On 1-8 August 2026 I attended an Oxford University Summer School for Adults on the topic of "The Architectural Secrets of Oxford's Classical Buildings", by Robert Adam.

This is my pre-course assignment (c.1500 words) on the topic...

> "Write about one or two classical buildings that you have visited or that greatly interest you. Discuss their location and history, provide some illustrations and explain what it is about the architecture and features of the buildings that interests you.".

The term "classical building" is a broad, descriptive term. I appreciate it usually means buildings designed according to the principles of classical architecture[1], e.g. symmetry, proportion, columns, pediments, inspired by ancient Greece and Rome. But I'm going to focus on...

Two "Classical" Buildings That Interest Me

My inspiration came from Wikipedia[2] which mentions that in the Hellenistic and Roman eras (by 100 BC) galleys with four, five or six rows of oarsmen were commonplace, and that with high freeboard (up to 3 metres) and additional tower structures from which missiles could be shot down onto enemy decks, they were intended to be like "**floating fortresses**".

Later in the Early and High Middle Ages, the cog[3] and the carrack[4], were also "almost like floating fortresses", being difficult to board and even harder to capture. And in a separate Wikipedia entry on

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[1] https://en.wikipedia.org/wiki/Classical_architecture

[2] https://en.wikipedia.org/wiki/Galley

[3] https://en.wikipedia.org/wiki/Cog_(ship)

[4] https://en.wikipedia.org/wiki/Carrack

Medieval warfare[5] there is a mention that in the 16th–17th centuries, medieval warfare ships were sometimes also described metaphorically as “floating fortresses”.

I can imagine that the Spanish treasure fleets[6], with their soldiers and cannon, must have seemed like entire **wooden cities afloat**.

With this in mind, my thoughts turned to Vitruvius[7] who repeatedly treated architecture as part of a broader family of technical arts that includes shipbuilding and mechanics. Most importantly, he argued that architecture depended on *ordinatio* (order), *symmetria* (proportion), *dispositio* (arrangement), and *eurythmia*[8] (harmonious appearance). These same proportional principles also governed ancient ship construction. A particularly relevant passage is *De Architectura* I.1, where he argues architects must understand many related arts including mechanics and construction techniques associated with ships and machines. Vitruvius also uses naval examples when discussing proportion and mechanics elsewhere in his treatise.

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[5] https://en.wikipedia.org/wiki/Medieval_warfare

[6] https://en.wikipedia.org/wiki/Spanish_treasure_fleet

[7] https://en.wikipedia.org/wiki/De_architectura

[8] https://it.wikipedia.org/wiki/Concinnitas

Ancient Greeks did not sharply separate architecture, engineering, and naval construction the way modern disciplines do. And Greek shipwrights and architects operated within the same intellectual world of geometry, harmonic proportion, measurement systems, and practical mechanics.

Greek architectural theory[9] treated beauty as arising from commensurable ratios between parts. Ancient ships were likewise constructed according to established proportional relationships[10], e.g. length-to-beam ratios, oar spacing, mast placement, hull curvature. The trireme[11], for example, was highly standardised and mathematically constrained in ways comparable to temple design.

It's my understanding that *Tekton* (τέκτων) could refer to shipwrights, house builders, temple carpenters, woodworking specialists, etc., and the root survives in architect (*archi-tekton* = chief builder). My guess is that temple roofs and ships both required large timber selection, joinery systems, some form of geometric layout and proportional design, and possibly even curved wooden members. However I understand Greek craftsmen did not have guilds in the medieval sense, but the Romans did have *collegia*[12] for the maritime trades (*Collegium Fabrum Navalium*). And we should not forget that both ships and temples had religious significance, e.g. ships benefited from sacred decoration and divine protection. And I think that the "ship of state"[13] likens governance to the command of a vessel.

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[9] https://en.wikipedia.org/wiki/Ancient_Greek_architecture

[10] https://webhelper.brown.edu/joukowsky/courses/maritimearchaeology11/files/18127007.pdf

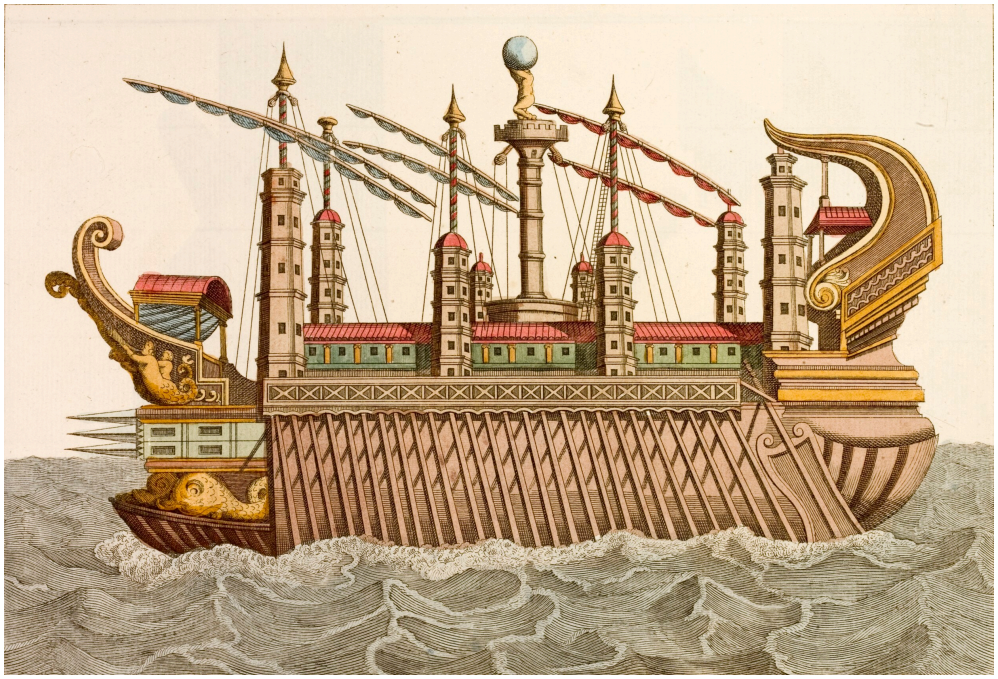
[11] https://en.wikipedia.org/wiki/Trireme

[12] https://en.wikipedia.org/wiki/Collegium_(ancient_Rome)

[13] https://en.wikipedia.org/wiki/Ship_of_State

Ancient ships themselves used architectural terminology, e.g. stern galleries, fore and aft castles[14], decks, frames, beams, ribbing, beakheads[15], etc. And Greek and Roman warships also incorporated literal architectural ornament such as carved eyes, figureheads, painted structures, and shrine-like stern constructions.

The most dramatic parallel comes from the enormous display ships such as the 110 metre *Syracusia[16],* described by Athenaeus[17], which reportedly contained gardens, baths, temples/shrines, decorated halls, and monumental interiors. It was essentially conceived as **architecture afloat**.



Almost everything we know about the giant ship *Syracusia* (later called the *Alexandris[18]*) comes from *Deipnosophistae* Book V, where Athenaeus quotes an earlier historian, Moschion[19]. The main

[14] https://en.wikipedia.org/wiki/Race-built_galleon

[15] https://en.wikipedia.org/wiki/Beakhead

[16] https://en.wikipedia.org/wiki/Syracusia

[17] https://en.wikipedia.org/wiki/Athenaeus

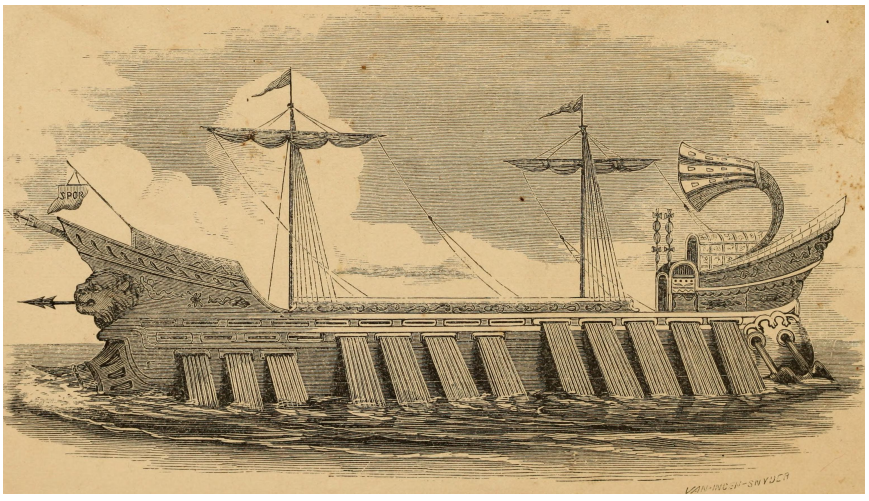
[18] Sicily had no harbour large enough for it, so it was sent to Alexandria, and renamed Alexandris

[19] https://en.wikipedia.org/wiki/Moschion_(tragic_poet)

passage is *Deipnosophistae* V.206d–209e (a reliable online text/translation exists[20]). Just to highlight its' classical architectural features:-

- All the rooms had tessellated[21] floors made of many-coloured stones, in which the entire story of the Iliad was represented
- There were gardens planted in pots and beds filled with earth, producing ivy, vines, and all manner of flowers
- It carried 60,000 *medimni* of grain and 10,000 jars of fish
- There was also on the ship a shrine of Aphrodite, furnished with couches, paintings, and cups
- There was also a gymnasium and a bath-room with three bronze tubs
- There were eight towers on it… upon each tower were stationed four heavily armed men and two archers, and through openings, stones could be hurled at hostile ships sailing beneath.

While the *Syracusia* was probably a real, functioning mega-ship, there was also the *Tessarakonteres*[22] which was considered vastly larger. But the description may have been partly impractical or exaggerated. It may have been more propaganda than warship, or a ceremonial



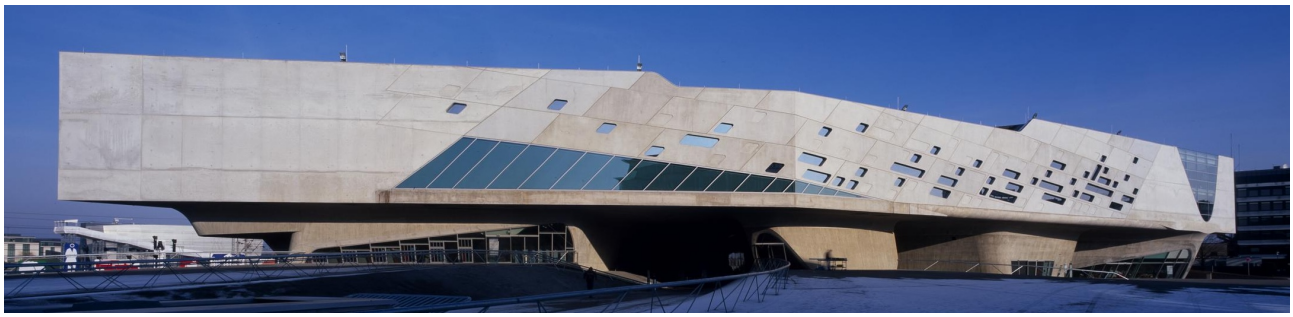
floating platform more than a seaworthy vessel. Ancient accounts describe something almost

[20] https://penelope.uchicago.edu/Thayer/E/Roman/Texts/Athenaeus/5C*.html

[21] https://en.wikipedia.org/wiki/Tessellation

[22] https://en.wikipedia.org/wiki/Tessarakonteres

unbelievable, about 130 metres long, gigantic beam width, thousands of rowers, towers and pavilions, and possibly multiple hulls or a catamaran-like structure.



And before we move on to my second example of "classical" architecture, today we can see a clear “stealth-like” link between the Zumwalt-class destroyer[23] and the Phaeno Science Center[24], the bunker-like monolithism, sloped surfaces instead of vertical façades, and an object-like appearance rather than a building or ship.

My personal opinion on what is described above, is that both *Syracusia* and *Tessarakonteres* defy the axiom that if a building is perfectly designed for its special function, it cannot be aesthetically bad. And I wonder how people will view the Phaeno Science Center in a 1,000 years time?

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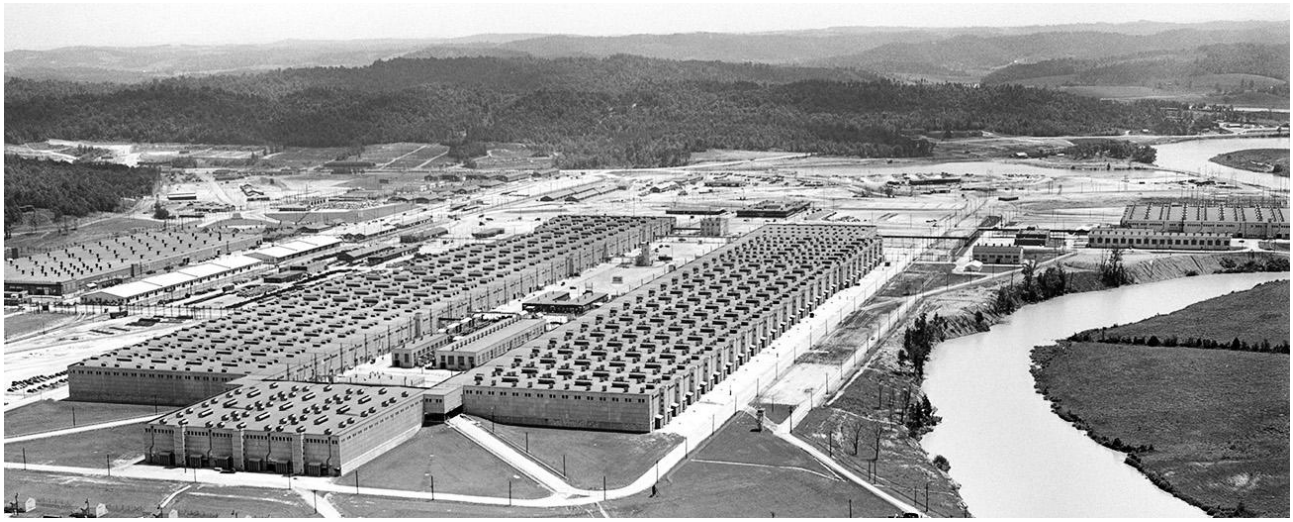
[23] https://en.wikipedia.org/wiki/Zumwalt-class_destroyer

[24] https://en.wikipedia.org/wiki/Phaeno_Science_Center

My second example, will exploit the idea that classical buildings in antiquity were **fundamentally utilitarian**. My past working experience informed me about this next building, although I never had the chance to visit.

It's not the 660,000 square metre Surat Diamond Bourse[25] (which is considered the largest office building in the world). Nor was it the 465,000 square metre Air Force Plant 31[26] (which was demolished in 2013–2014).



It's K-25[27], a 489,000 square metre gaseous diffusion[28] plant build at Oak Ridge[29] (enclosed volume ~2.76 million cubic metres). At its completion in early-1945, it was the world's largest building under one roof by floor area. Today the Boeing Everett Factory[30], completed in 1967, has a single

[25] https://en.wikipedia.org/wiki/Surat_Diamond_Bourse

[26] https://en.wikipedia.org/wiki/Willow_Run

[27] https://en.wikipedia.org/wiki/K-25

[28] https://en.wikipedia.org/wiki/Gaseous_diffusion

[29] https://en.wikipedia.org/wiki/Oak_Ridge,_Tennessee

[30] https://en.wikipedia.org/wiki/Boeing_Everett_Factory

enclosed interior volume of 13.3 million cubic metres (but with a floor area of "only" ~398,000 square metres).

K-25 was built in just two years (1943–1945) during World War II, under extreme wartime urgency as part of the Manhattan Project[31] (construction began before designs were finalised). Amazingly the Boeing plant was completed in about one year, also before some final design details for the 747 program[32] were settled.

K-25 was not a normal factory, it was essentially a giant machine for uranium enrichment[33]. Some saw it as just a steel shell wrapped around process equipment. I agree it is not a "machine for living in"[34], but perhaps it is a kind of "smart city"[35] with its sensors, feedback loops, and automated management.

Gaseous diffusion was but one of three enrichment technologies used by the Manhattan Project. Slightly enriched product from the S-50[36] liquid thermal diffusion[37] plant was fed into the K-25 gaseous diffusion plant. Its product in turn was fed into the Y-12[38] electromagnet[39] isotope

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[31] https://en.wikipedia.org/wiki/Manhattan_Project

[32] https://en.wikipedia.org/wiki/Boeing_747

[33] https://en.wikipedia.org/wiki/Enriched_uranium#Enrichment_methods

[34] https://www.open.edu/openlearn/history-the-arts/history/heritage/le-corbusier

[35] https://en.wikipedia.org/wiki/Smart_city

[36] https://en.wikipedia.org/wiki/S-50_(Manhattan_Project)

[37] https://en.wikipedia.org/wiki/Thermophoresis

[38] https://en.wikipedia.org/wiki/Y-12_National_Security_Complex

[39] https://en.wikipedia.org/wiki/Electromagnet

separation[40] plant. Because of the nature of gaseous diffusion, K-25 was possibly the most complex building ever constructed.

These three plants consumed about half a gigawatt of electricity, and according to the National Park Service, the entire Oak Ridge site consumed one-seventh of U.S. electricity production during 1943–45. Oak Ridge, Tennessee was selected because it was remote but still accessible (rail access), undeveloped land was available, there was an abundant electric power available, and there was easy access to water for cooling.

K-25's entire layout was dedicated to one particular technology for isotope separation, involving 3,000–4,000 stages in the cascade, with roughly 5,000–6,000 tons of porous nickel barrier, 5,000–10,000 high-speed compressors/converters, a huge high vacuum systems, and several thousands of kilometres of corrosion resistant pipes (Uranium hexafluoride[41] gas is highly corrosive).

K-25 was an impressive building, but Y-12, home to the electromagnetic separators, was possible the industrial complex with the strangest history. In 1942, the U.S. needed enriched uranium fast, but nobody knew which enrichment technology would work at industrial scale.

Y-12 was home to 1,440 calutrons[42]. What we see below is a so-called racetrack, which housed 96 calutrons around a shared magnet system. These were machines with huge magnetic fields designed to exploit the tiny mass difference between U-235 and U-238. There is something quite "classical" about the raw internal architecture.

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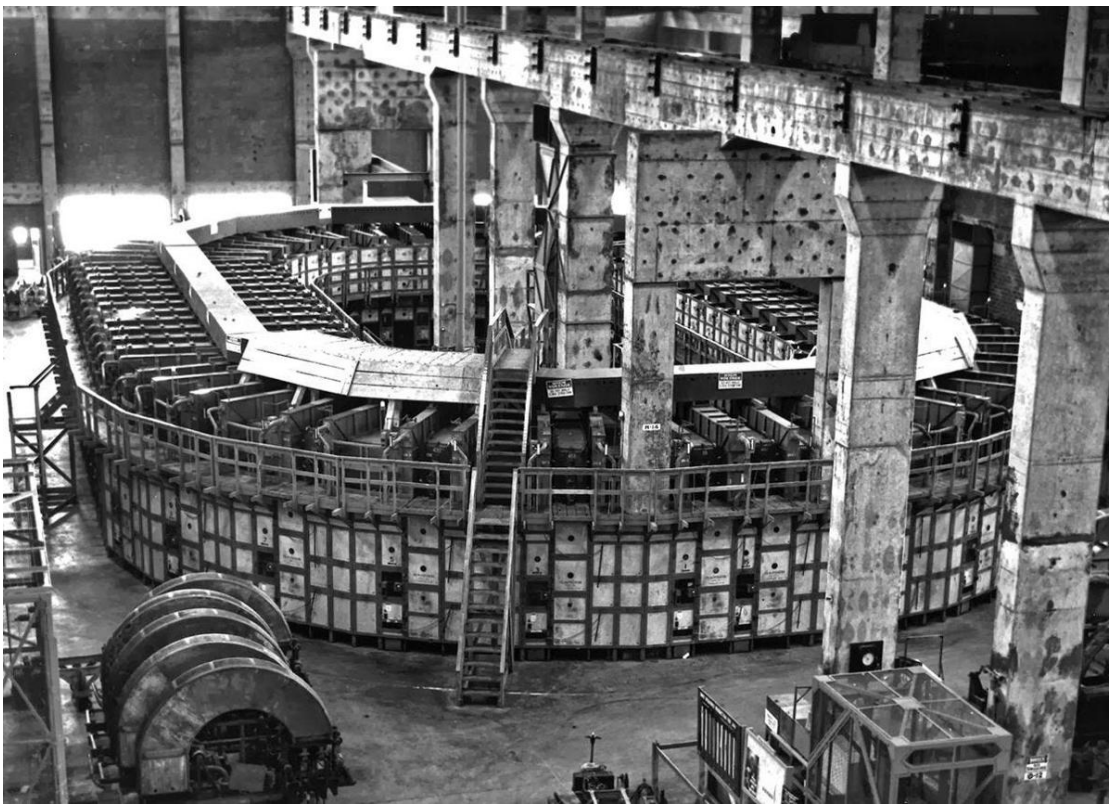
[40] https://en.wikipedia.org/wiki/Isotope_separation

[41] https://en.wikipedia.org/wiki/Uranium_hexafluoride

[42] https://en.wikipedia.org/wiki/Calutron



The story is that the giant electromagnets required enormous quantities of conductive metal, and copper was very scarce during wartime. They looked for another electrical conductor[43], and the U.S. Treasury loaned out 14,700 tons of silver bullion[44] from Fort Knox[45].

I appreciate I have not aimed at "Classical Architecture" (e.g. columns, pediments, etc.) but preferred to focus on an architecture governed by formalised, ordered, monumentality stripped to essentials. In some sense K-25 is profoundly classical (i.e. abstract, axial, symmetrical, repetitive, with serial proportions subservient to a logic, and overwhelming in scale). My friendly AI manage to come up with "K-25 behaves almost like a megastructure version of a classical plan, except the column has become the compressor stage and the entablature has become the pipe network".

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[43] https://en.wikipedia.org/wiki/Electrical_conductor

[44] https://en.wikipedia.org/wiki/Bullion

[45] https://en.wikipedia.org/wiki/Fort_Knox