PARADISE LOST: CARBONHOUSE (Towards a Lightweight Ontology)

Richard Branson’s Necker Island in the BVI; Virgin Unite, his environmental agency, as called for 3M+ resilient homes

The studio will focus on rebuilding in Tortola, in the British Virgin Islands, in the vivid aftermath of hurricane Irma. Students will select a particular building or type (housing, school, customs house, beach restaurant, luxury villa…) and offer radically resilient new habitation strategies. The 240mph winds, with tornadoes birthing in the eye of the storm, and travelling further north than is typical, seems to confirm the MIT prediction for new strength and trajectory of tropical storms due to oceanic warming – to date just 1 degree over pre-industrial. So there is a latent threat in such paradisaical setting, and many of the areas of habitation such as Apple Bay are on landfill that is likely to be repeatedly inundated (residents were washed out of first story windows by Irma’s storm surge).

The BVI Premiere, Dr Orlando Smith (a surgeon) expressed great interest in alternative building technologies, since even recent buildings constructed to Miami Dade code standards proved entirely inadequate. But like other governments of low-lying island atolls, the BVI recognizes the need for changed patterns of habitation and consumption globally, motivated to thinking-through general norms of civilizational ontology. Can Tortola use the devastation to bring forwards new models of benign and resilient living that might serve as models to be exported elsewhere? Given that BVI is a tax haven to many thousands of international corporations, and to a remarkable density of wealthy ex-patriot homeowners, there is unusual opportunity for it to serve as a pilot project that might indeed carry influence internationally.

Students will fan out across the island each choose a building type or community that offers a vehicle to pose the question of a lightweight ontology: a mini-thesis of sorts. This can be technically or conceptually pursued (ideally both!), with the goal that they offer a vivid alternative to simply rebuilding.
At a recent meeting of the US energy research agency, the focus was on gas pyrolysis and thinking-through the likely material paradigm as we transition from oil to gas as the prime source of energy. Implicit in the 3 prior energy paradigms that humanity has engaged (wood, coal, oil) was not just a primary fuel source but a corollary material culture: from wood and stone, to steel and glass, then to plastics and metals of all kinds. So what will be the material palette as we transition to gas, and what fuel source at civilizational scale given the backdrop of alarming environmental change?

A hypothesis was offered to the audience of scientists and investors: that the price of carbon fiber will likely be reduced by two orders of magnitude as gas deposition offers a radically benign source of carbon nanotubes. Asked what this would mean, my composite racing-boat engineer said it’d be obvious: we’d use nothing else! Talking with groups like NanoComp (who we will visit) and Graphenano, what’s also apparent is that carbon in these forms offers electrical properties as well as remarkable structural ones, so they are already using graphene solar skins, carbon electrical cables, graphene batteries; they have developed paints and radiant heating carbon skins, they can create Faraday cages or use the building as an antenna for 5G, etc – the multiple properties of the allotrope already being witnessed in nascent form, used in aircraft and satellites already.

So ARPA-e’s prompt allows us to consider a new genre of all-carbon buildings to offer resilient, autonomous, multi-functional building envelopes to shroud the carbon organisms within. So our drive will be to take seriously polymeric composites as an emerging class of materials that start to make their way into architectural use, offering remarkable resilience against extreme loading; but to go further to speculating on what current developments in gas deposition and other processes might offer to rethinking the base logic of buildings and habitation and their “footprint”. Evidently there would be no loss of formal or spatial opportunity given the amorphous nature of composites, where property can be layered spatially to attain a given performance: but what is then needed is a thorough understanding of the varied manufacturing logics they adopt (infusion, lamination, pultrusion, etc). We will seek solutions that are thought-through technically, requiring the invention by students of the protocol that subtends the design: how would your project really get formed in BVI? (Note – there is great interest in establishing new manufacturing hubs in BVI to stimulate the local economy).
Other Issues

Goulthorpe/Baharlou, currently working on composite housing, are aiming at a Media Lab exhibition in May on global housing. For this we are trying to create a CarbonHouse that attains poly-functional attributes in a simple portal frame. So this will offer good insight into the current potentials of these materials and methods.

We will visit (or be visited by) a variety of leading composite fabricators and engineers, such as NanoComp and TPI (the largest fabricator in the US). We will have access to composites engineers, also. Mid semester MG will organize a Carbon to Building initiative at JEC in Paris, which is the largest composite trade show internationally – all are welcome.

We aim to visit BVI for students to witness the devastation firsthand, and to meet local communities impacted by the storms.

Projects

Proposed Media Lab all-carbon portal frame: CarbonHouse
In the first 3 weeks, students will devise an autonomous emergency shelter, be it a tent or (ideally) a hurricane-proof shell, that can be erected by 2 people without tools. This will offer an immersive introduction to composites.

The remainder of the semester will be devoted to the development of independent projects that seek to offer a thoughtful reflection on a “lightweight ontology”, devising new modes of living that are mindful of the shifting environmental condition and the local determination that the devastation should not happen again. Witnessing the detritus of the destroyed buildings, you do get a profound sense of the base tectonics of contemporary buildings, and their piecemeal and flim-flam logic. Here, we will look to imagining a more serene deployment of matter in service of living, hopefully developing theses that can contribute to a profound reflection as they seek to rebuild.

We will read works such as *Utopia* by Thomas More, which used an imaginary island community as a critique of contemporary European social structure by way of counterpoint: he was careful to lace in enough realism to leave the reader wondering if this “other place” was real or not.

And we will look at treatises and works of the past that sought to think-through the full potential of a new material technology, such as Corbusier’s *Vers Une Architecture* and the poignant *Villa Savoye*, indeed offering a new ontology enabled by the potentials of steel and concrete:

![Le Corbusier Villa Savoye](image)

**Times/TAs**

Studio meets Tuesday and Thursday 1pm – 5pm. You will benefit from 2 TAs: SMArchS student Shane Reiner-Roth, interested in synthetic new materiality; and PostDoc Associate (from Achime Menges group in Stuttgart), Ehsan Baharlou, interested in CAD CAM and composites.

The pedagogical goals are to allow insight into this emerging class of materials, and to develop independent yet inventive projects in preparation for your later thesis.
READINGS

In preparation for Thesis in architecture:
Ulmer, Gregory, “Konsult: Theopraxis”, 2016: for MG

Historic exemplars (as a form of critical counterpoint):


(Milton, John, Paradise Lost, 1667 – Good Luck!!)

Philosophical thinking on technology and dwelling:


Corbusier, Le, “Vers Une Architecture” (Towards a New Architecture)

As a contemporary critique of current ideology and environmentalism:

Contemporary Theories of Material Imagination:

