



ARCHITECTURE

EHLINGER & ASSOCIATES

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HAGIA SOPHIA

This issue's signed limited edition print by Ladd Ehlinger is of Hagia Sophia (which means Divine Wisdom), a church in Constantinople (modern Istanbul, ancient Byzantium), Turkey. S. Sophia, as it is commonly called, was first built in 532-37 AD for the Roman Emperor Justinian by the architects Anthemius of Tralles and Isidorus of Miletus and is of Byzantine architectural style. It was built on the site where there had been two successive basilican churches of the same name, erected respectively by Constantine (c. 335) and Theodosius (415). It was the most important church in Constantinople.

S. Sophia was damaged by an earthquake in the ninth century and repaired, and the minarets (the four towers) along with other outbuildings were added by the Turks after they captured Constantinople in 1453 AD. The Turks converted the building to a mosque. When Turkey was secularized in the 1920's, Hagia Sophia was converted to a museum and displays even today characteristics of both the Islamic and Eastern Orthodox Christian heritage.

The dome had always been a traditional feature of the architecture of the ancient East, and became the prevailing motif of Byzantine architecture, which was a fusion of the domical construction with the Roman Classical columnar style. As Christianity evolved in the East, the dome became the expression of important theological concepts, most importantly the expression of the Unity and Oneness of God and man's intimacy with Him. This was quite the opposite of the development of the church in the West, where the basilican plan of the church predominated, with its emphasis on man's journey or procession in life toward God.

The dome is a perfectly symmetrical shape which exerts a vertical force and thrust upon its support, that is, it exerts a horizontal force upon its support which requires bracing. Byzantine architects were inventive in confecting bracing type sup-

ports in the form of pendentives (domical sections melded to a rectangular shape), semidomes and buttresses. These supports would thus tend to match the symmetry of the dome to act efficiently, and when used in a church, would serve to express in physical forms the theological concepts by their centralized shapes the oneness and unity desired.

The curious aspect of S. Sophia is that its main dome was not braced symmetrically. On the east and west, semidomes were used, and on the north and south buttresses were used. The view in the sketch is from the north, and the semidomes can be seen right and left below the level of the main dome. The nave of S. Sophia is formed of a central square supporting the main dome, with half squares supporting the semidomes east and west, with galleries north and south containing the buttresses and supporting minor domes forming thus a rectangle, which conformed to the classic processional basilican plan, while the overall impression on the interior is that of a space formed by one vast almost (perceptually) asymmetrical dome which fostered movement and procession simultaneously with intimacy.

Hagia Sophia was thus a successful attempt at a synthesis of the two divergent themes of expression of Christianity in architecture, procession and intimacy. It was done at an historical time when the government of Rome was a similar crossroad, whether to have an Eastern Empire, a Western Empire, or both, much like the movements within the church itself.

Successor Byzantine Christian churches and mosques used S. Sophia as the model for design to express intimacy, and were symmetrical in plan and three dimensions. Successor Western Christian churches used S. Sophia as the model for domical expression of the basilican processional plan, from the Romanesque period, through Gothic to the Renaissance and the Revival styles as well.

ARCHITRIVIA

Can you correctly identify these terms?
Clue The answer to A is not no. 1.

- A. Banker
- B. Straw Hat
- C. Ha Ha
- D. Monkeytail
- E. Acrolith

1. a statue with stone hands, head and feet and a wooden body
2. a bench where bricklayers prepare their material.
3. the name of a theater used only in the summer time.
4. a trench used to prevent livestock from crossing.
5. a scroll at the bottom of a stairway handrail.

Answers: (A-2, B-3, C-4, D-5, E-1)

CONGRATULATIONS

to Ladd Ehlinger who was recently appointed to the (ASCE) American Society of Civil Engineer's national Technical Committee on Forensic Engineering.

A VIEW ON WINDOWS

Like so many discrete elements of Architecture, the window must have had a reason for being in the first place. A window, after all, is only a hole in a wall, or so it seems. The window may well be one of the oldest and one of the most important architectural devices in history.

It's history is obscure, but when primitive man discovered the use of fire, he also learned that where there is fire,

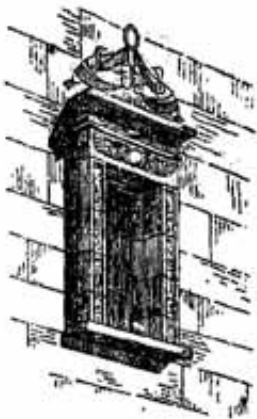
there is smoke. And when early man took fire indoors for cooking or keeping warm in winter, he took the smoke, and soon discovered that the unpleasant fumes could be released by making holes in the roof or slits in the walls.

He soon found that not only was it nice to get rid of the smoke, but it was nice to have light on the subject. However, since glass had not been invented, the blowing rains must have been a problem.

As the early architects got better at shelter building, they created subtle devices and new inventions to let out the smoke, let in a little sunshine and fresh air, and yet keep out the rain, snow, and sleet as best they could with chimneys, overhangs (eaves), oil-coated parchment, animal skins, or thin slices of clear marble or alabaster to cover the openings, along with shutters.

As towns developed, those who could afford better houses, would certainly have had windows framed with precious timbers or even dressed round with stone, and shutters for extra protection. All through ancient times, the typical urban residential design was a 1, 2, or 3 story structure built around a central court yard.

In most cases, depending upon the crime rate in the neighborhood, the friendliness of nearby towns, or the size of the property, a home rarely had more than a few, if any, windows on the "facing the street" side. Of course, if one had only a small narrow piece of property, it became essential to build two party walls, with tiny windows, often covered with iron bars, facing the street and the rear... much the same as one finds in today's urban setting (iron bars and all).



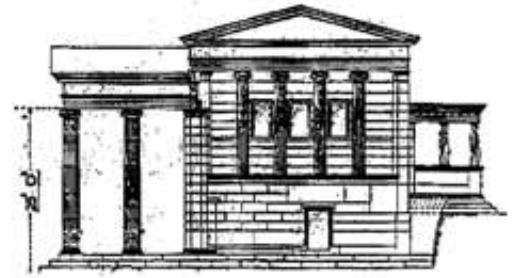
Medinet-Habu Tomb
Egyptian (1198 BC)
Unusual window decorated
with stone accolade.

The Egyptian, Greek, and Roman architects rarely used windows in their temples and monumental buildings as these were not places for viewing the world outside. In fact, the emphasis was upon a strict control of all light entering the building in order to enhance the drama of the interior. Pierced slabs of stone were often inconspicuously placed above the capitals along exterior walls in the form of a clerestory, or tiny slits were strategically cut into roof apertures, or tiny holes were designed into the roof to help accomplish this control.

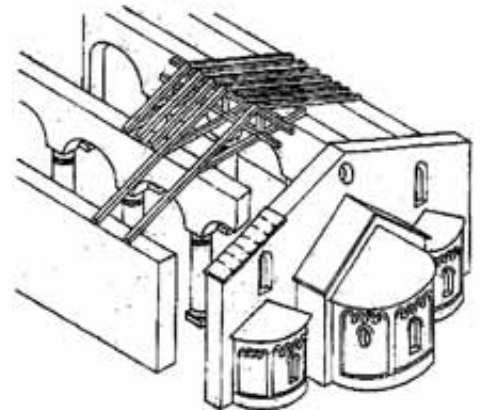
The invention of the wheel was to transportation as the discovery of glass-making was to windows. For generations the secrets of the art of glassmaking was held closely by a few, especially the Venetians. For this reason glass was tremendously expensive and was not widely used as an element in window design. The average citizen still had to rely on shutters, overhangs, oiled skins or parchment.

In the Middle Ages, the French, among others, got their hands on the Venetian glass-making secrets and, as fast as fire, the knowledge spread throughout the Western world.

A new material and a new technology was readily available...and it was affordable! This event had a profound influence in the changes that took place in architecture from the Gothic period forward, which will be discussed further in our next newsletter.



The Erechtheion, Athens
Greek (421-405 BC)
West Elevation: Rare
use of window in Greek
architecture.



Early Christian (300-800 AD)
Tahull, Spain
Basilican style with few windows



Apartment House, Ostia, Italy
Roman: (100 BC-200 AD) Use of glass
was rare. Shutters or hanging cloths
were probably used for protection.
Note the use of the arch.