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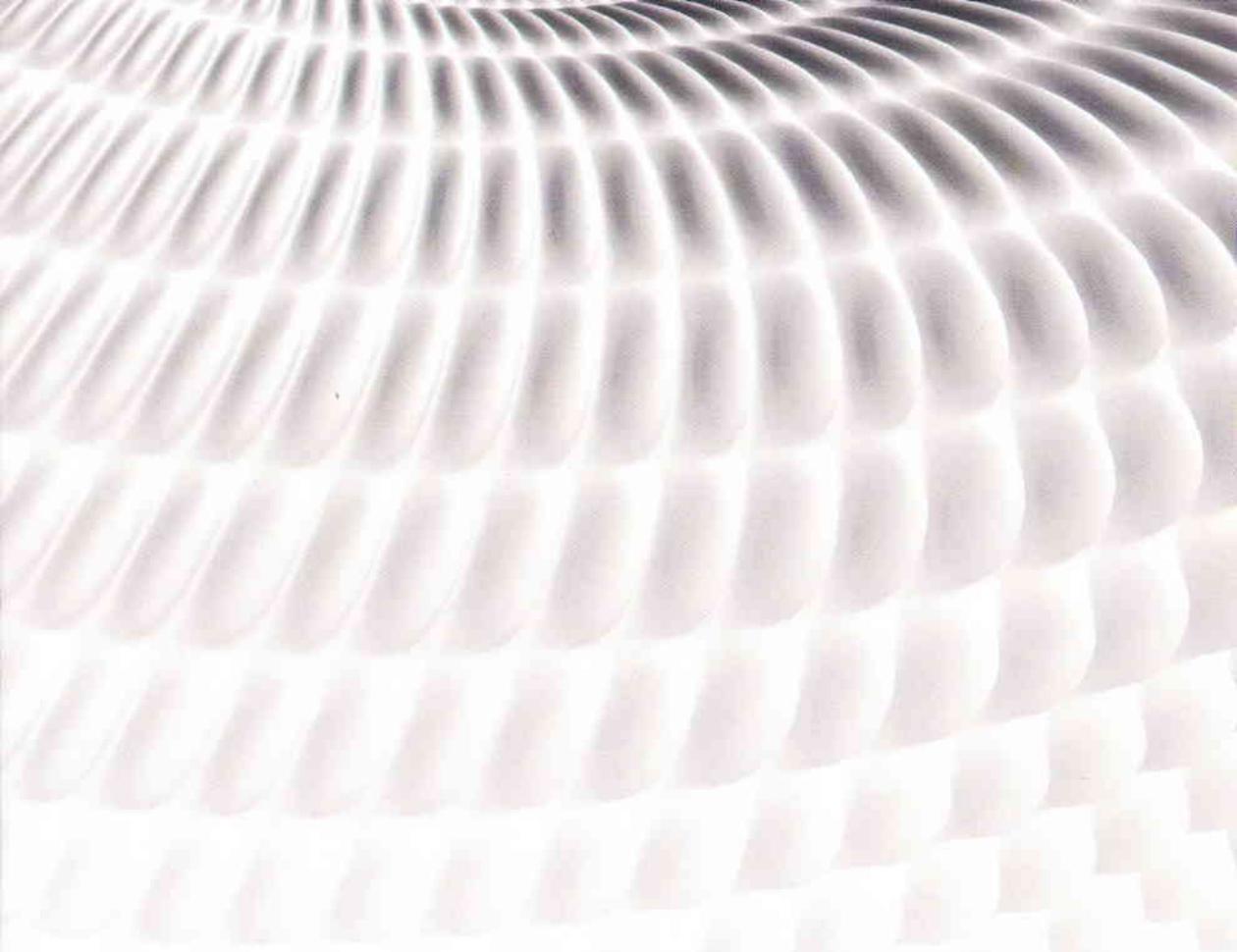
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SCALELESSSEAMLESS

PERFORMING A LESS FRAGMENTED ARCHITECTURE EDUCATION AND PRACTICE

EDITORS **MARIA VOYATZAKI** | **CONSTANTIN SPIRIDONIDIS**

**European Network of Heads of Schools of Architecture
European Association for Architectural Education
Münster School of Architecture**

International Conference

Scaleless - Seamless
**Performing a less fragmented
architectural education and practice**

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Basic Entwinements:

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Basic Entwinements

**Unassuming analogue inserts
in basic digital modelling [courses]**

*Everything we see hides another thing,
we always want to see what is hidden by what we see.*

René Magritte

The treachery of images

Before the possible assessment of any actual built (*arte*) fact, architectural manifestations and the ensuing discourse(s) mostly gravitate around its many, various representation(s). A vast *map-territory* relationship¹, functioning on many levels and scales encompassing both virtual and real.

Yet, as architectural representation(s) *per se*, they seemingly no longer are broadly recognizable as such, given the rapid spreading of state of the arts *renderings*², what might actually be seen is *representation(s)* on a multitude of layers, more multiverses than *arte-factuals*.

A different *treachery of image(s)*³, yet without any ambiguous by-lines, stating a revelatory, if ambiguous, thought-provoking negation⁴. The medium has, indeed, not only become the message, it has mutated into the embodiment of virtual space, perceived as factual.

With these – highly condensed – conditions meandering's in mind, a straight forward assignment was taken up, both as challenge and as possibility for further hindsight reflections.

Given were the pre-requisites of an already existing compulsory course in digital architectural modelling, into which, certain levels of analogue procedures were to be inculcated; With the added, keen directive, of adequate focussing on architectural *plan and section* awareness. Thus, a 3-week course in digital architectural modelling using *SketchUp 8* software for 1.st year students on the basis of own studio projects, was supplemented with 2 days of analogue exercises. It was further wished, to give more perspective to the subject, to (possibly) include some form of theoretical lecture(s) into the tight frame.

From reification to construct(s)

With the very short two day timeframe given to implement these wishes in a 3 week course, a series of standardised MO's were developed, with special emphasis on very sparse, yet exceedingly analogue-*ish* paraphernalia: easily available white 80g. A4 paper and black *Filia* oil crayon(s).⁵

The choice of these unassuming tools was based on twofold reflections: their ubiquitousness would not be considered obtrusive in the standardised educational computer lab settings, while simultaneously enabling intensive analogue old-fashioned handcraft labour, with dust-free/water-free utensils in close vicinity to hard-disks and keyboards.

The available time was divided into precise activity slots, resulting in four roughly equal periods: two morning and two afternoon sessions; The first two sessions would include a short informal 20 minutes lecture with illustrations while the second day only included one lecture. Each session would host two short exercises to be repeated. A total of eight exercises could thus be run in the two day period.

While the exercises and the lectures had a large backbone of standardised material, each course would bring a certain amount of new conditions into the setting: as the analogue module was inserted into an already rolling digital course, and each 1.st year class would arrive with different architectural pre-requisites, certain crucial adjustments had to be performed ad-hoc.⁶

For most students this would be their first introduction to digital drafting, and their first ventures into digital architectural translations. Regardless of prior digital understanding(s)⁷, one of the most remarkable aspects of their (digital) endeavours was the unilateral cognition of the architectural translations as being “models” i.e. freely rotatable / freely scalable *artefacts*. While this condition at first glance might appear tautological, it would, at second glance, certainly appear to be much more of an oxymoron.

On further investigation(s), this prevalent *no-nonsense* cognition condition (considering “architecture” to be a controllable, rotatable, scalable artefact with *tweackable* qualities of plasticity) has two powerful underlying groundings at its base: the now universally recognised ease of *Bullet-time*, the *Matrix*-like view of ubiquitously rotatable objects in space⁸, and the even more obvious conclusion that “models” would be build by slices of (simulated) material (cardboard/wood, etc.); Both conditions would be fairly prevalent in most students approaches to SketchUp “modelling” efforts.

It clearly was obvious, that the actual architectural issues and primordial conditions where thus all together overlooked: the apparent WYSIWYG did not at all reveal (even in *wireframe* settings) conditions of space, spatiality, spatial interrelations or other architectural primordial conditions (light/dark, heavy/light).

Eventually those would, in later stages of the digital modelling course, become apparent, and thus subject to more conscious decision making.

Ultimately, the final renderings would develop into (“glossy”), fixed images of perspectival static, even if evolved into eventual stop-motion or faster frames, with the aforementioned “*The Third & Seventh*” on-line viral status as star(t) fixture for most eager and engaged first year architecture students.

What was clearly missing during the modelling(s), where abilities to consciously discern various crucial conditions of architectural space(s), capture these for further observation(s) in easily extemporaled and conceptualized form(s).

To make those conditions as visible and *tweackable* as the digital constructs, a form of architectural shorthand would be needed.

Rapid condition extracting [Tachi-graphé]

Enter Filia and paper: handicraft. This would produce an exact opposite of the ongoing digital constructions activities where each action has to be named and defined before its execution, introducing a clear shift in brain modality. The rapid paced exercises are indeed indebted to Betty Edwards seminal approaches to drawing⁹, yet performed (and then informed) in more oblique manners. The aims of the exercises are not to instil drawing skills per se, rather than introducing conceptual awareness on crucial architectural conditions via the simple and fast drawing exercises assessable results.

One obvious and apparent benefit after the first round of exercises is the very straightforward understanding of *gestalt* v/s object, and of the obvious possibilities to *re-view* and assess the seen in more oblique ways. Similarly, the initial frustrations with translating architectural issues into digital modelling steps – all in fact clearly verbalized, binary actions- are giving way to more playful aspects of realisation(s). *Seeing is forgetting the name of the thing one sees*¹⁰, in likewise *minimalistic* attempts to deemphasized the making of objects, focusing instead on an awareness of perceptual architectural phenomena, via the *Rapid condition extracting* drawings.

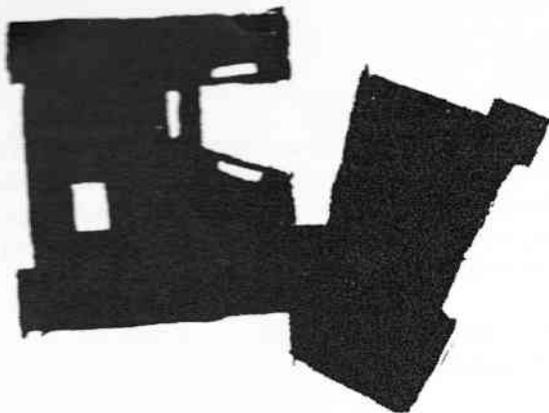
On the purely physiological side, the introduction of the exercises are clearly perceived as *different* after the first round: slow rotating and calibrating the digital model via (mostly) mouse/curser analytical moves gives then way to a liberating change of pace via the insisting, repetitive circular crayon layerings on paper, attempting to create and even, simple *gestalt* layer.

Analogue Exercise(s)

For all exercises, there would be a short introduction and concise verbal information on MO's¹¹. The exercises would last for a maximum of 20 minutes, with an average of 15 minutes for each. The results would then be quickly collected for a short crit/presentation (10-15 minutes) with Q/A, conducted around A4 paper grid outlays directly on the lab floor. Each exercise would be repeated at least once.

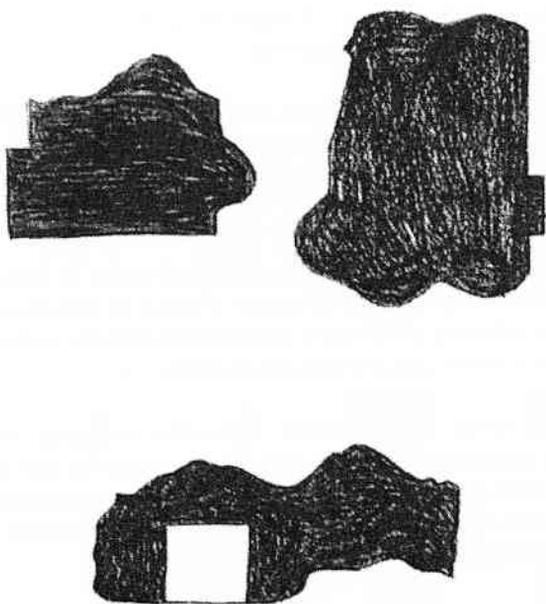
The exercises would obliquely introduce, through the material produced, more focused sensitivities to the following architectural conditions /subjects: Volumetrics, tectonics, *gestalt*, interstitial space(s), body-space morphologies. Through further hybrid exercises and one particular surrealistic, *semi-automatic* frottage¹² exercise thought provoking and readily debatable material would thus be rapidly available. A complete list of the exercises and their variable MO's is included in the notes is following:

- A – Volumetrics P/S
- B – Volumetrics Light (N & A)
- C – Tectonics
- D – Gestalt
- E – Interstitial space



This is not a plan

Fig. 1



These are not sections

Fig. 2

F – Body-Space morphologies

G – Frottage(s)

X – Hybrid(s)

Exercise I: PLAN / SECTION: Calibrate architectural object/project on SketchUp screen interface to standard split screen 4-view w/2D settings, axonometric; Extract plan and /or section of only interior air volume as 2D drawing on A4 paper; Edges defined by doors/windows; in case of openings, cut at exterior edge. Drawing surface to be evenly filled with black Filia crayon.

Exercise II: PLAN / SECTION/ LIGHT 1 with natural light: MO as exercise one, but with inclusion of light patterns on air volume and solids surfaces. Digital shadow rendering not allowed.

Exercise III: PLAN / SECTION / LIGHT 2 with artificial light: MO as exercise two, with inclusion of light pattern in air volume and solid surfaces by hypothetical artificial light source(s); Digital shadow rendering not allowed.

Exercise IV: TECTONICS: Calibration of digital model as exercise one, settings in wireframe. MO as exercise one, with clear identification of tectonic architectural elements:

Successful examples of Exercises I – IV taken as basis for “homework” for next day: Scan or photocopy, reprint 100% as inverted.

Exercise V: GESTALT: Calibration of digital model as exercise IV, settings in wireframe; MO as exercise I with identification of potential “gestalt” figures following either given architectural patterns and/or other identified patterns. Proceed in either case primarily by intuition.

Exercise VI: INTERSTITIAL SPACE: Calibration of digital model as exercise IV, settings in wireframe; MO as exercise I with identification of actual or presumed interstitial spaces; render figures following either given architectural patterns and/or other identified patterns. Proceed in either case primarily by intuition.

Exercise VII: BODY SPACE MORPHOLOGY: Calibration of digital model as exercise IV; alternate with perspective settings; settings in wireframe; MO as exercise I with identification of presumed movement patterns. Patterns/notations/mappings to primarily follow architectural settings; Proceed in either case primarily by intuition, yet follow architectural settings closely.

Exercise VIII: FROTTAGE(s): On the basis of produced results from exercises I – VII elaborate cut-out of the patterns /gestalt form. Use both positive and negative paper cut-out as basis for simple frottages. Exercise usually repeated 3 times for satisfying outcome(s).

Exercise O: HYBRID(S) All exercises could be tweaked according to the various architectural states of the students projects, thus giving the opportunity of having a more

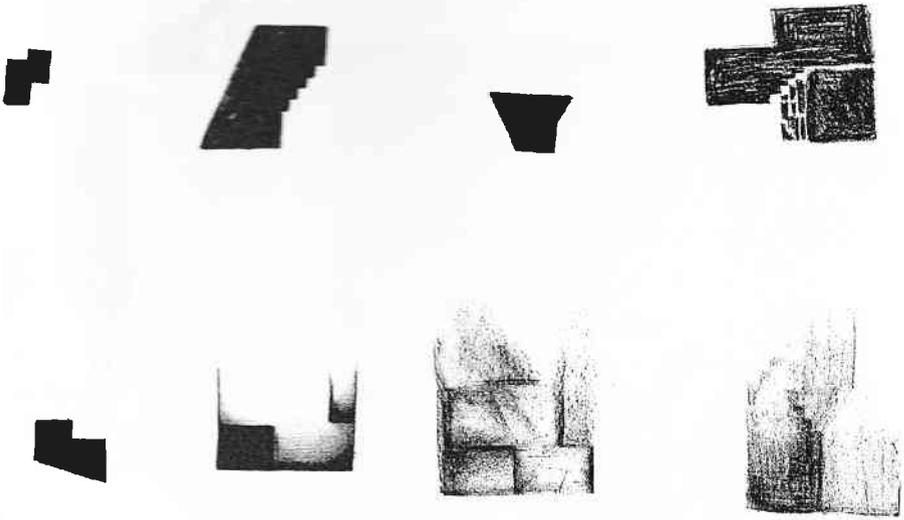


Fig. 3
Sample of exercise II + III.

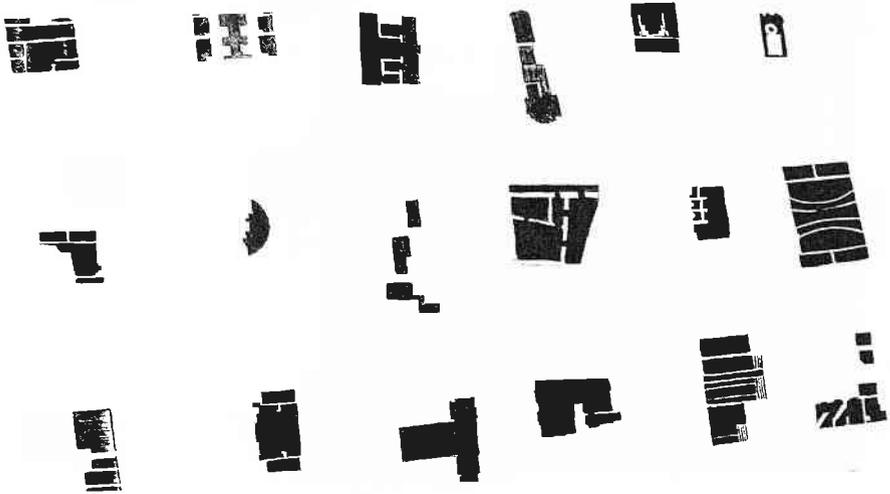


Fig. 4
Sample of exercise I and II.

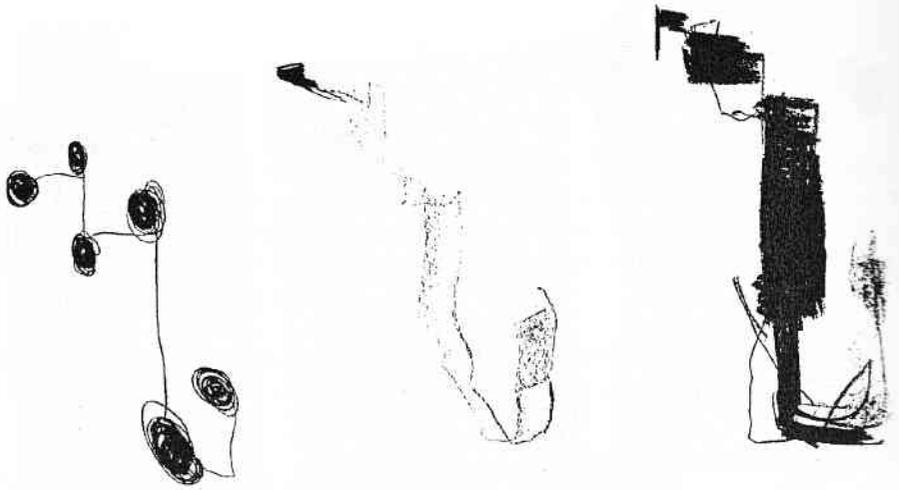


Fig. 5
Sample of exercise VII.

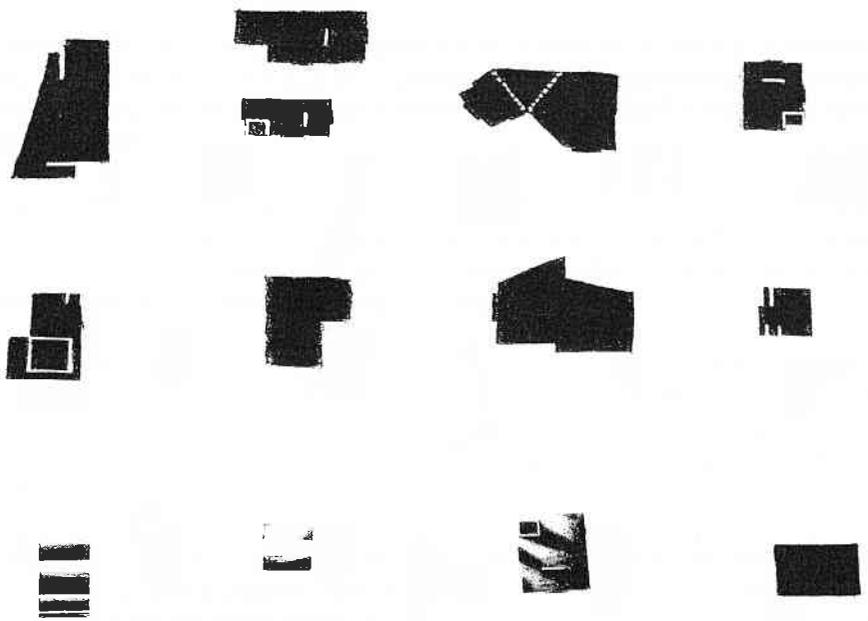


Fig. 6
Sample of exercise I, II and III.

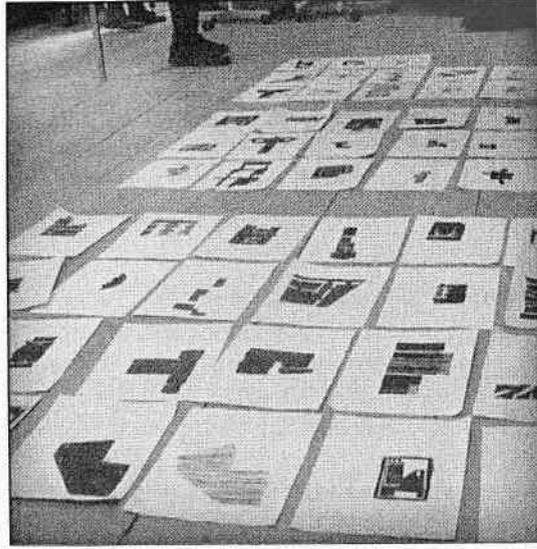


Fig. 7
Sample of exercise outlay.

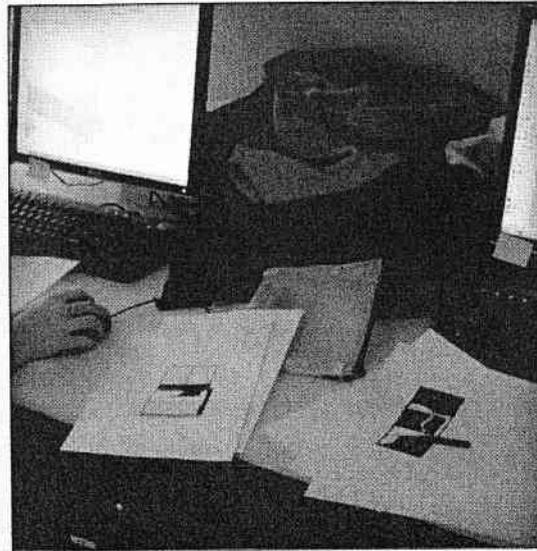


Fig. 8
Seamlesscaleless situation.

close dialogue with ongoing architectural design work. Tweak examples: combination of exercises i.e. II and VII, IV and VIII, and use of VIII for elaboration(s) of landscaping / site plans / interiors, etc.

Complement

As the production of the exercise's various tasks would very quickly yield relatively large amounts of both qualitative and highly debatable material¹³, the informal lecture(s) would act as complementary, intellectual *sorbets*, inserted with effective, yet *casual care*.

The lecture(s) presented as PP slides would informally circle around more general topics of architectural (re)presentations with examples from antiquity to present day, yet without forming any stringent, historical course. Certain examples would be highlighted, presented in quiz form to the audience, to assess the class's average level of basic architectural knowledge¹⁴ and drafting terminology.

As the lectures were designed to act as informal catalyst for interactive conversations, the presented examples acted simultaneously as both generic and more specific architectural lineaments. After the informal determined level understanding of the class after the first lecture's quizzes, slides would be re-adjusted for the next lecture.

While introducing the more classic issues of architectural rendering(s) for the students, other, more contemporary examples of recent scaleless *rotation conditions* were inserted. These inserts would usually consist of easily available short on-line videos. The Eames's *The Power of Ten*¹⁵ would act as cornerstone to the opening of this discrete parallel discourse. Other highlights would include *The Campanile Movie* and its subsequent Matrix Bullet-Time sequence¹⁶, including, if time would permit, the subsequent *Shrek* and other filmic parodies.

What would be considered as puerile digression(s) is actually firmly grounded in reality. The ubiquitous ways by which serious surfing with Google Earth is nowadays practiced with childish ease, combined with the investigative virtual rides globally via Google Street View, would presupposes a well developed cognitive awareness of satellites and drone's perspectival shift.

Actually, this is not necessarily the case.

Court-circuits or new tracés regulateurs

Memory is, indeed, short: Google Earth was introduced in 2005, Google Street View in 2007. The European mappings are even more recent, depending on location. The astonishing ease, and particularly the somewhat unsettling *un-impressiveness* with which these tools are integrated into the (global) quotidian, is mind-boggling. At first(!) The novel, ensuing body-space morphologies, while blurring the fault-lines and boundaries of virtual and real, pre-suppose a wholly different change of perspective paradigm: the irreversible detachment of the eye from the body, inducing a multi-faceted, simultaneous multi-verse.

The (scaleless) free rotation of objects has mutated to include the (scaleless) free rotation of the ocular, body-centered condition. To include this change of paradigm as complementary cognitive information further on-line video snippets were included (when time would permit it) to the informal lectures. Joe Kittinger's jump would be contrasted with Felix Baumgartner's preparations, Apollo 8's first filmic evidence of planet Earth appearance behind the moon, amateur's cheap but effective balloon expeditions to space (and the many parodies thereof), Jeb Corliss's *Grinding the Crac*, and the many other *Go-Pro*¹⁷ manufactured views that were impossible just a decade ago¹⁸.

With the rapid deployment and miniaturisation of flying drones and other UAV enabling even more stunning imagery¹⁹, the finalisation of the body-less ocularity and its shift into the realms of the ubiquitous quotidian has already happened.

Architecturally, the scaleless rotation from seemingly unattainable viewpoints is already in full deployment²⁰, while more sophisticated rotation(s)²¹ pave the way for completely novel ways of future building.

'Pataphysics

The somehow extreme agglomeration of intensely focused manual exercises, general pictorial lecture(s) with quiz inlays, and video inserts, might, on first glance, appear to be a somewhat up geared endeavour. Compared with classical drawing/drafting classes, and the usual step-by-step didactic inoculations of hard and software to amalgamate architectural design studio production.

The actual didactics accompanying the *Rapid condition extracting* exercises are a indeed a form of ludic thrust, balancing already obsolete representation techniques in an attempt to recalibrate radically rescued analogue practices, tweaking them, to cognitively fit new and constantly changing digital conditions. All the while the digital MO are themselves becoming obsolete, with the ongoing perfection of 3D printers and advanced digital translation software.

The short two-day course module could be viewed as a joyful '*pataphysical*²² insert, stirring a rather technocratic course with thought-provoking re-introductions and calibrations. Alfred Jarry's "*Science of imaginary solutions, which symbolically attributes the properties of objects, described by their virtuality, to their lineaments*" is much less Dada than first anticipated.

In their seminal treatise on architectural representation Alberto Perez-Gomez and Louise Pelletier state that:

*"If we persevere in our obsessive search for a scientific theory of architecture, we may finally stumble upon a model that is truly appropriate for the architect's search for form: ...Jarry's "science" of 'pataphysics. As opposed to traditional science, pataphysics celebrates the sheer unlikeliness of pure theory, noting the remarkable improbability of the circumstance that we live on Earth and are able to see the stars. Indeed, pataphysics remind us that the conditions necessary for life do not exclude those necessary for vision or vice-versa, an exceptional point, often overlooked..."*²³

Coda (seamlesscaleless)

In the frantic pace of a first year architectural curriculum, a two-day modular insert of analogue drawing in a longer digital modelling foundation course might not be evaluated to any status of *hinge*. Nevertheless, it has been the constant trickling of positive informal, ad-hoc feedback from participating students that fuelled the recapitulation of a now defunct course supplement.

The cognitive element of scalelessness had been introduced with relative ease via the many puzzle-like analogue realisations that continued emanating from the simple *Filia* exercises. Apparently, these simple *skills* were sufficiently inoculated to surface when needed to bridge the language gap of intuitive intentions meeting digital translations in architectural design situations.

The wishes to creating bonded amalgams between analogue and digital situations were translated into more *quirky* situations of constant overlay(s), generating a buzz-like readiness to change media when needed. If conditions of *seamlessness* and *scalelessness* would be considered as hybrid life-forms, with inherent capabilities for situation-compatible adaptability, much is gained.

In the actual global habitat of rapidly changing technological shifts, the momentary insert and training of small analogue *instamatics*, frozen cognitive flash-backs in creative architectural/design education will first show its real value in some years, after graduation and with establishment of next generation's idiosyncratic integrities.

Until then: Il faut cultiver son jardin.

Notes

- 1 "The map-territory relation describes the relationship between an object and the presentation of that object, as in the relation between a geographical territory and a map of it. Polish-American scientist and philosopher Alfred Korzybski remarked that "the map is not the territory", encapsulating his view that an abstraction derived from something, or a reaction to it, is not the thing itself. Korzybski held that many people do confuse maps with territories, i.e. confuse models of reality with reality itself." *Wikipedia's definition of "map-territory relation" term as of September 2012.*
- 2 One absolutely jaw-dropping CG rendering that surfaced in 2011, is Spanish CG world artist Alex Roman's seminal, incredibly photorealistic "*The Third & Seventh*" video. In it, he manages to reconstruct the interiors (and all exteriors too) of both Louis Khan's Exeter library and the Dacca parliament. Most mindboggling is the fact that *all* arte-facts depicted in the video are computer generated. To say the least of the amazing controls of architectural light ("natural" and artificial- both digital virtualities. Video URL > <http://vimeo.com/7809605>.
- 3 The Treachery of Images (*La trahison des images*, 1928-29, sometimes translated as The Treason of Images) is a seminal painting by René Magritte. The picture shows a pipe. Below it, Magritte painted, "Ceci n'est pas une pipe", French for "This is not a pipe."
- 4 In Michel Foucault's essay from 1968 titled *Ceci n'est pas une pipe* inspired by Magritte's painting, Foucault focuses on the unusual effect, what he termed its "strangeness" created by the drawing's highly realistic depiction of a pipe and the legend below it, stating, "This is not a pipe." Foucault argued that the incongruity between the pipe and its legend illustrated his

position, that "[neither words nor the visible] can be reduced to the other's terms: it is in vain that we say what we see; what we see never resides in what we say. And it is in vain that we attempt to show, by the use of images, metaphors, or similes, what we are saying..." Thus, the drawing strips us of the certainty that the pipe is a pipe, and and "inaugurates a play of transferences that run, proliferate, propagate, and correspond within the layout of the painting, affirming and representing nothing."

"inaugurates a play of transferences that run, proliferate, propagate, and correspond within the layout of the painting, affirming and representing nothing."

Foucault, Michel. *This Is Not a Pipe*. Tr. James Harkness. Berkeley: University of California Press, 1983.

- 5 *Filia* oil Crayons have a special history: invented in collaboration by a Danish engineer and a steel manufacturing plant in 1952, the crayons have been ubiquitous staple in Danish kindergartens and primary schools. While remembered with fondness by most Danes, the crayons possible use as serious tool by adult professionals was certainly not an established practice. (With the re-introduction of *Filia* crayons in various architectural drafting courses, younger Danish architects would now deftly use it as a conceptual sketching tool, surpassing other traditional analogue tools.)
- 6 Ten (10), later nine(9) classes of first year students from different departments would pass through the compulsory foundation course; The primary objective was the introduction and subsequent handling of architectural digital modelling techniques via SketchUp8 software; The SketchUp models would later in the course be rendered by various rendering software applications. To each course, classes would bring already (more or less) elaborated design studio project results; Almost all classes would bring very different architectural material (ranging from intricate conceptual architectural forms/shapes to reduced one-room shelters via smaller, more regular projects with some sort of in-built programmatic functionalities as stepping stone for digital modelling translations. The two-day analogue module was usually inserted after a week/10 days into the digital course.
- 7 While only one department had, early on, given their students a thorough intro and handling of Autodesk 3DStudio MAX, this was the case for all other classes.
- 8 *Bullet time* (also known as frozen time, the big freeze, dead time, flow motion, or time slice) is a special and visual effect that refers to a digitally enhanced simulation of variable-speed (i.e. slow motion, time-lapse, etc.) The term "bullet time" is a registered trademark of Warner Bros., who first used it in March 2005, in connection with the video game *The Matrix Online*. The term had previously been used in the promotion of the 1999 film *The Matrix*. (*Wikipedia* entry, sept. 2012)
Actually the Campanile at the University of California, Berkeley, was the first architectural object subjected to virtual camera moves by Paul Debevec in his ground-braking "Campanile movie" (1997). Technology and know-how then made their successful transfer to Hollywood via Debevec's PhD Student George Borshukov. Borshukov was hired by The Matrix's visual effects team to implement the "bullet-time" effects. Links:
"The Campanile Movie": <http://www.debevec.org/Movies/debevec-campanile.mov>
Relevant cross-over facts at: <http://www.debevec.org/Campanile/>
It is the ensuing "bullet-time" effect, re-used in countless films and other moving visuals since that established the ubiquity of the form-in-space cognition.
3D Tetris appeared in the mid-90's, evolving into equally ubiquitous conditions in most AV or filmic settings thereafter.
- 9 Betty Edwards, American art teacher and author, is best known for her 1979 book, *Drawing on the Right Side of the Brain*. Edwards's method of drawing and teaching was revolutionary when she published it in 1979. Underlying the method is the notion that the brain has two ways of perceiving and processing reality — one verbal and analytic, the other visual and perceptual.

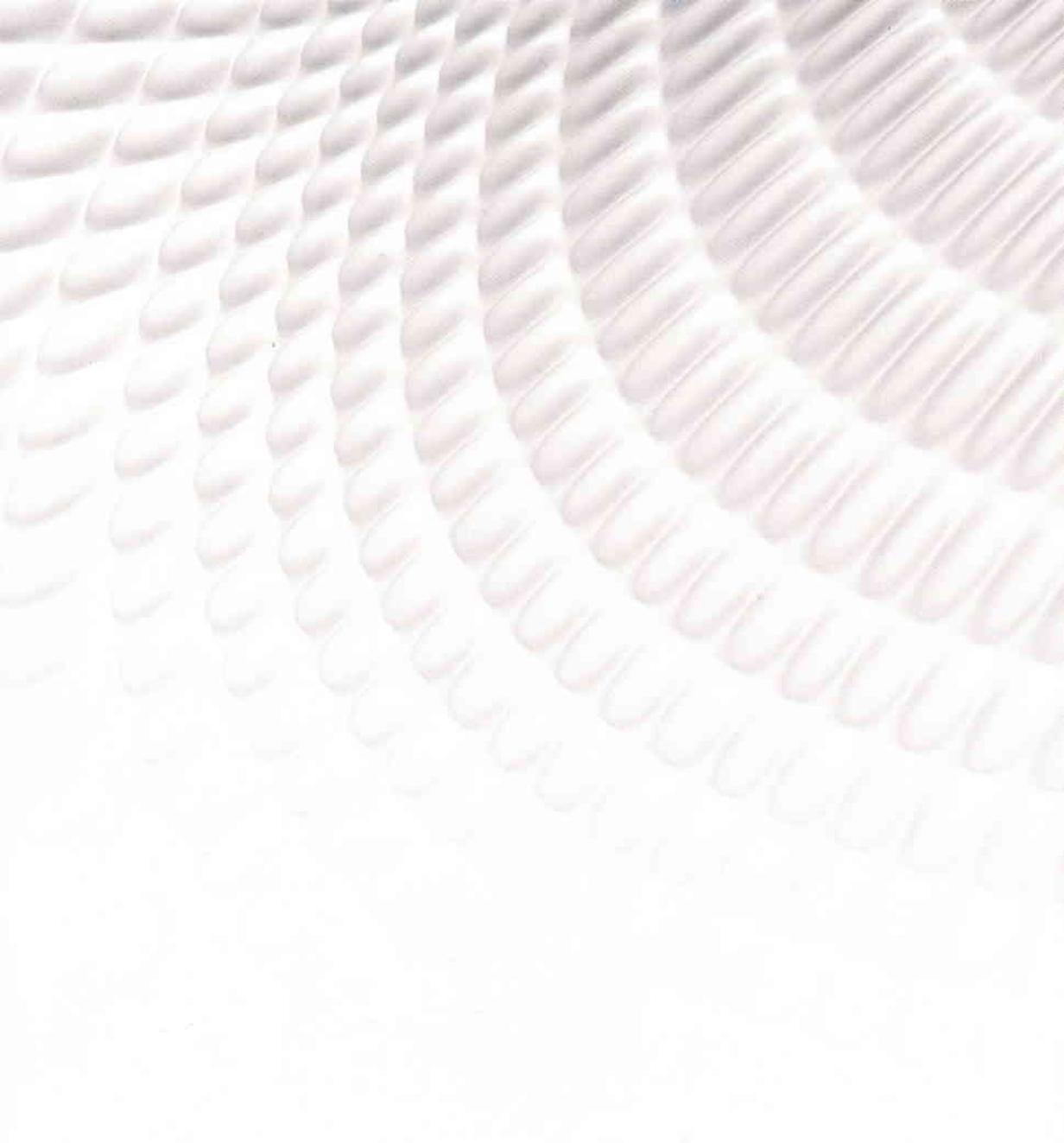
Edwards' method advocates suppressing the former in favour of the latter. It focuses on disregarding preconceived notions of what the drawn object should look like, and on individually "seeing" edges or lines, spaces, relationships, and lights and shadows, later combining them and seeing them as a whole, or gestalt.

Edwards's early work was based in part on her understanding of neuroscience, especially the cerebral hemisphere research suggesting that the two hemispheres of the brain have different functions. She spoke of verbal/analytic processing as taking place in the brain's left hemisphere, and visual/perceptual processing as taking place in the right. When later research showed that the locus of these activities is much less clear cut, she began calling the two modes "left mode" and "right mode", respectively."

Edwards, Betty, *The New Drawing on the Right Side of the Brain*, Tarcher/Putnam, 1999

- 10 Weschler, Lawrence: *Seeing Is Forgetting the Name of the Thing One Sees: Over Thirty Years of Conversations with Robert Irwin*, Berkeley, University of California Press, 2008.
- 11 Information, instructions and concise MO's were not given in writing, establishing from the start of each exercise, a playful climate of interactive intensity, prioritizing intuitive action over "analytical" broodings. Students were welcome to ask short, specific questions while working, to emphasise more direct approaches to the actions.
- 12 Frottage (from French *frotter*, "to rub") is a surrealist and "automatic" method of creative production developed by artist Max Ernst.
- 13 As a class would average 25 students, each exercise would generate a minimum of 2-3 A4 per student. A quick crit/outlay of material from each exercise would cover a surface of 6-9 m².
- 14 While some illustrations would be of more general character, specific examples of architectural drawings would serve as basis for interactive quizzes: a simple facade drawing of Villa Godi by Palladio, a plan and a section of Borromini's San Carlo alle Quattro Fontane, a plan/section of Vila Rotunda by Palladio, a site plan and detailed plan of Villa Marea by Aalto, plans and sections of Corbusier's Weber Pavilion. To assess knowledge of drafting terminology, various examples of axonometric representations were included.
- 15 Charles and Ray Eames's seminal short film's (second version from 1977) original title is: *Powers of Ten: A Film Dealing with the Relative Size of Things in the Universe and the Effect of Adding Another Zero*. The actual Best version available at YouTube > <http://yt.cl.nr/OfKBhvDjuy0>
- 16 Matrix's Bullet-Time sequence: Youtube clip > <http://yt.cl.nr/WhxbYTMNMxo>
Bullet time in chroma > Youtube clip: > <http://yt.cl.nr/jrd8kgWlku4>
What is bullet-time > Youtube clip> http://yt.cl.nr/_KtghA0rkDY
Campanile Movie > <http://www.debevec.org/Movies/debevec-campanile.mov>
- 17 Go-Pro is a miniature, waterproof wearable High Definition video camera, that since it's appearance in 2007 have enabled stunning new moving images from most unusual viewpoints.
- 18 Joe Kittinger > http://yt.cl.nr/Qw8OJJQ_hgk
Felix Baumgartner 96,000 ft Test Jump 2012 > http://yt.cl.nr/s_SzUnkYcR4
Apollo 8 Christmas > <http://yt.cl.nr/skSbdBo15vQ>
Jeb Corliss "Grinding The Crack" > <http://yt.cl.nr/TWfph3iNC-k>
Space Balloon - Stratosphere Spacecraft Launched From Newburgh, NY > <http://yt.cl.nr/y6ZMscMp8UM>
- 19 Drones and UAV's > http://en.wikipedia.org/wiki/Unmanned_aerial_vehicle
Nano Humming bird > http://en.wikipedia.org/wiki/Nano_Hummingbird
AR drone > <http://ardrone.parrot.com/parrot-ar-drone/select-site>
- 20 Extraordinary urban amateur UAV videos from all over the globe > <http://team-blacksheep.com/videos>.

- 21 Flight Assembled Architecture > <http://yt.cl.nr/JnkMyfQ5YfY>
ETH Zurich roboticist Raffaello D'Andrea and architects Fabio Gramazio and Matthias Kohler teamed up to have the quad-rotors build a 1:100 scale model of a tower envisioned by the architects. This resulted in the first art installation to be built by flying robots: a 6 m tall tower made out of Styrofoam blocks. (2011).
- 22 A recent MIT publication is a thorough documentation of 'Pataphysics >':
Hugill, Andrew: *'Pataphysics, A useless guide*. MIT Press, Cambridge, Mass. 2012.
- 23 Perez_gomez, Alberto: *Architectural representation and the perspective hinge*, MIT Press, Cambridge Mass, 2000, p. 296.



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