ARCHITECTURE

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THE SULEYMANIYE MOSQUE, ISTANBUL, TURKEY

Suleyman I was probably the greatest Sultan of the Ottoman empire (which ruled from Istanbul during the period from 1453 through the mid 16th century) and extended the boundaries of the Ottoman empire to their greatest hegemony.

Under Suleyman I, Turkish fleets appeared in the Western Mediterranean and were feared greatly, due to attacks on Venice, Southern Italy, Corsica and Sicily. Rhodes, North Africa, Asia Minor, Egypt and parts of Persia were added to the empire.

Suleyman's greatest achievements however, were in organization and administration. He recognized and incorporated into his administration talent in every type of vocation. He revamped the legal system personally, earning the nickname 'Suleyman the Lawgiver', and saw to it that the laws were fairly enforced. In this respect, his reign was very similar to that of Justinian a thousand years earlier, under Byzantine rule of the city under its name at that time: Constantinople.

Part of Suleyman's recognition of talent was embodied in his appointment of and his order to his court architect Koca Sinan to design a mosque that would surpass Justinian's majestic church, Hagia Sophia. The complex of buildings that resulted was the Kulliye (Mosque with other buildings) of Suleyman, this issue's limited edition signed print by Ladd P. Ehlinger.

Sinan's origins and birth date are rather murky. Most historians believe that he was born in 1491, somewhere in Albania or Serbia, of Greek descent (non-moslem). How he arrived in Istanbul is a mystery, as is the term of his life, as the Islamic lunar year was used, which is shorter than the Christian calendar.

From Sinan's autobiography we do know that he was a soldier, a military engineer, and participated in many Turkish campaigns, gaining much experience building castles, fortifications and bridges. In 1539 he was made chief of the Ottoman Empire's corps of architects. His campaigns had also given him first hand knowledge of architecture in the Balkans and other countries. If we can believe his derived birth date, Sinan began the practice of architecture as an independent profession at age 50.

Islamic architecture developed slowly over a few centuries and is the product of many places and peoples. It has a limited repertoire of forms and elements that it employs: courts, arcades, domed spaces and very large portals. It is fundamentally centered upon God, but in a different way from Christian architecture. At its heart is the mosque, an inward-looking building whose prime purpose is contemplation and prayer. It is a space removed from the immediate impact of wordly affairs. It is not, however, designed to be spiritually uplifting, nor to produce a sense of exhaltation, and there is no positive object of attention or of adoration.

Sir Bannister Fletcher's History of Architecture states: "Above all things the mosque is essentially democratic; in it all have equal rights, and it may serve many functions other than prayer. It is still commonly used as a school, transactions may be made there and treasures stored. Official notices are given out there and newly arrived caravans normally repaired to the mosque where travellers have the right of shelter; and though many of these functions have become comparatively unimportant in modern society, the mosque remains the focus of Moslem life - something between a forum and a prayer house."

In the Suleymaniye Mosque, Sinan set out to prove to the world that he and Suleyman could surpass the Greeks in concurrence with Suleyman's order. The building became one of the most important buildings in Turkish and Islamic architecture and was a turning point in Sinan's career. Interestingly, Sinan adopted the ground plan of Hagia Sophia, the pinnacle of Greek (Byzantine) architectural achievement. It appears that Sinan did so in an intellectural struggle to solve and surpass the formal problems of Byzantine architecture, which would then free him from those same patterns. The main dome is flanked by two half domes as in Hagia Sophia, but the internal and external expression of the forms and spaces is entirely different.

Hagia Sophia has a continuity of spherical forms and spaces which Suleyman's Mosque abandons, while articulating the differences with a clarity of structural expression, rendering a building of great repose and serenity, enhancing its purpose of contemplation and prayer.

The Suleymaniye has a dome with a diameter of 85 feet and a height of 170 feet, surpassing Hagia Sophia. The clarity of structure is enhanced by extensive use of limestone ashlar which is contrasted with intensive decoration and bold modelling based on carefully calculated proportioning. Ceramic tiles are used modestly but with careful precision within the mosque itself and abundantly and brilliantly in the octagonal tombs of the Sultan and his wife Roxlena, in the cemetery immediately behind the prayer chamber.

IF YOU'RE GOING THAT WAY

DOUBLE SPRINGS, ALABAMA

The incident at Looney's Tavern happened a 130 years ago - You missed it. The reenactment of the incident takes place each summer night and you shouldn't miss it. This musical rendition of Winston County's attempt to secede from the State of Alabama and form "The Free State of Winston" is both educational and entertaining.

VOLTERRA, ITALY (Tuscany)

Near Florence, this tiny medieval walled city is located on a hill surrounded by the beautiful farms and vineyards of Tuscany. It is the site of excavations of Etruscan and Roman civilizations. The archaeological museum is a "must" visit. Alabaster is quarried in the area and there are many shops and factories selling all sorts of items made from this delicate marble.

NASHVILLE, TENNESSEE

The Barbara Mandrell Museum: An example of "hoakie-tecture" as coined by Ehlinger. A sort of hybrid exposition, museum, retail, pilgrimage facility, housing an assortment of paraphernalia from the events of Mandrell's career and a gift shop with Mandrell records and souvenirs. The architecture is insignificant, but the phenomenon of the building type may not be. It seems uniquely American and perhaps could be grouped into a category called "Halls of Fame", i.e. Football, Baseball, Elvis, etc.

COST TRENDS MEDICAL OFFICES (2 STORY)

The list of cost represents a standard quality 7,000 S.F. building. Not included are land cost and site work, paving, landscaping, development cost, and specialized equipment or finishes.

The information comes from the latest edition of "Means Square Foot Cost" published by R.S. Means Co., a cost estimating source which E & A has found to be extremely realistic and reliable.

City	$ Per S.F.
Winston/Salem	$ 63.52 (Lowest)
Dallas	$ 68.18
New Orleans	$ 68.79
Atlanta	$ 68.71
Cleveland	$ 83.30
San Francisco	$ 97.35
New York City	$ 98.42 (Highest)

ROOFS AND FLAT ROOFS

In this issue, we will discuss roofs in general and flat roofs in particular — the kind of flat roof that is the bane of the typical homeowner or small commercial building owner that has had the misfortune to own one. In succeeding issues, we will discuss other types of roofs.

Roofs can be categorized by their geometry, essentially flat or pitched, and simultaneously by their methodology of providing resistance to water penetration: by being a barrier or a combination barrier and "rainscreen" shield. A "rainscreen" shield provides water penetration resistance by providing a "screen" that blunts the kinetic effect of wind driven water and at the same time has an internal space between the exterior of the building and the interior of the building which will equalize air pressures from and with the exterior, stop capillary and surface tension water movement and facilitates gravity drainage to the exterior of what water does enter the system.

Pitched roofs can be categorized both as rainscreen and barrier types. Of the barrier types there are two main classifications: membrane bitumen and metal. The bitumen type are used from very low slopes up to medium slopes, and the metal types are characterized from low slopes up to steep slopes, separated as to whether or not the fasteners are concealed or penetrating. Of the rainscreen types, essentially these are all shingle roofs and are used on slopes varying from 4" rise to 12" horizontally on up in steepness.

Flat roofs are essentially barrier systems and are divided into elastomeric membrane and bituminous membrane types. The elastomeric membranes are generally known as "single-ply" membranes (although some bituminous membranes are also single-ply) and consist of either factory or field cured membranes. The field cured membranes are usually Hypalon rubber or polyurethane, whereas the factory cured membranes are usually EPDM (a type of rubber) or PVC (poly-vinyl chloride).

The bituminous membranes fall into three major types: coal tar pitch, asphalt and single-ply bituminous (where elastomeric type plasticizers have been used to chemically alter the bitumen and enhance its performance).

Coal tar pitch roofs are the original "flat" roofs, going back to antiquity. From the 19th century until today the bitumen in coal tar pitch roofs has been derived from the volatile residue from the manufacturing of coke (carbon) or charcoal. When the coal or wood is heated in an airless environment, all of the voltile compounds are driven off as gases and condensed and then refined into the bitumen for roofs. Asphalt on the other hand is a by-product in the oil refinement process, and while similar to the coal tar pitch, has significant differences.

Coal tar pitch has significant properties beneficial to roofs: it has a low melting point, so low that a good summer day's heat is sufficient to render it plastic and semi-liquid so that it is self healing.

Conversely, freezing temperatures will not harden it to the point of crystallization or cracking. It is not very sensitive to ultra violet light deterioration. Generally, roofs designed with coal tar pitch consist usually of 4 or 5 plies of pitch impregnated material (felts), which used to be composed of heavy rag paper and are now composed of fiberglass fabric. The felts serve to reinforce the pitch, retard flow of the pitch and resist punctures. These roofs usually had a perimeter parapet, where the roofing membrane is turned up a vertical surface and capped with a metal flashing. The slopes of these roofs are shallow (1/16" per ft.) to dead flat to retard bitumen flow. The top or flood coat of bitumen is capped with gravel to retard bitumen flow and to shield it from ultra violet light. The "down-side" of coal tar pitch roofs is that care needs to be given to supplying adequate drainage due to the flat or near flat geometry, and the pitch is carcinogenic, especially to those that apply it.

Asphalt roofs have the advantage of being cheaper than coal tar and not nearly as carcinogenic. But asphalt roofs designed to coal tar criteria (flat or nearly so) are trouble - doomed to failure. The asphalt is not nearly as self-healing as the coal tar. It is more temperature sensitive during its application, if overheated in the kettle, it will usually crystallize as all of the volatiles (solvents) have been driven off by the excess heat. This is evidenced by an alligator skin appearance of the surface. The higher liquefaction temperature makes it harder to juncture with metal components and flashings, and usually requires use of a flashing cement that never hardens in these locations (drains, gravel guards). The lack of self healing means that a more positive slope (1/4" to 1" per ft) should be incorporated. It is also more vulnerable to ultra-violet light deterioration, and requires either gravel or a coating to ward off the UV.

Both coal tar and asphalt are very sensitive to being wetted during application before completion. Entrapped water does great damage to these roofs, more so to the asphalt than coal tar. As the sun and warm weather heat the entrapped water, it vaporizes under pressure, usually between plies and produces blisters in the membrane which weaken it. As the membrane thermally expands and contracts these blisters rupture, admitting more water into the system and continuing the cycle.

If you are a homeowner with a leaky flat roof, it probably leaks because it follows a coal tar pitch design while being asphalt, and/or there was no quality control when it was applied.

Later, what to do about it.....