí stated in the *Tragic Myth of the Angelus by Millet*?² At the end of this text published in 1963 but written between 1932 and 1933, Dalí emphasised the experimental value of his surrealist activities. Moreover, he placed his own investigations on a par with those devoted to philosophy, history or science. He went still further when he stated, supporting his theory with a quotation by the scientist Erwin Schrödinger, that the paranoiac mechanism characteristic of his own method underlay the determination of the experimental choice leading to scientific investigation. The obsessive paranoiac idea, Dalí claimed, occurred in an abrupt manner and focused attention on certain objects to the detriment of others:

How, I ask myself, can we not discern the presence of the paranoiac mechanism in the extraordinarily determinative process of 'experimental' choice which serves as a prelude to the investigations of the natural sciences? How, I ask again, can such a mechanism not be active in such cases, when the study of delirious paranoiac particularities means that we witness an *essential change in the objective world, a change which presents itself as sudden and which absorbs, through its instantaneous associative power, all of our attention and our affectivity, which in turn remain irresistibly fixed upon a 'certain' number of facts and objects, to the detriment*



and exclusion of all others? It seems to me that such phenomena, comprising just as violent determinations of choice, cannot be in vain, and cannot, to a more or less marked degree, fail to intervene in what for me is this conditional factor of scientific experimentation, and which, to use the same terms as E. Schrödinger, consists in *'the momentary disposition of our interest and of its determining influence in the direction of subsequent work.'*³

In this text, Dalí appeared to challenge the frontier between the fields of art and science. This stance deserves our attention, since it testifies to a tendency taking shape in the early twentieth century: while artists laid claim to objectivity, scientists were increasingly being led to admit to a certain degree of subjectivity in their research. In addition to the quotation from Schrödinger's work used by Dalí, one might also mention the writings of Henri Poincaré in this respect, a scientist who underscored the vacuity of demonstrative logic when not accompanied by intuition. For Poincaré, scientific truth appealed first and foremost to intuition, 'this faculty that teaches us to see': 'Logic is the tool of demonstration, intuition the tool of invention.' Poincaré's most important results do indeed appear to have been achieved not by dint of rigorous reasoning but by calling upon subconscious thought which alone is capable of grasping the unsuspected relationships between known facts.⁴

Albert Einstein in his writings also highlighted the ability of the scientist to call upon images. When reflecting on the principles of research, he rejected the possibility suggested by Isaac Newton of elaborating upon empirical knowledge by adopting experience as the point of departure. This, he claimed, was because fundamental concepts cannot stem from a mere observation of the facts: they have no prior or independent existence, but are instead 'spontaneous creations of the human mind.'⁵ The Einsteinian method therefore involves three phases: invention linked to spontaneous intuition, deductive reasoning, and finally the confrontation with experimental fact.⁶

If these examples point to the importance of subjectivity in scientific method, they find an inverse counterpart in the field of art. With regard to promoting the value of a rigorous scientific approach within the world of art and literature, one need only think of surrealism. From 1924 onwards André Breton emphasised the necessity of becoming acquainted with the scientific discoveries linked to biology and physics in order to express 'reality' from a surrealist standpoint: 'Does every man of today, eager to conform to the directions of his time, feel he could describe the latest biological discoveries, for example, or the theory of relativity?'⁷

It was undoubtedly Dalí who took this Bretonian exhortation most strongly to heart. As an avid reader of popular scientific works, he took the liberty of re-appropriating scientific reasoning that, more than any other form, had an enabling effect on his work in two main ways. Firstly, it lent credibility to his activities by underscoring their cognitive dimension, as Dalí exploited the social prestige of scientific reasoning to authenticate his artistic experiments. Secondly, it challenged the system of rational thought. By pinpointing the imaginary conjectures underpinning science, Dalí denounced rational construction of a



scientific type and underscored the arbitrary nature of the border between objectivity and subjectivity.

The appeal of the model of the scientific observation of nature

Between 1928 and 1929, as he established closer ties with Breton's surrealist movement, Dalí conceived of an 'antiartistic' vision of reality and referred to the model of the scientific observation of nature. He suggested, in writings of the time, simply recording what one sees. Paradoxically, it was by the overuse of the investigative methods of a botanist or an entomologist, and by the hyperbolic promotion of the concern for accuracy, that Dalí challenged the model of scientific observation and denounced the subjectivity of the viewpoint inherent to this position. He underscored the necessity of taking account of the psychological automatism of one's view of reality, an automatism that guarantees an unconventional and cognitive approach to reality: the real object is no longer recognisable, but becomes enigmatic and is revealed in a new light. Simulation of the hyper-objective and documentary attitude thus leads to a hyper-subjective and surreal description of reality.⁸

We could ask, in relation to Dalí's concerns in this period, in what exactly did and does the mechanism of 'scientific observation' consist? One definition could be as follows: the object is first of all removed from its context and placed in a measuring space which is regarded as neutral. The object is then observed by a mechanical eye, devoid of any affectivity. One might refer, for instance, to the example of the micro-photography of the 1920s: the photograph of the image seen under a microscope - like the front view of insect wings against a neutral background, photographs of crystals or the reproduction of a detail of a section of a shrimp's tail - enables one to discover other aspects of the object. It is also worth mentioning, within the context of the scientific films which began to develop in France from 1925 onwards, mainly through the work of Jean Painlevé, the technique of close-ups and ultra-cinema shots, where the camera films the blossoming of a flower in speeded-up motion, or the process of botanical fertilisation in slow motion. Of course, in the 1920s there was nothing new about the idea of combining scientific and artistic viewpoints. On the scientific side for example, Ernst Haeckel stated that observed forms of nature are already artistic forms.⁹ On the artistic side, Karl Blossfeldt, in *Urformen der Kunst*, sought to demonstrate that the formal models for the arts should be sought out in nature.¹⁰ Another example of the artistic appropriation of science could be found in the photographs of Albert Renger-Patzsch, which aimed to provide a new vision of ordinary objects, and which were very similar to scientific photographs [Fig. 1].



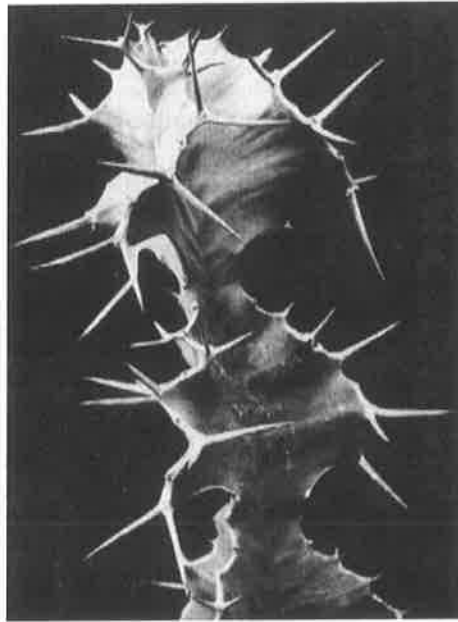


Figure 1 : Albert Renger-Patzsch, *Euphorbia Grandicornis*, 1922, photograph © 2005, Albert Renger-Patzsch Archiv, Ann und Jürgen Wilde, Zülpich/ProLitteris, Zurich

Dalí himself, influenced by *L'Esprit Nouveau*, began conducting his own exploration of this intertwining of art and science from 1927 onwards, within the context of the Catalan avant-garde. In 1928, when he turned towards surrealism, he remained faithful to a clinical type of vision, which led him to redefine Breton's project and to write literary texts of a documentary nature. In terms of themes, Dalí, who was well acquainted with books on botany, entomology, Painlevé's scientific films and the aesthetic approach of Blossfeldt and Renger-Patzsch, constantly referred to the model of the microscope and photography, and to the procedures inherent in documentary and scientific films. In a letter sent to his friend, the critic Sebastià Gasch, Dalí set out the nature of surrealist film and established a parallel between the rigour of the surrealist vision and the rigour of the vision of a scientist through his microscope. He emphasised that the production of an 'absolutely surrealist film' entailed an 'absolute rigour.' He also asserted that this kind of film would be 'as antiartistic as to film what the scientist sees in the microscope.'¹¹ Moreover, the Catalan artist, in a text of 1929 in which he enumerated various 'antiartistic' trends, mentioned the exemplarity of the documentary mode in all its forms:

Let us hope that the first irrational attempts, free from any aesthetic sense, paralleling attempts that are strictly scientific, will present us with a documentary of the long life of the hairs of an ear, or a documentary of a stone, or that of the life of an air current in slow motion.

We note the rigorous and powerful means that are today at the disposal of the documentary: the phonograph, photography, cinema, literature, the microscope, etc.¹²



This was not the only scientific approach Dalí appropriated. In terms of textual structures, Dalí also simulated the procedures of scientific experimentation with a view to promoting an antiartistic vision of the world: for example, in the series of 'Documentaires – Paris 1929,' seven texts of a documentary nature written by the painter for the Catalan review *La Publicitat* during his staying in Paris in 1929 for the production of *Un chien andalou*.¹³ In 'Documentaire – Paris 1929 – I,' in order to justify his approach, Dalí established a parallel between automatic writing and documentary texts: both stemmed from the experimental observation of reality and called upon a passive psychological automatism. But in the one case, we are looking at a rigorous transcription of inner reality; and in the other, at external reality, as he made clear:

In effect, the documentary and the surrealist text coincide from their beginning in their essentially antiartistic and particularly antiliterary process, since there is no intervention in this process on the part of the least aesthetic, emotive, sentimental purposes, these being the essential characteristics of the artistic phenomenon. The documentary notes, in an antiliterary fashion, things said to be in the objective world. In a parallel manner, the surrealist text transcribes with the same rigour and in as much an antiliterary sense as the documentary, the REAL and liberated functioning of thought, what actually goes through our minds, all this by means of psychic automatism and other passive states (inspiration).¹⁴

Dalí thus seems to be redefining Breton's 'trouvaille.' In Dalí's view, automatic writing becomes an experimental observation of the 'real workings of thought.' If one examines Dalí's conception of the documentary mode, one observes a hyperbolic depiction of the mechanism of scientific observation that ultimately leads to a surreal description of reality.

In 'Documentaire – Paris – 1929 – III', for instance, Dalí first defines a receptacle-area (the 'tables') where objects are removed from their natural context.¹⁵ He then conducts a neutral observation (using verbs linked to the idea of 'notation') spread out over time and relating the changes that occur. The objects are fragmented, juxtaposed and set into motion, which gives them a ghostly aura. Thus in Dalí's text, for example, the straw on a table is replaced by different kinds of 'objects':

I verify the changes undergone by two of the tables observed. One had on it the drinking straw, there are now five hands, two violets, three breasts: one underneath red silk, two underneath pink georgette. The elbow of a tuxedo. Eight champagne glasses, three bottles in ice, the remaining pearl of a necklace, a bit of smoke close by to the ice.¹⁶



The example of 'Documentaire – Paris – 1929 – V' is even more significant: the 'documentary' takes the form of a riddle. The straightforward notation of elements within a previously defined area engenders an enigmatic process of disappearances and transformations. First comes the observation of objects cut off from their context:

« There are » eighteen buttons, the one closest to me has a hair (perhaps an eyelash or a tiger's hair) coming out of one of its holes. Three centimetres to the right of this button there is a cookie crumb. There are still five more biscuit crumbs situated in the manner indicated in the first illustration. Beyond the crumbs and continuing to the right there is a dark abyss two hand-spans in width. On the other side of the abyss « there is » a table hanging on a thin and long wisp of smoke. There are on this table the number 86, a cup, a teaspoon, four fingertips.¹⁷

From this static phase, one then moves on to a dynamic phase in which objects come to life and are transformed: everything proceeds as if one were facing the mechanical eye of a camera filming the movements of objects in close-up and in speeded-up motion. Adopting an objective vision, in Dalí's account, thus makes it possible to establish an enigmatic reality, imbued with subjectivity:

When all this is noted, the biscuit crumbs change their place and form a new grouping (second illustration). The hair stays in the button, but further away, two biscuit crumbs (the two on the extreme right) take off, flying fast. Suddenly the following things take place in very rapid succession: seven hands follow one another, three gloves are introduced onto three hands, two hands leap on top of a chair, one on top of a table three metres away. The cookie crumbs all disappear but one, which makes three turns and then stays quietly in the same place (roughly). At this moment, the hands, gloves, buttons, hair, etc. are substituted by a mirror. The mirror disappears, substituted by the avenue of the Champs-Élysées that still glows in the afternoon light. The avenue disappears to be replaced by the window of a shoe store, lighted up electrically from the inside, etc. All these are objective data rigorously and scrupulously recorded.¹⁸

The delirious redefinition of Einstein's notion of space-time

In elaborating the paranoiac-critical method from 1929-1930 onwards, Dalí developed another conception of surrealism and integrated scientific models in an entirely different way. It was no longer a question of adopting a hyper-objective vision as a starting point to designate the subjectivity and the creativity inherent in any visual perception; but instead, on the contrary, of highlighting the hyper-subjectivity of vision and its inextricable link with objectivity. The paranoiac-critical method actually combines the speculative plane, which claims to be



objective ('critical'), and the irrational plane with its subjective nature ('paranoiac'). The irrational idea automatically projects itself into reality and is displayed there in an entirely objective manner: it takes the form of reality. The case of Dalí's *Paranoiac Face* (1932), a double image, is significant: it may evoke both an African landscape and a Picasso-type face. The obsessive idea of a 'Picasso-type face' can be objectivised in the concrete and verifiable forms seen in the postcard of an African landscape.

In order to conceptualise this inextricable link between subjectivity and objectivity, Dalí once again resorted to science: he no longer referred to an investigative method but to a scientific concept, that of space-time as defined in Einstein's theory of General Relativity. In fact, the more Dalí insisted on the objective character and the cognitive significance of delirium, the more he appealed to this notion: it was in 1933 and 1934, when Dalí integrated the notion of space-time into his work, that paranoiac-critical activity became a 'method of irrational knowledge.'¹⁹ But what is meant by 'space-time' and how did Dalí re-appropriate this notion? In his theory of General Relativity, Einstein, in order to explain the mechanics of bodies in accelerated referential systems, based his argument on non-Euclidian geometry: Euclidian space is a flat space in which the shortest segment is a straight line, while Non-Euclidian space is a curved space (a sphere, for example) on which the shortest segment is the arc of a curve called 'geodesic,' and in which there are no parallel segments. One might mention the example of the trajectory of a ray of light going from a star to the observer [Fig. 2].

If there is no mass between the star and the observer, the trajectory of the ray is a straight line (see the trajectory A); the curve of space-time tends towards zero. On the other hand, if there is a mass between the star and the observer, the trajectory is curved because of the presence of the gravitational field. The trajectory of the ray of light is a geodesic line (see the trajectories B1 and B2); space-time is curved.²⁰ The structure of space is thus variable, since gravity is no longer considered as a force, but as an element structuring space itself. There is interaction between space and mass, as mass determines the curve of space, and the curve of space defines the trajectory of bodies. One is a long way here from space as conceived by Newton, a rigid and absolute space in relation to which everything else is measured.



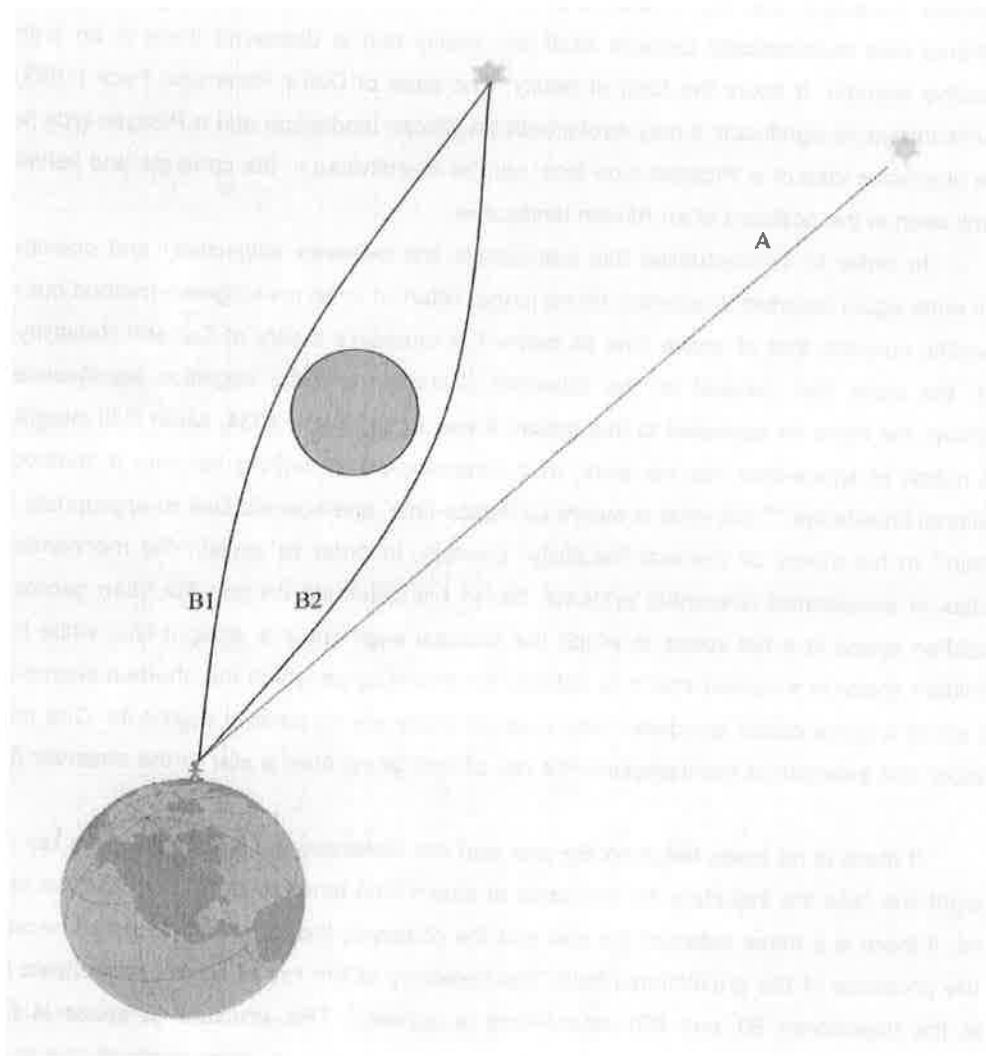


Figure 2 : Diagram of the trajectory of the ray of light going from a star to a terrestrial observer.

Dalí was fascinated by the interaction between space-time and object, since it enabled him to consider the interaction between irrational thought and the objective world: delirious ideas and the material world could interfere with each other on the model of an invisible physical space acting on bodies. The most significant text in this respect is undoubtedly 'Aerodynamic apparitions of object-beings.'²¹ This article is not so much aimed at the concrete construction of a new type of surrealist object, as at establishing a paradigm enabling one to conceptualise the interaction between subjectivity and objectivity. After having defined 'object-beings' as 'strange bodies of space,' Dalí, by way of illustration, associates the 'lyricism' of the extraction of blackheads from nasal pores to the 'lyricism' of a new conception of space. This association is very bizarre, since it places the trivial everyday world and the scientific world in parallel. In any case, the association enables him to trace the evolution of the idea of space: from the unsubstantial space of Euclid, one reaches the space-time of



Einstein. Dalí set out five stages in this process: 1) the ideal and non physical space of Euclid, which is compared to a 'broth'; 2) the three dimensional space of René Descartes, which is compared to slightly denser 'juice'; 3) the space of Newton in which forces are acting and which acquires the 'gravity of the apple;' 4) the space of James Clerk Maxwell and Michael Faraday which is characterized by physical states and which appropriates objects by 'saying' 'the apple is mine;' 5) the four dimensional space of Einstein which is compared to a 'voracious meat which squeezes strange bodies.'²²

In Dalí's view, over the centuries space had become increasingly concrete and active: it had acquired four dimensions and become a kind of 'meat' capable of crushing the body. One therefore grasps that the link between extirpating blackheads from nasal pores and the Einsteinian conception of space-time is the idea of an *invisible entity that is manifested in visible form by compressing and expelling bodies*. What is even more curious is that one finds the same stages and the same expressions to characterise each stage (without the culinary metaphors) in an article by Einstein published in Spanish in 1929 and in French in 1934, 'The problem of space, ether and the field.'²³ Is this a mere coincidence? Whatever the case, by comparing the two articles, it is easy to underscore the way in which Dalí exploits this scientific concept. He essentially retains the idea of a *space that acts* on bodies and not the reverse. Moreover, this active and physical space does not determine the trajectory of the objects, as in Einstein's theory, but the *very structure of the objects* (it expels and shapes objects). The examples of 'object-beings' mentioned by Dalí are thus any bodies with curved surfaces subjected to the actions of space: soft objects; curved figures such as Narcissus staring at his image, as depicted in Dalí's painting *The Metamorphosis of Narcissus*, the praying mantis-woman in Millet's *Angelus*; or Modern Style architecture with its undulating surfaces. The use of the space-time concept thus enables Dalí to characterise his own theory of paranoid thought, an active thought that acts on the outside world by shaping it.

Indeed, there is evidence that the imaginary Dalinian world of space-time is linked to his reading of Einstein's article. Dalí explicitly cited it in a little-known lecture given in Barcelona in 1935 and published by Fanés in 1999, 'The surrealist and phenomenal mystery of the night-stand,' in which Dalí set out to apply his method to *The Weaning of Furniture-Nutrition*²⁴, the image of a night-stand removed from the back of a wet nurse.²⁵ After claiming, in his lecture, that the very real hole in the back of the wet nurse was a delirious space that produced objects (the night-stand) and eroded conventional space, he retraced, by constantly proceeding through the same stages, the evolution of the idea of space. And this time he referred to his source, Einstein's 'The problem of space, ether and the field,' by quoting a sentence from the article underscoring the objective character of space:

Einstein writes: 'Two solid objects may touch one another or be distant from one another.' In the latter case, a third body can be inserted between them without altering them in any way, in the former not – there spatial relations are obviously real in the same sense as the bodies themselves. If two bodies are of equal value



for the filling of one such interval, they will also prove of equal value for filling of their intervals.

The development of the concept of space, considered from the point of view of sense experience, seems to conform to the following schema, *solid bodies, spatial relation of solid bodies, interval, space*. Looked at this way, space appears as something real in the same sense as solid bodies.²⁶

It is worth noting that Dalí is not interested in the method of experimentation as laid out by Einstein within this same article, but in a concept that this model of investigation enabled him to build. It is easy to understand why. The Einsteinian method first of all establishes a *purely* theoretical scenario (initial intuition and logical deductions), a scenario that is only later validated by experience. On the other hand, for Dalí, the delirious idea enables us to reach the truth of things not by a *purely theoretical view* that is subsequently confirmed by experience, but by *suddenly being embodied in the objectivity of the forms of the world*. There is a *consubstantiality* between the visible and the invisible and it is precisely this consubstantiality that the notion of space-time enables one to envisage and which confers universal validity on the Dalinian method: concrete irrationality lies at the very foundations of any cognitive act and any research, including of the scientific kind.

Dalí's interest in the imaginative world linked to space-time had numerous applications to his own work: the curve of space-time is materialised in desiring or desired curved bodies, hence an interest in surfaces which can be described by a non-Euclidian geometry, and in morphology. In conclusion, I would like briefly to outline some instances of this. It is not surprising, for example, that Dalí took an interest in the women painted by the Pre-Raphaelites because of the geodesics of their Adam's apples and because of the catenary arches of their clothes, which were adapted to the geodesics of their bodies, as he explained:

The Pre-Raphaelite morphology is summed up in the lukewarm and weak gravity of the 'depressive catenaries' of the underwear adapting themselves to the most terrifying of strained and strict costumes, with the geodesic curves of sculptural bodies, of turgescent, disturbing and imperialist flesh.²⁷

Indeed, in order to confirm his thesis, he illustrated his article about the Pre-Raphaelites with paintings by Dante Gabriel Rossetti, William Holman Hunt, and John Melhuish Strudwick [Fig. 3]. Without quoting his source, Dalí also copied into this article the definition of the geodesic and the catenary arch provided by Edouard Monod-Herzen.²⁸ This latter form naturally aroused his interest, since it is determined by the action of space.²⁹ Moreover, in relation to this form, Dalí also sang the praises of houses designed by Antoni Gaudí, with their aerodynamic and imaginative curves, enabling irrational ideas to materialise.³⁰ Their undulating walls thus became in Dalí's reading the waves of the sea, a woman's flowing hair,



or smoke. Dalí must indeed have been aware of how Gaudí proceeded to design his houses: he built models with ropes and weights, taking account of the force of gravity and adopting the catenary arch as the basic shape.³¹



Figure 3 : John Melhiush Strudwick, *The gentle music of a bygone day*, 1890 in Dalí's article 'Le surréalisme spectral de l'éternel féminin pré-raphaélite.' *Minotaure*. 8 (1936), 48.

In terms of Dalí's interest in morphologies derived from science, one should also mention the painting *The Metamorphosis of Narcissus*.³² All of the figures in this painting adopt a curved position, and in the poem with the same name, the *curve of the back* constitutes the leitmotiv of the text and is likened to the *curve of desire* which causes Narcissus to follow the 'slope,' to be swallowed up by the image and transformed into a flower.³³ The figure that embodies the curve engendered by the logic of desire is indeed Dalí himself in this painting. He is depicted at its centre, recognisable because of his *barretina*, the red Catalan cap. He also appears at the centre of the poem:

Le Catalan au dos sérieux,



et bien planté
dans une côte-pente,
une Pentecôte de chair dans le cerveau.
[The Catalan with his grave back
well planted
in a sun-tide,
a Whitsuntide of flesh inside his brain.]³⁴

Finally, it worth noting that, in the *Geodesic portrait of Gala*³⁵, Gala's head is shaped like a geodesic dome, as is clearly visible in the preparatory sketch for this work: perhaps this is hardly surprising in that Gala is the 'other me' so greatly desired by Dalí.

Dalí, by associating surrealist activities and science, places himself in an ambiguous territory midway between the serious and the playful. He is out of step both with the scientific world (since his experiences are not very scientific due to the overestimation of what is anecdotal and subjective), and with the artistic world (since the imaginative Dalinian world is destined to be misunderstood by those unaware of the scientific issues involved). Dalí's work is thus at all times met with a partial or complete lack of understanding. In any case, it invites us to reflect on the multiple models for a representation of the world. Reality is a matter of 'construction': it cannot be faithfully represented by science and considered as a point of reference on the basis of which literature and the arts execute imaginative variations. By denouncing an *a priori* knowledge of the world, Dalí draws our attention to the fact that there is no ontological difference between the scientific and artistic spheres, and nor is one superior to the other in terms of their approach to reality. He thereby draws us into an imaginary world of relative possibilities and truths.

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¹ This article is based on a paper given at the international interdisciplinary conference *Experiment-Experimentalism*, University of Manchester, March 2005.

² Salvador Dalí, *Le mythe tragique de l'Angélu de Millet*, Paris 1963, 91.

³ Dalí, *Le mythe tragique*, 91.

⁴ For instance, Poincaré emphasised in 'L'invention mathématique' how he discovered the class of Fuchsian functions: intuition was capable of suddenly linking elements belonging to



very different fields and of creating a stable and fertile combination; Henri Poincaré, 'L'invention mathématique,' in *Science et méthode*, Paris 1999, 19-21.

⁵ Albert Einstein, 'Sur la méthode de la physique théorique,' in *Comment je vois le monde*, Paris 1979, 131.

⁶ Einstein, 'Principes de la recherche', 'Principes de la physique théorique' and 'Le problème de l'espace, de l'éther et du champ physique,' in *Comment je vois le monde*, 121-125, 125-128 and 152-153.

⁷ André Breton, 'Introduction au discours sur le peu de réalité,' in *Oeuvres complètes*, Vol. I, Paris 1988, 275, and English translation by Polizzotti and Caws, *Break of Day*, Lincoln 1999, 14.

⁸ See, for example, Dalí, 'Réalité et surréalité,' and 'Le témoignage photographique,' in *Oui*, Paris 2004, 86-92 and 96-98.

⁹ Ernst Haeckel, *Kunstformen der Natur*, Munich 1998.

¹⁰ Karl Blossfeldt, *Urformen der Kunst*, Dortmund 1991.

¹¹ 'Pero un film absolutamente surrealista, màs claramente, un film en el que se pretendiese única y exclusivamente la planificación estricta de una serie de imágenes oníricas, o de imágenes aparecidas en el cerebro de un individuo, y la tal realización se llevase a cabo con un rigor absoluto, creo que el tal film representaría una serie de logros en el campo del espíritu, sería tan antiartístico como filmar lo que encuentra el sabio en el microscopio...' This letter from Dalí to Gasch is held in Gasch's archives in Barcelona and is quoted in Joan M. Minguet Batllori, *Salvador Dalí, cine y surrealismo(s)*, Barcelona 2003, 115.

¹² Dalí, 'Revue des tendances antiartistiques,' in *Oui*, Paris 2004, 102. For the English version, see Haim Finkelstein, ed. and trans., *The Collected Writings of Salvador Dalí*, Cambridge 1998, 104.

¹³ Dalí, 'Documentaire - Paris - 1929,' in *Oui*, 124-143.

¹⁴ Dalí, 'Documentaire - Paris - 1929- I', in *Oui*, 124. For the English version, see Finkelstein, *Collected Writings*, 105-106.

¹⁵ Dalí, 'Documentaire - Paris - 1929- III', in *Oui*, 130-131.

¹⁶ Dalí, 'Documentaire - Paris - 1929- III', in *Oui*, 130-131. English version, Finkelstein, *Collected Writings*, 109.

¹⁷ Dalí, 'Documentaire - Paris - 1929- V', in *Oui*, 139. English version, Finkelstein, *Collected Writings*, 115.

¹⁸ Dalí, 'Documentaire - Paris - 1929- V', in *Oui*, 139. English version, Finkelstein, *Collected Writings*, 115.

¹⁹ Dalí, 'La conquête de l'irrationnel,' in *Oui*, 261.

²⁰ Einstein broached the problem of the trajectory of the ray of light passing next to the sun and resolved it in 1915. See Françoise Balibar and Thibault Damour, 'La relativité générale,' in *Einstein*, Paris 2004.

²¹ Dalí, 'Apparitions aérodynamiques des "Etres-Objets",' in *Oui*, 243-49.

²² Dalí, 'Apparitions aérodynamiques des "Etres-Objets"', 245.



- ²³ Einstein, 'Le problème de l'espace, de l'éther et du champ physique,' 145-156.
- ²⁴ Salvador Dalí, *The Weaning of Furniture-Nutrition*, 1935, oil on canvas, 18 x 24 cm, St Petersburg (FL), The Salvador Dalí Museum. See Ades, ed., *Dalí*, Milan, 233.
- ²⁵ Dalí, 'Misteri surrealista i fenomenal de la tauleta de nit,' in Fèlix Fanés, *Salvador Dalí, La construcció de la imatge. 1925-1930*, Barcelona 1999, 261-263. Fanés published for the first time the text of the lecture given by Dalí in Barcelona in 1935.
- ²⁶ Dalí quotes in Catalan an extract from Einstein's essay: '-Einstein escriví, Dos cossos poden tocar-se o estar separats, en el segon cas es pot sense separar res posar un tercer cos entre els dos cossos, en el primer cas es imposa – aquestes manifestacions després són manifestacions reals al mateix títol que els cossos ells mateixos – Si dos cossos són equivalents per ocupar un interbal d'aquesta mena, són també equivalents per omplir un altre interbal./ L'evolució de l'idea de l'espai considerat segons l'experiència dels sentits pot representar-se de la manera següent, *objectes corporals, relació de posició dels objectes corporals, interbal, espai*, d'aquesta manera l'espai apareix com quelcom de tan real com els objectes corporals-.' Dalí, 'Misteri surrealista i fenomenal de la tauleta de nit,' in Fanés, *Salvador Dalí, La construcció de la imatge. 1925-1930*, 262.
- ²⁷ Dalí, 'Le surréalisme spectral de l'éternel féminin préraphaélite,' in *Oui*, 290-291. For the English version, see Finkelstein, *Collected Writings*, 312.
- ²⁸ Edouard Monod-Herzen, *Principes de morphologie générale*, Vol. I, Paris 1927, 29-30 and 89-96.
- ²⁹ A wire hooked to two supports and left to hang freely forms a catenary arch.
- ³⁰ Dalí, 'De la beauté terrifiante et comestible de l'architecture Modern Style,' in *Oui*, 222-229.
- ³¹ Dalí might have seen the photo of the first funicular model used by Gaudí to conceive the church of the Colònia Güell published by Ràfols in 1928. He created the church by using strings which were hooked to supports and from which he hung loads: a mirror placed on the floor under the model enabled one to see the maquette of the church from the right side. See Daniel Giralt-Miracle, ed., *Gaudí. Exploring form. space, geometry, structure and construction*, Barcelona 2002, 99.
- ³² Salvador Dalí, *The Metamorphosis of Narcissus*, 1937, oil on canvas, 50,8 x 78,3 cm, London, Tate Gallery. See Ades, ed., *Dalí*, Milan, 271.
- ³³ See the extended metaphor of the 'curve of desire' used to describe the metamorphosis of Narcissus. Dalí, 'La métamorphose de Narcisse,' in *Oui*, 299-301.
- ³⁴ Dalí, 'La métamorphose de Narcisse,' 299. For the English version, see Finkelstein, *Collected Writings*, 326.
- ³⁵ Salvador Dalí, *Geodesic Portrait of Gala*, 1936, oil on wood, 21 x 27 cm, Yokohama, Yokohama Museum of art. See Ades, ed., *Dalí*, Milan, 254-255.

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