

Arquitectura Energia e Clima.

Fundamentos para o desenho da *Casa Bem-temperada*

[Aula 06] *Desenho Passivo. Le Corbusier a 18°*

INTRODUÇÃO



Cromeleque dos Almendres (Neolítico, 6º/4º milénio a.c.)

Local de reunião das comunidades agro-pastoris para comemoração os grandes ciclos da natureza. Localização numa encosta suave, debruçada sobre o horizonte nascente alentejano, e a orientação equinocial, parecem confirmar uma relação intencional com a movimentação cíclica do sol e da Lua.

"L'architecture est le jeu savant correct et magnifique des volumes assemblés sous la lumière"

Le Corbusier, in *Vers une architecture*, 1920

"Architecture is the will of the epoch translated into space"

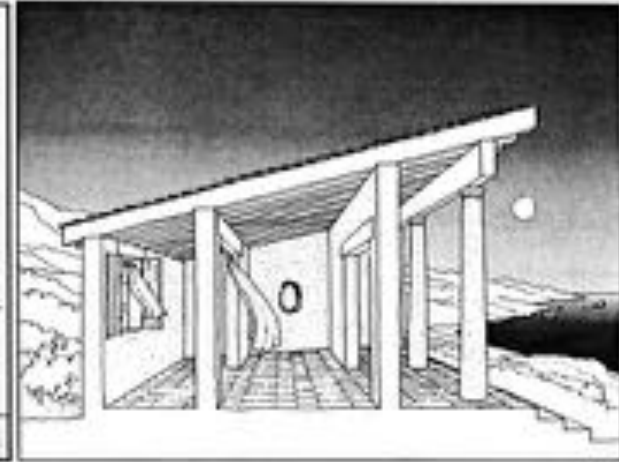
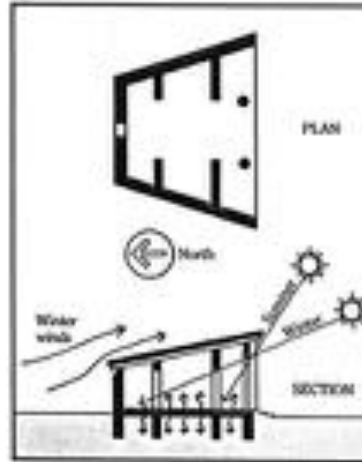
Mies van der Rohe, in *Architecture and the times*, 1924

(Traduzido por Philip Johnson do texto alemão "Der Querschnitt". Museum of Modern Art. New York, NY: 1947)

ENERGIA SOLAR PASSIVA

Sistemas de transformação de potenciais energéticos existentes procedentes de fontes naturais de energia para aquecimento/arrefecimento de edifícios através de medidas projectuais, sem recurso essencial a tecnologia ativa.

DESENHO SOLAR PASSIVO



ΞΕΝΟΦΩΝΤΟΣ ΑΠΟΜΝΗΜΟΝΕΥΜΑΤΩΝ
ΒΙΒΛΙΑ Δ'.

XENOPHON'S

MEMORABILIA OF SOKRATES,

Translated from the Text

or

RAPHAEL KÜHNER.

WITH NOTES AND PROLEGOMENA.

BY

GEORGE B. WHEELER, A.B.

Ex. Scd. Trin. Coll. Dub.

LONDON:

WILLIAM ALLAN, 13, PATERNOSTER ROW.

MDCCLXVII.

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THE MEMORABILIA.

hunger,* is bad for a fever; and that which is good for a fever, is bad for hunger; and frequently beauty, as respects swiftness in the race is a blemish with respect to wrestling, and beauty as regards wrestling is a blemish as regards swiftness: for all things are good and beautiful, in reference to their being admirably constituted: and evil and hideous, in reference to their being badly constituted.

8. And when he said, that those houses which were beautiful, were also useful, he appeared to me to teach us, what sort of houses we should build. He reasoned on the matter thus. Pray, if a man is likely to have a house such as it ought to be, ought he not to plan this, how it might be most useful, and most pleasant to live in? When this was acknowledged, he said: Is it not pleasant that it should be cold in summer, and pleasant that it should be warm in winter?

9. And when they used† to assent to this, he asked, In houses that face the south, does not the sun in winter time shine into the piazzas,‡ while in summer, proceeding over our heads, and above the roof, it affords a shade? Therefore, if it be right that this should be so, should we not build them more lofty towards the south, that the winter sun should not be debarred, but the portions towards the north we should build lower, that the cold winds might not blow upon it strongly?

10. But to speak briefly, where the owner§ during all seasons would most pleasantly retreat, and most safely store up his property, that would naturally be the pleasantest and most beautiful abode: but paintings and

* τὸ . . . λιμοῦ ἀγαθόν, Scil. "food" as τὸ περιττὸ ἀγνόησθαι is "abstinence."

† Kühner considers by the use of the optative that Xenophon wished to indicate the constant habit of Sokrates in speaking of the construction of dwellings, &c.

‡ πρὸς ἄνατον, Schneider thinks the πᾶσαξ or περισυλάξ of the later Greeks to be the same as the Homeric αἰθούσα.

§ ἀντόξ, i. e. dominus, domus possessor.

BOOK III.—CHAP. VIII. § 10.

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frescoes* deprive one of more pleasurable content than they afford. For temples and altars he said, the most becoming place was that which might be most open to view,† and free from the very tread of men. For it was pleasant to pray the moment one beheld it, and pleasant too to approach it in perfect purity.‡

* Various interpretations have been given of the words γυψοῖσι καὶ πικραλίαι.—1. γυψοῖσι ὄψα πικραλίαι γραμμῶν, ut ex historia aut mythologia. πικραλίαι, autem minoris artis picturae, ut flores, vel simplicis coloris inductio.—WEISKE.

2. "πικραλίαι, opus intestinum, lacunarum, et ornamenta similia."—SCHNEIDER.

3. "πικραλίαι intelligenda esse censeo ornamenta parietibus illis, que πικραλίαι dicta in ocion. ix. 2."—HERMANN.

† Altars and temples, but more particularly the latter, were usually surrounded by a circuit wall (περιβόλιον), the area included within which was usually thickly planted with trees and shrubs. Sokrates disapproves of this manner, since he wished the place to be ἑμπροσθενῶν, fully exposed to view, as if the worshippers could thus fancy they saw the deity before them, and could address him as if present. "Alii ex Vitruvio l. 7, intelligent locum excelsum, quod æque defendi potest."—KÜHNER.

‡ ἀγνός ἕστρατος, Weiske interprets by "pedibus non pulverulentis aut sordidulis." Schütz, much better, thinks that the words have reference to the fact, "si via, que ad templum ducit, parum frequens sit, facilius adituri ab omni piculo puros se servare possint."

MEGARON- arquetipo da casa passiva, segundo Sócrates (c. 450 a.c)

Grille climatique, Chandigarh, India, 1950 – 1965

Le Corbusier

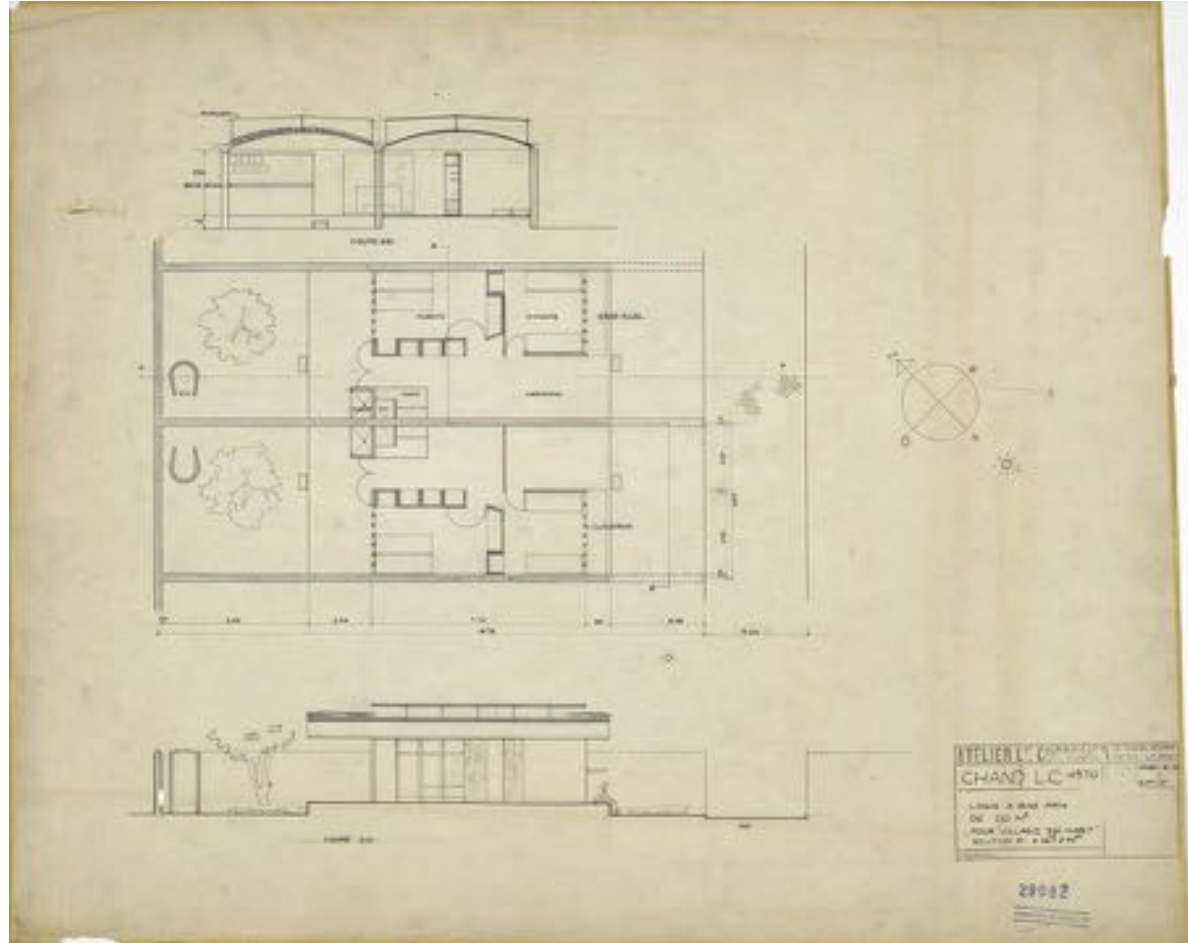
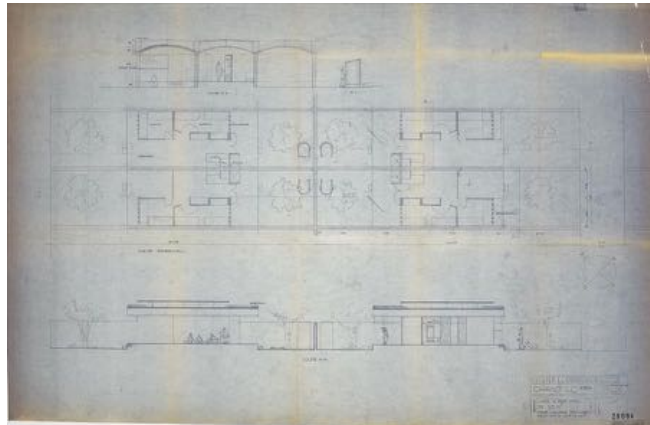
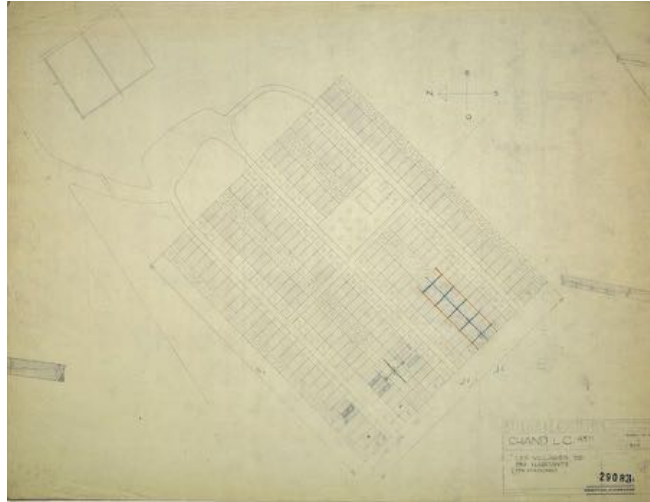
- I. The Grid is a graphical means of presentation which permits the enumeration, coordination and analysis of the climatic conditions of a place (defined by its latitude) in order to direct architectural research towards solutions in accord with the human biological makeup.
- II. It deals with the rectification and setting in order of the excesses of extreme climates in order to achieve, by means of architectural dispositions, conditions capable of assuring comfort and well-being.
- III. The Grid will be formed by 4 horizontal bands furnishing the environmental conditions. These bands will then be cut by verticals designating the time. Along its length, the Grid will be made in three panels, each having the same format.

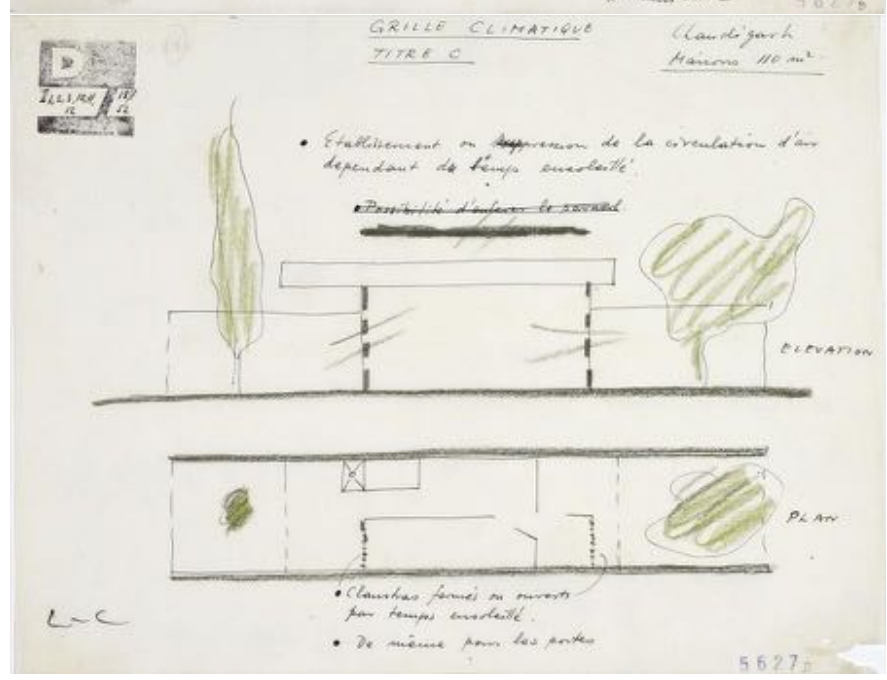
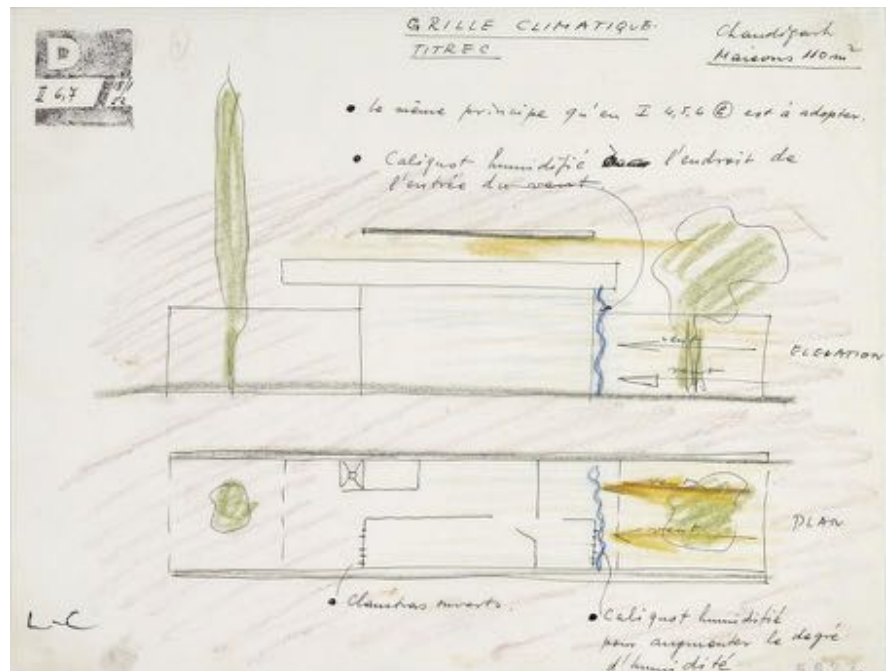
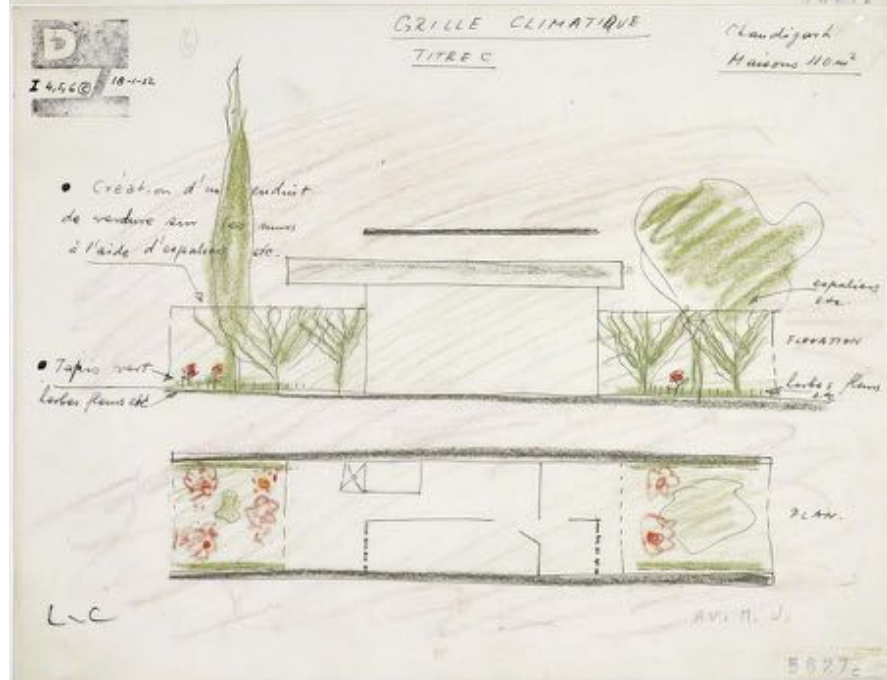
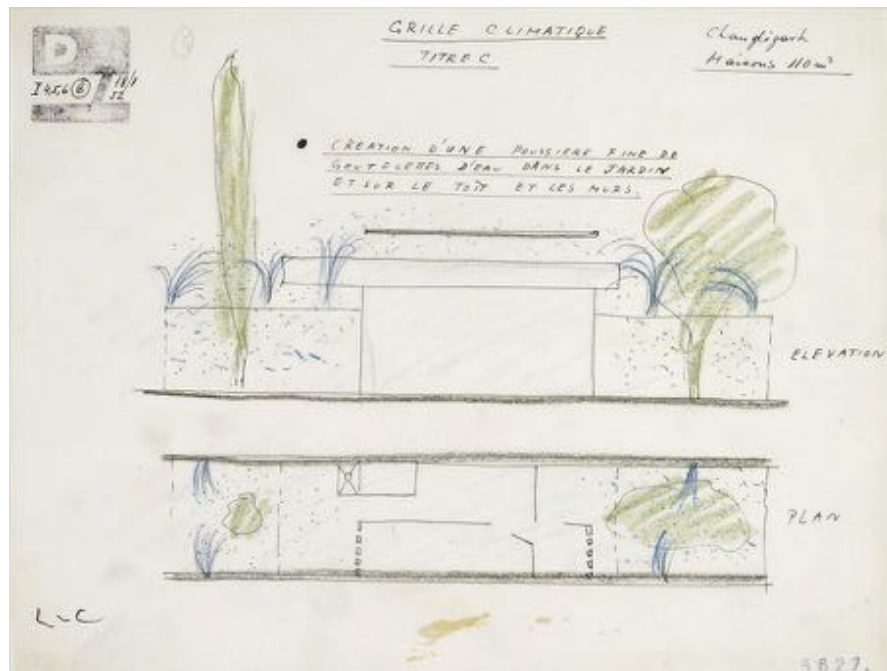
The panels will demonstrate the following :

A = Environmental conditions;

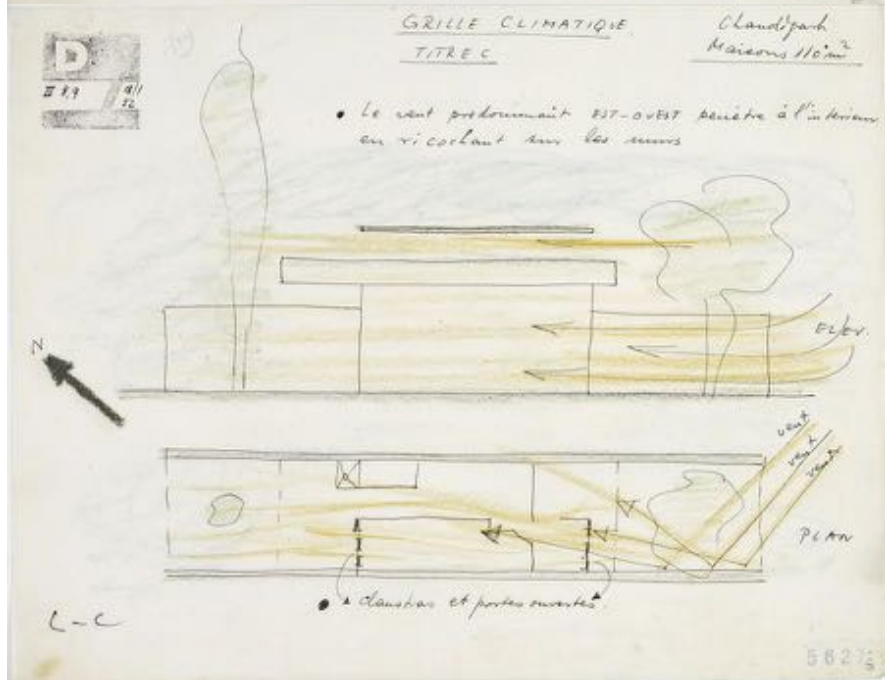
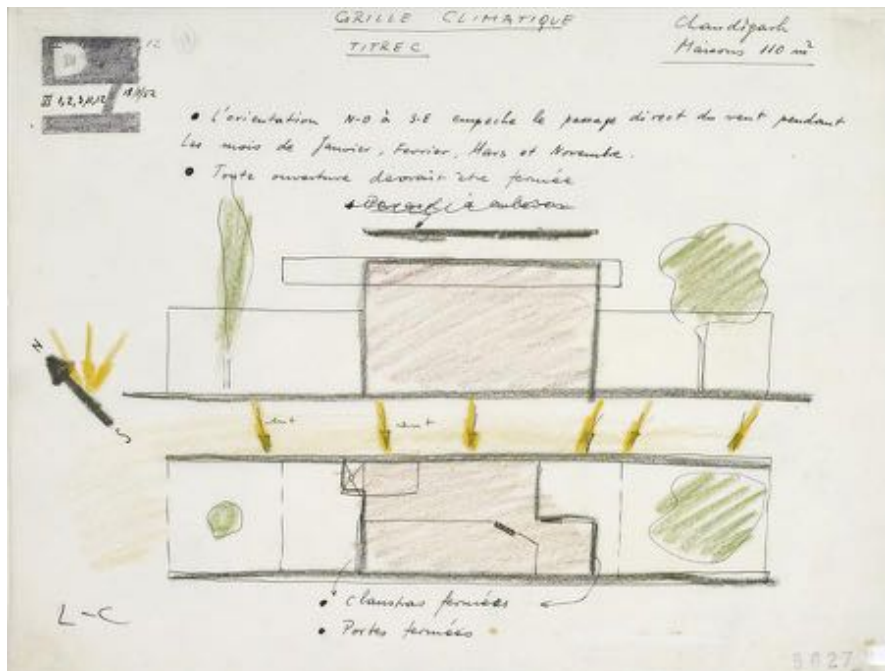
B = Corrections from the standpoint of comfort and well-being;

C = Architectural solutions.



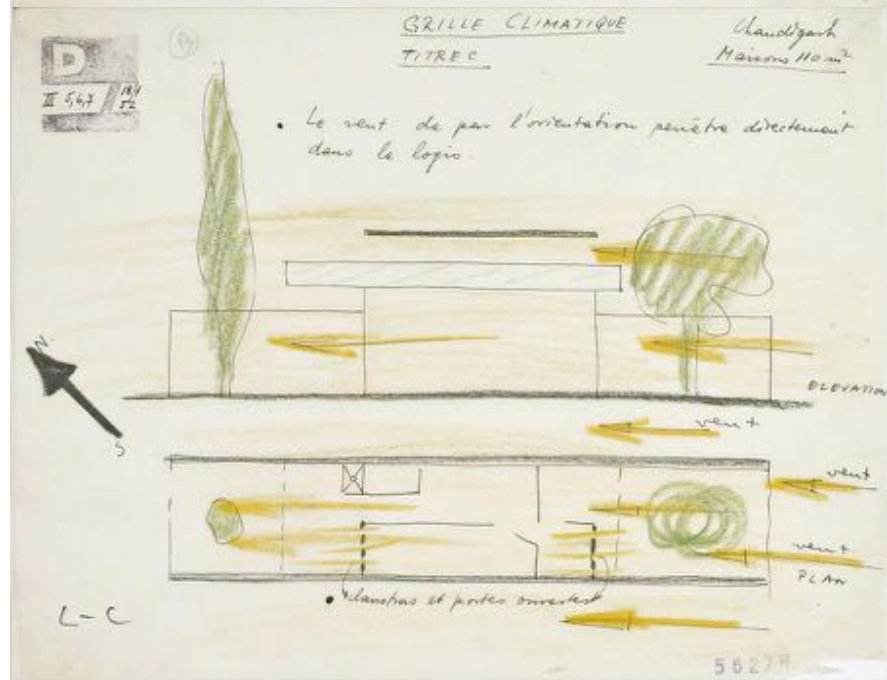
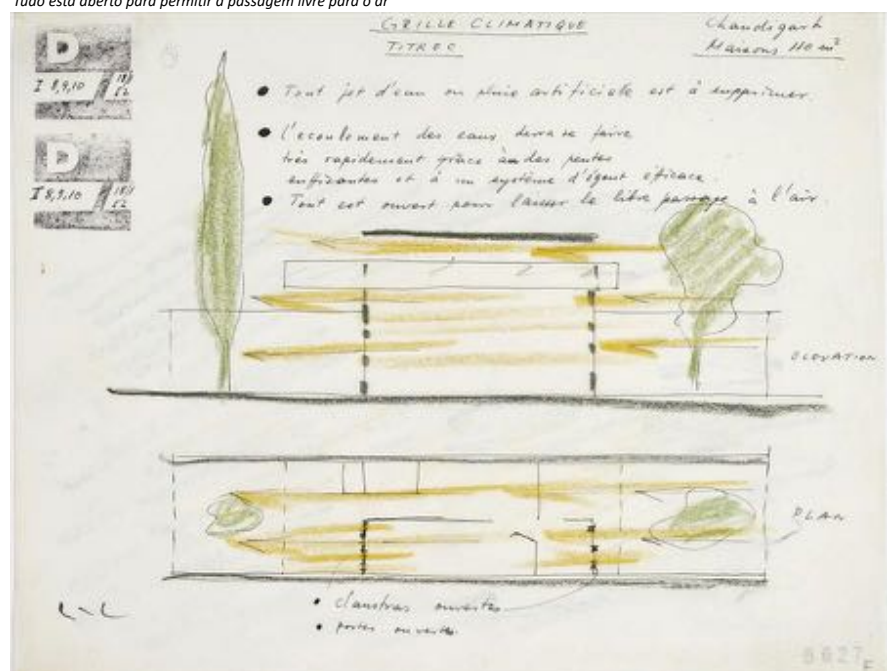


A orientação NO - SE impede a passagem directa do vento durante os meses de Janeiro, Fevereiro, Março e Novembro;
 Todas as aberturas devem ser fechadas

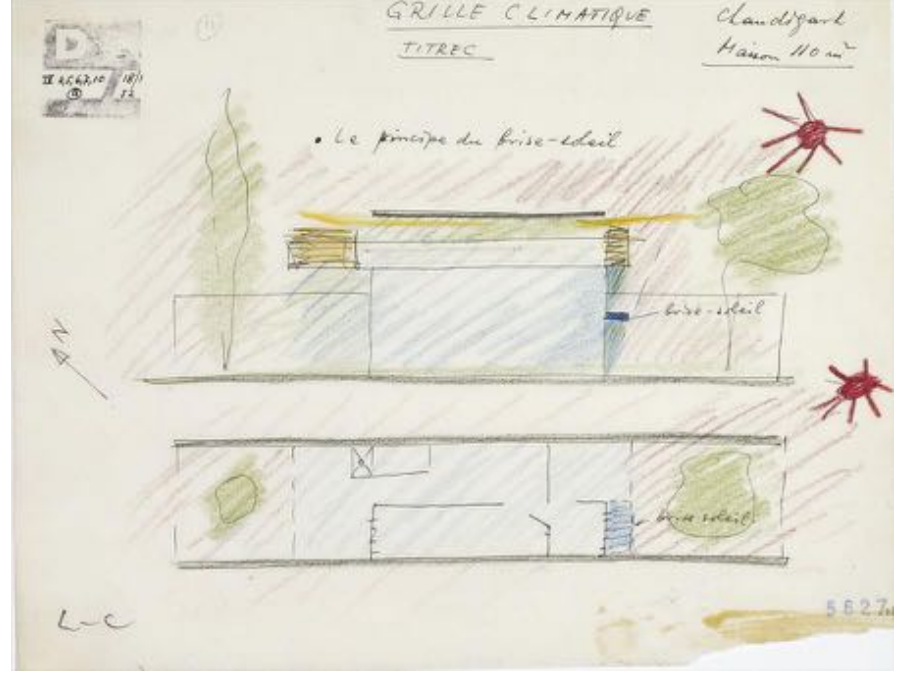
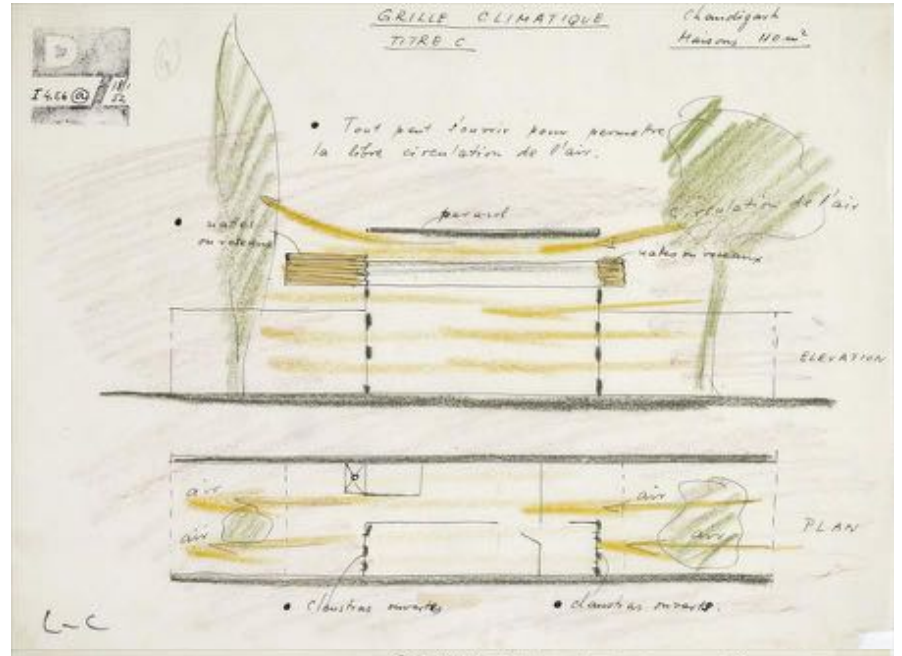
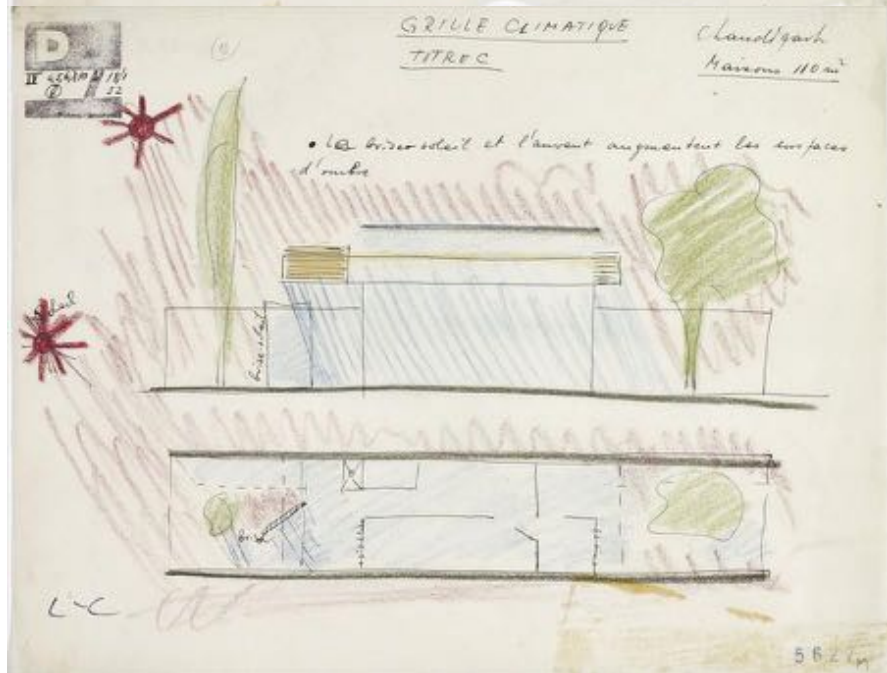
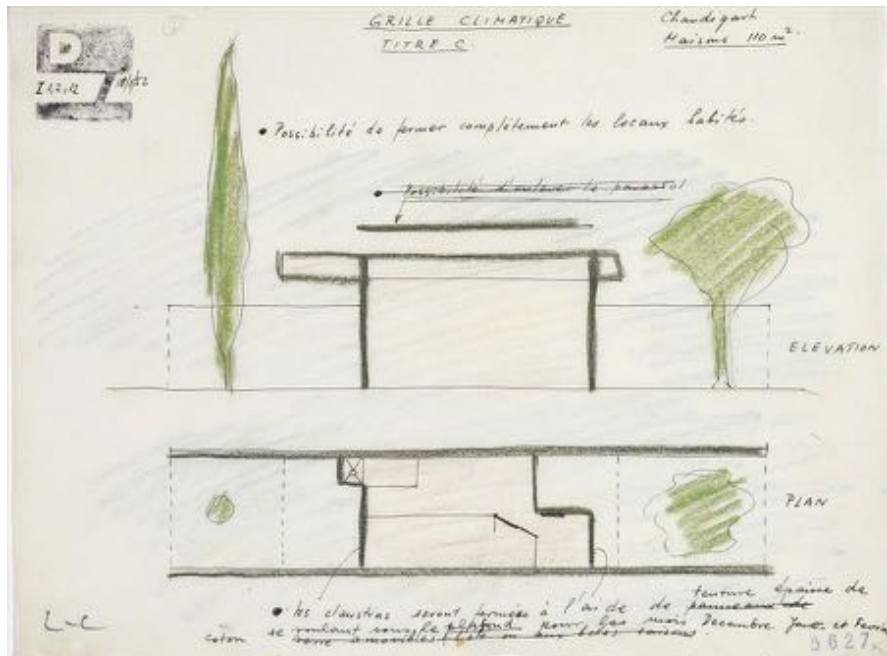


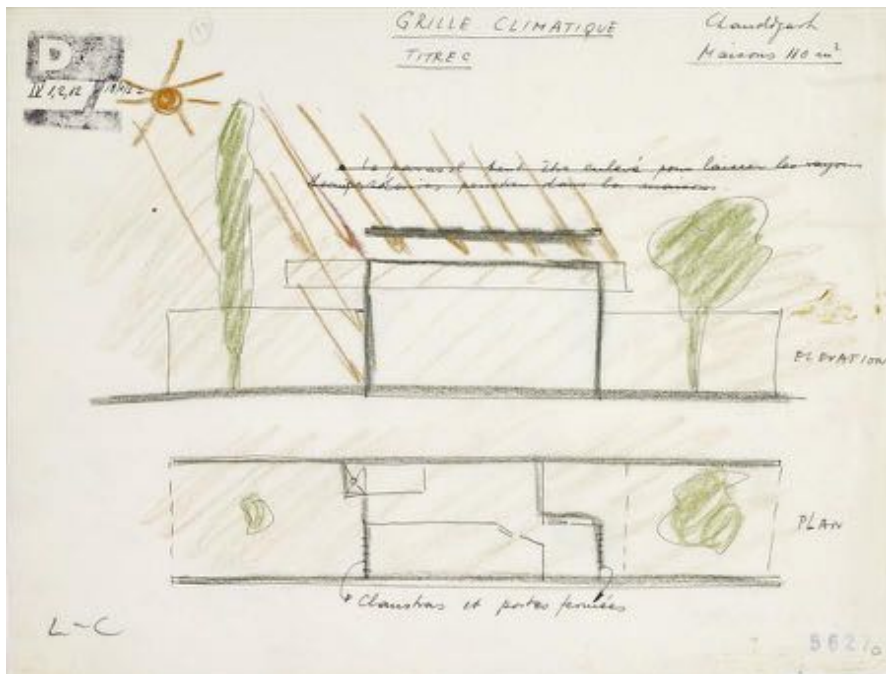
O vento predominante EST-OEST penetra o interior fazendo ricochete nos muros

O fluxo de água ou chuva artificial devem ser encerrado;
 A recolha de água deve ser feita muito rapidamente devido a declives suficientes e um sistema de drenagem eficiente;
 Tudo está aberto para permitir a passagem livre para o ar

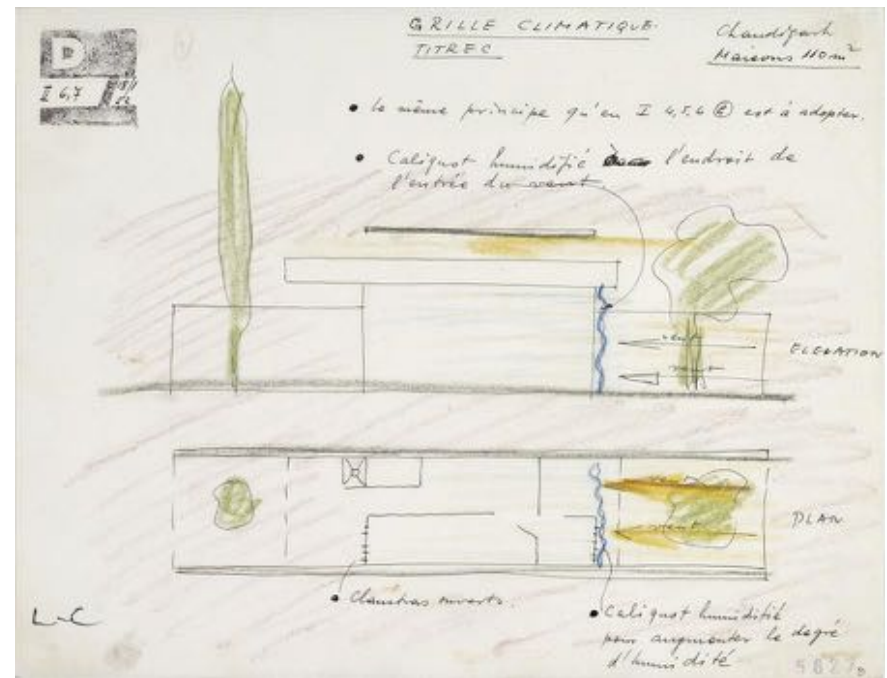


O vento orientado penetra directamente nas habitações

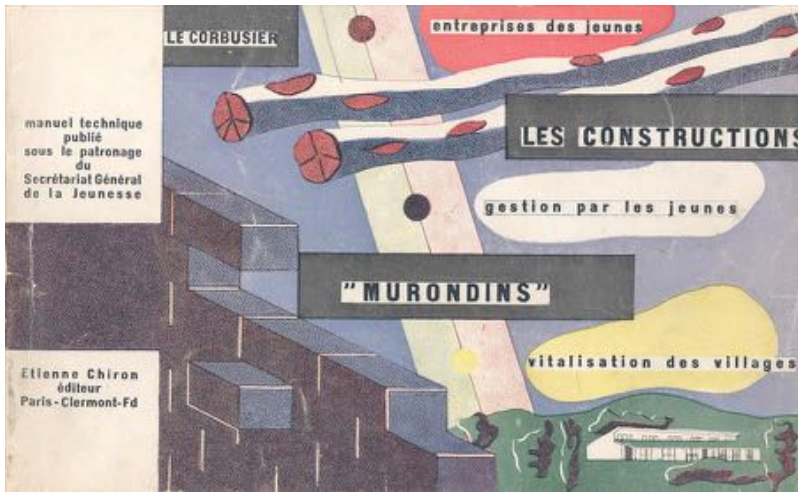




(o guarda sol deve ser removido para permitir que os raios solares entrem na casa)



O mesmo princípio que em I 4,5,6 deve ser adoptado
Tecido humedecido colocado na entrada do vento



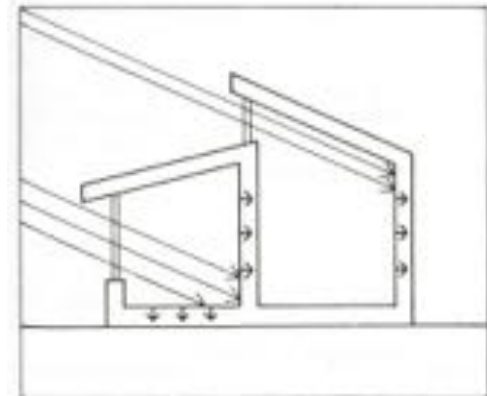
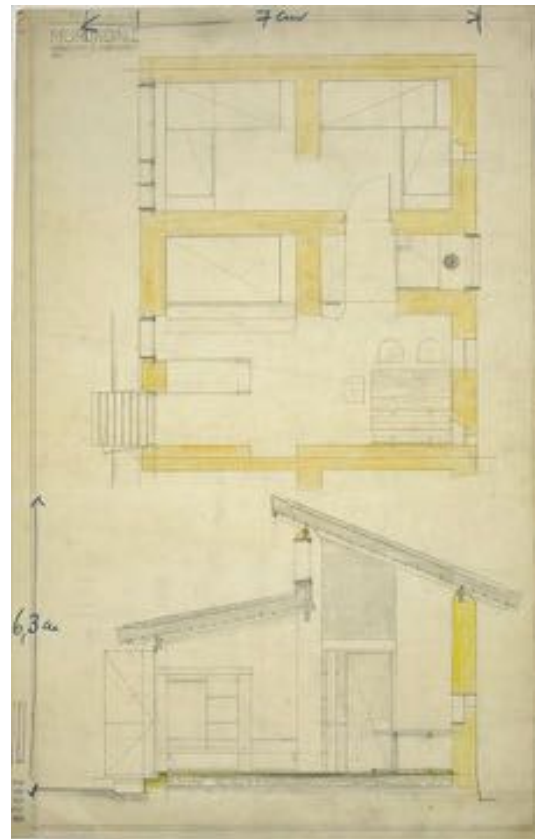
Les Constructions "Murondins", LE CORBUSIER, 1942

Ce livre Les Maisons "Murondins" est un petit cadeau à ses amis, les Jeunes de France, par Le Corbusier.

Résumé :

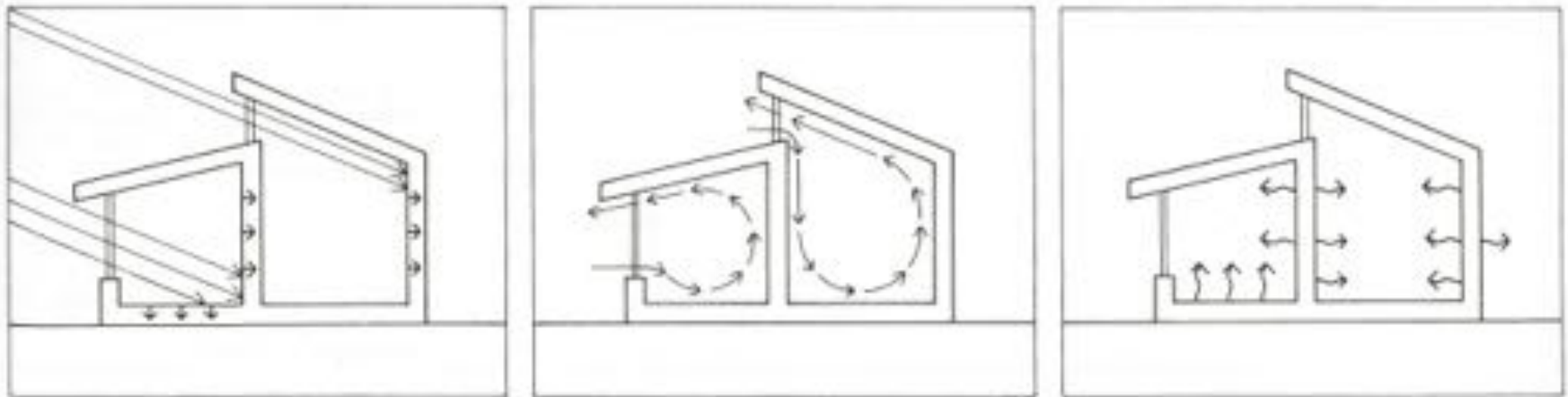
Les grandes épreuves sont venues: l'exode de mai/juin 1940! On a senti, à ce moment, qu'on ne pourrait plus fabriquer à temps utiles, en atelier, et transporter aux lieux prescrits, des abris nécessaires; et, devant cette situation sans espoir, d'un coup, la solution est apparue, comme l'œuf de Colomb: l'abri doit être construit sur place, par les usagers mêmes, avec des matériaux non ouvrés trouvés sur place: de la terre, du sable, des bois de forêt, des branches, des fagots, des mottes de gazon ...

Et notre abri s'est trouvé baptisé: "Murondins", c'est-à-dire: des murs et des rondins!



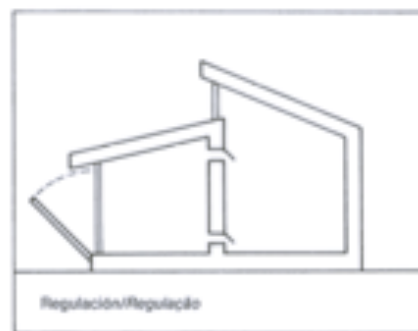
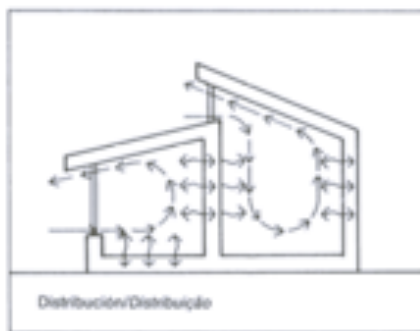
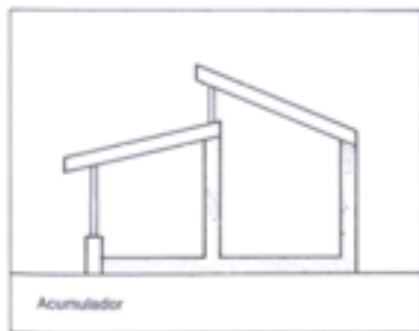
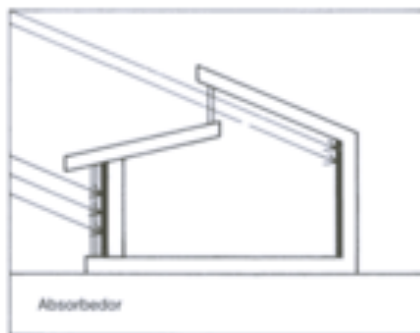
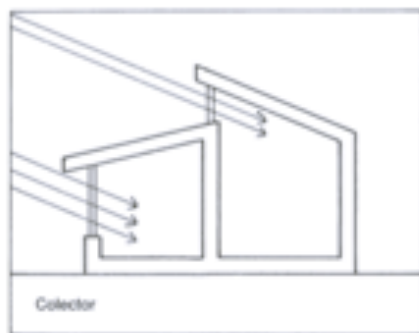
Modos fundamentais de transmissão calorífica:

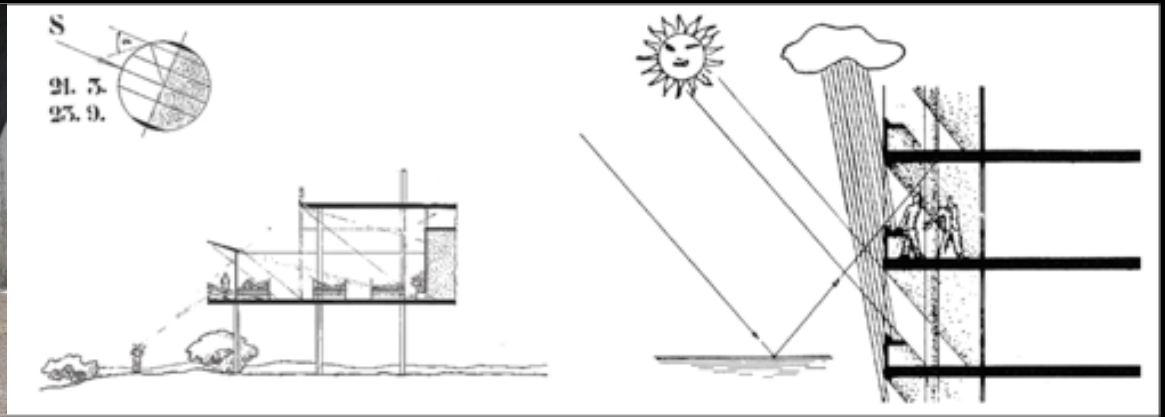
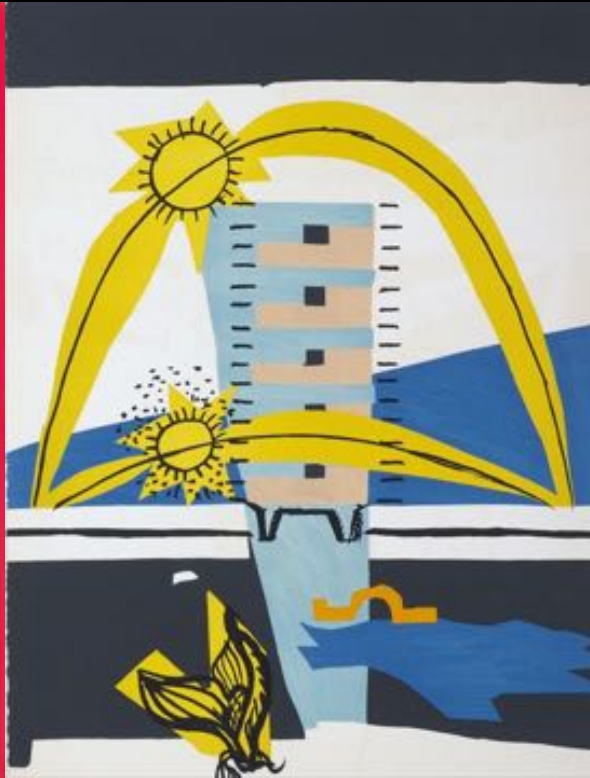
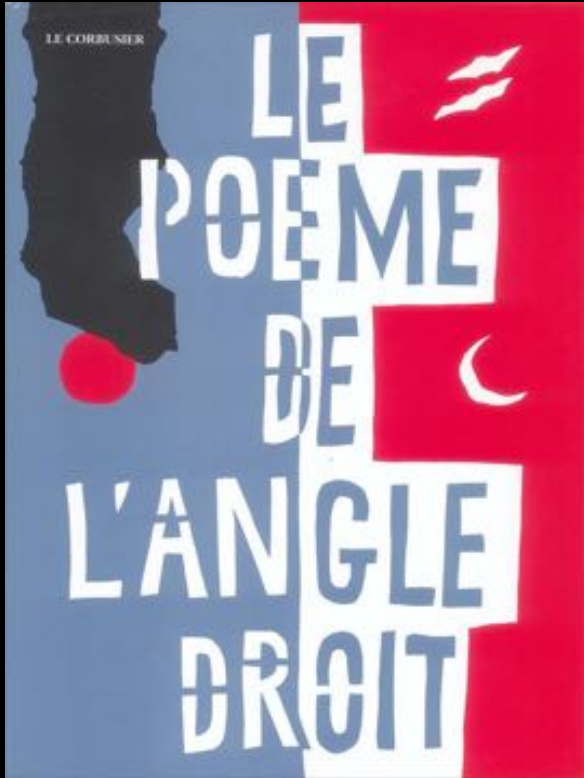
1. **Condução** : quando uma matéria absorve radiações solares estas transformam-se em energia calorífica. Processo físico em que o calor se transmite na matéria
2. **Convecção**: quando uma matéria transmite calor desde a sua superfície às moléculas dum meio vizinho líquido ou gasoso. Neste processo o calor move-se desde o nível energético mais alto ao mais baixo – quente para frio.
3. **Radiação**: transmissão de calor com irradiação infra-vermelha de amplitude longa e com nível energético mais baixo que a radiação solar. Depende da temperatura de superfície do corpo aquecido.



Modos fundamentais de aquecimento:

1. Colector
2. Absorbedor
3. Acumulador
4. Distribuição (convecção/ condução/ irradiação)
5. Regulação





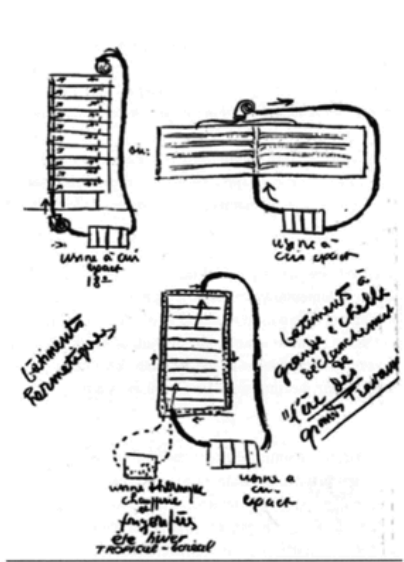
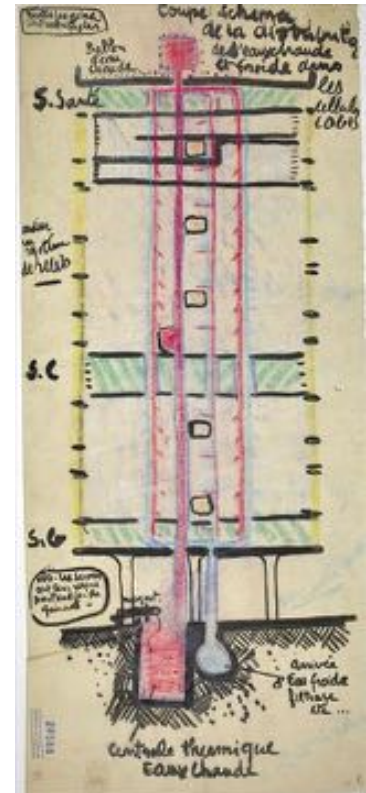
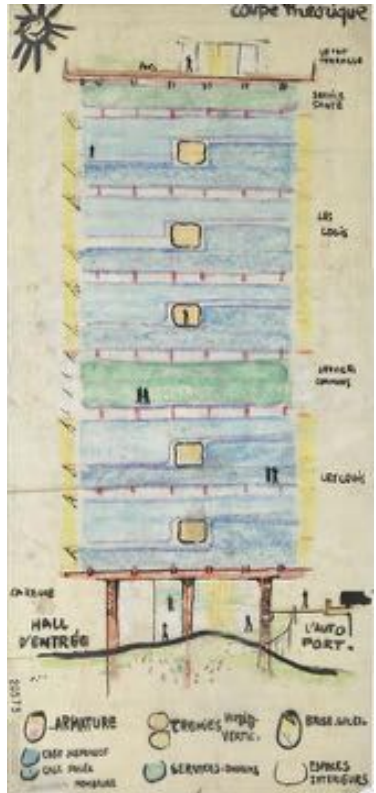
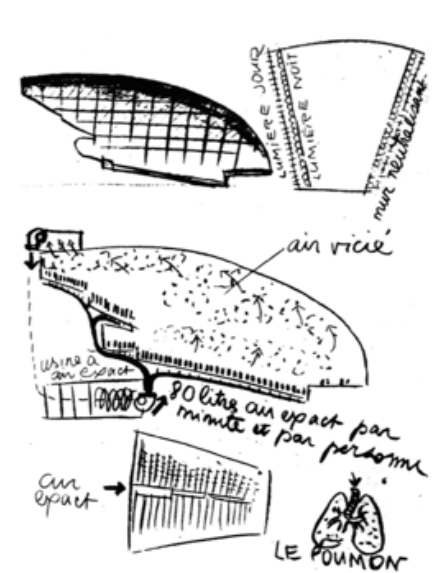
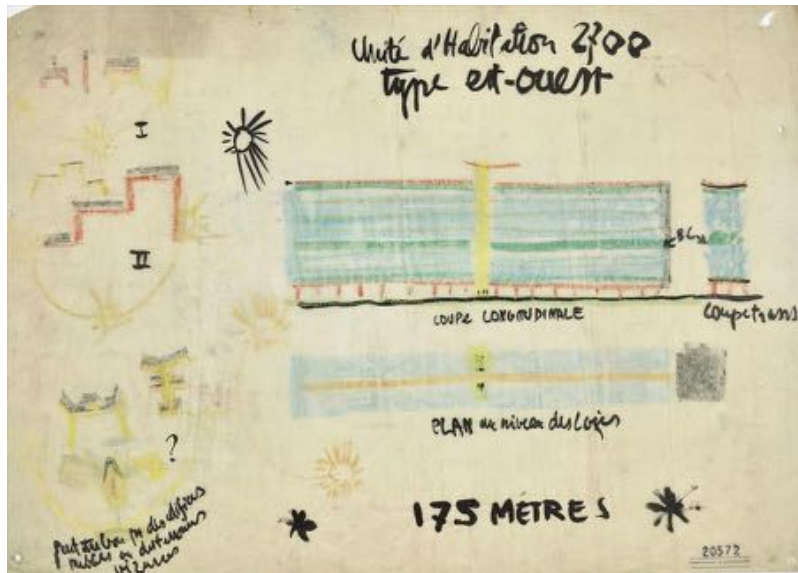


Figure 4. Respiration Exacte: sketches by Le Corbusier illustrating the two air circuits for thermal comfort and ventilation, published in Précisions (Paris: Éditions Crès, 1930). © FLC/ADAGP, Paris and DACS, London 2012.

IN, "Pierre, revoir tout le système fenêtres": Le Corbusier and the development of glazing and air-conditioning technology with the Mur Neutralisant (1928-1933). Rosa Urbano Gutiérrez

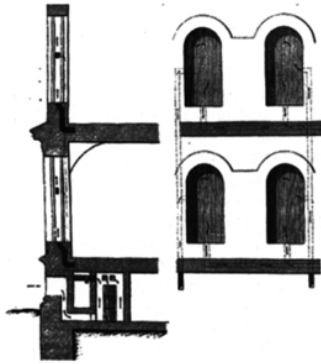


Figure 3. Hot-air heating system for warming the double-windows in the Winter Palace in Saint Petersburg, 1883. Drawing published in *Nouvelles Annales de la Construction* (Paris, 1883-4).

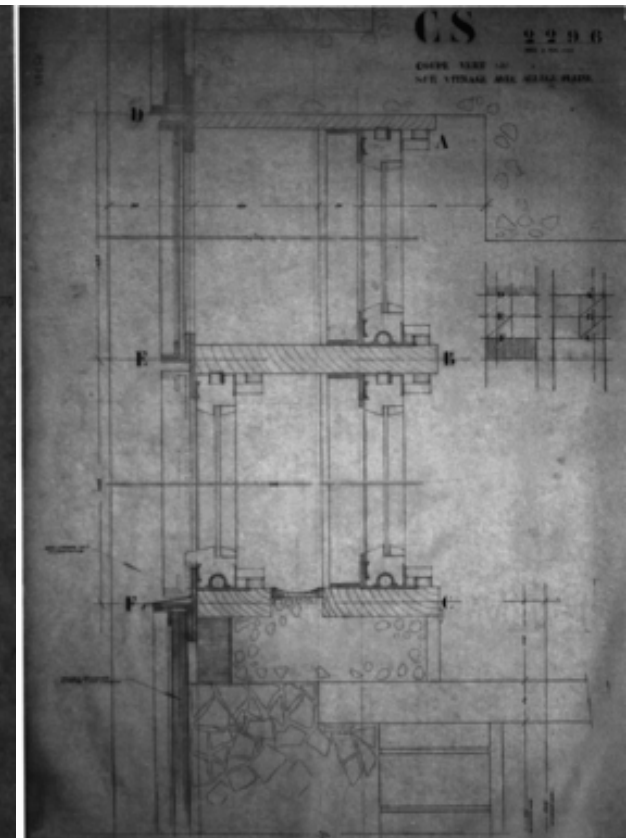
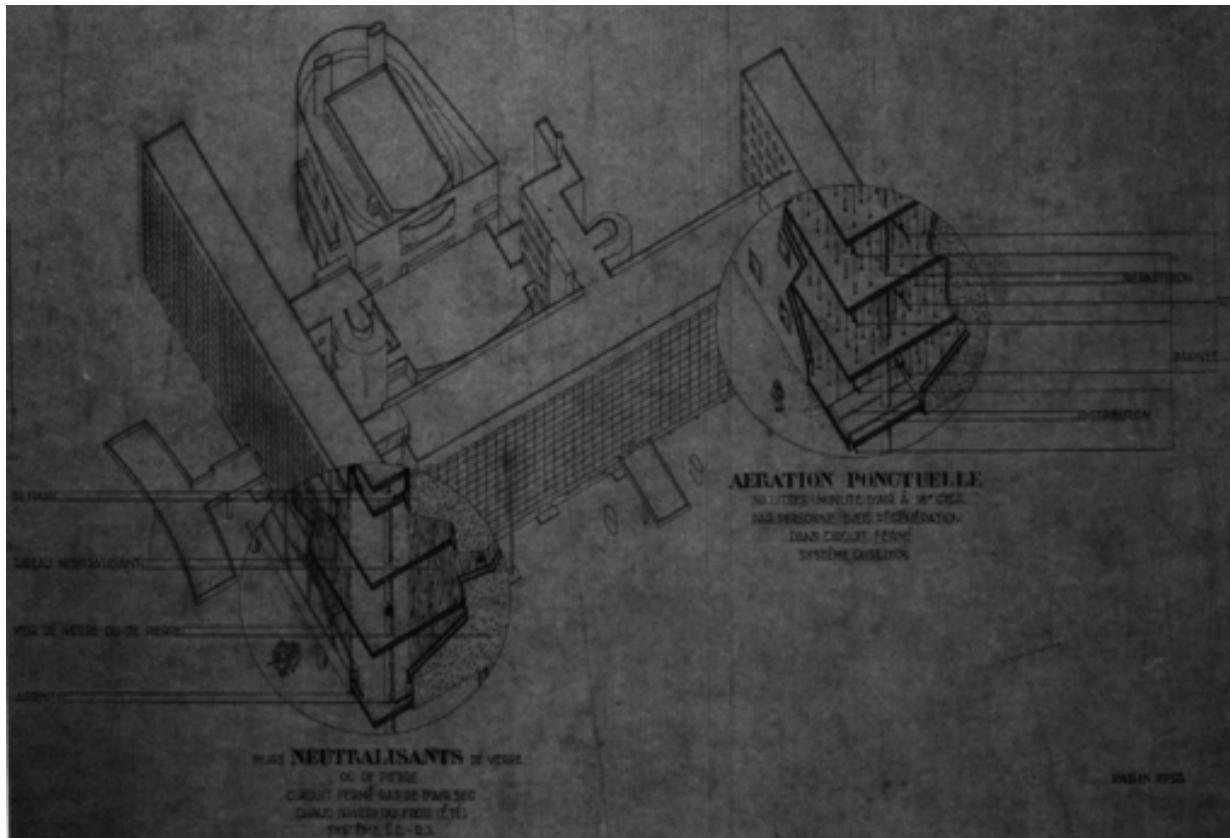


Figure 9. Le Corbusier and Jeanneret, Centrosoyuz, construction detail of double-façade with operable sections, 3 February 1930, FLC 15763A. © FLC/ADAGP, Paris and DACS, London 2012.