

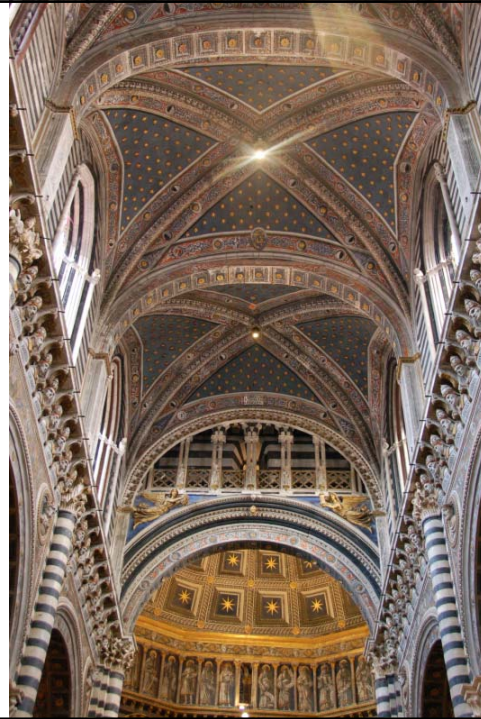
Structures I

Leçon 17

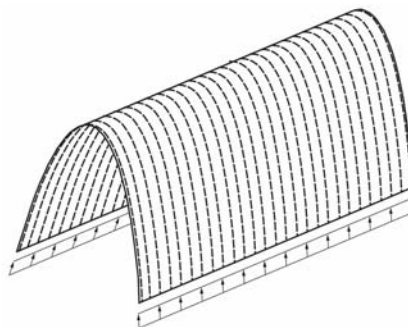
Voûtes

Coques

Dr O. Burdet, EPFL



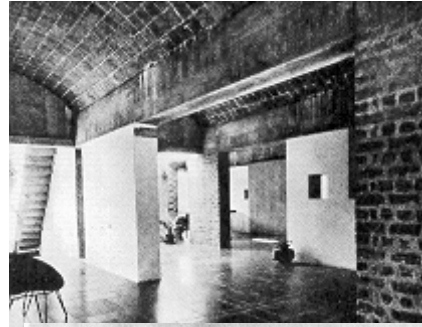
Voûtes en berceau



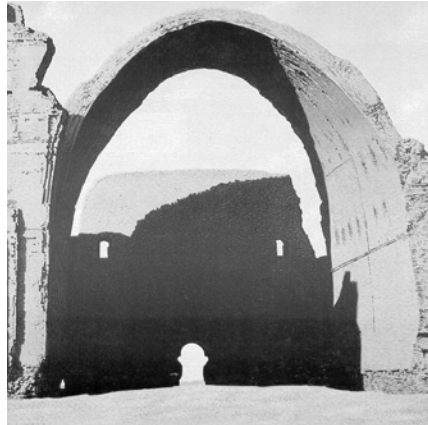
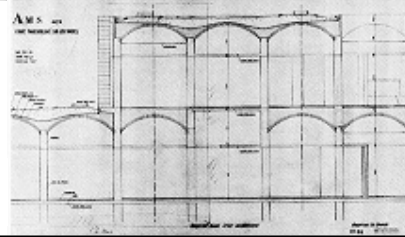
Voûtes en maçonnerie



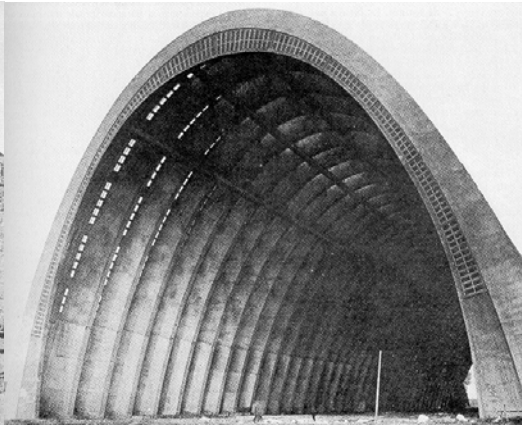
*Entrepôts du pharaon Ramsès II,
Louxou, XIII^e siècle av. J.-C.*



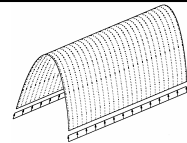
*Villa Sarabhia, Ahmedabad, 1955
arch. Le Corbusier*

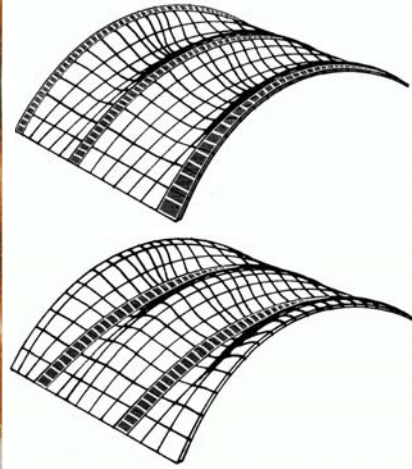


*Palais de Ctésiphon près de
Baghdad, III-IV^e siècle ap. J.-C.*

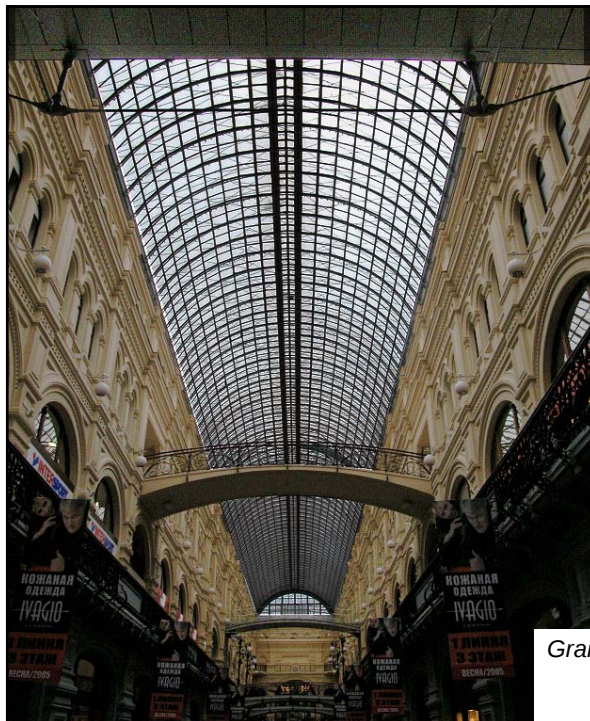


*Hangar pour dirigeables, Orly,
1923, ing. E. Freyssinet*





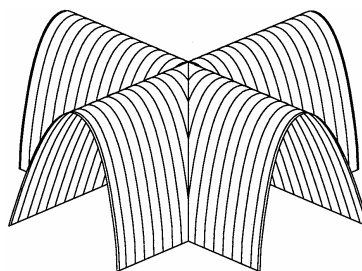
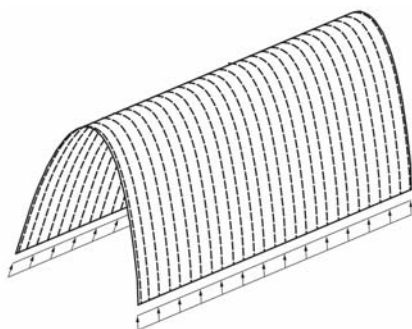
*Silos à riz à Vergana (UR), 1978
ing. E. Dieste*



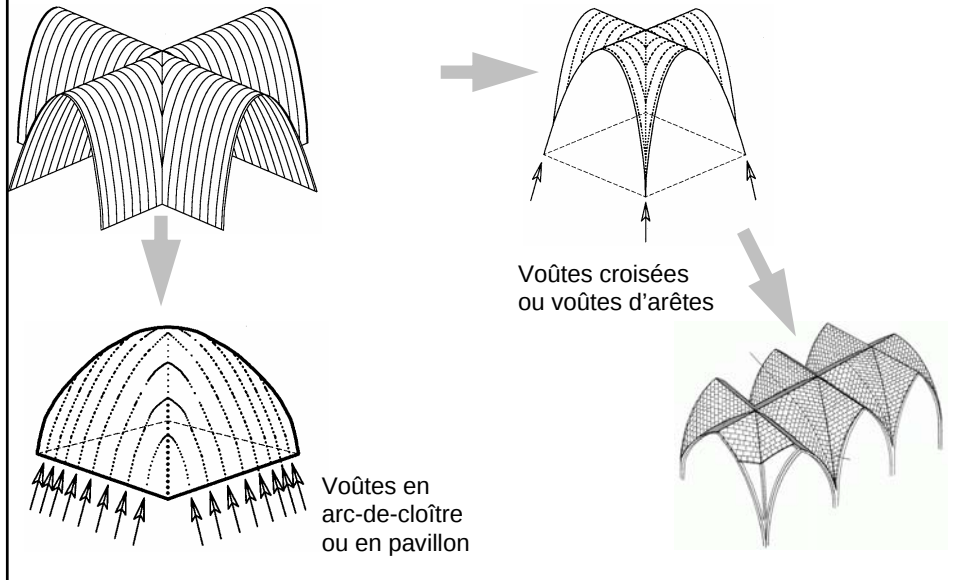
*Grand magasin Goum, Moscou, 1893,
arch. A. Pomerantsev
ing. V. Shukhov*



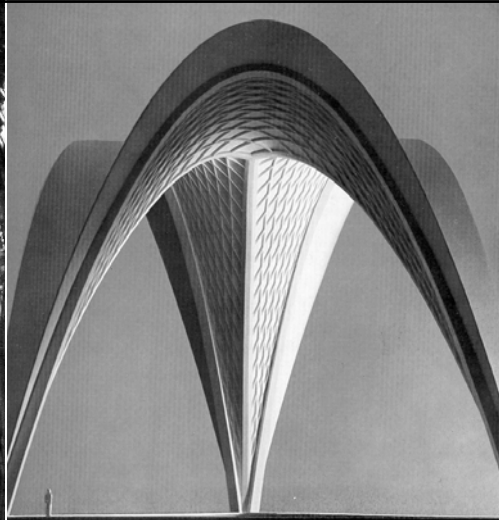
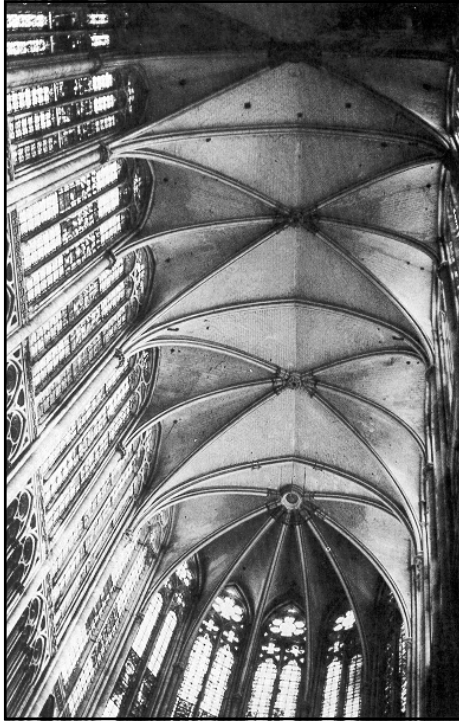
Intersection de voûtes



Intersection de voûtes

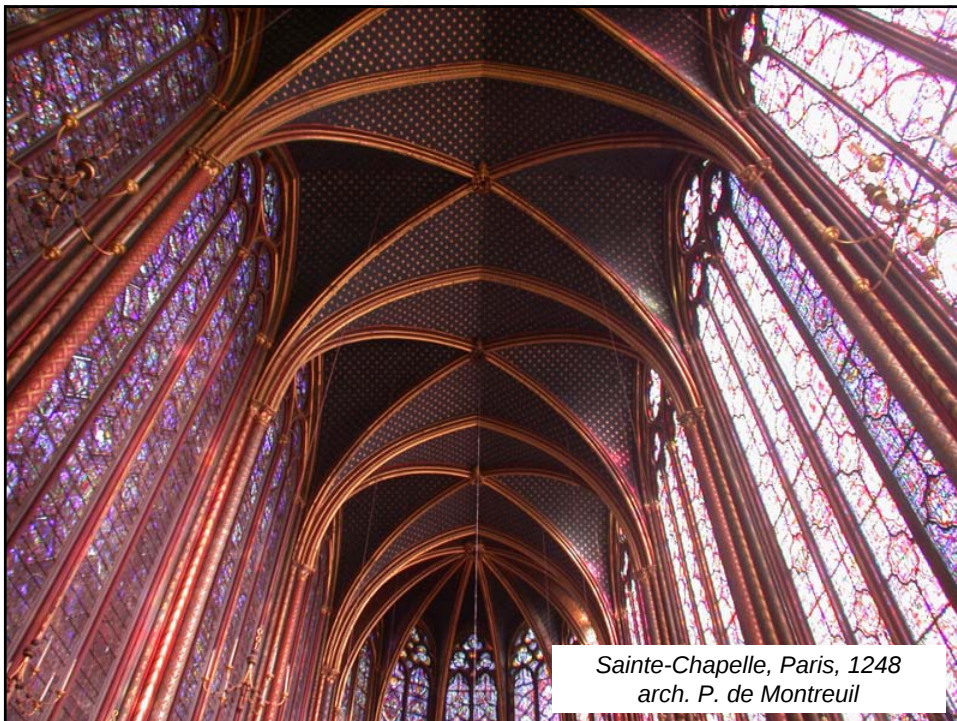


*Thermes de Dioclétien, Rome, env. 300 ap. J.-C.
Transformé en église Ste Marie des Anges par Michel-Ange (1561)*



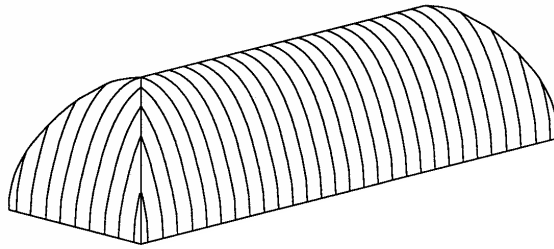
*Projet de cathédrale à New Norcia, Australie
Arch. P.L. Nervi, A. Nervi, F. Vacchini, C.
Vannoni*

Cathédrale de Beauvais, 1337

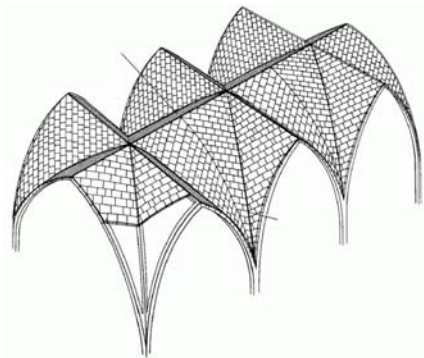


*Sainte-Chapelle, Paris, 1248
arch. P. de Montreuil*

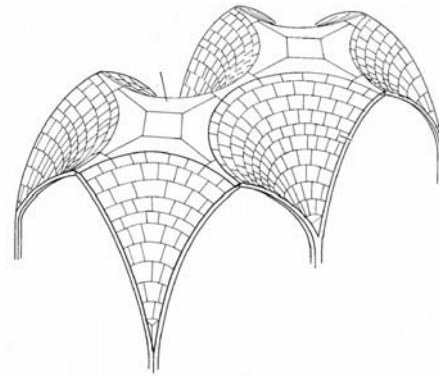
Combinaison de voûtes



Génération des voûtes

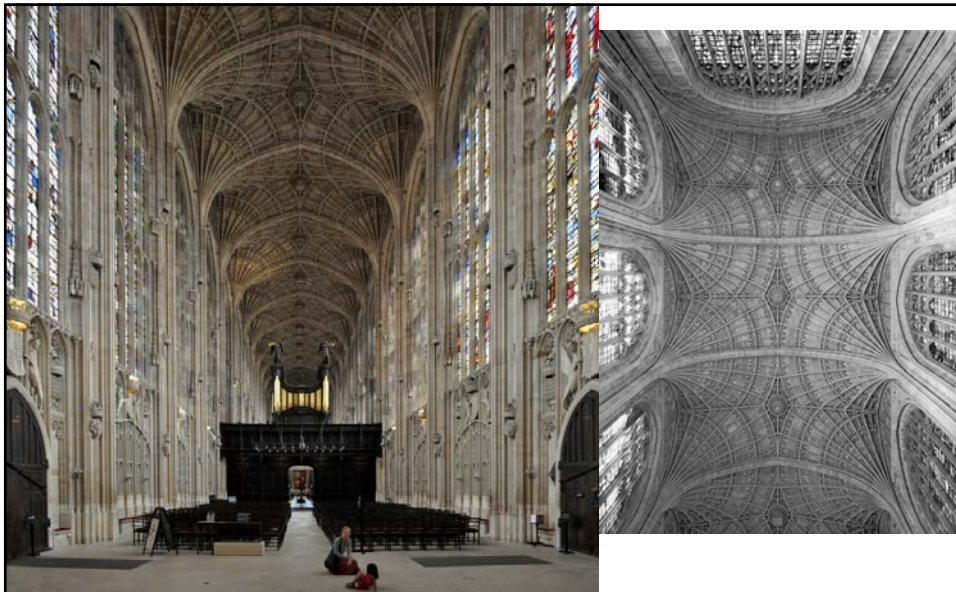
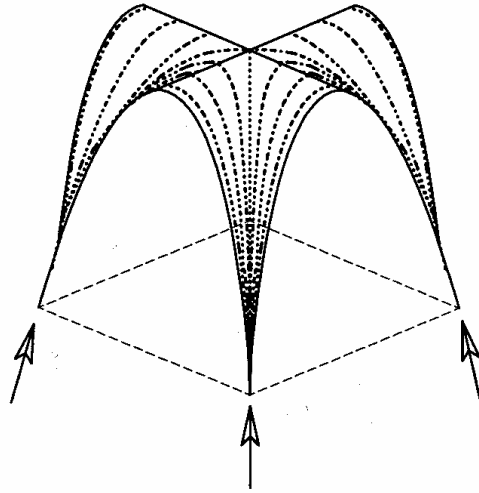


Voûtes croisées

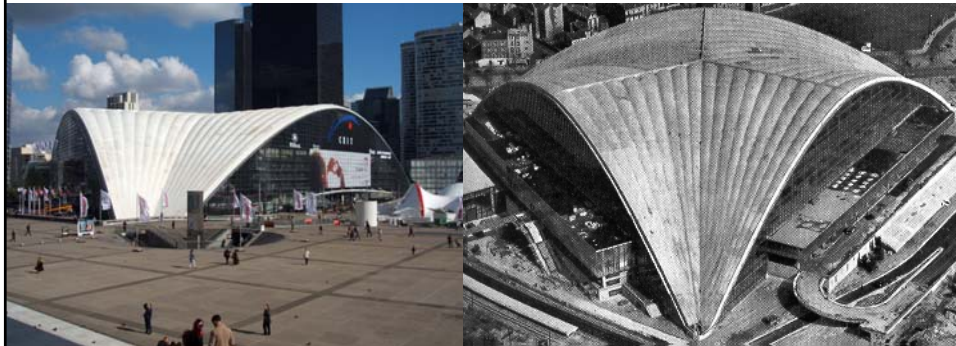


Voûtes en éventail

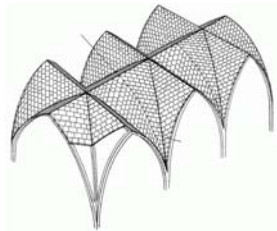
Voûtes en éventail



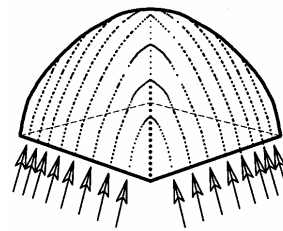
King's College, Cambridge, 1515



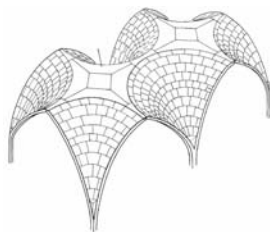
CNIT, Paris, 1958
arch. R. Camelot, J. De Mailly, B. Zehrfuss ing. N. Esquilan



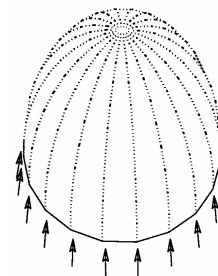
Voûtes croisées
 Voûtes d'arêtes



Voûtes en arc-
 de-cloître

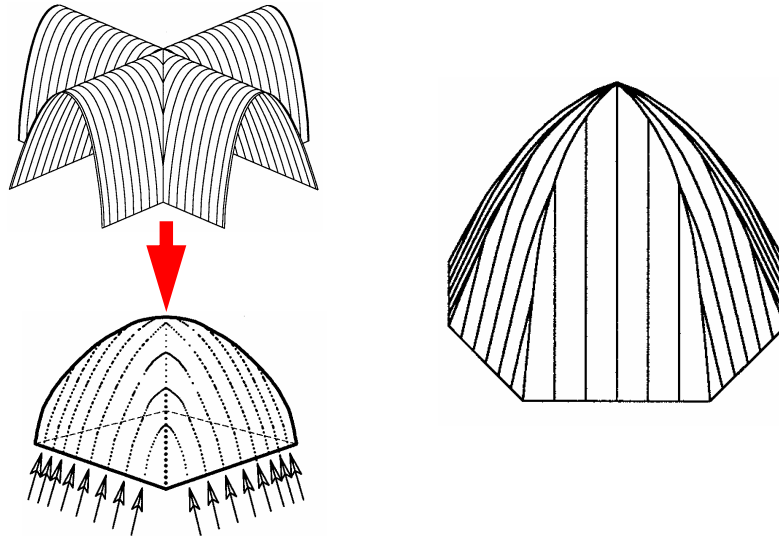


Voûtes en éventail

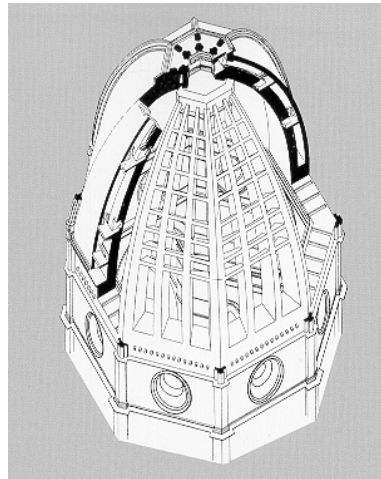


Coupoles

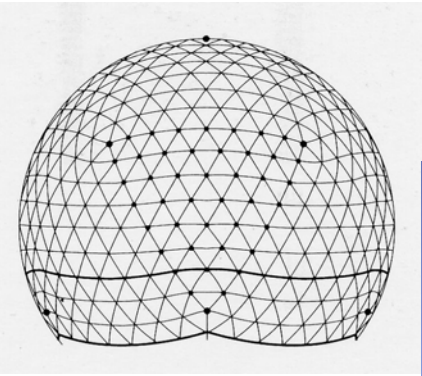
Voûtes en arc-de-cloître



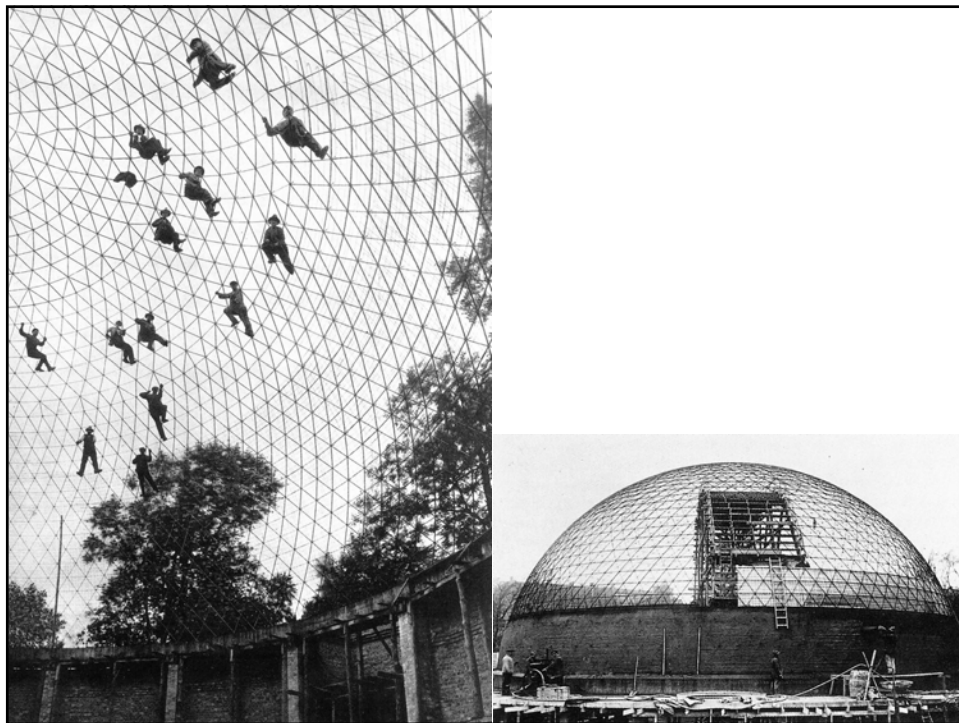
*"Coupole" de Santa Maria del
Fiore à Florence, 1436, F.
Brunelleschi (l=42 m)*



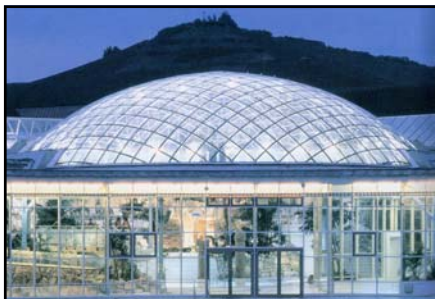
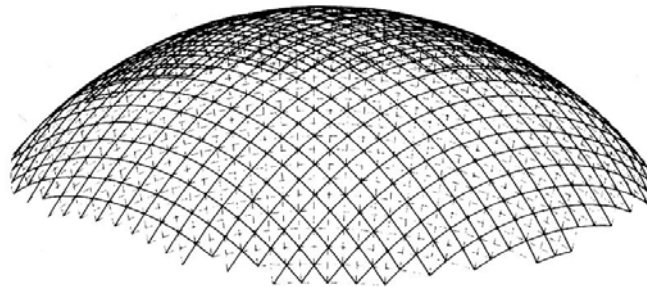
Coupoles géodésiques



*Coupole du bâtiment USA, Expo 1967, Montréal
Buckminster Fuller*



Réseaux d'arcs

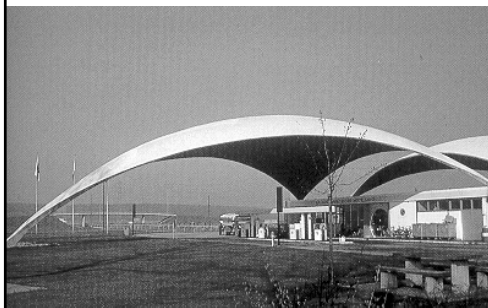


*Piscine à Neckarsulm (D), 1989
arch. K.-U. Bechler, ing. J. Schlaich*





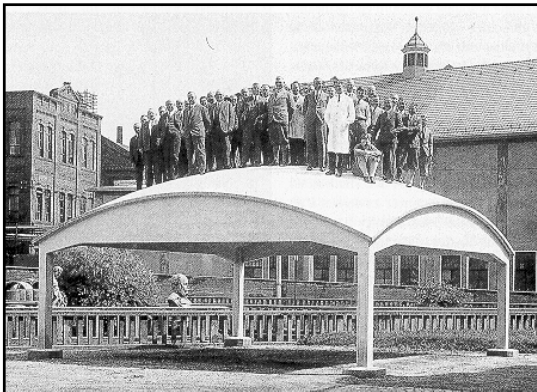
Coques



Coque de Deitingen Sud, H. Isler, 1968

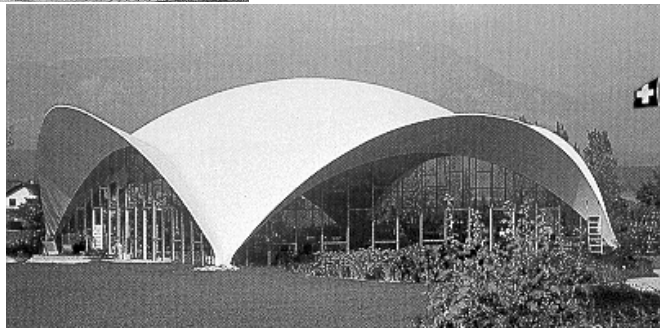


*Garderie d'enfants Nestlé, Expo 1964, Lausanne
arch. M. Magnin*

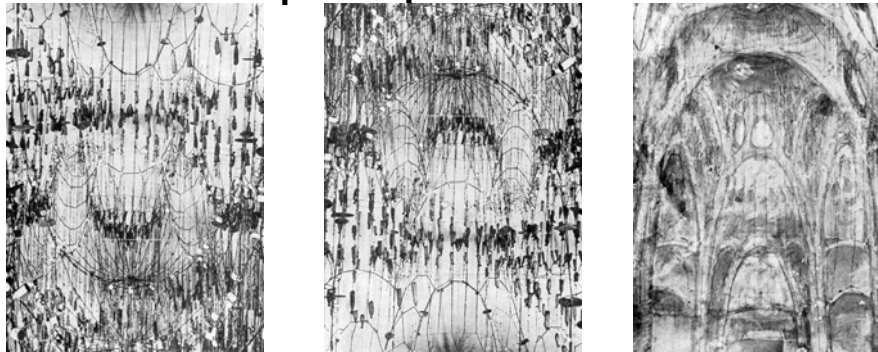


*Toiture expérimentale, Jena, 1932,
ing. F. Dischinger, $\ell = 7 \times 7 \text{ m}$*

*Centre de jardinage,
Soleure, 1961
ing. H. Isler*



Coques par inversion

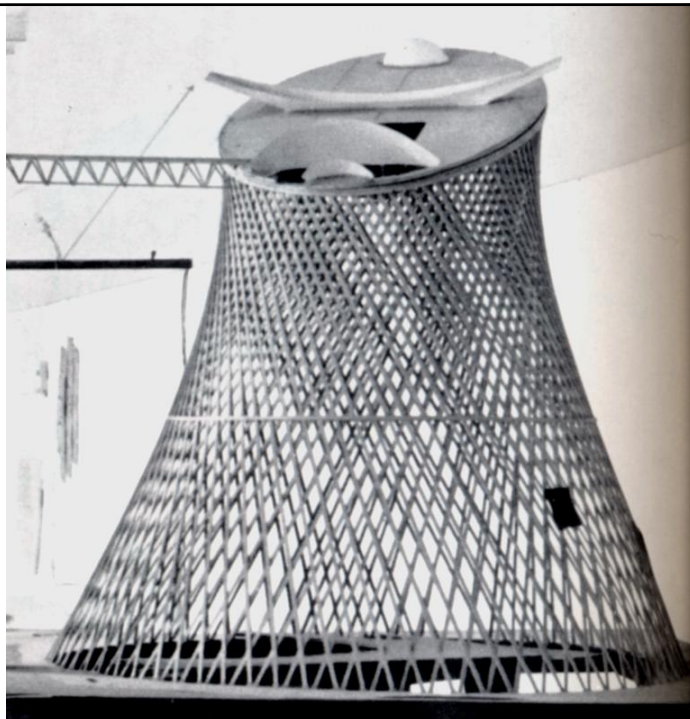
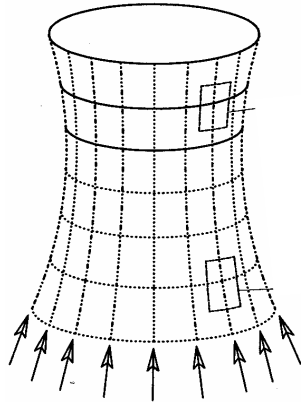


Maquette funiculaire et esquisse de la structure de la chapelle Güell à Barcelone, 1898-1915, arch. A. Gaudí

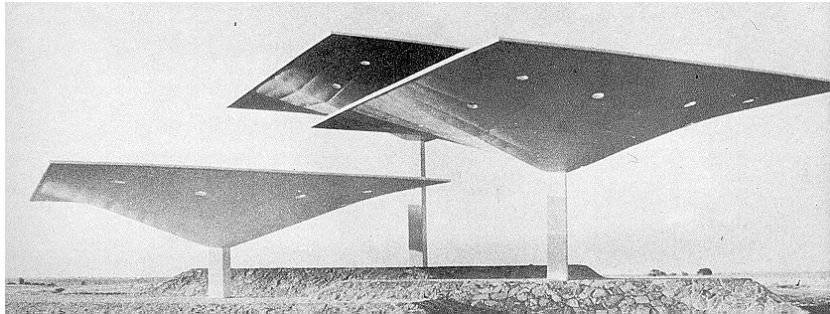
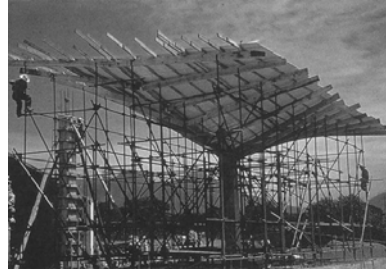
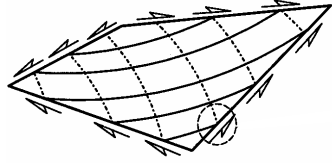


Sagrada Família arch. A. Gaudí

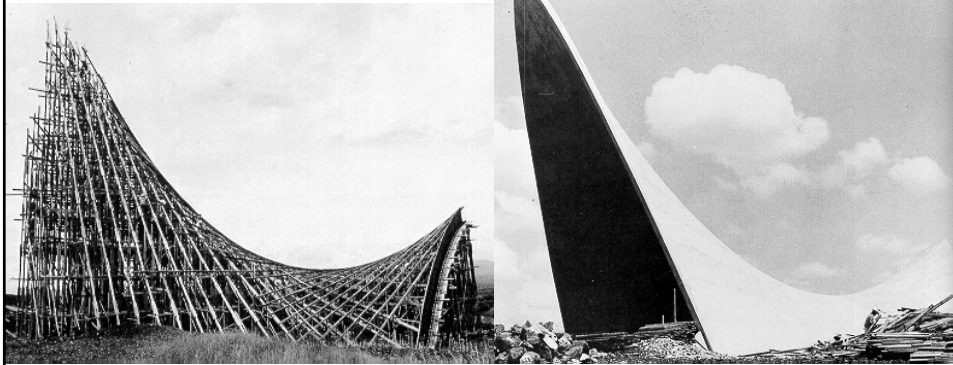
Hyperboloïdes de révolution



Paraboloïdes hyperboliques



Great Southwest, Dallas, USA, 1958, arch. F. Candela



*Capilla abierta, Lomas de Cuernavaca, Mexique, 1958
arch. F. Candela*



*Restaurant Loa Manantiales, Xochimilco, Mexique
arch. F. Candela*



*Musée océanographique, Valence,
Espagne, 1997
arch. F. Candela, ing. S. Calatrava*