

FIRMITAS, UTILITAS, VENUSTAS

**LOOKING AT GLASS THROUGH THE EYES OF VITRUVIUS
IN A SOCIETY BESOTTED WITH TECHNOLOGY**

**a talk given by Ian Ritchie at the Glass Supper held at the GLA
London**

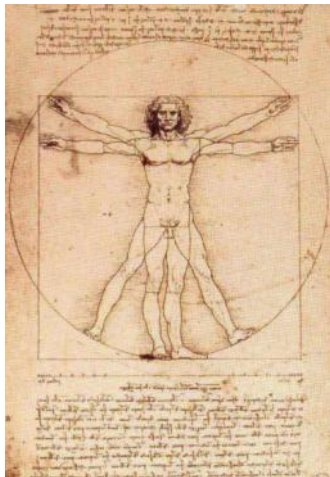
7TH December 2012



INTRODUCTION

- Sir Henry Wotton's 1624 version of **De Architectura** translates Vitruvius' mantra as 'the ideal building has three elements; it is sturdy, useful, and beautiful.' Typically today it is widely accepted as '**firmness, commodity and delight.**'
- These qualities are inextricably linked but are they always dependent upon one another, especially with respect to glass?
- Ideas of **quality**, a building that **lasts, transcends fashions** and continues to be meaningful to users, and **delight as deceit** are current strands of thought. Glass is justifiable, but are glass systems really good enough and **justifiable** considering that the life spans of most buildings today will need to increase to obtain best value in every sense?
Can the failures and breakdown joints, and of double and triple glazed seals be overcome?

The unifying theme is the idea that the architect wants to **fight against time** – not just physical decay - entropy, but relevance, meaningfulness, and even beauty. These are all ephemeral qualities.



Leonardo and Vitruvius

The reverse writing in Leonardo's drawing is his translation into Italian from the Latin of Marcus VITRUVIUS Pollio,

De Architectura, Book III of X, Chapter 1

The Notebooks of Leonardo DaVinci, Vol. 1 pp. 182-3

CONTEXT



AD 2000 → AD 2300

The scale of the problem is immense, and the scale of our response must be equal to it.

(IR)

EUROPEAN AND NATIONAL CONSTRUCTION RESEARCH FUNDING



European Construction Technology Platform
d.o.b. 2006

National Construction Technology Platform
d.o.b. 2006

JOINT TECHNOLOGY INITIATIVE
E2B

to explain that research is a core business and critical issue and help from

Energy Efficient Buildings
£1-2 to 2.3 billion research fund

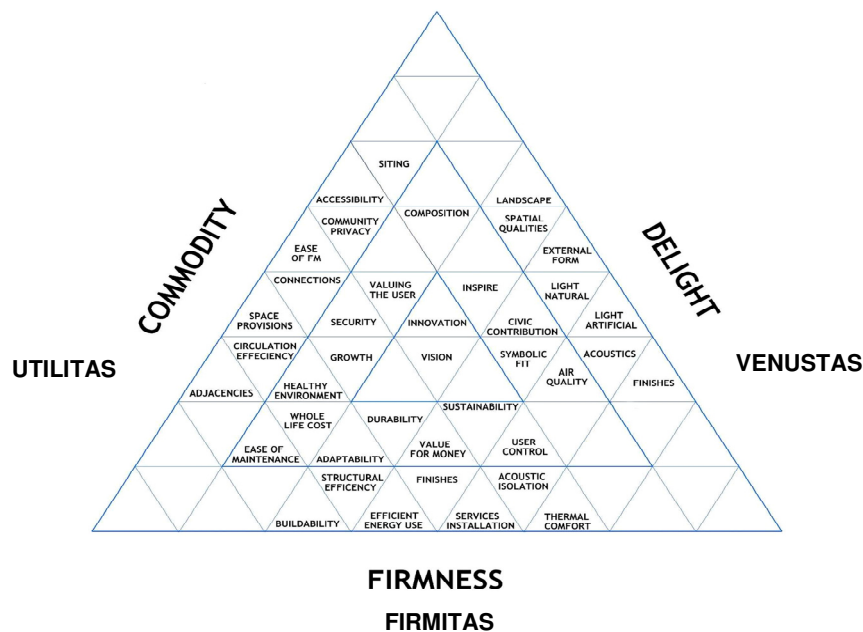
Technology Strategy Board
Energy Technology Initiatives

ECTP and JTI

EPSRCs + IMRCs

Research Councils

robust thin multi-layer insulation / aerogels / phase change & / nano materials



DELIGHT AS DECEIT

- Venustas: the etymology comes from the salient qualities possessed by the goddess **Venus**- ability to attract and arouse a feeling of love is one aspect. Is this pure delight, or can it also belie deceit much like a human relationship? When one falls in love, it is often said that it can hurt or provokes feelings that aren't always delightful – if one considers a memorial such as Libeskind's Jewish Memorial in Berlin then it is emotional provocation or meaningfulness in general that might best define 'Venustas' in building.

- On materials, Vitruvius recounts a tale in De architectura of **Archimedes** and his detection of adulterated gold in a royal crown. When Archimedes realised that the volume of the crown could be measured exactly by the displacement created in a bath of water, he ran into the street with the cry of "Eureka!" The discovery enabled him to compare the densities. He showed that the crown had been alloyed with silver, and thus the king **defrauded and deceived**.

- Delight often takes the form of **deceptive special effects**. What is attractive about a building from the outside – form, material play against light and surroundings – all qualities that can be achieved solely by utilising superficial effect?

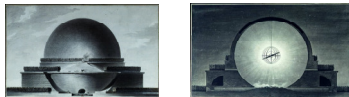
Can such effects provide a **richness of experience** over a period of given time? Is there a sell-by-date, like when watching old action films where the special effects seemed **so novel and convincing at the time** but now the deceit is **clear and underwhelming**? Is a lasting, long experience mutually exclusive to the length of time a building remains relevant? In other words, to what extent is **fashion relevant to understanding how long a building can delight** its users?

How far and for how long can smart glass continue to delight users? Is it already old news?

FASHIONS AND WHETHER TO BUILD TO LAST PHYSICALLY AND METAPHYSICALLY

- Historically, architects may have shunned fashion, viewing architecture as a **slow and deeply considered** practice – but can it **ultimately transcend fashion**?

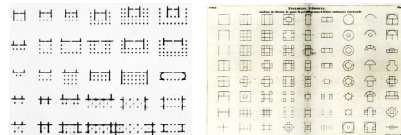
TWO 18thC ARCHITECTS: beauty opposing views



Cenotaph to Newton

"Shall I, like Vitruvius, define architecture as the art of building?
No, for this would be to confuse causes and effects.
The effects of architecture are caused by light."
Étienne Louis Boullée

TWO 18thC ARCHITECTS: logic opposing views



"Architects should concern themselves with planning and nothing else."

Jean-Nicolas-Louis Durand

Boullée 20thC practical counterparts Durand Le Corbusier Mies Van Der Rohe



Heidi Weber Pavilion, Zurich



Ronchamp



Tugendhat House, Brno



IIT Crown Hall

**TWO 21stC ARCHITECTS: opposing views
select your own**

for at least the last three decades

glass is the answer, but what was the question?

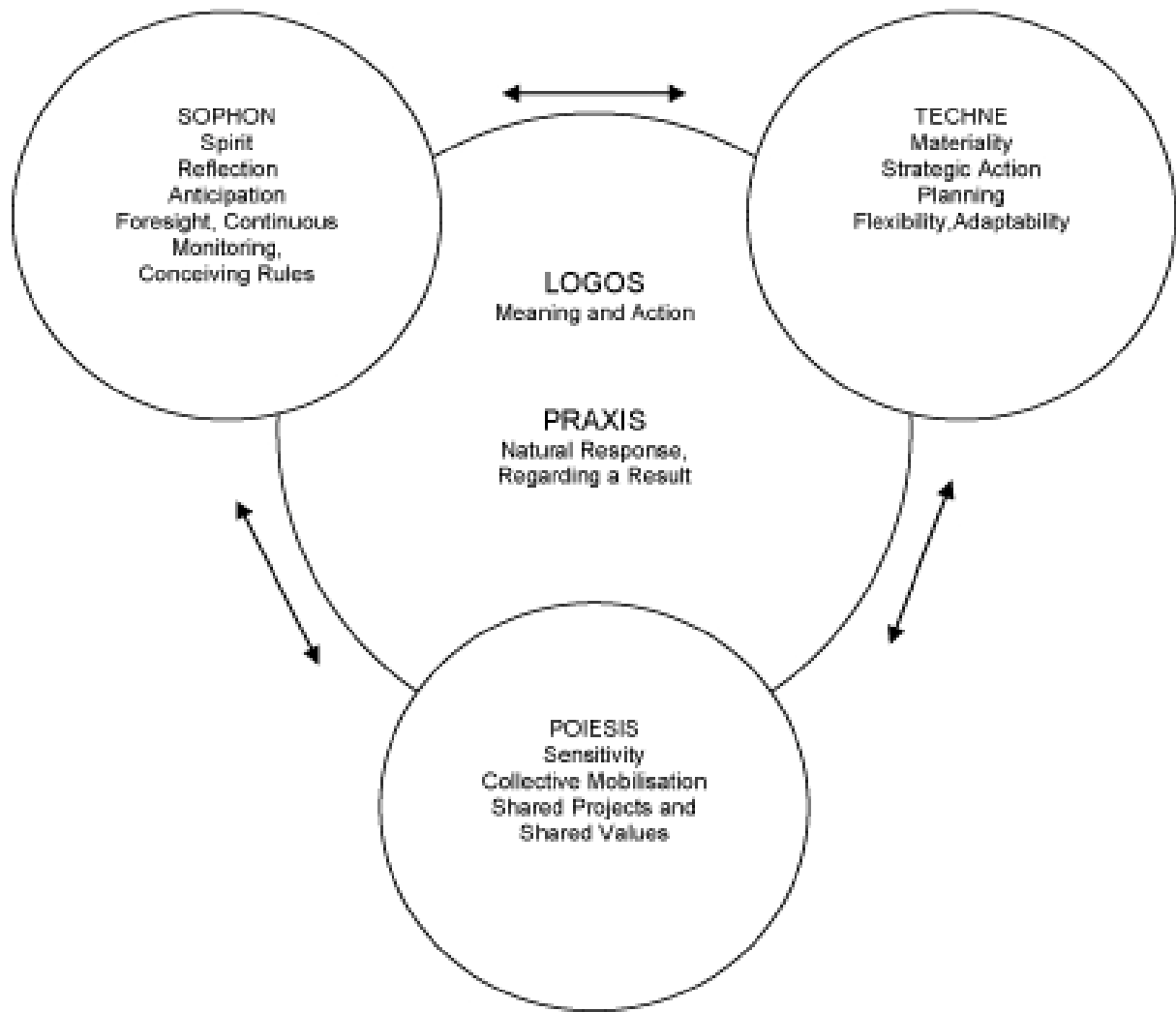
Do architects seek one aesthetic ambition that is the
media moment?

the screen world of the image

fact or fiction

communication or discourse

it is often difficult to recognise the difference



POIESIS DIAGRAM OF INTEGRATED THINKING

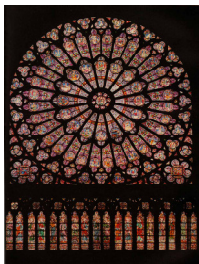
THE QUESTIONS WE NEED TO ASK ARE FAR DEEPER

FIRMITAS

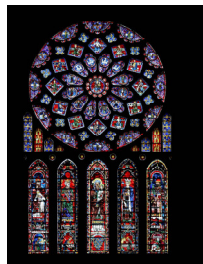
**‘I hear the ruin of all space, *shattered glass* and toppling masonry,
and time one livid final flame. What’s left us then?’**

James Joyce, *Ulysses* (1922)

FIGHTING ENTROPY - FROM ORDER TO DISORDER



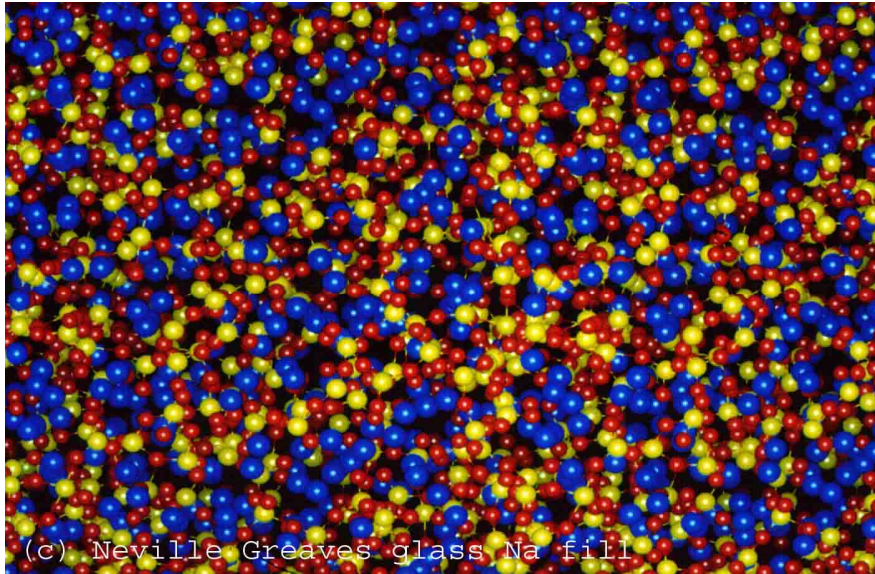
Chartres west



Chartres north



Carmo Lisbon



(c) Neville Greaves glass Na fill

simulation of Na glass – researching crack propagation

UTILITAS

A new function: sustainability and resisting entropy

Hypothesis: we are the image age

iconic buildings become 'green' and can be purchased from Patrick Blanc (white) at 500£ / m² !



Le Corbusier's Villa Savoye



VENUSTAS

beauty

loveliness

charm

attractiveness

grace

fighting entropy - from order to disorder

graceful form and line



Grace Kelly



Fumaki ceramic

aesthetics in glass structures

design understanding and dreams

the visual aesthetic

design intelligence and energy

the moral aesthetic

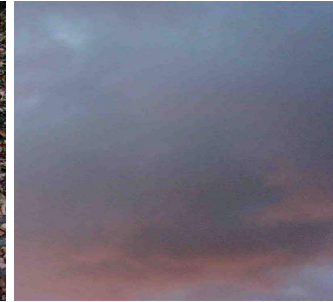
design expectations

physical aesthetic

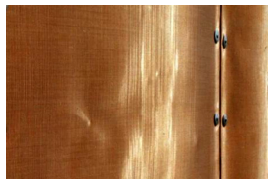
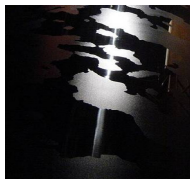
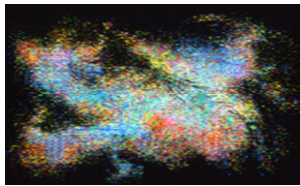
clean, white and green?

TiO₂ E171

beauty is the non-linear in nature

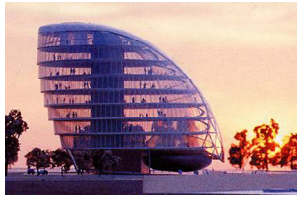


beauty - the non-linear in our architecture



- The relationship with **functionality and delight** can be seen through **durability** – a building needs to last and as it lasts, it must maintain its delight and functionality otherwise it becomes a **jaded deceit of its original premise**. Buildings must uphold durability of physical and metaphysical values concerning fashion, cultural developments in thinking, environment, etc.

we are all here – but which here?



convincing the client?

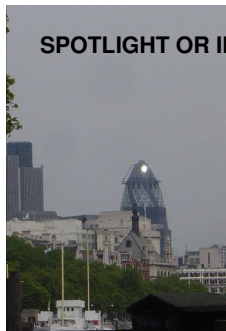


reality?

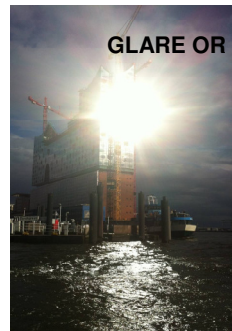
there are two phases of architecture:

the dream and the nightmare of reality

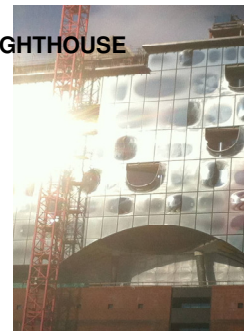
**DO WE CARE ENOUGH TO UNDERSTAND WELL ENOUGH THE
PHYSICS AND THE WORLD IN WHICH WE ARE DESIGNING?**



SPOTLIGHT OR IN THE SPOTLIGHT?



GLARE OR LIGHTHOUSE?



GLARE OR FIREWORKS?



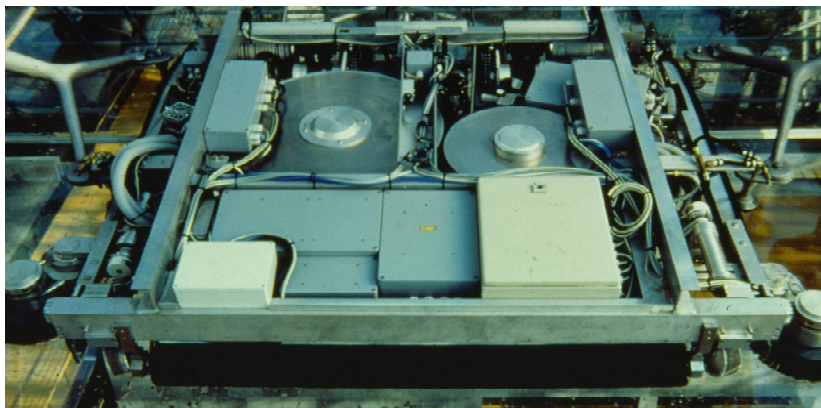
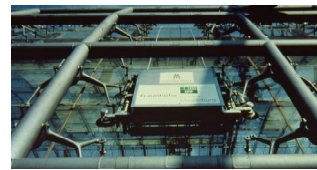
Do designers ever consider
first, second and even third
reflections of light and sound?

dangerous geometries?

- Failed examples of ideas that provided **initial delight** but now serve to **deceive the original hopes and ambitions**: **Unité d'habitation** and the buildings it inspired including **Park Hill** and **Robin Hood Gardens**.

The idea and human feeling at the time of an idea involving '**streets in the sky**' descended into territory for crime, and the materiality of the buildings **discoloured and declined** as a result of ill-considered impact of the environment on the building. It is widely considered that these buildings are 'past their sell-by-date' and are due for extensive renovation.

- **Self-cleaning** glass has been innovated in the past few years - but what about glass that not only cleans itself but **contributes to maintaining a clean environment**?



Leipzig glass hall robot cleaner– Fraunhofer Inst. Magdeburg/Ian Ritchie Architects

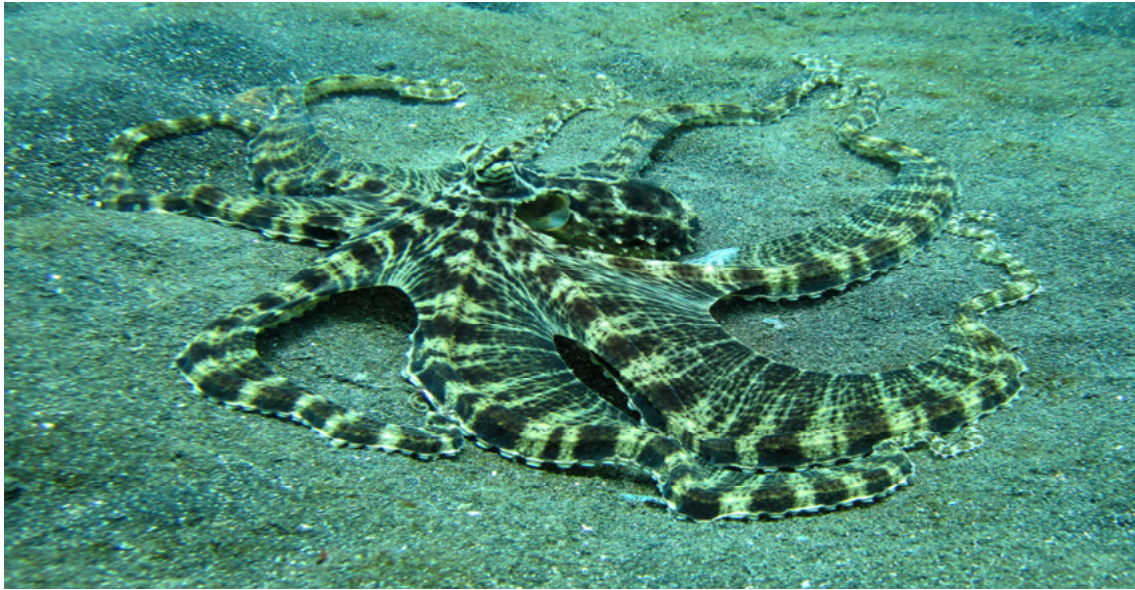
FIRMITAS, UTILITAS, VENUSTAS
WHERE ARE YOU NOW
VITRUVIUS?



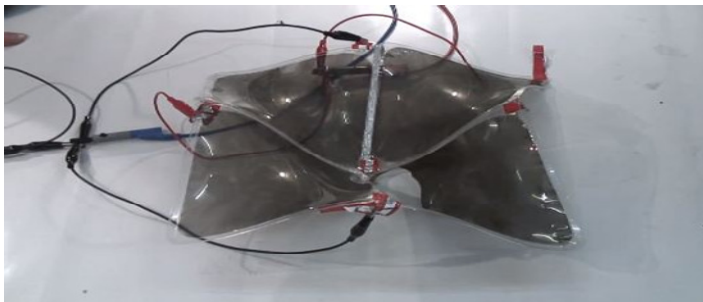
Freedom & Unity Monument Berlin – shifting - dynamic - Ian Ritchie Architects



'murmuration' of starlings



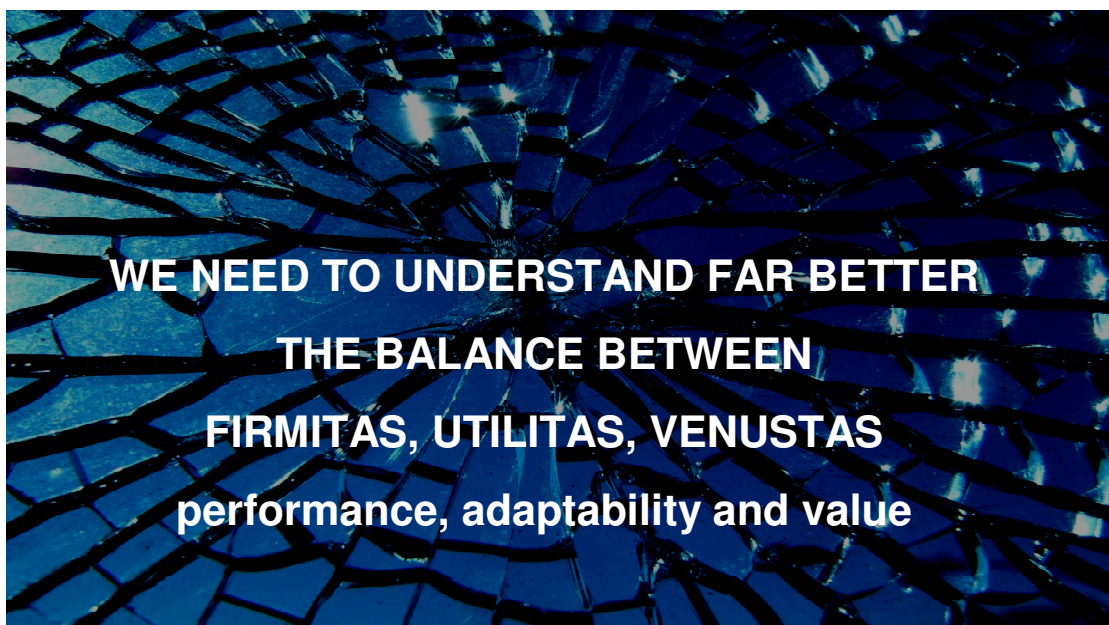
camouflage and shapeshifting



Shape-shifting polymers

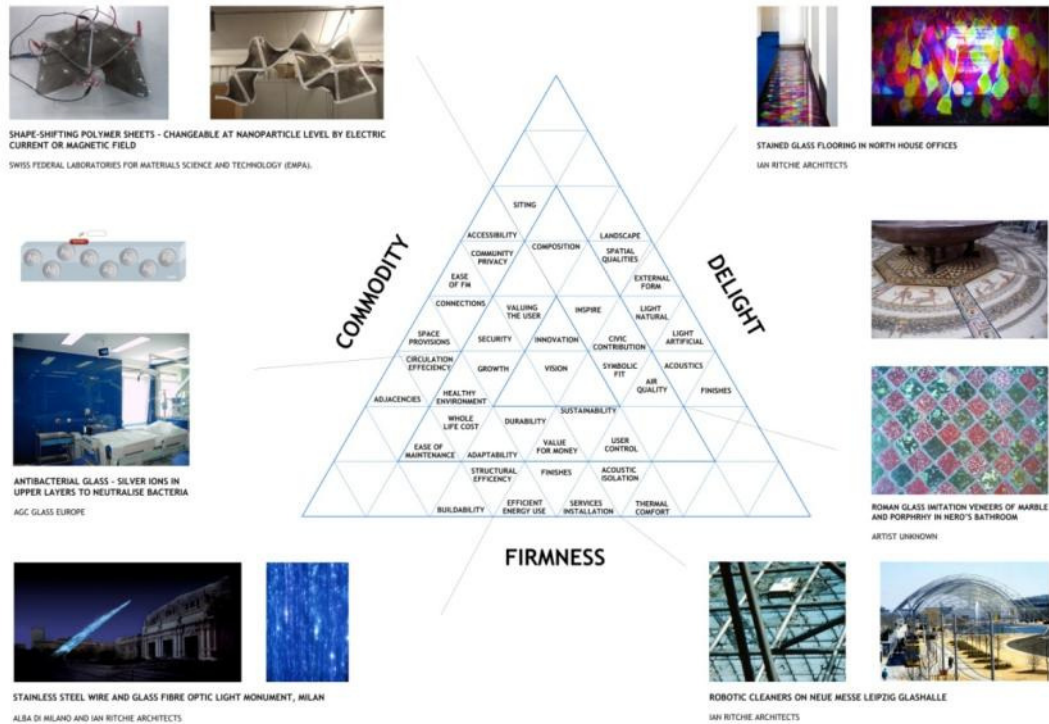
IS FUNCTIONALITY ALWAYS MUTUALLY EXCLUSIVE WITH NECESSITY AND CAN IT RENDER DELIGHT VOID?

- When first meeting his clients, **Cedric Price** would ask '**do you need a building? Are you sure?** In De Architectura, Vitruvius has described in great detail **Archimedes screw**, a device used to drain land as well as transferring water for irrigation. This screw is still being used today – an example of **firmness, commodity and delight** working through the ages. However, other systems that drain water, typically from mines, though beautiful and durable, have become defunct, and beautiful elements are now museum pieces where they continue to delight. Necessity can be shown, contradictorily perhaps, to be based on **human desires** – the water wheels are perfectly usable and durable and indeed delightful. However, the **desire to reduce manual labour** renders water wheels uneconomic in favour of more automated technologies.
- **Stained glass** has gone through a similar process - it was once the preserve of **ecclesiastical purposes** - a luxury, hand-made, expensive commodity. It went out of fashion as did decoration in the modernist architecture of the 1920s - 1960s, but coloured and printed glass has re-emerged in the form 2 and 3D glass 'wallpaper'.



THE IDEA OF SPECIFIC QUALITY IN DETERMINING FIRMITAS, UTILITAS AND VENUSTAS

- It is often said that a building **must be specific to a program** and use in order to have a **strong identity and character when designed and built** – but over time this can change. To what extent does **specificity** hinder or help a building's life and richness of experience?



- If one is to extract the word '**commodious**' from the **etymology of the word commodity**, it seems to suggest that large spaces that do not impose particular restrictive characters and qualities can be useful in the long-term. Tate Modern and the Millenium Dome could support this argument. But what about renovated buildings – re-used buildings? In this 'sustainable age', are the best new buildings the ones that re-use the best old ones? By implanting new meaning into an existing structure, delight can be restored to already existing qualities of commodity and firmness. Is glass open to changing it's specific qualities - can it adequately change shape, colour, thermal properties to suit new demands?

DOES FIRMNESS DENY UNCERTAINTY AT ITS PERIL?

‘Firmitas’ suggests stability; and could even mean sustainability in the sense of survival.

Also, Firmitas could mean stiffness, a contradiction perhaps in an age where the dynamic behaviour of buildings has become much better understood, and where architects appear to be seeking more dynamic enclosures.

I have spent most of my architectural career trying to develop better performance and delight from spaces, techniques, assemblies and materials. Innovating has been done not like Icarus, but through testing and ensuring the wings will stay on! This is about trusting in one’s own and one’s collaborators judgement, creating a foundation, a ‘Firmitas’ of trust in the shared endeavour.

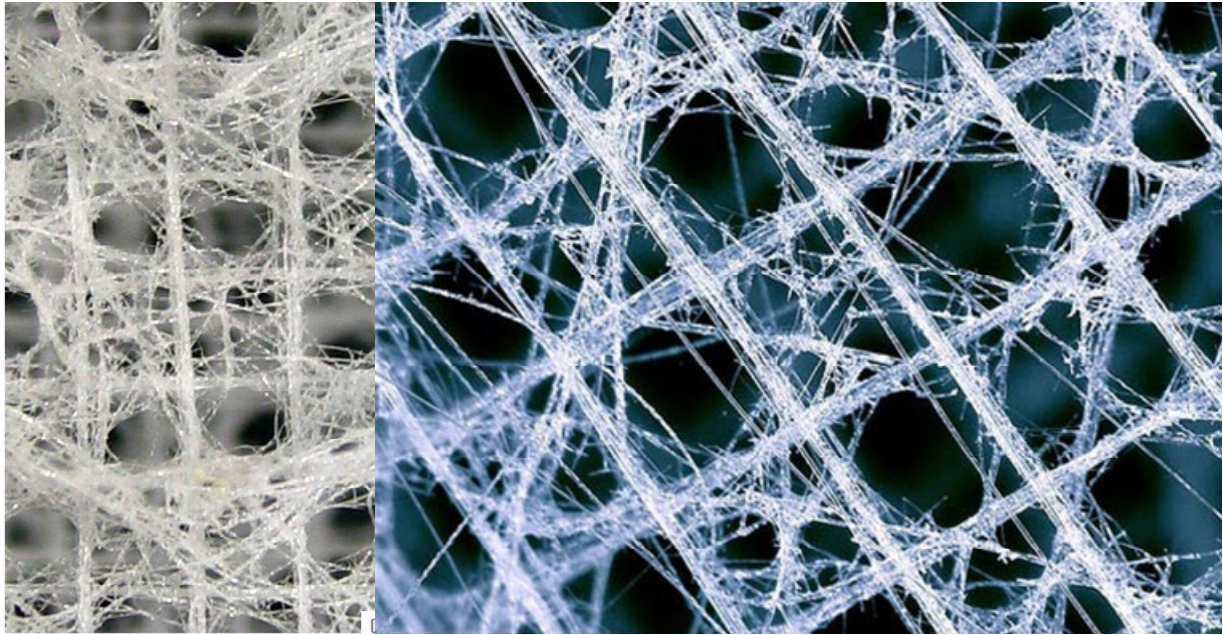
‘Firmitas’ also conveys a sense of certainty when we know that the only certainty about certainty is its uncertainty.

We are right to seek certainty in construction, cost and time.

Ironically, because of uncertainty, and entropy, Firmitas is unachievable. Yet we accept this temporal quality while we continue to expand the durability of what we construct, while alongside, ‘pop up’ architecture – olympics, restaurants and markets proliferate.

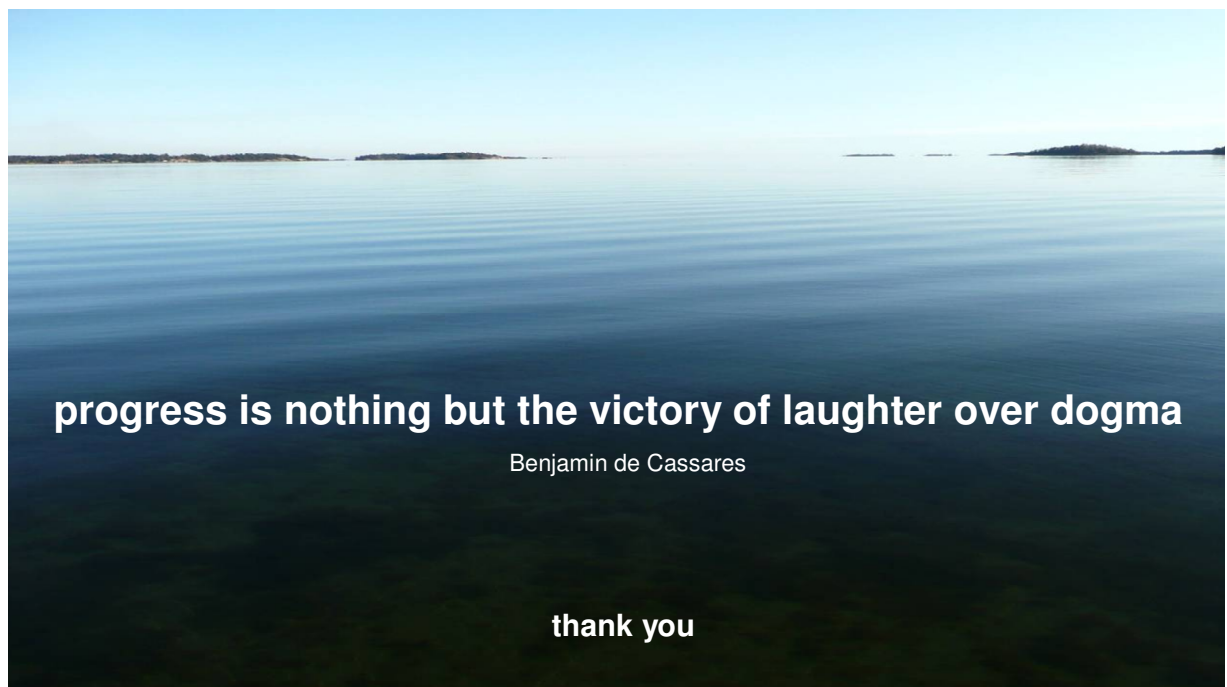
Today’s buildings are made of organic, inorganic and electronic matter – and as with the capital investment in intelligence in the car, so it is increasingly so for buildings.

How will glass cope with the digitized building technology and biologically inspired engineering and dynamic architecture that is being developed today?



Venus Flower Basket *Euplectella aspergillum*

Will, one day, **building glass** become as inherently flexible as the Venus Flower Basket?



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Key words:

Glass and entropy

Glass and health: coatings, light, wavelengths, thermal

Glass alternatives