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Le Corbusier and the American Modulor

M. Marni

Dipartimento di Ingegneria Civile Ambientale Architettura, Università di Cagliari

Abstract: *The definition of the Modulor as a set of measurements obtained through “universal” rules for composition of the new architecture has a long and complex development, stemming from a combination of studies in architecture, geometry and mathematics, but also from approximation and intuition. The process began in Paris in 1920, was completed in 1946 in New York and its results were published in an autobiographical vein in 1950 in the book entitled *Le Modulor* completed in 1955 by the book *Le Modulor II*. In his trip to New York in 1946 as French delegate for the project of the United Nations’ headquarters, his urgency to define the Modulor responded to an immediate need: to create a simple tool and a compositional principle to be applied to the United States’ building programme and to UN reconstruction and recovery programs. Unfortunately Le Corbusier did not manage to find a patron in America. He was unable to apply the Modulor in the USA. Not so in Europe, where work started on building the Unités d’habitation in Marseilles.*

Resumen: *La definición del Modulor como un conjunto de medidas obtenidas a través de reglas “universales” para la composición de la nueva arquitectura tiene un largo y complejo desarrollo, derivada de una combinación de estudios de arquitectura, geometría y matemáticas, sino también de aproximación e intuición. El proceso comenzó en París en 1920, se completó en 1946 en Nueva York y sus resultados se publicaron en el libro titulado *Le Modulor* completado en 1955 por el libro *Le Modulor II*. En su viaje a Nueva York en 1946 como delegado francés para el proyecto de la sede para las Naciones Unidas, la urgencia de definir el Modulor respondió a una necesidad inmediata: para crear una instrumento fácil y un principio compositivo que se aplicará al programa de construcción de los Estados Unidos y para los programas de reconstrucción de la ONU. Desafortunadamente Le Corbusier no encontró un patrón en América. No fue capaz de aplicar el Modulor en los EE.UU.. No es así en Europa, donde comenzó a trabajar en la construcción de la Unités d’habitation de Marsella.*

Keywords: *New York; UN Headquarter; Modulor; USA.*

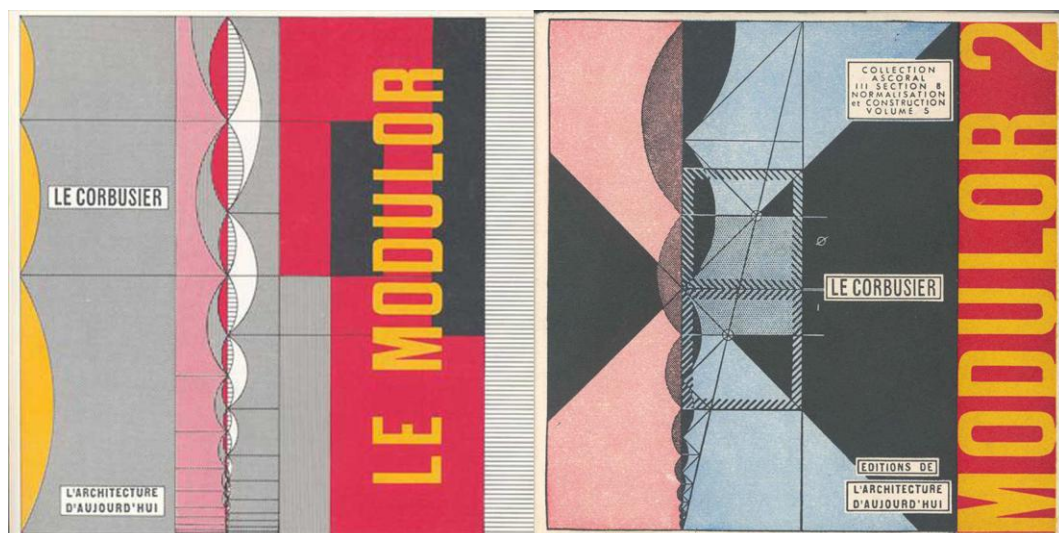
Palabras clave: *New York; Naciones Unidas; Modulor; USA.*

1. Introduction: definitions

Modulor is the term devised in 1946 by Le Corbusier and his assistants at Rue de Sèvres to indicate a new system of measurements for residential buildings and architecture, which came to be formalised at its highest degree of definition by the graded ribbon with the red and blue series (Fig. 1). The word *Modulor* joins together the words “*module*” and “*or*” (gold). A module is a repeatable unit which can be arranged with other units in different ways; the golden module (*Modulor*) is the specific module whose arrangement rule is based on the “golden number” or “golden section” or “Phidias’ constant” or also “divine proportion”. According to Le Corbusier, the *Modulor* is an “Harmonious Measure on the Human Scale Universally Applicable to Architecture and Mechanics”¹. In detail:

¹ Le Corbusier: *Le Modulor*, Éditions l’Architecture d’Aujourd’hui, Boulogne-sur-Seine: Collection ASCORAL, 1950, p. 5. Le Corbusier: *Le Modulor II*, Éditions de l’Architecture d’Aujourd’hui, Boulogne-sur-Seine: Collection ASCORAL, 1955.

- “measure”: these are two mathematical series of measures (the red series and the blue series) providing all the dimensions and points of occupation of space, the measurements of dwellings.
- “harmonious”: the numbers of the series are regulated by a “golden” ratio, generated by the particular Pythagorean geometric proportions yielding a single irrational number $\phi = 0,6180339887498948$, the Phidias’s constant. These are two Fibonacci series where, based on three measurements a, b and c the ratio of the smaller number (a) to the medium number (b) is equal to the ratio of the medium to the whole number (c) ($a:b=b:c$ where $a+b=c$). Introduced by Pythagoras and the Pythagoreans and formalised geometrically by Euclid, the golden ratio is Plato's reference for his “theory of the cosmos” in the *Timaeus*. For Pythagoras and the Pythagoreans the number is the *arché* of all things, because in the world of phenomena quantitative relations remain unchanged and numerical relations express the order of the universe. The myth of Apollo playing the music of the celestial spheres on the lyre is the quintessential expression of the concept of harmony. In the Italian Renaissance, according to Neo-Platonic humanistic concepts, the golden section became a “divine proportion” because it was the only one among the rules on proportion which held together the mystery of the Holy Trinity (the integer and the two parts comprising it) and the irrationality of faith. In the pages of *De divina Proportione* by Luca Pacioli, inspired by the treatises of Piero della Francesca, the golden ratio is held to be the standard of beauty for every artistic and architectural composition²;
- “on the human scale”: these are measures based on the proportions of the human body, based on the height of a man of 1.83 m, equivalent to 6 feet, and used as the reference unit to establish the measures of buildings;
- “applicable universally to architecture and mechanics”: in the ideal of Le Corbusier, these principles may be used indifferently in Paris, Marseilles, Algiers, New York and Chandigarh, and in the same way in cities damaged by war, in the most advanced metropolises and in developing countries.



1. Le Corbusier, covers of the books on the *Modulor*. Le Corbusier: *Le Modulor*; Le Corbusier: *Le Modulor II*.

² Fra' Luca Bartolomeo de Pacioli (1445–1514), Italian mathematician and Franciscan religious. In 1509 he public in Venice *De Divina Proportione*, conceived in 1497 at the Milanese court of Ludovico il Moro, with the famous engravings attributed to Jacopo de Barbari depicting the Platonic solids. Livio, Mario: *La sezione aurea*, Milano: Rizzoli, 2003.

2. The “rule of the right angle” and the “grid of proportions”

The first definition was developed in 1920: the “rule of the right angle” draws inspiration from the studies on the history of architecture of Auguste Choisy, engineer and teacher of the History of Architecture at the Ecole de Ponts et Chaussée. Le Corbusier had in his personal library a copy of the Choisy's *Histoire de l'architecture*, in the 1903 edition³.

From Choisy's texts, Le Corbusier learnt the method of studying Renaissance architecture through the use of “regulating lines”, geometrical constructions and schemes which define the order of the composition of floor plans and façades, also used by Peter Behrens⁴. The analytical principle of the “regulating lines” which made it possible to interpret and understand the main historical buildings, soon became a compositional and design principle: the “*loi de l'angle droit*”. This experience developed in the climate of lively enthusiasm of the *Esprit Nouveau*, opened by the article *Après le Cubisme*, and formed part of the broader process of moving beyond Cubism and embarking in aesthetic and cultural renewal pursued by Charles Edouard Jeanneret with his friend, the painter Amedée Ozenfant, on the *Revue Internationale d'Esthétique* between 1920 and 1925.

The “rule of the right angle” became the geometrical rule and architectural principle of the Purism who partook in the call for a “*retour à l'ordre*” which was launched after World War One by European artists and was later codified by Jean Cocteau in his “*rappel à l'ordre*” of 1926⁵. The “rule of the right angle” is theorised in the pages of the *Esprit Nouveau* in the Article “Tracés régulateurs” of 1921 later republished in *Vers une architecture*⁶ in 1923 and adapted in the chapter “L'angle droit” of the book *La Peinture Moderne* of 1925⁷. It was also applied to post-cubist pictorial studies presented in the art galleries of Paris from 1921 (Fig. 2). Lastly, it was applied to architecture, in the façades (the “public” side of the home) of the “purist” villas designed like avant-garde paintings: the *maison atelier* of Amedée Ozenfant, the Stein de Monzie villa and the *maison galerie* for Swiss banker Raoul La Roche, the greatest supporter and funder of the review (Fig. 3).

In June 1940 the German Army entered Paris: France was to endure Nazi occupation until August 1944. Over this period, the studio of Rue de Sèvres was closed. After his attempts at collaborating with the Vichy government failed, Le Corbusier returned to Paris and focused on study and research to prepare for the reconstruction effort and the need to provide low-cost housing. Thus he studied standardised architectural systems to industrialise building activity.

In 1926, France had established a standard-setting body for the building sector, AFNOR, the French Normalisation Association, under the control of the Ministry of Industry⁸. Le Corbusier was a vehement critic of AFNOR and in 1944 he opposed to it the studies of ASCORAL, the Assembly of builders for architectural renewal, produced by its Section III “Housing Science”, Sector b “Standard-setting and construction”, aimed at

³ Choisy, Auguste: *Histoire de l'Architecture*, Parigi: Baranger, 1903 (FLC Z 077).

⁴ Cohen, Jean-Louis: “Le Corbusier’s Modulor and the Debate on Proportion in France”, in *Architectural Histories*, EHAN, 23, 2014, p. 3. DOI: <http://dx.doi.org/10.5334/ah.by>.

⁵ Cocteau, Jean: *Le rappel à l'ordre*, Paris: Stock, 1926.

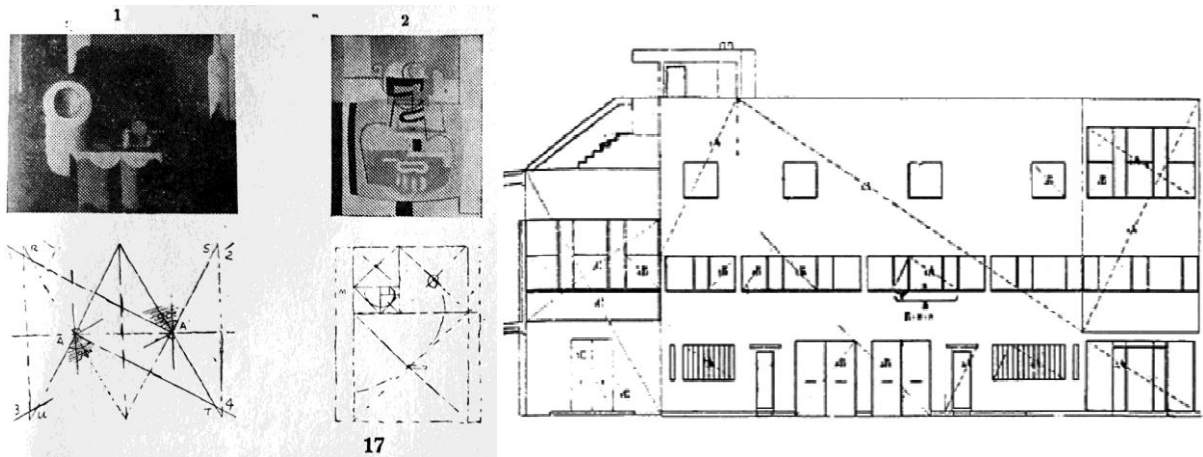
⁶ Le Corbusier: *Vers une architecture*, Paris: Éditions Crès, Collection de "L'Esprit Nouveau", 1923

⁷ Le Corbusier: *La peinture moderne*, Paris: Éditions Crès, Collection de "L'Esprit Nouveau", 1925

⁸ AFNOR: *Association française de normalisation*, the official French member of the International Organization for Standardization (ISO), created in 1926 for the standardization of all sectors of construction, under the tutelage of the Ministry industry.

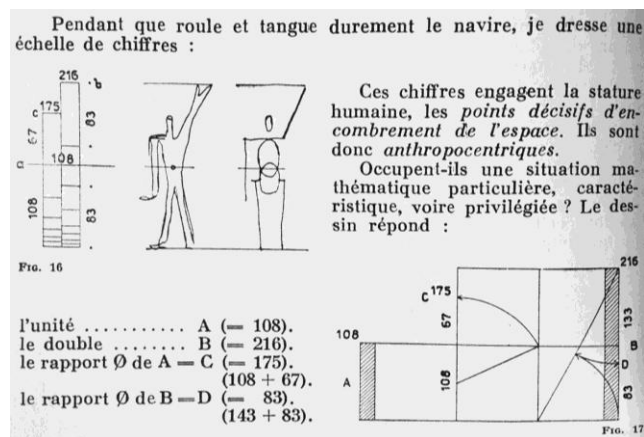
establishing standards and industrial processes in the building sector for reconstruction programmes in France⁹. Following the guidelines given by Le Corbusier, ASCORAL experts Hanning and Maillard formalised a grid using the geometric construction of the golden ratio, the “rule of the right angle”, and using as a reference the man with the raised arm (the maximum vertical space occupied by the human body). He told them: “Prenez l’homme-lebras-levé, 2m 20 de haut; installez-le dans deux carrés superposés de 1 m 10; faites jouer à cheval sur les deux carrés qui doit vous fournir une solution. Le lieu de l’angle droit doit pouvoir vous aider à situer ce troisième carré”¹⁰. The geometric construction provided the following measures: the unit (108 cm) corresponding to the solar plexus; the double (216 cm) corresponding to the man with raised arm; the Φ ratio of the unit (175 cm) corresponding to the top of the head; the Φ ratio of the double (133 cm) which is 83 cm corresponding to the resting hand (Fig. 4).

The “grid of proportions”, approved and appreciated by academia and based on the height of a 1.75 m-tall man, was patented in 1945. But since it was a single, linear one-dimensional rule applicable to several dimensions, it was called the “rule of proportions”.



2. Le Corbusier, regulating lines used on paintings. Le Corbusier: *Le Modulor*, p. 213.

3. Le Corbusier, regulating lines on the facade of Maison La Roche. Le Corbusier: *Vers une architecture*, p. 64.



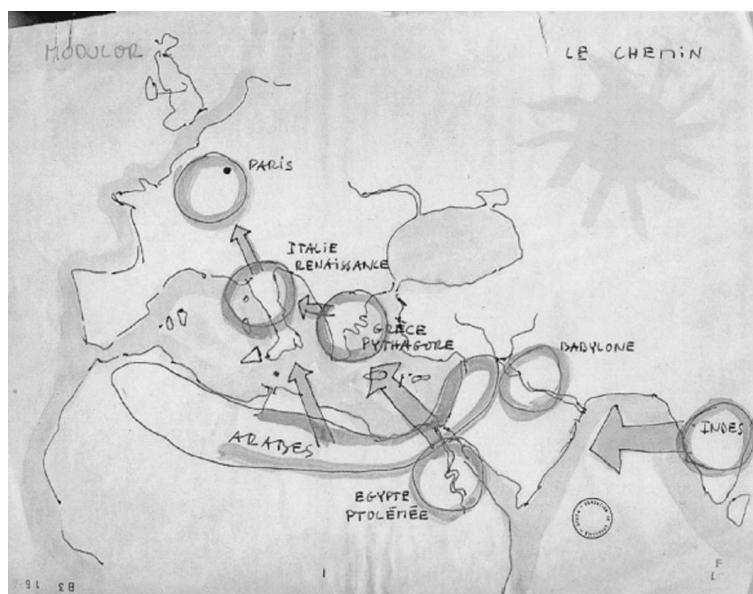
4. Le Corbusier, *Modulor* and geometric diagrams. Le Corbusier: *Le Modulor*, p. 50.

⁹ ASCORAL: *Assemblée de Constructeurs pour une Rénovation Architecturale*, founded in 1942, it consists of 11 sections, including Section III studies the "Science of housing" into three sub-sections a) housing construction; b) standardization and construction; c) industrialization.

¹⁰ Le Corbusier: *Le Modulor*, 1950, p. 37.

3. Modulator and Vitruvian Man

The last definition of the *Modulator* was made in Neo-humanist terms, confirmed by Le Corbusier's knowledge of the Renaissance treatises of Luca Pacioli¹¹. In a drawing of 1948 entitled *Le chemin*¹² (Fig. 5), Le Corbusier reconstructed ideally the cultural origins of the Modulator, which coincide with the path traced along the centuries by the “golden number” as a protagonist of the main civilisations and cultures. The Modulator is set in a definitively universal and meta-historical dimension, imagined by Le Corbusier in a path which goes from India, through Babylon and Ptolemaic Egypt, Pythagorean Greece and the Italian Renaissance, becoming universal in Paris: the Pythagoreans formalised it, Plato made philosophical use of it, for his theory of the cosmos, the Humanists and Neoplatonists recovered it and took it as the unit of reference for artistic and architectural beauty. Le Corbusier studied these notions from the texts: *Esthétique des proportions dans la nature et dans les Arts* and *Le nombre d'or. Rites et Rythmes Pythagoriciens dans le développement de la civilisation occidentale* of mathematician Matila Ghyka, a subscriber to the review *l'Esprit Nouveau*¹³. With that drawing, Le Corbusier claimed direct descent of his *Modulator* from the mathematical and, above all from the cultural principles of those civilisations: the magnificence and sciences of the ancient Near East and Egypt, the classic era of democratic Athens, with the architectures of Pericles' Acropolis and Phidias, and the Humanism of the architectural principles of Alberti and Palladio¹⁴. Similarly to Leonardo's universal man during the Renaissance (Fig. 6), after World War Two the *Modulator* became the Neo-humanist matrix of postwar reconstruction and peace, hence a universally applicable principle¹⁵ (Fig. 7).



5. Le Corbusier, *Modulator Le chemin* (FLC B3-16 36, ©FLC-ADAGP).

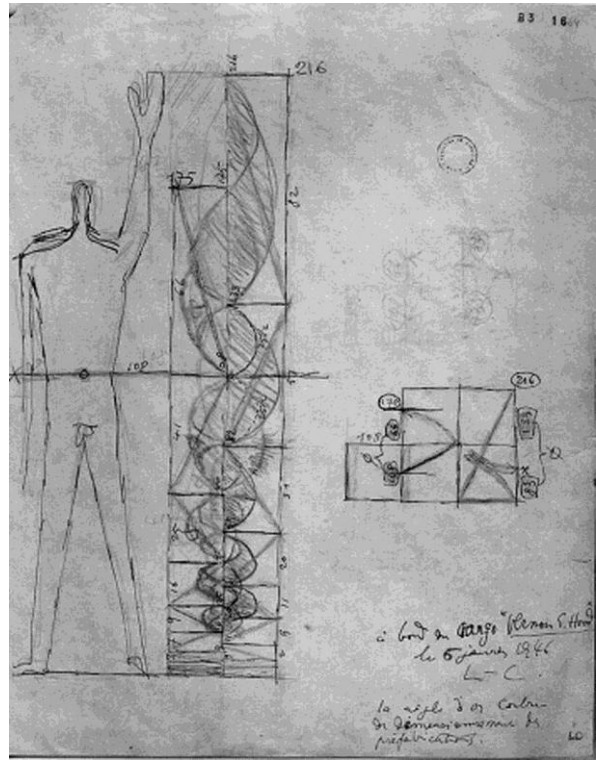
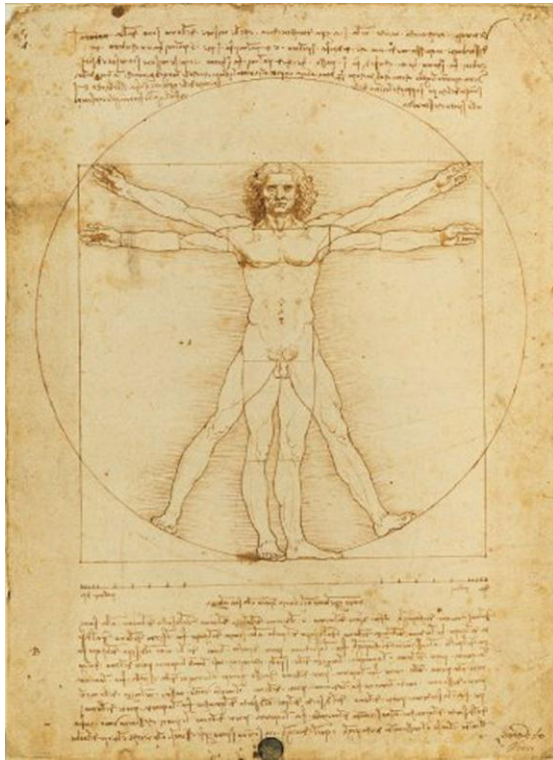
¹¹ Fonti, Alessandro: *Lessons of History of Architecture*, School of Architecture, University of Sassari, 2006, unpublished. Mameli, Maddalena: *Le Corbusier e Costantino Nivola. New York 1946-1953*, Milano: FrancoAngeli, 2012, pp. 117-121.

¹² Le Corbusier, *Le Chemin*, (FLC B3-16 36).

¹³ Ghyka, Matila: *Esthétique des proportions dans la nature et dans les Arts*, Paris: Gallimard, 1927 (FLC Z 010) e Ghyka, Matila: *Le nombre d'or. Rites et Rythmes Pythagoriciens dans le développement de la civilisation occidentale*, Paris: Gallimard, 1931 (FLC Z 047). Cohen: “Le Corbusier’s Modulator and the Debate on Proportion in France”, pp. 3-5.

¹⁴ Wittkower, Rudolf: *Architectural Principles in the Age of Humanism*, London, 1949.

¹⁵ Fonti: *Lessons of History of Architecture*, 2006.



6. Leonardo da Vinci, Vitruvian Man.

7. Le Corbusier, *Modulor* and geometric diagrams (FLC B3-16 84, ©FLC-ADAGP).

4. Modulor in NY

In the summer of 1945, definition of the *Modulor* gained strong momentum when the Ministry of Reconstruction tasked Le Corbusier with studying with total freedom, free from the constraints of building rules, an exemplary housing model for the middle class, the project for a *Unité d'habitation de grandeur conforme* for 1600 people “the first manifestation of a modern habitat”¹⁶ in Marseille on Boulevard Jules-Michelet, between 1946 and 1952. Then the *Modulor* system was experimented personally in the ‘petit atelier’ he built inside his Parisian office at 35 Rue de Sèvres as a cube using the 2.26 meter measurement; and in the *Petit Cabanon* in Cap-Martin on the French Riviera: “Application révélatrice. Il s’agit d’une chambre de 366 x 366 cm e di 226 cm de haut. Préfabriqué à Ajaccio (Corse) et monté à sec”¹⁷.

January 1946, during his 19-day trip to New York, on the 'Liberty' cargo ship *Vernon S. Hood* of the US Army, which had sailed from Le Havre on 22 December: “*Vernon S.-Hood Liberty Ship janvier 1946. C’est dans cette cabine de Cargo via New York que j’ai inventé le signe Modulor*”¹⁸ (Fig. 8). As reported by Le Corbusier: “*je dis à Claudius Petit qui m’accompagnait: “Je ne sortirais pas de ce sacré bateau sans avoir trouvé l’explication de ma règle d’or”. Un passager amiable parla avec les officiers: la cabine de l’un d’eux fut mise à sa disposition chaque matin, de 8 à 12 heures et le soir, de 20 heures à minuit. C’est là que je m’absorbai dans le tumulte des houles, à coudre quelques idées les unes à la suite des autres. J’avais dans ma poche le ruban*

¹⁶ Boesiger, Willy: *Le Corbusier, Œuvre Complète*, vol. 5, 1946-1952, Zurich: Edition d’architecture, 1953, p. 189.

¹⁷ Boesiger: *Le Corbusier, Œuvre Complète*, vol. 5, 1946-1952, p. 62.

¹⁸ Le Corbusier: *Carnet D13 Vernon S.-Hood Liberty Ship janvier 1946* (FLC W1-1 804); Jornod, Naima; Jean-Paul Jornod: *Le Corbusier. Catalogue raisonné de l’œuvre peint. I*, Milan: Skira, 2005, p. 171; Le Corbusier: *Carnets*, vol. I, 1914-48, Paris: Herscher, Dessain & Tolra, 1981, n° 792, n° 804.

gradu  par Soltan, enroul  dans une petite bo te en aluminium de film Kodak; cette bo te n'a pas quitt  ma poche depuis (...) Au retour   Paris, en f vrier,   latelier de la rue de S vres, je confiais   Pr veral le soin de le mettre en ordre les meditations di "Veron S. Hood". Les n cessit s du langage r clamaient un nom pour d signer la r gle d'or. Entre plusieurs vocables, celui de MODULOR fut choisi"¹⁹ (Fig. 9).

In December 1945 Le Corbusier had been appointed Head of the Mission for Urban Planning, Architecture and Cultural Relations and had been sent by the French Government to the United States together with Eug ne Claudius-Petit, to study the US institutions and promote French culture and technique²⁰. The United States was the ideal environment for promoting architectural and urban development theories and implement projects "Les Etats-Unis,   l'avant-garde du progr s industriel, sont   meme de donner l'impulsion n cessaire au depart de l'action constructive (...) la qualit  des techniciens am ricains et la pouissance de leur outillage les rendent aptes   provoquer cette initiative"²¹.

A few months later, in February 1946, Le Corbusier was appointed by the French Minister of Foreign Affairs and by the Minister of Reconstruction and Urban Planning representing France to the International Committee made up of architects of Member Countries for the design and construction of the United Nations' Headquarters²². For 12 months, between 1946 and 1947, he was in New York "to defend modern architecture on an occasion of global importance"²³. He was a member of the International Committee for the Design of the UN Headquarters, but most importantly he wanted to propose a universal program of global urban planning and architectural reconstruction through the American section of CIAM (*American Chapter for Relief and Post War Planning Inc.*) as the official UN body²⁴ (Fig. 10). The aim of the *American Chapter* was to coordinate the activities of the national CIAM groups by disseminating the *Charter of Reconstruction Principles* thanks to its know-how in advanced technology sectors with the support of major US agencies and institutions²⁵.

Given the global scope of Le Corbusier's project, we can appreciate the significance of the trip to the United States in the process of defining the *Modulor*. The need to translate the proposed measures into feet and inches led him to change the reference measures. Transferring the French *Modulor* to the US measurement system was not easy, because the translation into US units of measurements yielded a complex decimal number (1.75 m = 5.7414509794 feet). Le Corbusier reported: "N cessit   tait donc de rechercher des valeurs enti res en pied-pouce (...) Nous essayons d'appliquer cet  talon: six pieds = 6 x 30,48 = 182,88 centim tres. A notre enchantement, les graduations d'un nouveau "Modulor" sur base d'un homme de six piedsse traduisent sous nos yeux, pour les pieds pouces, en chiffres pleins   tous les  chelons!"²⁶.

¹⁹ Le Corbusier: *Le Modulor*, 1950, p. 55.

²⁰ CIAM: *Urbanisme des CIAM, ASCORAL, Programme d'enquete en USA relative au domaine bati*, 7 January 1945; CIAM: *Mission d'Architectes et d'Urbanistes fran aises aux Etats-Unis organis e par la Direction G n rale des Relations Culturelles au service du Minist re des Affaires Etrang res*, Paris, 1945 (FLC D1-13 1).

²¹ CIAM Document (FLC U3-19 2).

²² Le Corbusier: *UN Headquarter*, New York: Reinhold, 1947; Dudley, George: *A workshop for peace: Designing the United Nations Headquarter*, New York: The Architectural History Foundation, Cambridge, MA: The MIT Press, 1994; Bacon, Mardges: *Le Corbusier in America. Travels in the Land of Timid*, Cambridge: The MIT Press, 2001.

²³ Le Corbusier: *Memorandum de Le Corbusier relative   la creation des plans du Siege des Nations Unies   New York   l'attention de MM les Delegates de l'U.N.   l'Assembl e Generale de 1948* (FLC I3-11 1-8).

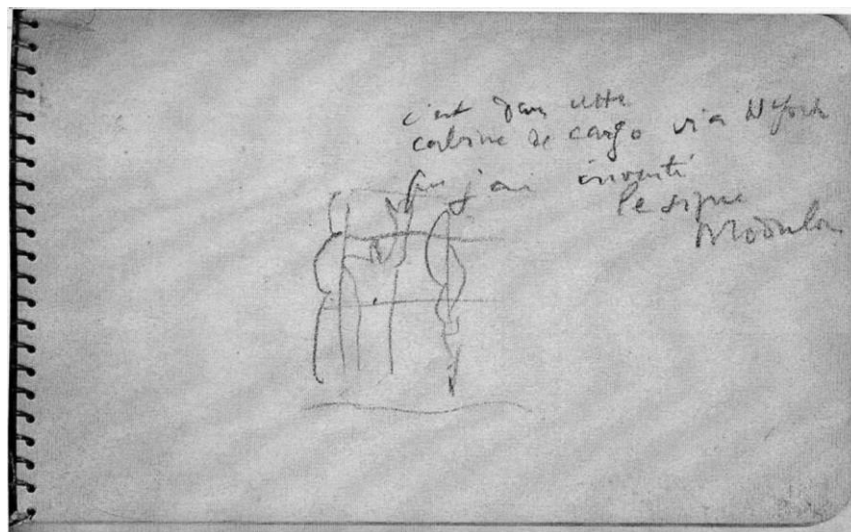
²⁴ Giedion, Sigfried: *letter to Le Corbusier and report of CIAM in US*, 4 January 1945 (FLC D2-15 41); Mumford, Eric: *The CIAM Discourse on Urbanism, 1928-1960*, Cambridge Mass: The MIT Press, 2000, pp. 142-152; Mameli: *Le Corbusier e Costantino Nivola. New York 1946-1953*, 2012, pp. 15-28.

²⁵ CIAM: *Document New York*, 13 March 1946 (FLC U3-19 82-85).

²⁶ Le Corbusier: *Le Modulor*, 1950, p. 56.

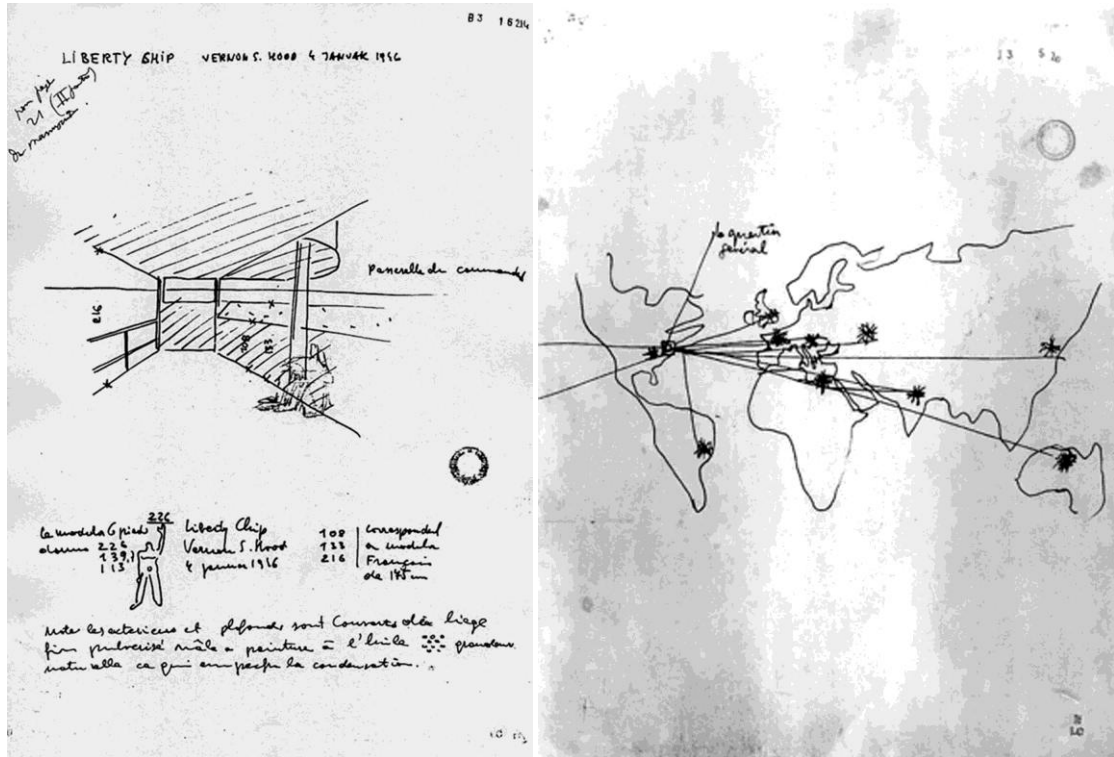
The European decimal metric system, “universal unit of measurement” the child of the French revolution had its match in the US foot-inch system – anthropometric by definition and derived from the ancient measurement systems – with the unit of 6 feet, with satisfactory approximation and a very small error. Le Corbusier ascribed to one of his assistants the definition of the new universal measure, which suggested to change the French unit of 1.75 m just as “dans les romans policiers anglais ou les “beaux hommes” – un policier par exemple – ont toujours SIX PIEDS de haut?”²⁷.

Consequently, the reference measure of the *Modulor* becomes 1.83 m, ensuring definitively universal applicability of the system. The new geometric construction provides the measures characterising the occupation of space: the unit (113 cm) corresponding to the height of the solar plexus; double this length (226 cm) corresponding to the man with raised arm; the Φ ratio of the unit (183 cm) corresponding to the top of the head; the Φ ratio of the double measure (140 cm) which is 86 cm corresponding to the resting hand.



8. Le Corbusier, sketches on *Modulor* (FLC W1-1 804, ©FLC-ADAGP).

²⁷ Le Corbusier: *Le Modulor*, 1950, p. 56.



9. Le Corbusier, *Liberty ship Vernon S. Hood*, French and American *Modulor* (FLC B3-16 214, ©FLC-ADAGP).
 10. Le Corbusier, *The UN International Program* (FLC J3-5 20, ©FLC-ADAGP).

5. Standardisation and Industrialisation

Thus, the urgency of defining the *Modulor* stemmed from essentially practical reasons: to formalise a simple tool and compositional principle to be applied to the extensive building programme of the US and UN, with the aim of transforming the whole traditional construction process, joining the Fordist logic of large-scale capitalism with the activities of large builders.

John Dale, Chair of Charles Hardy, Inc. in New York, introduced to Le Corbusier by André Jaoul, wished to produce and promote the MODULOR as a tool for architects, which they could keep at their drawing table together with the compass, in the form of a kit comprising a metal or plastic tape (Fig. 11) measuring 2.26 m in length, a numerical table and a booklet with instructions and combinations. He also endeavoured to find possible investors for an industrialised building programme.

At the same time, Henry John Kaiser too, the enlightened builder of the *Liberty* ships (the cargo ships produced in series for the American fleet and for the military supply programme to the UK) was planning to convert war production into the industrial construction of single-family houses in mass-production mode²⁸. Le Corbusier wrote: “Sortant de mon cargo le 10 janvier 1946 à New York, j’avais une entrevue avec M. Kaiser, le constructeur célèbre des Liberty-ships pendant la guerre. Son nouveau programme est de construire 10.000 maisons par jour aux Etats-Unis”²⁹. Le Corbusier also contacted the great American public agencies: he

²⁸ Between 1941 and 1945 the US built 2751 Liberty ships, according to a single design. Mitchell, William Harry: *The Liberty Ships*, Cambridge, Md: Cornell Maritime Press, 1970.

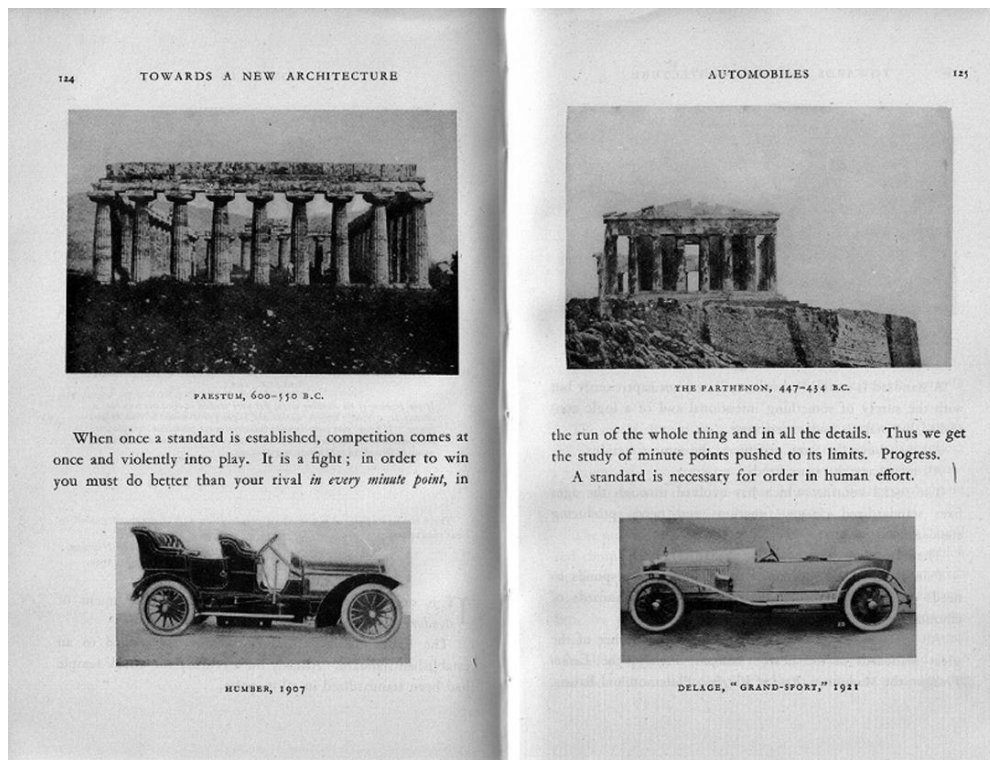
²⁹ Le Corbusier: *Le Modulor*, 1950, p. 52.

attempted to establish contacts with the politicians in Washington and with the administrators of the Tennessee Valley Authority, who had planned the whole economy of the Tennessee valley, building dams and new cities.

Le Corbusier had already addressed the problem of standardisation in his *Esprit Nouveau*. In his *Vers une architecture*, he quoted Frederick Engels' motto "Architecture or Revolution" and referred to the socialist utopia of creating cities where scientific and technical progress coincides with civil and social advancement, through the development of social and affordable housing on the basis of a low-cost standardised and industrialised design, applying advanced technologies. The issues of techniques and standards are key: airplanes, steamships and cars but especially the Parthenon were referenced as symbols of the need to set standards to produce the best architecture (Fig. 12). In the following years, the advances in the use of reinforced concrete and the projects for the *Maison Domino*, *Maison Citrohan* ad *Immeubles Villas* would make it possible to dream of the *Ville Radieuse*. The *Modulor*, the anthropometric human system by definition, was considered the "golden rule"³⁰ for the sizing of new, prefabricated buildings in the new urban quarters, as it met the need to join the industrialised and standardised production process with the "human" dimension.



11. The measuring tape of the *Modulor*. Maddalena Mameli Archives.



12. Le Corbusier, the concept of standard from greek temple to cars. Le Corbusier: *Vers une architecture*, pp. 106-7.

³⁰ Le Corbusier: *Carnet*, "La règle d'or Corbu de dimensionnement de préfabrifications" (FLC B3-16 64).

6. Disappointments and conclusions

Unfortunately John Kaiser changed its investment programmes and decided to focus on car manufacturing, TVA was not interested in the *Modulor* and new developments but especially the UN and Rockefeller chose Wallace Harrison as designer of the UN's Headquarters. At the same time, the CIAM's *American Chapter* failed to win approval of their “global plan” for reconstruction and planning on a world scale.

Le Corbusier did not, in the end, find an American sponsor. The *Modulor* and its standardised system for the industrialisation of the building sector and its universal principles of harmony found no application in the USA and in the UN's programmes, even though the design of the UN's Headquarters uses the measures of the red and blue harmonic series (Fig. 13-14).

Le Corbusier expressed the depth of his disappointment: “*En pays d’U.S.A. voué à la série, j’aurais aimé apporter la sécurité de l’illimitée variété, telle que semble l’assurer notre règle harmonique*”³¹. His disappointment was also witnessed by his friend and pupil Costantino Nivola, who hosted him during his stay: “*The truth is that Le Corbusier came to New York prompted by the same spirit that compelled Renaissance masters to go to Rome or Milan, to offer their artistic services to the era’s princes. But the great modern master of architecture, painting and sculpture did not find the Sforza family, the Medicis or the pope in New York. His disappointment compelled him to reconsider many of his previous premises, but not without beneficial conclusions*”³² and “*The United Nations became known as ‘the United Nations of America’*”³³.

In Europe, building works started on the *Unité d’habitation* in Marseilles: the cement modelled by the architectural order of the *Modulor*, by the timber formwork and by the trowel of Salvatore Bertocchi, acquired the noble quality of stone in its most material and primitive expressiveness. With the rules of the *Modulor*, Le Corbusier's modernity revealed its Neoclassical imprint, just as the aesthetics of *béton brut*, which becomes part and parcel of reinforced concrete architecture, becomes primitive and poetic³⁴ (Fig. 15).

A great opportunity Le Corbusier had to present the rules and possibilities of the *Modulor* in detail to a wide audience, was the conference for the Milan Triennial of 1951 during the *International Congress on Proportions in the Arts* focused on the Divine Proportion³⁵, attended, among others, by Matila Ghyka – who was still publishing works on proportions, rhythm and the golden ratio – and Rudolf Wittkower – who two years earlier had published his *Architectural Principles in the Age of Humanism*. But two years later in 1953 at Aix en Provence, the group, which would later call itself Team X, was formed and thus started the end of CIAM³⁶. The history of the *Modulor*, which had begun with the “rule of the right angle” after journeys and decades would end in the ineffability of the *Poème de l’Angle Droit*³⁷ (Fig. 16).

³¹ Le Corbusier: *Le Modulor*, 1950, p. 54.

³² Nivola, Costantino: *Ho bussato alle porte di questa città meravigliosa*, Cagliari: Arte Duchamp, 1993, p. 76.

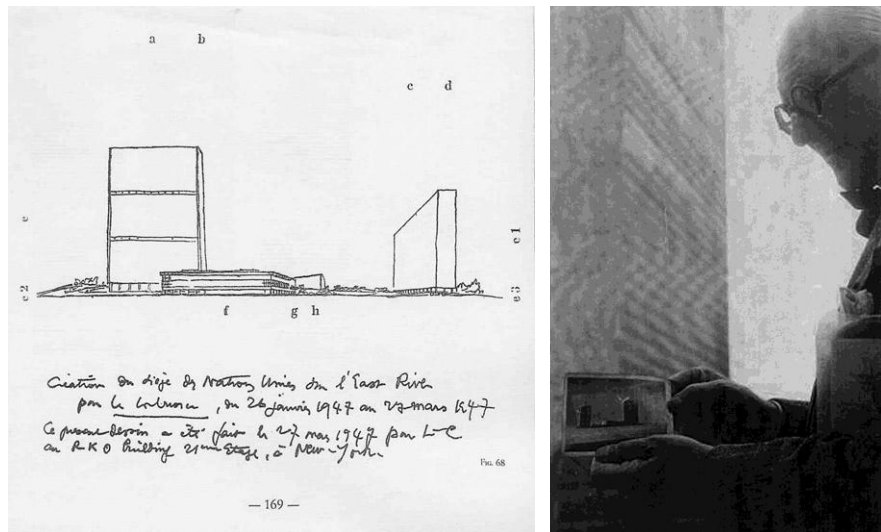
³³ Nivola, Costantino: “Le Corbusier in New York. A memoir by Costantino Nivola”, in Ingersoll, Richard: *Le Corbusier: A Marriage of Contours*, New York: Princeton Architectural Press, 1990, p. 6.

³⁴ Mameli, Maddalena: “Le Corbusier et la pratique du sand-casting”, in Sbriglio, Jacques: *Le Corbusier et la question du brutalisme*, Marseille: Parenthèse, 2013.

³⁵ Caronia, Salvatore: “Impressioni sul primo Congresso Internazionale sulle Proporzioni nelle Arti”, in *L’ingegnere*, Milano: Edizione Istituto propaganda Internazionale, Dicembre 1951 (FLC F1-18 195).

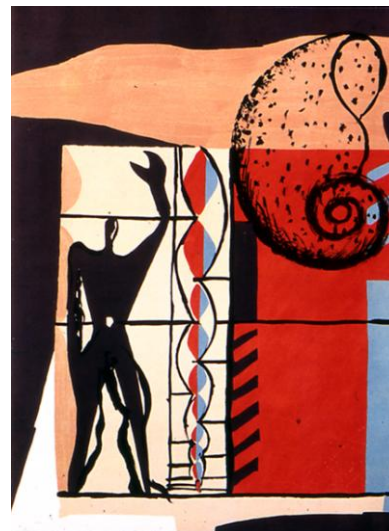
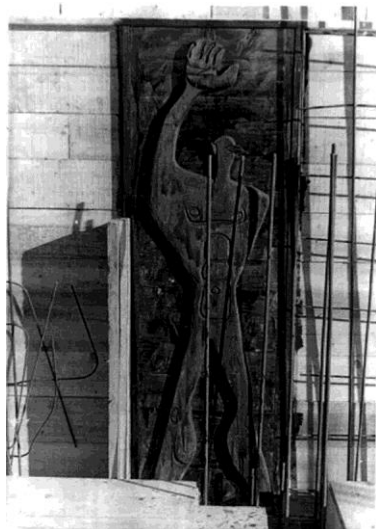
³⁶ Mumford: *The CIAM Discourse on Urbanism, 1928-1960*, pp. 225-240.

³⁷ Le Corbusier: *Poème de l’Angle Droit*, Paris: Éditions Tériade, 1955.



13. Le Corbusier, sketch of UN headquarter project. Le Corbusier: *Le Modulor*, p. 169.

14. Le Corbusier and the UN Headquarter, (FLC L4-4 37, ©FLC-ADAGP)



15. The formwork of the entrance wall of the *Unité d'habitation* in Marseille (FLC L1-14 152, ©FLC-ADAGP)

16. Le Corbusier, Modulor in the *Poème de l'angle droit*. Le Corbusier: *Le Poème de l'angle droit*, p. 28.

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