



ARCHITECTURE DESIGN THEORY

PART 2: **FORM**

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ARCHITECTURE DESIGN THEORY



LECTURE SERIES

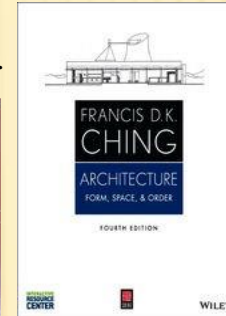
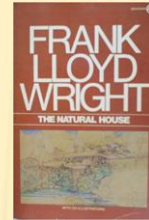
- ❑ PART 1 PRIMARY ELEMENTS [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ **PART 2 FORM** *(This Lecture)* [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 3 FORM & SPACE [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 4 ORGANIZATION [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 5 CIRCULATION [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 6 PROPORTION & SCALE [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 7 PRINCIPLES [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)

SOURCES

* Personal Architecture projects, frequent international travel, BS Architectural Engineering (U.Texas 84), plus 1-1/2 years of Urban Design (UCSD 1986-87)

COURSE TEXTBOOKS

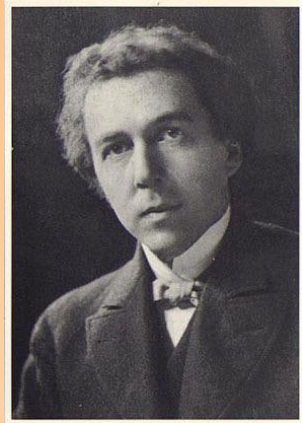
- [1] Ching, Francis D.K. *Architecture: Form, Space, and Order*. 4 ed., Wiley, 2014.
[2] Wright, Frank Lloyd. *The Natural House*. Bramhall House; 1954.



OTHER SOURCES

- [3] Storrer, William A. *The Architecture of Frank Lloyd Wright, Complete Catalog*. 4TH ed. U. of Chicago Press, 2017.
[4] Bacon, Edmond. *Design of Cities*. Thames & Hudson Ltd, 1978.
[5] Lynch, Kevin. *The Image of The City*. MIT Press, 1960.
[6] Wright, Frank Lloyd. *Testament*. New York, Bramhall House, 1957.
[7] Froebel; *Brief History of the Kindergarten*. Froebel Gifts, 2013.
<http://www.froebelgifts.com/history.htm>
[8] *PENN Rare Book and Manuscript: Frank Lloyd Wright's Paternal Family*. Penn Library. University of Pennsylvania, Feb. 20, 2014.
<http://www.library.upenn.edu/rbm/featured/mscoll822.html>
[9] Huxtable, Ada Louise. *Frank Lloyd Wright*. New York Times, Oct. 31, 2004.
<https://www.nytimes.com/2004/10/31/books/chapters/frank-lloyd-wright.html>
[10] Burns, Ken, and Novick, Lynn. *Frank Lloyd Wright: A Film by Ken Burns and Lynn Novick DVD*. PBS Home Video, August 28, 2001.
[11] Wright, Frank Lloyd. *The Art and Craft of the Machine*, Vol. 8, No. 2 pp. 77-81, 83-85, 87-90, May, 1901.
<https://www.jstor.org/stable/pdf/25505640.pdf>
[12] Wright, Frank Lloyd. *In the Cause of Architecture*. Architectural Record, vol. XXIII, March 1908.
[13] Wright, Frank Lloyd. *In the Cause of Architecture; Second Paper*. Architectural Record, May 1914.

ORGANIC ARCHITECTURE PHILOSOPHY [2.6]



Frank Lloyd Wright at the beginning of the 1900's

“Nature had become my Bible

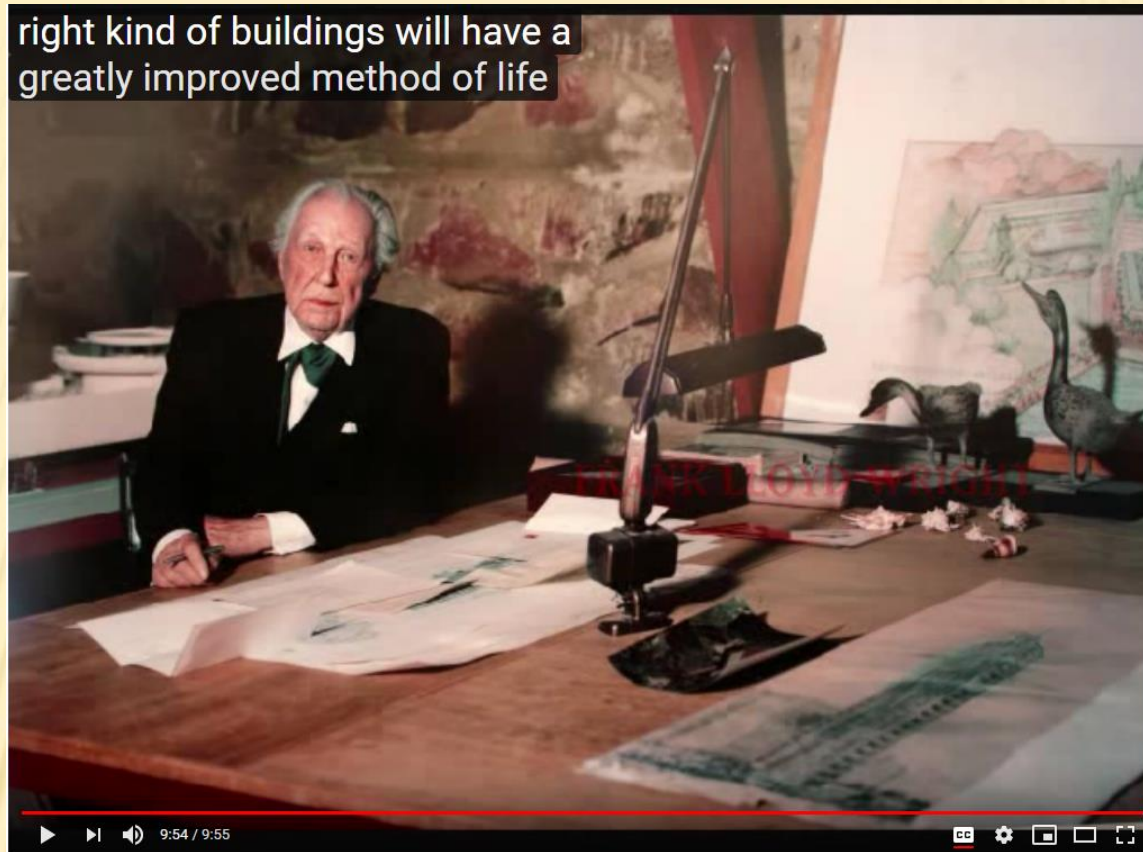
*... **Forms** more naturally significant of idea and purpose*

*... Grow **form** in realm of human spirit*

... esthetic and structure become one

*... **form** and function are one”*

FORM



Frank Lloyd Wright against modern cities

LISTEN to Frank Lloyd Wright: <https://www.youtube.com/watch?v=f1WMmMzxHkM>

“Science will eventually join with Art and Religion, and when they are one, then we will begin to have the right kind of education, we will have the right kind of buildings, we will have a greatly improved method of Life”

FORM

“Properties of form:

+ **SHAPE**

+ **SIZE**

+ **COLOR**

+ **TEXTURE**

+ **POSITION**

× *relative to environment, or visual field it is in*

+ **ORIENTATION**

× *relative to ground plane, compass points, other forms, or person viewing form*

+ **VISUAL INERTIA**

× *concentration and stability of a form, depending on its geometry and orientation relative to ground plane, pull of gravity, and our line of sight” [1]*

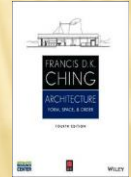
SHAPE

*“Outline of a plane or volume. It’s how we recognize, identify, and categorize figures and forms. Perception of shape depends on visual **contrast** along the contour separating figure from ground, or between a form and it's field” [1]*



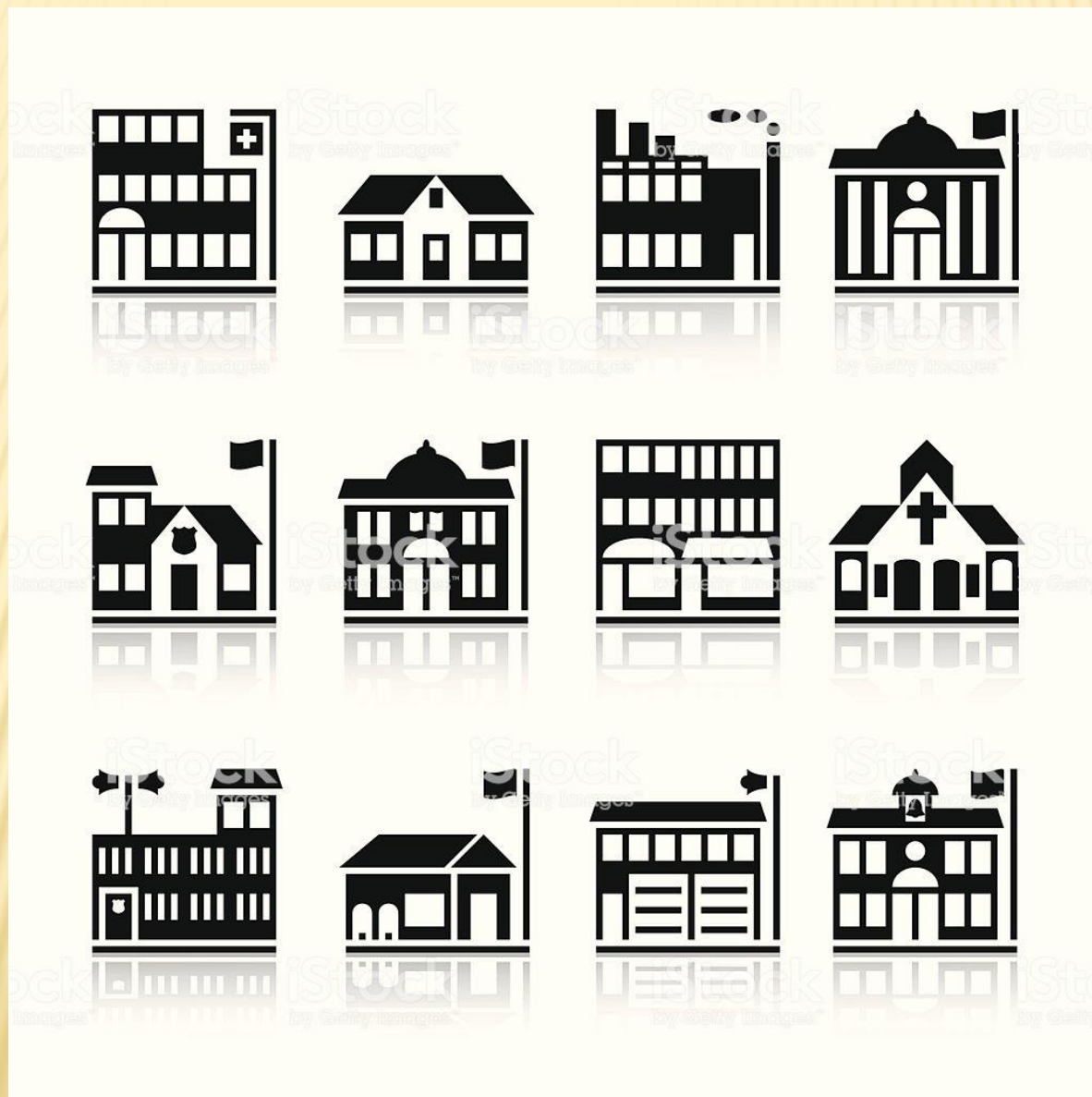
SHAPE - PERCEPTION OF CONTRAST

“Silhouette can illustrate junction between mass and space as building rises from ground plane and meets the sky.” [1]



SHAPE - PERCEPTION OF CONTRAST

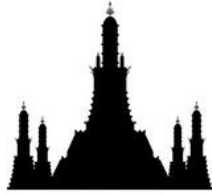
silhouettes



SHAPE - PERCEPTION OF CONTRAST

silhouettes

ASIA LANDMARKS



THAILAND



LAOS



MYANMAR



CAMBODIA



VIETNAM



INDONESIA



TAIWAN



Hong Kong



SOUTH KOREA



JAPAN



CHINA



MACAU



INDIA



NEPAL



SRI LANKA



MALAYSIA

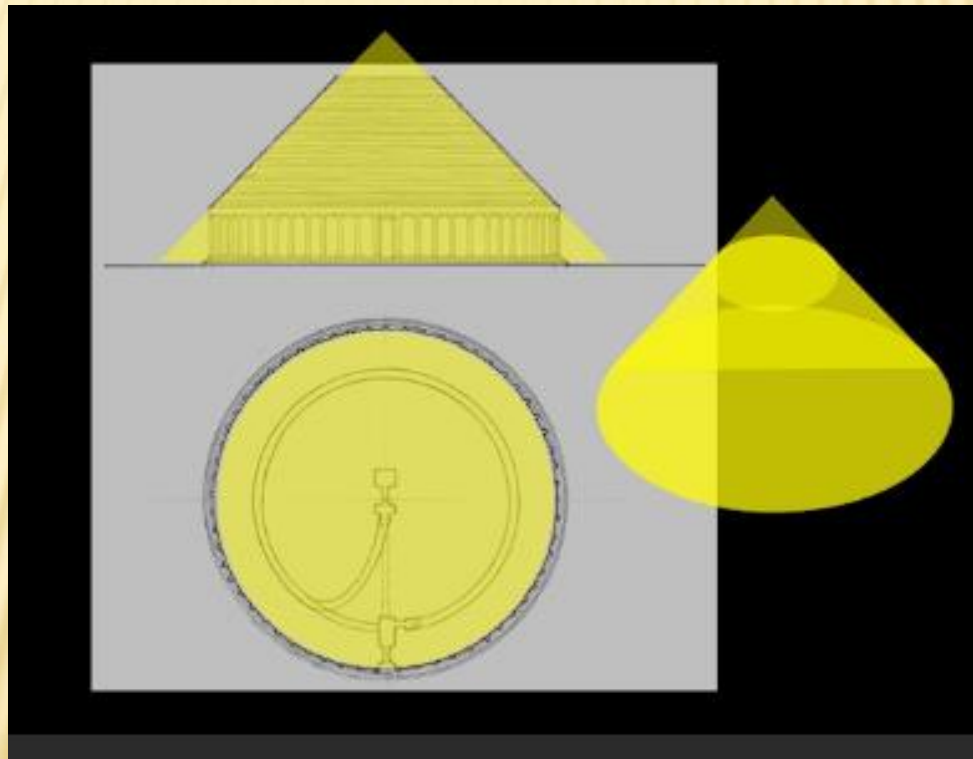
SHAPE

“Solid forms and spatial voids, foreground and background, interlock to form a unified whole” [1]



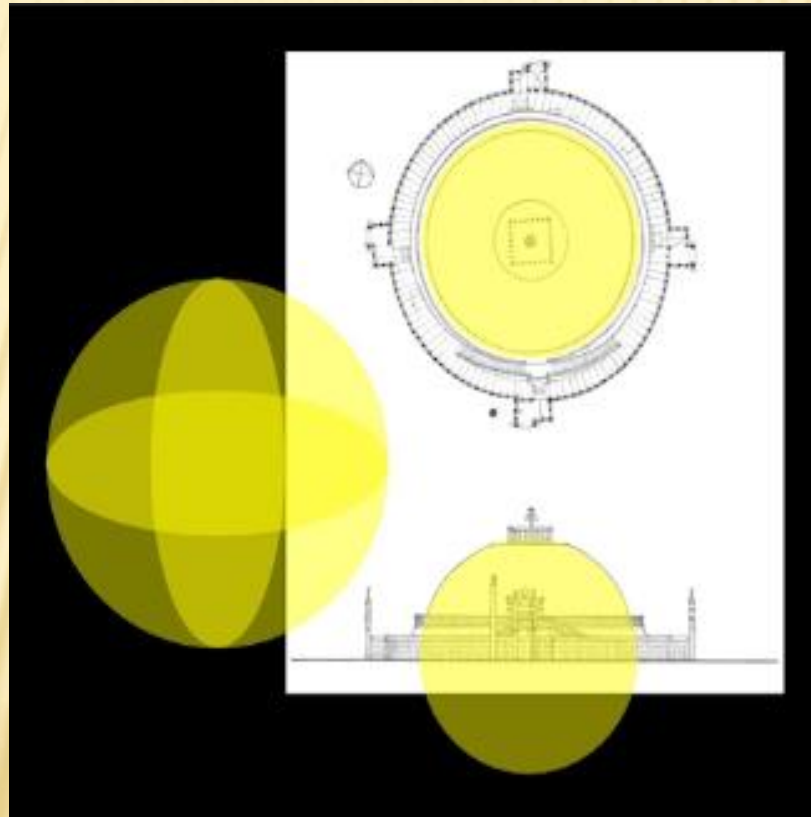
SHAPE

“While we think of shape in *two dimensional* figures, we should also visualize *three dimensional* forms they might represent”[1]



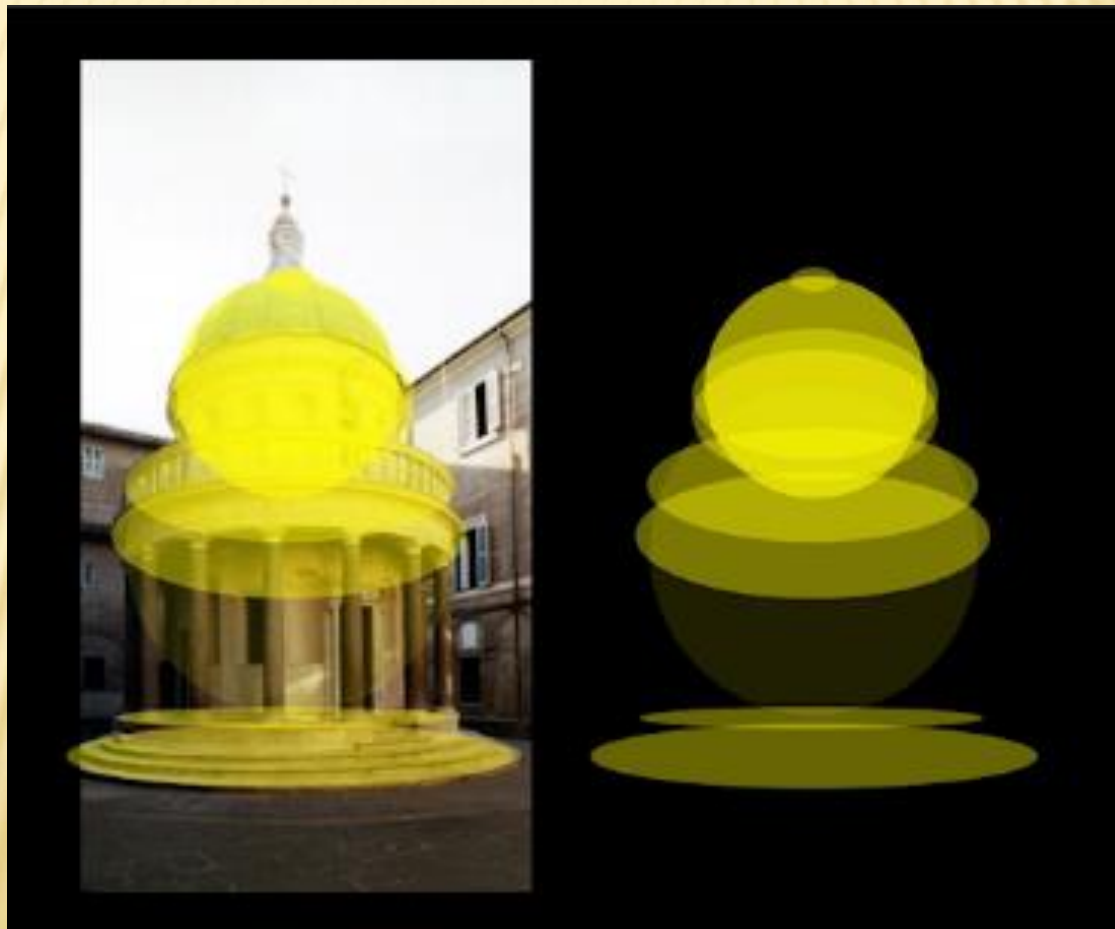
SHAPE

“When conceiving **three-dimensional** form we should simultaneously consider the **two-dimensional** shapes that might give rise to the form” [1]



SHAPE

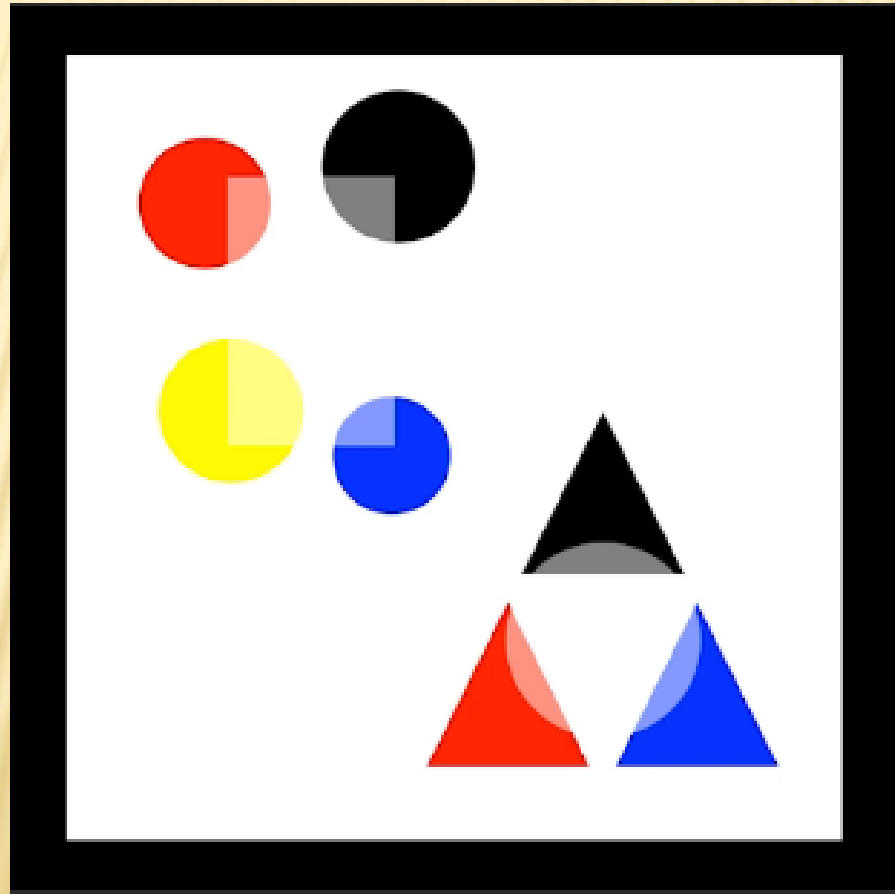
*“Because perception of shape can be distorted by **perspective for shortening**, we see true shape of a plane only when viewed frontally ... however we can still visualize true shape” [1]*



SHAPE

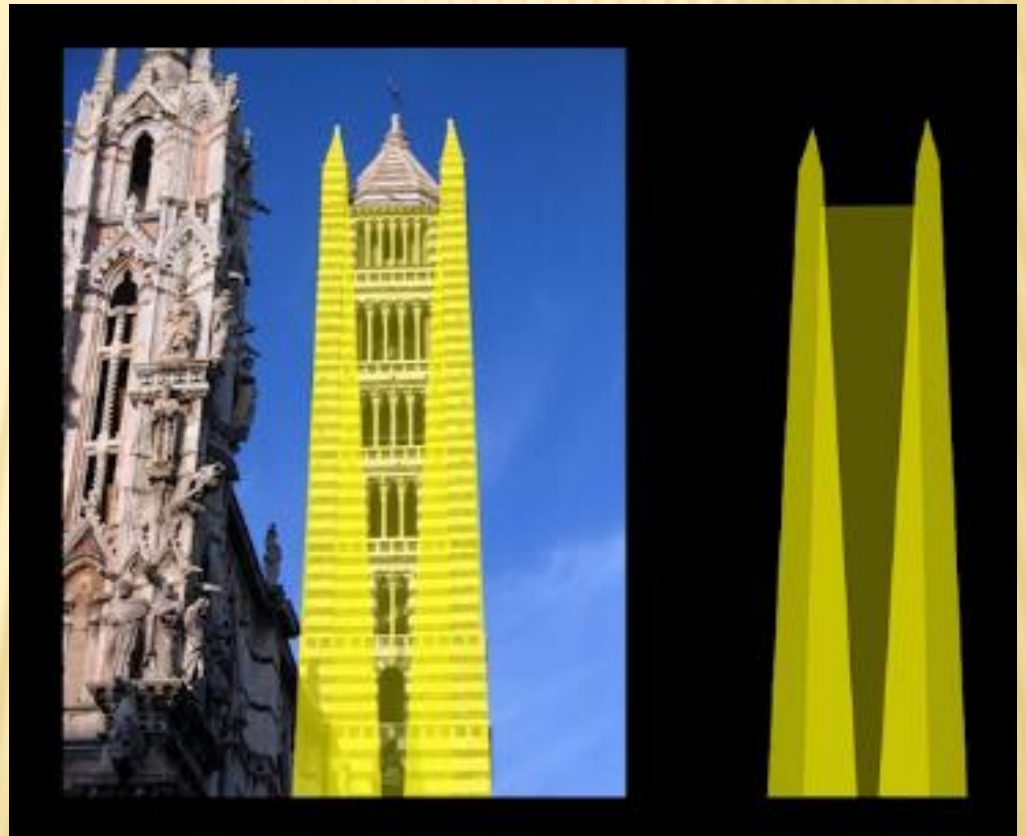
“ **Closure** refers to tendency for an open or discontinuous figure to be seen as if it were a closed, complete, and stable shape

... Even when a line does not exist, the **minds-eye** can create a line in an attempt to **regularize a shape** and make it visible” [1]



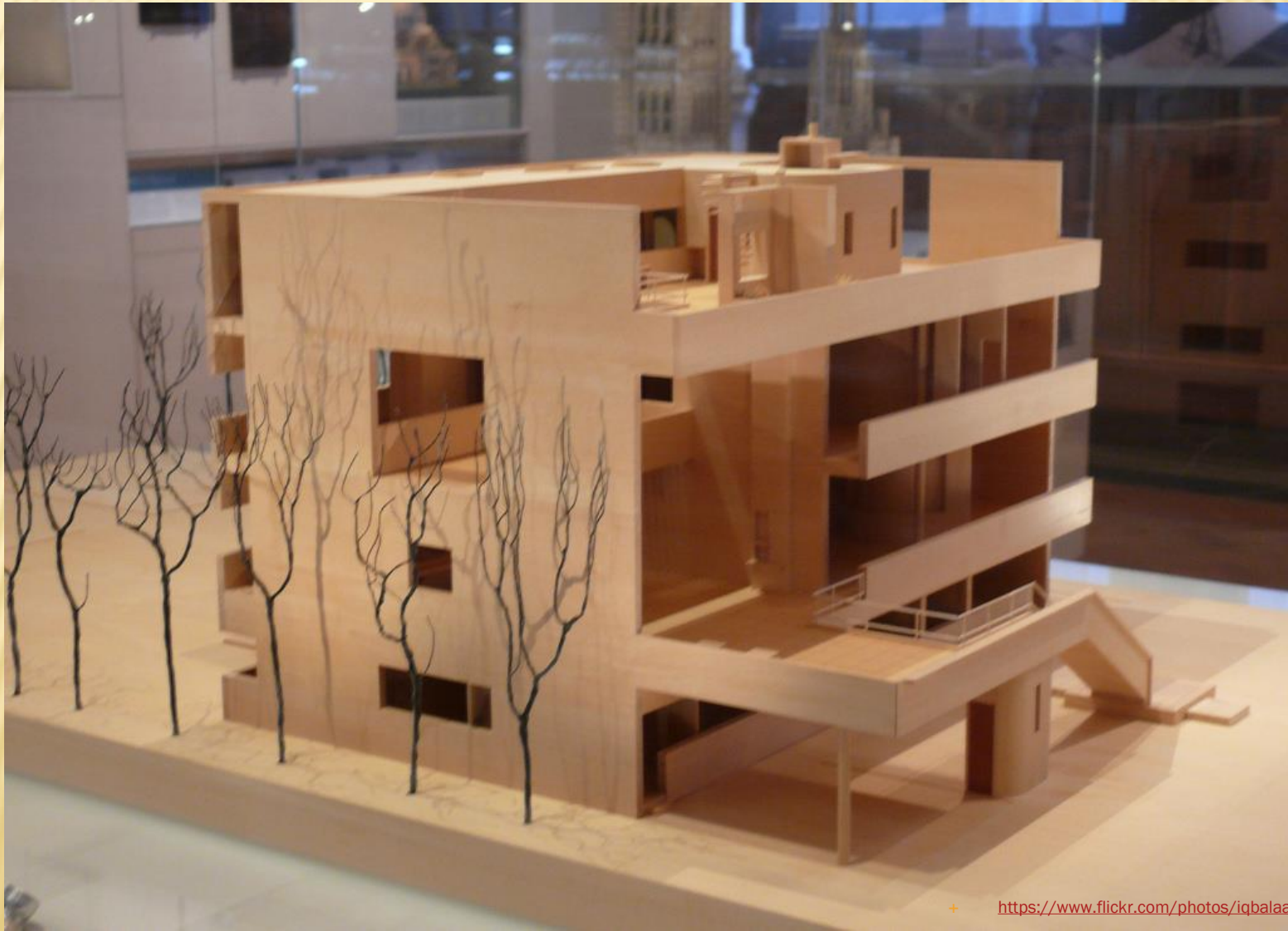
SHAPE

“Therefore in addition to the outward shapes that are easily recognizable, it is important to discern the shape suggested by the principle of closure” [1]

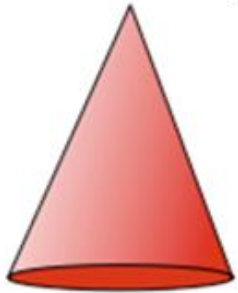


SHAPE

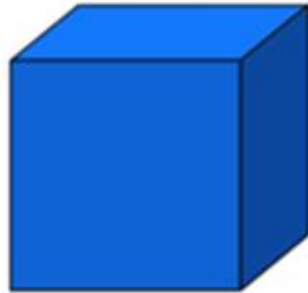
“Villa Gaches in France, 1927, by Le Corbusier, illustrates interplay between planar solids and voids” [1]



SHAPE - PRIMARY SOLIDS



Cone



Cube



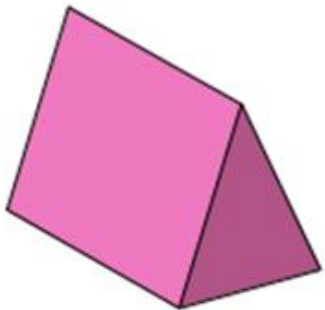
Cuboid



Sphere



Cylinder



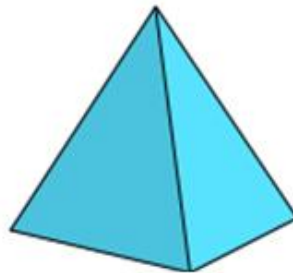
Prism

*Triangular prism



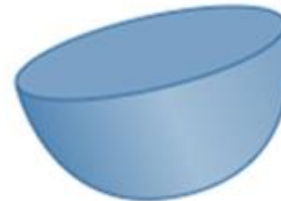
Tetrahedron

*Triangular pyramid

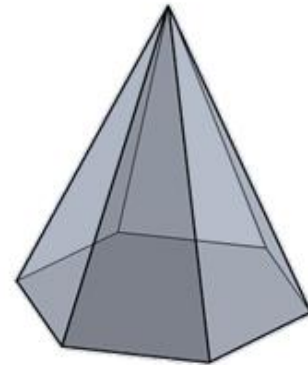


Pyramid

*Square Pyramid



Hemisphere



Hexagonal
Pyramid

SHAPE - PRIMARY SOLIDS

*“A **cylinder** is centralized about an axis, and can be easily extended; it’s **unstable** when it's axis is **inclined**”*

*... the **cone and pyramid** are **stable** on their **base** or can rest on their **apex** in a **precarious** state of **balance***

*...the **cube** is **very static and stable***

*...the **sphere** and other **curvilinear solids** on their **side** can evoke a **feeling of motion** [1]”*

SHAPE - SQUARE

“The square represents the pure and the rational” [1]



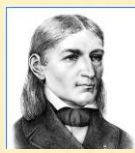
Frank Lloyd Wright
1867-1958



Unity Temple in Oak Park, 1905 Frank Lloyd Wright
(UNITARIAN)

FRANK LLOYD WRIGHT'S EARLIEST INFLUENCES [2,3,6,7,8,9,10]

- ✘ FROEBEL influenced by Taoism and Buddhism
 - + Japanese Shinto rooted in Chinese Taoism
 - ✘ Shinto Gods in everything, especially **nature**
 - ✘ FLW later loved Japanese Art, Design, and Culture



Friedrich Froebel
1782-1852 Germany



Maria Montessori
1913 in Italy

- ✘ Mother's family were all **UNITARIANS**
 - + Inspiration from all religions, love **nature**, God in everything



FATHER

Preacher, Lawyer, School Superintendent, Teacher, Musician
B.A., M.A. Colgate University
"Artist, photographer, and designer of furniture, graphics, books, and buildings, his patronage of Chinese and Japanese art, his obsession with every aspect of his surroundings, his dedicated collecting of beautiful things, owed much to his father" [Huxtable 2004]



MOTHER

Homeschool Teacher
using Froebel System

Others in history homeschooled:
Leonardo da Vinci, Monet, Mozart, Bach, Newton, Ben Franklin, Edison, Jefferson, Washington, Einstein, Teddy and Franklin-Delano Roosevelt, Churchill, John Muir, and the Wright brothers



- ✘ Most of childhood in rural **WISCONSIN**
 - + Like Pennsylvania farmland
 - ✘ Wunderlich farmhouse and barn



Frank Lloyd Wright 1867-1959



Future Designers



Strong Geometric Shapes in Frank Lloyd Wright's 1905 Unity Temple in Oak Park (a Chicago suburb) [3] .. influenced by the **Froebel blocks** of his childhood homeschooling [6]

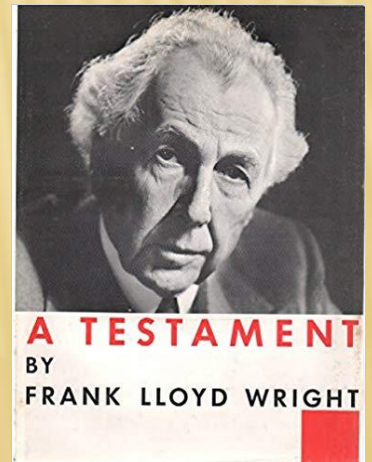
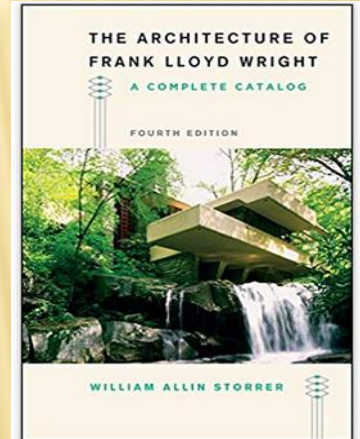


Frank Lloyd Wright
1867-1958



Unity Temple in Oak Park, 1905 Frank Lloyd Wright
(UNITARIAN)

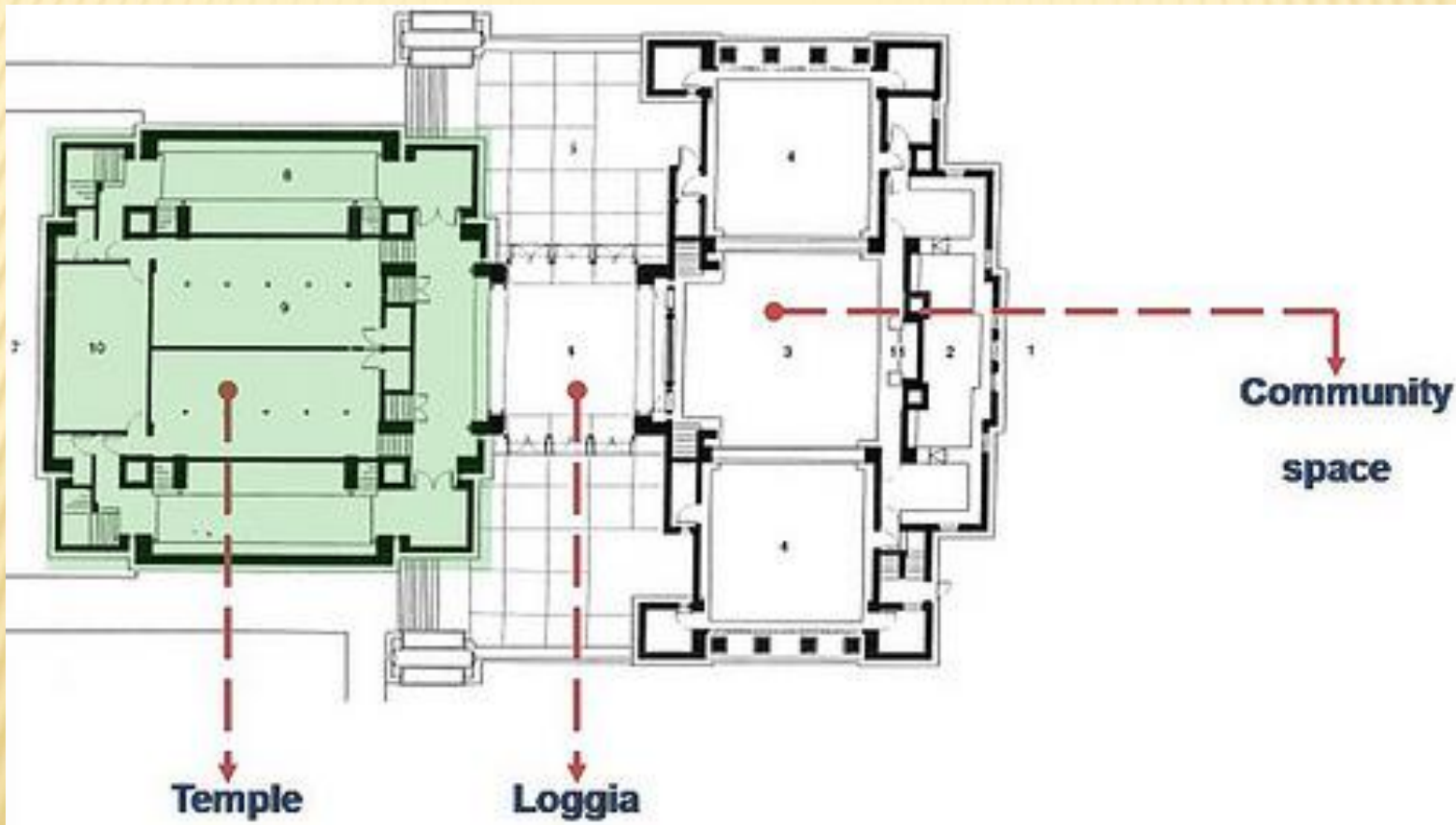
<https://chicago.curbed.com/2018/11/13/18087686/oak-park-apartment-high-unity-temple>



SHAPE - SQUARE



Frank Lloyd Wright
1867-1958



Unity Temple in Oak Park, 1905 Frank Lloyd Wright
(UNITARIAN)



Frank Lloyd Wright
1867-1958



Unity Temple in Oak Park, 1905 Frank Lloyd Wright
(UNITARIAN)

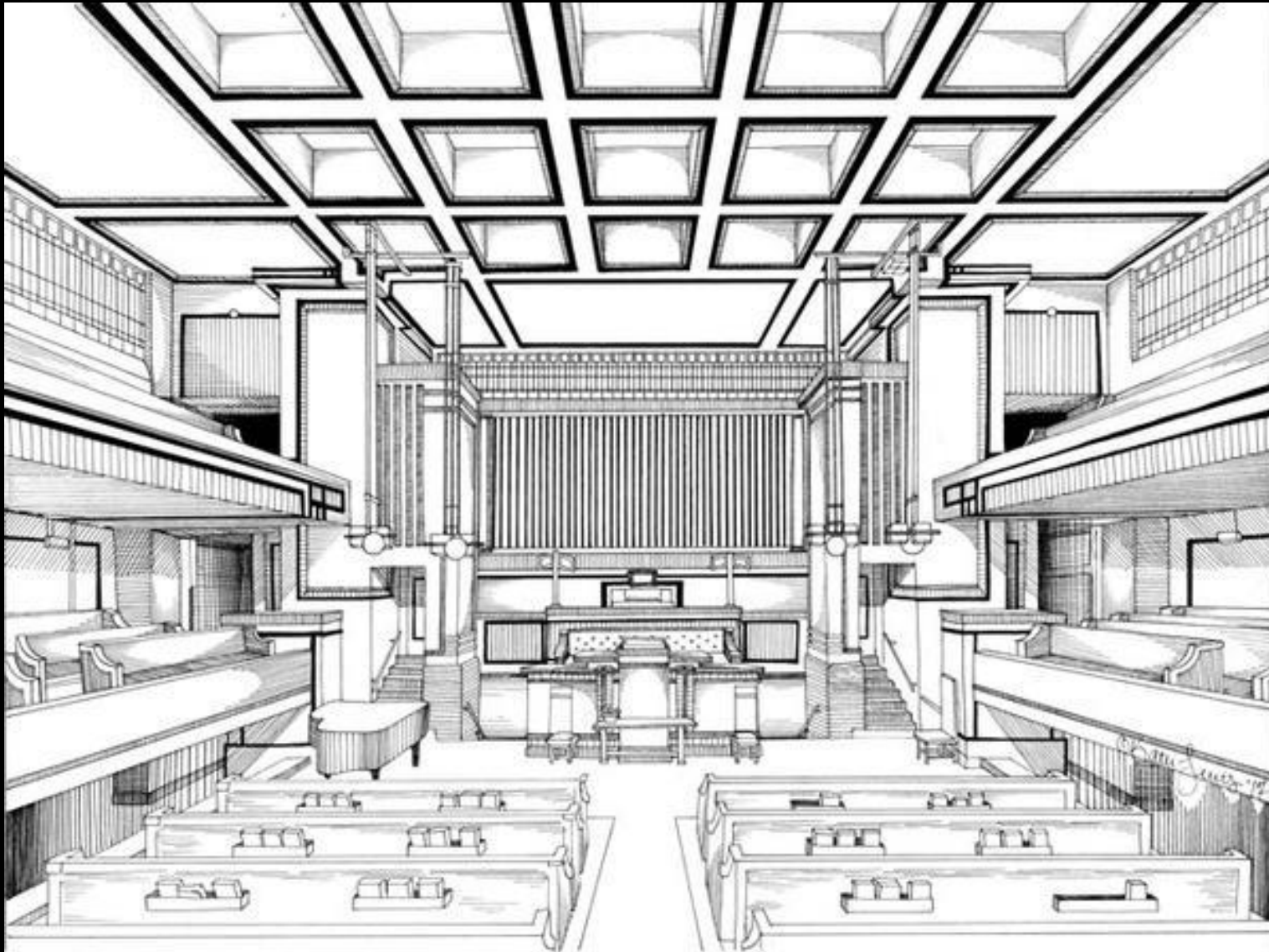
<https://www.alamy.com/stock-photo-unity-temple-oak-park-illinois-frank-lloyd-wright-37485614.html>

VIDEO: <https://www.youtube.com/watch?v=wiZPjjCvzMY&t=0s&list=PLQ8x1YyBhZPh702IL3Bi750aQ3SjyK-7P&index=3>

SHAPE - SQUARE



Frank Lloyd Wright
1867-1958

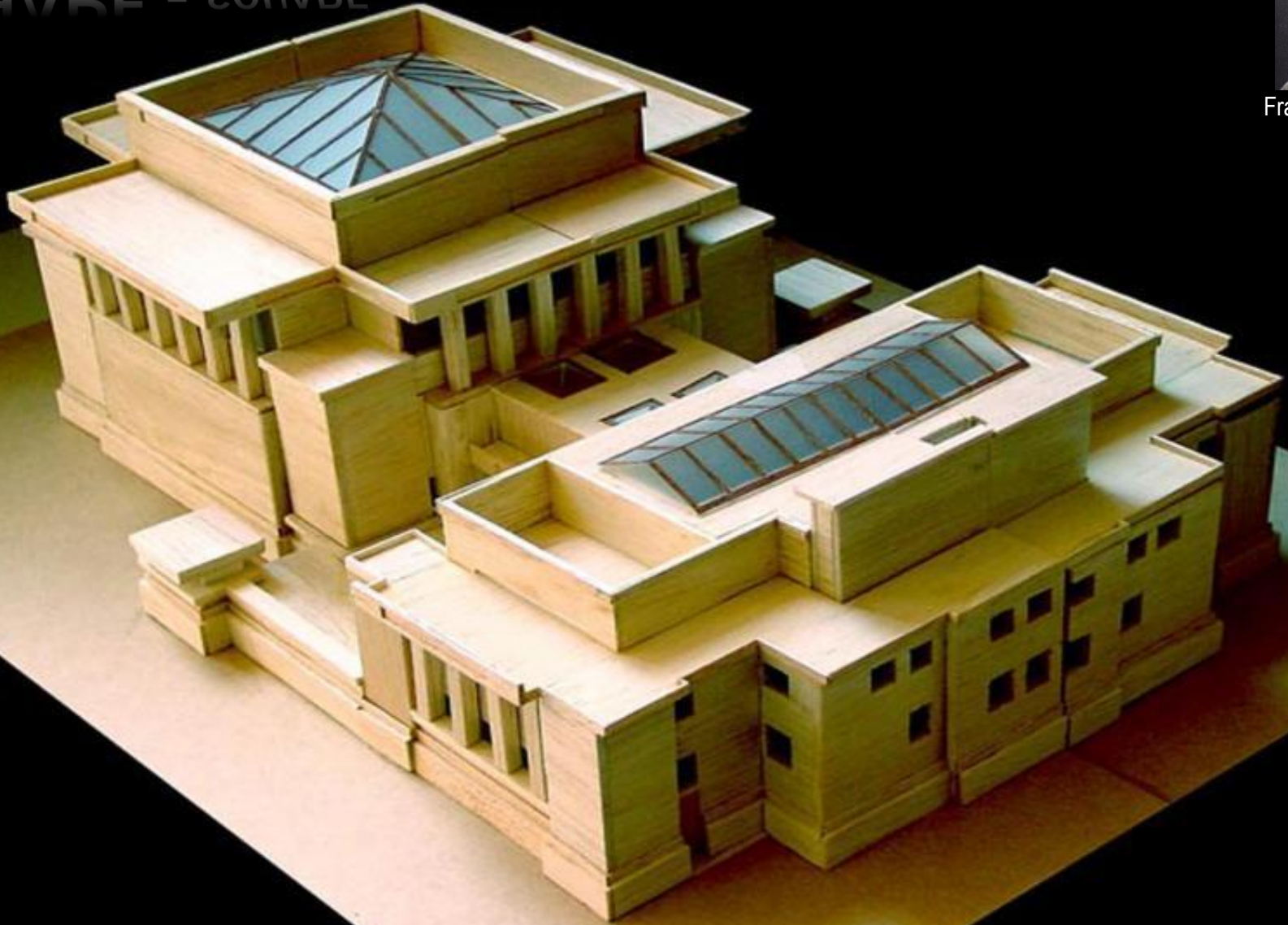


SKETCH of Unity Temple, Oak Park, 1905 Frank Lloyd Wright

SHAPE - SQUARE



Frank Lloyd Wright
1867-1958



WOOD MODEL of Unity Temple, Oak Park, 1905 Frank Lloyd Wright

SHAPE - SQUARE



Frank Lloyd Wright
1867-1958



WOOD MODEL of Unity Temple, Oak Park, 1905 Frank Lloyd Wright

<http://www.historiaenobres.net/ficha.php?idioma=es&id=149>

SHAPE - TRIANGLE

*“Gestalt psychology says we reduce what we see to the simplest and most regular shapes which are easier to perceive and understand ... a triangular is easy to recognize , and when resting on one side, is a **stable figure**” [1]*

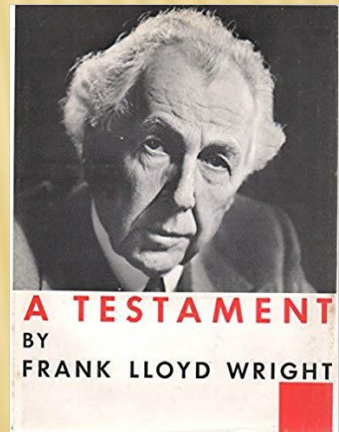
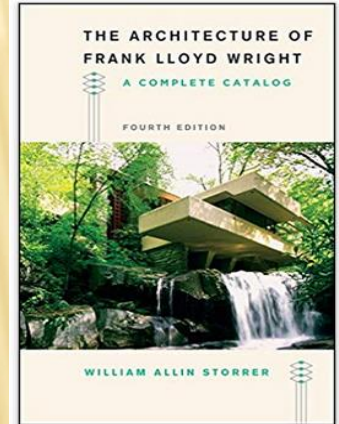


SHAPE - TRIANGLE

Strong Geometric Shapes in Frank Lloyd Wright's 1889 home in Oak Park (a Chicago suburb) [3] .. influenced by the Froebel blocks of his childhood homeschooling [6]



Frank Lloyd Wright
1867-1958



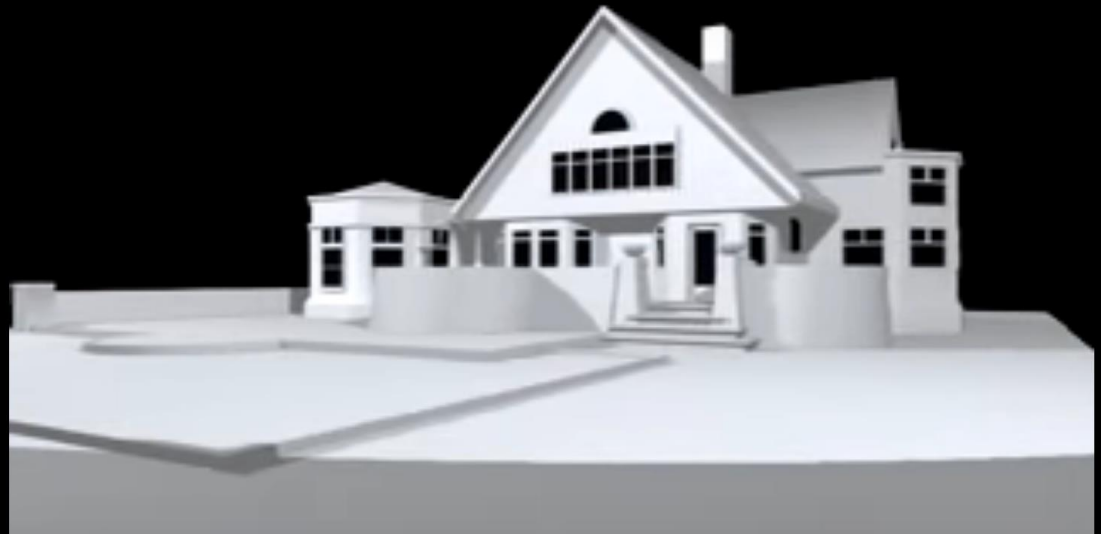
SHAPE - TRIANGLE



Frank Lloyd Wright
1867-1958

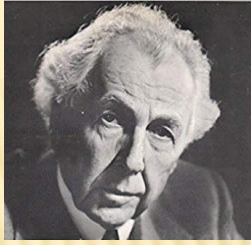
COMPUTER MODEL of Frank Lloyd Wright's 1889 home in Oak Park

VIDEO: <https://www.youtube.com/watch?v=E8Gev56ND8U>



SHAPE - TRIANGLE

“Symbolizes hands folded praying”



Frank Lloyd Wright
1867-1958

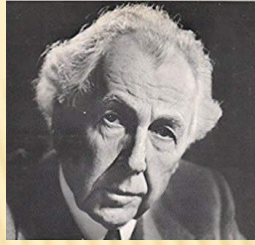


Unitarian Meeting House, Madison Wisconsin, 1947 Frank Lloyd Wright

<https://fusmadison.org/welcome/meeting-house/>

SHAPE - TRIANGLE

“Symbolizes hands folded praying”



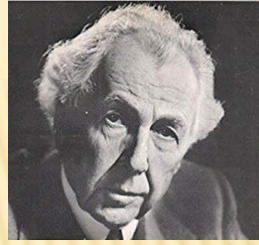
Frank Lloyd Wright
1867-1958



Unitarian Meeting House, Madison Wisconsin, 1947 Frank Lloyd Wright

<https://franklloydwrightsites.com/wisconsin/madison/unitarian/unitarian.htm>

SHAPE - TRIANGLE



Frank Lloyd Wright
1867-1958

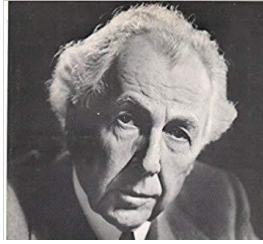
“Symbolizes hands folded praying”



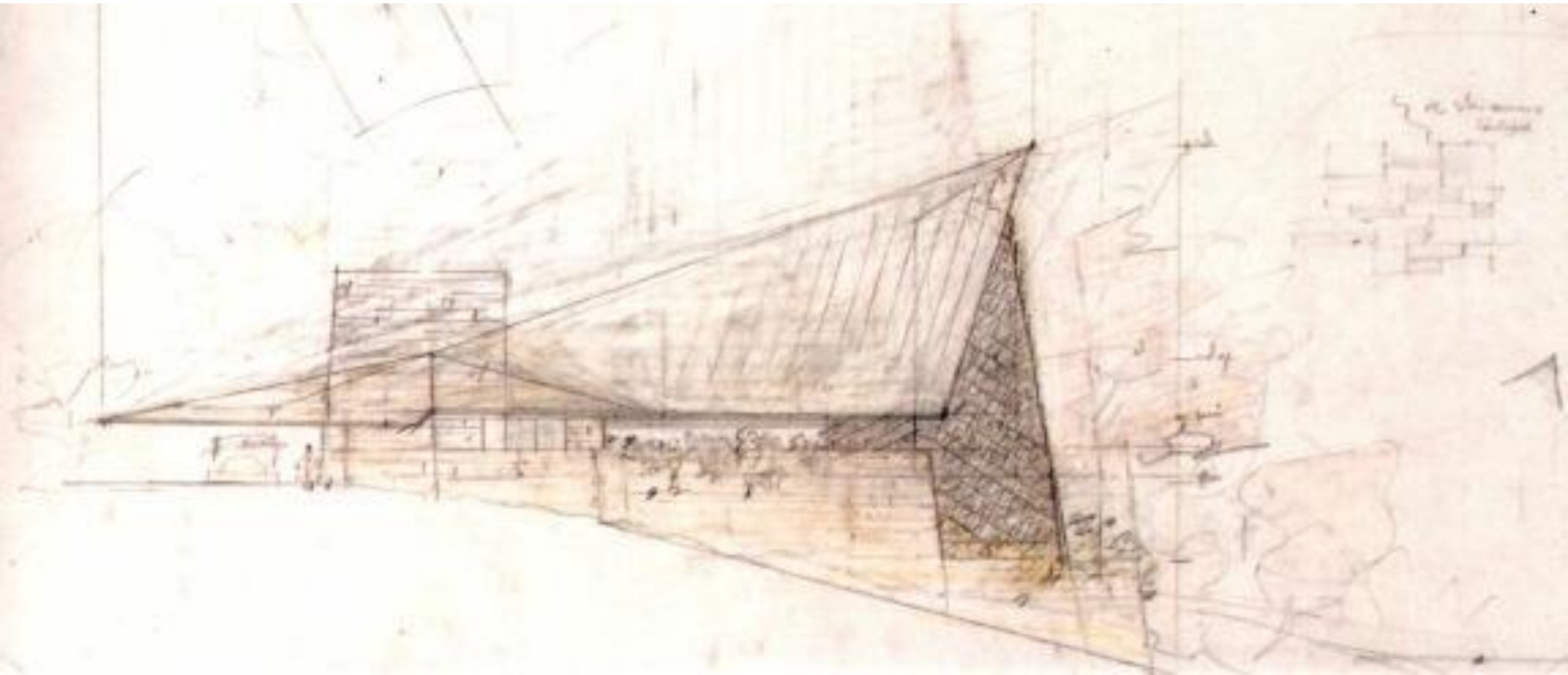
Unitarian Meeting House, Madison Wisconsin, 1947 Frank Lloyd Wright

<https://fusmadison.org/welcome/meeting-house/tours/>

SHAPE - TRIANGLE



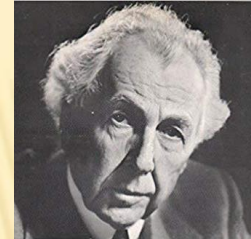
Frank Lloyd Wright
1867-1958



SKETCH of Unitarian Meeting House, Madison WI, 1947 Frank Lloyd Wright

<https://www.wrightontheweb.net/his-works/17-buildings/unitarian/unchdraw/>

SHAPE - TRIANGLE



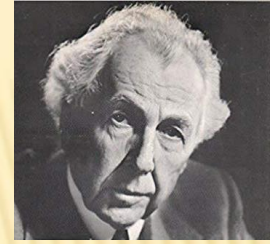
Frank Lloyd Wright
1867-1958



William H. Danforth Chapel, Florida Southern College,
1954 Frank Lloyd Wright

<https://www.bluffton.edu/homepages/facstaff/sullivanm/florida/lakeland/floridasouthern/wrightdanforth.html>

SHAPE - TRIANGLE



Frank Lloyd Wright
1867-1958

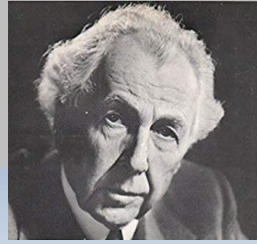


William H. Danforth Chapel, Florida Southern College,
1954 Frank Lloyd Wright

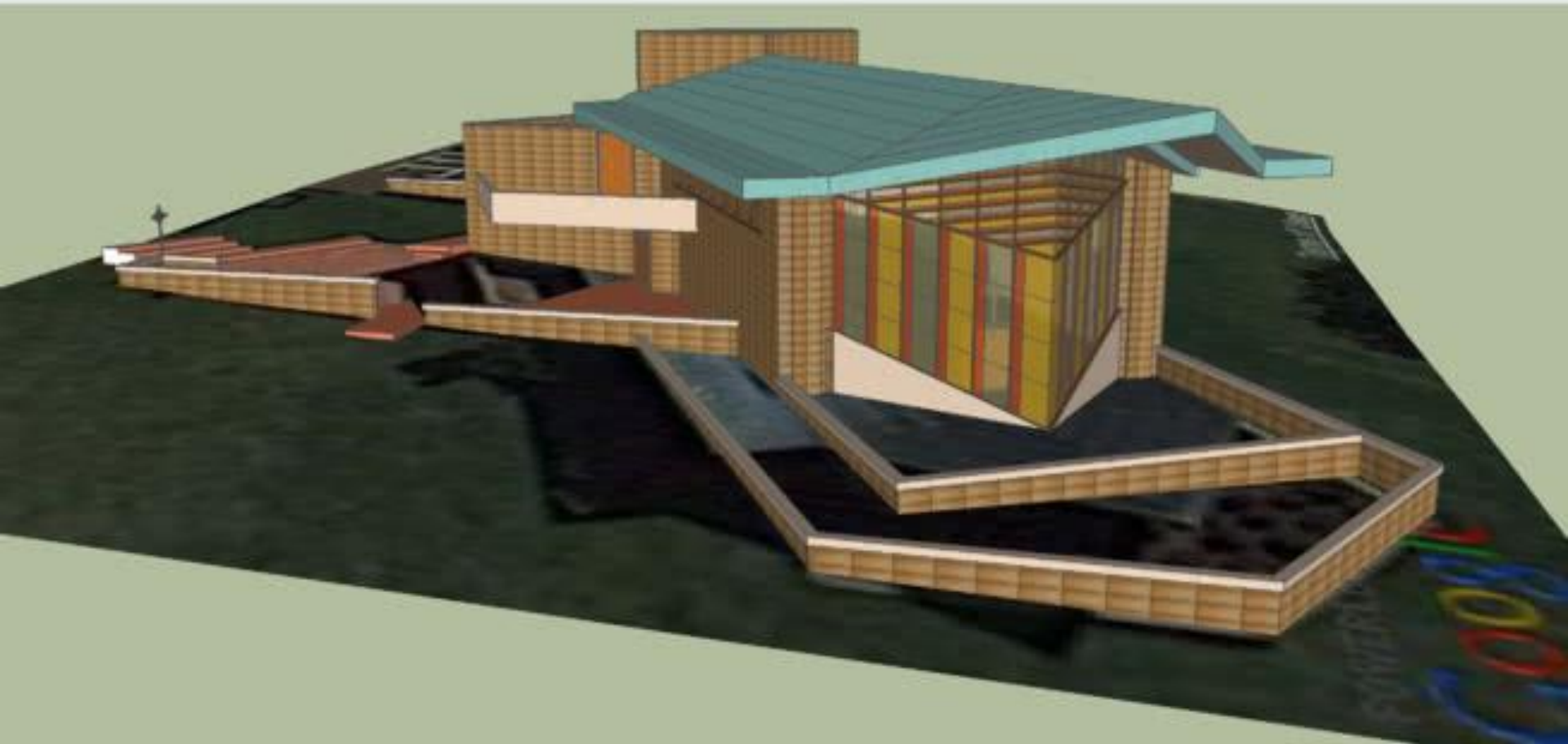
VIDEO: <https://www.youtube.com/watch?v=mASnuWiRbOM>

<https://www.bluffton.edu/homepages/facstaff/sullivanm/florida/lakeland/floridasouthern/wrightdanforth.html>

SHAPE - TRIANGLE



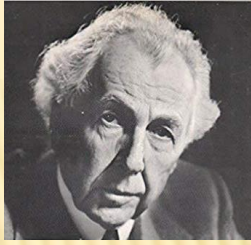
Frank Lloyd Wright
1867-1958



COMPUTER MODEL of William H. Danforth Chapel, Florida Southern College
1954 Frank Lloyd Wright

<https://3dwarehouse.sketchup.com/model/31e780cc1ccab3e35399b56adb25d441/Danforth-Chapel-Florida-Southern-College?hl=es>

SHAPE - TRIANGLE

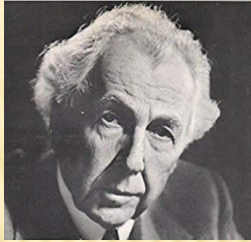


Frank Lloyd Wright
1867-1958

“Beth Shalom Synagogue in Philadelphia, 1954: A hexagon that tends towards an equilateral Triangle” [3]

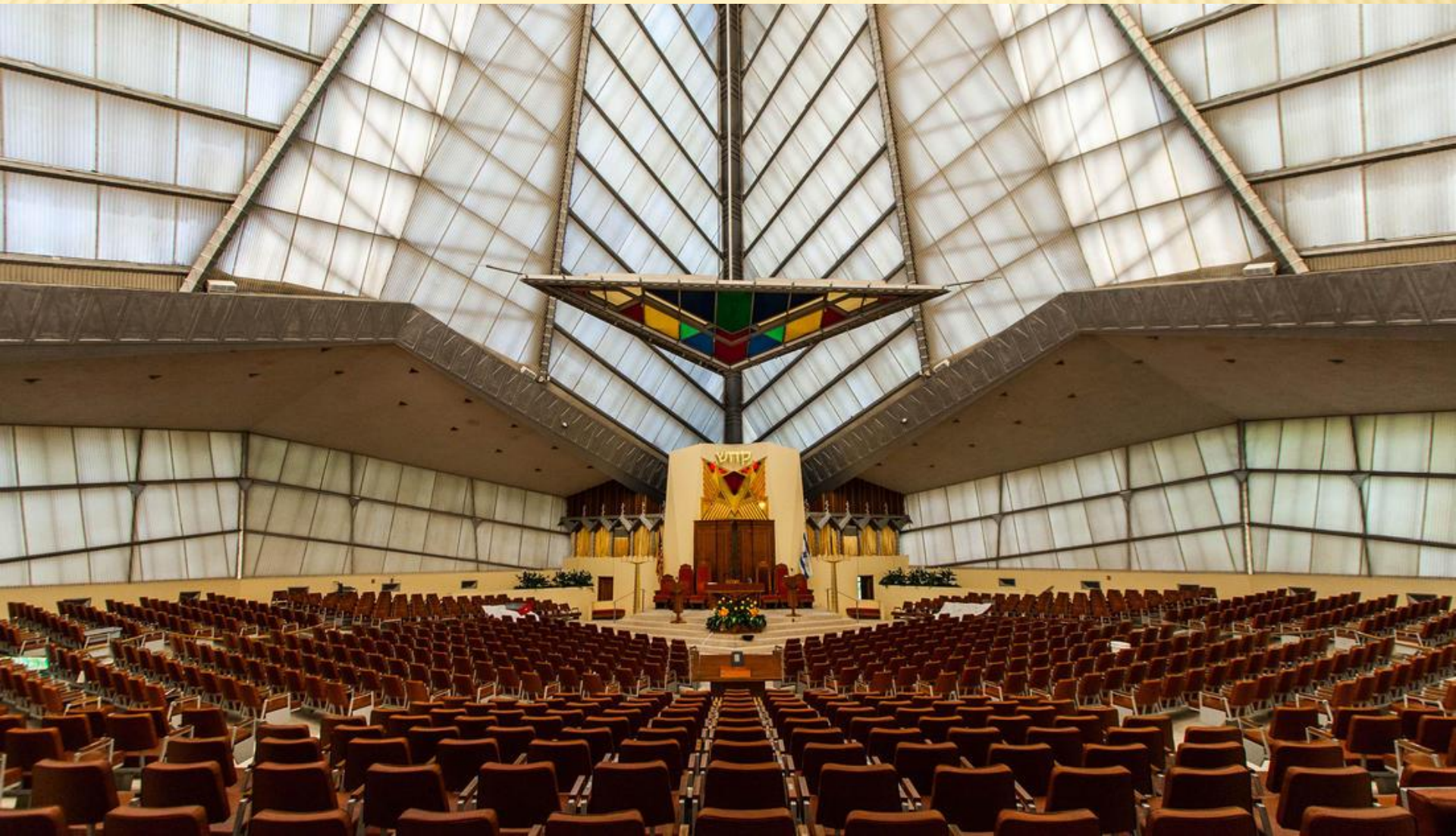


SHAPE - TRIANGLE



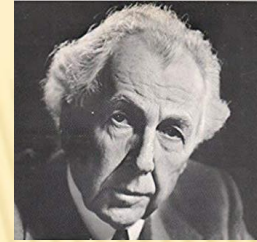
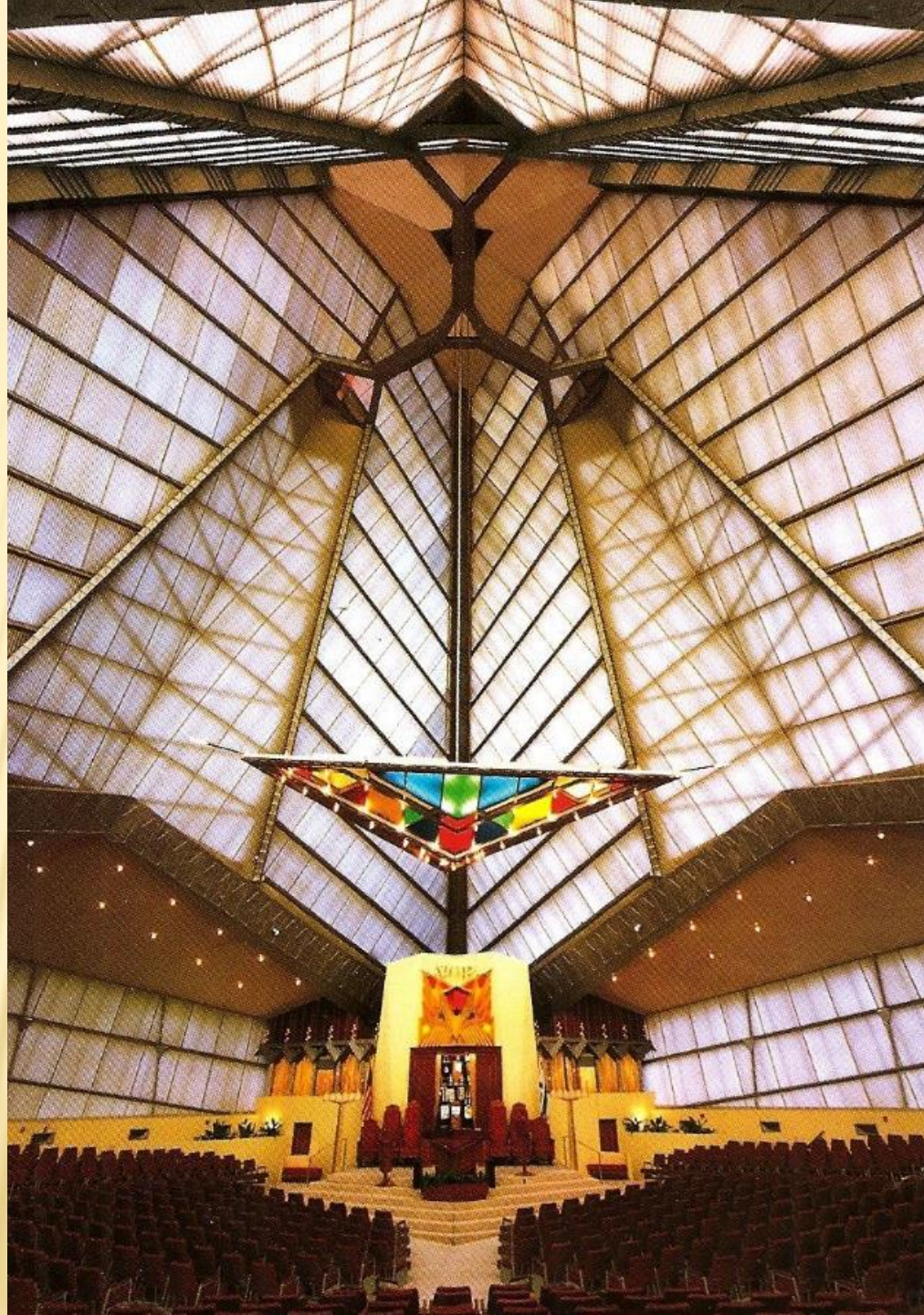
Frank Lloyd Wright
1867-1958

“Beth Shalom Synagogue ... a 160-ton steel tripod frame allows 1,023 seats” [3]



SHAPE - TRIANGLE

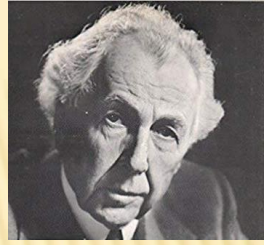
*“Beth Shalom
Synagogue....complete
freedom from internal
supports” [3]*



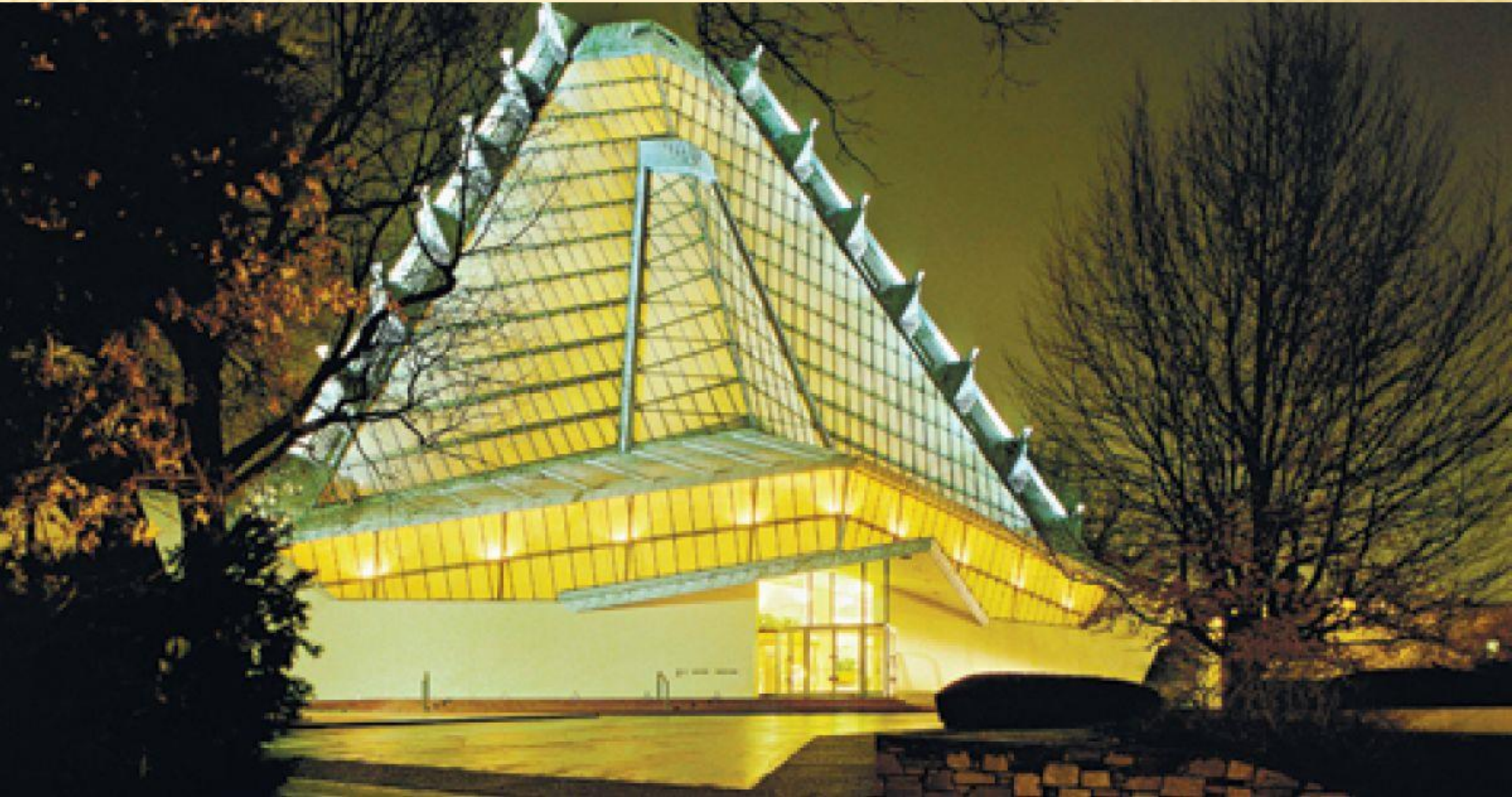
Frank Lloyd Wright
1867-1958

SHAPE - TRIANGLE

*“Beth Shalom Synagogue ...a double layer of translucent panels...
transmits soft light...” [3]*

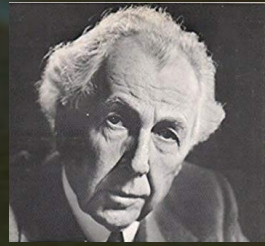


Frank Lloyd Wright
1867-1958



SHAPE - TRIANGLE

PLASTIC MODEL of Beth Shalom Synagogue, Philadelphia, 1954



Frank Lloyd Wright
1867-1958



SHAPE - TRIANGLE

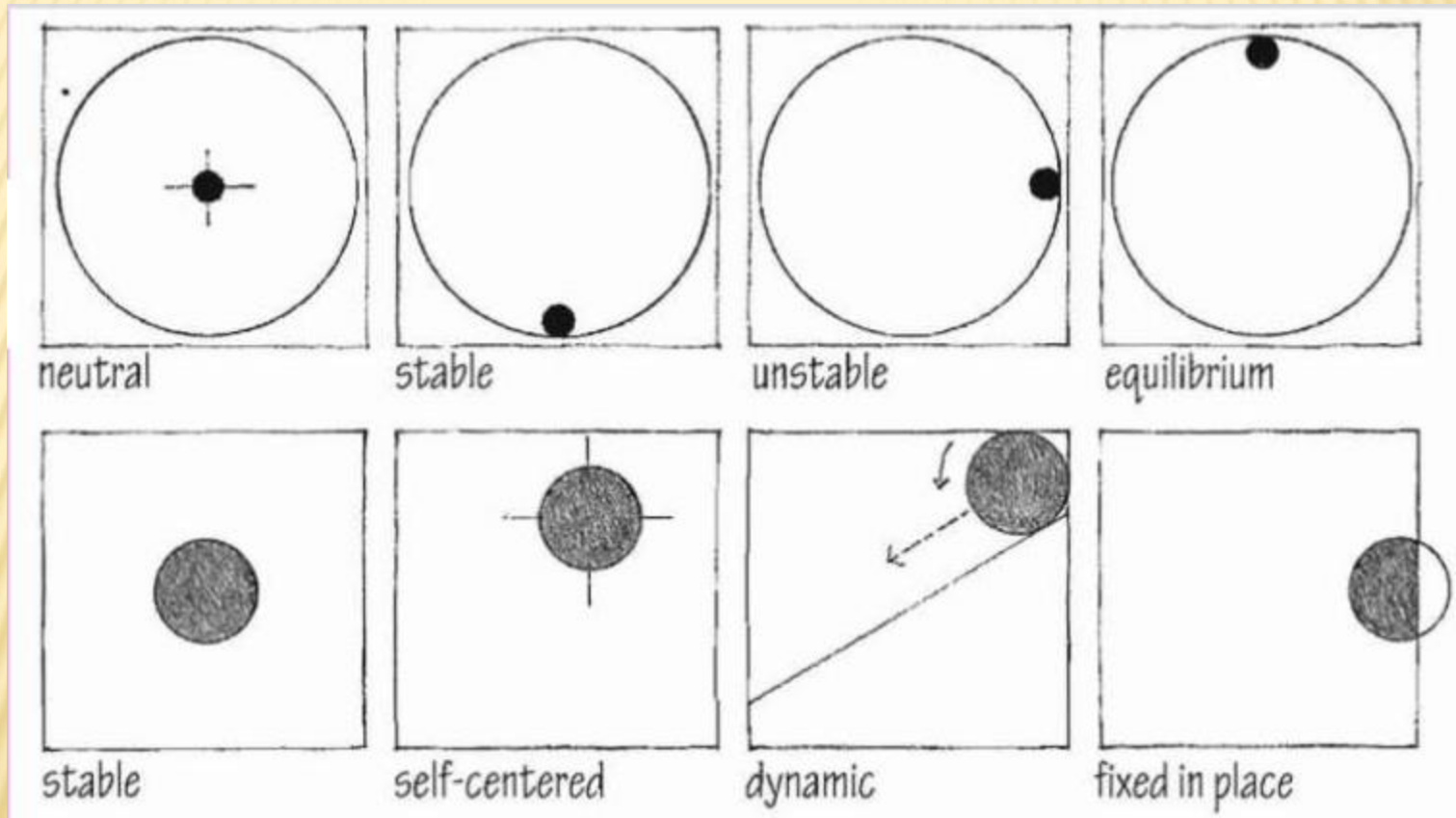
*“When tipped a triangle can be in a precarious state of equilibrium, and be **unstable**” [1]*



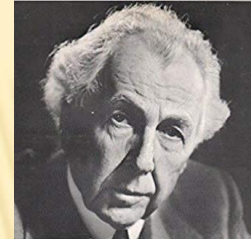


UCSD (University of California at San Diego) Library
where Professor Wunderlich spent time studying Urban Design

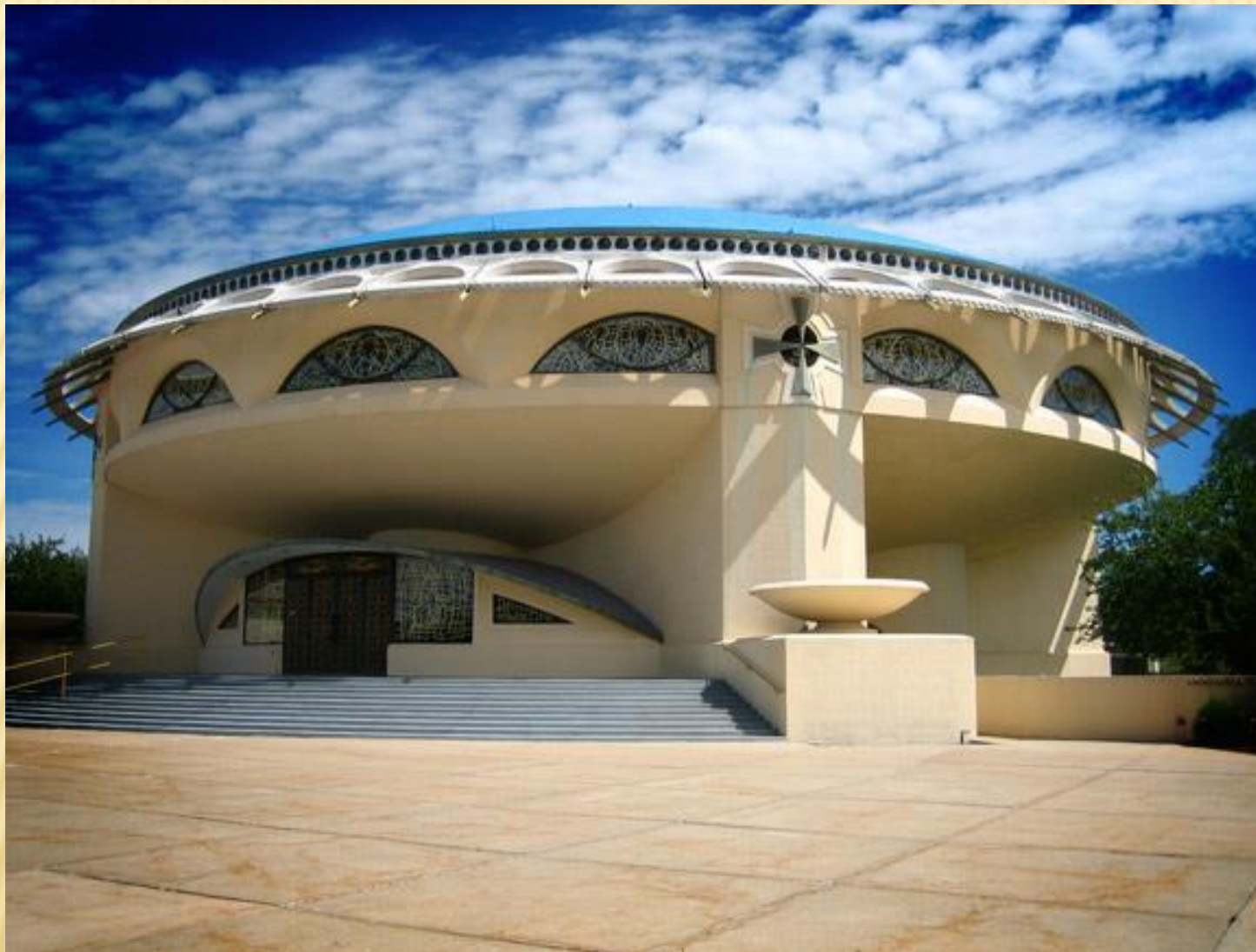
SHAPE - CIRCLE



SHAPE - CIRCLE

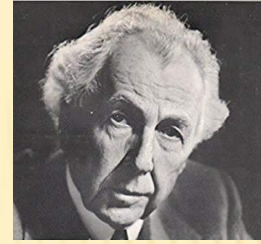


Frank Lloyd Wright
1867-1958

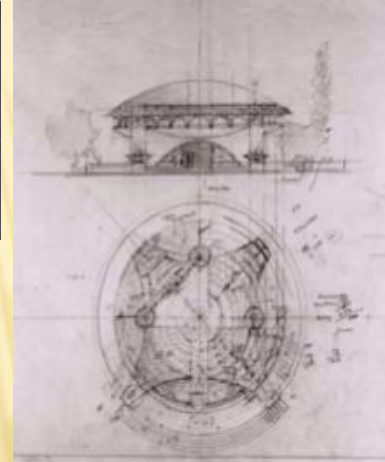


Annunciation Greek Orthodox Church, Wauwatosa WI.
1956 Frank Lloyd Wright

SHAPE - CIRCLE



Frank Lloyd Wright
1867-1958

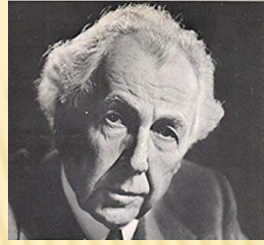


Annunciation Greek Orthodox Church, Wauwatosa WI.

1956 Frank Lloyd Wright

<https://www.wisconsinhistory.org/Records/Property/HI8918>

SHAPE - CIRCLE
SHAPE - CIRCLE



Frank Lloyd Wright
1867-1958

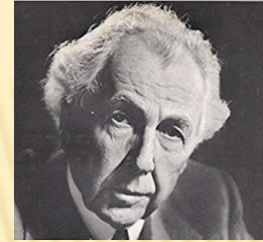


Annunciation Greek Orthodox Church, Wauwatosa WI.

1956 Frank Lloyd Wright

<https://wrightinracine.wordpress.com/tag/church/>

SHAPE - CIRCLE
SHAPE - CIRCLE



Frank Lloyd Wright
1867-1958



CHURCH FOR THE MILWAUKEE HELLENIC COMMUNITY
MILWAUKEE WISCONSIN
FRANK LLOYD WRIGHT, ARCHITECT



PAINTING of Annunciation Greek Orthodox Church, Wauwatosa WI.
1956 Frank Lloyd Wright

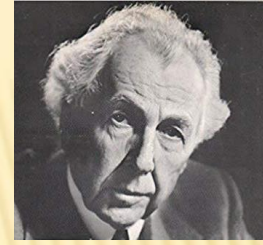
http://paintingandframe.com/prints/frank_lloyd_wright_annunciation_greek_orthodox_church_wauwatosa_wi-67098.html

PLASTIC MODEL of Guggenheim Museum, New York, 1959 Frank Lloyd Wright

<https://www.guggenheim.org/blogs/checklist/illuminating-details-from-frank-lloyd-wrights-guggenheim-blueprints>



SHAPE - CIRCLE



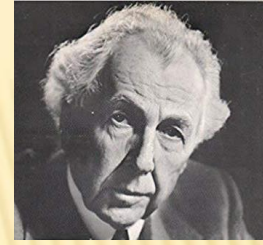
Frank Lloyd Wright
1867-1958



Guggenheim Museum, New York City, 1959 opening, Frank Lloyd Wright

<http://www.stua.com/design/guggenheim-museum-new-york/>

SHAPE - CIRCLE



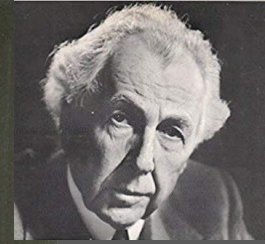
Frank Lloyd Wright
1867-1958



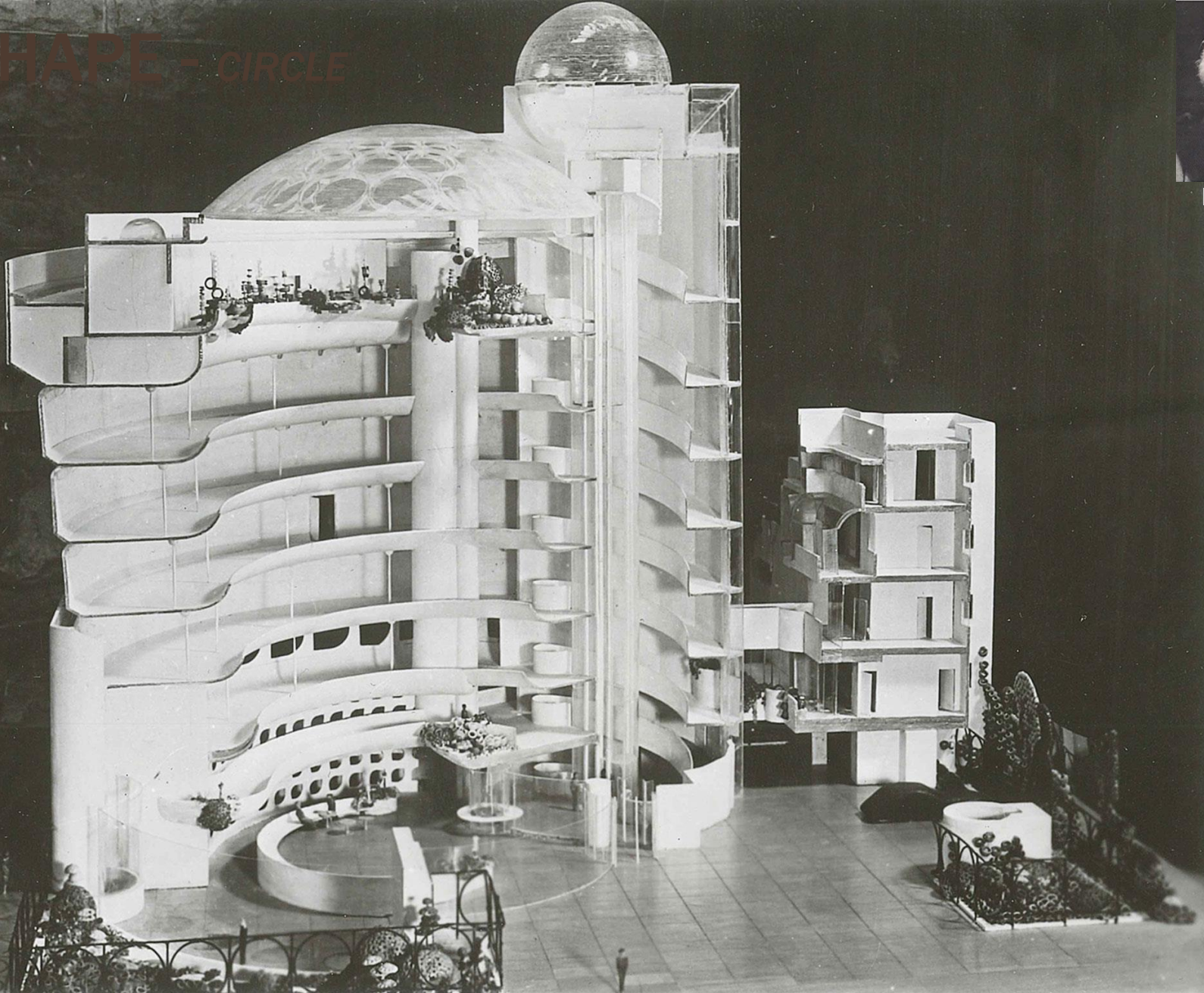
Guggenheim Museum, New York City, 1959 opening, by Frank Lloyd Wright

<https://twitter.com/guggenheim>

SHAPE - CIRCLE



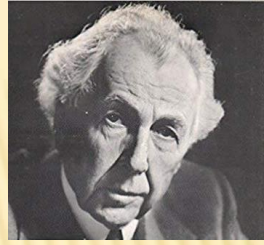
Frank Lloyd Wright
1867-1958



PLASTIC MODEL of Guggenheim Museum, New York, 1959 Frank Lloyd Wright

<https://www.guggenheim.org/blogs/checklist/illuminating-details-from-frank-lloyd-wrights-guggenheim-blueprints>

SHAPE - CIRCLE



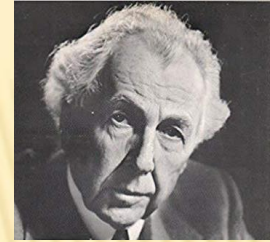
Frank Lloyd Wright
1867-1958



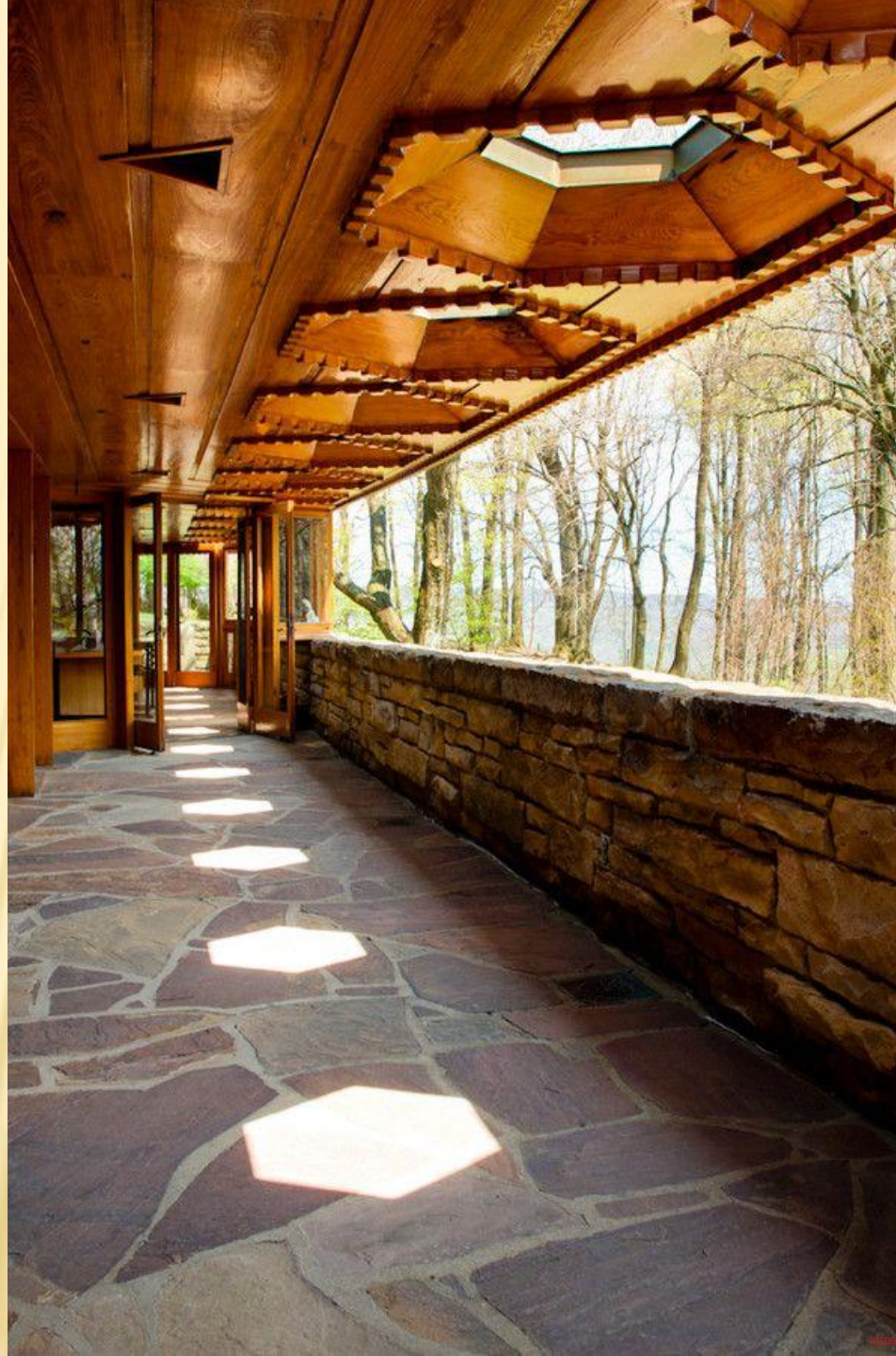
Guggenheim Museum, New York City, 1959 Frank Lloyd Wright

VIDEO: <https://www.youtube.com/watch?v=s2f4SRVp1pk&list=PLQ8x1YyBhZPh702IL3Bi750aQ3SjyK-7P&index=4&t=0s>

SHAPE - HEXAGON



Frank Lloyd Wright
1867-1958



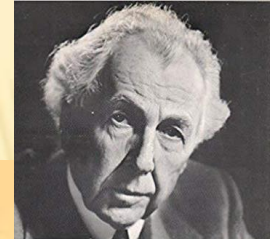
Hagen House/ Kentuck Knob,
Ohio, PA.

1956 Frank Lloyd Wright

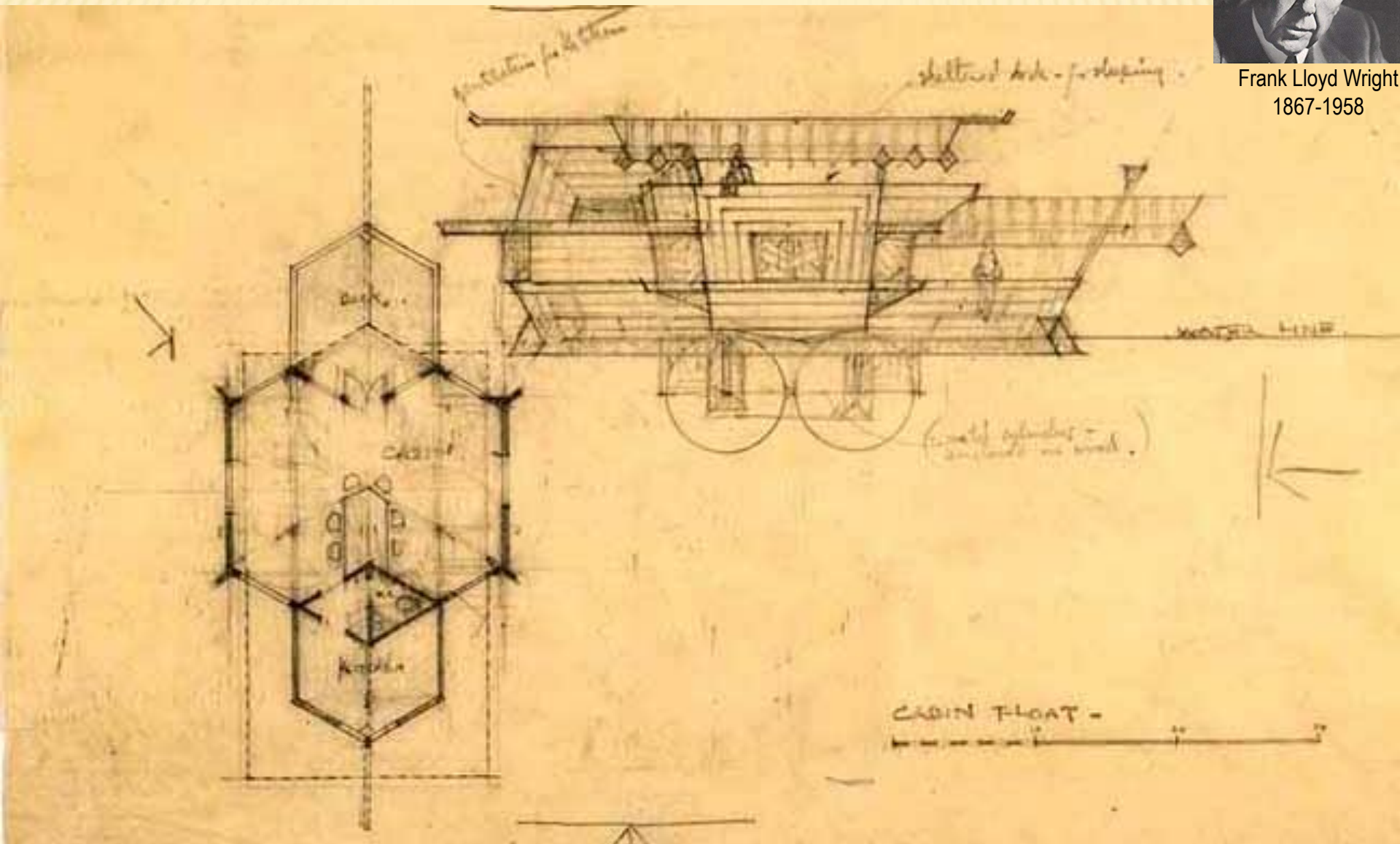
2015 Field Trip:

<http://users.etsu.edu/w/wunderjt/Frank%20Lloyd%20Wright%202015%20Field%20Trip%20for%20Architecture%20Minor%20students.pdf>

SHAPE - HEXAGON

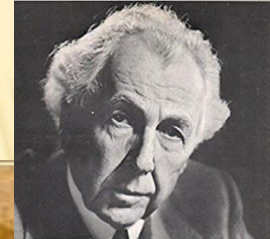


Frank Lloyd Wright
1867-1958



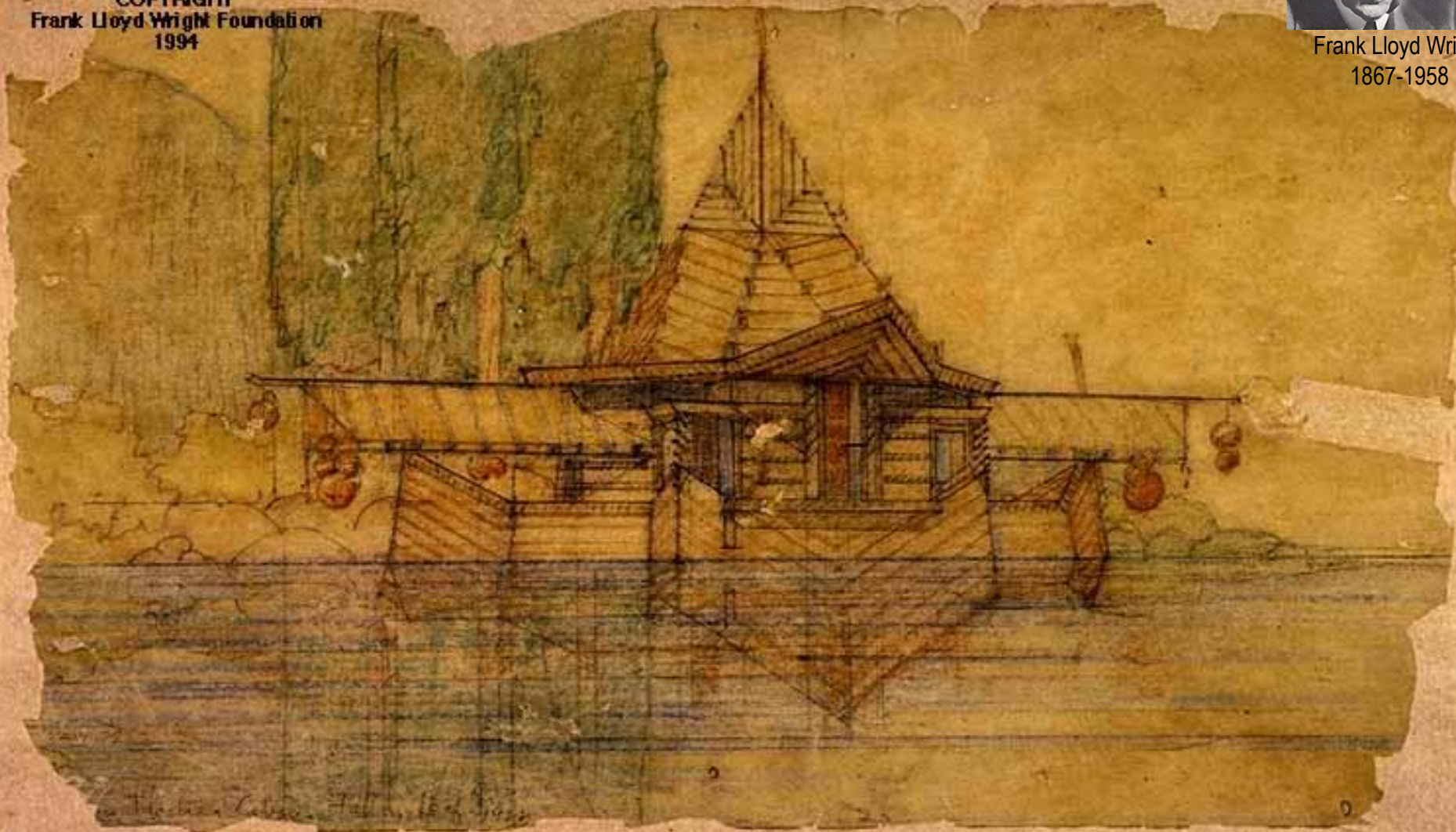
Boathouses, Lake Tahoe Summer Colony, Lake Tahoe, California
1923 Frank Lloyd Wright <http://atlasofinteriors.polimi-cooperation.org/2014/03/19/wright-tahoe/>

SHAPE - HEXAGON



Frank Lloyd Wright
1867-1958

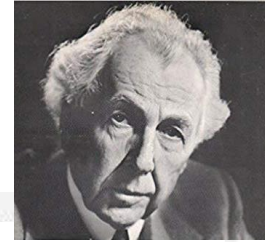
COPYRIGHT
Frank Lloyd Wright Foundation
1994



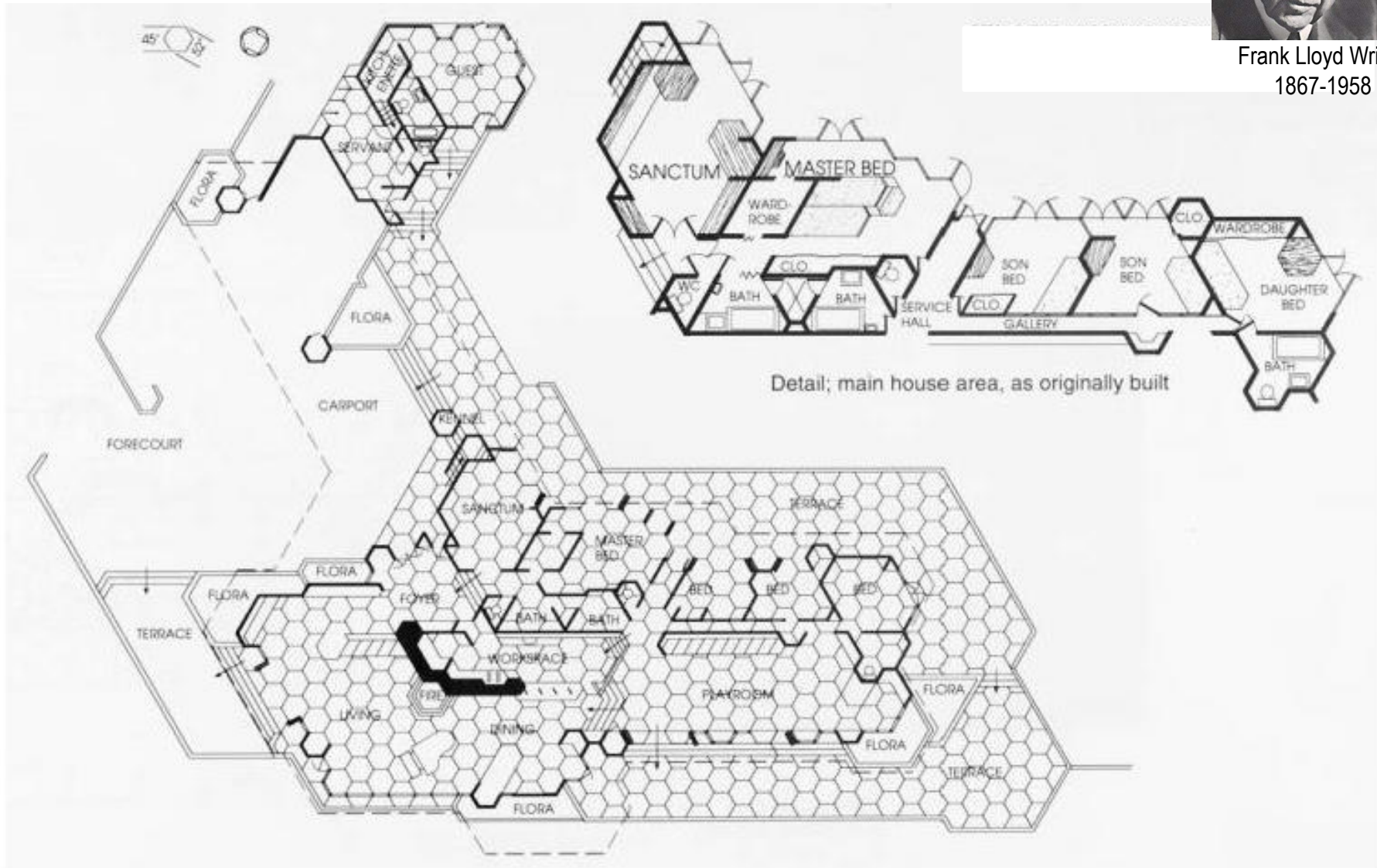
GRAPHITE and COLORED PENCIL on TRACING PAPER

Boathouses, Lake Tahoe Summer Colony, 1923 Frank Lloyd Wright <http://atlasofinteriors.polimi-cooperation.org/2014/03/19/wright-tahoe/>

SHAPE - HEXAGON

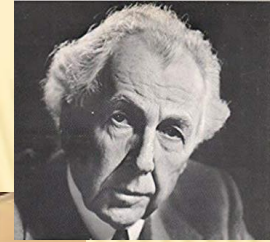


Frank Lloyd Wright
1867-1958



Hanna-Honeycomb House, Stanford California, 1937 Frank Lloyd Wright

SHAPE - HEXAGON



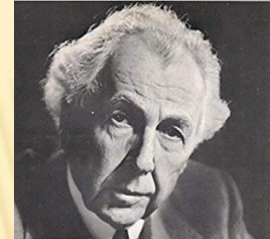
Frank Lloyd Wright
1867-1958



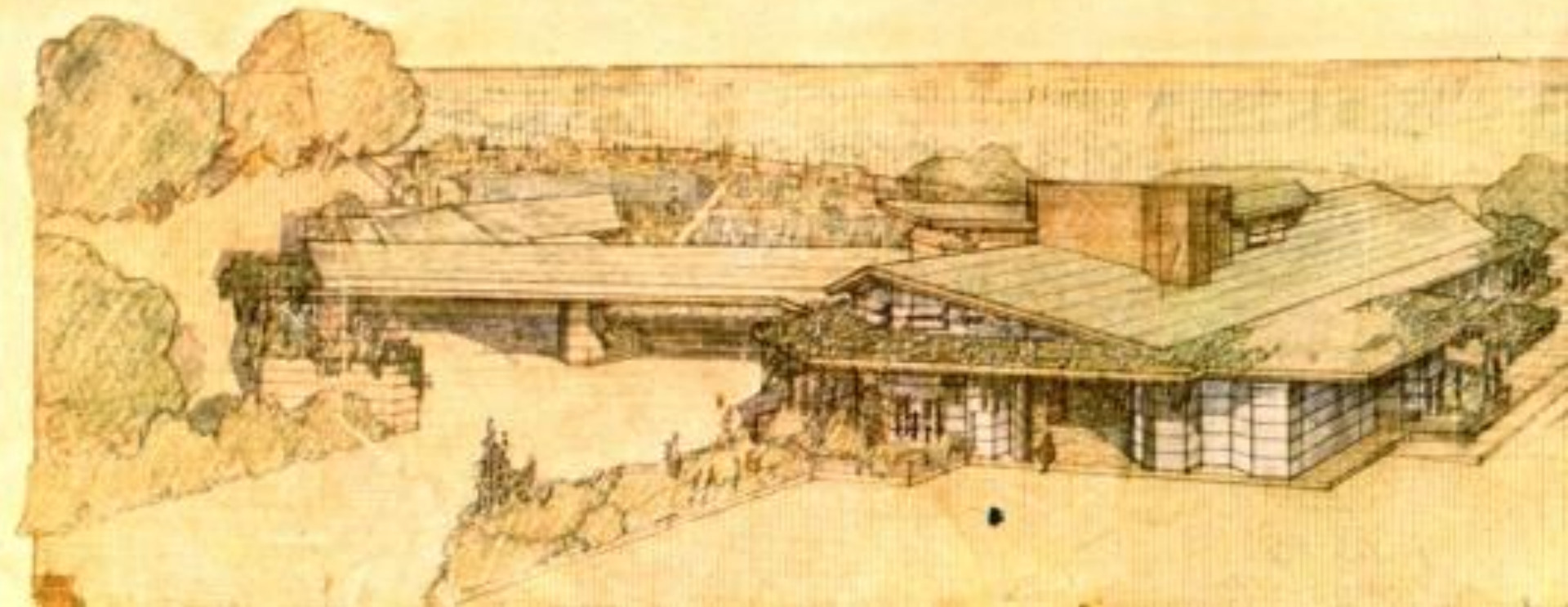
Hanna-Honeycomb House, Stanford California, 1937 Frank Lloyd Wright

SHAPE - HEXAGON

SKETCH with colored pencils



Frank Lloyd Wright
1867-1958



Hanna-Honeycomb House, Stanford California, 1937 Frank Lloyd Wright

SHAPE - OCTAGON



Frank Lloyd Wright



Robert G. Emmond Residence, Oak Park IL, 1893 Wright



Thomas H. Gale Residence, Oak Park IL, 1893 Wright

SHAPE - OCTAGON

JT Wunderlich III 1977 (age 16)

3rd prize

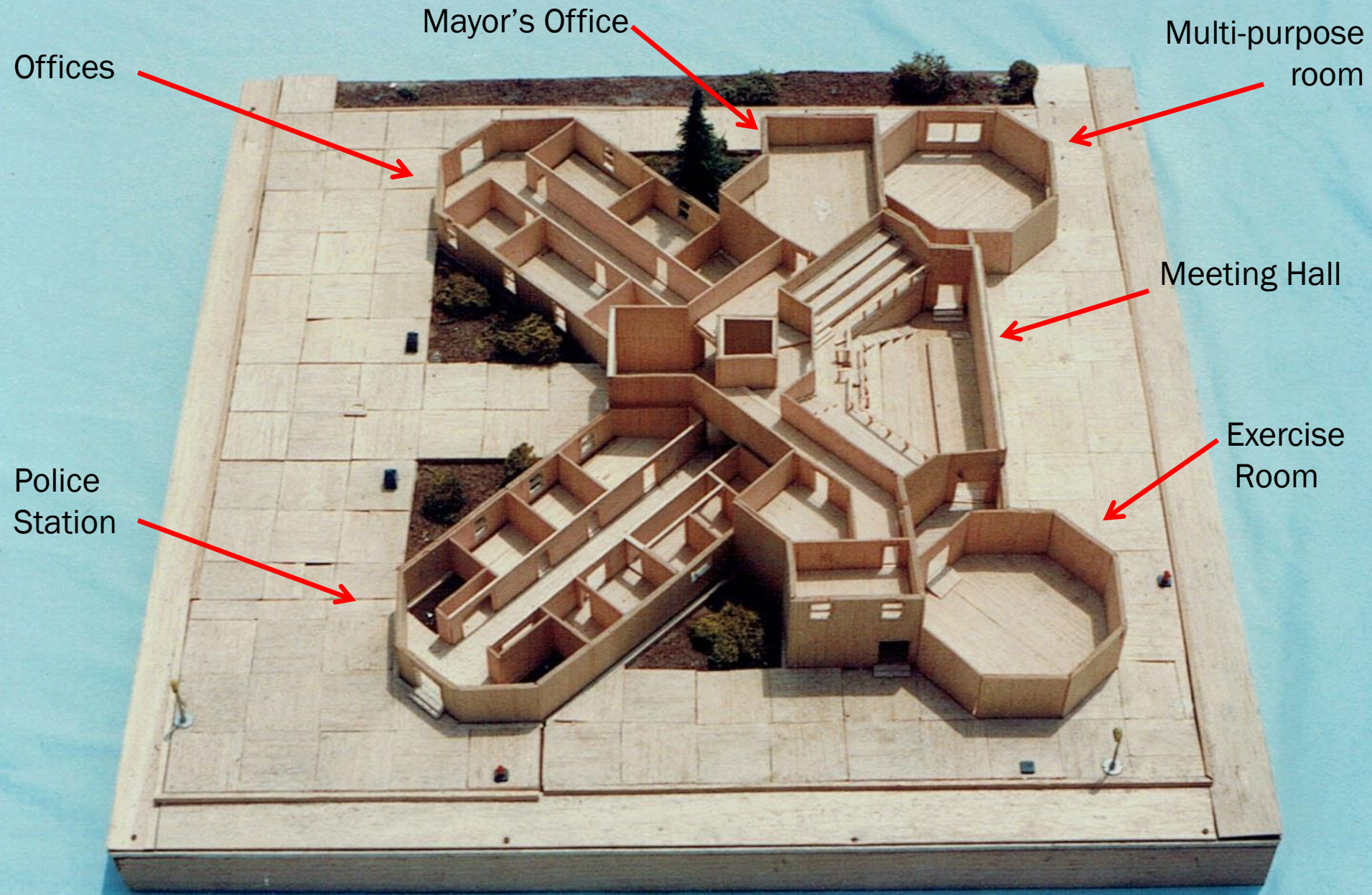
Pennsylvania Design Competition

(and New Jersey & Delaware)



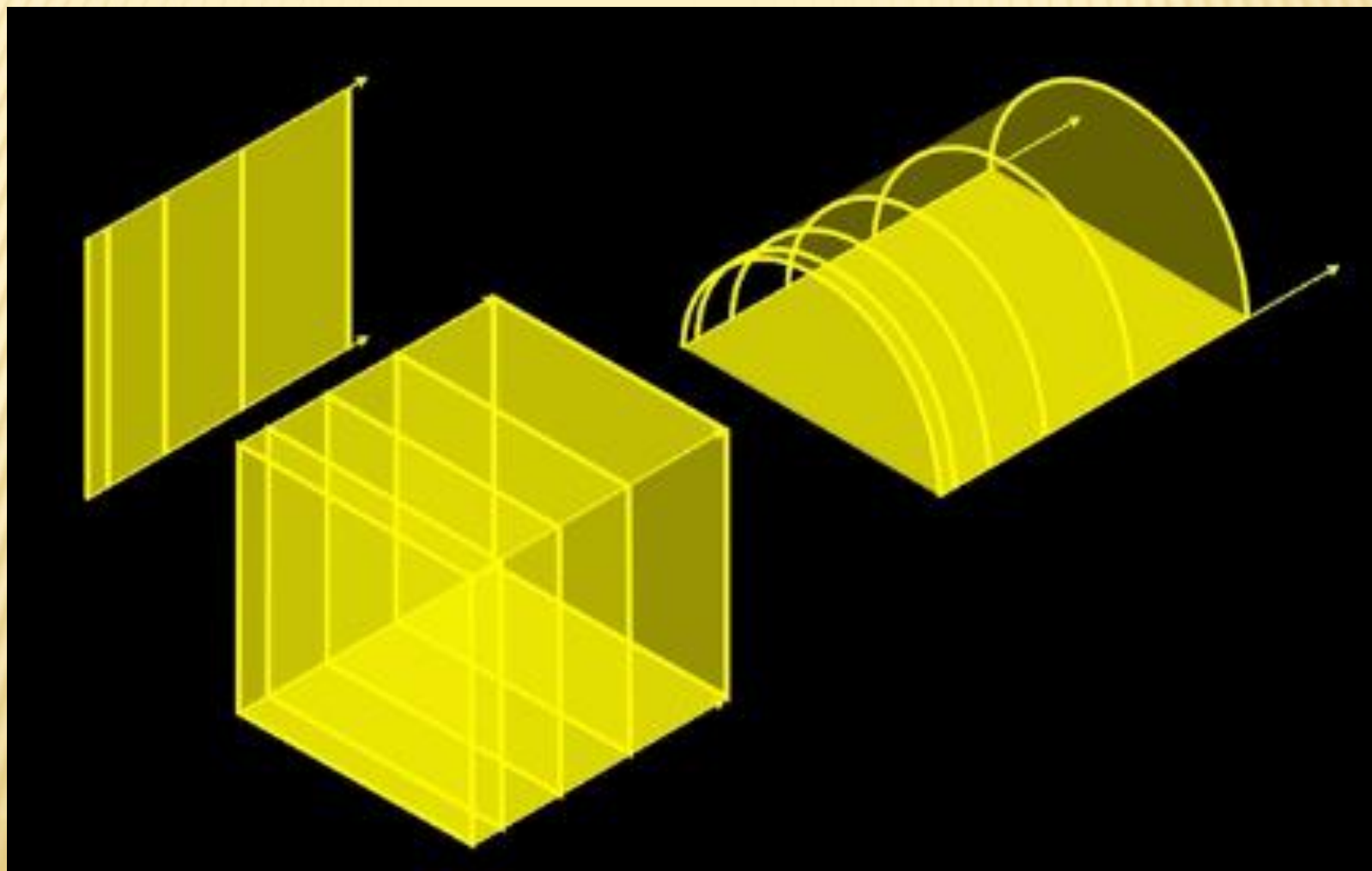
WOOD MODEL (*unfinished, hence only 3rd prize*)

of Philadelphia Municipal Building by JT Wunderlich III 1976



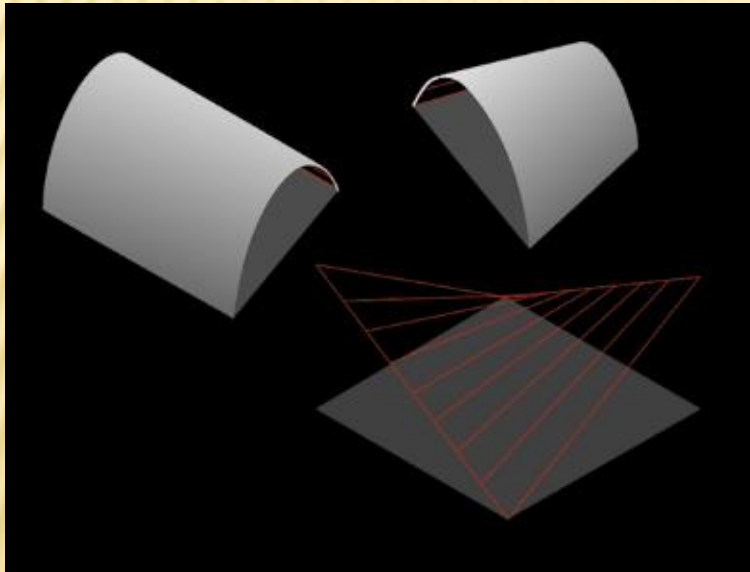
DEVELOPING FORM

“One dimensional lines and two dimensional shapes moving through space create *three-dimensional forms*” [1]



SHAPE

*“Not all shapes and forms can be distilled into regular geometric shapes – **curvilinear surfaces** and forms are more dynamic – while apparently without geometric basis, many are derivatives of straight lines and curves” [1]*



SURFACES - *CURVED*



Sidney Opera House, 1973 by Arup Group

<https://slideplayer.com/slide/1512536/>

SURFACES - *CURVED*

Walt Disney Concert Hall, Los Angeles CA, 2003 Frank O Gehry



SURFACES - *CURVED*

Walt Disney Concert Hall, Los Angeles CA, 2003 Frank O Gehry



Walt Disney Concert Hall, Los Angeles CA,
2003 Frank O Gehry



Figure 1: Photo of the physical model of the Disney Concert Hall

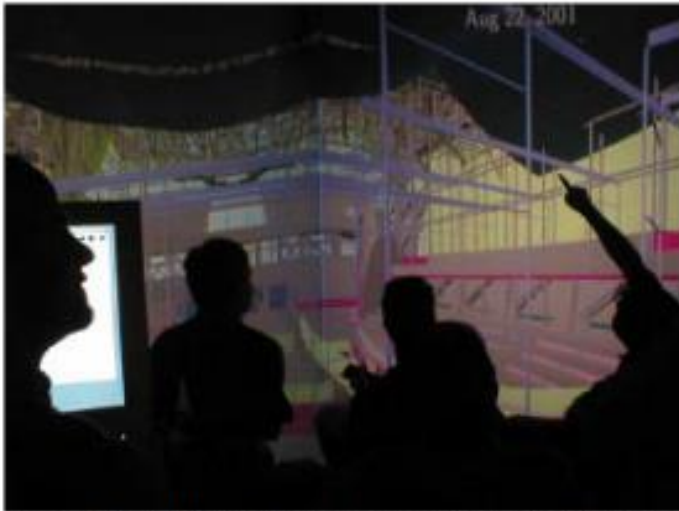


Figure 23: Collaboration in the Virtual Reality Cave.



Challenges and Benefits of 4D Modeling on the Walt Disney Concert Hall Project

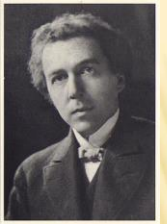
By

John Haymaker and Martin Fischer

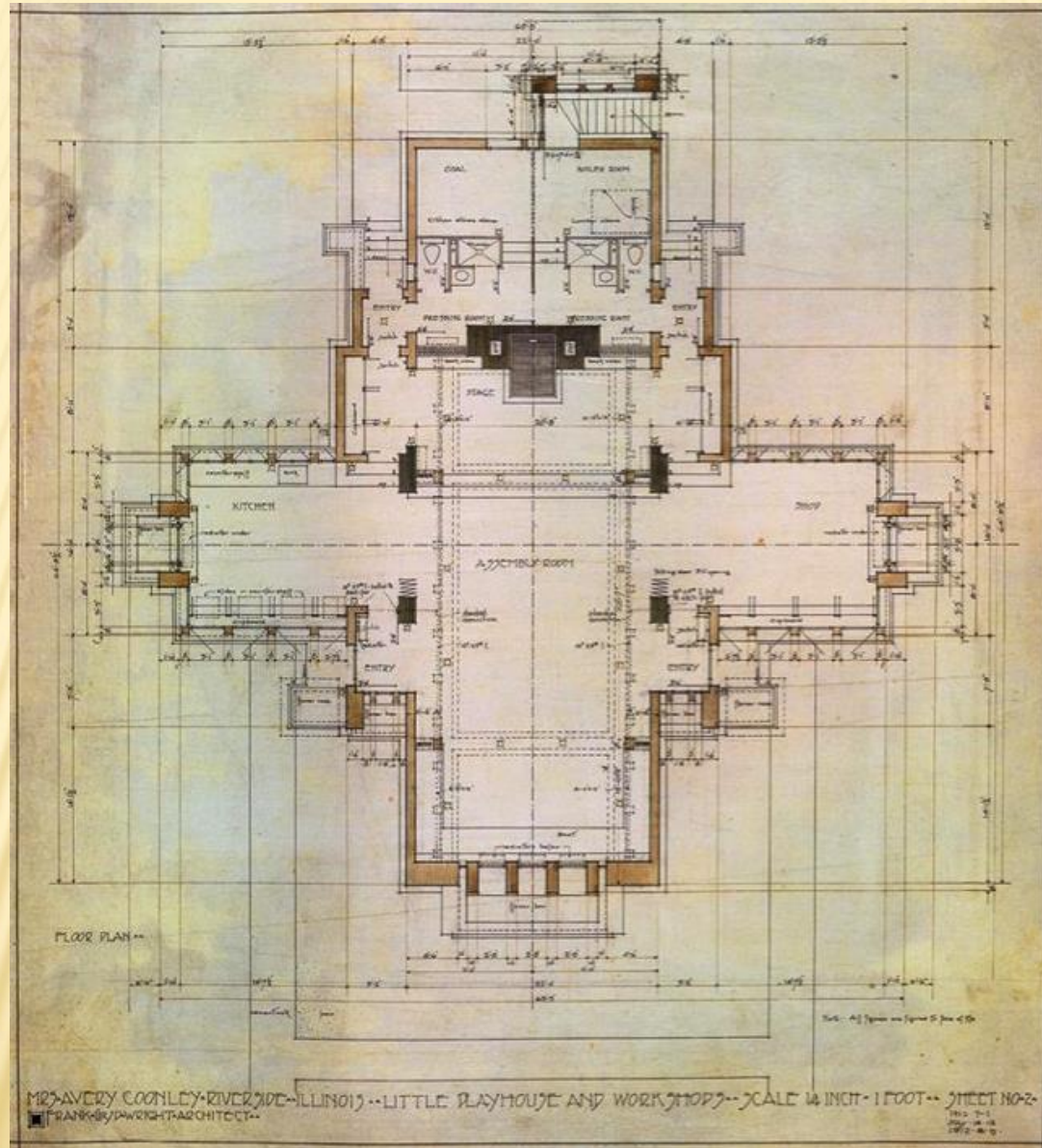
CIFE Working Paper #64
January, 2001

STANFORD UNIVERSITY

REGULAR FORM



Frank Lloyd Wright
1867-1958



Coonley Playhouse, Riverside IL. 1912 by Frank Lloyd Wright

<https://www.pinterest.com/pin/412923859572244251/>

IRREGULAR FORMS



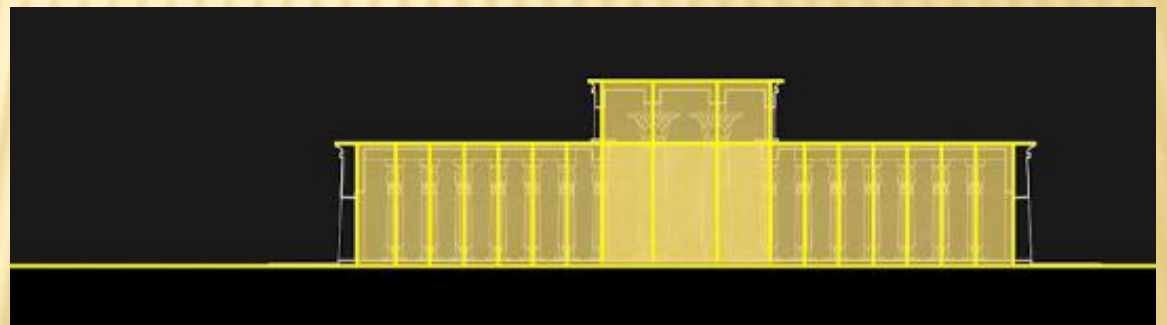
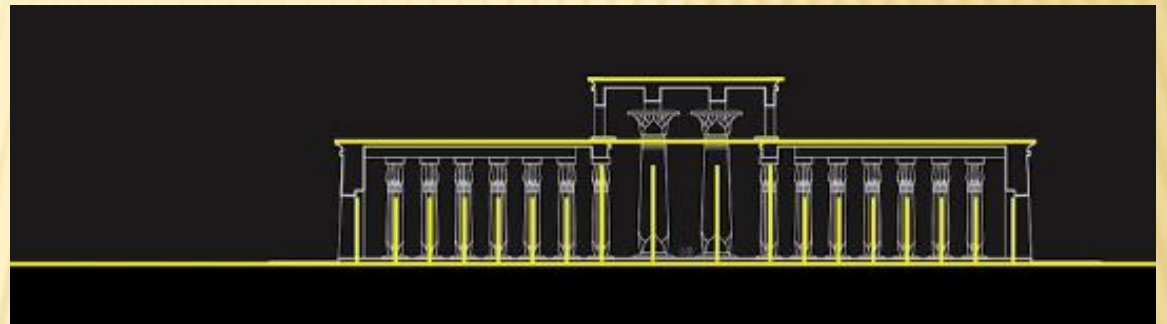
*China Central Television Station, Beijing,
2012 by Rem Koolhaas and Ole Scheeren*



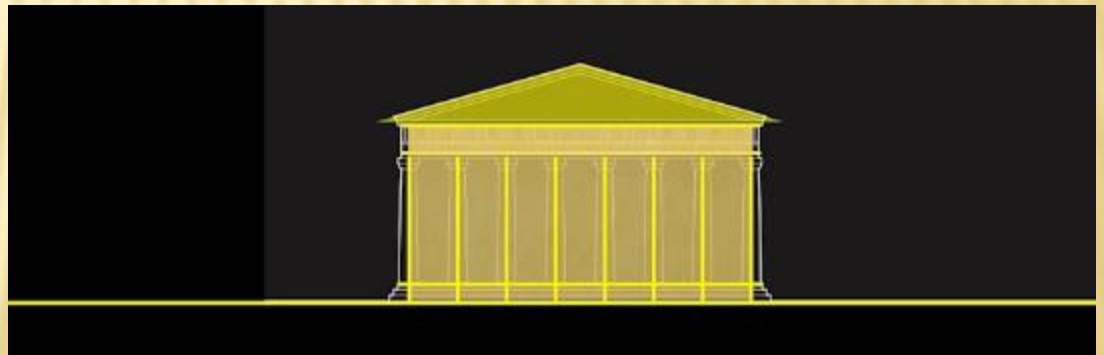
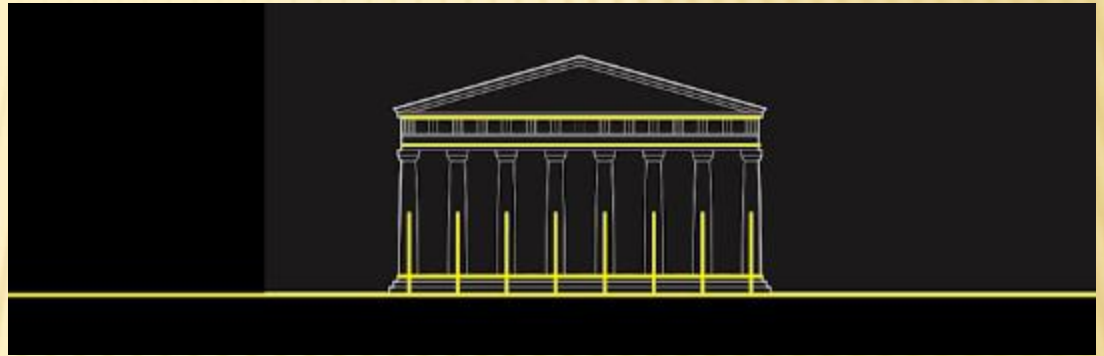
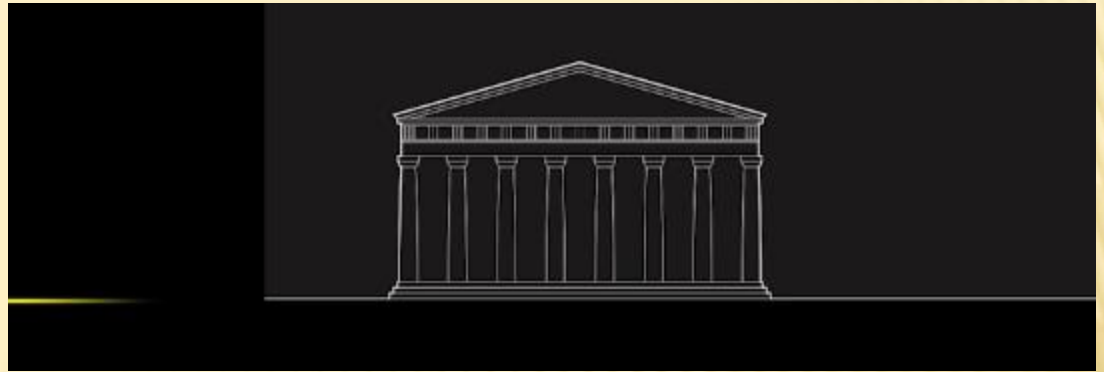
DEVELOPING FORM

“*in architecture,
the majority of
forms are
derived from
rectilinear or
Euclidean
geometry*”

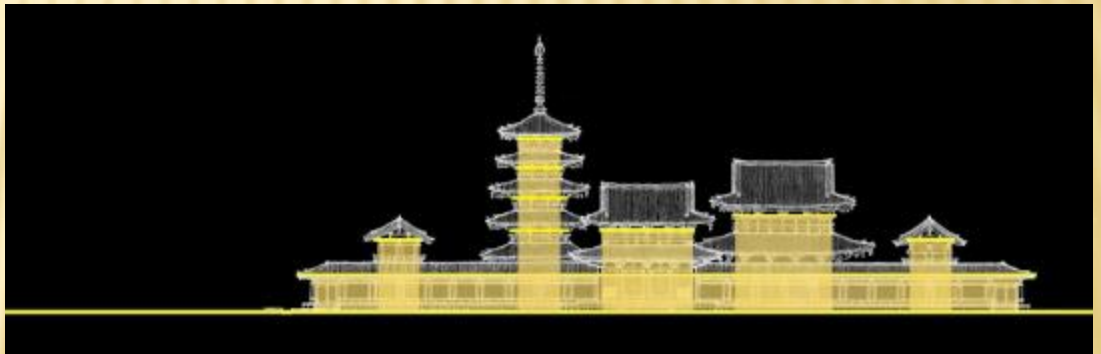
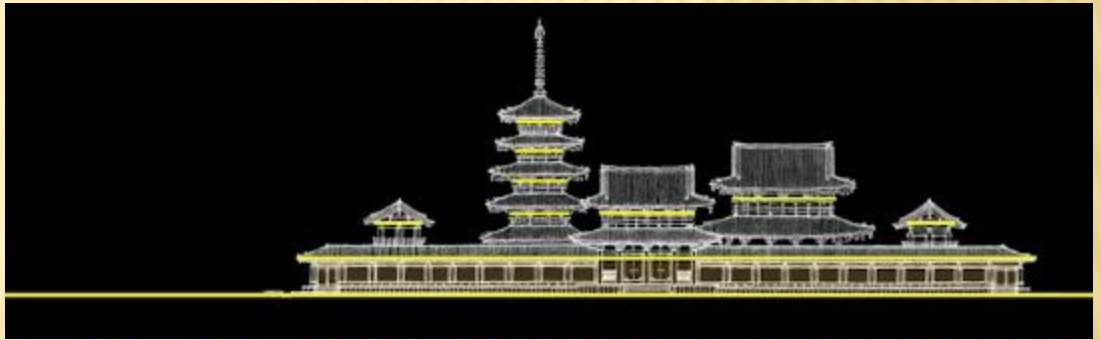
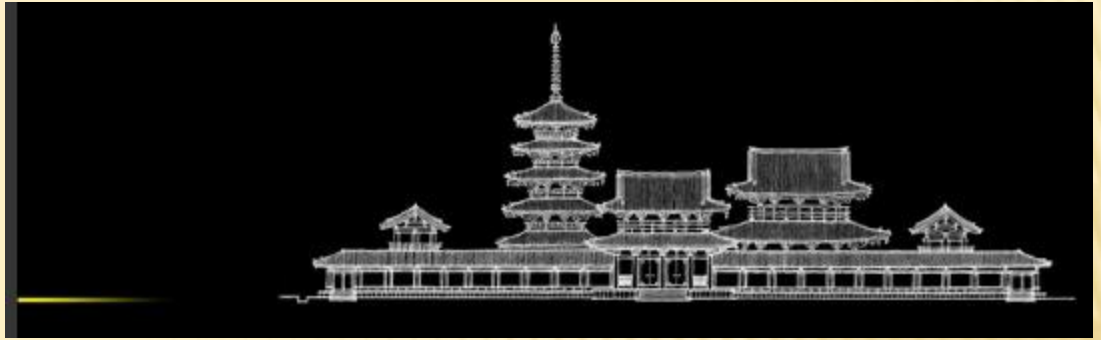
“*...for material,
construction, and
structural reasons,
the horizontal and
vertical have
dominated
architecture for
centuries*” [1]



DEVELOPING FORM

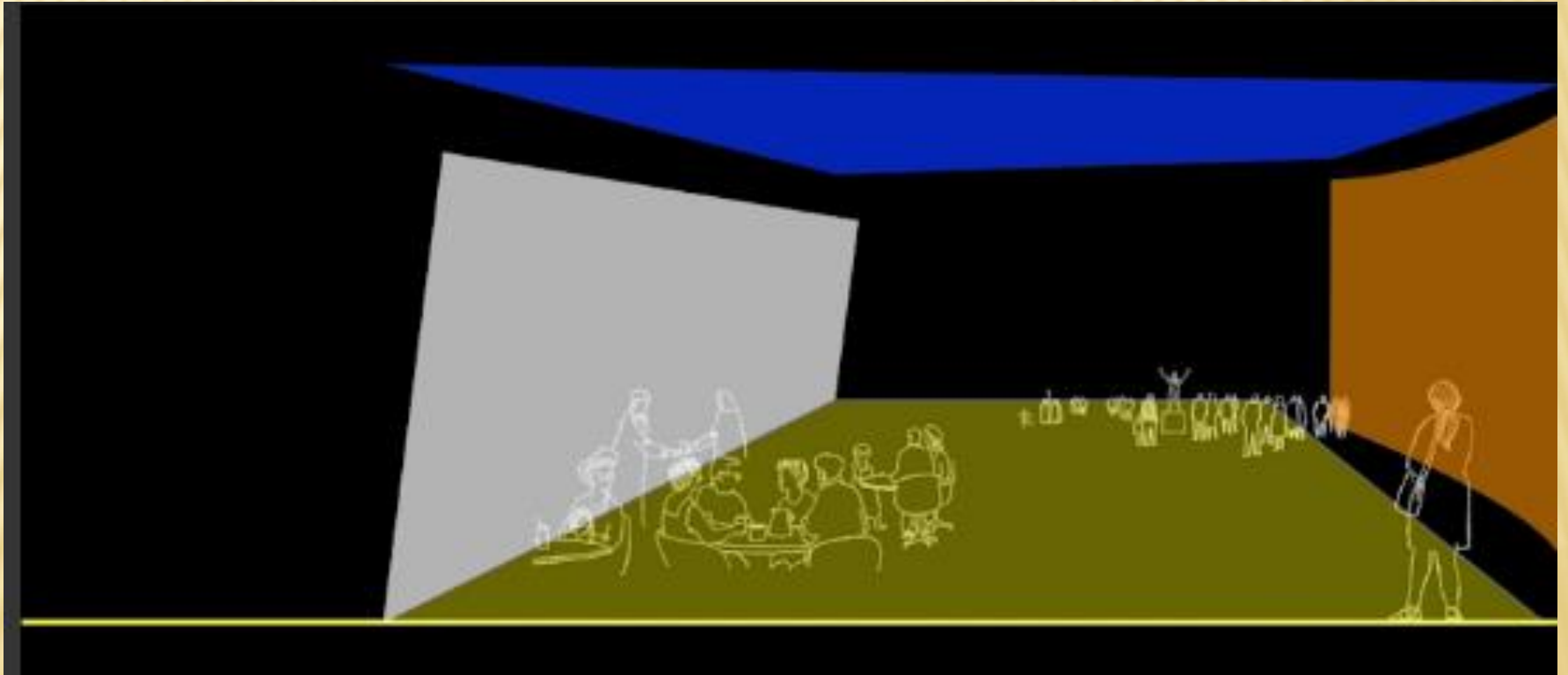


DEVELOPING FORM



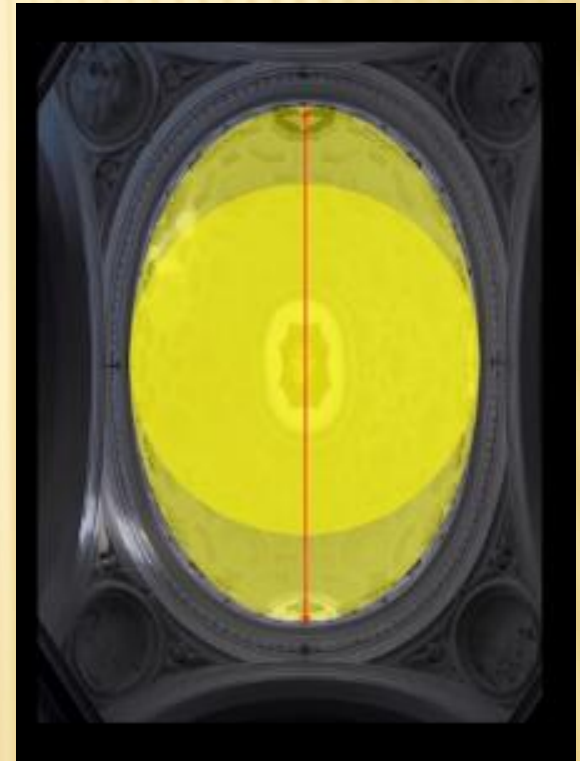
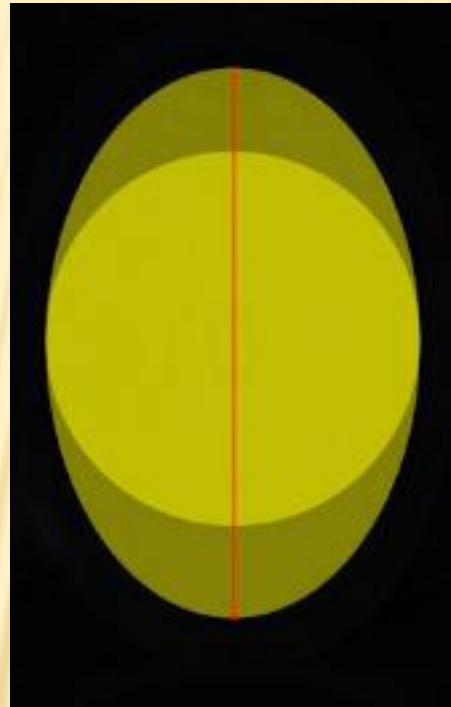
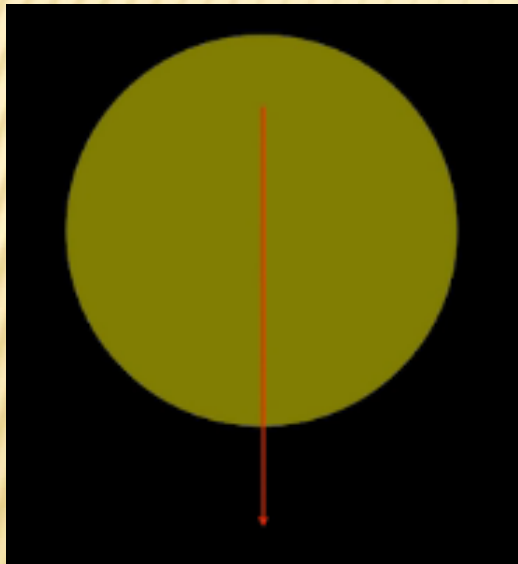
DEVELOPING FORM

“We still rely on flat and level floor planes for the base our activities -- it is in the realm of walls and ceilings where we have more freedom to veer from the vertical and horizontal” [1]

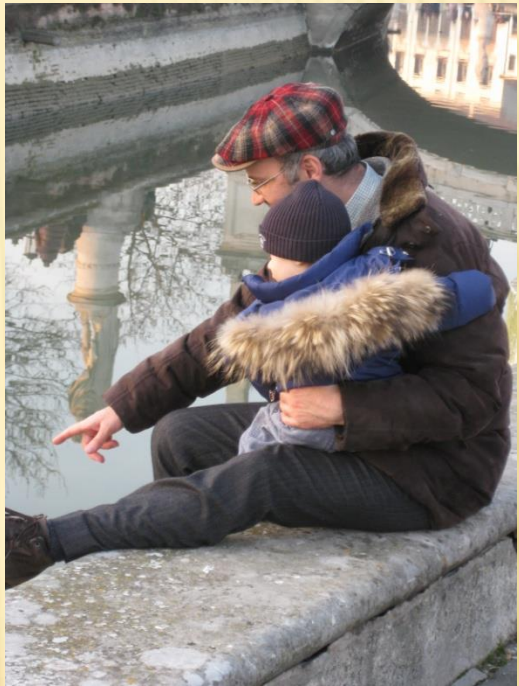


TRANSFORMATION OF FORM

“a form can be compressed into a planer form or be stretched out into a more linear one” [1]



Travel to Padua Italy, 2011,2014

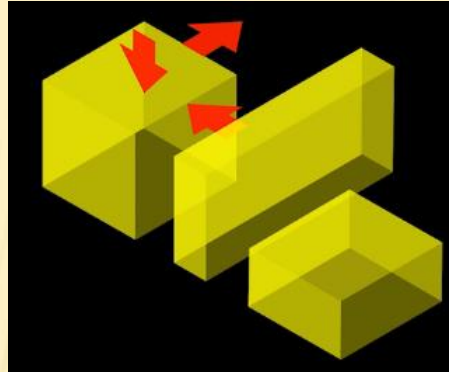


TRANSFORMATION OF FORM - DIMENSIONAL

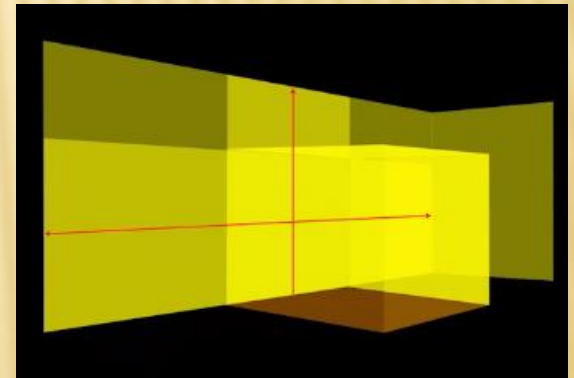
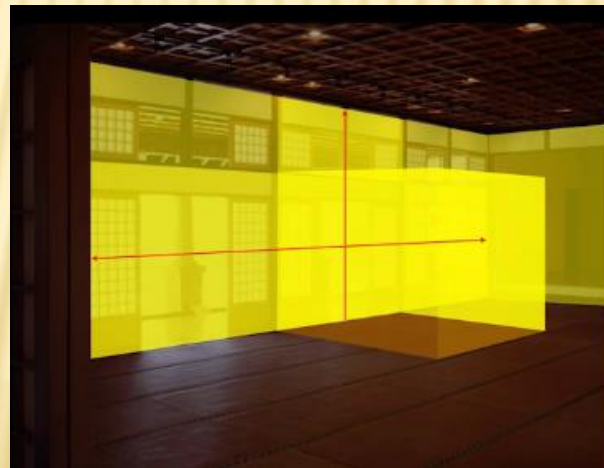
“Most forms are transformations of the primary solids -- variations generated by the manipulation of one or more dimensions -- or by the addition or subtraction of the elements” [1]

TRANSFORMATION OF FORM - DIMENSIONAL

“Form can be transformed by **altering** one or more of its **dimensions**, and still retain its identity as a member of the family of forms ...

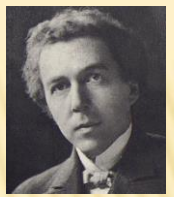


...a cube for example can be transformed into similar prismatic forms through discrete changes in height, width, or length.” [1]



TRANSFORMATION OF FORM - *DIMENSIONAL*

Extended overhangs and **magnifying the horizontal** is typical of Frank Lloyd Wright's Prairie Style designs

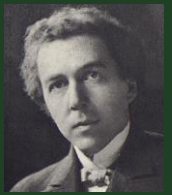


Frank Lloyd Wright
1867-1958



Robie House, Chicago, 1910 Frank Lloyd Wright <https://interactive.wttw.com/tenbuildings/robie-house>

TRANSFORMATION OF FORM - DIMENSIONAL



Frank Lloyd Wright
1867-1958



MAGNIFYING THE HORIZONTAL

TRANSFORMATION OF FORM - *DIMENSIONAL*



Frank Lloyd Wright
1867-1958

MAGNIFYING THE HORIZONTAL



Robie House, Chicago, 1910 Frank Lloyd Wright

VIDEO: <https://www.youtube.com/watch?v=8cFohx1K3eg&list=PLQ8x1YyBhZPh702IL3Bi750aQ3SjyK-7P&index=2&t=0s>

TRANSFORMATION OF FORM

- DIMENSIONAL

Minecraft 3D COMPUTER MODEL

by JJWIV

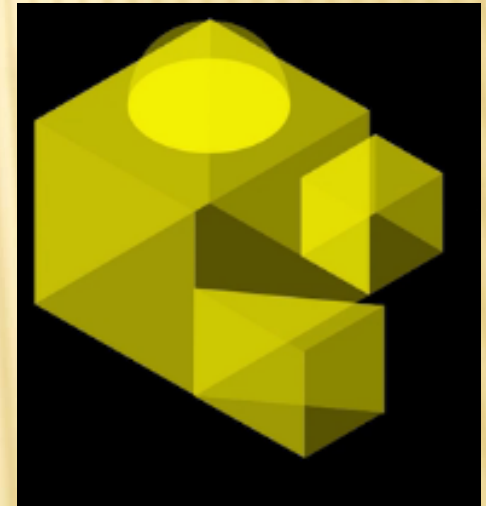
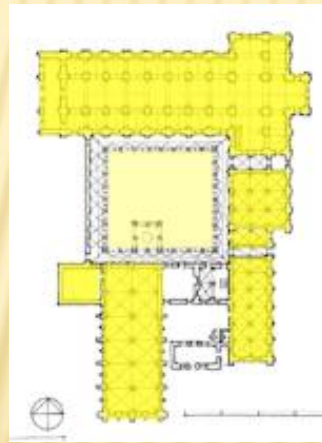
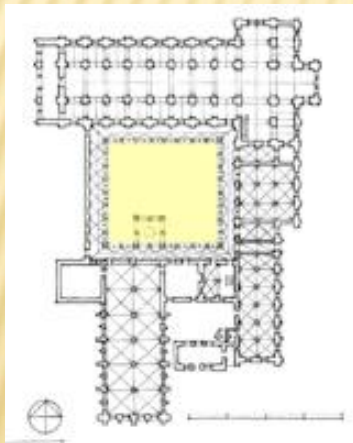


INDEX CARD, CHIPBOARD, FOAMBOARD, and WOOD MODELS by JJWIV



TRANSFORMATION OF FORM - ADDITIVE

“A form being transformed by the **addition of elements** to its volume, the nature of the additive process, and the number and relative sizes of the elements being attached, determine whether the identity of the initial form is altered or retained” [1]



TRANSFORMATION OF FORM - ADDITIVE

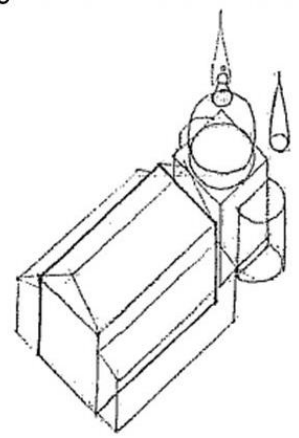


SUBTRACTIVE VOID

ADDITIVE FORM

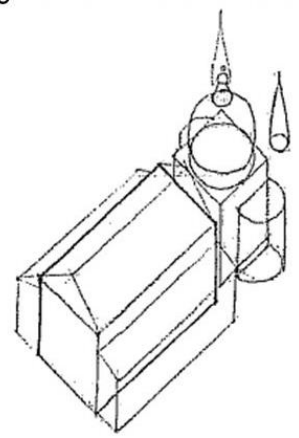


TRANSFORMATION OF FORM - ADDITIVE



Chiesa del Santissimo Redentore (“il Redentore”), Venice, Italy, 1577-1582

TRANSFORMATION OF FORM - ADDITIVE



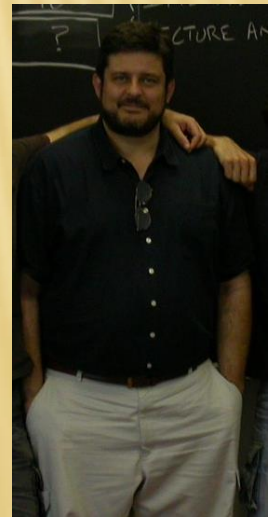
Chiesa del Santissimo Redentore (“il Redentore”), Venice, Italy, 1577-1582

TRANSFORMATION OF FORM - ADDITIVE

Before & After



JT Wunderlich III PhD 2002 ++
Homeowner / Design-Builder
Southeastern Pennsylvania
2000sf remodel +1500sf new



TRANSFORMATION OF FORM - *ADDITIVE*

JT Wunderlich III PhD 2002 ++
A&E Designer/ Builder



TRANSFORMATION OF FORM - ADDITIVE

JT Wunderlich III PhD 2002 ++
A&E Designer/ Builder

FOAMBOARD Models



DESIGN CHOICE 1

Head-space Too Cramped



DESIGN CHOICE 2

Nice, but desire more floor space



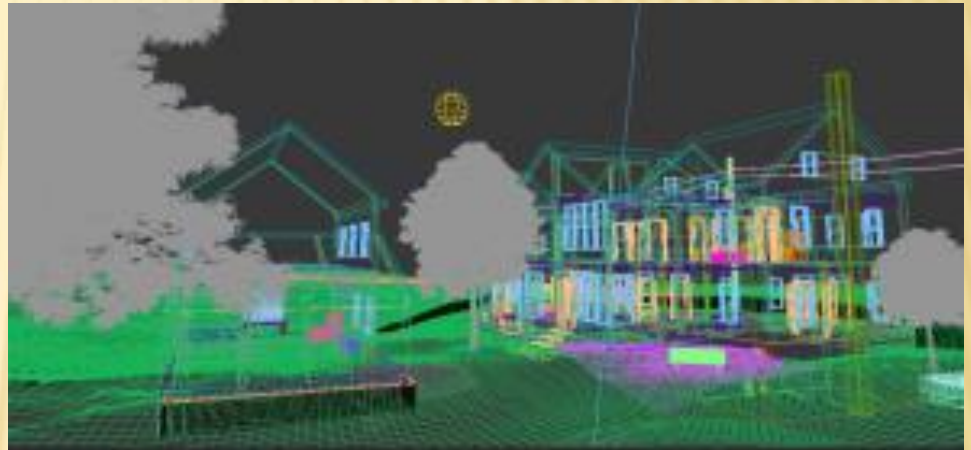
selected design
DESIGN CHOICE 3



Later Minecraft 3D COMPUTER MODEL by JJWIV



Later Revit 3D COMPUTER MODEL by JJWIV





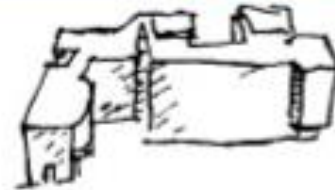
TRANSFORMATION OF FORM - ADDITIVE COMPOSITION

“Four house Forms, by Le Corbusier for the cover of volume two of the Oeuvre Complete, published in 1935” [1]

Cumulative Composition

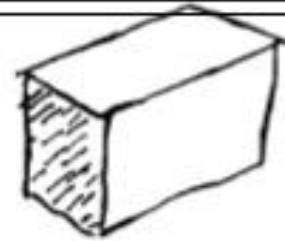
- additive form - a rather easy type-picturesque; full of movement

- can be completely disciplined by classification and hierarchy



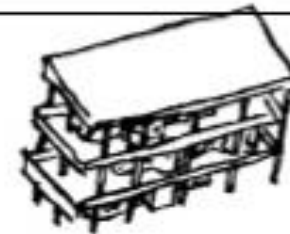
Cubic Composition (Pure Prisms)

- very difficult (to satisfy the spirit)



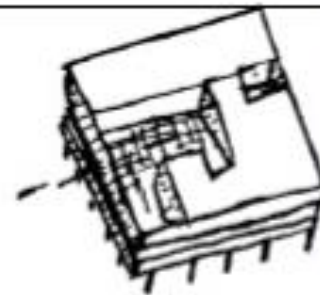
Very easy

- (convenient combining)

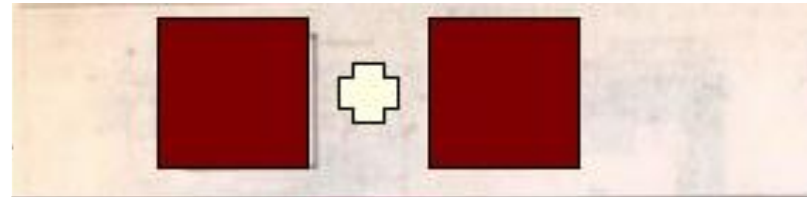


Subtractive form

- very generous
- on the exterior an architectural will is confirmed
- on the interior all functional needs are satisfied (light, penetration, continuity, circulation)



TRANSFORMATION OF FORM - ADDITIVE COMPOSITION



SPATIAL TENSION



EDGE TO EDGE CONTACT



FACE TO FACE CONTACT



INTERLOCKING VOLUMES

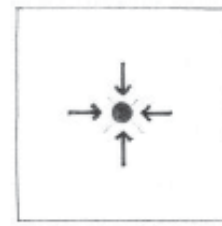


TRANSFORMATION OF FORM

= ADDITIVE COMPOSITION

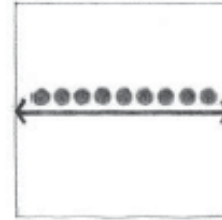
Centralized Form

A number of secondary forms clustered about a dominant, central parent-form



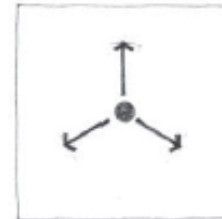
Linear Form

A series of forms arranged sequentially in a row



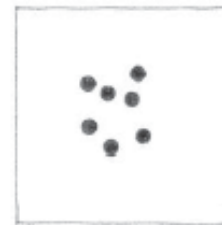
Radial Form

A composition of linear forms extending outward from a central form in a radial manner



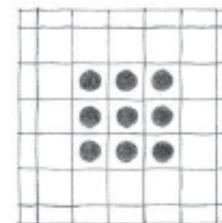
Clustered Form

A collection of forms grouped together by proximity or the sharing of a common visual trait



Grid Form

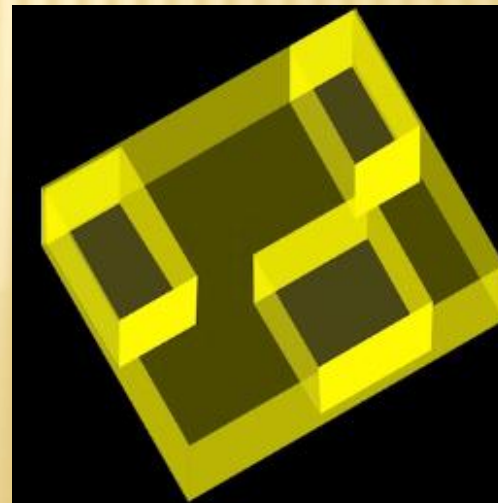
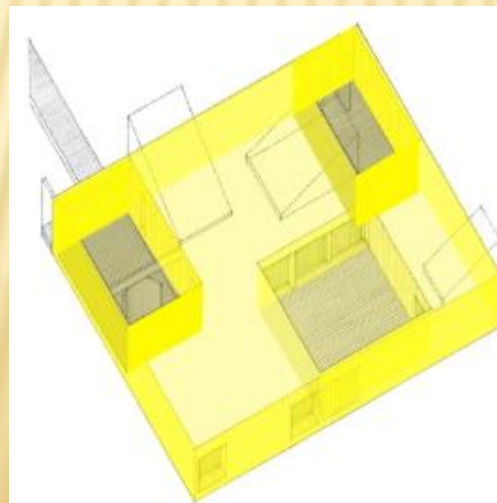
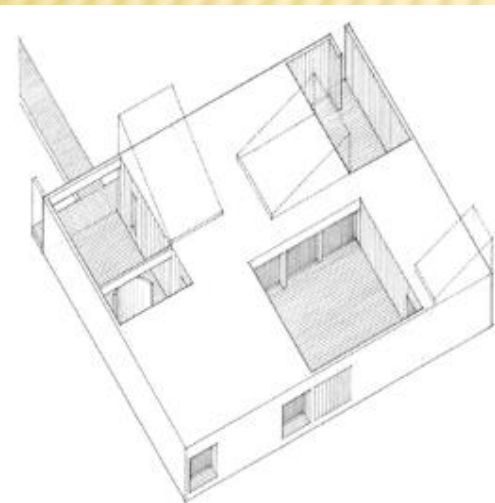
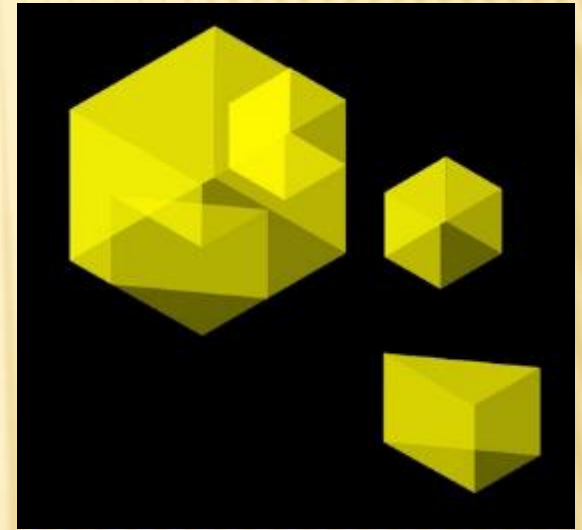
A set of modular forms related and regulated by a three-dimensional grid



see more on this in
PART 4 "ORGANIZATION"

TRANSFORMATION OF FORM - *SUBTRACTIVE*

“A form can be transformed by **subtracting** a portion of its volume -
- depending on the extent of the subtractive process the form
can retain its initial identity or be transformed into a form of
another family” [1]



TRANSFORMATION OF FORM - *SUBTRACTIVE*

*“Subtractive
Transformation
creating Volumes
of Space” [1]*

Gwarthmey Residence,
NY 1967 by Charles
Gwartmey



TRANSFORMATION OF FORM - *SUBTRACTIVE*

“We search for regularity and continuity. If any primary solid is partially hidden, we tend to complete its form and visualize it as if it were whole because the mind fills in what the eyes do not see” [1]



<https://nohat.cc/f/white-and-blue-high-rise-building-behind-bush-wall/5221655378919424-201809171515.html>

TRANSFORMATION OF FORM - *SUBTRACTIVE*

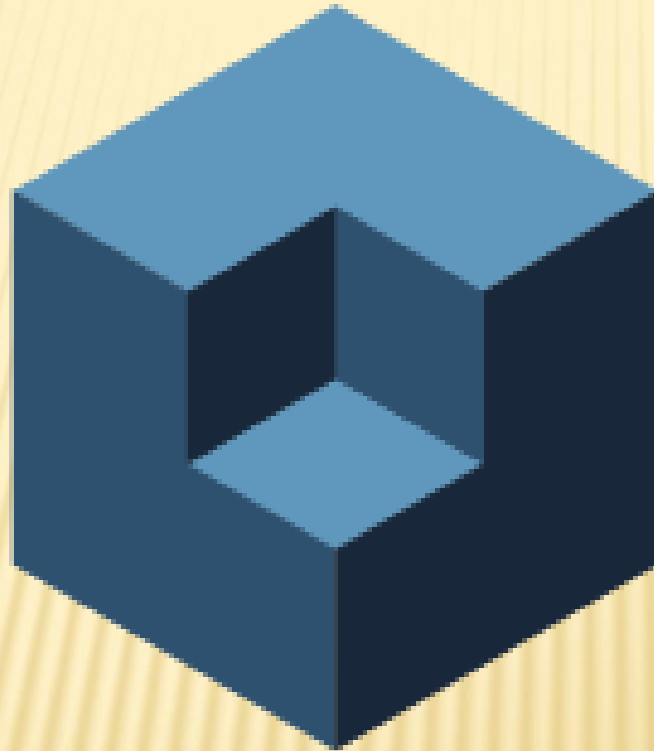
“the mind fills in what the eyes do not see” [1]



<https://www.pinterest.com/pin/268667933990302364/>

TRANSFORMATION OF FORM - *SUBTRACTIVE*

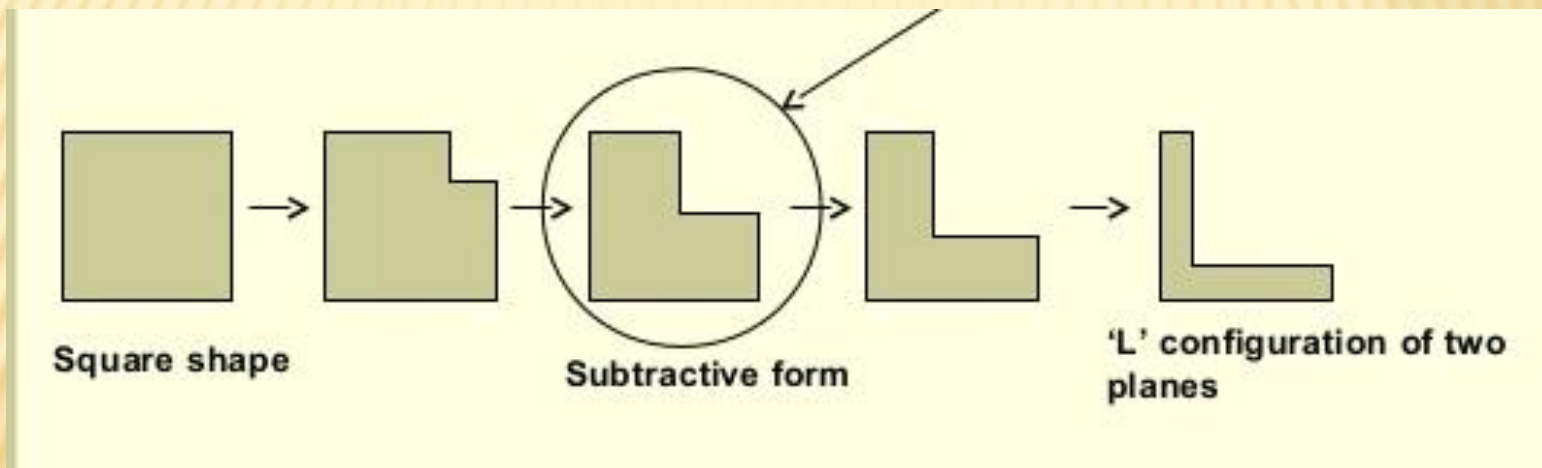
“...in a similar manner, when regular forms have fragments missing, they retain their identity” [1]



<https://colab.duke.edu/resources>

TRANSFORMATION OF FORM - SUBTRACTIVE

“ In this series of figures, at what point does the square shape with the corner portion removed become an L-shaped configuration of two rectangular planes ” [1]



<https://www.slideshare.net/fdjaipur/theory-of-design-form>

TRANSFORMATION OF FORM - *SUBTRACTIVE*

“volume subtracted to create *recessed entrance*” [1]



<https://www.revoly.com/page/Bishop-Hannington-Memorial-Church>

TRANSFORMATION OF FORM - *SUBTRACTIVE*

“volume subtracted to create courtyard” [1]



Buckingham Palace
ProAerialVideo.com

<https://www.youtube.com/watch?v=WIKYNKyq7uE>

TRANSFORMATION OF FORM

- **SUBTRACTIVE**

“volume subtracted to create **window openings shaded** by the vertical and horizontal surfaces of the recess” [1]

1986/87 J Wunderlich III, Director of Projects

“Cornerstone” High-tech office complex

San Diego CA

JDC inc (Development Company)



- Led Architectural Design Team (as Developer's Representative)
- Added significant Architectural Design (including thickening walls to emphasize “windows”)
- Project nominated for annual San Diego “Orchid Award”

FOAMBOARD MODEL by Carli Architects

1986/87 J Wunderlich III, Director of Projects
La Jolla, CA



66,000sf hi-tech office & manufacturing for "Xscribe" inc
44,00sf "spec" (speculative) office building

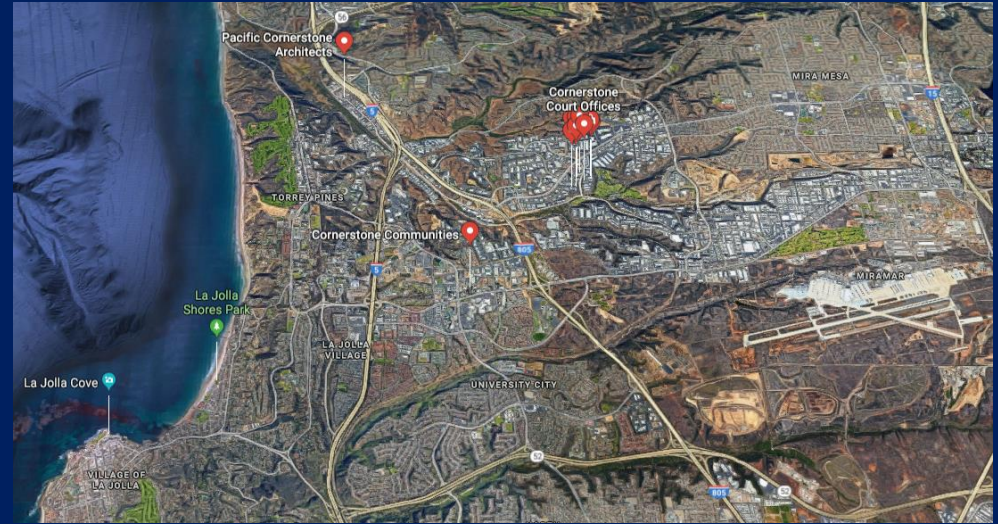




TRANSFORMATION OF FORM

- SUBTRACTIVE

JT Wunderlich 1985,86
Director of Projects / Designer
La Jolla, CA
2018 Google Photos



TRANSFORMATION OF FORM - *SUBTRACTIVE*

JT Wunderlich III PhD 2002 ++
A&E Designer/ Builder





TRANSFORMATION OF FORM

- SUBTRACTIVE



TRANSFORMATION OF FORM - *SUBTRACTIVE*

JT Wunderlich III PhD 2002 ++
A&E Designer/ Builder



TRANSFORMATION OF FORM - *SUBTRACTIVE*

JT Wunderlich III PhD 2002 ++
A&E Designer/ Builder



TRANSFORMATION OF FORM - *SUBTRACTIVE*

JT Wunderlich III PhD 2002 ++

A&E Designer/ Builder



TRANSFORMATION OF FORM - SUBTRACTIVE



COLLISION OF GEOMETRIES

“When forms collide, **each will vie for visual supremacy and dominance.**

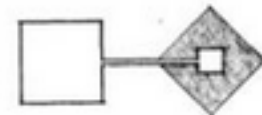
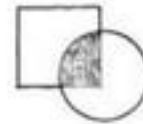
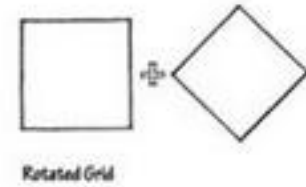
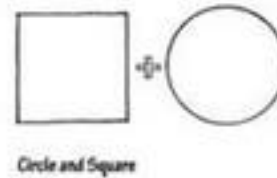
The following forms can evolve:

forms subvert individual identities and **merge**

one form **receive the other** within its volume

forms retain identity and **share interlocking portion**

forms can be **separate and linked by a third element that recalls the geometry of one of the original forms** ” [1]



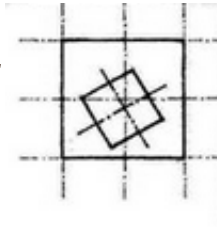
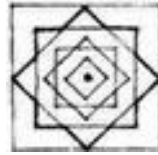
COLLISION OF GEOMETRIES

“Forms differing in geometry or orientation may be incorporated:

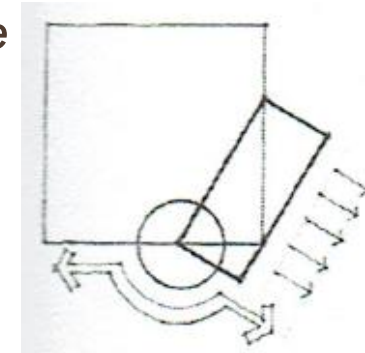
to accommodate or accentuate differing requirements of interior space and exterior form

to express the importance of a form within its context

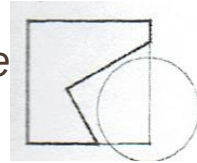
to generate a composite centralized form



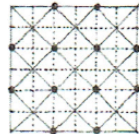
to inflict the space toward a specific feature of the site



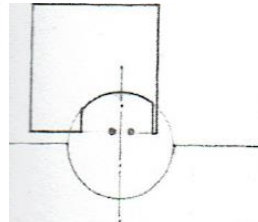
to carve a volume of space



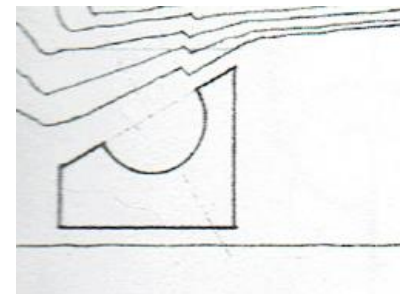
to express constructional or mechanical systems



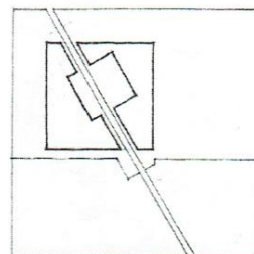
to reinforce symmetry of building



to respond to topography, vegetation, boundaries, or structures



to acknowledge a path”



[1]

CIRCLE AND SQUARE

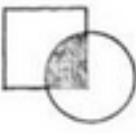


MOUNTAIN AMERICA
CREDIT UNION
CORPORATE HEADQUARTERS

Mountain America Credit Union Headquarters, West Jordan, UT

<https://www.commercialcafe.com/commercial-property/us/ut/west-jordan/mountain-america-credit-union-corporate-headquarters/>

CIRCLE AND SQUARE





CIRCLE AND SQUARE



Travel to Windsor
England 2014



CIRCLE AND SQUARE



The Island Villa (Maritime Theatre), Villa Adriana, Hadrian's Villa, near Tivoli, Italy

https://www.flickr.com/photos/roger_ulrich/24462581538

CIRCLE AND SQUARE



The Island Villa (Maritime Theatre), Villa Adriana, Hadrian's Villa, near Tivoli, Italy

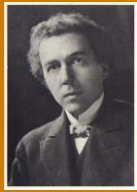
<http://www.soc.indiana.edu/villa/maritimeaenals.php>



Johnson Wax Building, Racine WI, 1939 Frank Lloyd Wright



Johnson Wax Building, Racine WI, 1939 Frank Lloyd Wright

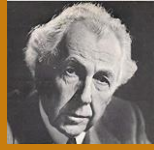


VIDEO: <https://www.youtube.com/watch?v=MJ8qH3GGSYk>

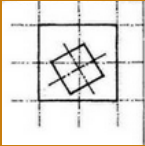
CIRCLE AND SQUARE



Taliesin West, Arizona, 1938 Frank Lloyd Wright

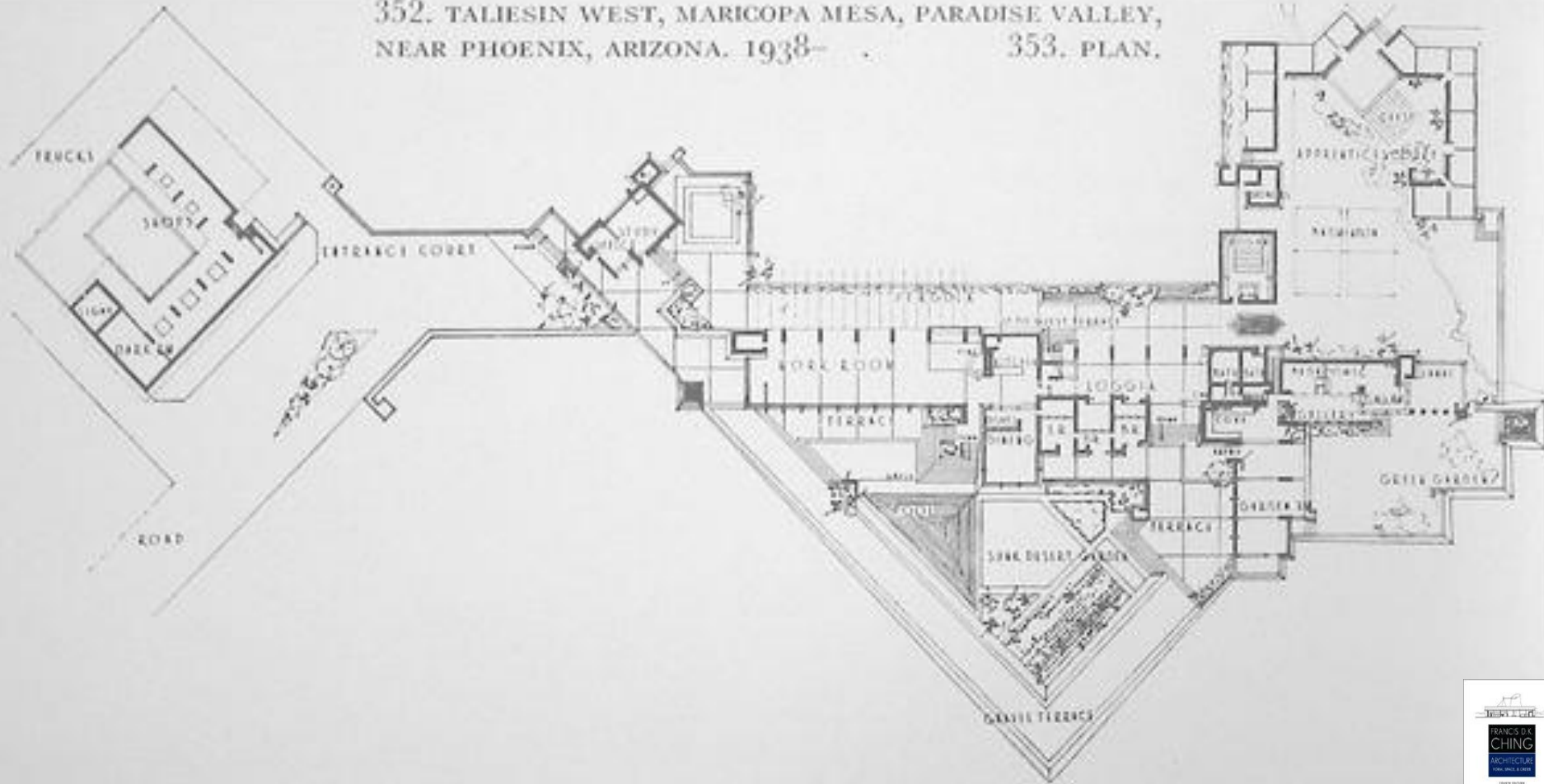


ROTATED GRID



VIDEO: <https://www.youtube.com/watch?v=w6DRwUUsgTk>

352. TALIESIN WEST, MARICOPA MESA, PARADISE VALLEY, NEAR PHOENIX, ARIZONA. 1938- . 353. PLAN.



SURFACES & EDGES

“ARTICULATION is how surfaces join to define shape and volume, revealing the nature of its parts and their relationship to each other, and to the whole.

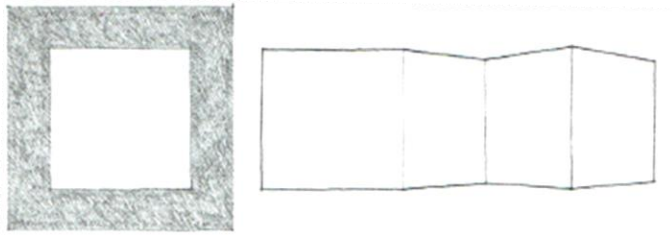
An ARTICULATED GROUP accentuates the joints to express their individuality.

A form can be articulated by:

- + differentiating adjoining planes with a change in material, color, texture, or pattern*
- + developing corners as distinct linear elements*
- + removing corners to separate planes*
- + lighting to create contrasts in tonal value along edges and corners*

Corners can be rounded to emphasize continuity of surfaces or a material, color, texture, or pattern can be carried across the corner to deemphasize the corner and emphasize the volume” [1]

SURFACES & EDGES

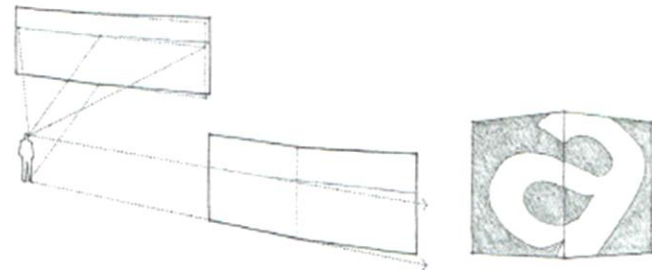


“How edge conditions resolved is critical to definition and clarity of a form.

A corner can be articulated contrasting surface qualities; Our perception is affected by laws of perspective and the quality of lighting.



Since we search for regularity and continuity, we tend to smooth out slight irregularities; for example, a wall that is only slightly bent will appear to be a single plane



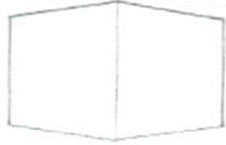
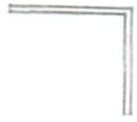
At what point did these deviations become a right angle?

a straight line?...

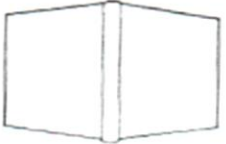
a change in a line's contour from a circular segment?" [1]



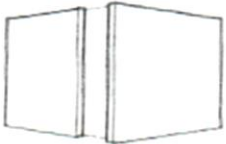
SURFACES & EDGES



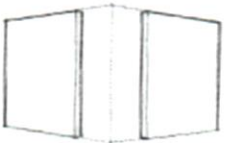
“The presence of the corner will depend on the visual treatment of adjoining surfaces if the corner is unadorned



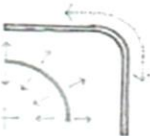
A corner can be emphasized with a distinct element independent of the surfaces



An opening at a corner weakens the definition of the volume and emphasizes the planar qualities of the surfaces



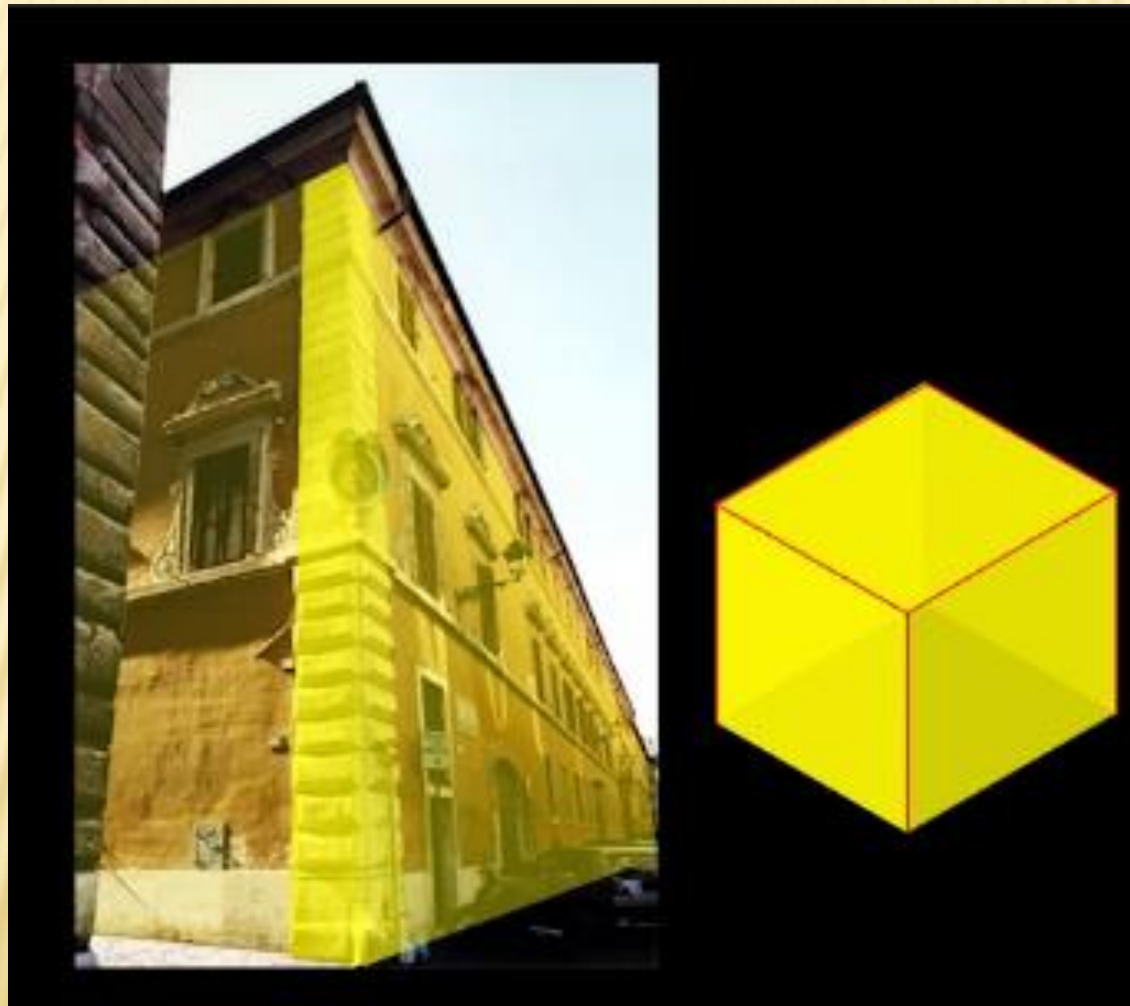
If neither plane extends to the corner, a volume of space is created which deteriorates the volume, allows the interior space to leak outward, and clearly reveals the surfaces as planes.



Rounding the corner emphasizes the continuity of the surfaces, compactness of the volume, and softness of its contour. The scale of the radius of curvature is important; if too small, it becomes visually insignificant, if too large, it affects the interior space and exterior form” [1]

SURFACES & EDGES

*“a **corner** can be reinforced visually with a distinct element that is independent of adjacent surfaces” [1]*



SURFACES & EDGES

“a **corner** can be reinforced visually with a distinct element that is independent of the adjacent surfaces” [1]



Trento Italy, 2008, 2009





Exposed Timber framing accentuates edges

Exposed Timber framing accentuates edges and corners

Narita, Tokyo, Osaka, KYOTO 2013



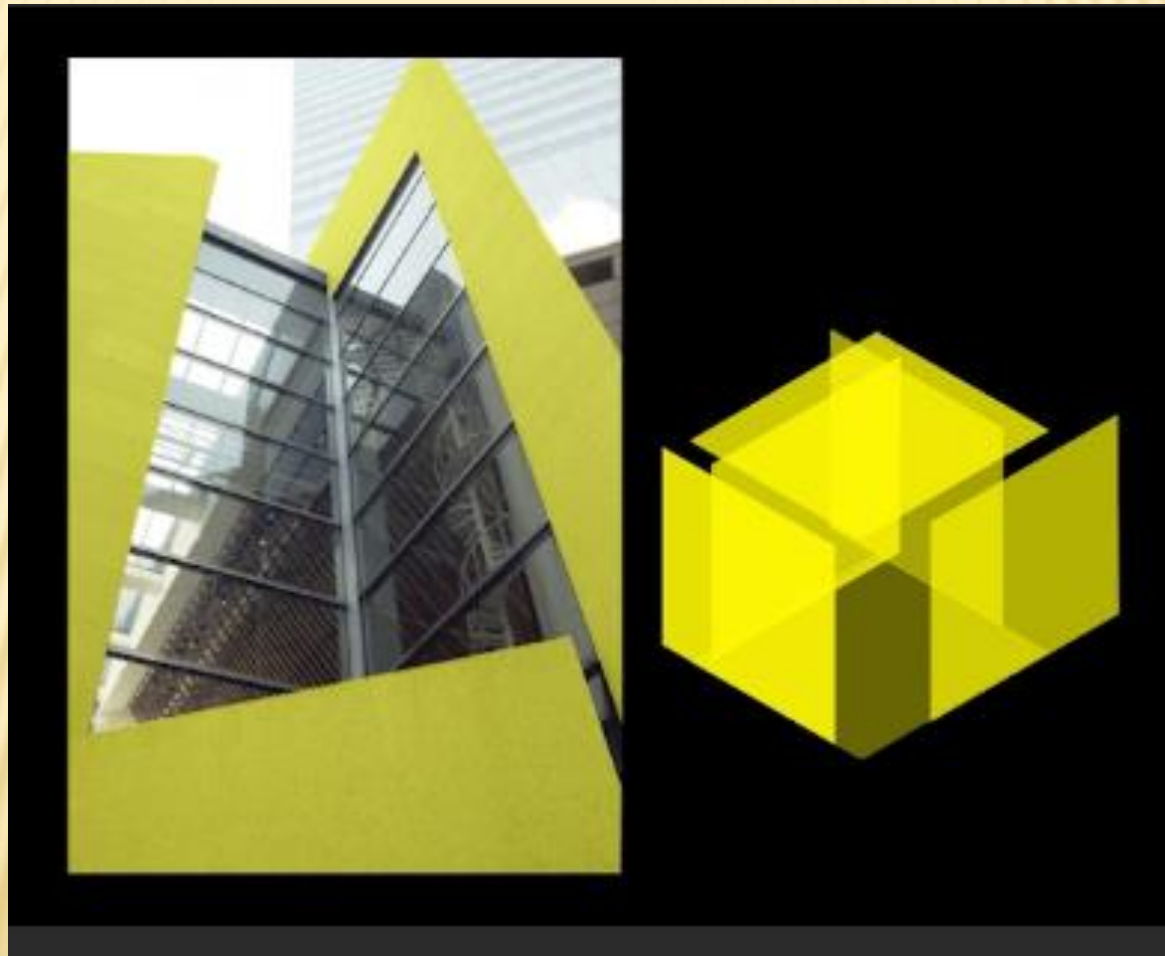


Exposed Timber framing accentuates edges and corners

Narita, Tokyo, Osaka, KYOTO 2013

SURFACES & EDGES

“Openings at a corner diminish the corner and emphasize the planar qualities of the neighboring surfaces” [1]



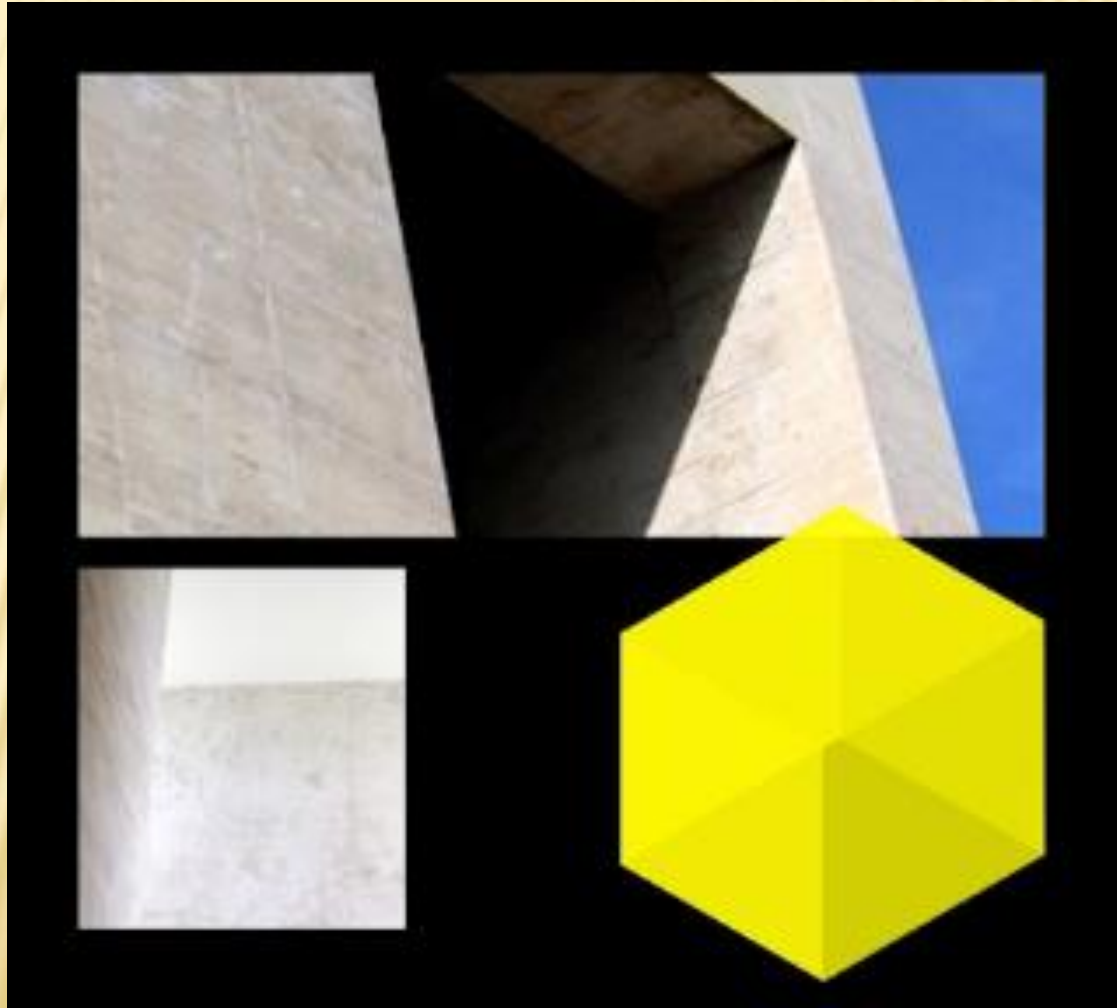
SURFACES & EDGES

“In opposition to the emphasis on joints and joinery, rounded corners emphasize the continuity of the form’s surfaces, the compactness of its volume, and softness of its contour” [1]

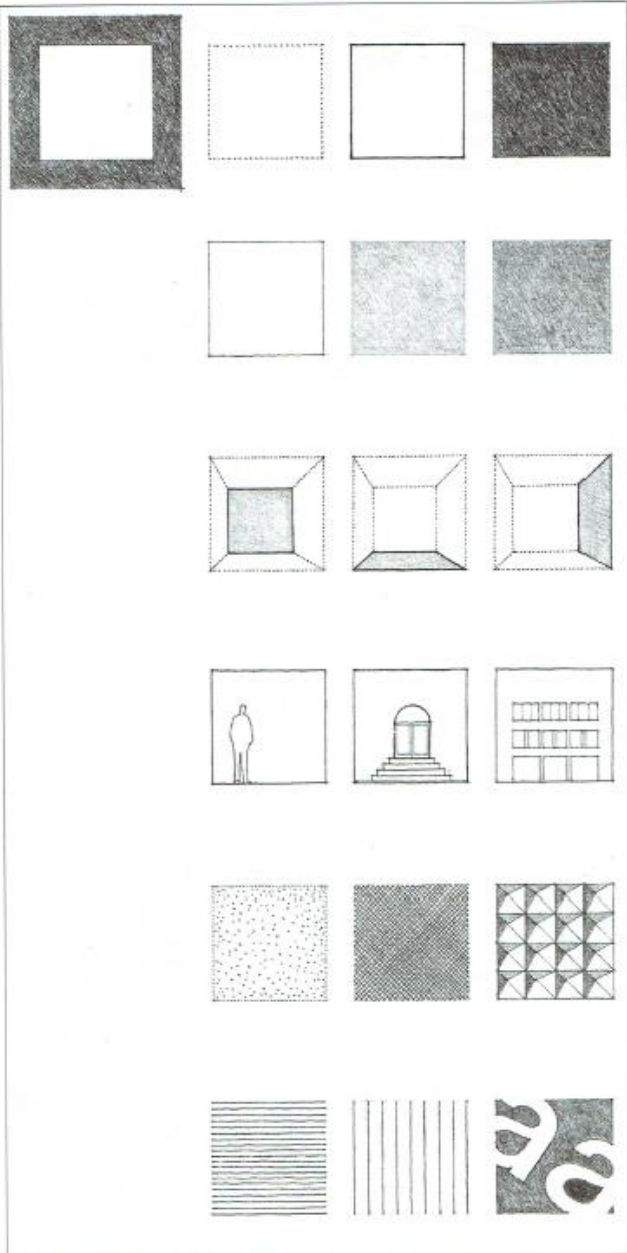


SURFACES & EDGES

“Corners define the meeting of two planes -- carrying a color or pattern across a corner onto adjoining surfaces emphasizes the volume of the form” [1]



SURFACES & EDGES



“Our perception of the shape, size, scale, proportion, and visual weight of a plane is influenced by its surface properties as well as its visual context.

A contrast between a surface color and the surrounding field can clarify its shape, while modifying its total value can increase or decrease its visual weight

A frontal view reveals the true shape of a plane; oblique views distort it

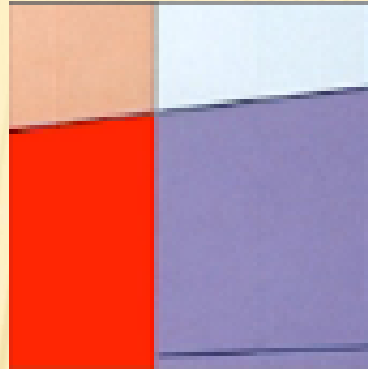
Elements of known size in a plane can aid our perception of its size and scale

Texture and color affect the visual weight and scale of a plane and the degree to which it absorbs or reflects light and sound

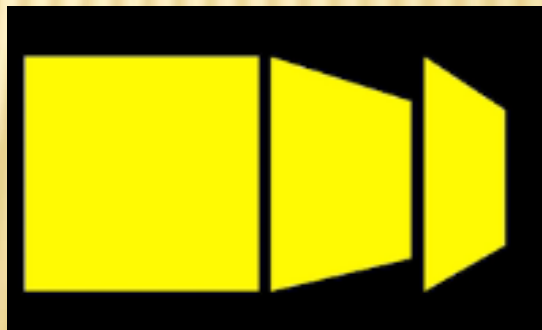
Directional or oversized optical patterns can distort the shape or exaggerate the proportions of a plane” [1]

SURFACES & EDGES

*“Our perception of shape, size, proportion, and visual weight of a plane is influenced by its surface properties as well as its visual context -- **contrast between the surface color of the plane and that of its field** can clarify its shape -- while modifying the **tonal value** can either increase or decrease its visual weight” [1]*

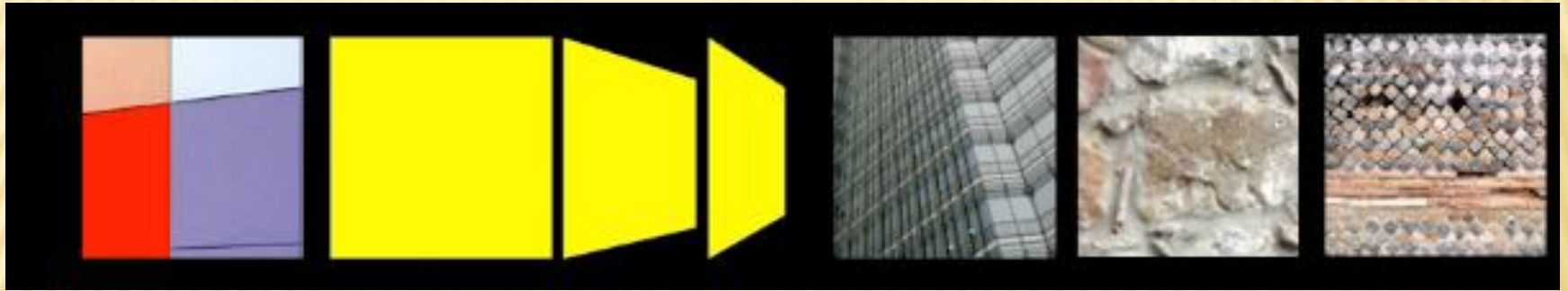


*“A frontal view reveals the true shape of the plane, **oblique views distort it**” [1]*

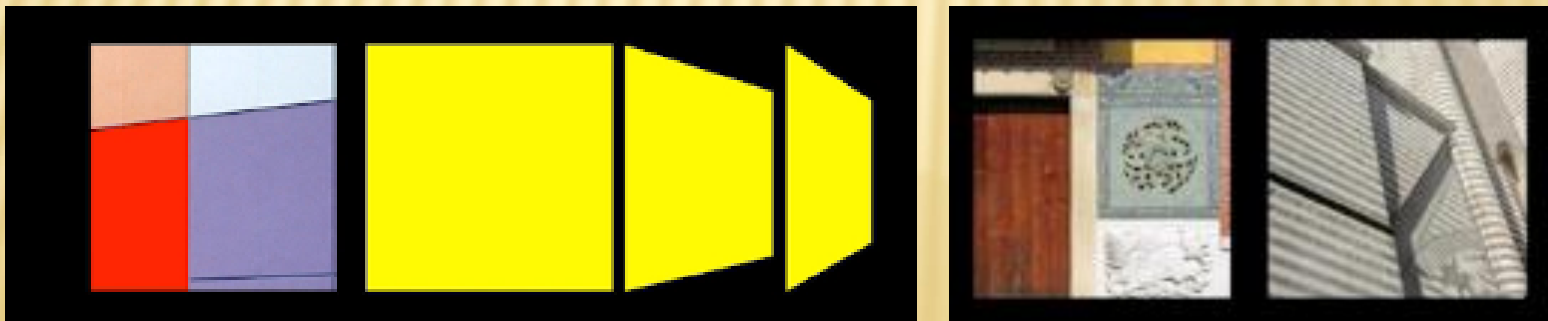


SURFACES & EDGES

“Texture and color affect the visual weight of a plane and degree to which it absorbs or reflects light and sound” [1]



“Directional and optical patterns can distort the shape and proportions of a plane” [1]



SURFACES & EDGES

*“Architectural design is about relationships; our **perception of the intrinsic color and texture of a material is greatly influenced by how it is joined and assembled with other materials in construction**” [1]*



SURFACES & EDGES

These marble columns
reinforce the
verticalness of the
exterior

Venice Italy,
2008, 2011, 2014, 2017



SURFACES & EDGES

The varying textures and architectural detailing between the 1st floor, and 2nd & 3rd floor facades clearly identifies the first floor within



SURFACES & EDGES

University of Trento, Trentino Alto, Italy, 2008, 2009
Visiting Professor for PhD course in 2009

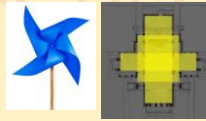
The varying textures and architectural detailing between the 1st floor and upper floor facades clearly identifies the first floor within



ORGANIC ARCHITECTURE DESIGN PRINCIPLES

CONFORM TO SITE, sun, topography, environment

PINWHEELED PLANES -- CRUCIFORM



- PRAIRIE-SCHOOL, BROAD CENTRAL CHIMNEY, LONG CANTILEVERS (overhangs & balconies)

FOLDED PLANE like origami ...continuity...walls, ceilings, and floors become one

SIMPLE GEOMETRIES

HUMAN SCALE

OPEN FLOOR PLAN

- ✗ DESTROY BOX, no Victorian box-type rooms, – FLOW between rooms, and inside/outside
- ✗ Walls become screens, BANDS of WINDOWS, FRAME VIEWS – like ENGAWA
- ✗ Use MATERIALS IN NATURAL STATE -- same on exterior and interior

FROEBEL
BLOCKS



UNITARIAN
MOTHER
Teacher



Japanese Buddhism & Shintoism,
with some roots in Chinese Philosophy

FORM and FUNCTION are one! Harmony, *not one following other, secondarily*

A UNIFIED WHOLE - inside and out - ORCHESTRATE SUN

BRING NATURE OUT OF MATERIALS, but Innovate (Textile Blocks, Modular "Ken" Design, etc.)

STRUCTURAL ART like in Nature (e.g., the veins in Leaves) - Interior space made exterior as architecture

SOFT WARM OPTIMISTIC COLOR TONES of earth, and autumn leaves

ASSIMILATE FIXTURES into structure, BUILT-IN FURNITURE many plants & planters

ARCHITECTURE = MUSIC

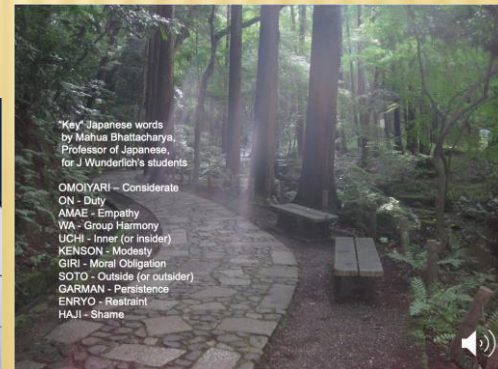
Arts & Crafts, Italy, JAPAN



MUSICIAN
Preacher
FATHER



ARCHITECT
MENTOR Louis
Sullivan



© JT Wunderlich PhD



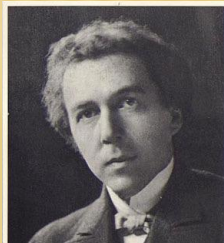
Frank
Lloyd
Wright



NOTE: COMPRESSION & RELEASE is not Organic Design, but commonly used by FLW to cramp/hide entries so as to magnify destination Architecture

See more on **ORGANIC ARCHITECTURE DESIGN PRINCIPLES:**

Wunderlich Lecture Series on *“The Life and Work of Frank Lloyd Wright”* ©



Frank Lloyd Wright
1867-1958

HOMEWORK

Watch the following short videos of non-residential architecture by Frank Lloyd Wright

1) **LARKIN ADMINISTRATION BUILDING, 1904** Buffalo NY

<https://www.youtube.com/watch?v=tBWjdCAD3E&list=PL5PK39I6z30QbbSjISM0CEKcWUjrjOSsiT&index=4>

2) **UNITY TEMPLE, 1905** Chicago - **His Unitarian Religion**

<https://www.youtube.com/watch?v=GvCIXNrYVg>

<https://www.youtube.com/watch?v=uEzXDGE0of0&list=PL5PK39I6z30QbbSjISM0CEKcWUjrjOSsiT&index=4&t=0s>

3) **JOHNSON WAX BUILDING:, 1939** Racine Wisconsin

<https://www.youtube.com/watch?v=Mj8qH3GGSYk>

4) **UNITARIAN MEETING HOUSE, 1951** Madison Wisconsin - **His Unitarian Religion**

<https://www.youtube.com/watch?v=kut1Sq8qvsI>

5) **BETH SHOLOM SYNAGOGUE, 1959 opening** Philadelphia

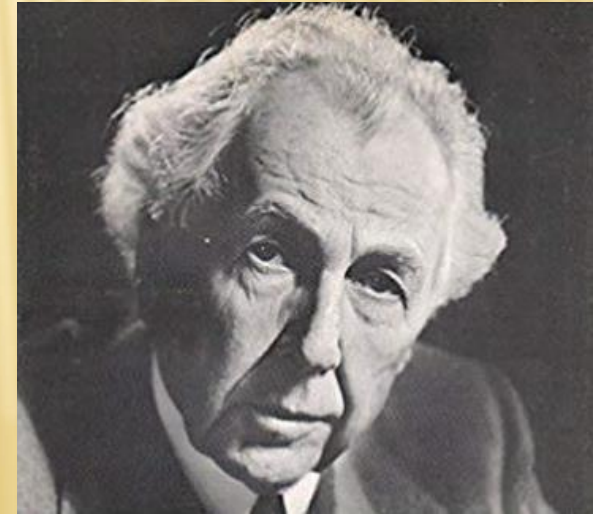
<https://www.youtube.com/watch?v=pe8nmUUXCmA>

6) **GUGGENHEIM MUSEUM, 1959 opening** New York, NY

<https://www.youtube.com/watch?v=QvgVKWvb2tl>

Listen to this **1953** interview of Frank Lloyd Wright:

<https://www.youtube.com/watch?v=-e-9K1edb6U>



Frank Lloyd Wright

1867-**1958**

ARCHITECTURE DESIGN THEORY



LECTURE SERIES

- ❑ PART 1 PRIMARY ELEMENTS [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ **PART 2 FORM** *(This Lecture)* [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 3 FORM & SPACE [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 4 ORGANIZATION [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 5 CIRCULATION [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 6 PROPORTION & SCALE [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)
- ❑ PART 7 PRINCIPLES [PPTX](#) [MP4](#) [YouTube](#) [PDF](#)