

The Pantheon, Rome

The Pantheon in Rome is the subject of this issue's limited edition print of a sketch by Ladd P. Ehlinger, AIA. This sketch shows the north elevation. This building was built and rebuilt several times. Marcus Agrippa, a Consul during the reign of Augustus (27 BCE - 14 CE), built the first Roman temple on this site. It was rebuilt by Trajan and Hadrian after horrendous fires. In the reconstructions, the slope of the of the pediment's roof on the portico was increased and changed from southern facing to northern facing. Most everything else was salvaged, including the original inscription:

"M[ARCUS]AGRIPPA[FILIIUS]
CO[N]S[UL] TERTIUM FECIT,

meaning:" Marcus Agrippa, son of Lucius, made [this building] when consul for the third time." An additional inscription not visible in the sketch below that was made by the emperors Severus and Caracalla, which noted their restoration of the building in the year 202 AD.

The architect for the Hadrian rebuilding was Apollodorus of Damascus. This rebuilding took place from 113 to 125 AD. He made the cella (main worship space) behind the portico circular and covered it with a dome of masonry and concrete. This dome is designed of totally compressive forces with no tensile

stone, brick masonry, tile masonry and concrete, with the upper regions composed

of pumice and tufa, lighter stones of volcanic origin. The oculus, or eye, at the top of the dome was left open to the sky and its height equals the diameter of the dome - 142', and the interior floor was sloped to drain to internal drains.

The Romans had the equivalent of our Portland cement that we

structural components to remove the thrust at the base of the dome. It is still the world's largest span (142' or 43 M) unreinforced dome. To reduce weight, there were coffers (recessed panels) inserted in the lower surface region of the dome, and the materials used were heavier at the lower regions of the dome, such as

make concrete from, which they called "Pozzalana". It was mined from volcanic sites where the heat of the volcanic activity was sufficient to cause the chemical reaction on the limestone to produce the hydraulic cement. The Romans learned that if crushed into a powder, and combined with water, the Pozzalana would react with the water and produce a rock hard substance similar to today's concrete. Aggregates (fillers) of crushed masonry, stone etc. were added to reduce the amount of Pozzalana needed. Domes, vaults, and walls would be constructed with a shell of stone, brick or tile masonry and its voids were filled with concrete.

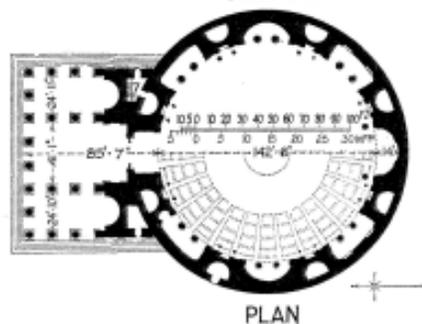
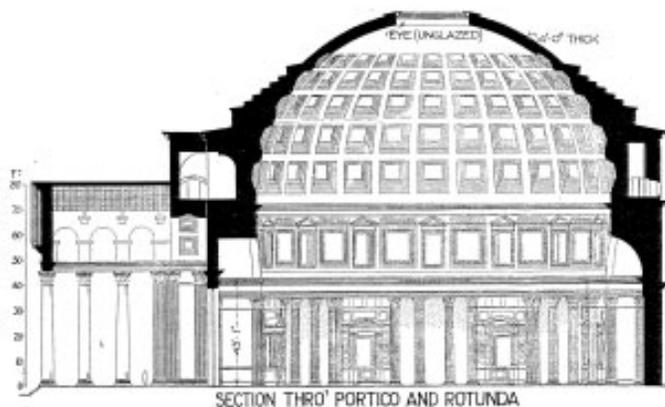
Pantheon meant a temple dedicated for many gods. After the fall of Rome, in the 7th century, the Catholic church took over the building dedicated it to "St. Mary and the Martyrs". It

has been in continuous use since its construction. During times of unrest and civil breakdown though, parts of the building were vandalized and stolen as well, such as the bronze shingles that were removed and melted down, similarly the bronze ceiling of the

Portico, and all of the rooftop statuary.

The Pantheon has influenced numerous buildings since its construction, notably: Hagia Sophia (532-537) in Constantinople (now Istanbul), the "Duomo" (Santa Maria del Fiore) in Florence (1296-1436), Thomas Jefferson's Library at the University of Virginia (1817-1826), and nearly all mosques of the Islamic faith (Suleimaniye Mosque, Blue Mosque, Dome of the Rock) in all Islamic countries.

Ladd P. Ehlinger, AIA



Covid-19 and Technology: Effects on Use of Space

by R. Perrin Ehlinger, AIA

The outbreak of Covid-19 has had, and is still having, a massive impact on all of our lives. It has radically changed the way we interact with our environment and with each other. Some of those changes will likely be permanent.

Working From Home

Technology has rapidly advanced over the past decade and working from home had already become much more common. Powerful and inexpensive computers and high speed internet access allowed many people to work and interact with their colleagues without needing face to face interaction.

Since the lockdown, working from home became a necessity for many whose job functions could accommodate remote work. Many people found they preferred it, and businesses were surprised it didn't affect productivity and communications. A number of these positions will continue to be remote, and it is already impacting traditional uses of office and residential spaces.

With no requirement to live within a rapid travel distance of a physical office, telecommuters no longer need to pay high rents or mortgages for a necessary proximity to their place of employment.

Global Workplace Analytics gives some statistics that put the scale of this change into perspective. About half of all jobs are compatible with working from home, at least part of the time. Before Covid-19, less than 4% of the workforce was working from home, even part-time. Predictions for the end of 2021 are that nearly 25% of people will be working multiple days from home.

Downsized Offices

With fewer workers physically at the office, businesses will downsize their physical locations for fewer on-site staff. For health concerns, cubicles will be phased out for larger areas and office rooms where people can be comfortably separated, and A/C supply air will either be UV light treated, or split into individual cooling units that don't share air between spaces.

Meeting rooms will upscale for those required in-person meetings that will arise, particularly since employees may be traveling farther for their infrequent visits to the office.

Education from Home

Similar to working from home, interest in schooling from home has exploded. This includes either homeschooling and online schooling, from elementary to college level. The Washington Policy Center says that 40% of parents are considering removing their children from traditional schooling permanently.

If just 1/2 of those 40% continue from home after Covid-19 restrictions, the reduced usage of the existing schools will require consolidation and closures. But this also means the remaining public schools should be much better funded, with reduced maintenance and staffing.

Home Use

With the increased use of the home, the home itself will need to adapt to the changes in use. Both for working and education, additional quiet spaces are needed where outside interference is minimal.

The DIY home movement was already in full swing during the Covid lockdown, as people finally had time to start and finish projects around the house. Hopefully, the changes in lifestyle will lead to savings that people can continue to reinvest into their homes. Less driving and gas used, and lower car insurance can add up to a solar power system to reduce the higher bills, and then allow for additions/remodeling.

Restaurants / Retail / Manufacturing

Even for jobs that can't be remote, plenty has also changed. The food service industry is the prime example, where the business model has changed due to Covid-19, to primarily delivery. In larger areas that allow it, indoor seating is limited and socially distanced. In other areas, seating has been moved to outdoors only. How these changes will affect customer expectations and future restaurant use remains to be seen.

In manufacturing, outbreaks of Covid-19 are forcing a re-evaluation of processes and interactions, particularly in food packaging. Expect health protection of workers to become a standard part of future designs of these spaces - it won't just be a change in methods.

Movie Theaters may be the hardest and most permanently hit from these use changes. Large televisions have become so inexpensive, and internet streaming so fast and reliable, that numerous cinema quality movies were already skipping theatrical release. Covid-19 may kill the movie theater busi-

ness model entirely.

Brick and Mortar retail was already in decline before Covid, due to the convenience of online shopping and delivery. The business model has to change in order to survive, but Covid-19 was a nail in the coffin for many already struggling.

Traffic and Zoning Uses

With more people working from home, more students schooling from home, offices hosting fewer employees, and people increasingly relying on delivery and pick-up for many of their shopping needs, traffic and zoning use patterns will need to change for the new uses.

Some areas have begun closing off streets for pedestrian use only, and are allowing restaurants to place seating on the sidewalks. On street parking is being blocked off for this and retail uses.

With rapidly changing use patterns will come a need to change traffic and zoning uses so that support businesses in commercial zones can survive. This will likely require more mixed use buildings, and walkable areas with limited traffic, and no on-street parking that can serve both local residents and still be a draw for nearby drivers.

Advancement of Automation

Tasks that were already becoming automated will now advance at a much more rapid pace due to Covid-19 and fears of contagion.

Robotic food preparation and drone deliveries were already being tested prior to Covid-19 - now there's a need and demand for them.

A.I. mixed with new robotic technologies will advance manufacturing, warehouse stocking and retrieval, and construction: all allowing for a safer working environment.

With voice recognition tools and phone apps that can control our TV's, lighting and so much more - there's no reason these same applications can't be applied in a commercial setting. Instead of touching potentially contaminated buttons in an elevator, simply announce what floor you're heading to.

Tough Times lead to Golden Ages

While there's no predicting how long the Covid-19 outbreak will continue to directly affect us, it is clear that a lot of the changes manifesting themselves will become permanent. This isn't necessarily a bad thing in the long run, however, as we adapt and overcome.