

TIM BENTONMilieu, spirit,
flesh and fusion
in Le Corbusier's
life and work**Abstract**

How can a study of Le Corbusier's post-war work – the *Poème de l'angle droit* and *Modulor 1 and 2* – throw light on his earlier preoccupations. These works are retrospective and confessional. They are obsessed with the question 'By what right may I create?' The former work looks for answers in experience and the latter in the 'divine' world of mathematics. From at least 1906, when he bought and devoured Edouard Schoré's *Les grands initiés*, Le Corbusier had a strong sense of predestination and a conviction that suffering was a necessary part of the voyage to enlightenment. His dualism, the belief in the separation of the spiritual and material worlds, encouraged him to view mathematics as part of the 'hidden world' of the spirit. His problem, in the research leading up to *Modulor 1*, was how to reconcile divine proportion and human experience. He invariably described the passage from the material to the spiritual worlds in terms of physical processes – smoking, simmering, brewing, giving birth. This idea, clearly described in one of his lectures in 1929, and his frequent discussion of 'cosmic' forces and symbolism during the 1930s, indicates that these ideas were well entrenched before the war.

Keywords

Le Corbusier; dualism; predestination; mathematics; proportion; the spirit

Seeking to illuminate the past by interrogating the future would normally be considered by this unrestructured English empiricist to be forbidden. And yet, this is how I propose to begin this essay, by looking for clues in the *Poème de l'Angle Droit* (1955) and *Modulor I and II* (1950 and 1955) to throw light on underlying themes that motivated Le Corbusier's life and work.¹ It is a procedure that

1 A starting point for the discussion of the *Modulor* is Jean-Louis Cohen, "Le Corbusier's *Modulor* and the Debate on Proportion in France," *Architectural Histories* 2, no. 23 (2014): 1-14. Dario Matteoni illustrated several of Le Corbusier's sketches for the *Modulor* in his excellent discussion: Dario Matteoni, "L'idea Del *Modulor*: Le Corbusier e la tradizione della Sezione Aurea," in *Le Corbusier La Ricerca Paziente*, ed. Sergio Pagnamenta and Bruno Reichlin (Lugano: Citta

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risks the grave sin of 'reading in'. Reading in is the ugly sister of deductive logic which proceeds by adopting propositions held to be generally true and then applying them to individual instances. We know this best by the syllogism 'All men are mortal; Socrates is a man, therefore Socrates will die'. To argue, however, that Le Corbusier was saturated with hermetic and alchemical theory and imagery may or may not be true. To attach these sources to imagery in the *Poème de l'Angle Droit*, as Richard A. Moore does rather brilliantly, lacks explanatory power unless it can be shown that other explanations are not equally valid.² The application of Ockham's Razor is usually beneficial.³ To take a banal example, Moore refers to the colour green, the colour of the first level of the *Poème*, as 'the alchemical symbol of the universal primary matter', but it is also, more simply, the colour of grass and most vegetation.⁴ You cannot prove that this use of the colour green was based on alchemical sources. On the other hand, Moore correctly cites as inductive evidence of alchemical interest that Le Corbusier structures the *Poème* around the hinge 'Fusion' which he annotates 'Laissez fusionner les métaux; tolérez des alchimies...'.⁵

di Lugano e FAS Gruppo Ticino, 1980), 103-23. Johan Linton submitted Le Corbusier's account of the genesis of the Modulor to mathematical scrutiny: Johan Linton, «Le Corbusier et l'esprit mathématique,» in *Le symbolique, le sacré, la spiritualité dans l'oeuvre de Le Corbusier*, ed. Claude Prelorenzo (Paris: Fondation Le Corbusier and Editions de La Villette, 2004), 55-65.

- 2 Richard Moore, A, "Alchemical and Mythical Themes in the Poem of the Right Angle," *Oppositions* (1980): 111-39.
- 3 William of Ockham (1285-1349) held that the simplest explanation should be retained unless proven wrong. He is generally considered as one of the founders of scientific enquiry. A feature of his teaching was that he held that articles of faith should be kept separate from demonstrable truths.
- 4 Richard Moore, "Alchemical and Mythical Themes" p. 114.
- 5 Le Corbusier, *Le Corbusier. Poème de l'angle droit. Lithographies originales [de l'auteur]*. (Paris: Tériade (impr. de Mourlot frères, 1955), p. 114.

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Two reasons permit me to venture down this perilous path of 'reading in'. I remember vividly Josep Quetglas explaining to me that many ideas can lie dormant in the mind, active and influential, without finding overt expression in word or image until much later. This proposition gained traction with me during my research on Le Corbusier's photographs of the 1930s, when I discovered a taste and talent for the New Photography of the 1920s that had left no visible trace in his work until he began taking photographs with his 16mm movie camera in 1936 and turned to Lucien Hervé as his preferred photographer in 1950.⁶

My other excuse is that, after drawing out some themes from these confessional works of the 1940s and 1950s, I will revert to an inductive method, 'reading out' propositions from textual or iconographic evidence. A comparison could be made with the investigative procedure of 'profiling' employed by some police departments which cannot provide proof of guilt but may narrow down the field of enquiry.

This is not the place to offer any new insights into the *Poème*. The most balanced analysis is that of Juan Calatrava, to set aside the accounts of Richard A. Moore and Mogens Krustup.⁷ Where Moore reads in alchemical symbolism and hermetic mysticism, Krustup looks for insights into Le Corbusier's personal life by trying to interpret his personal iconography. When discussing a document, it is normally best to begin with the text, which Calatrava does well.

In some ways the *Poème* might be discounted as a scrap book of experience: imagery and parables collected over a thirty-year period. It does not read like a theoretical text or a well-structured programme. Much of the text of the *Poème*, as well as much of *Modulor II*, is personal. Most of the illustrations reference his wife Yvonne, vacations on the Bassin d'Arcachon, his collection of seashells, bones and pine-cones and his dog Pinceau. Le Corbusier did, however, take the trouble to organise the pages into an 'iconostase' arranged as 5-3-5-1-3-1-1, which indicates a system of thought. As already mentioned, this structure hinges on the fourth level, given the alchemical label 'Fusion', that separates the physical from the metaphysical worlds. It is notable that this programme is 'top heavy', that is, focusing most closely on lived experience before passing over into the world of the spiritual.

The master set great store by the *Poème*, as he did for that other troubled work, *La Ville Radieuse* (1935). In the *Avertissement* of his book *Quand les cathédrales étaient blanches*, published in 1937, Le Corbusier described *La Ville Radieuse*, published two years earlier:

Ce livre est le fruit de quinze années de travaux; il est touffu; il est comme un collier garni de nourritures. On me l'a rapproché. Je ne puis pas aujourd'hui encore, aménager un beau salon, où l'étiquette soit reine.⁸

He clearly did not worry greatly about consistency. Experience is messy, troubled and confusing. Insights and creativity require failure, struggle and incomprehension on the part of the public.

My strategy now will be to consider Le Corbusier's image of himself as the sacrificial prophet of Modernism. Then I will consider five instances of Le Corbusier's dualist approach before trying to understand how Le Corbusier envisaged the 'harmonising' of the opposites that defined his world.

The path of the initiate

I interpret the *Poème* and the introduction to *Modulor II* as the *via crucis* of the initiate, an answer to the question 'By what right can I create?' Le Corbusier had a fixed idea of himself as a predestined prophet or poet, condemned to seek enlightenment and transcend tribulations, sacrifice and calumny. In the *Poème* he lets slip a phrase evocative of Nietzsche's Superman or the life of Christ: 'Je vis au milieu des hommes en plein dans leur écheveau embrouillé'.⁹ This separation of 'Je' from 'hommes' demonstrates Le Corbusier's sense of predestination, perhaps inherited from the Calvinist milieu of his

6 Tim Benton, *Lc Foto : Le Corbusier : Secret Photographer* (Baden, London: Lars Müller, Springer distributor, 2013).

7 Le Corbusier and Juan Calatrava, *Poème de l'angle droit ; Lithographies originales*, [Reproduction en fac-similé] ed. (Milano: Electa, 2007). Mogens Krustup, «Persona,» in *Le Corbusier Maler Og Arkitekt; Painter and Architect* (Fonden tiludgivelse af arkitekturtidsskrift, 1995), 118-57. I have not been able to consult the dissertations by Nancy Monroe Stephenson (1981), Daphne Becket-Chary (1990) or James M. Splawn (1991).

8 Le Corbusier (1937) *Quand les cathédrales étaient blanches; voyage au pays des timides*, (Paris : Librairie Plon, 1937), 'Avertissement', p. 1.

9 Le Corbusier, *Le Corbusier. Poème de l'angle droit . Lithographies originales [de l'auteur]* (Paris : Tériade (impr. de Mourlot frères), 1955), p. 135.

home town. It also reveals Le Corbusier's assumption that he was working for humanity rather than for individuals. Each house design was also a solution to a general problem.

Guillemette Morel Journel has tellingly described his literary style as 'polygénérique'.¹⁰ By this she means that Le Corbusier weaves a web of overlaid arguments, anecdotes and parables to persuade his readers. As part of the introduction to *Sur les quatre routes*, written in 1939, Le Corbusier recounted in gory detail the terrible accident he had suffered in August 1938, when swimming in the port of Saint-Tropez.¹¹ A motorboat split open his skull and slashed his thigh, creating a wound as long as *La Ville Radieuse* (as he explained to his mother).¹² He claimed that there had been nine means of being killed or maimed for life and described his survival as 'the miracle of St-Tropez'. He underwent a painful operation without anaesthetic and spent several weeks in hospital.

When this manuscript was presented to the publisher Gallimard, the redoubtable Jean Paulhan could not see the point of this personal anecdote in an introduction to a book on urban theory. It was cut from the edition published in 1941, but Le Corbusier was unhappy and tried to have the story reintroduced when the book was proposed for republication between 1951 and 1953.¹³ In my view, Le Corbusier considered his near-death experience as evidence both of divine intervention and of his maturity achieved through suffering, providing unique insights and solutions for modern society. In the original introduction, he explains that this anecdote was not meant to 'évoquer une situation pittoresque' but to 'expliquer certaines choses utiles à ce livre.'¹⁴ He explains:

La plus forte, c'est la preuve acquise de l'expérience accomplie... Le mal fait, l'accident révolu, l'homme a changé. Instantanément, il est transporté sur un autre plan. Le paysage est neuf, les perspectives inconnues... D'emblée le bloc de ses énergies s'est orienté, appuyé sur une réalité... [manuscrit illisible] Il ne faut pas des jours, des semaines, des mois de lente adaptation : une seconde a suffi, après le premier étourdissement qui est d'ailleurs un moment insaisissable, un moment fulgurant de total abandon, de démission – cet instant qui doit être pour celui qui se jette du haut d'un rocher, d'une tour ou d'un môle pour toucher le sol dur, l'eau profonde – l'autre bord, un autre bord de la vie. L'homme fait instantanément face à son destin. Admirable puissance de vie qui est en nous.¹⁵

The experience of facing death is described as a passage to 'the other side – another side of life'. One is reminded of the second temptation of Christ, prompted by the devil to jump from a great height.¹⁶ It lies alongside the many references, in this and other books, to his defeats at the hands of bureaucrats and politicians (League of Nations 1926-7, 1937 Paris exhibition, United Nations 1946-7). Le Corbusier characterised his defeat in 1927 in terms of life and death (figure 1).¹⁷ He sketches the failure of his project for the League of Nations as a fall of Icarus, spiralling to his death. All his efforts over ten years had been crushed ('écrasés par la concussion'). I have interpreted these notes as an exercise in the rhetorical figure of pathos, but they also bear witness to a deeper belief in his tragic status as sacrificial prophet or Messiah.¹⁸ Not only do his failures at the hands of the establishment guarantee his modern credentials, they also reflect his fundamental view of the life of suffering as the true path of the initiate, leading to wisdom.

This is exactly the program of Édouard Schuré's *Les grands initiés*. Schuré explains in his introduction that the great initiates, from Krishna to Jesus, progressed from a perfect understanding of the world and a life of action and sacrifice to arrive at a higher level:

En ramassant leur volonté à son centre, en développant ses facultés latentes, ils atteignaient à ce foyer vivant qu'ils nommaient Dieu, dont la lumière fait comprendre les hommes et les êtres.¹⁹

10 Guillemette Morel Journel, Thesis «Le Corbusier, L'écrivain; arpenter sur les 4 Routes» (École des Hautes Études en Sciences Sociales, 2010), p. 176.

11 Guillemette Morel Journel reprints the first pages of Le Corbusier's introduction, cut by Paulhan (ibid. Pp. 398-399). For the manuscript see FLC B3(12)242 ff.

12 Le Corbusier to his mother 23 August 1938 (FLC R2(1)263).

13 Le Corbusier, *Sur Les Quatre Routes* (Paris: Gallimard, 1941).

14 Morel Journel, «Le Corbusier, L'écrivain; Arpenter Sur Les 4 Routes.» p. 401.

15 Idem.

16 Bible, Luke 4:9-13. Although Le Corbusier quickly abandoned his faith, he had been well schooled by his very religious aunt Pauline.

17 Notes for a lecture in Zürich on 15 February 1934 (FLC A2(19)10).

18 Tim Benton, *Le Corbusier Conférencier* (Paris: Le Moniteur, 2007), pp. 47-48.

19 Édouard Schuré, *Les Grands Initiés, esquisse de l'histoire secrète des religions. Rama, Krishna, Hermès, Moïse, Orphée, Pythagore, Platon, Jésus* (Paris: Perrin, 1889), p.xi-xii.

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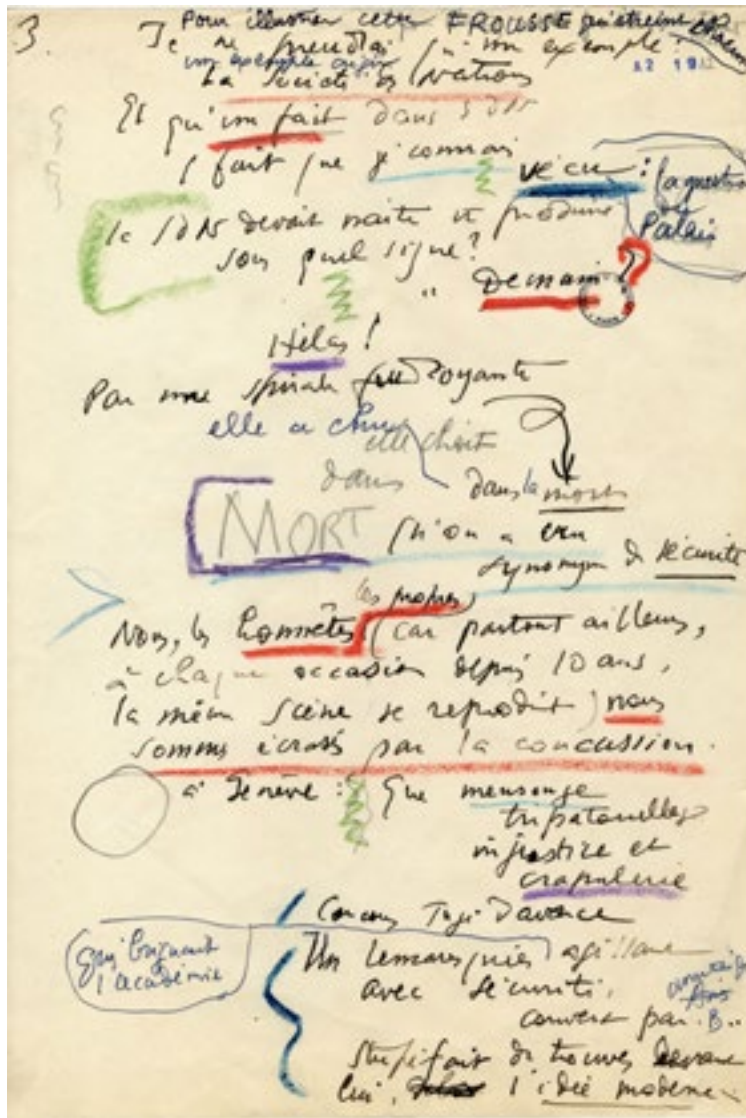
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Figure 1. Le Corbusier, third page of notes for a lecture in Zürich on 15 February 1934 (FLC A2(19)10-003).

Jeanneret bought this book in 1906 and gave an enthusiastic account of it in a letter to his parents on 31 January 1920.²⁰ In this letter he claims to have experienced a new understanding:

Voyez-vous, chers parents, je comprends maintenant ce qu'est 1 vocation libérale, c'[est]-à-dire une vocation où l'homme tout seul, par ses seules facultés, ne pouvant espérer secours d'aucun cas fortuit, doit mettre son cœur, son âme, son corps, sa santé à la conquête de ce qu'une mystérieuse volonté exige de lui, en le malmenant et le tuant souvent.²¹

This appreciation of his destiny was no doubt prompted by reading Schuré, which he discusses four pages later.

Ce Schuré m'a révélé des horizons qui m'ont comblé de bonheur. Je pressentais cela. Non c'est trop dire. Plus justement, mes luttes entre le rationalisme, que la vie réelle active [et] que les petits bouts de science emmagasinés au gymnase avaient établi fortement en moi, et d'autre part l'idée innée, intuitive, d'un Être suprême, que la contemplation de la Nature me révélait à chaque pas, cette lutte avait préparé le terrain à recevoir cette noble semence dont ce bouquin de 600 pages est rempli.²²

Paul Turner reminds us that the annotations left by Le Corbusier in books that he owned reveal a very selective reading style.²³ He picked what interested him. In the case of *Les grands initiés*, it was the chapter on Pythagoras. Whatever Jeanneret grasped or remembered of the occult details in this long book, he retained the metaphysical idea of a world of the spirit, detached from the tangible world, to which

20 FLC R1(4)77-86.

21 FLC R1(4)78.

22 FLC R1(4)82. I have clarified the sense by adding punctuation.

23 Paul Venable Turner, *La formation de Le Corbusier : Idéalisme et mouvement moderne* (Paris: Macula, 1987), p. 67. Le Corbusier told his parents, 'Je ne suis pas un dévoreur de livres' (FLC R1(4)81).

only some initiates achieve access through personal sacrifice and pain.²⁴ The initiate has to spend time in the desert or high mountains, rejected by people and face to face with his thoughts. Jeanneret cited with approval a note from Eugène Grasset stressing the importance of predestination:

Vous voilà encore errant à la recherche de la beauté. Elle viendra vous trouver un jour si vous êtes prédestiné. Et alors ressortiront autrement les chocs sensibles que vous aurez reçus ; parce que la beauté ne se donne ni à la volonté ni à la violence - ses entrepreneurs de travaux.²⁵

This idea of a predestined ascent to wisdom through sacrifice would have been reinforced by his reading of Provensal's *Art de demain*, where the plight of the modern world is described as an inability to combine art and science, faith and knowledge. The real architect/artist should climb to the highest point and reflect on '...l'endroit où il va, ce que son moi agrandi par la connaissance peut reporter dans l'univers...'.²⁶ Provensal expresses the anxiety of the artist face to face with creation:

Au seuil des portes d'or où l'Initiation groupe les génies aux paroles pleines de mystères, il s'arrête haletant. Cette lumière splendide l'éblouit. L'énigme l'épouvante.²⁷

Le Corbusier uses similar imagery in *Modulor II* to describe the experience of entering into the divine world of numbers: 'Le choc de cette lumière est difficile à supporter'.²⁸

Le Corbusier's dualism

The second theme is Le Corbusier's dualism. In part, this was a habit of thought, tending to separate any condition into opposites. We will turn to five practical examples of this tendency (in engineering, mathematics, the Modulor, dimensions and nature). But first, we will focus on its epistemological form, which insists on the separation of the physical and spiritual worlds. This is stated clearly in the *Poème*.

L'indicible en fin de compte, soustrait au contrôle de la raison, porté hors des réalités diurnes, admis au cœur d'une illumination. Dieu incarné dans l'illusion. La perception de la vérité peut être bien.²⁹

Reduced to its simplest form, we find it in some notes for a lecture in 1942:

Binôme – matérialisme et poésie. La poésie cherche, trouve et conduit. Le matérialisme obtient.³⁰

A confirmation of the separation of material and spiritual worlds would have come from an article published in *L'Esprit Nouveau* No 7 (7 April 1921) by the Chilean Surrealist poet Vicente Huidobro.³¹ In an article entitled 'La création pure', he proposed a strange genealogy of art that progressed from intelligence to sensibility. Representational art was a matter of understanding the physical world (intelligence). As art evolved, it moved into the realm of pure creation. As he put it: 'L'Art n'est autre chose que l'histoire de l'évolution de l'Homme-Miroir vers l'Homme-Dieu...'.³² Citing Schleiermacher, Huidobro insisted: 'La poésie ne cherche pas la vérité, ou plutôt elle cherche une vérité qui n'a rien de commun avec la vérité objective.'³³ '[l'artiste] ne cherche plus à l'imiter [la nature] dans ses apparences, mais à faire comme elle en l'imitant dans le fond de ses lois constructives.' This is the work of poetic and divine sensibility building on intelligence. It is also an explanation for Le Corbusier's illustration of botanical sketches in the opening pages of *La Ville Radieuse*: his architecture and urbanism develops organically, like a growing plant.³⁴

24 For my views on Jan Kenneth Birksted, *Le Corbusier and the Occult* (Cambridge Mass, London: MIT Press, 2009). See Tim Benton, "New Books on Le Corbusier (Book Review)," *Journal of Design history* 22, no. 3 (2009), pp. 275-280.

25 Jeanneret to Ritter 14 January 1911 (FLC R3(18)28).

26 Henry Provensal, *L'art de demain ; Vers l'harmonie intégrale* (Paris: Perrin, 1904), p. 24.

27 Ibid. p. 25.

28 Le Corbusier, *Modulor 2; La parole est aux usagers* (Paris: Éditions de l'Architecture d'Aujourd'hui, 1983, first edition 1955), p. 74.

29 *Le Corbusier. Poème De L'angle Droit*, pp. 89-91.

30 FLC C3(6)246-001.

31 Vicente Huidobro, «La Création pure,» *L'Esprit Nouveau* 7 (1921): 769-76. Huidobro published in France under the name Vincent Huidobro.

32 Ibid, p. 772.

33 Friedrich Daniel Ernst Schleiermacher and Carl Heinrich Eduard Lommatzsch, *Vorlesungen Über Die Aesthetik* (Berlin 1842), pp. 55-61.

34 Le Corbusier, *La Ville Radieuse* (Boulogne, Seine): Éditions de l'architecture d'aujourd'hui, 1935).

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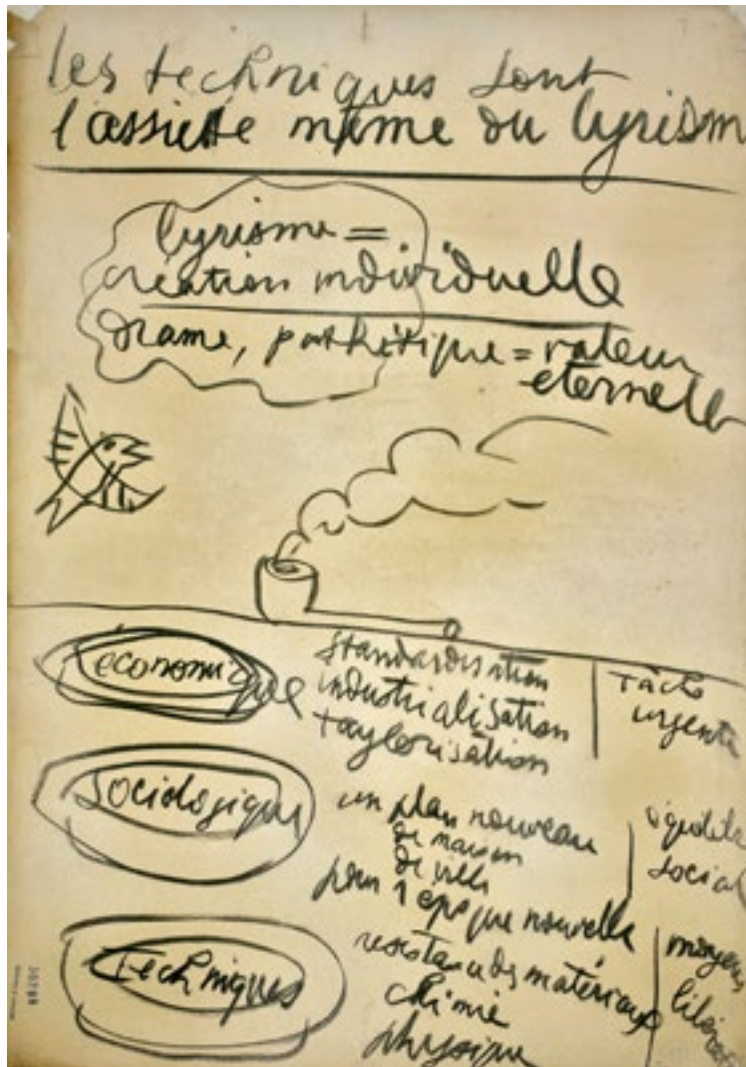
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Figure 2. Le Corbusier, « Les techniques sont l'assiette même du lyrisme », opening of his second lecture in Buenos Aires, 5 October 1929 (FLC 30298).

This is effectively the basis for Le Corbusier's aesthetic for the rest of his life although Ozenfant and Jeanneret did not express themselves in these terms in the period of Purism. In *Après le Cubisme*, the emphasis was on searching for order, the unchanging laws of Nature and form, usually understood in terms of geometry. Le Corbusier assumed that art (but also the sphere of number) belongs to a higher level and to access it is to transcend the physical realm into a spiritual one. Mystics, philosophers and mathematicians might aspire to gain access to the metaphysical sphere but, for Le Corbusier, the artist and poet have to find their inspiration in the real world. How to pass from the material to the spiritual is the subject of the last section of this essay.

Le Corbusier's dualism was clearly expressed in the opening drawing of his lecture '*Les techniques sont l'assiette même du lyrisme*' in Buenos Aires on 5 October 1929 (Figure 2). Le Corbusier begins by drawing the line that separates the domain of material things from the world of the spirit: "Sous la ligne: ce qui est; au dessus: ce qu'on ressent".³⁵ It is notable how many pages of the *Poème* are divided in two by a horizontal line, sometimes separating the physical and spiritual worlds, sometimes sky and earth, sun and moon. The lecture drawing is extremely important because it explains both Le Corbusier's theory of creativity and his attitude to the material changes that had revolutionized the world. To take the second first, Le Corbusier explains that you have to understand the full reality of the modern world – economic, sociological and technological – before you can create. These realities have to be physically consumed like the three dishes of a French meal. This immediately sets the architect apart from the world of the academy and makes him 'modern'. But this is not enough. To create there has to take place a mysterious process of digestion and reflection – symbolized in the drawing by a smoking pipe – before the little bird of inspiration will take flight, leading to the spiritual and ethereal sphere of lyricism, individual creation and eternal values. To be modern is necessary but insufficient. Work of eternal value – like the Parthenon – will always retain its eternal value. This is his response

³⁵ Le Corbusier, *Précisions sur un état présent de l'architecture et de l'urbanisme* (Paris: G. Crès et cie, 1930), p. 38.



Figure 3. Le Corbusier, *Poème de l'angle droit*, p.49.

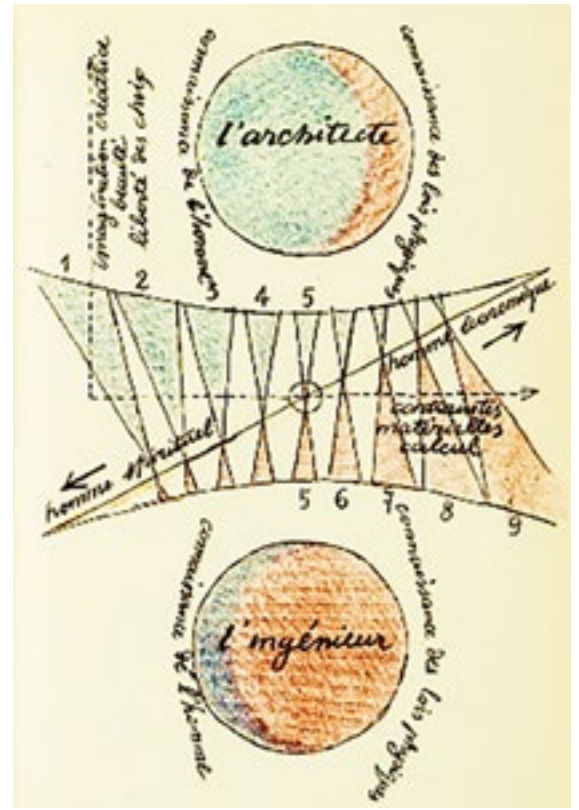


Figure 4. Le Corbusier, illustration in Pierrefeue and Le Corbusier, *La maison des hommes*, 1941 (TB19640).

to the functionalists who asserted that solving practical problems was enough. It was also his answer to the question: ‘If new tools replace old tools, why does new art not make old art redundant?’ Le Corbusier’s dualism is essential to this formula. Le Corbusier’s theory of creativity always involves a mysterious but physical transition from matter to spirit: digestion, brewing, simmering or giving birth, often stimulated by smoking and drinking. We will return to this theme.

Engineers and architects

The allegory of the ‘trois assiettes’ also informs Le Corbusier’s attitudes to engineers. As he says in *Précisions*, he had glorified the engineers in *Vers une architecture*.³⁶ Constrained by economy, engineers are forced to base their designs on geometry, thus achieving the pure forms that Le Corbusier celebrated in *Vers une architecture*. But, as he explains in *Urbanisme*, the engineers do not understand what they have created. When Le Corbusier and his friend Paul Budry visited the Barberine dam high in the French Alps, they enthused to the engineers about the possibilities of using such methods in Paris. The engineers were appalled: ‘Nous leur disons : « Que c’est beau ! ». Ils nous prennent pour des imbéciles. Des poètes ! On est horriblement déçu’.³⁷ Engineers mastered the physical world but not the spiritual one.

It is interesting how Le Corbusier’s symbolic union of hands – originally those of the engineer and architect – become transposed into a symbol of general conciliation of opposites (spiritual and material) in the *Poème* (figure 3). Opposition of black and white, sun and moon are given powerful graphic expression. With the logo for ASCORAL, the symbol had already been transposed into a cosmic diagram with the sun and moon symbolising spiritual and economic man (figure 4). This reflects a general progression in Le Corbusier’s thinking, towards an attempt to synthesize all the opposites that framed his world into a general system.

Mathematics and proportion

Le Corbusier also interpreted the distinction between geometry and number in metaphysical terms. He expressed this in different and sometimes contradictory ways

36 ‘J’ai porté l’ingénieur sur le pavois. *Vers une architecture* [...] lui était voué pour une bonne part.’ (ibid. p.36).

37 Le Corbusier, *Urbanisme*, 4e édition (Paris: G. Crès, 1925), pp. 138-143.

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Un grand mathématicien déclare : « Faire appel simultanément à la géométrie et aux nombres, c'est là le vrai but de notre vie ».³⁸

The 'grand mathématicien' was his friend Dr Andreas Speiser, professor of mathematics at the University of Zürich. Speiser distinguished between number, which was the sphere of 'order, harmony, beauty etc... in short, everything spiritual' and space, which was the sphere of physical objects and extension. He explained, 'Dans le monde spatial sont projetés des images du monde numérique', a clear transposition of Plato's allegory, which describes the physical world as being like a cave, on the walls of which are projected the shadows of the 'forms' belonging to the higher existence outside the cave, this existence being that of science and geometry, illuminated by the sun of pure reason. For Speiser, number and geometry belong to the world of pure reason whereas space belongs to the real world.

Le Corbusier did not share this Platonic idealism in this form. Le Corbusier explicitly rejects the approach of pure theory – the approach of the mathematician or philosopher – to insist on his own route to 'illumination'.

Quand cinquante années d'une passion accumulent les observations de chaque minute d'une vie active, il est pardonnable, explicite, possible, qu'en certains virages, une illumination se produise : un homme voit clair, il découvre.³⁹

Le Corbusier meant by this an insight that passes beyond reasonable deduction into the realm of immutable truth. The word 'illumination' is important here, since Le Corbusier constantly defines happiness and wisdom in terms of sunlight.

Employing a different sense of the word 'number', Le Corbusier contrasted his approach to that of the mathematician Le Lionnais:

Le mathématicien joue avec les nombres, il est messenger des « dieux ». L'homme n'est pas un dieu, par définition. Et le poète que je suis déclare : pour prendre contact avec l'univers, l'homme regarde, employant ses yeux qui se trouvent « à 1m. 60 » environ du sol.⁴⁰

The artist cannot 'play with numbers' but must search for truth through his senses. For Le Corbusier, the poet is similar to the visionary and prophet, figures of enlightenment who see beyond the physical world.

Qui est le visionnaire, le lecteur de l'événement, le prophète qui se projette au-devant encore de la marche des événements ? Le poète. [...] Le poète est celui qui montre la vérité nouvelle.⁴¹

The difference between a poet and a prophet is that the former is inspired by experience and the latter by faith, a faith nourished by his belief in himself as predestined initiate.

The Modulor : golden section and dimensions

Le Corbusier conceived of another way of contrasting number and space. In *Modulor II* he contrasted proportional systems, which are based on geometry and number, and therefore 'divine', and dimensions, which relate to the real world and the bodies of men and women. He expressed this in a comment about an architect Guettard who visited him and enthused about the 'key number 113' and no doubt about the mathematical and esoteric significance of numbers in general. Le Corbusier noted:

Pendant qu'il pavoise, je me dis : mes 113 à moi sont des centimètres, et rien d'autre, et qui, traduits en anglo-saxon, ne sont plus que des pieds, et au nombre de presque quatre, et rien de plus... et rien de cela n'est sacré...⁴²

The combination of number, in the strict sense of dimensions based on the human body, and geometry was the basis of the Modulor. In the end, the Modulor consisted of two series of numbers in a Fibonacci series, roughly corresponding to the golden section ($(\sqrt{5}+1)/2$). But as Le Corbusier recounts his 'discovery' of the Modulor, the origins were anthropomorphic. His first brief to Gerard Hanning was bizarre:

Prenez l'homme-le-bras-levé, 2m 20 de haut, installez-le dans deux carrés superposés de 1m 10 ; faites jouer à cheval sur les deux carrés, un troisième carré qui doit vous fournir une solution. Le lieu de l'angle droit doit pouvoir vous aider à situer ce troisième carré.⁴³

38 Le Corbusier, *Modulor 2; La parole est aux usagers*, p. 13.

39 *Ibid.*, p.15.

40 *Ibid.*, p.17.

41 Le Corbusier, *Précisions*, p. 32.

42 Le Corbusier, *Modulor 2; La parole est aux usagers*, p. 21.

43 Le Corbusier, *Le Modulor; Essai sur une mesure harmonique à l'échelle humaine applicable universellement à l'architecture et à la mécanique*, (Boulogne,: Éditions de l'Architecture d'aujourd'hui, 1950), p. 37.

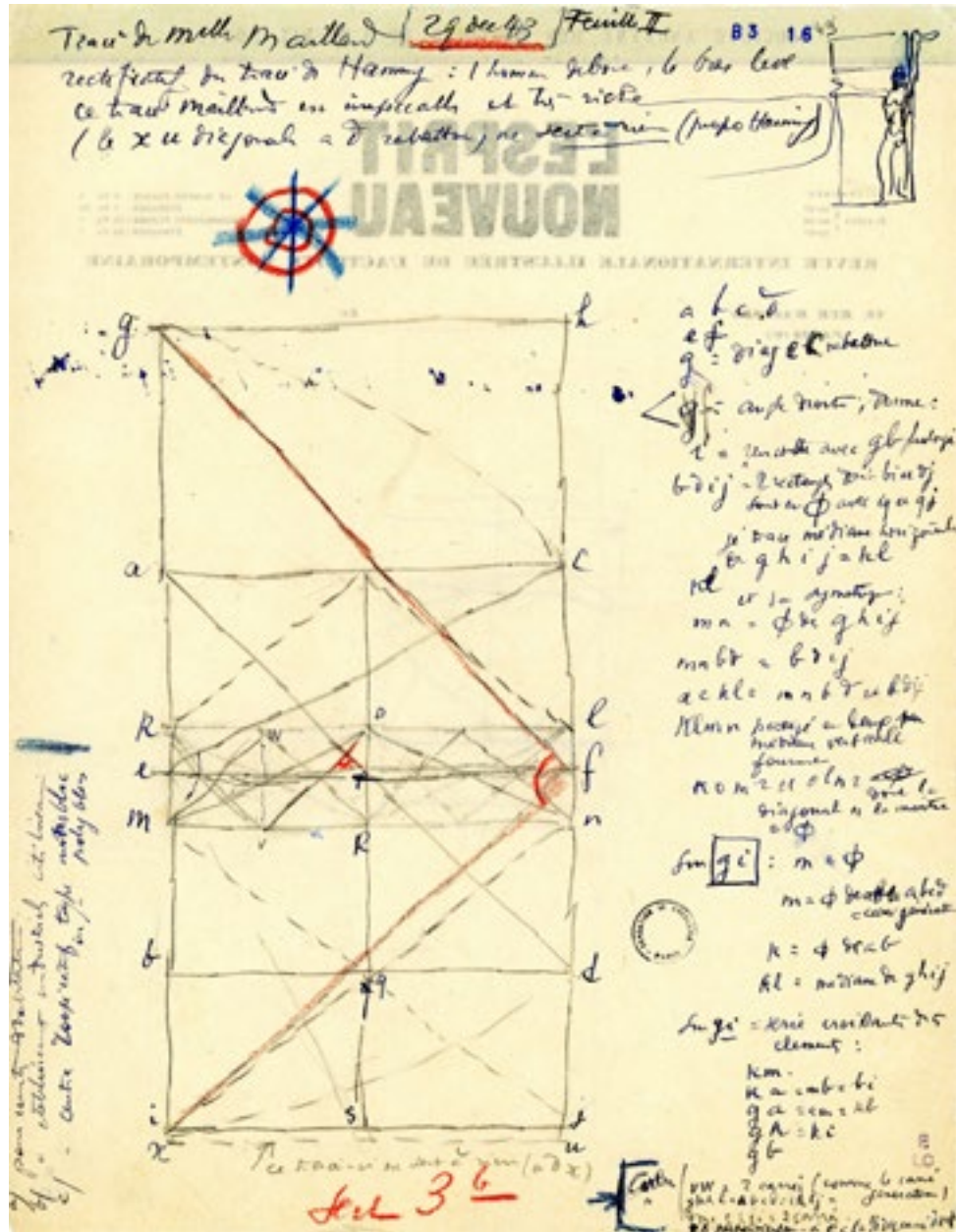


Figure 5. Le Corbusier, diagram trying to understand Elisa Maillard's geometric construction and derive a progression of dimensions from it (FLC B3(16)49).

The proposition was to begin with human dimensions and then look for an intersection with geometric proportions. Important for Le Corbusier was that the construction should be inscribed in two squares. The incoherence of this instruction was demonstrated by the first solution of Le Corbusier's assistant Gerard Hanning, which was to extend one square by the diagonal of half the square on one side ($(\sqrt{5}-1)/2$) and by the diagonal of the square ($\sqrt{2}-1$) on the other. This creates a rectangle with a combined length of the extended square equal to ca. 2.032, nearly forming a double square. If this rectangle had been a double square, the right angle inserted into it would necessarily have constructed an isosceles triangle symmetrically disposed around the centre point.

The model was reworked by Mme Elisa Maillard. She began the same way, extending the original square to construct a golden rectangle ($(\sqrt{5}+1)/2$) but then placed a set square with one foot on the end of this extension and the apex on the centre line of the square. This results in a triangle of base 221.37 centimetres, using Le Corbusier's dimensions.⁴⁴ It was important for Le Corbusier that the rectangle formed by this triangle should be a double square. In fact, it is 1.37cm too long. To progress from this geometric form to a sequence of dimensions on the Fibonacci series demanded complex and anti-intuitive measures (Figure 5). The fact that Le Corbusier endlessly repeats the

44 On a page of typed calculations, the tiny imprecision of this calculation is demonstrated as being in the ratio 1:1.006 (FLC B3(16)59).

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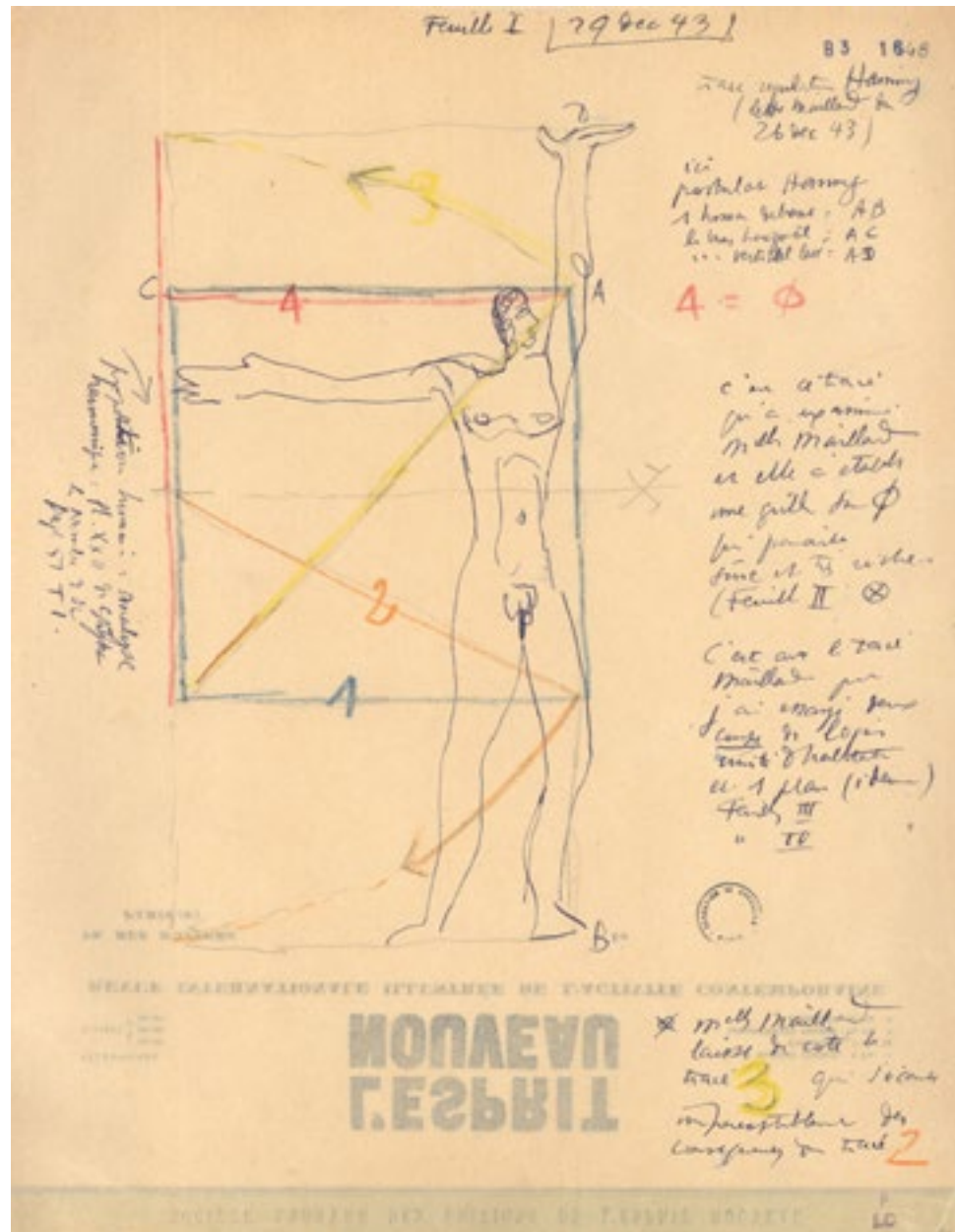
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Figure 6. Le Corbusier, sketch based on Gerard Hanning's geometric diagram 19 December 1943 (FLC B3(16)48).

Hanning and Maillard diagrams in his sketches over the next five years demonstrates both that they were significant and that he had trouble understanding them.

Although Le Corbusier first presents this in *Modulor I* in purely geometric terms, he must have been thinking in more anthropocentric terms (Figure 6). Here the square '1' reflects the width of a man with arm stretched sideways (1.10m in this scheme). This was also the height of a man's navel and half the height of a man with arm raised.⁴⁵ The problem was then how to turn this square into a proportional series. All it took was to take 1.10m and 2.20m (or 1.13 and 2.26 in the final version) and insert them into Fibonacci series to arrive at the Modulor. But Le Corbusier wanted the 'proof' of a geometric and visual solution. On the Vernon S. Hood freighter, on which he crossed the Atlantic in the winter of 1945-1946 in considerable discomfort, he made a number of sketches in which he tried to make sense of the complicated mathematics of the Modulor in visual terms (Figure 7). He constructed three blocks, starting with the square (108cm in this version of the Modulor), a second block based on the golden rectangle and a third based on doubled squares. This is much simpler to understand than the

45 There was little consensus about the standard dimensions of the human body. For a very different analysis, see Adolf Zeising, *Neue Lehre von den Proportionen* (Leipzig: R. Weigel, 1854). Ghyka published another variant from H. Heller's *Proportionstafeln* in his *Esthétique des proportions dans la nature et dans les arts* (Paris: Gallimard, 1927), p. 279.

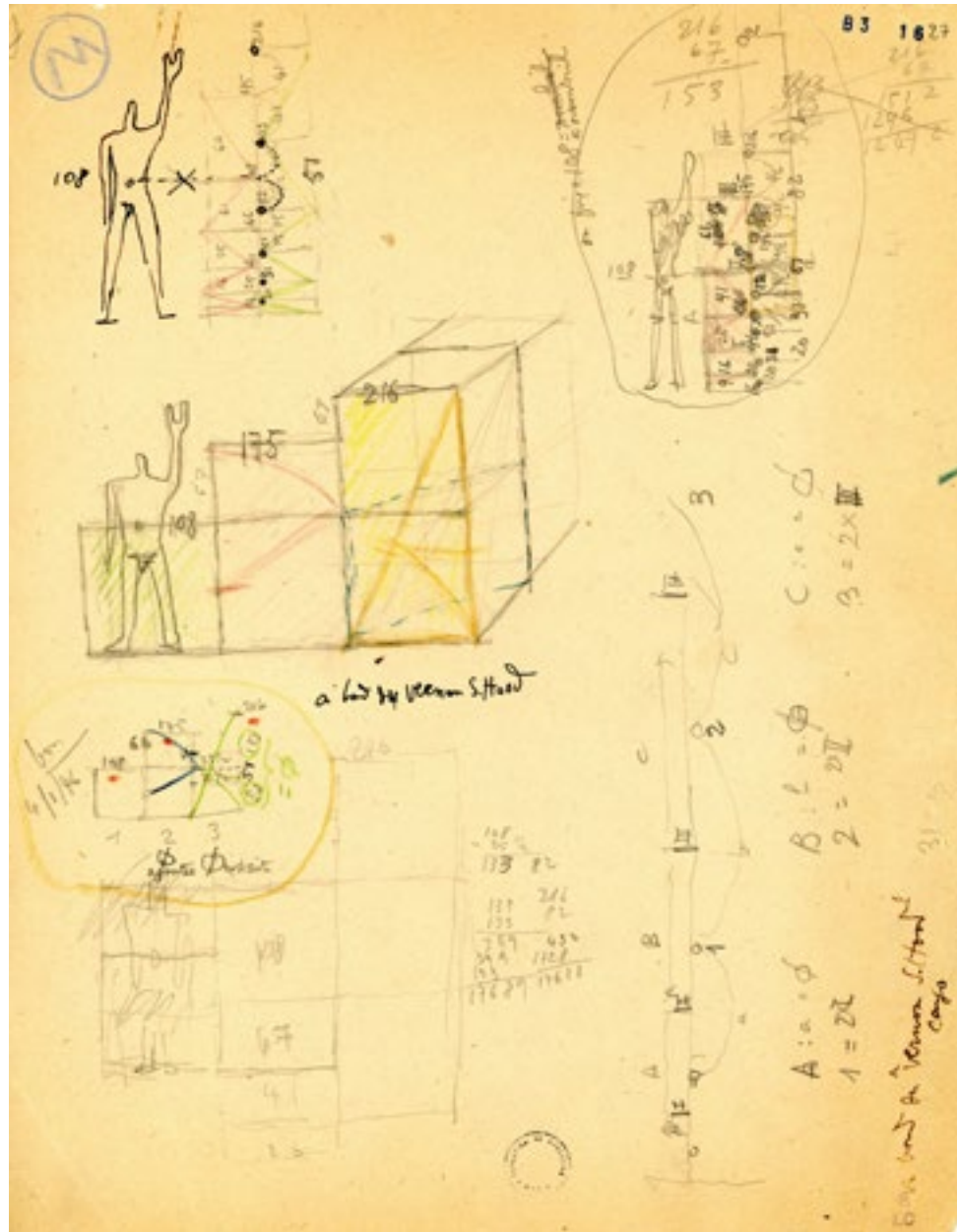


Figure 7. Le Corbusier, sketch of version of the Modulor system, made on the Vernon S. Hood, January 1946 (FLC B3(16)27).

diagrams of Gerard Hanning and Mme Maillard.⁴⁶ Furthermore, Le Corbusier understood these three blocks in symbolic terms.

1. L'unité qui ne bouge pas [the square]
2. L'élément qui engendre la vie = la section d'or, ou le mouvement, fournissant une série Fibonacci [the golden rectangle]
3. La combinaison qui fait état du double [the double square].⁴⁷

Furthermore, he wanted something that was practical on the building site. On one of his notes of 13 January 1944 he explained his reason for beginning with a square:

Le carré semble, entre mille autres points de départ possible, être l'un des plus simples, les plus intuitivement admissibles, facile à tracer sur un chantier. Par conséquent apte à proportionner du chantier fait à l'antique ou moyen-âge, c-à-d sur place. [...] Mais quelle dimension donne-t-on ? Car alors cela pourrait fournir (tracés au mur) les dimensions de toutes sortes : portes, petits bois de fenêtres, casiers etc. ⁴⁸

46 Le Corbusier came to understand a visual way of deriving the Fibonacci series from the Maillard diagram: tracing the tangent of the line joining the middle of the base of the triangle to its apex (eg B3(16)84).

47 Le Corbusier, page of notes, dated 9 December 1945 (FLC B3(16)62).

48 FLC B3(16)53. He notes that the ensemble could have either 2.20 or 2.25 as the measure of the body.

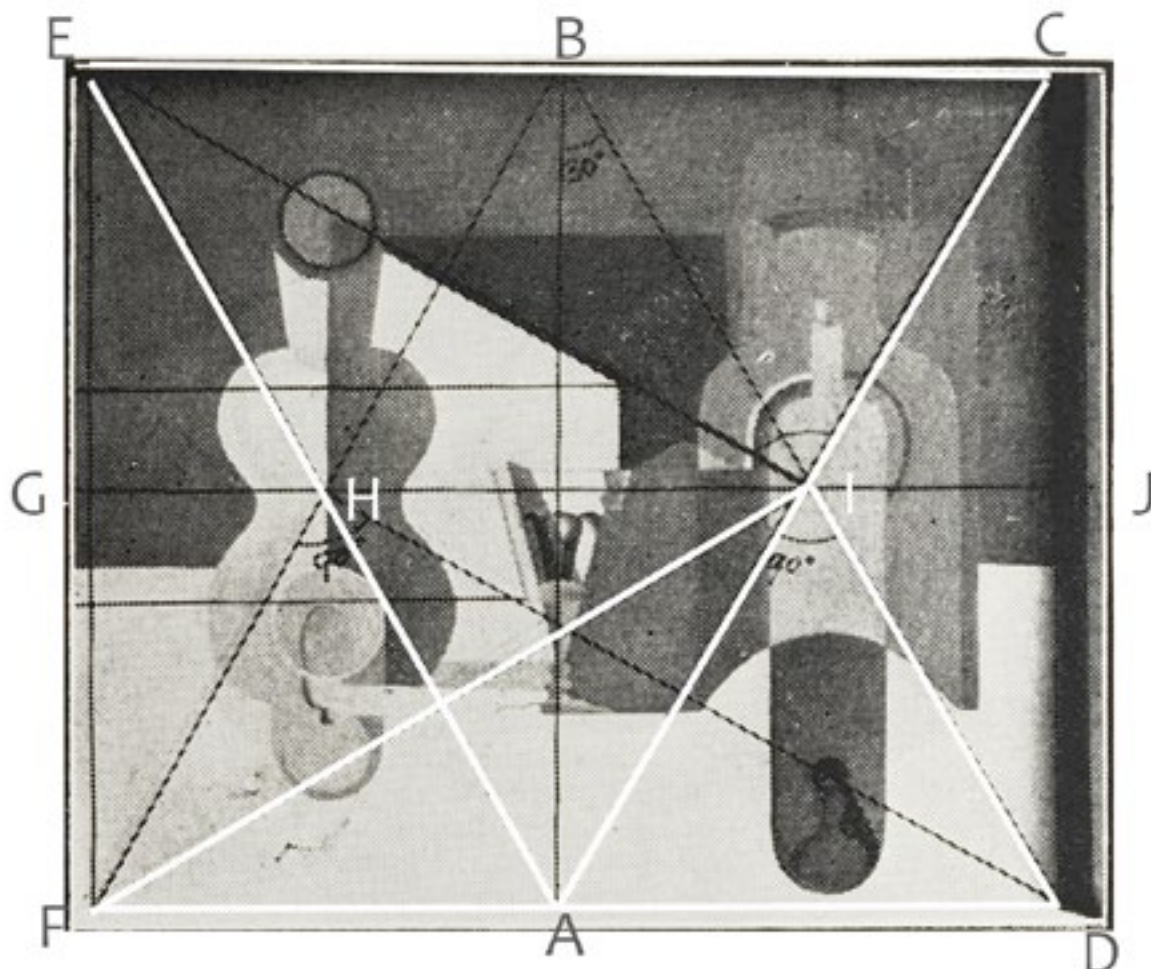
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Figure 8. Le Corbusier, *La bouteille de vin orange*, 1922, marked up with a geometric structure, adapted by the author (*L'Esprit Nouveau*, 17, June 1922, unpaginated).

This thought-process explains the presence of the Modulor man reliefs on Le Corbusier's post-war buildings. As well as being a kind of artist's signature, they symbolize the presence of the Modulor in the hands of the workmen. At every stage, Le Corbusier insisted on binding together the physical and practical with the theoretical and 'divine'.

Le Corbusier and Amédée Ozenfant worked consistently with proportional systems in their Purist period (1918-1925). But, here again, they distinguished between geometry as an aid and the judgment of the artist as final arbiter. They frequently marked up their canvases with a pre-existing geometric structure consisting of two golden section rectangles. This was facilitated by the French system of dimensioning canvases in three sequences: 'F: figure (portrait)', 'P: paysage (landscape)' and M: marine. The proportions of these are, respectively, based on the double golden rectangle ($2/(\sqrt{5}+1)/2$), 2:3 and the golden section ($(\sqrt{5}+1)/2$). Thus the F40 (figure) canvas, often used by Ozenfant and Jeanneret, measures 81x100cm. This can be described as two golden rectangles of 50x81cm (strictly speaking 50 x 80.90cm) stacked on top of each other. Into this combined rectangle can be inscribed two isosceles triangles ECA and FBD. Ozenfant claimed that they were equilateral triangles but this is not accurate.⁴⁹ Once again, Le Corbusier inserts right angle triangles into the network of lines, of which EGI defines the slope of the shadow in the lantern. Most of the other points in the composition are fixed by the intersection of the triangles ECA and FBD which in turn divide the canvas neatly into four equal vertical divisions and to horizontal divisions. None of these points appear to reflect the golden section, despite the fact that Ozenfant and Le Corbusier claimed to be interested in this proportional relationship.⁵⁰

As Ozenfant admitted, 'divine geometry' plays a very minor rôle in the composition: 'Or, il ne s'agit pas de géométrie élémentaire mais d'optique.'⁵¹ Around 1929 Le Corbusier returned to using

49 In a rectangle 100x81, the isosceles triangles would measure 100x95.2x95.2.

50 Amédée Ozenfant and Le Corbusier, 'Élaboration d'une esthétique expérimentale', *L'Esprit Nouveau*, 1, 1920, unpaginated.

51 *L'Esprit Nouveau* 17, June 1922, unpaginated. A preparatory drawing for *Nature morte rouge au violon*, 1920 shows a similar arrangement of lines, indicated as in the galerie Denise Renée in Naïma Jornod, Jean-Pierre Jornod, and Le



Figure 9. Le Corbusier, *Composition avec une poire* (1929) (FLC 147).

a variety of geometric structures in his paintings, which he explains in *Modulor I*.⁵² This was now a much more explicit deployment of geometrical figures and golden section proportions, no doubt influenced by his reading of Matila Ghyka's *Esthétique des proportions dans la nature* (1927).⁵³ In these paintings he is more interested in variants of the Fibonacci spiral. In one painting (*Composition avec une poire*, 1929) he includes a diagram of the *tracé* used in the painting (Figure 9).⁵⁴ Needless to say, Le Corbusier ignores the classic method of drawing the spiral of the Ionic volute, the four-point or thirteen point structures invented by Scamozzi, adapted by Palladio and others and taught in all the schools of architecture. Instead he invents a curious approximation of the golden section

Corbusier, *Le Corbusier (Charles Edouard Jeanneret) : Catalogue raisonné de l'oeuvre peint* (Milan: Skira, 2005), vol 1, p.353.

52 Le Corbusier, *Le Modulor*, pp.213-216.

53 Ghyka was a subscriber to *L'Esprit Nouveau* and mentions Le Corbusier in his *Esthétique des proportions dans la nature et dans les arts* (Paris: Gallimard, 1927), p. 12 and p. 424. Le Corbusier owned this book as well as Ghyka's more esoteric follow-up: Ghyka, Matila C. *Le nombre d'or rites et rythmes pythagoriciens dans le développement de la civilisation occidentale*. (2 vols). (Mayenne: Gallimard, 1931).

54 *Composition avec poire*, 1929 (FLC 147). The geometric structure is discussed in *Modulor I*, p. 214.

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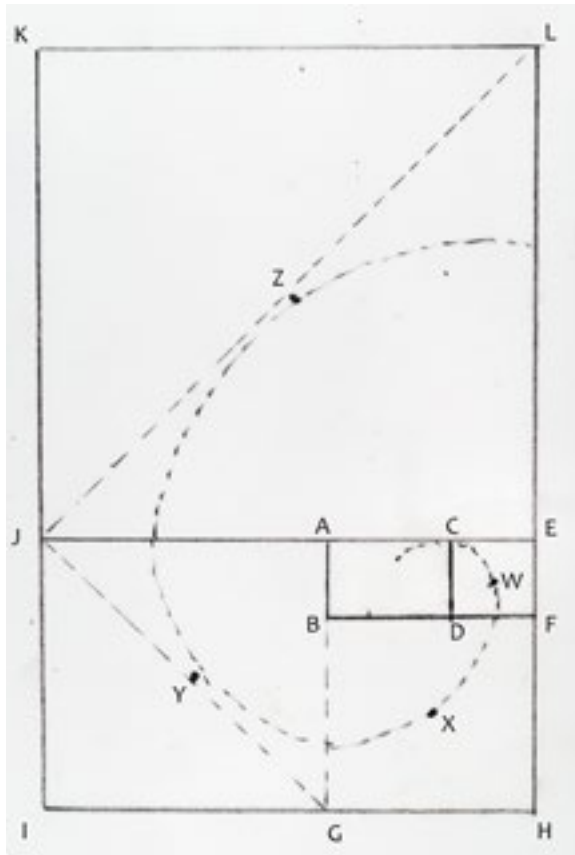
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Figure 10. Reproduction of diagram of spiral, reproduced in *Modulor I*, page 214.

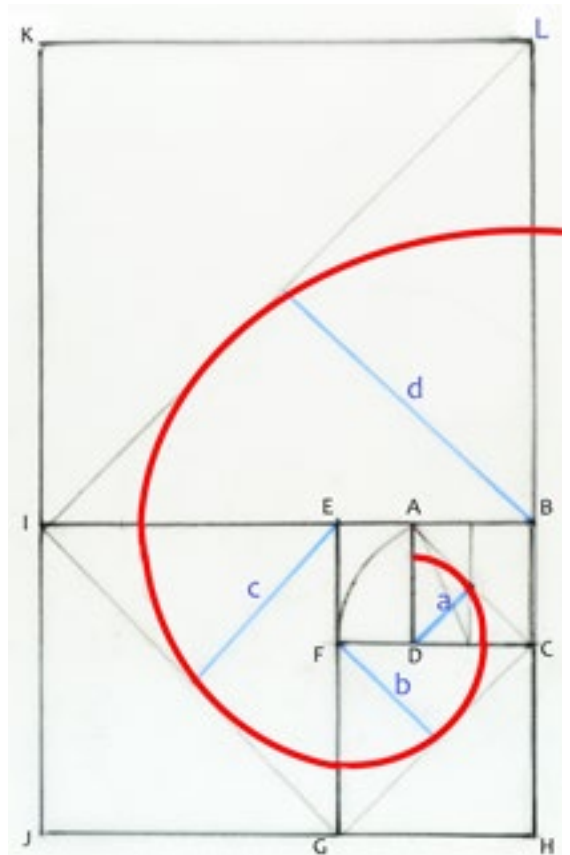


Figure 11. Reconstruction of diagram structured by golden section gnomons.

logarithmic spiral, which he explains, in *Modulor I* (p.215), as being a ‘gnomon à croissance harmonique’. He published a version of the diagram on page 214 (Figure 10). Although this shows a set of squares with the centre of each diagonal picked out, they constitute neither gnomons nor a harmonic sequence.⁵⁵ He would have learned about Aristotle’s definition of a gnomon, from Ghyka’s *Esthétique des proportions* (pp. 178-180). A gnomon is a shape that when added to a given form reproduces its proportions in a new shape. The gnomon of a golden rectangle is a square. On the diagram on page 214 (Figure 10), Le Corbusier begins with a golden rectangle ABCD and adds a square to the right CEDF. This does not create a new golden rectangle. Le Corbusier correctly constructs a set of golden rectangles and gnomons in his diagram 2 on page 213. What he should have done, in order to create a sequence of golden rectangles and their gnomon squares, is shown in Figure 11. Starting with the square ABCD, the golden rectangle EBCF is formed. The square FCHG is its gnomon, creating a new golden rectangle EBHG, and the process is repeated to the left and then above. The lengths a,b,c,d are in a golden sequence.⁵⁶

Instead, Le Corbusier seems to have begun with a rectangle in the proportion of 1:3 enclosing the box of matches on the lower left of the painting. If we give the short side of this rectangle the dimension 1, it creates a square below it (3x3), a square to the right (4x4) and a square above (7x7), thus creating a rectangle in the proportion of 7:11 or 1:1.5669, which approximates to the figure 1:1.5669 inscribed by Le Corbusier on the painting (Figure 12). The centre points of the diagonals of these three squares have been explicitly picked out on the painting. The progression 3,4,7 corresponds approximately to the geometric progression $3, 3(4/3), 4(4/3)^2$ which does not justify le Corbusier referring to it as a ‘harmonic progression’. Le Corbusier’s chose this strange construction for a reason that has nothing to do with proportion and more to do with symbolic association. On page 266 of his *Esthétique des proportions dans la nature et dans les arts*, Matila Ghyka uses exactly this diagram, complete with the proportion 1.5669, to explain the proportions of the skull of the Harvard skeleton. Ghyka explains this number as representing $2x(3^{\phi}+1)/(4^{\phi}+1)$, which is one of the least convincing claims for proportionality in his

55 If the square CEDF has a side 1, $DW=\Theta/2$ (0.707), $BX=\Theta/2x_{\phi}^2$ (1.851), $AY=\Theta/2x_{\phi}^2+1$ (2.558) and $ZE=\Theta/4x(4^{\phi}+2)$ (4.4095). I can identify no geometric progression in this sequence.

56 The spiral has to be drawn by hand, since there are no indications for the multiple centres required.



Figure 12. Le Corbusier Composition avec poire with geometric reconstruction.

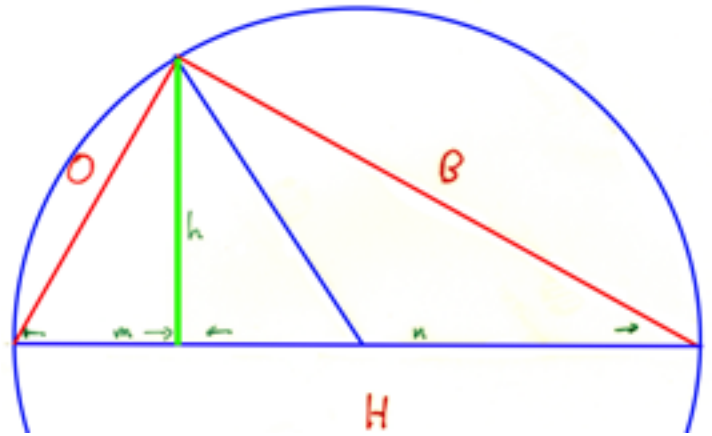


Figure 13. The place of the right angle.

book. The outline of the skull, illustrated by Ghyka, resembles that of an inverted pear which probably explains Le Corbusier's interest in this obscure diagram.

This demonstration shows, once again, that Le Corbusier's grasp of the mathematics of the golden section was very approximate. I have found no logical explanation for the mysterious ratio '1:1.5669' that Le Corbusier gives as the proportion of the rectangle KLHI (Figure 10)

The place of the right angle and dimensions

It is important to understand the properties of the place of the right angle, which Le Corbusier set such store by (Figure 13). I will show that the actual geometric properties of the right angle triangle have very little to do with Le Corbusier's use of it and very rarely involve the golden section. The apex of a triangle whose base coincides with the diameter of a circle will always lie on the circumference of the circle if the height does not exceed the radius of the circle. The vertical line indicating the height of this triangle ('h') will always be the geometric mean of the portions of the width to left ('m') and right ('n') of this vertical line. The ratio of the geometric progression 'm':'h':'n' will be different in each case and bear no fixed relation to the ratio of width to height of the triangle. Only if the ratio of width to height of the triangle is $\sqrt{5}$ will the progression 'm':'h':'n' follow the golden mean. The right triangle inscribed in a circle has the useful property, however, of identifying similar triangles (and therefore the rectangles defined by them).⁵⁷ This is the property of the geometric progression: $m:h = h:n$. The two right triangles imposed on the photograph of the Petit Trianon demonstrate this simple property.⁵⁸ It should be clear, however, that we are dealing with a practical rule of thumb quite different from the divine proportion or pure geometry.

⁵⁷ The use of right angle triangles and set squares to identify similar rectangles was advocated by August Thiersch and taken up by Heinrich Wölfflin, whose pupil August Klipstein accompanied Jeanneret on the voyage d'Orient in 1911.

⁵⁸ Le Corbusier and Amédée Ozenfant, «Les tracés régulateurs,» *L'Esprit Nouveau* 5 (1921), 563-72, reprinted in Le Corbusier-Saugnier, *Vers une architecture* (Paris: G. Crès, 1923), pp. 53-64, p. 61.

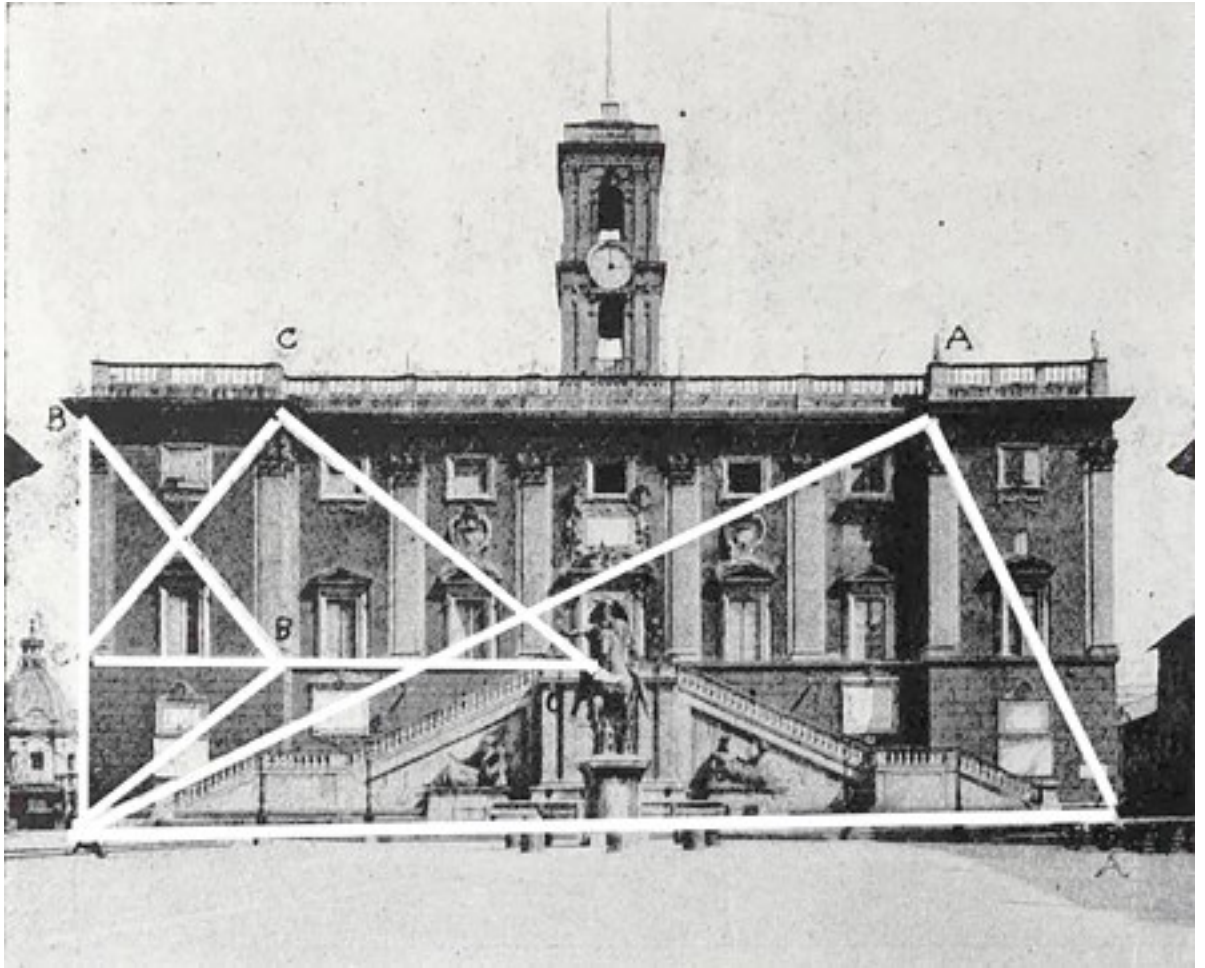
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Figure 14. Place of the right angle, Palazzo dei Senatori (*L'Esprit Nouveau*, 1, October 1920, p.46).

To take the example frequently cited by Le Corbusier, the Palazzo dei Senatori on the Campidoglio in Rome (Figure 14). Le Corbusier claimed that Michelangelo ordered the dimensions of the façade ‘par la force des nombres.’ In *Modulor I* he candidly explains that his method was simply to lay a postcard over the photograph in order to find the place of the right angle. According to Le Corbusier’s triangle AAA, the ratio of the width of the right hand bay to the height of the building is equal to the ratio of the height of the building to its width minus the right hand bay. Similarly, triangle BBB asserts that the ratio of the height of the lower storey to the width of the left hand bay is equal to the ratio of the width of the bay to the height of the upper storey. Furthermore, triangle CCC claims that the ratio of the width of the left hand bay to the height of the upper storey is equal to the height of the upper story to half the width of the building minus the width of the left bay. Stated in these terms, it is difficult to see the significance of these diagrams, but graphically they look persuasive.⁵⁹ Unfortunately, the photograph is severely distorted: the left wing is shown considerably wider than the right. Applying the three right triangles to a measured drawing shows that, apart from the triangle AAA, they do not ‘fix’ either the height of the base of the piano nobile, nor confirm the width of the left-hand bay (Figure 15). The triangles AAA, BBB and CCC are interrelated. Curiously the three triangles only work in the unique case that the ratio of the height of the building to its width is as 39.31:100.⁶⁰

I know of no evidence of the place of the right angle being used before the completion of a project. A partial exception is one of the elevation drawings for the maisons La Roche-Jeanneret.⁶¹ This was the penultimate project corresponding to the wooden model exhibited in the Salon d’Automne in October 1923. There are various tentative diagonals drawn on this elevation but none of them affected the final design. The place of the right angle was invariably applied after the design was finished, to

59 It is sufficient to complete the rectangles defined by the right angle triangles to realise that the similar figures they define are unimportant in the design. More important were the lines themselves as drawn onto elevation drawings or photographs.

60 In fact, the height would need to be 39.30756.

61 FLC 15109, reproduced in the third edition of *Vers une architecture* (1928, reprint 1966) p. 64.

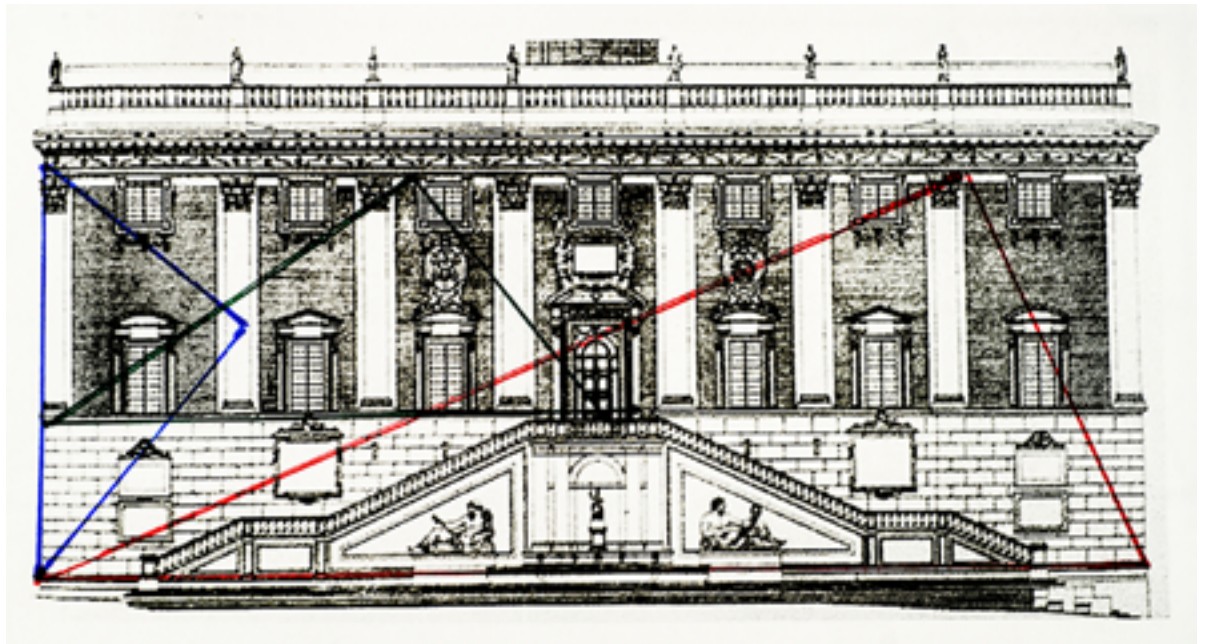


Figure 15. Corrected diagram, based on measured elevation.

seek reassurance about decisions taken for other reasons, as in the elevation drawings of the Atelier Ozenfant, where they have almost no bearing on the proportions of the façades.⁶²

In only one case, highlighted in *Modulor I*, does the golden mean appear relevant. The theoretical dimensioning of the Villa Stein-de-Monzie was based on a grid of 5.0-2.5-5.0-2.5-5.0 meters= 20 metres. In fact, the site, within the none aedificandi limits, was 70 cm wider.⁶³ A golden mean rectangle based on the dimension 20.7m would have given a height of 12.79m.⁶⁴ The actual height is 13.04m, only 25 cm taller.⁶⁵ This proximity to a golden rectangle is the completely fortuitous result of building out to the full permitted width of the site in combination with ‘normal’ ceiling heights.⁶⁶ In hindsight, it allowed Le Corbusier to claim that the façade was designed to the golden mean. A façade constructed entirely along the Fibonacci scale would have articulated the plan 5-3-5-3-5 (=21m) with a height of 13m.

Le Corbusier never applied the place of the right angle or the golden section to plans of buildings.⁶⁷ This was because he and Pierre designed in plan. In the 1920s, Le Corbusier always tried to use whole number dimensions as a starting point for his plans. This use of whole-number dimensions encouraged simple arithmetic modulation. The Pessac houses were based on a grid of 2.5, 5.0, like the Villa Stein-De Monzie. The later versions of the Citrohan house (Guiette, Stuttgart) were based on a 5.0m bay. The first project of the Villa Savoye, on an unencumbered site, was based on a grid of 5 metres.⁶⁸ The dimension of 5 metres corresponds neither to any structural constraints nor to considerations of human proportions. Instead, it seems to have come from some Cartesian notion of the world sectioned in metric units. This reliance on the ‘abstract’ notion of a unit of measure originally defined as one ten-millionth of the distance from the equator to the North Pole along a great circle, was precisely what Le

62 *Ibid.*, p. 62.

63 Tim Benton, *The Villas of Le Corbusier and Pierre Jeanneret 1920-1930*, Revised and expanded edition (Basel/Boston: Birkhäuser, 2007), pp. 161-182 and 217-218.

64 Note that a right-angle triangle cannot be inscribed into a golden mean rectangle, since the height is greater than half the width.

65 Based on FLC 10422.

66 The ground floor and top floor measure 2.60m and 2.80m, the two middle floors 3.12m, with five floor thicknesses of 0.30m.

67 Francesco Passanti makes a meticulous geometric analysis of Jeanneret’s Villa Favre-Jacot (1912), arguing that he had learned about proportional systems in Germany (Passanti, Francesco. “Architecture: Proportion, Classicism and Other Issues.” In *Le Corbusier before Le Corbusier*, edited by S. Von Moos and A Rüegg (New York: Bard Graduate Center, 2002.), pp. 69-97. Post-hoc geometric analysis is fraught with dangers of ‘reading in’.

68 For an explanation why this interval was changed to 4.75m, along with several other modifications of the grid, see Benton, Tim. “Villa Savoye and the Architect’s Practice.” In *Villa Savoye and Other Buildings and Projects, 1929-1930*, edited by H. Allen Brooks. *The Le Corbusier Archive.*, (New York: Garland Publishing, 1984), pp. ix-xxxii.

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Corbusier challenged in his research for the Modulor. It was also linked to the idea of standardisation of component parts. For example, Le Corbusier had Henri Frugès order 595 steel windows measuring 2.50x1.05m (doubled up as 5.0m windows), and this was part of his campaign to introduce standard components for the building industry.⁶⁹

By contrast, in elevation, Le Corbusier and Pierre never used 'ideal' whole number dimensions. Their room heights, based on subjective judgement, typically varied from 2.60m to 3.15m. For example, the Villa Stein-de-Monzie had ceiling heights (in ascending order) of 2.80, 3.12, 3.12 and 2.60, with the roof parapet measuring 1.12.⁷⁰ In his article on the *tracés régulateurs* published in *L'Architecture Vivante* in 1929, Le Corbusier made clear that he used the *tracés* to try to order elements in the façade determined by the plans.⁷¹ He claimed that the external staircase on the garden side of the villa Stein-de Monzie was raised in order to correspond to the diagonal of the façade. Thus we have another opposition between plans notionally based on standard metric modules and elevations based on human dimensions confirmed by the visual test of the place of the right angle or simply parallel diagonal lines. The plan of the Mundaneum project, on the other hand, was designed from the outset around the golden section.

Nature and nature

Jeanneret had been trained at the École d'Art at La Chaux-de-Fonds to study nature closely in all its complexity and then reduce the forms to a geometric order capable of becoming a repeating pattern.⁷² Even then, Jeanneret was fascinated by the juxtaposition between natural flora and fauna and the geometric structures of rock. He expressed this most clearly in his watch design of 1906, interpreting the arms of the city of La Chaux-de-Fonds in two fields: the organic with the busy bees on top and the crystalline rock forms below. In the Villa Fallet we find the same contrast on the garden front, with the theme of pine cones and tree branches contrasted with geometric stone features (Figure 16).

My fifth instance of Le Corbusier's dualism becomes the contrast between Nature and nature. By this I mean the difference between the natural world, in all its richness and complexity ('nature') and the ineluctable laws of nature ('Nature'). He explains this crisply in *Urbanisme*:

Donc: la nature est multiforme, féconde, illimitée, mais l'homme en tire des lois simples et il en fait des équations simples.⁷³

To begin with, Le Corbusier understood the latter largely in terms of geometry, but later he began to think in terms of the cosmic laws of the twenty-four hour day or the lunar cycle governing the tides.

Le Corbusier expressed himself clearly describing the Villa Savoye: ‘

Les habitants, venus ici parce que cette campagne agreste était belle avec *sa vie de campagne*, ils la contempleront, maintenue intacte, du haut de leur jardin-suspendu ou des quatre faces de leurs fenêtres en longueur. Leur vie domestique sera insérée dans un rêve virgilien.⁷⁴

Man had to be kept physically separate from nature which was to be consumed visually. As he noted in *Œuvre complète* II (1935), ‘D’ailleurs, l’herbe est malsaine, humide etc... pour y habiter.’⁷⁵ By the time this was published, the pendulum had swung in the direction of nature. The Villa de Mandrot (1930-1931) has load-bearing stone walls and is anchored to the ground with no externally visible

69 Needless to say, it was impractical: you cannot fit 5.0m steel windows into reinforced concrete buildings constructed on 5.0m centres. It was impractical in the same way that Palladio's plans did not take account of the thickness of walls but this is characteristic of all ideal proportional systems.

70 Based on FLC10422 (LC number 842).

71 ‘Il y a bien quinze années, ayant sur ma planche à dessin les façades d’une maison, dont les trous et les pleins étaient disposés conformément aux besoins du plan, je me suis senti en face d’un ensemble cacophonique.’ *L'Architecture vivante*, Spring and Summer 1929, p.13. An earlier description is in the lecture at the Salle Rapp reprinted in *Almanach de l'architecture moderne* (1925), pp. 36-38.

72 Mary Patricia May Sekler brilliantly traces the impact of this education throughout Le Corbusier's career (Mary Patricia May Sekler, “Le Corbusier, Ruskin, the Tree and the Open Hand,” in *The Open Hand; Essays on Le Corbusier*, ed. Russell Walden (Cambridge MA: MIT Press, 1977), 42-95. See also Tim Benton, “Le Corbusier y la N(n)aturaleza: síntesis de geometría y forma natural en Le Corbusier,” in *La Recherche Patiente; Cincuenta Anos Despues - Fifty Years Later*, ed. Jorge Torres Cueco and Clara E. Mejía Vallejo (Valencia: General de Ediciones de Arquitectura, 2019).

73 Le Corbusier, *Urbanisme*. p. 143.

74 *Précisions*, p. 138.

75 Willy Boesiger, *Le Corbusier et Pierre Jeanneret, Oeuvre Complète 1929-1934*, Les Editions de L'architecture (Zurich 1935), p. 24.



Figure 16. Charles-Édouard Jeanneret (Le Corbusier), Villa Fallet, 1906-7, La Chaux-de-Fonds (TB dsc02256)

pilotis.⁷⁶ The two houses built in 1935 – the petite Maison de weekend and the villa Le Sextant - went further, built of stone and wood with brick and plywood detailing.⁷⁷ I have argued elsewhere that this return to nature, which transformed his painting and architecture, was influenced by the holidays he spent every year from 1926 to 1936 at Le Piquey on the Bassin d’Arcachon.⁷⁸

Fusion

In this section I will review a number of ways that aided the passage from the material to the spiritual worlds. One means of opening the door from the physical to the spiritual world was through ‘unity’ of dimensions. Le Corbusier’s studies for the Modulor follow the line of Abbé Laugier’s saying ‘tumulte dans l’ensemble; unité dans le détail’.⁷⁹ Coordinating dimensions along a proportional system supported by the sacred rules of number and geometry might increase the chances of passing from subjective judgment to objective truth. This was one of the ideas behind developing the Modulor.

It was important for Le Corbusier that his Modulor was not only supported by Nature (number and geometry) but also by antiquity and the vernacular. In a diagram he sketched the progression, from

76 Bruno Reichlin, «La Villa De Mandrot à Le Pradet (Var) 1929-1932 Le dehors est toujours un dedans,» in *La Corbusier la ricerca paziente*, ed. Bruno Reichlin (Lugano: FAS Gruppo Ticino, 1980), 87-102, Tim Benton, “La Villa Mandrot i el lloc de la imaginació,” *Quaderns d’arquitectura i urbanisme*, 163 (1984): 36-47.

77 Tim Benton, “The Little Maison De Week-End and the Parisian Suburbs,” *Massilia* 1 (2002), “Le Corbusier e il vernacolare: Le Sextant a Les Mathes, 1935,” in *Le case per artisti sull’isola Comacina*, ed. Andrea Canziani (Como: NodoLibri, 2010), 22-43.

78 Tim Benton, “Atlantic Coast: Nature as Inspiration,” in *Le Corbusier : An Atlas of Modern Landscapes*. ed. Jean-Louis Cohen (New York: Museum of Modern Art, 2013), 162-67. Tim Benton and Bruno Hubert, *Le Corbusier; Mes années sauvages sur le Bassin d’Arcachon*, ed. Pôle Culturel Petit Piquey (Paris: Ibep, 2015). and Tim Benton, “‘I am attached to the natural order of things’: Le Corbusier’s Rejection of the Machine,” in *Being Modern the Cultural Impact of Science in the Early Twentieth Century*, ed. Robert Bud, et al. (2018). See also Niklas Maak, *Der Architekt am Strand : Le Corbusier und das Geheimnis der Seeschnecke* (München: C. Hanser, 2010).

79 Frequently referred to by Le Corbusier, it was included among his Modulor sketches on the Vernon S. Hood (FLC B3(16)31-001).

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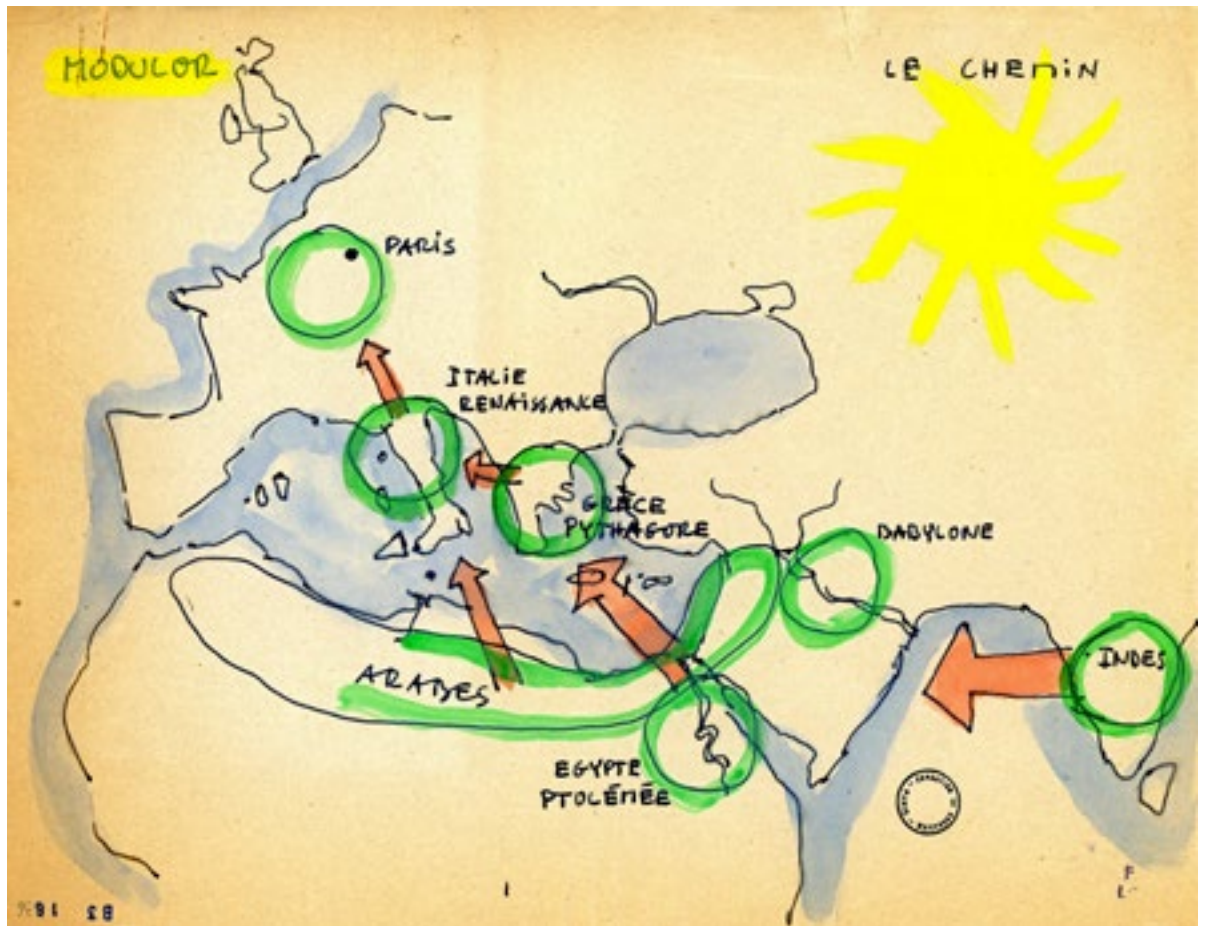
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Figure 17. Sketch of the route of the Modulor idea from antiquity to Paris (FLC B3(16)36).

India, Egypt, Greece, the arabs, the Italian Renaissance to Paris (Figure 17). Significantly, this sketch is crowned by a bright yellow sun of enlightenment. He was also interested in antique and traditional units of measure, having his assistants research the Egyptian cubit and the Turkish units of measure (Figure 18). Having always admired the sense of proportion of Turkish architecture, he sought the explanation in their measurements. Furthermore, his sketchbooks are full of measurements taken of modest vernacular buildings.

As we have seen, the passage from the material to the spiritual worlds was usually described by Le Corbusier in terms of brewing, cooking, digestion or giving birth. At the end of his life, Le Corbusier described the process of creation:

Lorsqu'une tâche m'est confiée, j'ai pour habitude de la mettre au-dedans de ma mémoire, c'est-à-dire de ne pas permettre aucun croquis pendant des mois. La tête humaine est ainsi faite qu'elle possède une certaine indépendance ; c'est une boîte dans laquelle on peut verser en vrac les éléments d'un problème. On laisse alors « flotter », « mijoter », « fermenter ». Puis, un jour, une initiative spontanée de l'être intérieur, le déclic se produit : on prend un crayon, un fusain, des crayons de couleur [la couleur est la clef de la démarche] et on accouche sur le papier : l'idée sort, l'enfant sort, il est venu au monde, il est né.⁸⁰

On page 39 of the *Poème*, Le Corbusier illustrates the successful outcome of the law of the meander, when life forces its way through the barrage of vicissitudes to run straight, with two sketches: the plan of Chandigarh and a woman and baby with the Himalayas as backdrop. I see the latter sketch as the literal illustration of 'l'idée sort, l'enfant sort' – the act of creation.

In the *Poème*, he is at his most specific:

Faire une architecture c'est faire une créature. Être rempli, se remplir, s'être rempli, éclater, exulter, froid de glace au sein des complexités, devenir un jeune chien content. Devenir l'ordre.⁸¹

To be impregnated, to be filled up, to split open and exult; these are euphemisms for sex and birth, leading to order, which we can assume to be the divine order of *l'espace indicible*. It is fascinating

80 Le Corbusier, *Textes et dessins pour Ronchamp* ([Paris]: Éditions Forces vives, 1965), p. 1.

81 Le Corbusier. *Poème de l'angle droit*, pp. 136-7.

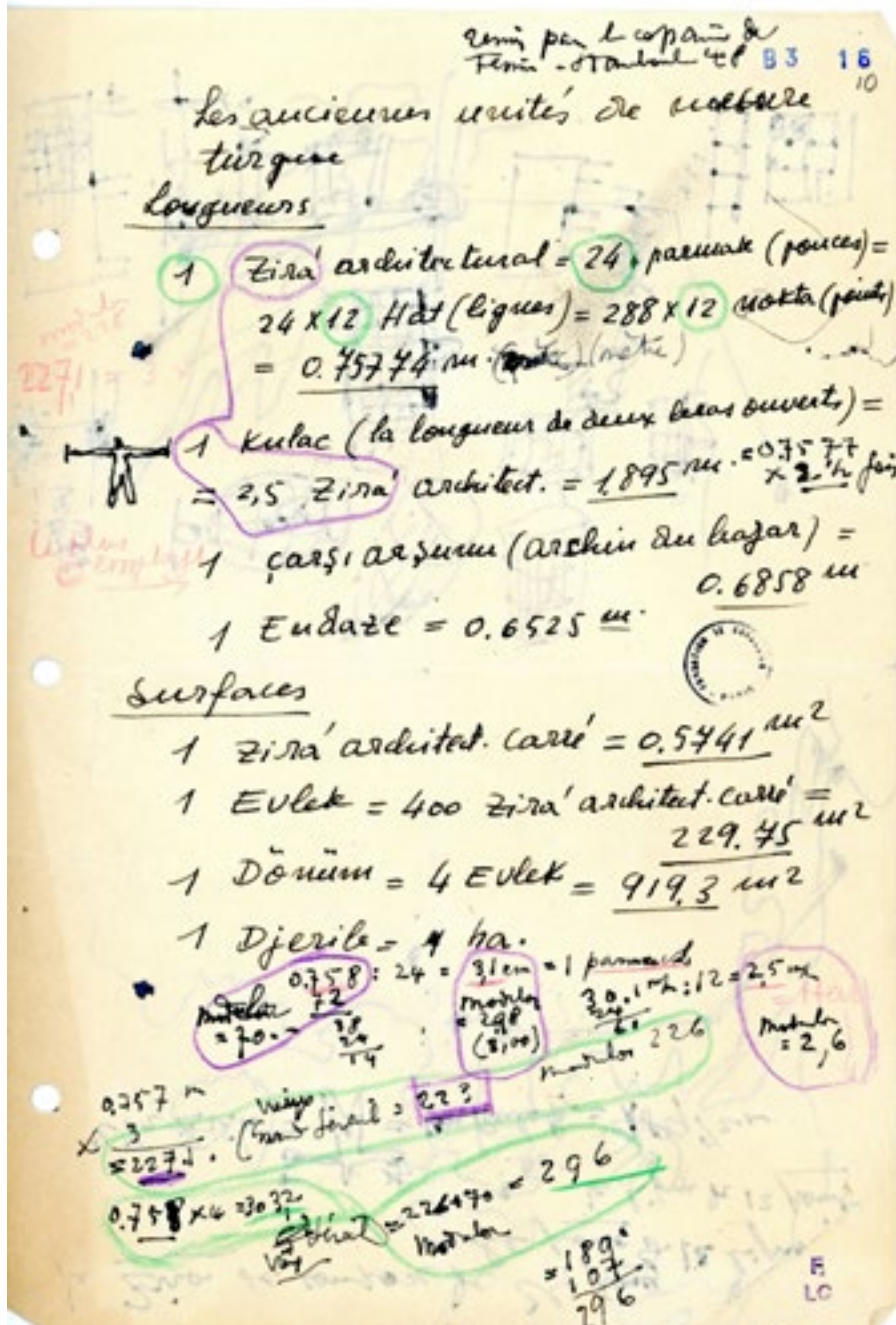


Figure 18. Notes supplied to Le Corbusier with traditional Turkish units of measurement (FLC B3(16)10).

that he summarises this by referring to his dog Pinceau ('jeune chien content'), who is often described in his letters in terms of wild, Dionysiac energy. It is astonishing that Le Corbusier could combine feminine and masculine metaphors of accomplishment.

In the *Poème*, Le Corbusier describes the 'birth' of 'la maison des hommes' (the Unité d'habitation, Marseille) as a natural process :

Débarrassée d'entraves mieux qu'auparavant, la maison des hommes, maitresse de sa forme, s'installe dans la nature. Entière en soi faisant son affaire de tout sol, ouverte aux quatre horizons, elle prête sa toiture à la fréquentation des nuages ou de l'azur ou des étoiles. Avisée, regardez la chouette venue d'elle-même se poser sans qu'on l'ait appelée.⁸²

The section of a Unité d'Habitation is juxtaposed with mountain ranges – symbols of the initiate's progress to truth – while the roof plays host to the spiritual world of clouds and stars. This is the miracle of transcendence into the sphere of the Gods, confirmed by the owl of wisdom, messenger of Athena.

Nature itself works the miracles of birth, growth and death. In *La Ville Radieuse*, Le Corbusier describes the cosmic cycle of the 24 hour day in terms of the continual re-fertilization of male and female, sun

82 *Ibid.*, pp. 58-60.

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Figure 19. Le Corbusier, *Poème de l'angle droit*, p. 61.

and moon.⁸³ Under the heading 'Le mâle et la femelle' he sketched the six phases of the day seen from an airplane:

Le soleil et l'eau. L'actif et le passif. Harmonie, rivalité, conflit, traité d'alliance, fécondation [...] C'est l'apothéose d'une grande journée. Symphonie pastorale. Ô nature ! Deux éléments ont joué ensemble le jeu magnifique : le mâle, la femelle, Soleil et eau. Deux éléments contradictoires qui, pour exister, ont besoin l'un de l'autre...⁸⁴

That this interdependence of contradictory elements is described in terms of Beethoven's Pastoral Symphony reinforces the importance of music as vehicle for 'harmonisation'.

A curious assimilation of fermentation with the mysteries of esoteric number and exotic rites is contained in the story of the 'Dive Bouteille' reproduced at length by Le Corbusier.⁸⁵ This shaggy dog story by Rabelais boils down to the adage: to understand the mystery of the divine bottle, drink. As Le Corbusier explains: « Pour me mettre au clair moi-même, j'interprète : agis et tu verras le miracle. Ne glose pas tant. Ne cherche point à l'évader ! La bouteille te dit : Bois ».

Drink and tobacco were the friends of creation. Many of his paintings are signed with a pipe or matches. For instance, in the very important painting *La main et le silex*, 1930, chosen as the frontispiece for *La Ville Radieuse*, the twin icons of creativity – a pen and matches – sign the painting. In an interview, Le Corbusier explained that he held a particular devotion, like primitive man, to the giver of fire: 'le feu est dans sa poche à disposition, dans un petit emballage pelliculaire du bois, on frotte et ça s'allume.'⁸⁶

83 Le Corbusier, *La Ville Radieuse*, pp. 77-78.

84 *Ibid.*, p. 78.

85 Le Corbusier, *Modulor 2*, pp. 206-210.

86 Interview with Max Favalelli, 'Le soir on cambriole' RTF 1960, cited in Jornod, Jornod, and Le Corbusier, *Le Corbusier (Charles Édouard Jeanneret) : Catalogue raisonné de l'oeuvre peint*, p. 496.



Figure 20. Le Corbusier, *La main et le silex*, 1930 chosen as frontispiece for *La Ville Radieuse* (FLC 101).

Le Corbusier annotated *La main et le silex*: ‘L’objectif et le subjectif sont les deux pôles entre lesquels surgit l’œuvre humaine faite de matière et d’esprit.’⁸⁷ The painting records the blending of hand and nature. It could be an illustration to the slogan, ‘... tu contractes avec la nature un pacte de solidarité...’.⁸⁸ For Le Corbusier, the hand was the organ of the material world, compared to the eye and ear which gave access to the spiritual. ‘Main pétrit, main caresse, main glisse. La main et la coquille s’aiment.’⁸⁹

Seashells were for Le Corbusier a locus for the transition from the sensual to the spiritual:

Coquillages; la Mer n’a cessé de nous en jeter les épaves de riante harmonie sur les grèves [...] En ces choses ici entendues intervient un absolu sublime accomplissement. Il est l’accord des temps, la pénétration des formes, la proportion – l’indicible en fin de compte soustrait au contrôle de la raison, porté hors des réalités diurnes admis au cœur d’une illumination. Dieu incarné dans l’illusion ; la perception de la vérité peut-être bien.⁹⁰

On 8 January 1923 Le Corbusier wrote to T.H. Wijdeveld, editor of *Wendingen* magazine, asking to be sent a copy of the special issue on seashells.⁹¹ Le Corbusier claimed to have made a study of seashells in a museum 20 years previously. He told Wijdeveld that he was particularly struck by the X-ray photographs taken in the Zoological museum Amsterdam. The X-ray photograph of the Nautilus shell was reproduced as a key image introducing the chapter ‘L’heure du repos’ in *Urbanisme*.⁹² This shell has continually been referred to as an example of the pure Pythagorean spiral produced by nature: Nature producing divine geometry. Later, Le Corbusier would read avidly the books by Matila Ghyka, although, as he explains in *Modulor I*, he could only really understand the diagrams.⁹³ He later warned

87 Le Corbusier, *La Ville Radieuse, éléments d’une doctrine d’urbanisme pour l’équipement de la civilisation machiniste*, p. 2.

88 Le Corbusier, *Poème de l’angle droit*, p. 30.

89 *Ibid.*, p. 89.

90 *Ibid.*, pp. 89-91.

91 FLC R3(6)149.

92 Le Corbusier, *Urbanisme* (Paris: G. Crès, 1924), p. 189.

93 Matila C. Ghyka, *Esthétique Des Proportions*. and Matila C. Ghyka and Paul Valéry, *Le nombre d’or; rites et rythmes pythagoriciens dans le développement de la civilisation occidentale précédé d’une lettre de Paul Valéry*, 2e éd. ed. ([Paris]: Gallimard Ed. La Nouvelle revue française, 1931). See also Le Corbusier, *Le Modulor* (Paris, 1983 1st edition 1950), p. 29.

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Figure 21. *Wendingen*, 5, 8-9, 1923 X-Ray photograph of the *Charonia tritonis* seashell.



Figure 22. Le Corbusier, *Spirales géométriques animées*, 1932 (FLC 104).

his readers to be wary of the formulas proposed by Ghyka. Nevertheless he annotates his sketches of the Modulor with page references to Ghyka's *Nombre d'or*.

The photograph of two shells juxtaposed introduce the key chapter 'L'esprit de vérité' in *L'Art décoratif d'aujourd'hui*.⁹⁴ This was the chapter, liberally illustrated with machines and botanical diagrams, where Le Corbusier tries to explain the passage from brutal reality to the inexplicable and the work of art.

Lorsque intervient dans l'œuvre humaine l'inexplicable, c'est-à-dire lorsque notre esprit est projeté loin du rapport étroit de cause à effet et qu'un sentiment allègre nous soulève et porte nos pensées de l'objet brutal au phénomène cosmique dans le temps, dans l'espace, dans l'insaisissable, dans le seul perceptible de racines qui s'enfoncent tout autour et nous nourrissent du suc du monde, l'inexplicable est alors le miracle de l'art, ce moment où un objet défini, crûment créé, là sus nos yeux, d'une forme semblable pour nous tous, est comme un radium, un potentiel de l'esprit, une puissance concentrée, une œuvre d'art.⁹⁵

Once again, the metaphor is organic, in which the work, with its roots in the material world, sprouts to create the miracle of art. The seashell as illustration of the spirit of truth can only be understood as a representative of nature producing pure geometry and hence divine truth.

Other photographs in *Wendingen* illustrated a shell that entered Le Corbusier's iconography as symbol of eternal truth (Figure 21). The shell featured on the right side of Le Corbusier's painting *Spirales géométriques animées* as an allegory of eternal truth (Figure 22).⁹⁶ The Dyonisiac figure on the left is based on sketches of women dancing at Le Piquey.⁹⁷ Separating this joyful image from the seashell is a wooden barrier, literal evocation of the wall that separates the physical and spiritual worlds.

94 Le Corbusier, *L'art Décoratif D'aujourd'hui* (Paris: G. Crès, 1926), p. 167. This was the *Cardium Pseudolima Lamarck* from page 11 of the *Wendingen* issue.

95 *Ibid.*, p. 183.

96 This theme was picked up again in a mural painting in E-1027 in August 1939 (Tim Benton, *Le Corbusier peintre à Cap Martin* (Paris: Editions du Patrimoine, 2015), pp. 71-78.

97 Carnets B6 pp. 3904, B6 pp. 520-522.

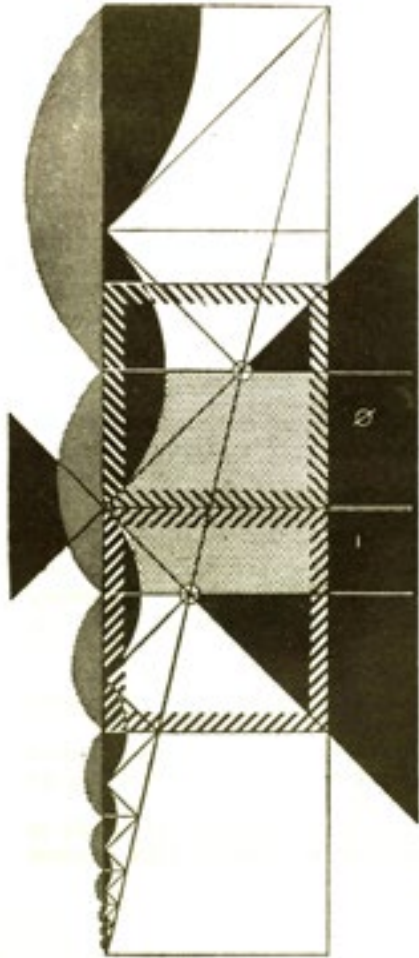


Figure 23. André Maisonnier and Justin Serralta, 'definitve' diagram of the Modulor (*Modulor 2*, Fig 10).

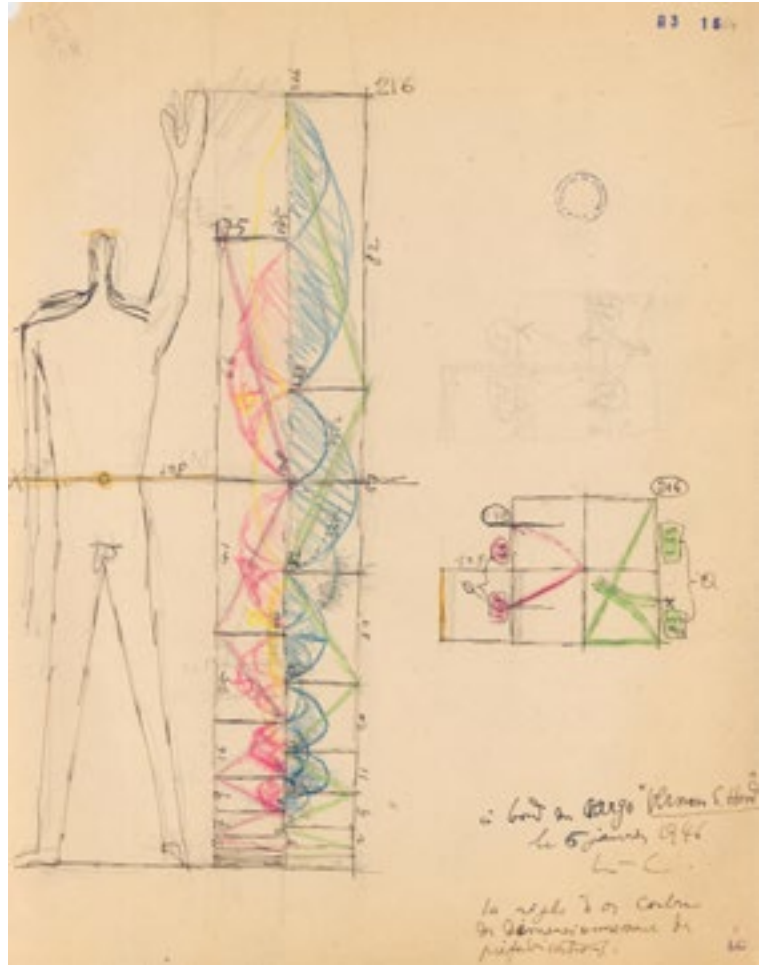


Figure 24. Le Corbusier sketch of Modulor on the Vernon S Hood 5 January 1946 (FLC B3(16)64).

'Derrière le mur, les dieux jouent ; ce sont les nombres, constituants de l'univers.'⁹⁸ It is significant that Le Corbusier seized on the idea of Justin Serralta and André Maisonnier whose foreheads 'had been caressed by the wing of the Muses' and who represented the Modulor dimensions as a kind of Pythagorean spiral (Figure 23).⁹⁹ Le Corbusier explored this idea on the Vernon S. Hood, without achieving the clarity of his assistants' model (Figure 24). Once again, he was not satisfied until he had discovered a visual demonstration of the truths of 'divine geometry'.

The seashell and barrier introduce Le Corbusier's section *B2 Esprit* of the *Poème* where he explains the origins of the Modulor:

La rencontre fortunée, miraculeuse peut-être, d'un nombre parmi les nombres a fourni cet outil d'hommes. L'appréciant le philosophe a dit : « Rendra le mal difficile et le bien facile ».¹⁰⁰

Here again, we have a fusion of opposites, a woman's body and number, a human 'rencontre fortunée' and a philosopher, who operates in the sphere of truth.

There were other more tangible metaphors for understanding the passage between the material and physical worlds. Stimulated by Ozenfant and the theories of Victor Basch and Charles Henry, Le Corbusier adopted for a time the physical theory of empathy.¹⁰¹ As explained in their article 'Sur la

⁹⁸ Le Corbusier, *Modulor 2*, p. 15.

⁹⁹ *Modulor 2*, p. 44.

¹⁰⁰ Le Corbusier, *Poème De L'angle Droit*, pp. 53-54. It was Einstein who apparently told Le Corbusier that the Modulor would 'make the bad difficult and the good easy'.

¹⁰¹ Victor Basch, «L'esthétique nouvelle et la science de l'art,» *L'Esprit Nouveau* 1 (1920): 5-12. The other elements were formal and associative. See also the chapter 'Mécanisme de l'émotion' in Amédée Ozenfant and Le Corbusier, *Après le cubisme*, (Paris: Éditions des Commentaires, 1918), pp. 43-45. For the context of the movement into aesthetics based on science, see Judi Loach, "Architecture, Science and Purity," in *Being Modern; the Cultural Impact of Science in the Early Twentieth Century*, ed. Paul Greenhalgh Robert Bud, Frank James, Morag Shiach (London: UCL Press, 2018), 207-44.

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Figure 25. Le Corbusier, sheet of notes for his lecture at Lausanne in February 1924 (FLC C3(6)25-001).

plastique' some of the origins of formal sensation are mechanical.¹⁰² The muscles, the 'flux sanguin' and the sense of balance are directly affected by formal combinations. Based on the work of Fechner and Wundt, this was part of an attempt to create a science of aesthetics, although Victor Basch makes clear that physiological sensations are only the first of three stimulations of the aesthetic.¹⁰³ For Ozenfant and Jeanneret, therefore, the same plastic elements stimulate the same subjective reactions. The consequence was the policy of Purism to search for the invariable forms underlying all aesthetic sensation: composed of lines and curves and the phileban solids. This was the closest Le Corbusier got to materialism, although he always retained a separate sphere for the spiritual. The reference to 'physiologie' recurs in his teaching, however.

In a lecture at Lausanne in February 1924, Le Corbusier includes a sketch of phileban solids and jagged lines, which he labels 'physiologie' (Figure 25). Further on in this lecture he will claim that the effect of the jagged forms of the French alps, as seen from the Northern Swiss shore of lake Geneva, predisposed the people of Montreux, with the view of the 'Dents de Midi' to a taste for the Gothic, whereas he chose a site facing the more classical and modern mont Gramont to locate the house for his parents at Corseaux.¹⁰⁴

102 Amédée Ozenfant and Charles-Édouard Jeanneret, «Sur La Plastique,» *L'Esprit Nouveau* 1 (1920): 38-48, p. 38.

103 Basch, «L'esthétique Nouvelle et la science de l'art.» Basch had just been appointed to a newly created chair at the Sorbonne. His work was part of a movement to investigate the scientific foundations of art.

104 Benton, *Le Corbusier Conférencier*.

The musical analogy

Perhaps the most potent metaphor for the transition from the physical to spiritual worlds was music. In *Modulor I* Le Corbusier attributed to Pythagoras the resolution of the problem of how to establish the relationships between sounds.¹⁰⁵ He did it by combining the evidence of the human ear with the proofs of mathematics. But whereas the ear can detect precisely harmonious and discordant sequences of notes the eye is less sensitised to proportional relationships.¹⁰⁶ The Modulor was supposed to provide visual guidance similar to the Western system of musical notation, ‘... how many of us know that in the visual sphere – in the matter of lengths – our civilizations have not yet come to the stage they have reached in music.’¹⁰⁷

All this makes it surprising that Le Corbusier chose the golden mean rather than a harmonic scale for his system of proportions. There was a great deal of interest in Renaissance theories of harmonic proportion after the war.¹⁰⁸ As Rudolf Wittkower famously argued, Alberti and Palladio favoured proportional systems based on ratios that the human ear can detect, such as the octave (1:1), Fourth (4:3 = 1.333), Fifth (3:2 = 1.5) and Sixth (5:3 = 1.666), as well as the diagonal (1.414) which has practical utility for nesting rectangles.¹⁰⁹ This was the logical conclusion of taking seriously Plato’s *Timaeus* and the theory of the music of the spheres. When describing the proportions of the Villa Stein-de Monzie, Le Corbusier uses the Fibonacci approximations 3-5-8 as if they corresponded to a sequence of the golden mean. In fact 3:5 (1.666) and 5:8 (1.6) are some way off the golden mean (1.618). But both 3:5 (Major Sixth) and 8:5 (Minor Sixth) do have a correspondence with musical harmony. Le Corbusier seems unaware of this.¹¹⁰ Despite his love of music, Le Corbusier’s sensibility was profoundly visual.

It is no accident that Le Corbusier invariably used the word ‘harmoniseur’ for the poet who could bridge opposites and reconcile matter and spirit. With a mother and brother who were musicians and who considered music to be the highest form of art, the young Jeanneret had always tried to refine his musical taste. Furthermore, from his early reading he would have absorbed the teachings of Plato in the *Timaeus*, who considered music to be a record of the harmony of the universe.¹¹¹ Le Corbusier cites Leibniz:

La musique est un exercice d’arithmétique secrète et celui qui s’y livre ignore qu’il manie les nombres.¹¹²

But he preferred a quotation from the seventeenth century composer and theorist Jean-Philippe Rameau:

Ce n’est pas la musique qui est une partie des mathématiques mais au contraire, les sciences qui sont une partie de la musique, car elles sont fondées sur les proportions et la résonance du corps sonore engendre toutes les proportions.¹¹³

Le Corbusier concluded:

L’harmonie régnant sur toutes choses, réglant les choses autour de nos vies, est l’inspiration spontanée, assidue et inlassable de l’homme animé d’une force : le divin, et chargé d’une mission : réaliser sur terre le paradis.¹¹⁴

This is at the basis of le Corbusier’s puzzling references to *acoustique visuelle*. By this he seems to mean an innate capacity to detect by the aural and visual senses a truth and an order beyond rational understanding. The *acoustique visuelle*, the *synthèse des arts majeurs* and the *espace indicible* have occupied many historians and critics and form another chapter.

105 Le Corbusier, *Le Modulor*, p. 16.

106 The belief that the eye can detect proportional relationships such as the golden section and find them pleasant was challenged by a number of researchers in the late 19th and early 20th century (P. H. Schofield, *The Theory of Proportion in Architecture* (Cambridge: Cambridge University Press, 1958), pp. 98-100. Le Corbusier owned a copy of this book, which is critical of the Modulor system.

107 Le Corbusier, *Modulor II*, p. 16.

108 Le Corbusier attended the conference on “Divina Proportione” at the Triennale in Milan in 1951, where he presented his ideas on the Modulor and at which Rudolf Wittkower and Matila Ghyka and others spoke.

109 Rudolf Wittkower, *Architectural Principles in the Age of Humanism* (London: Warburg Institute, 1949). See for an interesting experiment in translating the Modulor into three ‘musical’ series (Zuk, Radoslav. “Three Musical Interpretations of Le Corbusier’s Modulor.” *Nexus Network Journal* 15 (2013): 155-70).

110 Zuk, *Ibid*, p. 159.

111 A favourite topic in the Renaissance, the theme was picked up again, especially after the war.

112 Le Corbusier, *Modulor 2*, p. 6.

113 *Ibid.*, p.76. Jean-Philippe Rameau defined music as the science of sounds : Jean-Philippe Rameau, *Traité de l’harmonie réduite à ses principes naturels... Par M. Rameau* (Paris: J.-B.-C. Ballard, 1722), Book 1, p. 1.

114 Le Corbusier, *Modulor 2*, p. 76.

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Conclusion

Most artists have not written about the sense of wonder they feel when a work of art escapes the materials and processes that constitute it to become extraordinary – I choose the word carefully. Le Corbusier, who wrote about everything, often in embarrassing detail, tried to explain to himself and his readers why he had the gift to create. Part of the answer was his sense of predestination. Another part was his conviction that the life of the prophet and poet must be accompanied by suffering and rejection and that these were both a proof of his vocation as initiate and a constituent part of creation. His dualism allowed him to believe that art belongs to a distinct, spiritual sphere that mortals cannot access directly. He was fascinated by the idea that mathematics and geometry somehow gave direct access to truths behind the wall separating matter and spirit, but he was convinced that only by material means can man break through – looking, listening, touching, feeling. It was human judgment, rather than geometry, that must show the way, but judgment could be confirmed by geometry, just as it could be confirmed by comparison with the great works of the past or the unschooled work of the peasant. He sought explanations for the transformation of matter into spirit in the mysterious miracles of nature – birth, growth, reproduction, brewing and alchemy – and increasingly saw the world as a great machine of cosmic cycles which, if properly understood, could guide the process of creation. The *Poème de l'angle droit* and the *Modulor* books give an insight, among many other writings, into this mentality which was established much earlier in his career.

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