

Physique du Bâtiment I

Phénoménologie

Chapitre 1 **Course solaire**
 Ombre portées

Chapitre 2 **L'air humide**
 Diagrammes
 psychrométriques
 Chaleur sensible / latente

Chapitre 7 **Confort thermique**

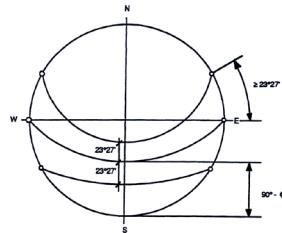
Chapitre 3 **Hydrostatique**
 Hydrodynamique

Chapitre 4 **Conduction**
 Convection
 Rayonnement

Résumé

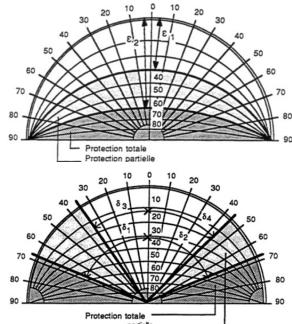
Projection de la course solaire Ombres portées

- Construction 'projection solaire'



Equinoxes: $h = 90^\circ - \phi$
Lever à l'Est / Coucher à l'Ouest
Solstices: $h = 90^\circ - \phi \pm |\delta_{\max}|$

- Protections solaires

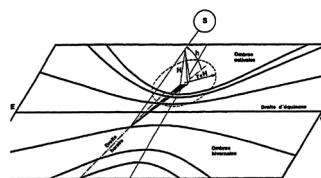


Horizontales: Efficaces et nécessaires
en façade Sud

Verticales: Efficacité limitée
Evt. en façades E et W

Mobiles: Stores (tissu/lamelles)

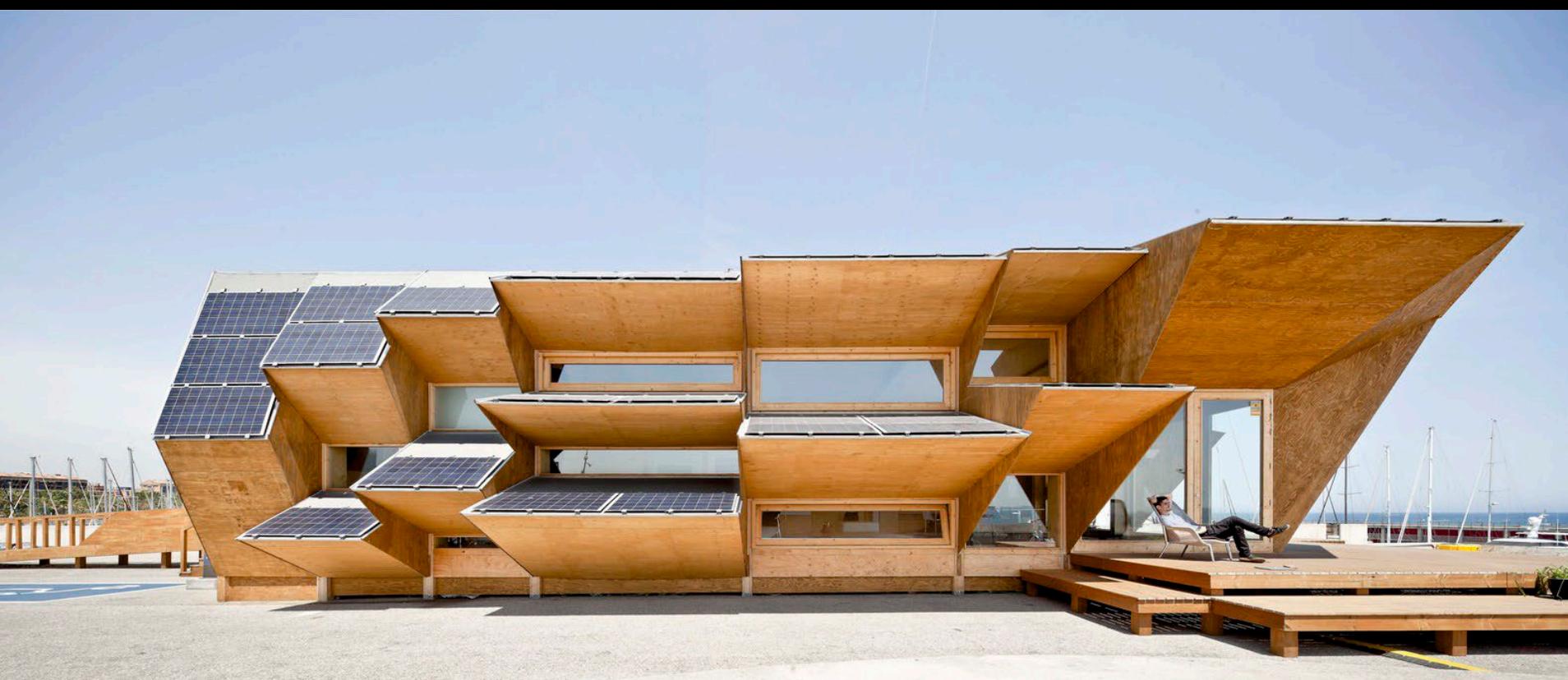
- Gnomon



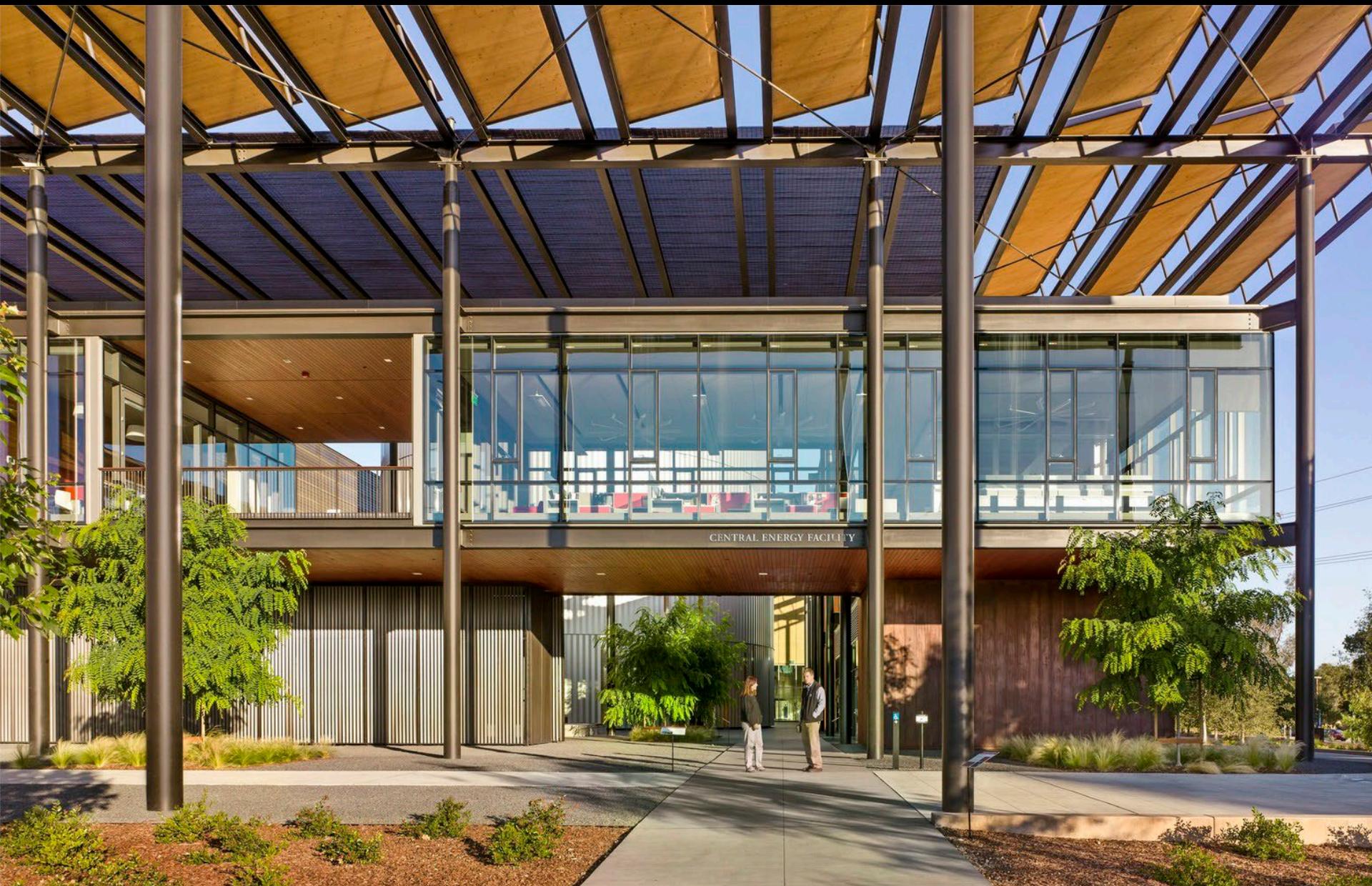
Architecture solaire



Architecture solaire



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Architecture solaire



Architecture solaire



Architecture solaire



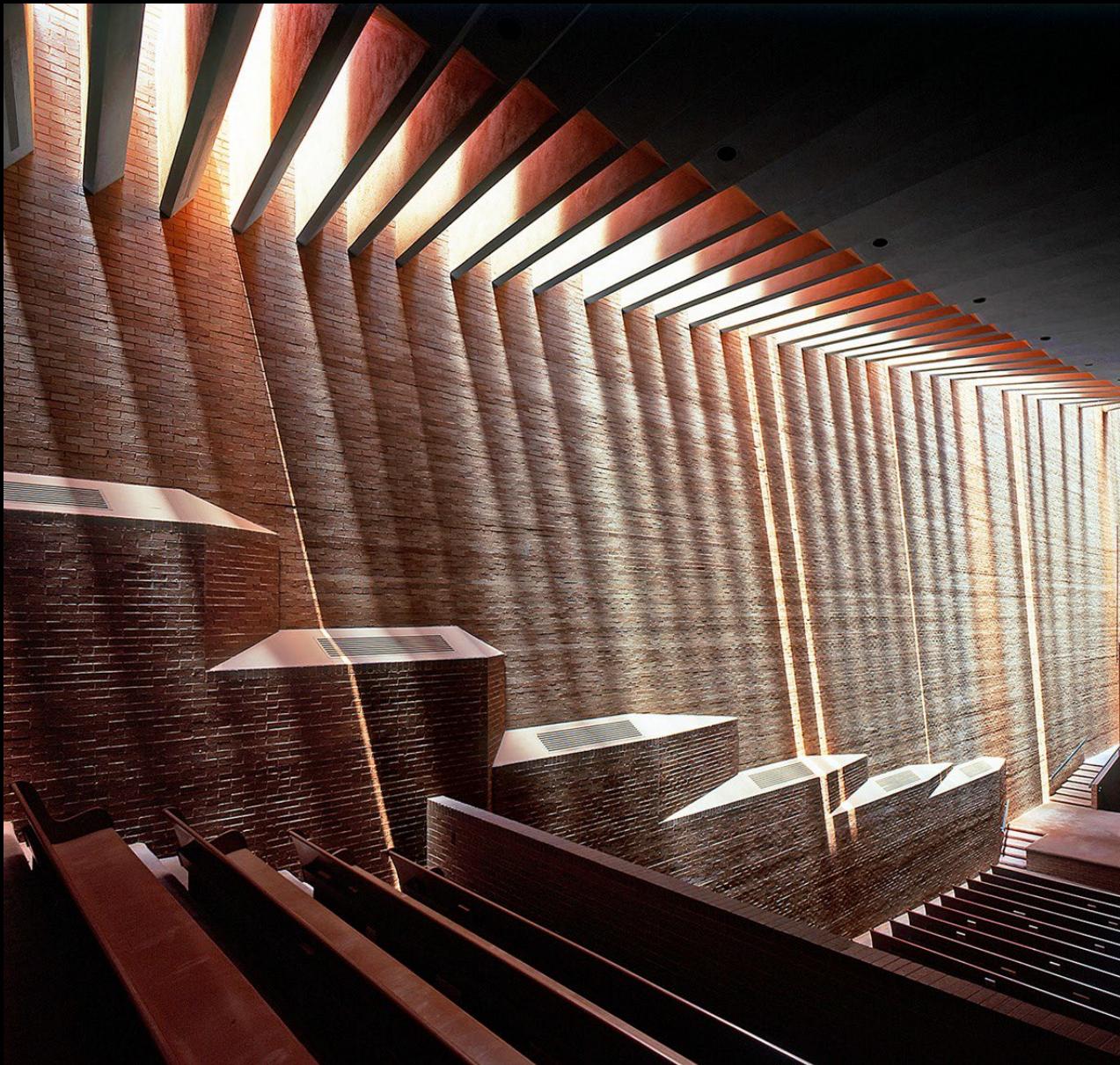
Les ombres portées



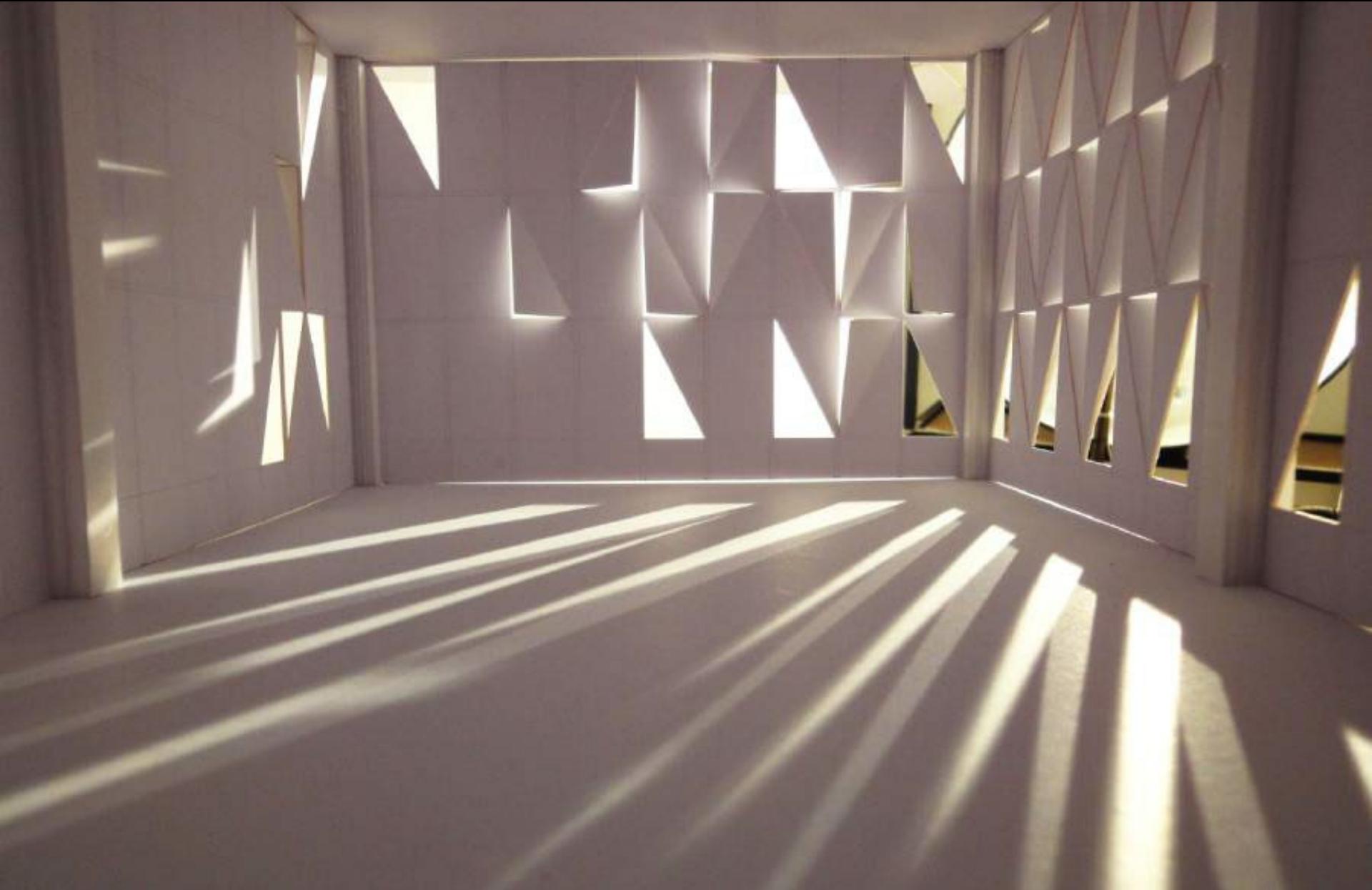
Les ombres portées



Les ombres portées



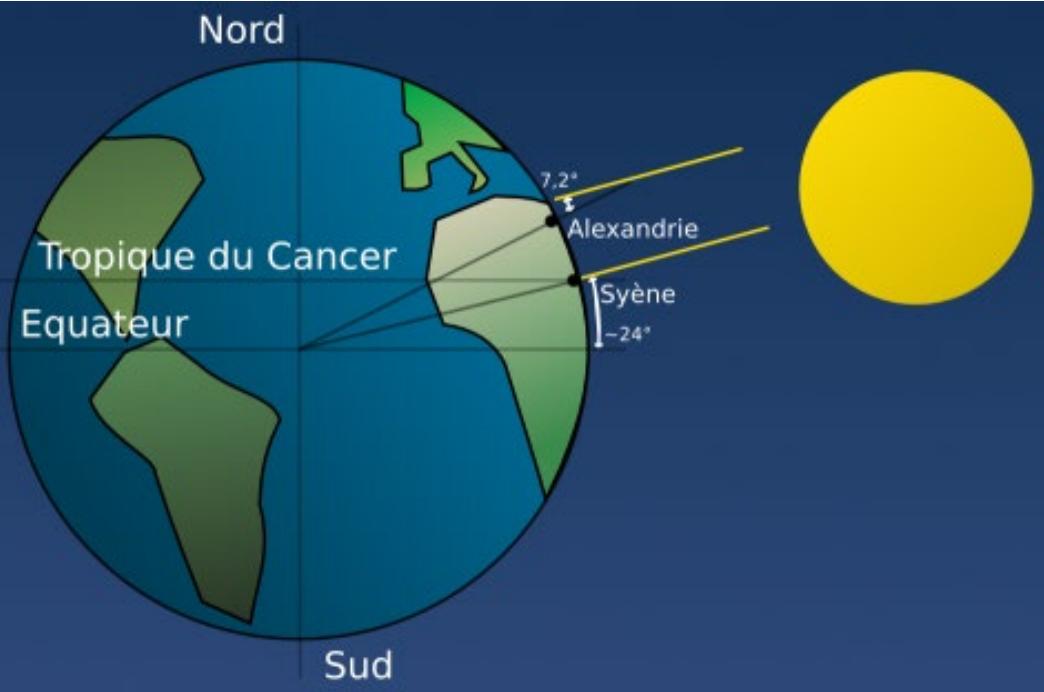
Les ombres portées



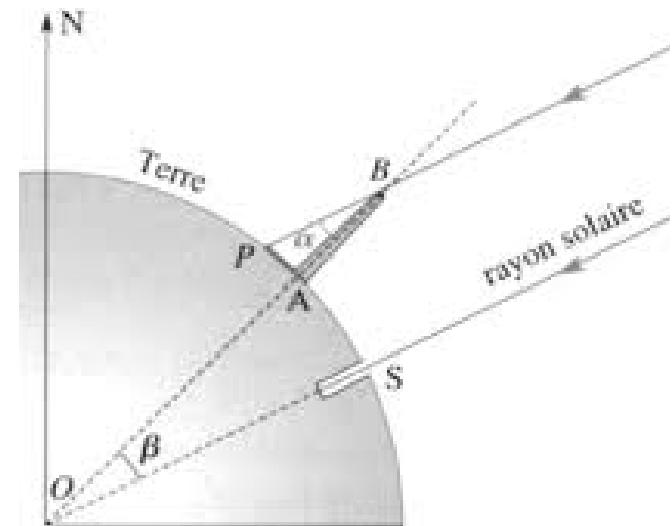
Le gnomon de Louxor



Estimation de la circonference de la terre (env. 40'000 km)



Ératosthène
267 - 194 av. J.-C.



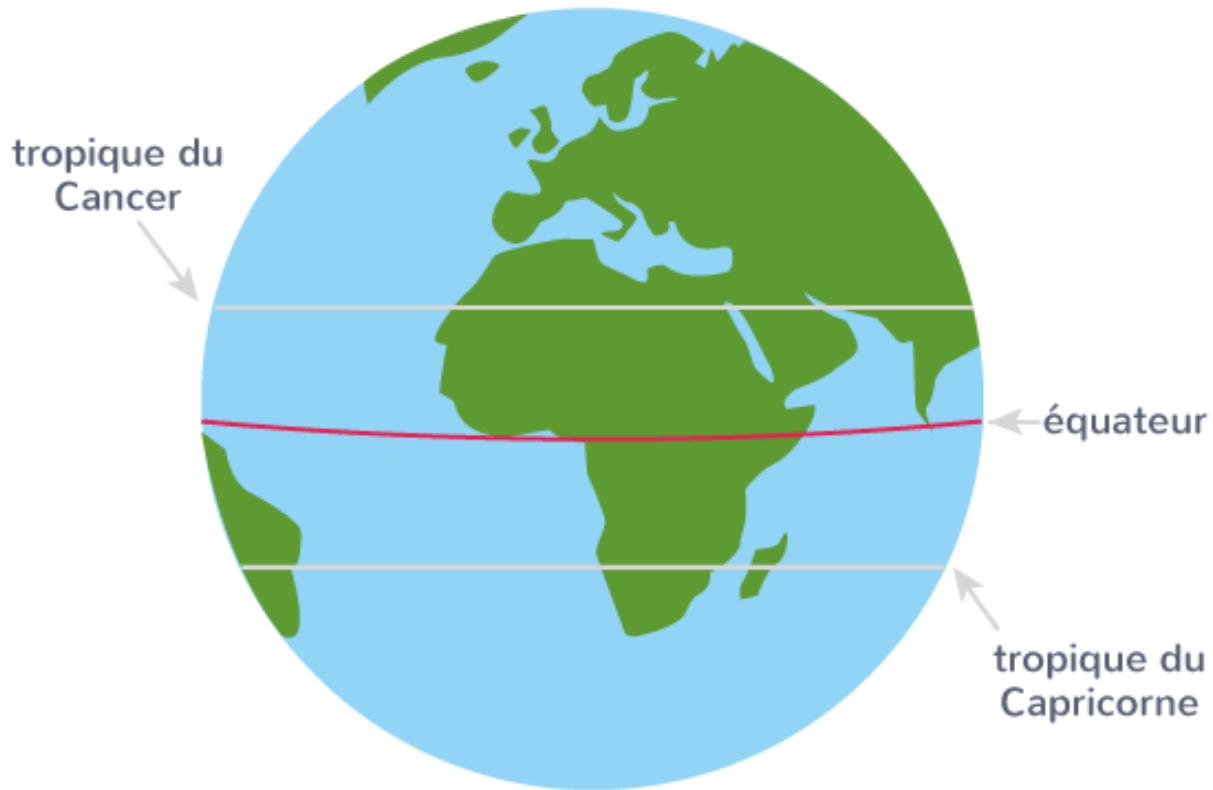
Un puits près de Syène



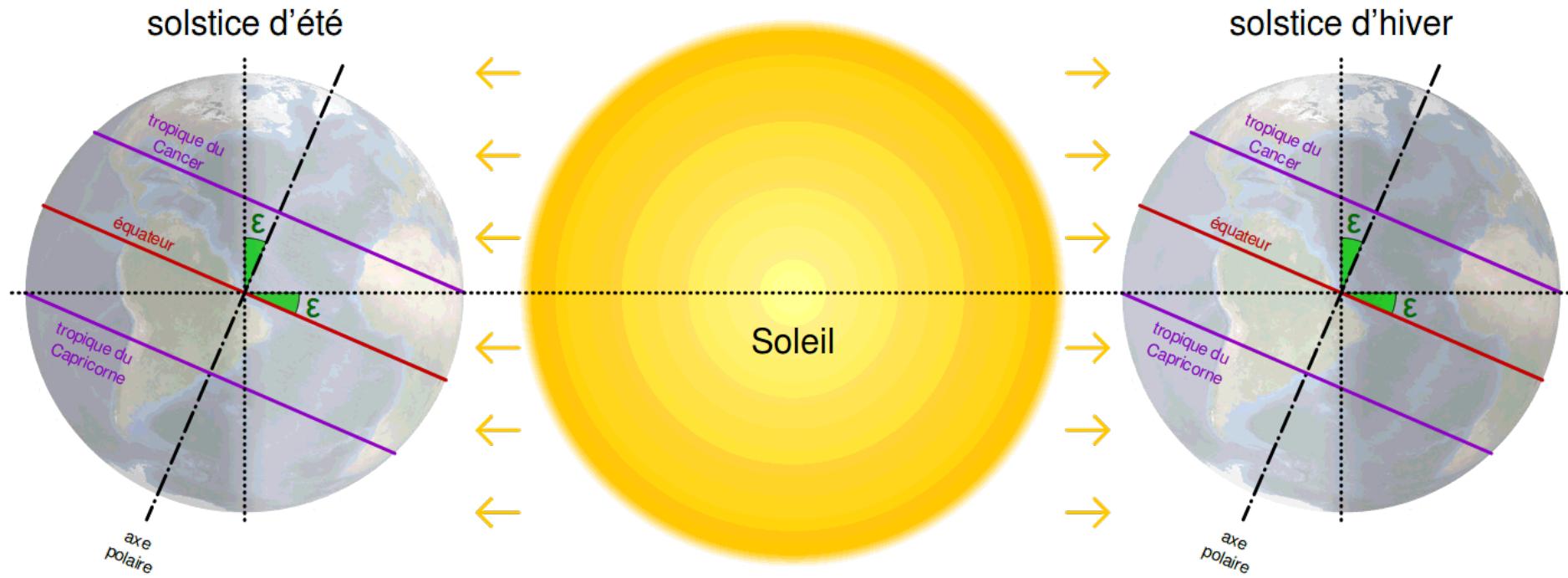
L'arc méridien entre les deux tropiques ($2 \times \delta = 2 \times 23,45^\circ$)



Ératosthène
267 - 194 av. J.-C.



Les deux tropiques



la déclinaison géocentrique $\delta = 23,45^\circ$

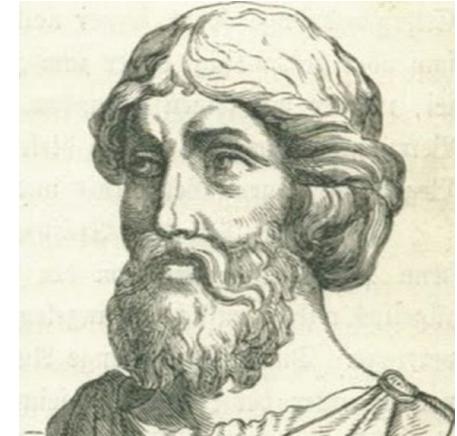
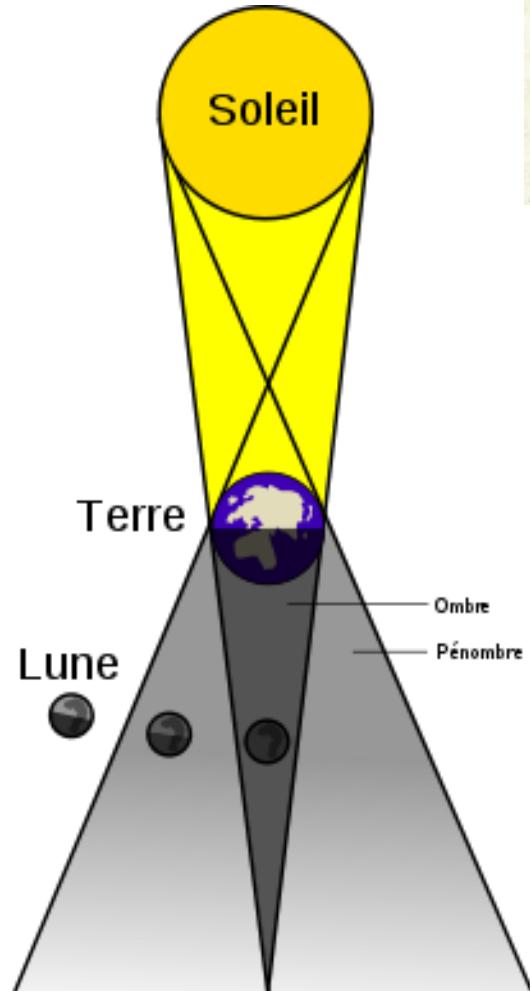
Diamètre de la lune

1/(3,7) diam. terr.



Distance terre-lune

30 diam. terr.



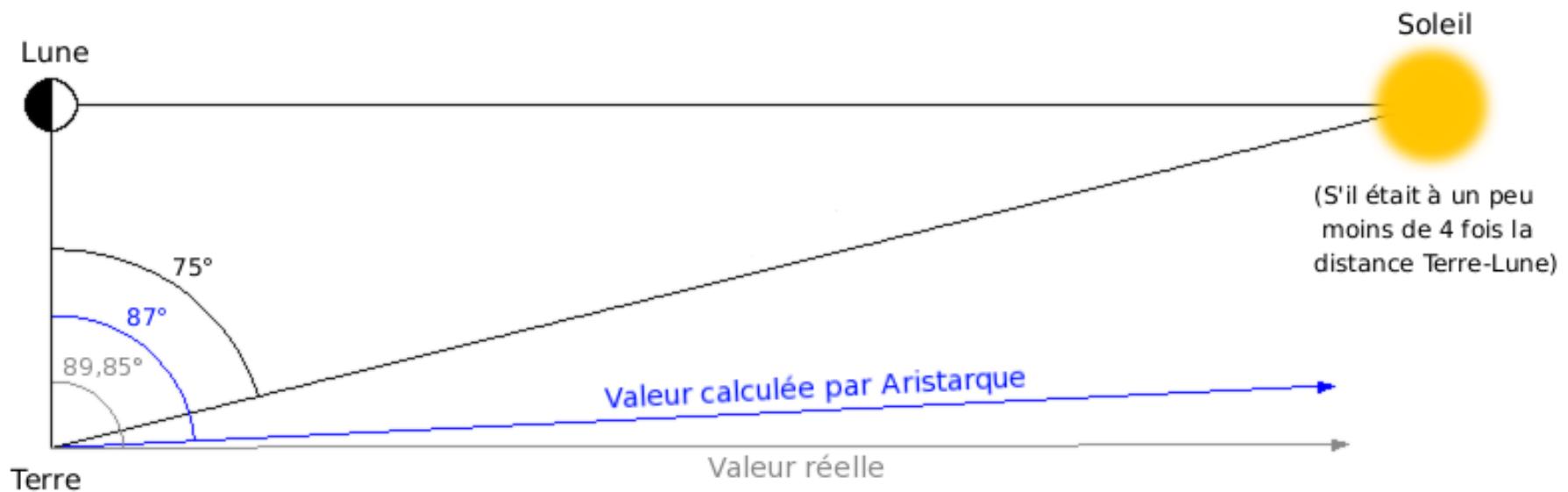
**Aristarque
de Samos**
310 - 330 av. J.-C.

Distance terre-soleil

12'000 diam. terr.



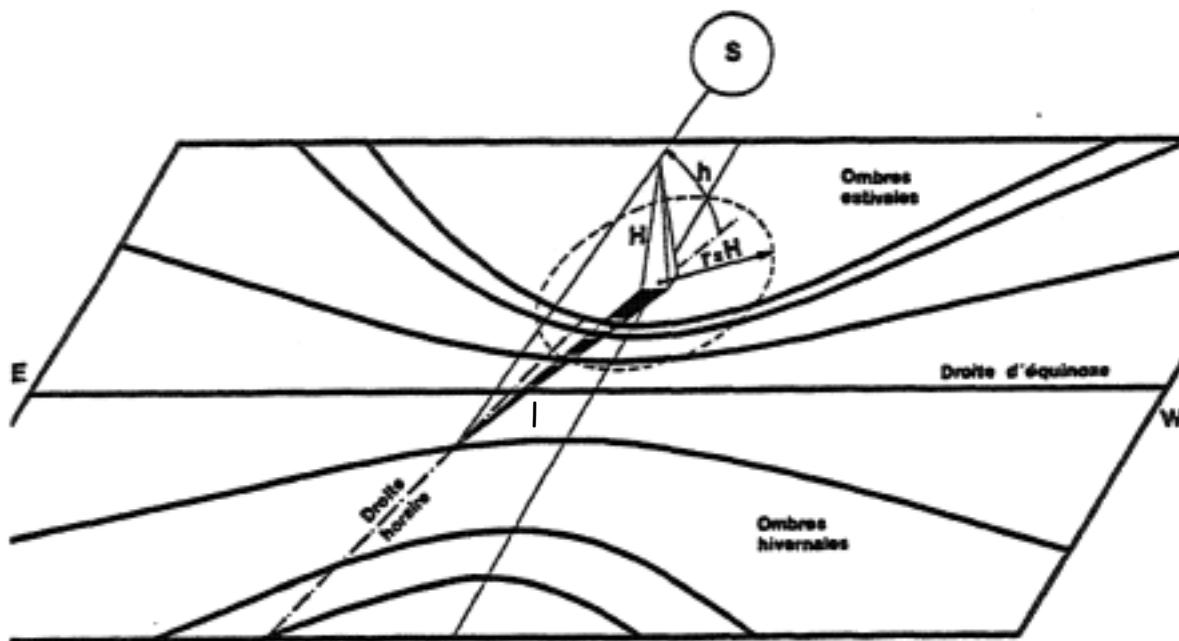
Aristarque de Samos
310 - 330 av. J.-C.





Obélisque-gnomon du Vatican, Place St-Pierre, Rome (2000 av. J.C.)

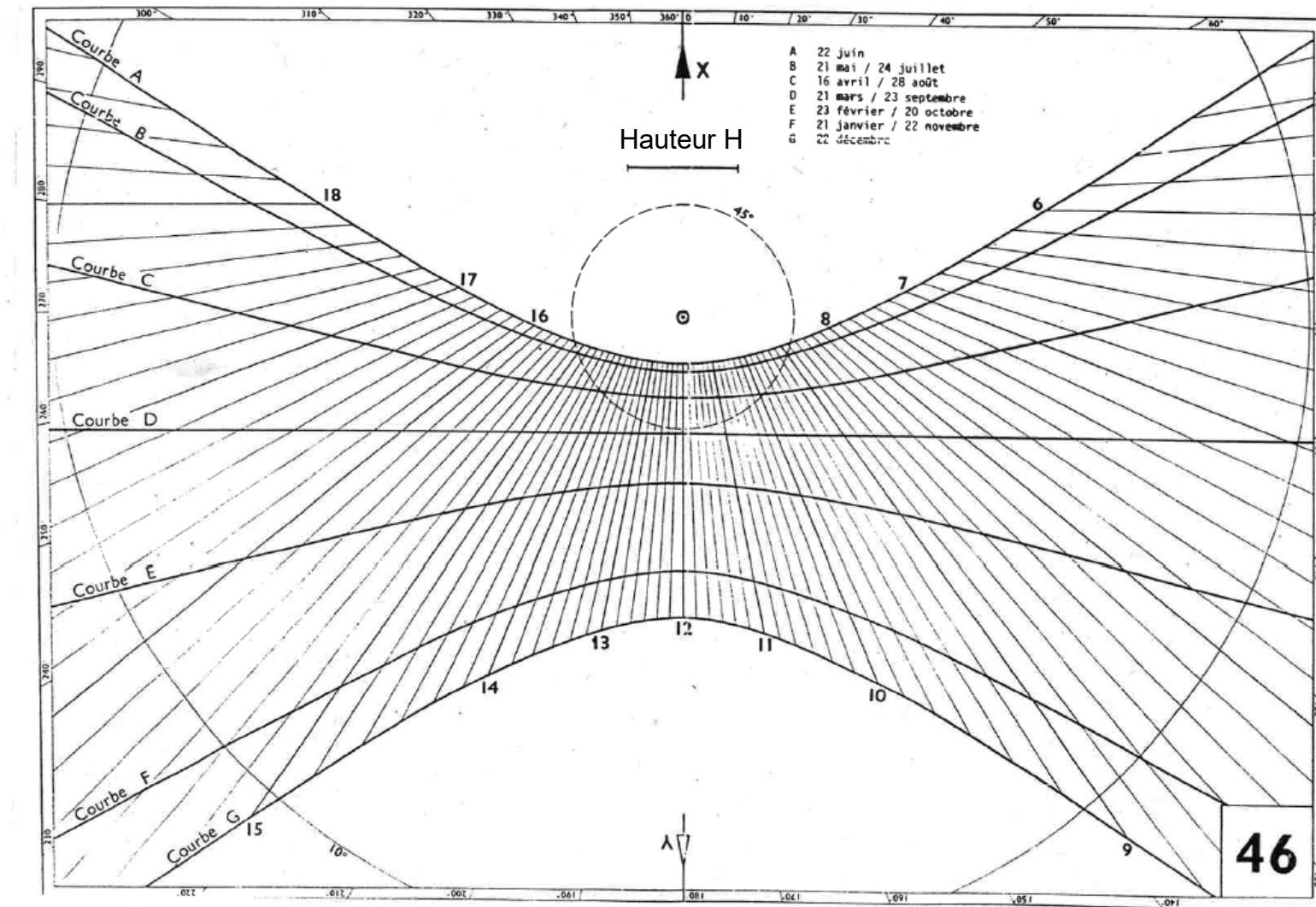
Le soleil



*Ombre au sol d'un gnomon de hauteur H
La droite d'équinoxe sépare le plan horizontal en deux zones relatives respectivement aux ombres estivales et hivernales.*

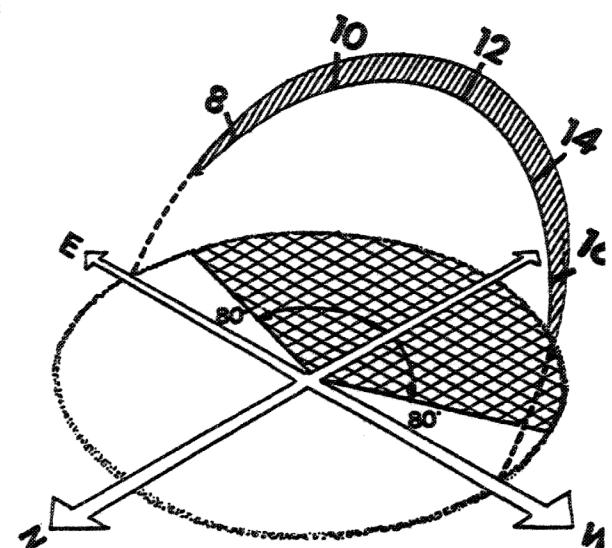
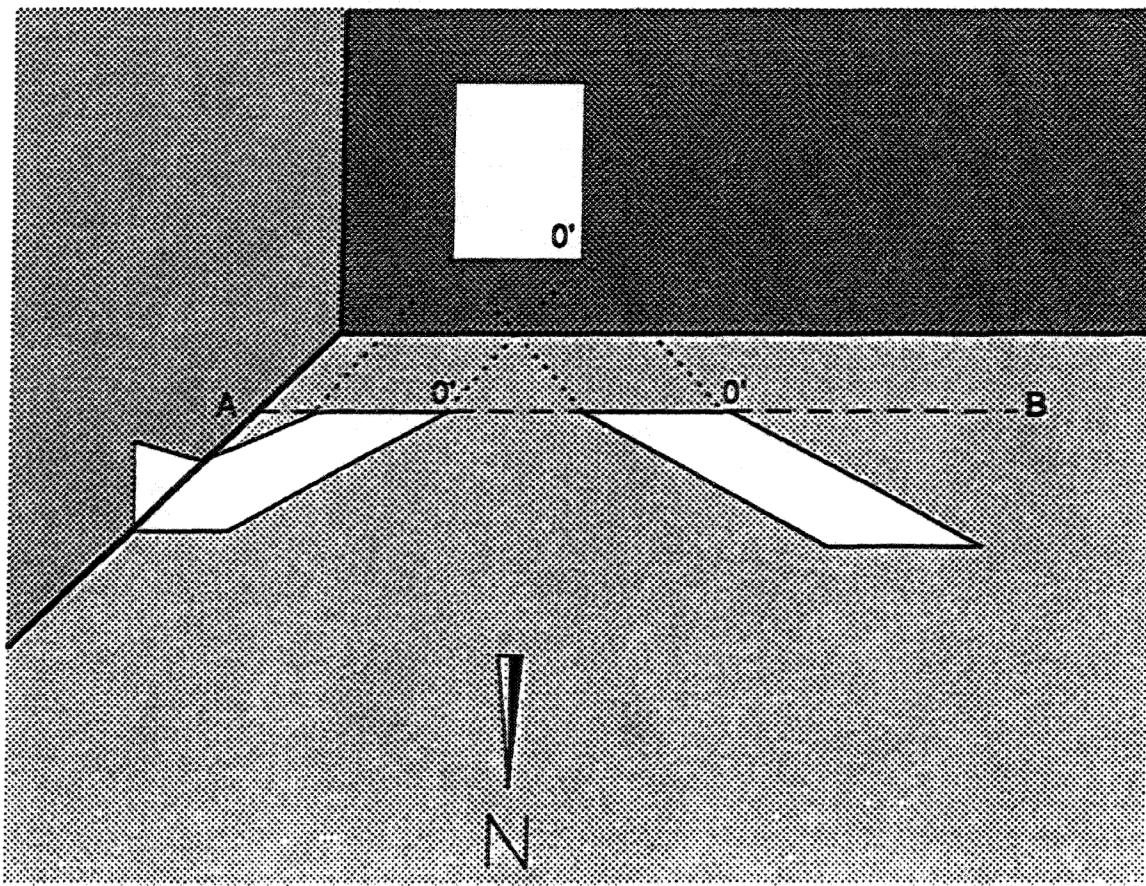
Ombre au sol d'un gnomon (Poly/Fig.1.6.9)

Le soleil



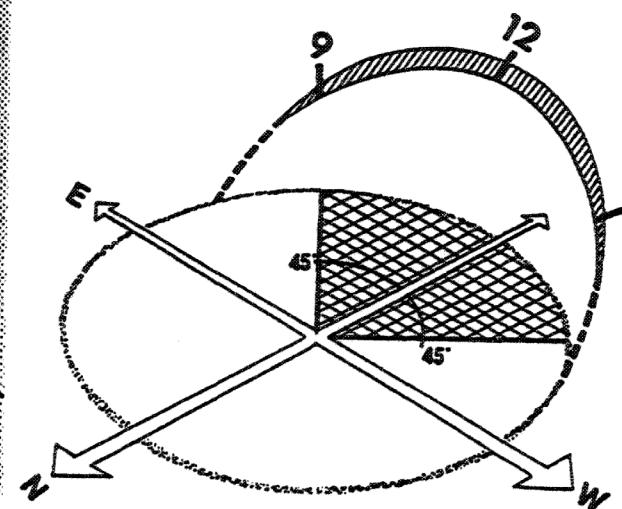
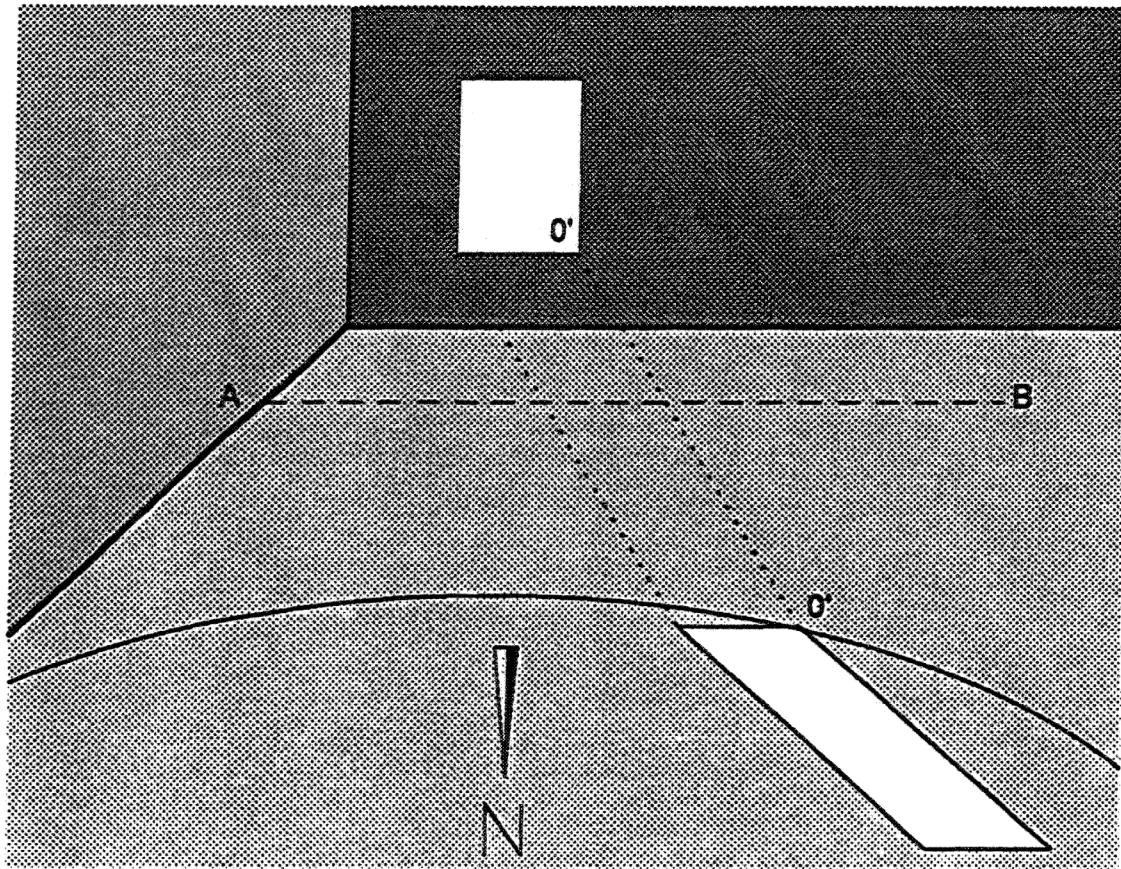
Ombre au sol d'un gnomon (Diagramme CSTB)

Le soleil



Tache lumineuse à l'équinoxe

Le soleil



Tache lumineuse en hiver