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GHOSTLY

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Fictions

Ghostly: Protocols and Fictions (editorial note)

Simone Ferracina

To speak of ghosts is to describe encounters—endured, missed, imagined, or overheard. A ghost is a mere trace; there is no life, no pulse, no pumping blood, no object but a vague virtuality, a set of phobias and superstitions ready to be dressed, perhaps a blurry halo or image. And yet a flickering light, a sudden gust of cold air and the echo of a distant laughter cannot be entirely dismissed as notional—they affect real bodies in space and time. The ghost is active, it has breath (*gast*) and agency beyond mere appearance and disappearance.

The phantasm becomes the key to unlocking a set of potentialities, but also a symptom, an index of deep seated motives, of unfinished business—memories, disease, ecological crisis and injustice.

The etymology of *phantasma*, from the Greek *phantazein* (to make visible, to display) points to the ability of ghosts to unconceal or to give a voice. In this sense, specters perform the role of interfaces—their apparition mediates between life and death, past and present, material and immaterial, bodied and disembodied, natural and supernatural. Their liminal cries dissect signifiers and recombine them in new ways, peeling words from their established (normal)

contexts and framing new contexts altogether. Spooks as translation apps.

With haunting, translations become distortions— the magician's trick erases causal links; deprives events of legibility; bewilders, amazes, gaslights. The door slams open *by itself*, independent of anyone's apparent action, and that is why we fear, shake and tremble—as if we were accustomed to always perceiving or being in control of what happens inside and around us, in our gut and across the infrastructures and ecologies that stretch and twist around our biopolitical (and technologically enhanced) body. For a moment, we peer into the reality of our condition, we renounce abstraction and modernity and embrace that which troubles us— its invisibility, strangeness and frailty.

This issue collects invited contributions around the theme of "ghostly" and its loose metaphorical ends. Pieces are organized in two clusters: "Protocols" includes research in media, technology and design methodology, as well as experimental architectural and artistic practices. "Fictions" focuses on story-telling and the invention and rehearsal of (less-than-) perfect futures.

Protocols

Alessandro De Francesco: Augmented Writing

Brunella Antomarini

that they were waiting for us in the car   that we couldn't stay home   you had
understand that in reality i was already gone

the objects fall from my hands into the grass fall everywhere fall from my hands under the carpet stirs a sequence
of nights passed alone in a hotel in all directions inside the pit of summer   and what if there were a
mass of imageless dreams   sound dreams maybe that occupy the nights and vanish leaving traces in the cracks
black liquid seeps out of the pulsating rubber dilates on the grass   on the summer that won't come back
then they show me a direction to follow between the nerves and i enter the tube   it's a matter of looking
of exploring the contents of

it's completely dark inside it   there's a liquid behind us   it's a matter of looking   the wardrobe comes open

By dint of writing on screens, the art of writing has been split into two opposed vocations, the digital and the material.

The first one is defined by its immateriality, which over the years of the avant-gardes has been called virtual, asemic, polysemic, chain of signifiers, etcetera. After losing their task to carry listeners or readers into the world as its main representatives, and after accomplishing their successive task of defending their autonomy from representation, words, like conductors of energy, carry readers and listeners into themselves, that is, into the images of themselves, be they painted, photographed, in motion, or, as sounds do, entering bodies and fading into them. Fluctuating in the reticular continuum of the web, every temporal sequence becomes a spatial display. Any sense of 'before' and 'after' is reduced to the quick selections of a pointer, and their power to change the scene on the screen. Due to the habit of sensing multiple superimposed pages, we instinctively feel that the screen 'contains' all the images conjured up by the pointer, and that it displays a non-linear temporality, in which events do not occur after one another but emerge from a net of overlapping micro-causes and contingencies (but isn't this also true of the world?).

upon forcing the door to get in the sound of a
television could already be heard from the landing
in the stairwell we had the keys others say it
was easy to get in there were a lot
of them in the apartment a kid was lying on
the floor with a ball under his arm the others were
scattered all over this place they thought we
thought was empty they begged for mercy
saying nothing were shaken malnourished we
maintain that we forgot what happened
the technique employed behind the
shudders onscreen

is heard in any place equipped with a
diffusion device even some rooms shut up
and empty in the house your home
they make dizziness at blinding distances in
plastic bag left in the kitchen behind the lamp
on top of the shelves

upon forcing the door to get in the sound of a
television could already be heard from the landing
in the stairwell
the noise covered everything we had the keys
it was easy to get in

The other vocation is its materiality: writing, being independent of meaning, is its visual and tactile appearance on paper. The spatial display of time here is itself a visual semantic source: whereas the screen 'contains' an infinite stack of layers, the paper shows only one. The sheet of paper reveals a simultaneity that was neglected before, when it was a mere tool for 'transparent' words to be placed in ordered sequences.

The more redundant the paper book (waste of paper, of time, of money), the more the act of writing becomes a matter of impressing the paper support and of testing its resistance and the possibilities to play with it.

In the osmosis of video and paper pages, we discover in hindsight, how pleasant it has always been to touch them, to handle them, to move them and to turn them in our hands. A paper book does not need now to contain meanings, or store cultural patrimonies, but it simply survives within the technological horizon of artifacts: it unties that knot (renounces the rebinding), quite disregarded before digital culture, between page and meaning. The book releases its pages, lets them free from those fetters, in order to morph into a video, to be handled, or watched, as one's eyes move on its surface.

In this convergence—or rather in this feedback loop—between digital and material, what gets lost is the totality of sense. In fact, if reading is just one of the possibilities given by the page, we browse and skim over it, well aware that what we are doing is allowed by its material left-over: the page is a relic holding back its ancient time in the space of the paper.

It is not a matter of respecting an order of premises and conclusions. Touching the paper lets us enjoy the revelation of the non-necessity of that logic. Our eyes can have solace from that effort. It was Friedrich Nietzsche who in *The Gay Science* said that
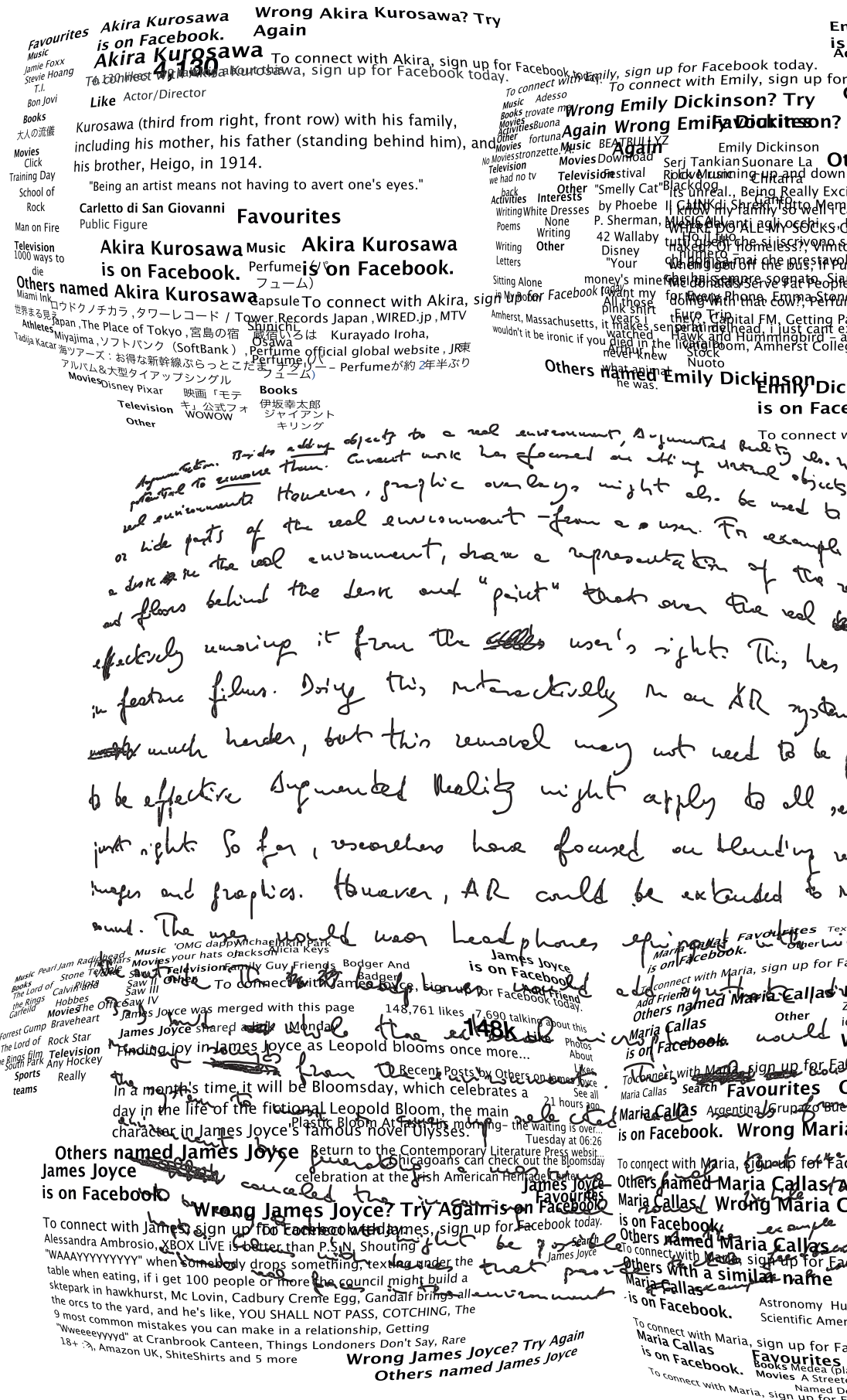
The course of logical ideas and inferences in our brains today corresponds to a process and a struggle between impulses that are, taken singly, very illogical and unjust; we generally experience only the result of this struggle: this primeval mechanism now runs its course so quickly and is so well concealed.

Now our aged logic—making sense of the world through the transparency of language, namely writing and reading—has come to the point of its illogicality. The times are ripe to confirm Nietzsche's suspicions; it is about time that an utter materiality preserves a surface where all that is necessary is out there, because what is necessary is always at hand. However, now that we know it, it is only just at hand; there is nowhere else, or if another place ever existed, it would be but a nuisance, a redundancy—of information, of non requested knowledge—unless that nuisance becomes itself part of the game, as sound waves (like glitch music which uses electronic errors as musical score).

Like myths told on Etruscan vases, screens expand the reading to a tactile visual question and whatever is written appears as already read beforehand, it does
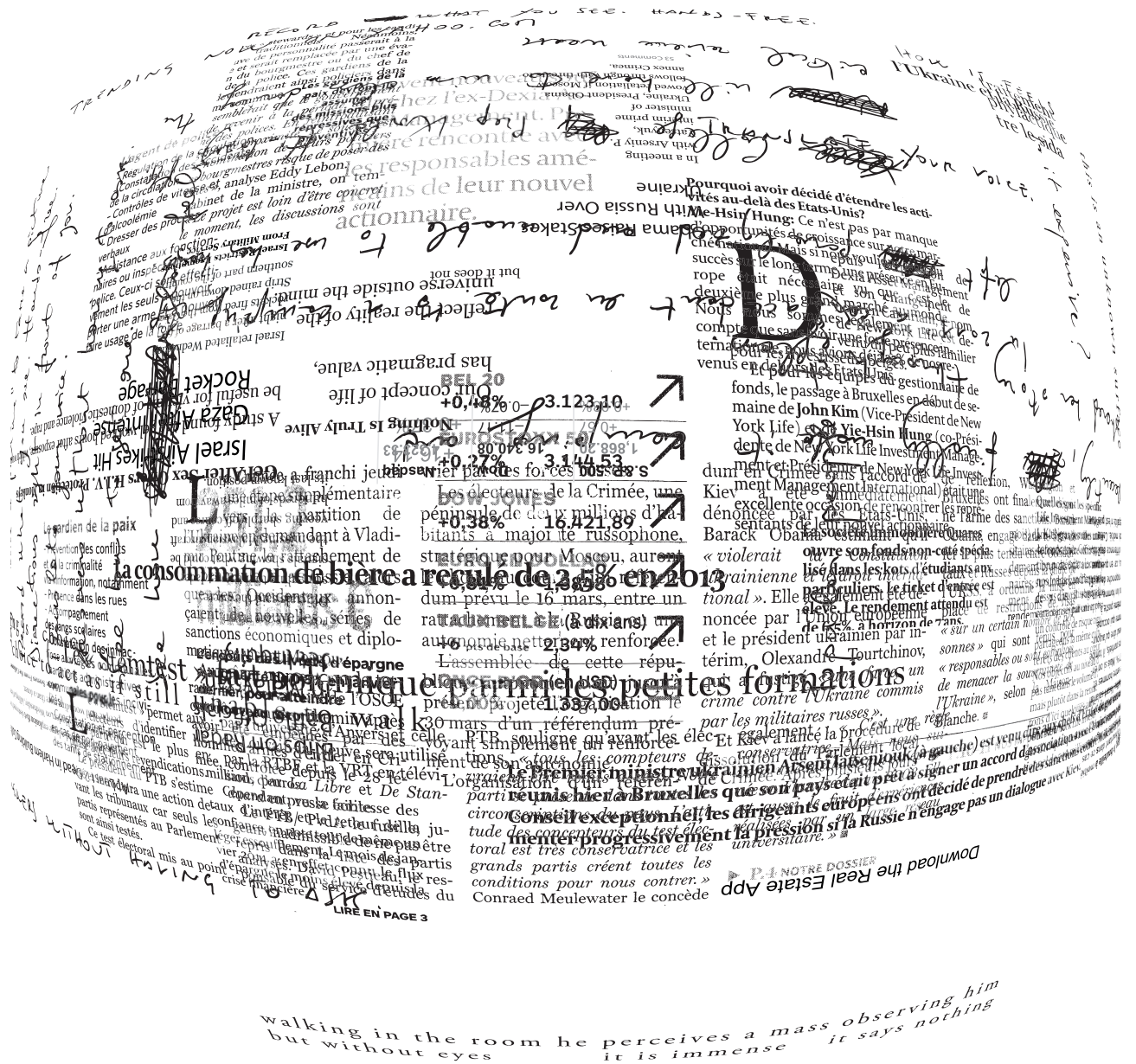
not need to be read again, as what the text refers to arises from the text itself,
endlessly read by the self-generating virtual surface.
It is there to be shown, rehearsed, tested, forgotten, and protected by the invisible
layers of the screen. Exactly as it happened in mythologies, in most cases we know
what it's all about, and the text asks the spectator to be only another witness to its
autonomous existence, or pre-existence (to facts).

Favourites
Music
Jamie Foxx
Stevie Hoang
T.I.
Bon Jovi

Akira Kurosawa is on Facebook.

Akira Kurosawa
4,180
To connect with Akira, talk about Kurosawa.

Wrong Akira Kurosawa? Try Again

To connect with Akira, sign up for Facebook today.

Like Actor/Director

Books
大人の流儀

Movies
Click
Training Day
School of
Rock
Man on Fire

Kurosawa (third from right, front row) with his family,
including his mother, his father (standing behind him), and
his brother, Heigo, in 1914.

"Being an artist means not having to avert one's eyes."

Carletto di San Giovanni
Public Figure

Television
1000 ways to
die

Favourites

Akira Kurosawa is on Facebook. Music
Perfume（パフューム）

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Others named Akira Kurosawa
Miami Ink

Capsule To connect with Akira, sign up for Facebook today.
Shinichi
Osawa

世界まる見え
ロウドクノチカラ ,タワーレコード / Tower Records Japan ,WIRED.jp ,MTV
Athletes
Tadija Kacar

Japan ,The Place of Tokyo ,宮島の宿 錦水館いろは Kurayado Iroha,
Miyajima ,ソフトバンク (SoftBank) ,Perfume official global website ,JR東
海ツアーズ：お得な新幹線ぶらっとこだまで行く
アルバム＆大型タイアップシングル

Movies
Disney Pixar
映画「モテキ」公式フォ
Television
WOWOW
Other

Perfume（パフューム）– Perfumeが約 2年半ぶり

Books
伊坂幸太郎
ジャイアント
キリング

Emily Dickinson
is on Facebook.

Music Adesso
Books trovate m
Activities Buona
Movies fortuna
Music BEATBULLYZ

Wrong Emily Dickinson? Try Again **Wrong Emily Dickinson? Try Again**

No Movies stronzette
Television
we had no tv

Movies Download
Television Festival
Other

Emily Dickinson
Serj Tankian Suonare La
Il CIIKdi Shreta
"Smelly Cat"
by Phoebe
P. Sherman,
42 Wallaby
Disney
"Your
money's mine
All those
watched
never knew
what animal
he was.

Activities Interests
Writing White Dresses
Poems None
Writing
Letters Other

Sitting Alone

Amherst, Massachusetts, it makes
wouldn't it be ironic if you died in the hotel
money's mine

Others named Emily Dickinson

**Emily Dic
is on Face**

To connect w

James Joyce is on Facebook

'OMG dapp Michael McFrank Favourites
your hats jackson Alicia Keys

Music Pearl Jam Radio Years Music
Stone Temple Movies Television Family Guy Friends Bodger And
Books Pilots Saw Badger
the Lord of Calvin and Saw II Other Best Friend
the Rings Hobbes Saw III
Garfield Movies The Office Saw IV

To connect with James Joyce, sign up for Facebook today.

James Joyce was merged with this page 148,761 likes 7,690 talking about this

Forrest Gump Braveheart
The Lord of Rock Star
the Rings film Television
South Park Any Hockey
Sports Really
teams

James Joyce shared a link Monday
Finding joy in James Joyce as Leopold blooms once more...

148k

Photos
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Likes

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In a month's time it will be Bloomsday, which celebrates a
day in the life of the fictional Leopold Bloom, the main
character in James Joyce's famous novel Ulysses.

21 hours ago
Plastic Bloom At Last morning- the waiting is over...
Tuesday at 06:26

Others named James Joyce

Return to the Contemporary Literature Press websit...
Chicagoans can check out the Bloomsday
celebration at the Irish American Heritage Center.

James Joyce
is on Facebook

James Joyce
Favourites

Wrong James Joyce? Try Again is on Facebook today.

To connect with James, sign up for Facebook today. To connect with James, sign up for Facebook today.
Alessandra Ambrosio, XBOX LIVE is better than P.S.N, Shouting
"WAAAYYYYYYYYY" when somebody drops something, texting under the
table when eating, if i get 100 people or more the council might build a
sktepark in hawkhurst, Mc Lovin, Cadbury Creme Egg, Gandalf brings all
the orcs to the yard, and he's like, YOU SHALL NOT PASS, COTCHING, The
9 most common mistakes you can make in a relationship, Getting
"Wweeeeyyyyd" at Cranbrook Canteen, Things Londoners Don't Say, Rare
18+ :), Amazon UK, ShiteShirts and 5 more

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is on Facebook.

James Joyce is on Facebook

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Add Friend
Others named Maria Callas

Maria Callas
is on Facebook. Other

To connect with Maria, sign up for Fa
Maria Callas Search **Favourites**

Maria Callas Argentina / Grupo / Bue
is on Facebook. **Wrong Maria**

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is on Facebook.
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Scientific Amer

To connect with Maria,
Maria Callas
is on Facebook. **Favourites**
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Movies A Streetc

To connect with Maria, sign up for Fa Named De

Emily Dickinson
...on Facebook. Emily Dickinson
Add Friend is on Facebook.

...Facebook today.
Others named Emily Dickinson
Wrong Emily Dickinson? Try
Again

Search
Others named Emily Dickinson

...hotel hallways, Boys hugs are so comforting,
...ited or Angry and You Can't Text Fast Enough
...Carcare qualcosa in casa e coprire di
...Rockerradio, Nightrain, Sophie Kinsella, Per
...u using her purple cushion matters. Per
...to scegliere, Italian Torrent, TVDream – La tv
...bs Dont Serve Drunk People why Do
...me Pazzi, Gordon Ramsay......Whatwas the
...e, Gordon Ramsay, Per tutti quelli che amano
...he adverts these days are all sexual am
...aid, Ben & Jerry's, Custom Shoes & Apparel –
...xplain it
...nd 202 more
...ge

Others with a similar name

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singers photo
Rita Moldão –
Soprano
J. S. Bach–
Stiftung
Accademia
Pietro Ballo
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Alma Mahler
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Gustav; 6.
Books   Franz Werfel
Eine
Movies   Luchino
Visconti Tod
Activities Kokoschka
Interests   Musik,
Literatur,

Other   Walter–Gropius–Schule
Other
ÓPERA ACTUAL, Lviv National Opera, Arena di Verona, Concerlirica
Internacional, Україна, Maria Guleghina, Emma Stace Darling, Genova –
Teatro Carlo Felice, Fredriksbergs Stuteri, Association Française du Poney
New–forest, Stutteri Firfod, Declaración Universal de los Derechos
Humanos, The Street Track Flow, Den Jyske Operas Venner
The Metropolitan Opera, Seven Arts Friends, SubAdictos, Operaclick News,
Doppio Zero Buenos Aires, Amics de l'Art Romàntic, Opera Academy
Verona, Suzie Gregory, Archivo Manuel García, Marco Sanello,
Maria Guleghina, Emma Stace Darling, Goran Filipec, Marburae Art–Gallery
Macclesfield, Il Sipario Musicale

Add Friend   Alma Mahler
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Others named Alma Mahler
Others with a similar name
To connect with Alma, sign up for Facebook today.

Wrong Alma Mahler? Try Again
Others named Alma Mahler

Add Friend

Favourites   Alvaro Vallejo
Music   Fabio
Armiliato
Miguel Bosé
Accademia
Pietro Ballo

Wrong Alma Mahler? Try Again
Others named Alma Mahler

...as HoldEm Poker   Wrong Maria Callas? Try Again
Maria Callas

...cebook today.

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...dalista.it facceVille: La City   CityVille
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Others with a similar name
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Add Friend   Maria Callas   Search
...Callas? Try Again

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Other
...bble Space Telescope Jet Propulsion Laboratory
...rican magazine Sky & Telescope
Astronomy
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Music Opera Others named Maria Callas
...ay) Activities Others with a similar name
...car Viaggiare Wrong Maria Callas? Try Again
...esire Others named Maria Callas
...cebook today. Others with a similar name

Activities Favourites
New Scientist Sports
Astrophysics Badminton
Music Opera
Other

Michael Jackson
is on Facebook.
59,265,774 likes 745,889 talking about this
To connect with Michael Jackson, sign up for Facebook today.
About   Photos   Likes Short Films   Newsletter

59m   Michael Jackson   .   Highlights
Yesterday
...fans can join four misfits on a journey of transformative adventure at Michael Jackson ONE.
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Mike Jackson   shared a link.
45 minutes ago

Michael Jackson's Ghost
is on Facebook.

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About   Photos   Likes   755

Mike Jackson is the Chairman and CEO of AutoNation, Inc.
215 likes   13 talking about this

Had a great time on Fox Business. I spoke about the
AutoNation coast to coast rebrand, the state of the US
economy and vehicle sales.

Michael Jackson's Ghost
9 May 2011 via Mobile

Whatup cunts?
I do not want fake photos which is made in photoshops
which will make it fake

Michael Jackson's Ghost
19 July 2009

I need more pic of MJ's ghost
I need more photo's that are not fake
Like   Comment

Michael Jackson
is on Facebook.
To connect with Mike Jackson, sign up for Facebook today.

13

la lumière dans les organes
pas de lumière dans les organes
no light inside the organs
non solo
luce o quasi negli organi
la lumière dans les organes
quasi negli organi
do setor elétrico será
Merkel consumidores
cerca de
there is a
warm surface
on the sides
of the road

And to the material sheet of paper an opportunity is given: to present and show in the empirical world what escapes control in the flowing world of the screens.

So who's the writer in Alessandro De Francesco's work?
The writer takes ready-made words and inserts them in a space to construe self-organized texts that, whether they are interrupted narratives, or Facebook-like self-descriptions and self-promotions, or reminders of cultural fossils like *Kurosawa*, *Alma Mahler*, *Dickinson* or *Joyce*, are displayed on the paper surface, swirling in rotatory portholes, to be lost and retrieved at the next cyclical return. They sound like old myths, confirming what Walter Benjamin called the mere exhibition value of the arts.
Using words like brushstrokes, placing them upside down or right-side left, or in a spherical perspective, the writer paints and types and handwrites, following in any case the visual rules of concave-convex space, and accompanying the surface's own swelling and fading away.
If there is no order, there is not even a broken order (as it happened in the avant-gardes), as continuity is granted by the perspectival and tactile qualities of the text.

And Alessandro De Francesco's videos confirm and reinforce the idea of the double direction taken by writing: the text is literally set in motion, swollen first by the image, then by the fisheye lens, and lastly by the increasing invasion by the text-image of the whole screen, which overcomes its flatness and runs into the spectators like the arrival of the train by the Lumiére brothers.

AW1_4, a paper work of digitally printed augmented writing, is turned into a fisheye digital video in which the invasion of the visual scope triggers in our minds that "imaginary museum" that images contain and unleash on occasion (if we follow Aby Warburg's *pathos formulae* or Henri Focillon's inner life of forms), recalling and reinterpreting paintings such as those by Robert Motherwell, Cy Twombly, and Emilio Vedova—further "augmented" by the pervasive noise in the background, made up of both fragmented voices from YouTube videos and sounds recorded from real life.
By occupying all space in quasi-anamorphic multiplication of its visual structure, the text-image claims for itself a total attention, and even becomes a kind of threatening entity for a few seconds, just black ink and white paper, hinting at the mirrored presence of the camera.
After the avant-gardes, the writer takes a further step: instead of deconstructing meaning, or revealing its processes, challenging and frustrating the reader, he plays with the infinite possibilities of its self-organization and superimposition. He turns backward to the Renaissance representation of space and plunges forward to catch digital suggestions.

Now, who is the reader of these texts? Having been previously challenged by the avant-gardes, the reader is ready to indefinitely flow within spatial words, ready to survive the lack of those references that the previous generations of writers had already subtracted from him, a readiness enhanced on the web.

Alessandro De Francesco. AW1_4.

A film of this piece by Alessandro De Francesco can be played with the Aurasma app (iPhone & Android). Download, register and then follow the 'organseverywhere' channel. With the app open and scanner on, place the camera over the image. A film will begin to play.

He is more and more skilled in mastering the screen with pointers and touchpads, in finding unpredictable connections and in jumping from one site to another, superimposing times and places. His multitasking ability allows him to be absorbed by the spinning whirls. He does not worry about his own vulnerability. But after all, when beforehand was he ever the master of his own reading or watching?

A Renaissance painting was meant to invite a multitasking spectator to be absorbed by the simulated 3D, contemplating a world that he did not contribute to make or to make meaningful. According to the Renaissance canon, straight and curved lines form a closed totality, an isomorphic space in which nothing moves. The viewer of Renaissance art was treated as a mere witness of meaning, upon which he was requested, at best, to meditate.

Here we have a similar relationship between the reader-spectator and the curves, geometric figures and frames of this 'augmented' 3D simulation, and we are similarly asked only to witness and respect what appears on the surface. However, in Alessandro De Francesco's work any possible totality or centripetal vanishing point is blurred: the sense of what we detect is exactly that swelling, waving and fading away of communication as such. Now the reader-spectator is in charge of becoming himself a user who actively decides to be turned into a used (passive) witness. This is a reader who finds plenty of languages on the web and breaks through the wall of incomprehension through images, music, and automatic translators.

The reading elicits a distance, both semantic and physical (the rounded and swollen 3D text becomes unreadable in the convex sides and seems to continue in the back of the swollen form, betraying the 'new line' rule).

And conversely, from that extreme detachment some emotion is triggered, some tenderness for those half-sentences and extrapolated words that used to mean much and were the building blocks of a civilization, and now resound as traces of bygone illusions or myths, like *Childhood*, *Manhattan*, or *War II*—floating, swelling or rainfalling like fleeing but tangible memories.

Note that all objects must be tracked (AW1.7).

What are these objects? They are us, tracked by the artifacts that exist out there and nonetheless enter our very bodies and minds, revealing themselves as instructors and masters of our actions (and wasn't this always the case?).

A sense of transition, from one corner of the page to the other, from hand to digital, from screen to paper, is ingrained in our thoughts and becomes a stable condition, a constant translation where the source language is always missing and the target language never coincides with the final assignment of the information.

Where is matter in this structure of writing and thinking? Matter is what survives the transition: paper and ink. But, being what contains all the motion and all the suggestions, it is *living* matter, *materia signata*, or *force vive*, nothing inert and therefore nothing substantial. Rather, it is always impressed with another form,

with another sense, always giving in to its constant morphing.
Suggesting at the same time utter weight and utter weightlessness, being both persistent and floating, like Gian Lorenzo Bernini's marble folds, matter exerts the power of the surface, in its tireless yielding to the centrifugal energy of augmented writing.
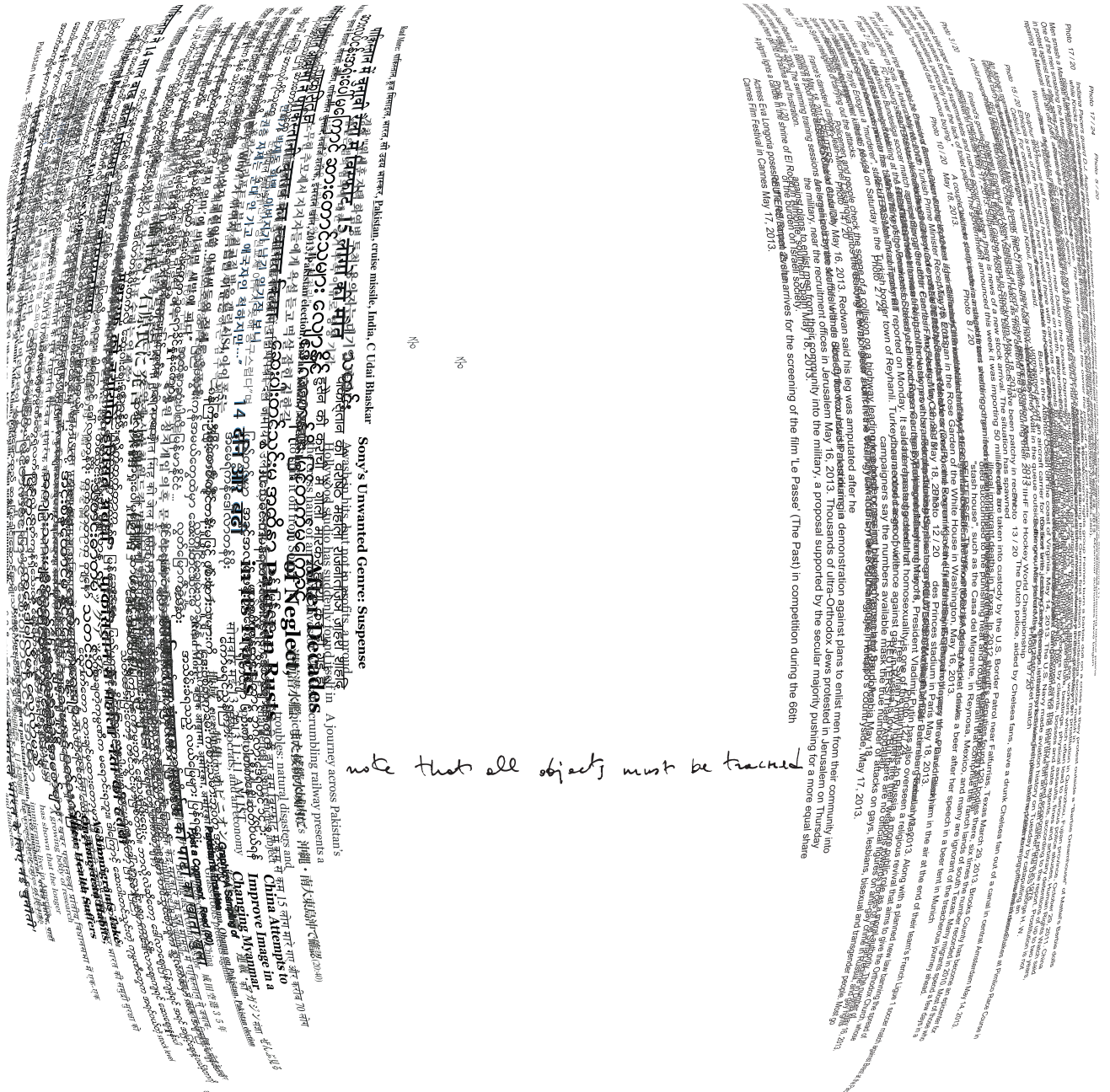
note that all objects must be tracked
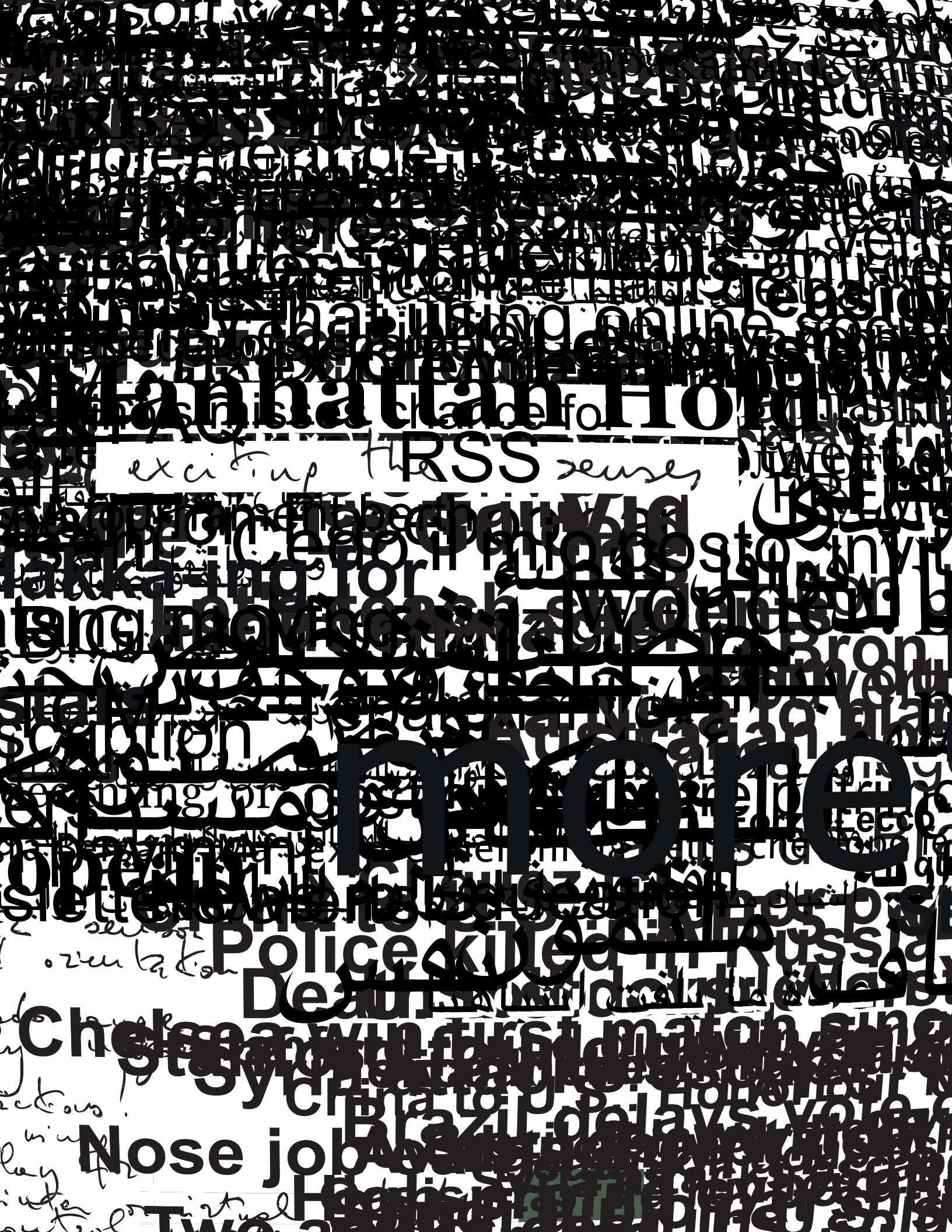
Manhattan Hotel

exciting the senses RSS

more

Police
Death

Chelsea win first match

Nose job

Software is the Message

Lev Manovich

Did McLuhan "miss" computers? In his major work, *Understanding Media: The Extensions of Man* (1964) the word "computer" appears twenty-one times, and a few of those references are to "computer age." However, despite these references, his awareness of computers did not have a significant effect on his thinking. The book contains two dozen chapters, each one devoted to a particular medium—which for McLuhan ranged from writing and roads to cars and television (the last chapter, "Automation," addresses the role of computers for industrial control, but not its other roles).

The reasons for this omission are not hard to understand. McLuhan's theories were focused on the media that were most widely employed by regular people during the course of human history. In 1964, the popular media for representation and communication did not yet include computers. Although by the end of the 1960s computer systems for design, drawing, animation and word processing were also developed (along with the first computer network that eventually became the Internet), these systems were only used by small communities of scientists and professionals. Only after the introduction of the PC

in 1981, these inventions started to be disseminated to the masses.

As a result, *software* has emerged as the main new media form of our time (I write "software" rather than "digital computers" because the latter are used to do everything in our society, and often their use does not involve software visible to the ordinary users—like the systems inside a car). Outside of certain cultural areas such as crafts and fine art, software has replaced a diverse array of physical, mechanical, and electronic technologies used before the twenty-first century to create, store, distribute and access cultural artifacts, and communicate with other people. When you write an article in Word, you are using software. When you are composing a blog post in Blogger or WordPress, you are using software. When you tweet, post messages on Facebook, search through billions of videos on YouTube, or read texts on Scribd, you are using software (specifically, the category referred to as "web applications" or "webware"—software which is accessed via web browsers and which resides on servers).

McLuhan's theories covered the key "new media" of his time—television, newspapers and magazines with color photos, advertising, and cinema. Just as these mediums, software medium took decades to develop and mature to the point where it dominates our cultural landscape. How does the use of professional media authoring applications influence contemporary visual imagination? How does the software offered by social media services such as Instagram shape the images people capture and share? How do particular algorithms used by Facebook to decide what updates from our friends show up in our News Feed shape how we understand the world? More generally, what does it mean to live in a "software society"?

In 2002, I was in Cologne, Germany, and I went into the best arts & humanities bookstore in the city. Its new media section contained hundreds of titles. However, not a single book was devoted to the key driver of the "computer age": software. I started going through the indexes of book after book: none of them included the word "software" either. How was that possible? Today, thanks to the efforts of my colleagues in the new academic field of "software studies," the situation is gradually improving. However, when I looked at indexes of works of key contemporary media theorists published during the last year, I still did not find entries for "software." Software as a theoretical category is still invisible to most academics, artists, and cultural professionals interested in IT and in its cultural and social effects.

Software is the interface to our imagination and the world—a universal language through which the world speaks, and a universal engine on which the world runs. Another term that we can use in thinking about software is that of a dimension (think of the three dimensions that we use to define space). We can say that at the end of the twentieth century humans have added a fundamentally new dimension to everything that counts as "culture" — that of software.

Why is this conceptualization useful? Because "cultural software" is not simply a new object—no matter how large and important—that has been dropped into

the space which we call "culture." And while we can certainly study "the culture of software"—programming practices, values and ideologies of programmers and software companies, the operations of Silicon Valley or Bangalore, etc.—if we stop there, we will miss the real significance of software. Like the alphabet, mathematics, the printing press, the combustion engine, electricity, and integrated circuits, software re-adjusts and re-shapes everything it is applied to—or at least, it has such a potential. Just as adding a new dimension adds a new coordinate to every point in space, "adding" software to culture changes the identity of everything that a culture is made of. In this respect, software is a perfect example of what McLuhan meant when he wrote that the "message of any medium or technology is the change of scale or pace or pattern that it introduces into human affairs."

However, the development and current hegemony of software does not simply illustrate the points McLuhan made fifty years ago. It also challenges these ideas. Here is how.

In the first few decades, writing new software was the domain of professionals. Nonetheless, already in the 1960s Ted Nelson and Alan Kay proposed that computers could become a new kind of cultural medium. In their paradigm, the designers would create programming tools, and the users would invent new media using these tools. Accordingly, Alan Kay called computers the first *metamedium* whose content is "a wide range of already-existing and not-yet-invented media."

This paradigm had far-reaching consequences for how software medium functions today. Once computers and programming were democratized enough, some of the most creative people of our time started to focus on creating these new structures and techniques rather than using the existing ones to make "content." During the 2000s, extending the computer metamedium by writing new software, plugins, programming libraries and other tools became a new cutting-edge type of cultural activity.

For example, GitHub, a popular platform for sharing and developing open source tools, houses hundreds of thousands of software projects. Making new software tools is central for the fields of digital humanities and software art. And certainly, the key "media companies" of our time such as Google, Facebook, or Instagram do not create content. Instead, they constantly refine and expand their software tools, which are used by hundreds of millions of people to make content and to communicate.

Thus, it is time to update *Understanding Media*. It is no longer the medium that is the message today. Instead, "the software is the message." And continuously expanding what humans can express and how they can communicate is now our "content."

Keep Calm and Be Counted

Electronic Monitoring's evolving effects across scales of time and space

Jordan Geiger, text and a conversation with Raphael Sperry
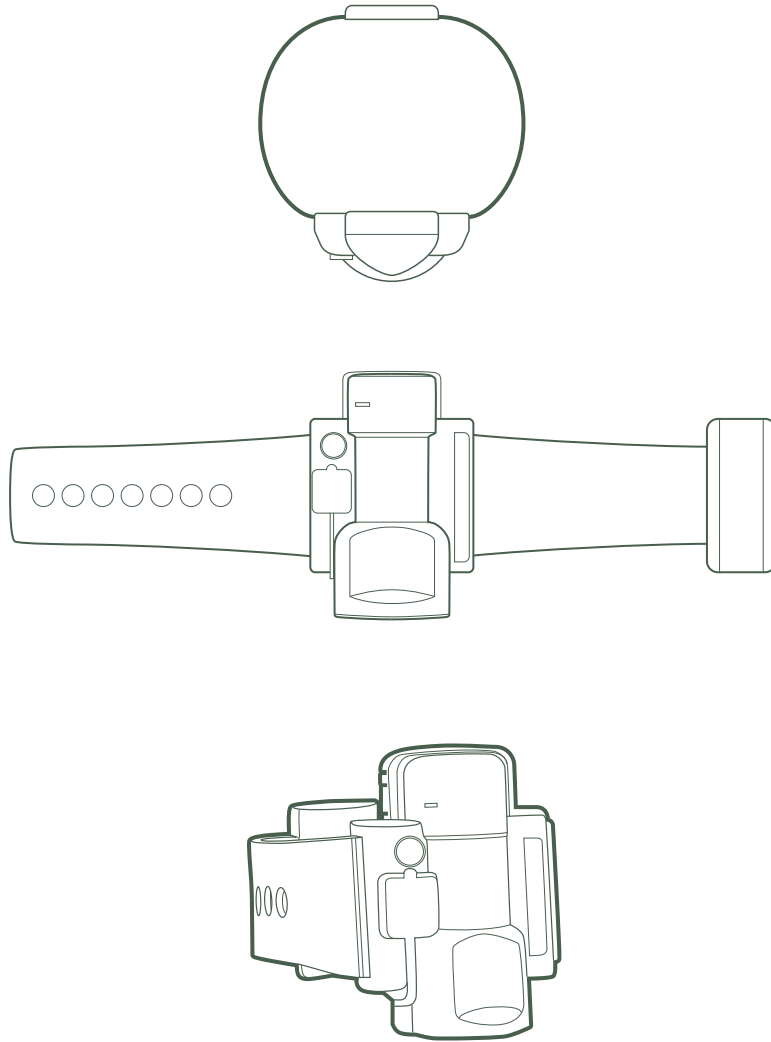
The following is a short description of some origins of "electronic monitoring" (EM) and its architectural and corporeal effects. It is followed by a discussion of EM's uses and abuses, conducted over email with Raphael Sperry, President of Architects, Designers and Planners for Social Responsibility.

Whither Calm?

Among all things internet-of-things (IoT), one inveterate form of wearable technology stands out and multitasks in ways deserving of our attention. Electronic Monitoring (EM) ankle cuffs like the BI ExacuTrack perform architectural and corporeal feats that pre-date those of our most popular consumer electronics, and still gesture toward where our bodies' relations to computing may be going. Increasingly worn by parolees and persons awaiting trial, these relate not only to the bodies of the accused, but to the spaces and people around them in ways that were both foreseen and unforeseen.

EM seems to be an insidious payback on computer scientist Mark Weiser's anticipation and promise of ubiquitous computing: that it would grow invisible and fade into the background. Weiser's 1991 article, "The Computer for the 21st Century," related cases of innovation and shared creativity emerging at the Xerox Palo Alto Research Campus (PARC), so-called pads and tabs and badges that would free us to direct our attention to more important things than reporting our location or opening a door. Tellingly, Weiser and his colleague John Seely Brown[1] also referred to this coming mode of computing as "calm." By this, they meant that the invisible proliferation of sensors and actuators, of code and data, in our buildings and cities would not tax our attention with visibility or a conscious interface. Instead, they would fade into the background. Calm, in a sense, was the alternative not to "nervous," but instead to "needy." A world of calm computing, Weiser and Seely Brown seemed to suggest, was one that had some self-sufficient independence of us. As those wearing the anklet cuff learn, though, calm is neither passive nor neutral, and not without a subject: rather, calm technology effects what we might call "calm bodies moving within vigilant spaces and times."

The ExacuTrack is the most widely deployed of GPS-enabled anklets, the basis of EM's rapid growth in the US penal system. Its proponents have much to praise in its relation to incarceration. Architecturally, socially, financially, administratively, the small device purports to relieve our overfilled prisons and promises safe reintegration into society for parolees, meanwhile transferring the cost and responsibility for incarceration to the parolee and to private corporations respectively. The anklet seems to offer something for everyone, be they calling for prison reform or deregulation. What operations does EM effect on space, time and bodies? What role does it play in a neoliberal economic structure? Where might "calm" be leading?

Architectural Inversion

Alongside efforts to stem architects' complicity and contribution to the creation of spaces for execution and torture,[2] all forms of prisons continue to expand in the United States. Not despite but perhaps because of this, EM has grown as well. Although its proponents often describe its potentials for moving people out of prisons, EM instead can be understood as extending the space of prisons; outsourcing their program to urban space and private homes; and, by their punishing cost to probationers, as leveraging the continued full capacity of prisons.

EM has been described as bringing about an "open air panopticon."[3] Referring to Jeremy Bentham's prototypical prison design, and its familiar analysis by Michel Foucault as an instrument for placing the prison guard within a prisoner's very mind, this description of EM conceives it as a kind of anti-matter—or rather, a dark matter[4] for the prison industrial complex. As it proposes a dissolution of prison architecture, the object instead just turns incarceration inside out, inverts its space so that the city is a calm prison of sorts. Further, as it enables parolees to walk the streets amongst other citizens, it inspires the creation of crowdsourced maps of sex

1—
Mark Weiser and John Seely Brown, "Designing Calm Technology," (Palo Alto: Xerox PARC, December 21, 1995).
2—
For an account of the story around ADPSR's proposed rule 1,402 to the American Institute of Architects, see Mimi Zeiger, "Tough Cell: architects' involvement in prison design" in *The Architectural Review*, February 2, 2015.
3—
Graeme Wood, "Prison without Walls," http://www.theatlantic.com/magazine/archive/2010/09/prison-without-walls/308195/. Retrieved on 16 Jan 2016.
4—
As Sperry points out, "dark matter is like regular matter, only it can't be seen except through its effects on other things."

Plan of Jeremy Bentham's archetypal Panopticon and its inversion, an orthographic diagram of EM's shift from centripetal to centrifugal orientation of the spaces of incarceration.
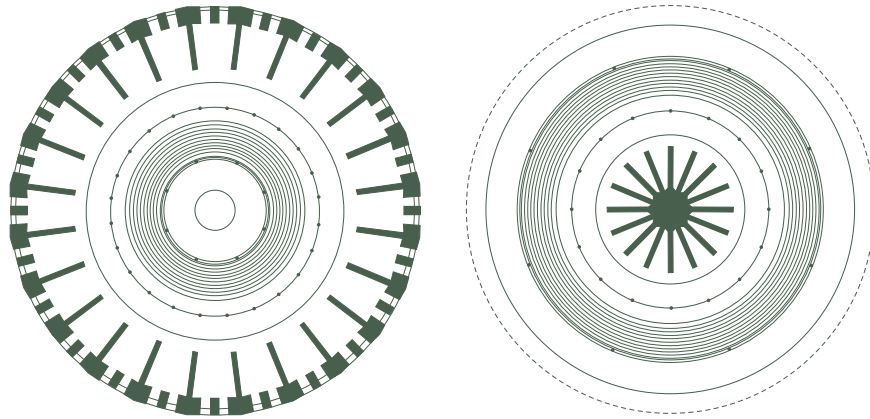
5—

These are plentiful now, drawing on publicly accessible big data sets from sources like *Megan's Law* in California http://www. meganslaw.ca.gov, and feeding private concerns with names like *Family Watchdog* http://www.familywatchdog.us or *Criminal Watchdog* http://www.criminalwatchdog. com/neighborhood-watch/. See also the gunfire detection site *ShotSpotter* http://www. shotspotter.com which represents reports of urban gunfire—seemingly innocuous, but possibly meaningless.

6—

Jacob Reidel recounts for example the Vernon C. Bain Correctional Center at Hunts Point, New York. Jacob Reidel, "Shipping Out," in *CLOG: Prisons.* (New York, N.Y.: Clog, 2014).

7—

Rachel Swan, "Jail To-Go: Ankle Bracelets Could be the Next Great Law Enforcement Tool, if the City Doesn't Get Defeated by Data." May 21 2014 on *SF Weekly* http://www.sfweekly. com/sanfrancisco/jail-to-go-ankle-bracelets-could-be-the-next-great-law-enforcement-tool-if-the-city-doesnt-get-defeated-by-data/ Content?oid=2949655&showFullText=true retrieved on Jan 16, 2016.

8—

This ambiguity was epitomized as Martha Stewart wore it—and got caught by it—defying house arrest after a conviction for insider trading. To this we can append a growing list of fame and infamy in public figures who have been fitted with the anklet, a sort of contemporary star map of our times. See James Kilgore, "The Rise of Electronic Monitoring in Criminal Justice." CounterPunch: April 30, 2012. http://www. counterpunch.org/2012/04/30/the-rise-of-electronic-monitoring-in-criminal-justice/.

offenders and other ex-cons.[5] How to understand the complex spatial and temporal performance of the ExacuTrack in social and political terms? How does EM alter the prison type if not architecture's status more generally? How does it exact selective punishment on bodies and on spaces of the city, even if it appears as a placeless, decidedly anti-ergonomic device?

Incarceration outside of prison architecture has some history in "non-building" forms that skirt certain regulatory or financial constraints, such as vessels permanently moored on an urban edge.[6] Yet electronic monitoring really alters the space and time of incarceration in ways that have not been achieved previously. To begin with, GPS-based anklets work on "inclusion zones" and "exclusion zones"—places where a parolee is perpetually monitored for leaving a safe area or entering a prohibited part of town (where, say, a restraining order is in place). But they also act temporally with "inclusion times" and "exclusion times" to enforce curfews and to prod wearers to do their jobs. As has been noted, these are not monitored in real time, because they can't be. "Case managers receive a stack of daily reports on convicts' movements, which they can scan for peculiarities—but they aren't constantly sitting in front of a computer screen, following dots on a GPS map."[7] The reports yield maps, but uninterpreted and often unverifiable ones. Further, the mappings that they inspire now proliferate as traced by (and under the eyes of) the general public, similarly unverified. Setting aside the logistical challenge of processing a surfeit of incoming data, we may consider the ethical and teleological ones.

Here are the first shifts from Jeremy Bentham's Panopticon and its later Quaker cousin in Philadelphia's Eastern State Penitentiary. The latter is considered perhaps the first panopticon built in this country, steeped in ideologies of reform through hard labor: unlike the British original, the American debut had a tiny work yard for each cell outfitted with tools and a bible. Today, EM's role extends the country's contemporary logic of incarceration: not toward reform, but to constant spectacle, to financial sanction, to shaming and sometimes to the curious vanity of being worn.[8, 9]
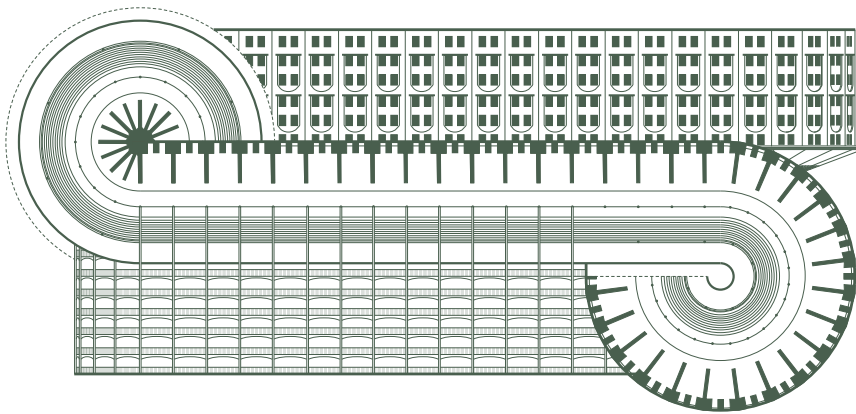
A continuous peel of interior and exterior surfaces, unrolling the enclosures of conditions for control and observation.

The anklet conditions things like the space and time of schools[10]—not for the protection of students from potentially predatory citizens at large, but from one another. Now evidence suggests that the prison swells not merely beyond single authorities with transparent oversight, but to a web of geopolitically expanding participants and controls. In some instances,[11] purview already extends beyond the city, to the entire planet, as immigration and deportation authorities turn to the device for assistance in determining compliance. Recently, EU committee ministers have adopted new principles[12] to redress the lack of standards for administering EM and ensuring things like data privacy and public oversight—yet the implementation and further review of EM's effects remain to be seen.

EM's complex spatial performance is part of a vast and multi-scalar shift in which the architecture of incarceration, whether panoptic or not, is more than merely inverted; the spaces and times of the city, if not the nation, are fundamentally mutated. Since tracking is based in part on GPS, and jurisdictions are increasingly subject to legal maneuvers like gerrymandering and migration policy,[13] this mutation has no specific dimension. Its reach is across scales, from the single body to the planet.

Bodies and Byproducts

What unseen economics underlie the anklet, as various industries, technologies and administrations outsource incarceration to the domain, but not the shared oversight, of the polis? The adoption of GPS anklets represents an array of partners, beginning with the GEO Group and its subsidiary BI Incorporated, which manufactures the anklet in the US for over 200,000 people per year; GEO in turn, is also a major operator of private prisons in the United States. As a result, its profit structure ensures business whether it manages inmates before, during or after a prison term.

We might consider this arrangement a high-efficiency economic structure for the given circumstance, where EM offers a panoply of chances to monetize the incarcerated. Those released under the condition of wearing an EM device have

9—
"While house arrest is no doubt preferable to a stay behind bars, many people upon release are being put on monitoring as an additional means of constraint. In such cases, the use of EM is extending the length and intensity of a sentence, rather than relieving it. Electronic monitoring is often conflated with prison reform, but in most cases, it is used to intensify punishment." Lisbet Portman, "Change of Scenery: The Architectural Reach of Electronic Monitoring" in *Scapegoat: Architecture, Landscape, Political Economy - no.7 Incarceration*. (Toronto: CreateSpace, 2014), 121.
10—
voiceofthemonitored.files.wordpress.com/2012/10/dissent-article-on-em-2012.pdf.
11—
www.sfbg.com/politics/2010/03/16/who-profits-ices-electronic-monitoring-anklets-0.
12—
voiceofthemonitored.com/2014/03/24/european-committee-of-ministers-recommendations-on-electronic-monitoring/
13—
In the Canadian context, see Tings Chak's 2014 works "Undocumented: The Architecture of Migrant Detention," which has taken form as a graphic novel and exhibition.

already entered a loop of (literal, physical) pay structures: not only are many of the US's private prisons owned and operated by the GEO Corporation, but halfway houses that purport to reintegrate the incarcerated into society are as well. With BI as a subsidiary, GEO continues its earnings by collecting fees from those wearing an ExacuTrack. This is as much explainable by the logics of redundancy in the prison industrial complex as by the mores of punishment that prevail today.[14]

At the scale of a single subject, the bargain to exit prison with an anklet carries a daily charge paid by parolees themselves, thereby not merely decongesting prison beds but also offloading costs to the convicted. It goes further, as the accounting for this alternative to current prison administration costs get mobilized to elide and obviate larger ethical and societal questions.[15] And so the anklet proves itself not merely spatially and temporally nimble, but also lucrative and redundant in its profits.

This chain of byproducts extends to data monetization, and also represents a recent sort of "technology transfer." By this we can understand how technologies for one market sector find new life in another. There are historical precedents to today's migration of carceral monitoring equipment into the recreational use of consumers. As Paul Virilio has recounted, the same metal detecting portals that found their way into French maximum security prisons by the 1980s had already been long in use in French airports.[16]

GEO practices aren't the focus of our concerns per se, and not only because the company faces new competitors.[17] Rather, IoT products tend to blossom wherever incarceration was formerly effected only through physical structures. This is due in part to the partnerships of private concerns and governments that yield each new carceral technology as an extension of the contemporary ethics of punishment. JPay, the self-proclaimed "home for corrections services," handles money transfers, consumer electronics, and information management to inmates in prisons around the country. Its recently introduced tablet computer, the JP5 mini, customizes an Android operating system to prevent other operating systems from being installed. This enables the device to be monitored by prison staff for reading and approval of all incoming and outgoing communications. The device is pitched by JPay as serving "inmate rehabilitation and education," but it also primes the inmate for their data monitoring on the outside. All this relies on lucrative participation of various state legislatures, satellite service providers, civic Departments of Corrections, and last but not least, the individual subjects who wear these devices.

The growth of GPS anklet monitoring also sparks a kind of knowledge industry with the legal academic research published in the *Journal of Offender Monitoring*.[18] The tether that encircles a prisoner, in short, is now made of many strands. In print and online, one finds a growing body of literature, most of it from law.[19]

Consider the contemporary status of the body as a monitored and surrounded thing. In this context, what is to be made of the quantified self movement, which outfits bodies with health monitors of different stripes and stylings? What

14—
"Proponents of electronic monitoring hew to a doctrine of personal responsibility; they believe restitution—even to a jailer or taxpayers—is the first step toward recognizing one's misdeeds... Progressive politicians roundly support the devices." Rachel Swan, "Jail To-Go."
15—
www.slate.com/articles/health_and_science/ human_nature/2005/05/call_my_cell.html
16—
Paul Virilio, "The Overexposed City" in Paul Virilio, *Lost Dimension* (Cambridge, Massachusetts: Semioetext(e), 1991), 12-14.
17—
SuperCom, based in Israel since 1988, entered the US market in 2014. Its many product lines range from EM to secure payment, e-office, healthcare and parking management. Some of their technologies are used across all of these uses, showing a sort of agnosticism to the "calm."
18—
www.civicresearchinstitute.com/jom.html.
19—
voiceofthemonitored.com/about/.

differences are to be perceived between the BI anklet and a Fitbit? Here we confront a cultural question as the decision to trade biometric privacy grows decreasingly startling in everyday life.[20] Is some Hudsuckerian delirium to be found or forecast in EM's grip on the body and in the diagram of a scaleless circle?

From the economic to legal, spatial and corporeal orders, we can now see a growing set of concentric circles widen outwards from the GPS anklet. Originating in the human body and extending around the globe at shifts in scale, the morphology of incarceration now leverages a pervasive computing technology to supplant Bentham's radiating arms with the endless loop of an encircling boundary.

Jordan Geiger: What spatial effects are to be anticipated now thanks to EM? I described a geography of concentric circles of information centered on the body and eventually reaching an international dimension, as with immigration and deportation proceedings. What's your take?

Raphael Sperry: EM will reinforce the already existing geography of urban ghettos (see Loïc Wacquant, the UC Berkeley sociologist, on the link between the ghetto and "hyperincarceration"). If one were able to map where EM "inclusion zones" most heavily overlap, the result would be unsurprising: it would be poor neighborhoods heavily populated by people of color where opportunities for employment and even decent housing are scarce, where violence and police activity are already heavily concentrated. Will the inclusion of EM technology—and the drain on individuals' financial resources to pay for it—do anything to address the already well-known problems of American ghetto communities? More likely, by rendering the rest of the city an "exclusion" zone, it will reinforce patterns of legalized discrimination and racial segregation that have yet to be dismantled.

JG: I also think about the transnational question—the expansion of inclusion zones beyond cities and their ghettos, just as the technology and the reach of its corporate structure suggests. EM has also a strange relationship to a history of surveillance beginning with the panopticon. Some goals remain and others have changed and hardened.

RS: Surveillance was supposed to help discipline and reform offending people through forcing them to internalize a regime of self-control modeled on an exterior regime of control. Ironically, the actual design of the panopticon—to achieve direct human surveillance of prisoners at all times—did not become widely realized in prison design until the advent of "podular" prisons in the late 1970s in the U.S., the same time that CCTV began to promise an additional form of technologically-enabled constant supervision that might serve the same function. As many cases of abuse by prison guards caught on videotape in prisons of all design types demonstrate, however, the prospect of surveillance does not do much to restrain people's actions. All too many video cameras have no one watching them, or at least no one who is prepared to do anything about what they see. So since surveillance by camera did little to fulfill the dream of the panopticon, there's good reason to doubt if EM will be more successful.

20—
www.foxnews.com/tech/2013/11/04/
biohacker-implants-chip-in-arm/.

31

The surface of inscription at a larger scale: overlay of city street grids with multiple inclusion and exclusion zones, curfews and other time codes: the urban plan grows a choreography of personalized control routines.
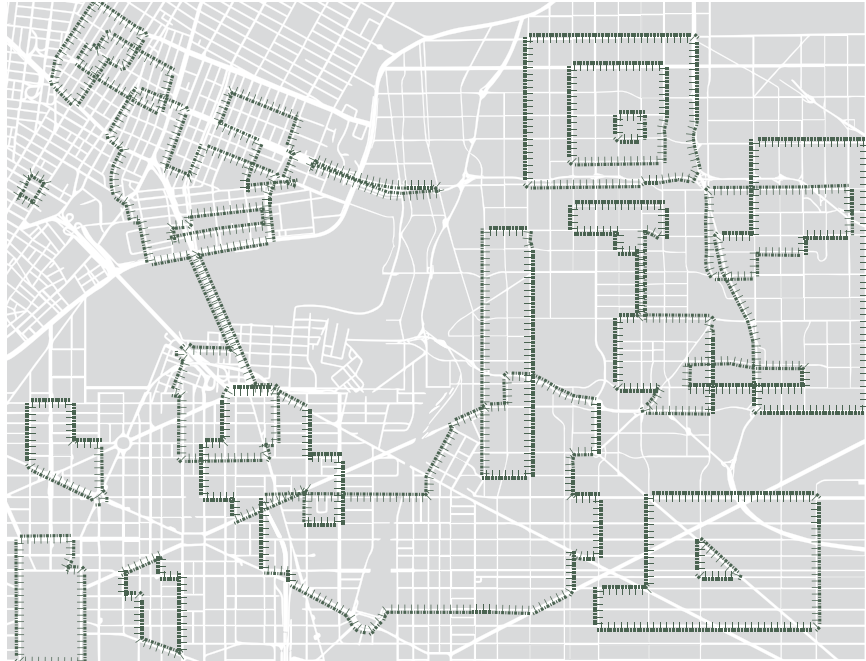
In general, I think that these technologically mediated systems of control are still very subject to human intervention. The example you raised from Paul Virilio, of the use of metal detectors in prisons, has been frequently circumvented, as evidenced by the widespread presence of contraband in prisons. Very often, the smuggling is carried out by prison guards themselves: the collusion of the metal detector operator defeats any improvement in the technology. In the case of EM, the devices generate so much data that the question becomes who is responding to which parts of it, why, and how. Not only is data not neutral, but in the American private for-profit implementation of EM, the corrupting aspects of the profit motive have moved from "informal" arrangements to a central feature of the program. Data will be accumulated to further the profits of those in charge of the system, not directly for public safety or for the rehabilitation of those on the monitors.

JG: This is but one of many cases in which the rhetorics of Big Data meet two logical challenges. On the one hand, there are the unresolved technical and ethical questions you raise around data ownership and interpretation. Virilio's point was more to raise the irony of the tech transfer, to address the fact that this particular technology had moved from spaces of motion (airports) to stasis (prisons), and not the other way around as one might presume. Obviously both were marked by authoritarian control. Today, EM shows how surveillance has moved from detection to data collection and interpretation.

RS: This is also an interesting challenge to the widely-held notion that "information wants to be free:" what does that statement mean in this context? EM information isn't generally available to the person wearing the monitor, and the companies

that own it aren't (or at least shouldn't be) free to use it any way they want either. This kind of forcibly collected personal data actually undermines freedom by its very existence—which is the point: to use information to replace prisons. I am often struck by the shallow libertarianism of the tech sector; EM seems to really showcase a lot of those problems.

JG: Will EM change the politics of invisibility of the carceral system?

RS: One of the central features of the current system we have of mass incarceration is how it is structured to render the incarcerated population invisible. The remote locations and high walls of prisons are perhaps the most obvious aspects of a much broader network of stigmas and restrictions that keep the incarcerated and the formerly incarcerated outside the bounds of mainstream social and civic life. (As one formerly incarcerated person remarked to me, it's obvious that this system is racially and class structured: no one talks about Martha Stewart as an "ex-convict.")

In this context, EM seems to promise a reinclusion in civic life for those found guilty of crimes, but I'll believe that when I see it. One of the chief forms of exclusion has been the use of questions about criminal history to discriminate against people seeking jobs, housing, etc. EM has the potential to automate discrimination on the basis of criminal records. One of the most successful means of rolling back discrimination has been through "ban the box" campaigns, several of which have been won by organizations of formerly incarcerated people. It is not uncommon for parole restrictions associated with EM to include a prohibition on associating with other people with criminal histories; if widely implemented, this could criminalize organizing against criminalization itself.

JG: Yes, there is the Miami case that Lisbet Portman recounts.[21] The rules enforced by EM limited probationers to only living under a bridge. To intensify the absurdity, once word got out that parolees were living under the bridge, a small piece of land nearby was designated as park and even that space was no longer permissible. EM effectively leveraged expulsion of citizens who had been complying with restrictions and abiding by the conditions of their release after imprisonment. EM ensured continuous punishment and alienation.

RS: It seems like technology actually has the potential to take us into the past rather than the future. Banishment hasn't been a criminal sanction for centuries (if not longer), but that seems to be exactly what was achieved in Miami.

JG: What do you make of the quantified self question? The opt-in and opt-out is essential.

RS: This question seems so basic, but the simple fact that one has a choice of wearing a Fitbit or not sets it worlds apart from EM. This mirrors the distinction that sets prisons apart from other places: unlike a home, school, workplace, etc. you cannot choose to leave a prison. The liberal formulation of punishment is

21—
Lisbet Portman, "Change of Scenery: The Architectural Reach of Electronic Monitoring" in *Scapegoat: Architecture, Landscape, Political Economy - no.7 Incarceration*. (Toronto: CreateSpace, 2014).

that the prison's restriction on liberty is the punishment itself, not the all-too-often degrading or dangerous conditions, which are supposed to be unintended aberrations. Historically, however, the United States has not been able to operate prisons that come close to the liberal ideal. There are similar issues with EM and how it transcends the ostensible simplicity of its geofencing operations. You must opt-in to the geographical restrictions, but then you are also involuntarily opting in to contributing to the profits of the GEO Group. Or if the technology fails, you are treated like a criminal, not a consumer. A faulty battery can get you sent to jail, rather than on hold with customer service.

JG: But how does the quantified self render the future of EM? In one of James Kilgore's essays, he seems to predict that the IoT's birthing of the quantified self will render EM obsolete: we'll all be reporting, everything, already. Are we all, as the title of this article suggests, starting to "keep calm"?

RS: On the one hand, as we were just discussing, there is an essential difference between opt-in and opt-out scenarios, but over time those may fade away. Dave Egger's "The Circle" is only one recent vision of a coming world of total transparency that appears at first as an opt-in but rapidly becomes one that people cannot avoid opting out of due to social pressures. As quantified self technologies that are currently considered optional—think social media—become more essential and regulated (as happened, say, with electricity), their pervasiveness might approach the level of calm computing. Then perhaps future criminal sanctions would include restricting or even eliminating one's social media avatars. It is already acceptable in many states to inflict "civil death" as a criminal sanction through banning convicted criminals from voting or serving on juries (among other things); if the virtual self became more legally incorporated into civic life, that might start to seem like a rational prospect.

JG: How about prospects for progress? Where might we hope to go now that the internet of things seems to be with us to stay?

RS: I'm not sure I like the idea I just came up with here: that criminal sanctions might take place in the virtual world. In some ways, I suppose it already happens and I'm OK with that. For instance, electronic monitoring of bank accounts might be a reasonable way to interdict fraud and simultaneously rein in the power of the financial sector. But the idea that social media becomes an essential part of civic life strikes me as potentially very destabilizing to human relations, governance, and trust. We've discussed how many within the technology sector seem to be fairly naïve when it comes to questions of liberty and privacy; this makes me nervous to accept the internet of things as it is currently advertised.

To the techno-optimist, perhaps a future where prisons are fully replaced by EM and people can reintegrate into their neighborhoods via social media would be the ideal, but from where I sit the possibilities seem far less bright. The communities most afflicted by crime and violence, and by violent policing, are already on the losing side of the "digital divide." For criminal justice, the most valuable progress I
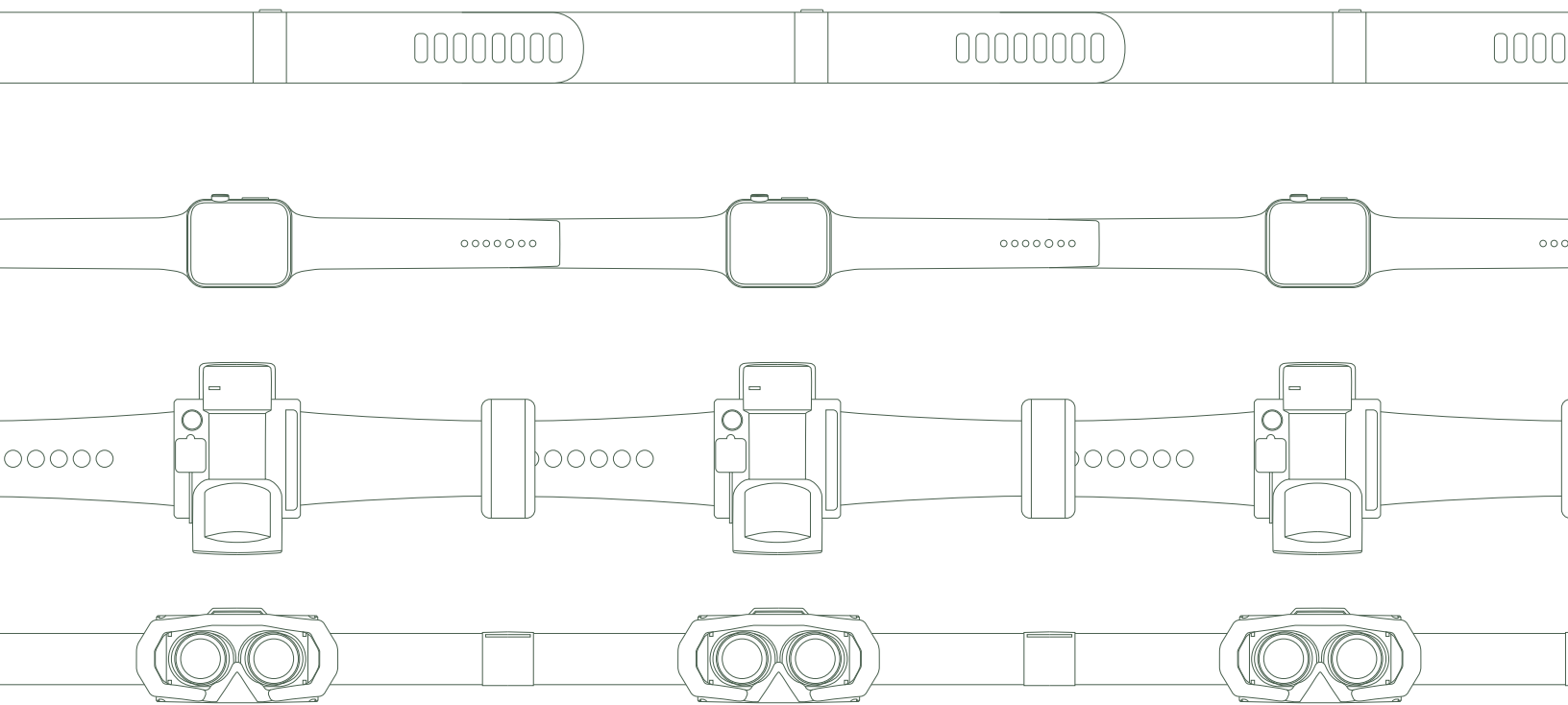
The quantified self and its varied instruments of measure.

see being made is in the evolving practices of Restorative Justice and community empowerment. Human rights are of central importance here, for instance with the recent update of the *UN Standard Minimum Rules for the Treatment of Prisoners*:[22] this kind of progress, which is powerful and essential, does not rely on the internet of things. I can't speak for people who are sitting as victims in a Restorative Justice circle, but even with my imagination I can't see how if I were in that position, and I was faced with someone who had offended me who genuinely wanted to make it right, what use EM would be. After all, the person who offended has to opt in to make Restorative Justice work, so how much use would any technology structured so fully around coercion be?

22—
http://www.penalreform.org/resource/standard-minimum-rules-treatment-prisoners-smr/.

The Living Prosthesis: Limits of Human Bearability

Ling Tan
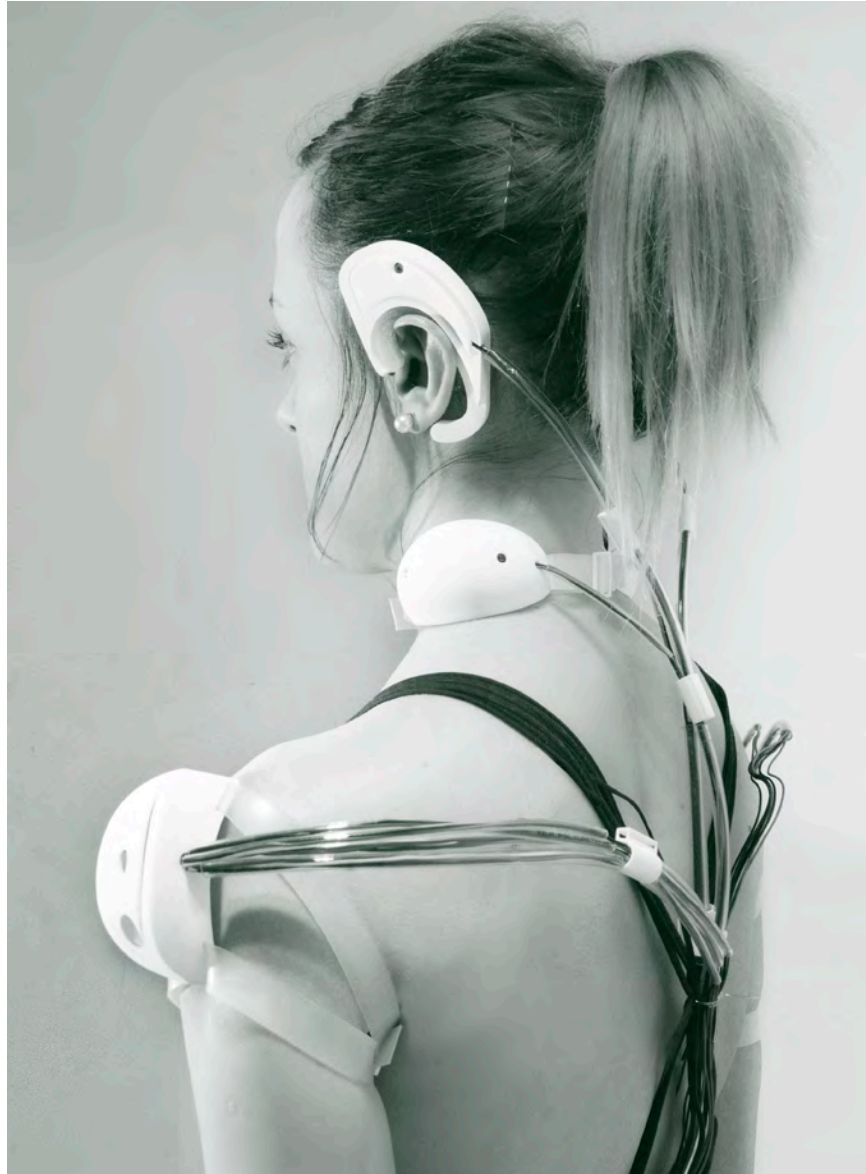
Technology enhances aspects of a user's life and mediates our perception of reality; changing the way we understand the world. The use of wireless networks in mobile devices, for instance, causes us to always carry around a piece of technology that enables us to have access to additional information and to engage in social networking while on the move. CCTVs and wireless location systems also ensure constant surveillance of users by tracking their location in real time.[1] Sensing of bodily data in affordable consumer products like oximeters provides information about one's body in quantifiable measures. Embedded medical devices such as pacemakers, which use sensors to monitor the heart and trigger actuators that regulate its beat, have the purpose of life preservation. What is currently missing is a systemic combination and integration of the disparate technologies that are found attached to or embedded into the human body, one that could point towards

1—
Lev Manovich, "The Poetics of Augmented Space," in *Visual Communication* 5.2 (2006): 219-40.

the wearable and bearable technology that will fulfill our needs in the future. The limit to which human behavior can be altered with such implantable or body-borne devices during interaction with and inhabitation of the environment, is also changing. This raises questions about the infringement of a user's privacy and subjective perceptions, the merging of our virtual and physical spaces, and the ethical issue of implanting such technological devices into the body. When technology becomes invasive, who is in charge, the user or the prosthesis? In the circular exchange of information between human and machine, where both are driven by their own teleological mechanisms, there will be instances where machine dominance and human subservience occur.

Attachment to the Human Body

The relationship between a prosthesis and a user is primarily that of an attachment to the body, or of an extension of the body to supplement a deficiency.[2]
As the prosthesis is used to enhance or counter a weakness in the user's biological body, the technological side of the device could be said to imitate biology, and be seen as a form of substitution. One example might be a deaf man fitted with haptic prostheses to supplement his loss of hearing,[3] or a patient with a prosthetic limb.

In a philosophical sense, the prosthesis is part of an extended mind. As discussed by Andy Clark and David Chalmers, cognition consists of both bodily movements and brain processes, and "does not limit itself within the physical brain or skull".[4] Chalmers uses the term "active externalism"[5] to describe the use of external supplements, such as language or technological tools (for instance, a pocket calculator) that engage bodily movements. In this context, the prosthetic device and the body can act as an external coupling system integral to the cognitive process. As discussed by Mark Wigley, a similar view was held by Sigmund Freud, who had personally experienced wearing a prosthetic jaw for a period of time.[6] Freud sees the body as deficient and defines the mind as the site where consciousness is constructed. In this perspective, the aim of the prosthesis—similar to the natural body and its senses—is to extend the boundaries of the mind and aid in the construction of consciousness.

In an architectural context, a prosthesis is an extension, "an auxiliary organ"[7] that supplements a gap in the main body. Le Corbusier argues that humans are born with insufficient capabilities. We do not have the natural ability to fight predators, to withstand harsh weather, and hunt or fight for food;[8] we tend to forget things easily and we are ashamed of our appearance. Apart from physical limitations— notes Le Corbusier—humans are also not adequately motivated mentally, and are often more interested in leisure than in intellectual or productive work. We are frequently too lazy to carry out tasks that require attention and laborious concentration. Hence we acquire tools such as shelter, clothes, cabinets, food containers, computers and robots to carry out the actions that we are unwilling or incapable of attending to. All these, including architecture, become a form of prosthetic extension of our deficient body.
The notion of prosthesis discussed above describes a symbiotic relation between

2—
Mark Wigley, "Prosthetic Theory: The Disciplining of Architecture," in *Assemblage* No. 15, (1991): 7-29.
3—
Norbert Wiener, "Problems Of Sensory Prosthesis," in *Bull. Amer. Math. Soc.* 57 (1951), 27-35.
4—
Andy Clark and David J. Chalmers, "The Extended Mind," in *Analysis* 58, (1998): 10-23.
5—
Clark and Chalmers, *ibid*.
6—
Wigley, "Prosthetic Theory."
7—
Le Corbusier, *The Decorative Art of Today* (Cambridge, MA: MIT, 1987).
8—
Le Corbusier, *ibid*.

the technological device and its user. Mark Wigley argues that both supplement each other's deficiency. Relating it to the use of a computer mouse,[9] he notes that both the mouse and the user employ the other as a prosthetic extension to access the digital system of the computer. Together, they form an interface to the virtual world. Doug Engelbart, who invented the mouse, indicates that the most functional interface is achieved when the user's central nervous system is able to match the outer environment through his senses.[10]

Therefore, the technological prosthesis evolves with the body, engendering a new form of behavior. Here, the effect of a prosthesis goes beyond the extension of bodies at a specific time; one begins to be affected by a prosthetic device before, during and after usage.[11] Andy Clark and David Chalmers discuss this with regards to the requirement of a reliable coupling system to enable a prosthesis to form part of an extended cognition system. "If the resource of my calculator or my Filofax are always there when I need them, then they are coupled with me as reliably as we need."[12] In order for a prosthesis to form a seamless connection with our mind, that is, the memory of the effect and prosthetic experience matters more than the duration of its actual use. When we become accustomed to the presence of a prosthesis on us, its subsequent removal might incur more deficiency to our body than was experienced prior to its annexation. In the case of medical prostheses, removal might even result in the endangering of life itself.[13]

The Role of Prosthetic Devices From the Past to the Future

Mark Wigley writes, with regard to the invention of the computer mouse, that "a history of 20th century prosthetics can be written in terms of the ever smaller movements of the fingers that have ever greater effects over ever larger domains."[14] Human behavior can also be seen evolving as a result of the introduction of domesticated technological appliances in the 1960s. In the case of the mouse, movement across a horizontal surface is translated into visual motion across the virtual screen, augmenting the user's gestures. Having become a reliable coupling system in the user's perception, the prosthesis can be subconsciously interacted with on a daily basis.

Our engagement with the environment has become more personalized, portable and encapsulated within a non-physical layer that is seemingly attached to the body. This layer—the so-called virtual world— is accessed through computers and prosthetic devices such as mobile phones. Our experiences become mediated as we begin to understand the physical environment through the virtual information layered onto the body's natural sense perceptions.

In order to further domesticate technological prostheses, the corresponding interfaces require progressively smaller movements and fading visibility. Because a user-computer interface is "at once technological and biological,"[15] it involves the alteration of our behavior (expanding the human ecosystem) in order to communicate with the electrical circuitry and signals that create the digital world (expanding virtual environment). Through this, the user and machine can establish

9—
Mark Wigley, "The Architecture of the Mouse," in Oliver Sacks, *The Mind's Eye* (New York: Alfred A. Knopf, 2010), 50-57.
10—
Doug Engelbart, *Augmenting Human Intellect: A Conceptual Framework* (Menlo Park, CA: Stanford Research Institute, 1962).
11—
Wigley, "The Architecture of the Mouse."
12—
Clark and Chalmers, "The Extended Mind."
13—
Ibid.
14—
Wigley, "The Architecture of the Mouse."
15—
Ibid.

a common ground, enabling the user and the digital space to enter each other's world. As a result, prosthetic technology has become more intrusive and pervasive. Intelligent agents that come in the form of technological appliances constantly track the health, mood and safety conditions of their owners,[16] reminding and advising us when to take pills, what to wear or when to exercise— augmenting our private behaviors. The boundary between the user's privacy and the sharing of information for his welfare continues to be blurred.

Prosthesis as Reality Mediator

David Chalmers discusses the term "reality" as dependent on the act of being conscious ("I think, therefore I am conscious").[17] From his viewpoint, reality is the construction of the environment on the basis of individual experiences. Following this account, consciousness is part of the cognitive process. If we relate this to the formation of a reliable coupling system between a prosthetic device and a user as part of an extended mind,[18] it becomes clear that when a prosthesis is fitted onto the body it is granted the ability to affect the user's perception of reality.

From a cybernetic point of view, Heinz Von Foerster defines the term "reality" in relation to the human discovery of things such as language,[19] and claims that these discoveries comprise the user's cognition. As he argues, "it is he (the observer) who invents it, and likewise, when we perceive the environment, it is we (the observers) who invent it."[20] The term is broken down to become an "operation of recursive descriptions"[21] in the user's mind, made possible by continuous discoveries.

Doug Engelbart, who deals specifically with virtual reality as the simulated space displayed by computers, speculates on a future where computer-user interfaces can be established directly through the user's brain, bypassing bodily senses.[22] This suggests that sense perceptions help the mind construct the environment, forming the individual's reality.

If reality is constructed by an individual's perception of the environment, why is it that most commodities produce similar sets of reactions in different individuals? Heinz Von Foerster argues that an individual's reality is made up of a community of other individuals' realities, as we interact with an environment that is comprised of other observers. This establishes a certain common ground, allowing us to have similar associations. He refers to the "reality = community" formula,[23] suggesting that there are other individuals with their own perception of reality in the environment, and that these make up a certain set of similarities. "If you desire to see," he writes, "learn how to act."[24] It can be therefore said that our individual reality is made up of the perceptions acquired while interacting with other individuals in the environment.

This perspective is supported by contemporary theorists such as Lev Manovich, who discusses the contemporary notion of reality as a database, where a user perceives the environment through the "world wide web filled with ever-changing data, images, texts"[25] contributed by users around the globe who engage with the

16—
Stefan Poslad, *Ubiquitous Computing: Smart Devices, Environments and Interactions*. (Chichester, U.K.: Wiley, 2009).
17—
David J. Chalmers, "Facing up to the Problem of Consciousness" in the *Journal of Consciousness Studies* 2(3) : 200-19, 1995.
18—
Clark and Chalmers, "The Extended Mind."
19—
Heinz Von Foerster, *Understanding Understanding: Essays on Cybernetics and Cognition* (New York, Springer: 2003).
20—
Ibid.
21—
Ibid.
22—
Doug Engelbart, *Augmenting Human Intellect*.
23—
Heinz Von Foerster, *Understanding Understanding*.
24—
Ibid.
25—
Lev Manovich, *The Language of New Media* (Cambridge, MA: MIT, 2002).

Reality Mediators.

Top—
Mindwave device detecting brain wave activities.
Bottom Right—
Sound actuator fitted on back on ear.
Bottom Center—
Muscle sensors detecting arm muscle activity.
Bottom Left—
Microchip translating the biodata collected from the user's body.
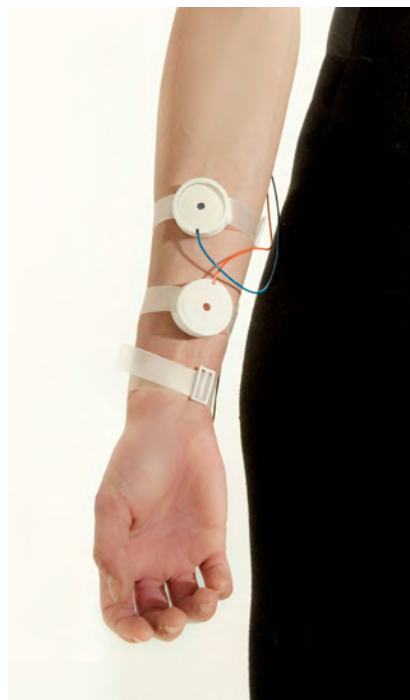
internet. Reality is then defined by the data that the internet provides to the user, which is information created through the realities of other individuals.

Reality can then be concluded to be a construct of the user, made up of sense perceptions and of observations, discoveries and interactions with many different entities. Therefore, our reality can be easily influenced and altered by external stimuli and has the potential to be mediated.

Steve Mann coined the phrase "Mediated Reality" to describe a type of reality experienced through technological devices attached to the body. Such prosthetic devices are used for "augmenting, deliberately diminishing, and more generally, for otherwise altering sensory input." [26] As Mediated Reality involves a wider spectrum

26—
Steve Mann, "Cyborg unplugged: Some ecological issues of wearable computing and personal safety devices," 2010. Available at http://wearcam.org/unplugged.pdf.

40

of bodily senses, it has a greater impact on the user than Augmented Reality, which is commonly experienced only through the user's visual field.

The *Reality Mediators* project investigates the effects of Mediated Reality on the user and on his interactions with the environment. It consists of three sets of design experiments that seek to explore the degree of disruptiveness generated by active goal-based technological prostheses. The three sets of experiments employ three different types of sensors: muscle sensors, brainwave reading devices and Global Positioning Systems (GPS). These are paired separately with four types of actuators, such as muscle stimulators, sound actuators, heat pads and vibration motors, fitted onto different parts of the body. Their cumulative outputs produce an inherently unpleasant effect on the user, which is measured in terms of its disruptiveness to everyday activities.

Prosthesis as an Artificial Intelligence

In a technologically advanced society, surveillance and intervention must form a symbiotic relationship. Lev Manovich contextualized this argument with regards to the emergence of Augmented Space[27] in the form of the internet, wireless location systems, mobile phones and digital displays. "By tracking the users—their moods, pattern of work, focus of attention, interests, and so on— these interfaces acquire information about the users, which they then use to automatically perform the tasks for them."[28]

The future of technological prostheses can then be hypothesized to be that of an artificial intelligence having its own understanding of the environment and of users. Through prolonged periods of coupling with the user, it is able to learn and adapt to his preferences, and starts to dictate the user's reality (perception and autonomy) through the effects produced.

The SEED project surveys the possibility of bearable prostheses as commodities. It speculates on a future where embedded prostheses form a symbiotic relationship with the user's body, taking on and modulating their genes through prolonged periods of growth and interaction.

Limits of Human Bearability

Paola Antonelli defines the term elasticity as "the by-product of adaptability + acceleration."[29] Elasticity is characterized by our ability to embrace fast-changing advancements and to capitalize on them for our own purposes. Our brain develops in a way that adapts to external tools, enabling them to become part of an extended cognition. One example is the sensory prosthesis created by Norbert Wiener, designed to replace loss of hearing with the sense of touch through a device that sends electrical vibrations to the fingers.[30] After wearing the prosthesis for a prolonged period of time, a deaf user is able to mentally translate the language of the electrical vibrations—its rhythm and intensity—and to understand what the speaker is saying.
It can be concluded that our mind is simultaneously elastic and sensitive, in order

27—
Lev Manovich, "The Poetics of Augmented Space."
28—
Ibid.
29—
Paola Antonelli, *Design and the Elastic Mind* (New York, Museum of Modern Art: 2008).
30—
Norbert Wiener, "Problems Of Sensory Prosthesis."

SEED **project by Ling Tan. Have you considered the intake of new sets of nutrients to grow SEED according to your desired outcomes?**

to reject or accommodate changes in the environment. In the case of a bearable prosthesis, if a reliable coupling is formed, the mind is elastic enough to adapt and make full use of the device, allowing it to become part of a system of extended cognition. If anything during the process causes the user to receive an unpleasant feedback, the mind is sensitive enough to reject the device. However, my experimental tests show that if the unpleasant feedback happens after a prolonged duration of bearing the device, the mind becomes uncertain as to whether it should reject or accept it, and chances are it will accept it. Hence, what makes a prosthesis more or less bearable for the user is not so much the extent of physical pain imposed by the device, but rather its effects in the long run.

While we can measure the degree to which technology transcends physical and physiological boundaries, we can only speculate about the ethical consequences of these developments and their effects on human self-perception. Although wearable and bearable devices are still at an exploratory stage, these debates are already on-going, highlighting problems like the infringement of privacy involved in sharing users' biodata, the possibility (and consequences) of such symbiotic devices
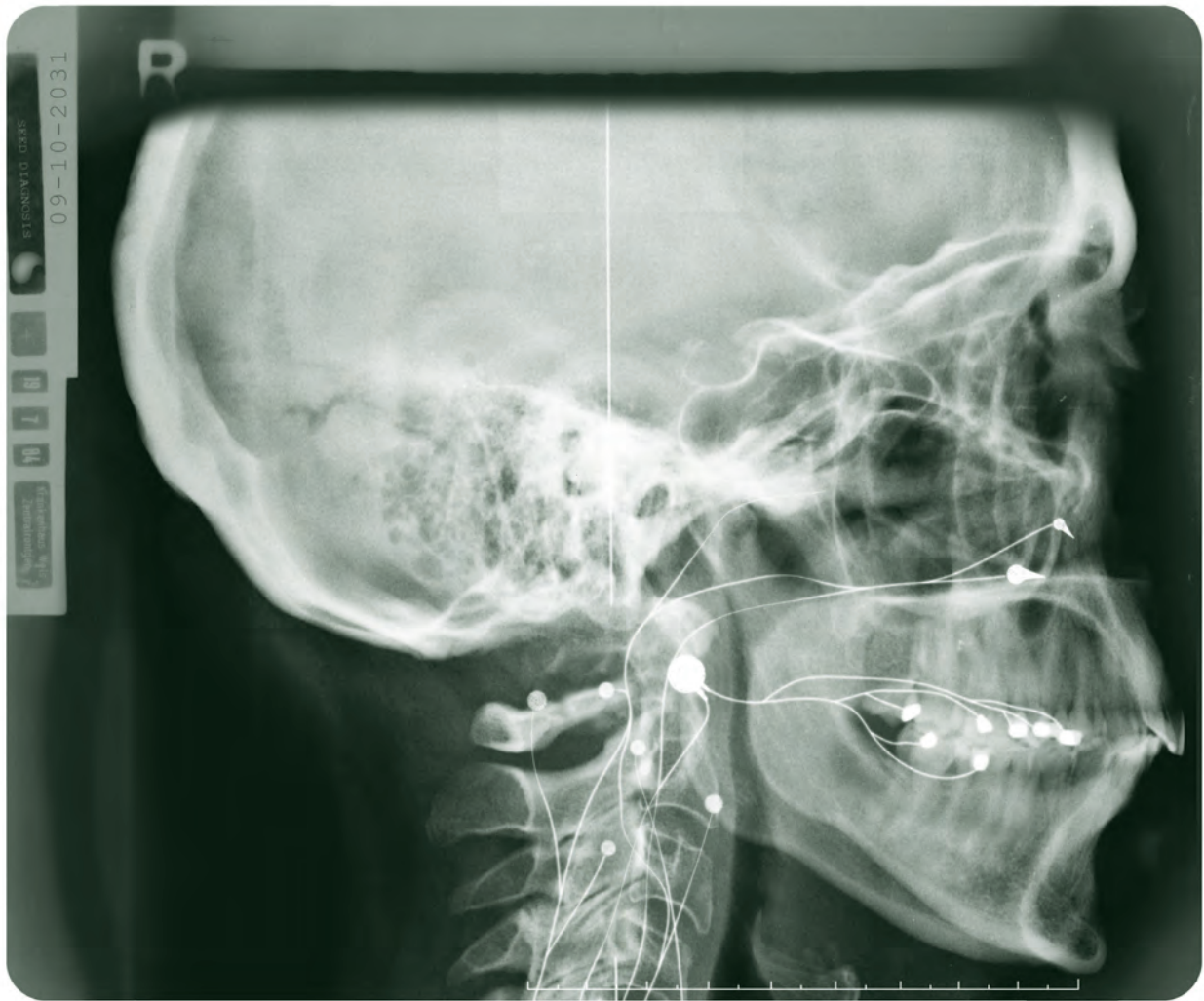
being hacked and stolen, and the potential addiction to the effects produced. As researchers and designers, we must address and investigate these topics before such invasive technologies are integrated into our everyday lives. As users, we must expand our understanding of the environment as comprising physical space as just one among many layers of reality.

SEED project by Ling Tan. Sign of healthy growth has been detected.

Prototypes for a Shifting Baseline

Miriam Simun

Right—
Direct Olfactory Stimulation Device (DOSD).
Image courtesy of Miriam Simun.
The *Direct Olfactory Stimulation Device*
(DOSD) adapts human physiology to enable
the taste of unavailable species by creating
flavor illusions through the use of scent.
Inspired by insect physiology (insects use
their antennae to smell and thus navigate
their world) and long-standing human
traditions of technological extension of the
senses, the device integrates direct olfactory
stimulation into the eating experience.

The idea of "shifting baseline syndrome" emerged in the 1990s to describe the slipping definition of a "healthy" ecosystem. Daniel Pauly was the first among ecologists to describe the phenomenon. He observed that each generation of marine scientists tended to accept the biological stock size and species composition at the beginning of their career as the baseline for a healthy ecosystem, assuming inadequate data for previous periods. As subsequent generations of scientists used a diminished number of species to evaluate subsequent changes, a gradual shift of baseline perception in defining a "healthy" or "natural" ecosystem occurred.

This tendency only exacerbated as science adopted ever-more sophisticated modeling techniques that required ever-more detailed data. As our fellow species decline, our tools for finding and counting them improve.

How does one apply precise calculations to the sound of a sea full of turtles knocking so regularly against Columbus' ships that the sailors were kept awake all night? As we continue to rely more heavily on data and model-calculated evidence in order to understand ecological realities, how do we account for what came before the model, for baselines from the past?

The phrase "shifting baseline syndrome" uses terminology reminiscent of illness in order to describe our consistent accommodation to the creeping disappearance of species on earth. The chief symptom associated with this condition is our propensity to develop what ecologists call "inappropriate reference points" for evaluating losses and identifying targets for rehabilitation measures. In other words, if we aren't able to determine how it all "once was," how will we ever get back to it?

Shifting baseline syndrome throws a wrench in the works, making it difficult to return to the nostalgic "nature" we pine for. In truth, natural systems are always changing, and humans have been impacting ecosystems for millennia. The ability to pinpoint "natural" or "untouched" starting points for ecosystems is a romantic impossibility.

And yet, the reality is documented and difficult: Species extinction continues to increase at alarming rates due to changing climates and human populations extending over every corner of the planet. Putting a numerical stake in the ground feels ever more necessary if we are to manage and slow down rates of extinction. Welcome to the Anthropocene, where humans are the dominant environmental force on earth. As Stewart Brand wrote in the *Whole Earth Catalog*, "We are as gods and might as well get good at it."

Even gods can forget across generations. How can we remember what is missing? And how do we engage with what is to come?

The *Prototypes for a Shifting Baseline* series seeks to secure ghostly traces of earthly species that may vanish during the Anthropocene. It captures what might soon be lost—not in terms of images, text or data points—but through sensory and embodied experience. These devices stage, in tangible fragments, versions of the human experience of threatened species. Through an array of sensory s(t)imulations that include smell, taste and touch, these devices appeal to our bodies in coping with, and responding, to this loss. Through tactile engagement we recall, reconnect and mourn; or perhaps we understand ourselves to be ready to forget, and move on, ever onwards.

Top—
Yamamayaa Petting Ring. **Image courtesy of Miriam Simun.**
The *yamamayaa* ("the cat in the mountain"), also known as the Iriomote cat (*Prionailurus bengalensis iriomotensis*), is a subspecies of the leopard cat that lives exclusively on the Japanese island of Iriomotejima. There are fewer than 100 yamamayaas left on earth. Key threats include habitat degradation, increased tourism, and traffic accidents. A discarded clump of Yamamayaa is transformed into a petting ring.

Left—
GhostFood. **Image courtesy of Miriam Simun and Miriam Songster.**
***GhostFood* serves simulated 'taste experiences' of species threatened by climate change. Scents of threatened foods are delivered via the *Direct Olfactory Stimulation Device* (DOSD), paired with edible textural substitutes made from climate change-resilient foodstuffs. The scent-texture combination provides taste illusions of foods that may soon be no longer available to eat. *GhostFood* staff serve the public, guiding visitors through pre-nostalgic ephemeral experiences, and engaging dialogue.**

Pooka: Radical Creativity and the Edge of Perception

Rachel Armstrong

Reality is that which, when you stop believing in it, doesn't go away.
Philip K. Dick [1]

As night falls in the Bog of Allen, which stands between two rivers—the Liffey and the Shannon—in Ireland, a tale of the pooka[2] is sometimes told around peaty hearths. The story starts with the familiar figures of a farmer—let's call him Pat—and his faithful sheepdog, Rex. They're down at the local pub after a long day in the field. Pat finishes his Guinness and whisky chaser, while Rex has been asleep under his master's stool for most of the night. When the bell for last orders is rung, the farmer decides to avoid the rush of traffic and the habitual dance with the breathalyzing Garda lying in wait. Instead of taking the main road home, Pat turns down a lane that seldom sees a car. Although it is dark and densely lined by hawthorn trees, the narrow road seems a safe bet for a tipsy man who can get along perfectly well at his own pace, without the pressure of traffic backing up behind him. Still, the track is treacherous. It is rickety and patchily tarmacadamed owing to the scars left by the swelling and fall of the bog, which has dried up potholes in its surface like a can opener. The now lively sheepdog obediently keeps pace with Pat, dropping just a little behind the farmer's back wheel. And so they run together—dog behind man. The canny animal anticipates that at any moment, as the old man steadies his wheel around the dips, he'll make a wrong call and come to a sudden, uncomfortable stop. Pat concentrates on the job at hand and at some point realizes that he can no longer hear his sheepdog panting. He whistles sharply and glances downwards to check on his loyal companion but, instead of a keen-eyed friend, Pat meets the glare of a hellhound—its snout curled back into a foaming snarl, coals glowing in its head that stare as menacingly at the man as Death itself.

Sometimes the story is told in foreboding tones whereby the unlucky farmer is never seen again. At other times, Pat lives to tell the tale since the pooka is

1—
Philip K. Dick, *How to Build a Universe That Doesn't Fall Apart Two Days Later*. 1978.
http://deoxy.org/pkd_how2build.htm.
2—
The pooka may also be known as *púca*, which is Irish for spirit, or in English it means "puck," as in Shakespeare's character in *A Midsummer Night's Dream*.
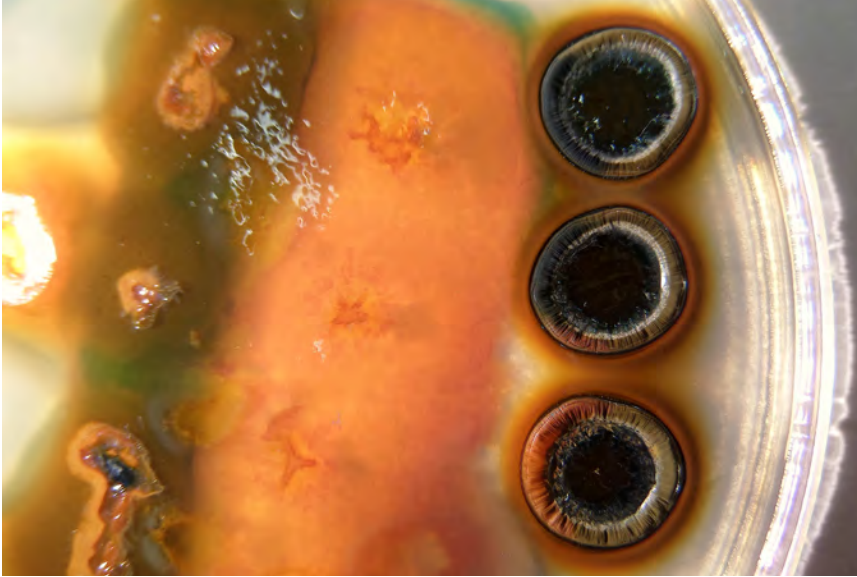
condemned to patrol a narrow existence plane that is bound by very particular geographical limits. Pedaling for his life, Pat sails over potholes and reaches safety against all odds, to be rewarded by the familiar sight of Rex waiting at home, wagging his tail.

In this modern age, ghostly tales are rationalized with the aim to sanitize them. Since the dawn of psychotherapy, Sigmund Freud helped us denude ourselves from perceptual confusion by homogenizing our mental experiences through analysis, rationality and logic. Carl Jung even persuaded us that dreams are not supernatural encounters but subconscious ablutions with hidden meanings and purpose. By applying objective and subjective analyses, muddy emotions can be stripped from our unconscious and provide diagnostic insights that may lead to corrective clinical behavioral measures—and contribute to the constitution of a collective notion of mental "health."

The pooka may thus be rationalized as a state of alcohol-induced dreaming reflecting the violent tendencies of a farmer towards his dog, or perhaps it can be discounted as a simple perceptual error in the poor light. Objectively, the pooka may represent the conduct of a spooked dog, or even a collective cultural archetype that speaks of inexplicable accidents that take place down country lanes.

The modern age discounts the authenticity of such mysterious encounters because they cannot be empirically measured. It denies the possibility that uncanny occurrences may be real bodies with agency in their own right. Rather, it reduces them to the illusions generated by weak and troubled minds, or provoked by incidental sensations that are induced by subtle environmental variations such as air movement and changes in the visual appearance of a place. Given that our current theories of perception are based on a reductive view of our perceptual abilities, where sensory receptors detect "qualia"[3] that embody abstractions of reality, it is unsurprising that our phenomenological accounts are far from complete.

3—
"Qualia" is a scientific term used to indicate fundamental units of sensory experience.

Beyond biology, even our theoretical models of the world imperfectly describe our experiences, for we cannot stand outside our own existence as impartial observers. We are entangled within systems that we cannot fully perceive, so we are forced to navigate parallel conceptual realities and sometimes we get caught between the gaps that are unobserved—spaces invisible not only to our bodies, but to the very frameworks of our existence.

Reality always exceeds the limits of our imaginations, and there is plenty of room for slippages that challenge the certainty constructed around the modern world. I am drawn to the idea of the pooka, which embodies a "Nature spirit." In Celtic and Nordic cultures such liminal identities are understood as shape changers that bring good or bad fortune. Indeed, the pooka symbolizes and perhaps even embodies the unique creativity of the natural world that Ilya Prigogine invoked in his provocative accounts of the directionality of time.[4]

At the start of the 21st century, Nature's strangeness is at the heart of our analyses and observations. We are incredibly aware of its potency and turbulence though the phenomenon of climate change, which appears to have no fear of the modern world. Yet, despite the proliferation of reality frameworks that supplement the dominant narratives of the industrial era, Nature continues to avoid definition. On account of its restless material creativity, it cannot be reduced to any particular combination of definable entities such as technology, culture and ecology.[5] By forming new hybrids and undergoing radical transformation, Nature is constantly spilling out beyond its definitions and evading being delineated or captured. In this sense, Nature is indeed a harbinger of both positive change—which can be appreciated in its fertility, resilience and generative novelty—and simultaneously an ominous force that can wield massive, unprovoked destruction, such that caused Charles Darwin to abandon his faith in a benevolent god.
Yet in the modern world we understand reality to be made up of geometric objects that have particular properties such as mass and volume, as well as discrete, geometrically constrained borders. We have used this assumption to observe the natural world and in doing so, have reduced its potential to narrow, specific roles. If it is not relegated to a resource that can be consumed by proliferating machines, then it is seen as little more than a definable set of forms and functions. The radically disruptive presence of **the pooka cannot exist** within this classical framework as it eludes measurement or definition—and is therefore cast as a purely imaginary being and rationalized into nothingness, denying Nature its creativity.

With the rise of quantum physics during the 20th century, new life was breathed into our reality frameworks. Quantum physics could successfully explain a vast range of phenomena, including the nature of atoms, the formation of elements, how light interacts with matter and the evolution of stars. While it is scientifically grounded, quantum physics is based on a different set of theories to classical science. It engages with the material realm at miniscule scales, where paradoxical behaviors can be experimentally demonstrated. Owing to the inconsistencies in various models used to explain the weird phenomena observed, quantum theory

4—
Ilya Prigogine. *The End of Certainty: Time, Chaos and the New Laws of Nature.* **1st edition (New York: The Free Press, 1997).**
5—
Koert Van Mensvoort and Hendrik-Jan Grievink, eds. *Next Nature: Nature Changes Along with Us.* **(Barcelona: Actar, 2012).**

actually "carries in itself the seeds of its own destruction,"[6] and truly belongs within the realm of the uncanny. In this context, the pooka exists as a material paradox—as a set of entangled subversive phenomena that are composed of very tiny material vibrations and dependent on the behavior of light. Yet, these phenomena can only be indirectly observed as functions of phantom and observer, and never formally verified. **The pooka is a Schrödinger's cat**.

Systems theory and complexity science are relatively new models of scientific thought that have also developed over the course of the 20th century, and they embody the notion that reality is shaped from the relationship between things. The concepts are based on a philosophy of process that is realized through the organization of material hubs and assemblages of active agents, or bodies. In this context, **the pooka is not a single entity but emerges out of the fluid exchanges in an ecology of relationships**. These exist within the connections forged by matter on many scales—photonic flows, ethanol, uneven ground, a running dog, and an agitated farmer. At some point the generative creativity between the bodies reaches a tipping point and ruptures the steady exchanges to precipitate an irreversible event that changes everything.

My fascination for the pooka is provoked by an interest in the radical creativity of the natural world and the language frameworks that are used to represent it. Indeed, from a material perspective, our biological systems exist at interfaces where mind and matter are entangled. At the molecular level, we continually seek out adventure in new events, while simultaneously craving the comfort of familiarity. Our existence oscillates between boredom and terror, and the myriad states in between these extremes are dripping with contradictions, strangeness and poetry. They linger in the ripples of causality that trail behind us and produce traces that contain opportunities for transformation. These material shadows shape the mythology of places. Surely, no matter which lens we choose to observe the pooka with, it remains at the margins of reality. Yet, it can be called into existence through new narratives that renegotiate its relationship with the material world.

Around my grandmother's giant cast-iron range, the pooka is reflected upon again and again—being more than a fey tale or an abstraction of Nature, but rather taking on the potency of a unique cultural construct. It is an agreement made between storytellers, who "swear blind" they know the truth of a tale and weave a unique existence for the pooka—to entertain, bewitch, or encode within it some deeply concealed truth. These **stories are in themselves shape shifters and an embodiment of the pooka**. They produce material effects by striking hope or fear into our hearts, and therefore inform our choices elsewhere—for instance, in taking a shortcut down a dark lane at twilight.

The light is fading rapidly and a figure is moving quickly and purposefully towards you. It is impossible to tell if it has two legs, or four. Black on black, the nature of this beast is beyond your apperception. While your retina shifts from full color to night vision, you can now hear the creature breathing heavily—and it's too late to run.

6—
Adrian Kent. "Our Quantum Reality Problem." Aeon, January 28, 2014. http://aeon.co/magazine/nature-and-cosmos/our-quantum-reality-problem/.

Weatherizing: 13178 Moran Street. Detached Garage. Detroit, 2010

Catie Newell

Detroit as Dark Volumes

Captured volumes of darkness are prevalent enough in Detroit that they could be recognized as a distinct architectural typology. It is a specific darkness, one that exists in the coupling of boarded up spaces with the strained, missing, stolen, and neglected electrical infrastructure. Perfectly formed to the interior of a vast array of spaces, the darkness is held behind structures that were once fully operational homes and buildings, which now don an extra ad hoc skin cloaking conventional apertures. Dispersed widely throughout the physical urban setting, these foils to anticipated illumination are found both separately and in tandem but should not be taken as an indicator of the status of a building's occupation nor its ownership.

Under normal circumstances, a boarded-up window is a temporary fix to an accident or the more probable break-in, with the wooden infill acting as a mere patch. However, the stories are more complex in Detroit. This seal has evolved out of tending to broken window panes, reacting to concerns over security or privacy, and in efforts to deter squatters or scrappers. Such contentious circumstances

prompt strategies that promote long term use. The detailing may include custom screw heads, a sill lined with nails and glass shards, complicated interior bolting, or wood that has clearly weathered with time.

The darkened internal volumes are at home among a landscape of limited electrical services. The availability of electricity is dwindling at large with the extensive theft of copper wire and the city's reduction in provided service locations. Being off the grid is not necessarily by choice, while being connected is not necessarily carried out lawfully.

Between personal devices and the expected (taken for granted) artificial illumination, people have a tendency to seemingly emit light. Generally speaking, the more people in a location the more illumination. Detroit was built for more than double its current population. Physically extensive despite its countless vacancies, the relatively unlit urban massing constitutes a unique setting among the expectations of illumination in American cities.

Weatherizing is a response to this darkness in Detroit and a vehicle upon which to discuss these respective city circumstances. As a material study and electrical

13178 Moran Street is an example of a very common house typology in Detroit, Michigan. Foreclosed in 2009, the house was boarded-up and auctioned off by the city.

experimentation, its alteration of an abandoned stand-alone garage mutates and activates the barrier between the enclosed atmospheres of the interior and the shifts of the greater surroundings on the exterior. Considered to be a replacement of the common flat-pane windows, Weatherizing uses the typical mediator of glass in an unusual configuration, evoking an altered understanding of the volume and its exchanges through the creation of a glowing atmosphere and in response to implications of security and containment within Detroit.

The text that follows tells its story; and while doing so, it tells a story of Detroit at that precise moment in time.

In Time

Timing. As with anything that is so tangled to the exact conditions of its context, it all has to do with timing. The acquiring of a house was the collective brainchild of the 2009-2010 Taubman College of Architecture and Urban Planning Fellows at the University of Michigan. Celebrating its 25th year, the 2009-2010 Fellowship brought five fellows to its faculty, an anomaly to the typical three. Socially, the selected candidates (Ellie Abrons, Meredith Miller, Thom Moran, Rosalyne Shieh, and myself) formed an immediate pack, one that would soon be referred to as the 5Fellows. Drawn together at first by our similar ages and rookie status, the group was strengthened by intellectual dialogues filtered through our collective differences spawned from varied—even conflicting—backgrounds, schools, mentors, and research foci. Concurrently, times were tough. We all turned to academia for financial stability while simultaneously recognizing that to get

anything built, you had to make it yourself. Across all of our interests and methods was a shared instinct "to make."

Ann Arbor, home of the University of Michigan, provided little spark for a meaningful design setting suitable to a fellowship year. Roughly thirty miles to the east, Detroit, in its constantly awkward relationship to the more stable and affluent Ann Arbor, was a setting rich in issues capable of spanning the diverse interests of such an eclectic group of young designers.

In a fury of brainstorms and group decision making, we found ourselves peering in on projects happening in residential spaces in Detroit. Acquaintances of Rosalyne Shieh, Mitch Cope and Gina Reichert, introduced us to the foreclosed housing stock of Detroit through their work as Design 99. Their practice of tending to their own neighborhood through creative work was both commendable and inspiring. When we visited their block and they casually indicated to us that the auction of foreclosed properties in Detroit was to occur the following week, we took the leap.

500 for $500

Appropriately, the 2009 auction was held in Detroit's Greektown Casino. It was to be the last of the auctions conducted in person. Now, taking cues from the world of online auctions, the purchasing of foreclosed properties from the Wayne County Foreclosure Auction is an electronic and faceless event. But on October 12, 2009, a room capable of holding not more than 500 people was opened at 9:00 a.m. sharp and the identities of those in attendance were made public.

The auction book, with its canary yellow cover, was nearly two inches thick. All the properties that had not been acquired during the previous auction (when starting bids matched the amount of taxes owed back) were reset to an initial bid of $500. Early research on available properties was only possible by scrolling through an online PDF, catching a glimpse of the plot on Google Earth, and driving around in person. Provided to each bidder in attendance, the enormous weight of the auction book made the daunting task of sifting through the available properties physically tangible. A few pages were dedicated to the auction's rules and regulations, and the rest—a long list with an average of 18 plots per page—was organized by neighborhood. The properties ranged from countless residential buildings to the abandoned Roosevelt Hotel, and even included an airport. The anticipated property taxes deterred us from simply buying up the abandoned airport on the spur of the moment, as if in some child-like dream. With some such properties falling into uninformed hands, future auctions would institute a sliding scale to establish starting bids in hopes of preventing the thoughtless grabbing of land.

There was a gross disproportion between the number of people permitted into the space and the properties up for grabs. Mitch and Gina were denied entry. Having run to the bank to procure the mandatory $500 cashier's check for each property they intended to bid on, their 9:15 a.m. arrival was already too late. It was a crime to the process that—cash in hand to buy a property—they were turned away because the room could only hold a limited population.

As the day continued forward, the weak numbers became increasingly apparent. Day one of the four-day event already had its long drags of no bidding. The

auctioneer began interacting more with the audience, not reading every plot and instead asking if anyone was planning on bidding on anything on a page, or even within a neighborhood.

As we waited, Thom Moran texted the other Fellows. Use of a phone within the room was a violation of auction floor rules, so he was kicked out. It was odd to be sitting in a room staring at land lot numbers in list format, uncertain of the quality of the spaces under review. However, the typology was an easy bet: a single family home, detached garage, evidence of a squatter, all service infrastructure long since stolen, and a lack of demand. Thom's ejection provided us with the opportunity for a reconnaissance to see the houses in person. He confirmed what was expected, and at Mitch and Gina's suggestion he scouted out the houses that they were intending to purchase. With no competition—not even on the neighboring pages of the auction book—I purchased the house at 13178 Moran Street for $500.

The paperwork consisted of a xeroxed half sheet that I signed with the name 5Fellows—an entity that did not legally exist. The address of this phantom owner was listed as my apartment in Ann Arbor, with hopes that this would not be tracked directly to me and thus squander any future first-time homeowner's incentives.

To appease requirements for University funding, I quickly tried to deed over the property. The paperwork was not immediately processed, and the property tax forms continued to try and find the 5Fellows. When I moved to Detroit my ties to the Ann Arbor address were gone, never having seen a confirmation of the change.

On Paper

Completion of the new deed and its almost immediate switch over to Design 99 required a visit to the Building Department. The service space was small, confusing, filled with anger, and I felt as if I was somehow missing a step. I could have been standing in the wrong line twice, and might as well have started grabbing up properties by changing deeds since there was little to no verification of previous ownership or current purchases. Future paperwork would assume I had never been there in the first place.

As a friend learned the hard way, one task I did not complete was to check if the house had been removed from the demolition list, an ongoing catalog of the properties the city slowly chisels away at. The document is usually paired with the foreclosure book, yet the lists are not cross-checked and any property purchased at auction could still be scheduled for demolition.

There was a definite disconnect between this process and the overly specific lingo-rich meetings we held with the University of Michigan lawyers. There seemed to be a strange balance between urgency and apathy. On paper, the actual physical status of each property and its respective home was left unknown and unexplored.

Obtaining Electricity

With the only Michigan driver's license among the group, I was the clear choice to become the owner and contact for our electrical supply—an endeavor that we hoped to resolve in a matter of weeks and instead strung out over four months. It was a two-part ordeal: convince Detroit Edison to set up an account, and get an

electrician to drop a line to the house.

Though never reprimanded, the previous owners of the house were stealing electricity. This put a red flag on the property, and so a young female wishing to legally pay for services seemed questionable. A background check, lots of paperwork, and many in-person efforts were required to get them to take my money. There were so many ways to steal from the electrical company, that opening a new account seemed like a rather dubious act.

The electricians that dropped by the house to provide quotes for the actual work would unknowingly teach me lessons on how to steal electricity. Between their investigative efforts to find out what had previously been scrapped from our house, and their pointing out methods of how electricity was being stolen around the neighborhood, I gained a sense of how it all worked. Of course, that was also paired with numerous stories of random outages that they would discover were caused by a scrapper grabbing a live wire. In each case the evidence was an unbearable sight. From then on, every time I walked into the alley to use it as our temporary bathroom, I more than half expected to find a dead body grasping our new copper-filled line.

Side Window

Unable to easily break in through the front door of our own house, we used a side window to access the space. An older air conditioning unit acted as the stairs and

Though legally owned by the city, the house had several occupants including squatters, animals, and trees.

entry stoop for those of us too short to simply hoist ourselves into the window.

There was a tree in the middle of the house and a few items I have come to expect
in abandoned spaces: random articles of clothing, a tire, empty cardboard boxes,
scraps of building materials, and wrappers and cups from processed and fast foods.
Our first action was to board up the windows. In other cities one would expect
the counter response, but in Detroit, it is a sign of tending to a space. Fresh boards
in a window indicate that someone is watching over the house, protecting it from
intruders, and moving it forward in its occupation. It is the houses with empty
windows that one can expect to have been long left by their actual owners.
We debated for a long time whether to get plexiglass or glass windows. The
decision had to balance cost and the likelihood of possible break-ins. In the end
we opted for plexiglass because of its resistance to breakage. Unfortunately,
fabrication would take much longer than expected, leaving the windows boarded
up for quite some time.

NoHam Residents

The house was in the neighborhood of NoHam, a nickname to be understood as
"North of Hamtramck," one of the two independent cities that float within the
geographical boundaries of Detroit. Like Hamtramck, NoHam is richly diverse, with
predominant Bangladeshi, Arab, and Polish ethnicities. Just as diverse as the human

population, the housing stock is strikingly mixed, ranging from houses that are lived in and the occasional missing teeth, to houses abandoned entirely, arson damage, and properties that are being used creatively.

We were deterred from staying on site after dark, both by our own comfort level and by the cautions of those around us. As numerous voices emanated from different mosques around the neighborhood, the call to prayer—always just before sundown—would beautifully cue us to pack up our tools.

My time on site matched exactly with my father's. A resident of Metro Detroit, he was understandably concerned about his thirty-something daughter modifying a structure in a random neighborhood in Detroit. He didn't want me there by myself, and I didn't want to stop the project. And just like that, my dad and I started to make installations together, with him as my right-hand man. His legitimate worries about Detroit, paired with his maker mind, made for an instant partner in crime.

In the Dark

At the time, my research in the field of architecture was speculating on a broad—yet raw—pursuit of the weather. Earlier interests centered on the ephemeral conditions of a site: fleeting and treacherous weather, the shifts between day and night, and the magic of precipitation as objects/textures falling from the sky. These interests led me to question the stiff barricades and energy-fed artificial interiors that we build for ourselves.

The qualities of Detroit morphed my thinking and adjusted it to the greater stakes of the city. For starters, the gross depopulation proved key in understanding a housing stock that existed as a material reality but was in no demand. With no need to return them to normative use, its forms could be left undefined and contentious. These earlier observations were further inflected by concerns over barricading—from the weather as much as from human invaders—and by an observed prevalence of contained darkness and occupation. These circumstances loosened the criteria by which the house's materials needed to perform. Neither a non-existent resident nor the neighborhood would gain anything from a simple wall. Somehow, to aggressively transform the barricade between the interior and the exterior felt permissible in Detroit. And at least subconsciously, I was looking for a beautiful way to do it.

Fully Sealed

There was a moment of darkness for the entire house. The windows were all sealed with wood, and the plexiglass infills had not yet arrived. The boarding up process having been a relatively imprecise task, light slipped in through numerous cracks at the edges of the boards, providing small notes on the familiar layout of the house. Sitting curiously within a dark residential space evokes both fear and calm; the darkness occludes our visual space, while expanding our imagined anxieties.

The mind embraces the familiar surroundings without finding nor trusting their boundaries. In turn, the imagination uploads onto the thick darkness its creative, false, and cautious imagery. Because the darkness permits—even necessitates—a

No longer needed to be a residence, the interior of the house offered an opportunity for spatial manipulation and a reflection on the intended use of a space.

different reading, it allows for the emergence of mystery and mistrust over constructed (built) certainty. It engenders a fantastical space.

On instinct, to begin piercing the envelope in a controlled manner, the simplest of holes were drilled right through the existing walls. The insertion of glass tubes—an alternative to the flat pane window and a portal for light, wind, human voices and air between the city and the house—transmitted a glow that would dominate all future steps. Held within the dark space, this object radiated. Like a giant optical fiber, the light it sourced from the beaming sunlight outside, radiated boldly. The intruding light leapt from the glass, grabbing onto the nearby walls and capturing a perceivable thickness in the air. It melded the vast expanse of the exterior atmosphere with the precious space we had bundled away from it.

Moving to the Garage

As the other four started working in the house on projects driven by different spatial ambitions and intentions, their initial maneuvers allowed light to flood in, and the darkness was lost. So I moved to the detached garage. It was a simple volume, electrically disconnected and sized adequately for substantial material and ephemeral work. Celebrating its darkness, alterations to the garage began with patching light leaks within its modestly constructed surfaces and with the more aggressive infill of a window. The obsession for a total removal of light became something of a madness; whereby I waged a war on the smallest of holes through which light was allowed to penetrate the volume.
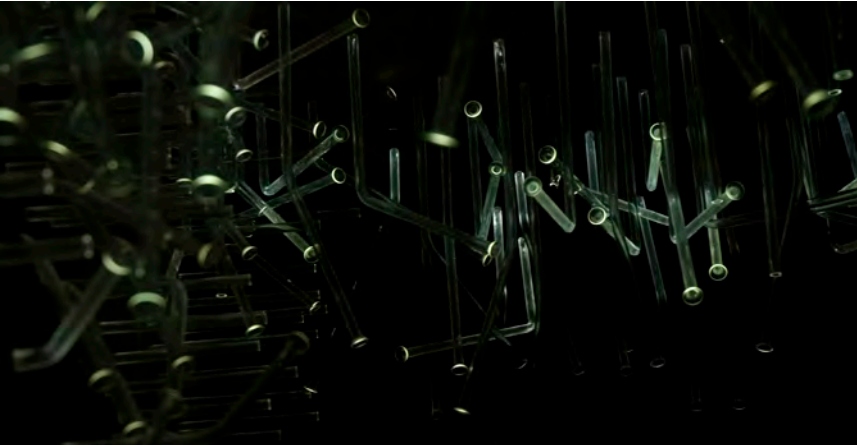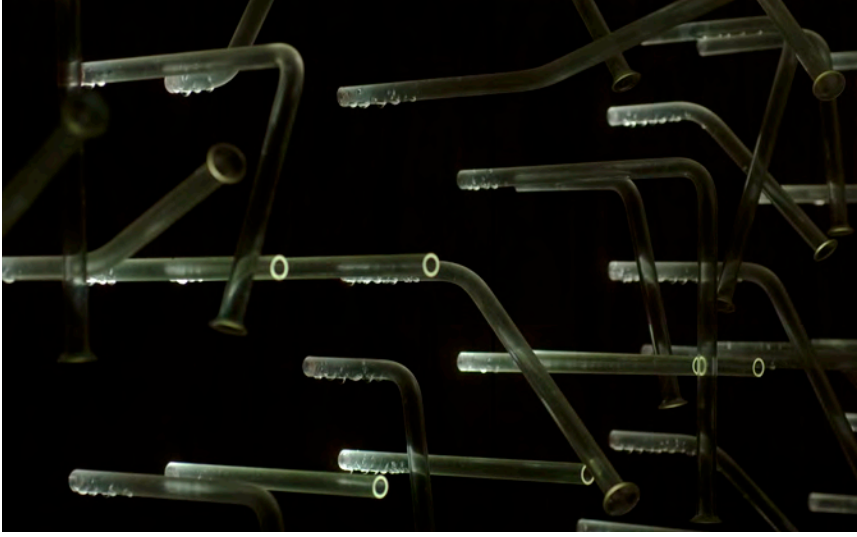
With the old window removed and all of the light leaks plugged, the interior became intangible and the space seemingly fell away. Its dimensions were unperceivable, yet its presence was powerful. This full barricade removed a sense of time and any connection to the exterior surroundings. Though absent of light, the space felt dense. It was not giving of clarity, yet not vacant of attributes. This was the darkness I had been seeking after.

Tending to the Space

It was within this darkness that the glow of the hollow glass tube insertion could find not only a transmission surface, but also an intangible medium for dispersal. The quantity of tubes that were fabricated was determined by the surface area of the original (now removed) flat pane window. Nearly 1,000 half-inch diameter glass tubes could fit within its bounds. Extending out to lengths of up to three feet, the tubes operated to transform what was once just a surface window into a volume. To provoke the most tension within the original space, the glass tubes were positioned by piercing through the most significant architectural features, where the building needed detailing, and where human occupation could be agitated: framing the door swing and the roof peak, tracing out previous windows, entangling with an adjacent tree. Their basic rhythm followed a nondescript diamond pattern carefully calculated to fall within the flat ridge of the vinyl siding that wrapped the exterior. The placement of each tube risked bringing too much light into the interior space, foiling the balance between the internal darkness and the inserted glow. Therefore, construction drawings were not used. Rather,

the true architecture—the atmosphere of the volume—was explored and revealed through physical making.

The depths and bends of the glass tubes were collectively orchestrated to imply a more continuous volume, interrupted with anomalies. The attenuated space of the garage and its aggressive extensions through both sides of the wall developed a tension with the occupant, who was drawn to the light and yet fearful of the glass spikes. The work sparked conversations about the denial of occupation and the security of a space from intruders.

Time of Day / Time of Night

The cadence of the work fell in stride with the duration of daylight. As the sun set, the tubes would shift in color and brightness, casting the pink light of the sky over the interior surfaces of the garage. Nighttime brought back a completely darkened space, and the inability to work without artificial lighting. As the construction was conducted simultaneously on the interior and exterior of the space, it necessitated a pairing with the weather. Therefore, the work day commenced early to maximize daylight. As the construction continued, each additional tube added another registration of the Midwest atmosphere shifting in real time on both sides of—and within—the wall.

The shadows cast by the glass tubes were a fortunate surprise. The sun shone directly over the house, sending shadows across the front and side elevations. On the brightest of days, the clear glass tubes were difficult to see, leaving the

shadows as the only evidence of the project—like line drawings striking on the otherwise conventional vinyl siding.

To create effects of illumination at all hours, the work was given a nocturnal life. Embedded into the walls was a system of LED lights, charged by solar panels on the roof. The system would collect energy by day and then illuminate at night, after sunset. The resultant was a glow that, during the night, was both outward and inward. Fully off-the-grid, the space was being constantly illuminated—lit naturally or by its own registration of natural light.

Fear of Vandalism

From its position in the detached garage, Weatherizing could not be seen from the street. However as circulation, in particular that of the pedestrian, is less formal in Detroit, what operates as public or access land does not necessarily coincide with the city zoning or layout. The urban typology of NoHam, like many other neighborhoods within the city, consists of a double throughway for cars. There is a public street at the front of each house, and a service alley providing access to each property's rear detached garage. Nowadays one would not dare drive a car down the back alley. Instead, this is more commonly used as a dumping ground, a pedestrian shortcut, and a corridor for electrical theft. How a local moves through the neighborhood deviates from the provided sidewalks and depends on the physical status and presumed occupation of any given house. Within such blurry territories, *Weatherizing* was far from hidden, and rather on public view

Weatherizing **extends through the roof as well, introducing light and weather conduits through all surfaces of the space. Solar panels are located within the system.**

to those passing in the alley. Further, the attention we were giving to the house was undoubtedly noticeable to an otherwise quiet neighborhood. We were not in competition with other signs of construction and everything from our cars out front to the sounds of the tools made our presence obvious.

This visibility, paired with the fragility of the glass and the presence of illumination implying an electrical connection, kept me in a state of constant worry about vandalism to the project. Interactions with passers-by ranged from unapproachable glances to asking how we were doing, while others still would stop by—their presence being impossible to decipher as either earnest curiosity or casing the place.

Rarely did I leave all of the glass in place. From my vantage point, this was the most critical potential loss, while in reality the tubes had no value in the scrapping industry—just the thrill of breakage. Even I had the overwhelming urge to break all of the glass for that one beautiful moment of audible splendor. Clearly, breaking a window has its thrills. Yet, the prevalence of this occurrence in Detroit speaks to an innate mischievousness played out as power over space, as a substrate to express anger, and in a setting where you could get away with it.

Truman and Blade

Blade would peer out of the backdoor. Happy to see us, but willing to defend and alert should we enter the backyard space. He wouldn't even bark, content to have company and clearly aware of property lines. We were strangers in so many ways, but he knew we were tending to the house. That seemed to be the ticket to his approval. His owner Truman was doing the same thing.

From what we assumed, Truman was our legitimate next door neighbor. He had been living there for over 20 years. His wife had long passed, though his age would indicate a spouse of a similar age would not have died simply from growing old. The story was never asked for. Truman kept to himself, though he was polite whenever any of us happened to be outside at the same time. His windows did not offer the same greeting. We learned from Truman the trick of boarding up openings from the inside and the strategy of well-placed nails to deter entry through a glassed aperture. Any intruder opting to not use the front door would painfully regret that decision.

It was not until after his eviction that any of us saw the inside of Truman's house. Towards the end of construction, an eviction crew suddenly came to remove Truman. From what we could tell, he had received no warning. A van pulled up, and officers requested that he leave. Where he went is a mystery. And just as quickly, a team moved into the space, measuring the windows and promising a prompt return to board up the space.
They left about as hurriedly as they had taken care of Truman. In their haste, having quickly changed the lock on the beaten front door, they left it open.

Truman was living amongst his things. His belongings were scattered on the floor, in places one foot deep. Other rooms offered a clear exposure to the aging carpet and traces of a past domestic life. The water was not running, the electricity was now understood as a jump from a neighbor, and there was no furniture. However, despite the contrast to a normative organization of domestic objects, the belongings seemed settled in their places. It was a sign of clinging on to things— sparse as objects but seemingly overfilled with memories.

The interior world I had imagined in Truman's home was in sharp constrast with this found reality. Suddenly, by comprehending the situation and by seeing his belongings, I had met a new Truman, and understood so much more about his strained domestic life.

At the scale of the neighborhood, there was nothing to be gained from evicting Truman. No one was seeking out a house. He was just another person on the list of those not paying their taxes. Yet he was tending to that house; causing no problems besides the theft of the electricity. It would have been better to leave it in his hands—Truman caring and occupying the house, and Blade out back. Both houses would suffer without Truman.

The work the eviction team had done to remove Truman from the house had also removed all of the protections from other intruders he had set up. The boarding up was subpar and within days the neighborhood kids started using the house as a hideout. At first they made attempts to go unnoticed, but that just as quickly became of little concern to them—and of big concern to us. The threat of invasion to our home now felt imminent.

The neighborhood kids soon moved in. This was predictable as, with the work nearly complete, our presence at the house had greatly diminished. During our last days we watched them watch us, sitting out front in their beat-up cars. High school age at best, their pass times were those of boredom: smoking, drugs and vandalism. After approximately a week away from the house, I returned to find the door smashed in around the lock and a huge set of footprints on its outer surface. What I had feared most—the breakage of every piece of glass within reach—was only carried out on one or two components, and only a few were missing. The door suffered the most trauma, and surprisingly, with evidence of chip wrappers and Gatorade bottles, the space was being used. From then on I left the door unlocked.

Weather Changes

The interior of the space was mesmerizing. A powerful glow touched three faces of the garage, condensing around the entry door. Darkness continued to loom in the far reaches of the space, varying in its intensities according to the external weather. Shifts in light, the shadow of someone passing by, the whistle of the wind, and the touch of precipitation all changed the effect captured by each tube, and their cumulative effects. The bends and flares that detailed the ends of the tubes grabbed the adjoining atmospheres in all directions, registering their surroundings.

The winter had been mild. The work was carried out from mid-February through April. As we broke down a barrier to the elements, we faced few bouts of precipitation. It wasn't until the project was entirely installed that its performance with rain and fog would be tested. When the fog rolled in, the glass tubes grabbed at the air permitting condensation on both the interior and the exterior. Water gathered along the lengths of the tubes creating a new delicate texture that dotted the light.

The space aroused a spread of emotions. The glow produced a calming effect while the penetrations of the glass tubes, which appeared as suspended and pointed towards the inhabitant, induced anxiety. On the exterior, the delightful array of light and shadow was paired with a defensible geometry that provided both security and privacy to interior occupants. Each and every atmospheric and illumination shift over the day, over the seasons, and in the instance of a passerby, created a unique experience of the work and a registration true to that instant.

New Atmosphere

In *Weatherizing*, the form of the window had become volumized and was attenuated by the tension with an otherwise darkened space. The result was a new atmosphere, formulated by the immaterial effects of both the captured interior darkness and the whimsical introduction of exterior light. The space of the garage, which could previously be seen as an atmosphere of darkness—an artificial night—was burst into a connection with the mysterious and moody exterior. The focus was taken away from the architectural surface and shifted to the qualitative attributes of the spaces within and surrounding the volume. Reliant on the immediate sensual qualities of these atmospheres, the luminosity radiated by the tubes became an eerie registration of the seemingly intangible surrounds, and a foil to the once apathetic barrier.

Once Residence

For me, in architecture, these sublime findings come with an urgency. They are the reflection of conditions much greater than the mere architectural object from which they emerge. The works resonate with a wider implication of their context spatially and with cultural, social, legal, and political undertones. They are a substrate onto which to inscribe, discuss, freeze and acknowledge these times— times so harsh as to leave a physical mark on the built environment.

Across all of my built installation work, there is an invested interest in small but intense atmospheres resonating within their city while also clearly remaining an anomaly. I actively pursue spaces that are undefined, seeing them for their potential physical and conceptual manipulation. *Weatherizing* is the first work of the *Once Residence* installation series. The *Once Residence* series is characterized by intricate installations that manipulate and respond to former domestic spaces as a means to simultaneously situate and obscure the present realities of ailing cities,

while making compelling new environments that provoke or deny occupation. These projects are at their core not about their own existence or outcome, but are instead about the city that hosts them, and the potent cultural circumstances or contingencies that apply pressure to their immediate built surroundings at the time of their fabrication. Relying on foils, each installation attends to the emotional effects of pairing delicacy with aggression, light with darkness, transparency with opacity, the familiar with the unfamiliar. In all cases, the work formulates questions of occupation and a reflection on the current status and pulse of the city. It is an act of making in homage to very timely and current physical, legal, and cultural circumstances. The conditions of the city are far more interesting then anything I could ever make up. The actualities of my spatial production collapse architectural interpretation with the city itself.

Seeking the sublime, I actively pair beauty to the horror of the condition of things. The works act as a beacon and voice for the realities they are built through. They do not offer a solution, but instead hope to incite action, providing a glimmer of what might be through the horror of what is. The outcome remains ambiguous in its morals and ethics; destructive in ways, and creative in others.

None of these projects would be possible, or interesting, under what one would call "normal" circumstances. Instead, they speak to the present conditions of the city—as a part and reflection of Detroit.

The luminosity becomes an eerie registration of the seemingly intangible surrounds and a foil to the once apathetic barrier, responding to implications of security and containment within Detroit.

The Scan: Prototypes for a Post-human Scenography

A collaboration between The Bartlett UCL, Royal Central School of Speech and Drama, Shunt, and Scanlab Projects.

Text by Bob Sheil & Thomas Pearce

*"I am in another room, I am crying. You said hurtful things to me and you weren't sorry.
Right now you are on a bus eating cake.
The woman sitting next to you died six months ago."*
Shunt, The Scan

In our digital age, the human eye has lost its privileged position as the sole and central audience of an unfolding perspectival world as it finds itself challenged by a plethora of post-human eyes. Emerging technologies of vision such as 3D laser scanning—regarded as less faulty, faster and more accurate than the human eye—find an ever more central role in production, analytics, control and decision making.

Architecture and scenography, practices that are both firmly shaped around the centrality of vision of the human subject, are challenged to find novel ways to address a hybrid audience of human and non-human modes of vision. How do we perform and build facing this new audience? How do we deceive or delight these new eyes? How do we infiltrate and inhabit the parallel digital data space they create? How can we uncover their shadows, their glitches and fallacies and subvert the realism of their representation? How can we design an architecture or scenography for the post-human eye?

A live survey: time-based narrative tableaux staged around the scanner's circular sweep.

The Scan (2013) is a prototype for a post-human scenography that develops 1:1 collaborative and site specific acts between designers and performers through 3D scanning, bespoke instrumentation, robotics, rehearsal and live performance. With a particular emphasis on how 3D scanning may be manipulated in situ, the work seeks to mediate between live performance and digital representation, and thus explores a new relationship between performance and audience through time and location.

The Scan presents a sequence of investigations that utilize an ad hoc space at the Royal Central School of Speech and Drama's Eton Avenue premises to explore synthetic processes of design prototyping and exploratory performance. Central to the work is the manipulation of 3D laser scanning as a critical and creative spatial tool. Installed in three locations at the RCSSD, a series of spatial instruments are introduced to disrupt, provoke and distort rehearsals that are captured as 3D architectural models. Through specifically located reflective panels, performers are digitally projected from interior to exterior spaces and composited in digital montages.

Creatively appropriating and instrumentalising machine vision for a novel post-perspectival and post-anthropocentric scenography, the work simultaneously dismantles the spatio-temporal realism of this vision while forwarding hybrid and fragmented notions of site/stage, subjectivity and authorship.
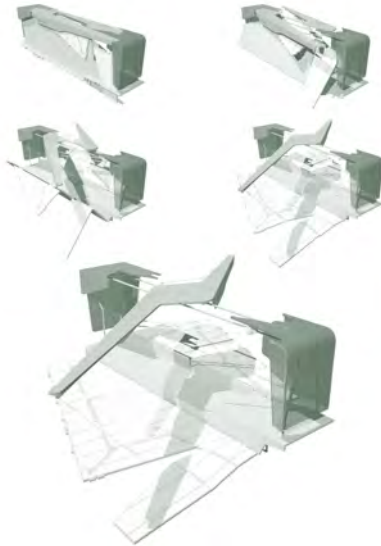
The work is the latest iteration of a creative collaboration between the RCSSD and The Protoarchitecture Lab at The Bartlett School of Architecture, UCL. Shunt, an award-winning artists' collective, created an original score for the performance at the RCSSD. Protoarchitecture Lab worked with ScanLAB to develop novel and bespoke instruments in response to Shunt's proposals and used digital technologies of capture and modelling to blur the boundaries between the represented and the actual in the subsequent performance.

Performance Space / Performative Space

The development of *The Scan* combines two research interests that have been central to Protoarchitecture Lab's body of work during the last couple of years: firstly, the exploration of performative space—both as the spatial and architectural framing of theatrical performance and as the acknowledgement of the inherently performative nature of architectural materials and spaces; secondly, a critical and subversive approach to novel technologies of digital fabrication and representation.

Our interest in the production of theatrical space led to a first creative collaboration with the RCCSD called PerFORM between 2007 and 2009. Initially, a group of students of the Bartlett's Diploma Unit 23[1] worked on a project to design and build a small performance space exploring issues of sustainability and spatial innovation. During this design studio and an ensuing funded research project,[2] some key conceptual positions were developed that would prove to define the agenda of our further research.

As both a prototype design and an event design, the work was specifically framed to further strategies of audience participation and challenge the conventions of 'black box' theatre, including the relationships between auditorium, stage and backstage. Also, by envisioning the travelling mobile stage platform as a temporary deployable structure, unfolding in a mechanical choreography, we developed the notion of stage architecture as a performance in its own right. Finally, the work tapped into the experimental representation of time-based (architectural and theatrical) performance. This involved, among others, the production of two sets of flipbooks: while a first flipbook animated the choreographed deployment of the project's 3D design model, a second one contained a sequence of images showing the re-enactment of this performance by a dancer's figurative movements.

Reshuffling the Cards of Reality

With regards to our critical approach towards novel technologies of digital fabrication and representation, 3D laser scanning has become a crucial tool in our design research. Initial steps in 3D scanning were made during the PerFORM project, during which the scanner was used as a survey tool that allowed for the design and fabrication of bespoke and highly accurate site insertions. This conventional approach to the use of scanning technology, however, changed dramatically between this first collaboration and the development of *The Scan*, which instead undertook a subversive artistic appropriation of the same technology.

Challenging the black box: prototype design for a deployable, mechanically choreographed mobile stage platform.

1—
Led by Bob Sheil and Emmanuel Vercruysse.
2—
Hosted by the Centre for Creative Collaboration and led by Bob Sheil and research assistant Matt Shaw.
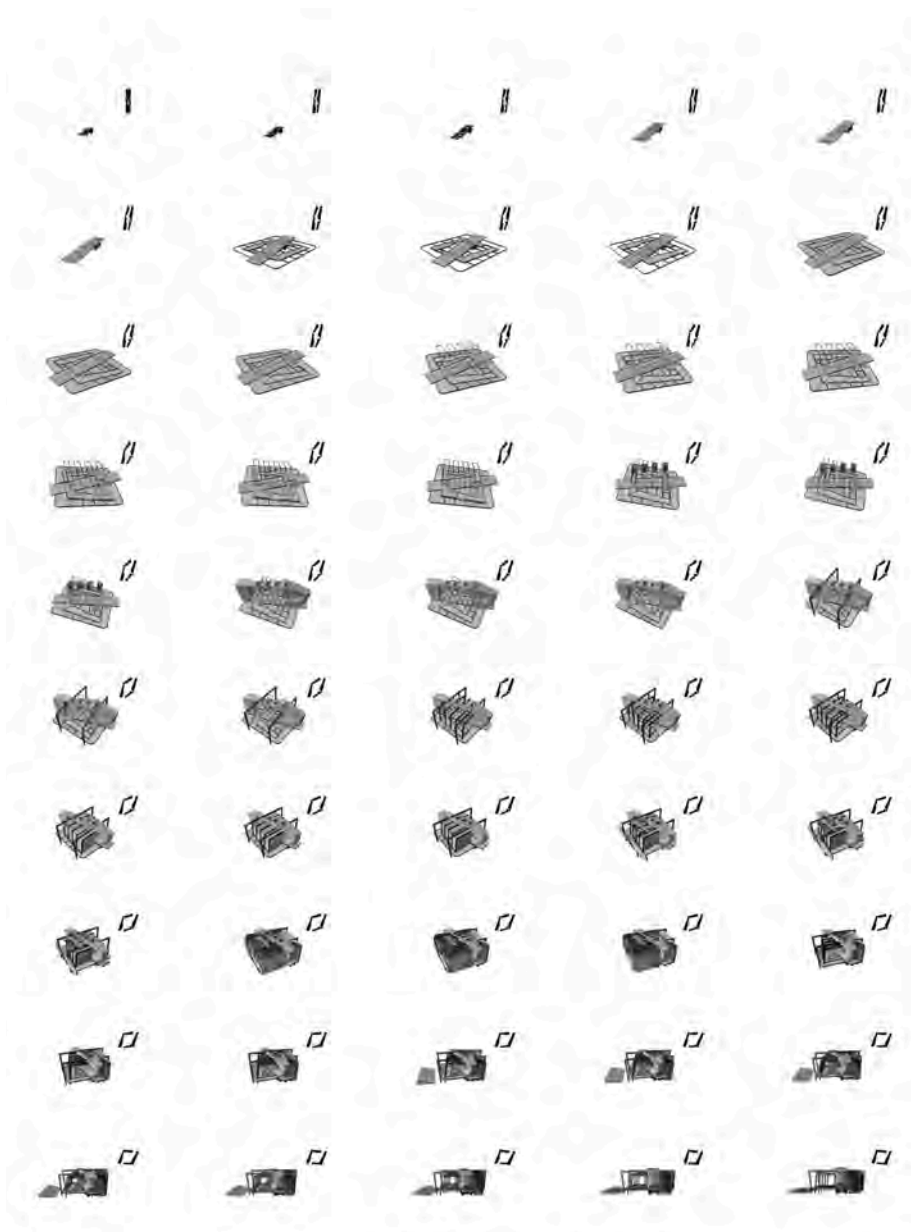
Representing architectural performativity: flipbook animating the choreographed deployment of the mobile stage.

Between the two project phases, the emphasis of our research in scanning shifted away from a positivist assumption of the congruence between the physical world and its digital representation towards a growing interest in the disjunction and discrepancy between the two. Such discrepancy appears in the case of measuring errors, which create so called "noise" in the point cloud, for example when the scanner's laser beam hits a reflective surface or the edge of an object. This noise, digital points that do not correspond to any actual physical object, is normally elaborately filtered out of the point cloud. We, on the contrary, recognize this noise as the space of potential occupation and artistic appropriation as it turns the scanner from a passive, *realist* measuring tool into an active *surrealist* agent that actually *creates* spaces in the digital realm.

The artistic appropriation of this noise starts with the understanding of the physical and geometrical principles that lie at its origin and leads to the retro-engineering

of these principles so that the noise can be controlled and purposefully created. As such, the scanner can be turned into a phantasmagorical, high-tech surrealist device of engineered illusionism. This engineered illusionism allows us designers to create fictional digital spaces and illusionary environments through understanding and then misusing the rules of techniques of representation.

The suitability of such subversive scanning strategies of engineered illusionism for scenographic purposes is evident: it echoes the very origins of the discipline of scenography, which was first developed by artists practicing illusionistic architectural painting techniques such as *quadratura* and *trompe l'oeil*. Such anamorphic illusions suggesting the spatial extensions of a given space beyond the surface of a painted wall or ceiling were in turn used for the creation of illusions of environments in stage designs.

The technique of representation crucial to these engineered architectural and scenographic illusions was the development in the renaissance of the rules of perspective. Bruno Latour describes the double role of perspective as a tool of realism and illusion as the "four-way freeway" of representation: perspective does not only allow us to realistically represent a scene (one way freeway) or to pragmatically act upon an external reality by implementing alterations designed within the technique of perspective (two way freeway) — not only can we

"displace cities, landscapes, or natives and go back and forth to and from them along avenues through space, but we can also reach saints, gods, heavens, palaces, or dreams with the same two-way avenues and look at them through the same 'windowpane' on the same two-dimensional surface. The two ways become a four-lane freeway! Impossible palaces can be drawn realistically, but it is also possible to draw possible objects as if they were utopian ones." [3]

Perspective thus is a technique of realistic representation rather than a dogma of realism of the subject matter depicted.[4] Mastering this technique allows us not only to depict a "reality" but also to challenge it. Perspective, to speak with Latour again, is a technique with which we can create "complete hybrids between the real and the imagined: nature seen as fiction, and fiction seen as nature, with all the elements made so homogeneous in space that it is now possible to reshuffle them like a pack of cards." [5]

A Post-Perspectival Illusionism

This "four-way freeway," however, cannot be directly translated to the case of the 3D scanner, as its relation between data collection and representation is more complex and less direct than is the case for classical perspective. We could in fact state that 3D scanning functions at once in a post-perspectival and pre-perspectival way.

To elaborate on this statement, it is critical to very briefly explain how a 3D laser scanner works. The scanner's range finder measures the distance between itself

3—

Bruno Latour, "Visualisation and Cognition: Thinking with Eyes and Hands," in: Henrika Kuklick, ed., *Knowledge and Society Studies in the Sociology of Culture Past and Present*, Jai Press vol. 6 (1986): 8.

4—

Cf. Anne Friedberg, *The Virtual Window: from Alberti to Microsoft* (Cambridge, Mass: MIT Press, 2006), 33.

5—

Latour, "Visualisation and Cognition," 9.

and objects in a scene by using time-of-flight measurement: shooting laser beams at the objects, it converts the signal's return time to a distance value. Constrained only by the speed of light, it can create millions of measured points per minute, which can then be translated into a set of three-dimensional xyz-values.

Similar to other technologies of active optics and remote sensing (e.g. radar), the scanner is post-perspectival: although it collects data from a fixed position, it does not have a picture plane, retina or photographic plate. In this sense, speaking of the scanner "eye"—as we have done until now—is in fact a case of stubborn anthropomorphism that resorts to an essentially humanist epistemological understanding of the human observer as the active knowing subject acting upon the passive known—be it real or manipulated.

At the same time, the scanner's measuring method is pre-perspectival: the translation of collected distance values to xyz-values and their representation on a perspectival picture plane is but a matter of post-processing to make the point cloud data legible to the human eye. This means that, as opposed to classical perspective, in which the viewer's position was identical to the painter's, the observer's location is no longer necessarily "encoded into its representation." [6] Instead, she/he can now freely navigate through the point cloud model—echoing futurist Bruce Sterling's speculations on the future of the camera which

"simply absorbs every photon that touches it from any angle. And then in order to take a picture I simply tell the system to calculate what that picture would have looked like from that angle at that moment." [7]

These considerations imply that techniques of "scanning illusionism" cannot simply operate on the level of "realist" representation (simulating fictional narratives within the flat constraints of pictorial representation)—but instead will have to engage with this pre-perspectival stage of data collection. As this data collection (the actual measurement) is firmly embedded within the material reality of the measured scene,[8] the trigger for such illusionism will necessarily lie in the realm of physical intervention and thus become a spatial, architectural challenge.

A Live Survey

As a prototype for a post-human scenography, *The Scan* applies such a post-perspectival engineered illusionism to create a "stage" that is marked by hybridity—hybridity between physical and digital performance spaces, and hybridity between realist and fictitious spatial representations.

Similar to our first cooperation, there was a shared interest to break out of the theatrical convention of the black box stage. This time however, rather than designing a movable stage, an existing building—the premises of the RCSSD at Eton Road—was used as performance spaces. The attraction of these spaces lies in their labyrinthine quality: it is a conglomerate of buildings that has been extended, added and layered upon, a complex set of spatial relations that becomes legible

Human and post-human eye: perspectival point cloud representations imposing a humanist picture plane on post-perspectival data.

6—
Friedberg, *The Virtual Window*, 28.
7—
Bruce Sterling, *Vernacular Video* [Lecture at the Vimeo Awards Festival], New York, 9 October 2010.
8—
Karen Barad uses precisely time-of-flight measurement to illustrate the material entanglement of processes of knowing (the materiality of the laser beam) with processes of being (the measured material object) and to define her concept of an entangled onto-epistemology. Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham: Duke University Press, 2007), 78.

only through a longer experience of navigating its rooms—but even then would need a set of universal keys to reveal its unexpected backdoor connections. In a first stage of the project, a survey of the building is conducted using the 3D scanner. A routine 3D scan of an existing building is largely planned around maximizing the efficiency of selected scan positions so that the exercise captures all necessary information in the fewest number of set ups. Set up positions can be seen as black circles. These are the blind spots directly beneath the unit that the instrument does not measure when operating. If undesired, they can be eliminated by data from another position that looks back to that position. In this case they were left in and allow the total number of scans in this assembly to be understood by the reader.

Looking at perspectival representations of the assembled scans, the opaque walls and floors of the buildings dissolve as they are turned into clouds of millions of points, whose pixel size and hence opacity can be controlled within the digital model. The spatial correlations, lost in the additive complexity of the floor plans and labyrinthine circulation, become transparent and legible.

However, the conventional metrological use of the scanner as a realist instrument of truth—elucidating, revealing, making legible the site—was simultaneously challenged during this first survey. The exercise to scan selected areas of the RCSSD was exploited for simultaneous performance experimentations by two production groups, Shunt and a group of performers soon nicknamed "CSI" due to their interest in the forensic use of scanning technology. Some experiments were spontaneous and others were partially scripted, based on a briefing by ScanLAB prior to the survey. Each experiment was designed to explore the implications for performance and documentation generated by the time-based spatial capturing offered through 3D scanning. The experiments intervened across a suite of scheduled capture positions with unscheduled performance tests that explored conditions such as sound, movement, materiality, dialogue, montage, blind spots, building fabric and narrative.

Opposing Page—
The elucidating scanner: the complex spatial correlations of the labyrinthine RCSSD buildings are rendered transparent and become legible.

Right—
Shady evidence: first scanned performance experiments staging fictitious forensic scenes and exploring the scanner's shadow zones.

72
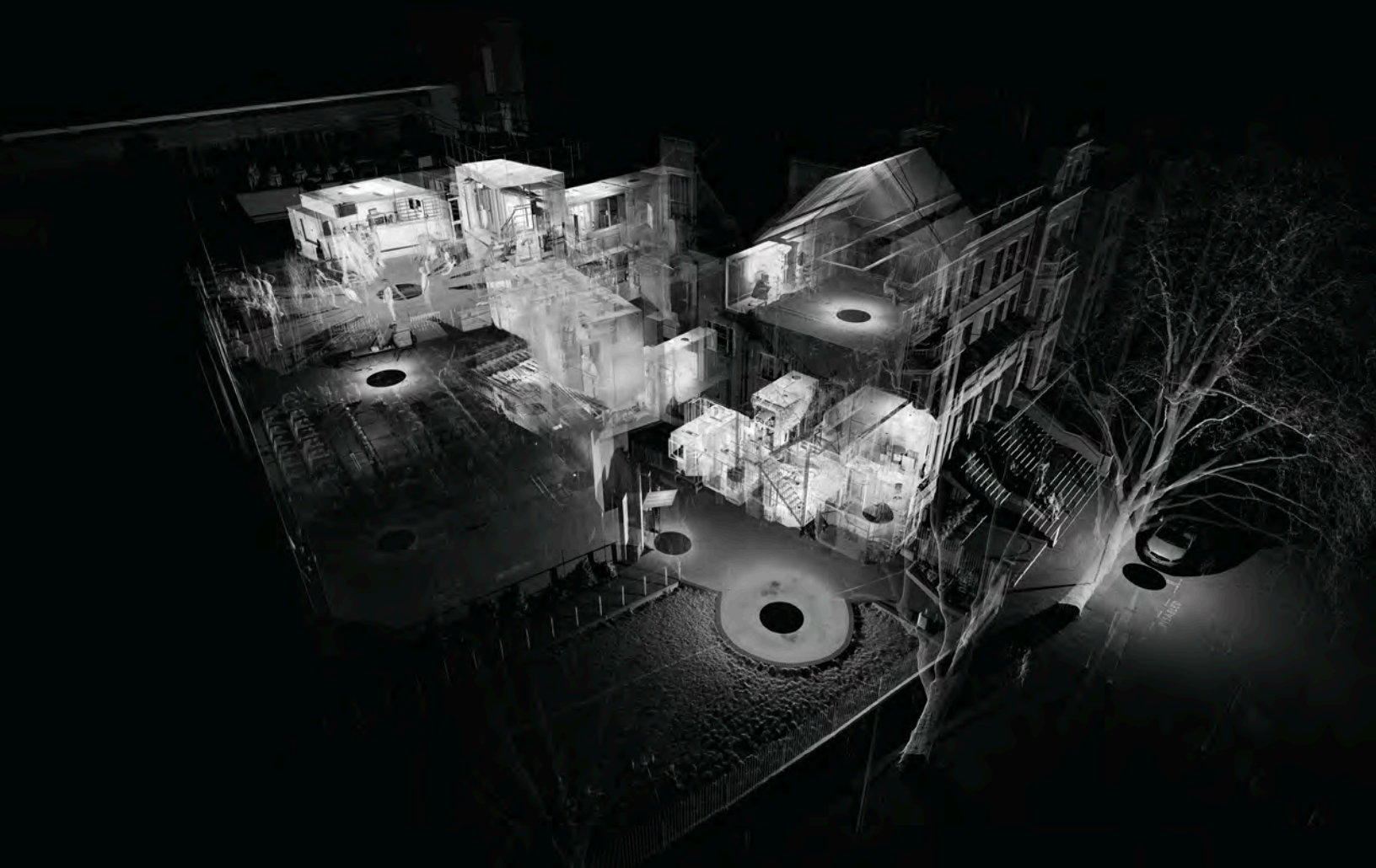
A first set of performance experiments created narrative tableaux wherein the actors, like in early photography, would stand still waiting for "full exposure" while the scanner's rays swept past them (depending on resolution and accuracy, the scanner describes a 360° rotation that creates tens of millions of measured points in a matter of minutes). Soon, however, the performers recognized this very rotational movement as inherently choreographic, a time-based constraint and opportunity creating a narrative space to be inhabited by their performance. It meant that, for example, one moving performer could appear multiple times within a single scan. Also, as the scanner reads a scene as concentric sections of reality, it can slice a moving body, disassembling, warping and extending it.

The notion of time-based tableaux or of a "live" site survey emerged, and established the ambiguity between the forensic accuracy and "realist" capture of the scanner on the one side, and its phantasmagoric, fictional, and deceptive potential on the other—an ambiguity that would remain the main impetus of the rest of the project.

Bending a Blind Man's Cane

One key scene, called "the Crying Room," enacted and scanned during this process of live surveying, would become crucial to the further development of the piece. The scene involved a woman, crying and reciting a text in front of a large mirror in one of the RCSSD's many rehearsal rooms. The resulting point cloud model showed a non-existent, mirrored digital room, in which the performer's "blind side" appeared.

This is explained by the fact that the scanner's laser ray measures strictly one-dimensionally—rather like Descartes' (faulty) description of vision as a blind man stabbing his cane in the dark until it meets an object. What happens here is that this cane is "bent" or deflected by the mirrored surface and travels on to meet an object in front of the mirror. The ignorant blind man (the scanner) however assumes that the object lies in the extended direction of his stabbings and thus digitally creates this parallel, fictional room behind the mirror.

Opposing Page—
"There is no circle": the scanner reads the scene as concentric sections of reality; it slices, disassembles and recomposes performing bodies.

Right—
The Crying Room: the performer's "blind side" appears in a non-existent, mirrored digital room created by the ignorant scanner.

74
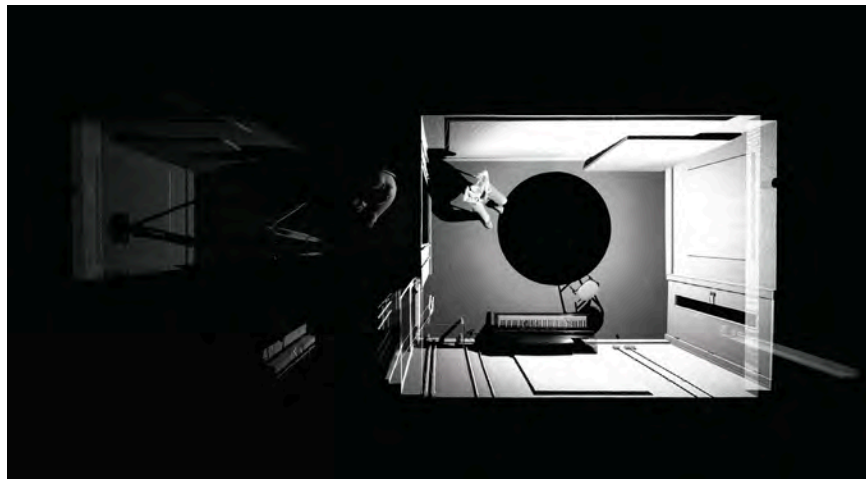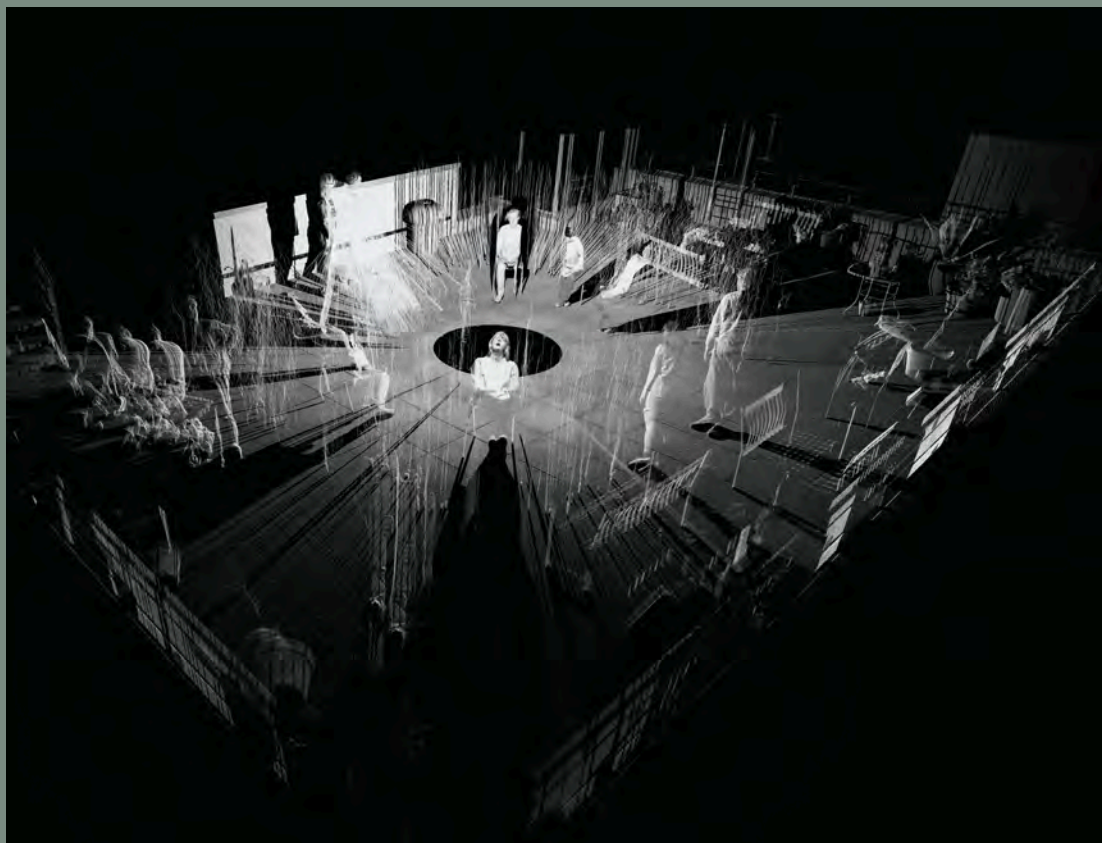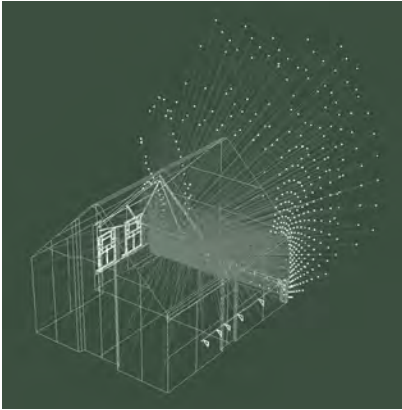
From spillage to engineered mirage: custom software component written to parametrically control reflective panels and displaced performance point clouds.

This result provoked an interest in developing the reflected data as a parallel performance space exclusively within a digital environment. Scanning instrument manufacturers recommend to avoid capturing shiny or reflective surfaces, as these would generate noise in the resulting point cloud. By focusing on what we were advised not to do, reflection became a key tool in establishing and manipulating an additional, purely digital, extended performance space.

A design and prototyping phase followed with the aim of transforming these mirrored spaces from incidental digital spillages into purposefully created mirages. Custom software components were scripted that reverse-engineer the reflections created by parametrically controlled reflective panels and can calculate the position of the resulting displaced point clouds in relation to the performance position. The point cloud produced during the initial survey was not only essential for this simulation of the scanner positions and the reflective panels' orientation but also for the design and prototyping of the prosthetic armatures that would hold them in place. The accuracy of the scanning data and digital simulation could be passed on into the physical prototyping stage through the implementation of digital design fabrication methods (laser and waterjet cutting) that allow for the fabrication of bespoke and highly precise insertions that fit accurately onto the scanned building elements.

Digital Doppelgangers, Colliding Mid-Air

Adding digitally fabricated spaces using these developed simulation algorithms provided a new scenographic strategy towards the given site conditions, a strategy governed by the ambiguity between making the labyrinthine building transparent and legible on the one side and on the other side, the urge to continue and emulate the additive complexity of the as-found physical space through an equally complex juxtaposition of fabricated digital spaces—hence adding even more "rooms" to the building.

A series of positions within the RCSSD building were selected to receive the installation of paired bespoke instruments creating such digital performance spaces. Each of these paired instruments incorporates a 3D scanner head mounted on an armature that faces a second housing of programmable reflective panels. The orientation of the paired elements to one another is informed by results of the live survey and further develops the enactment of a performance in real space that is designed to be read and alternatively explored in a digital model. The installed instruments capture performances that are designed to "occupy" the hidden space in the presence of an audience who only sees the performance that is being reflected. All reflected digital spaces sample, copy and paste elements of indoor rehearsal and circulation spaces to converge in the (digital double of the) courtyard of the building, piercing the walls that surround it and colliding in suspension high above ground.

The resulting conglomerate of digital and physical performance spaces reminds of Katrina Varian's project, one of the 2008 students who imagined a series

of external "parasite" spaces enveloping the RCSSD's courtyard to house experimental performance and audience locations. However, as opposed to her project—and more general to the first phase of the collaboration—, it is not *The Scan*'s physical insertions that form the actual scenographic space. The reflective panels, rather than being a scenography in their own right, are both signifiers of and triggers to the digitally extended scenography. Like in illusionist baroque painting, surfaces become a portal to a further three-dimensional space that supposedly/digitally lies beyond them.

Around a first of these scanner positions, a scene is staged in a staircase on the north side of the courtyard. Through three pairs of mirrors, a scanner on the upper floor captures a single performance, which is taking place on the lower floor, simultaneously from three different angles. These three different "views" are projected outwards (using the logic of the blind man's broken cane—which in this case is broken twice) and are digitally created as fictional spaces floating above the courtyard. This scenario is not only post-perspectival but also post-Cartesian as it explodes, multiplies and scatters the xyz-values of a single geometric entity into a digitally displaced, multi-perspectival point cloud.

A second scene is developed for the ballet room, in which the two techniques described above—the scanner's rotational choreography and the reflective screens—are combined. An array of ten mirrors delicately balances from the ballet

Above—
Post-Cartesian explosion: three sets of bespokely fabricated mirrored instruments capturing a single performance simultaneously from three different angles.

Left—
A digitally displaced, multi-perspectival point cloud.
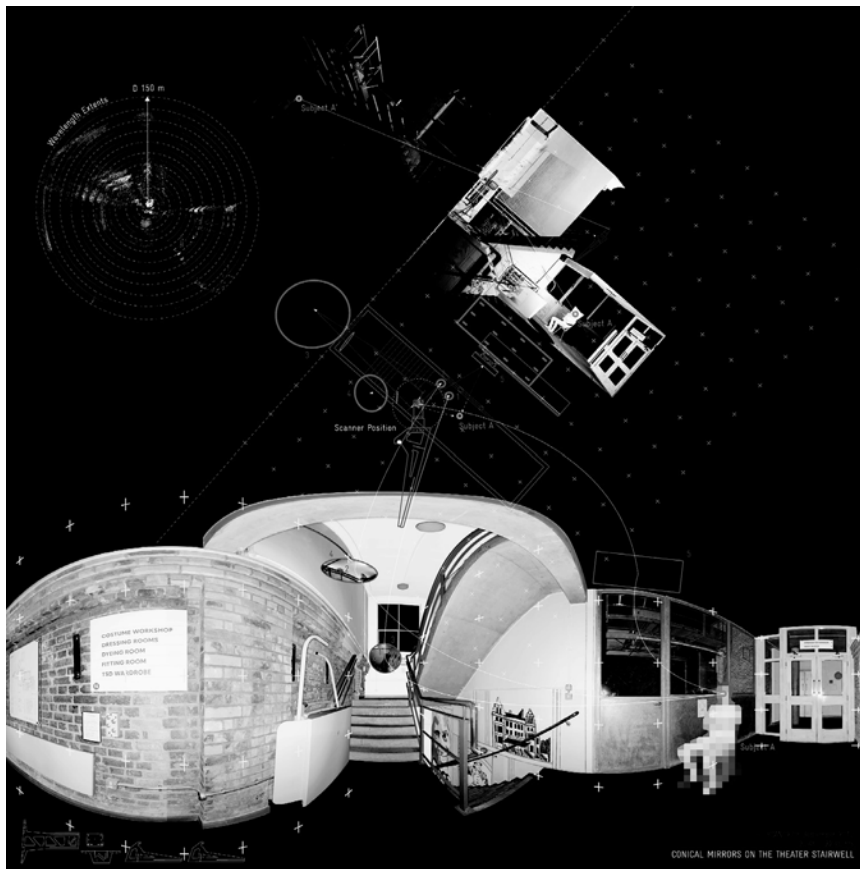
Masked performers inhabiting the focal point of the ballet room mirror array.

rail and against the wall, lined up like serially connected metallic ballerinas. As the scanner makes its rotational movement and sweeps across these mirrors, each mirror consecutively reflects its rays towards one and the same focal point for the duration of a couple of seconds. Hence, a performance, taking place on this "hot spot," is reflected, scanned and digitally "created" ten times behind the mirrors. Hovering three stories above ground, a four-dimensional "film reel," a spatialised Muybridge image sequence occupies the space beyond the wall, capturing the performance in ten consecutive "frames."

The performers, by studying analytical drawings and through scanned rehearsals and explorations of the resulting digital point cloud mirages, become accustomed to inhabiting and interacting with this four-dimensional scanner-timed scenography. They become guides for the audience and their projected digital doppelgangers.

Re-Fragmenting the Mirror Stage

As time and gestures are exploded in space, the spatial and temporal realism of the point cloud is dismantled. Instead of the snapshot quality of a "unique" moment in time and space, a multiplicity and complex layering of both unfold. With this spatio-temporal disruption, the notion of the autonomous performer/audience/subject as a unique spatial and temporal individual is exploded, too. If in the classical Lacanian theory of the so called "mirror stage," the child, by recognition of an image of the "self" in the mirror, develops an "imaginary wholeness" and self-consciousness, the mirrors in our case are used to quite the opposite end: they are devices that re-fragment notions of selfhood, identity and subjectivity.

This spatially scripted sense of fragmentation and displacement also becomes part of the spoken script of the piece, in which the role of the audience, which is led through the (digital and physical) spaces by the performers, is constantly obfuscated and ambiguated:

"A: This is a summary of events.
You are all here.
We are walking in a circle together.
B: You aren't here.
You're jumping through walls and looking at yourself in the mirrors.
In some you look fatter.
There is no circle."

The audience's—partially uncomfortable—submission to the machine-timed and machine-recorded choreography destabilizes its usual centrality as the singular consuming perspectival "eye" to whom the piece is directed. As many scenes are acted out for the ominous post-perspectival eye of the scanner, the audience looses its privileged position—reflecting a post-anthropocentric reality in which a plethora of heterogeneous non-human eyes and agents have complemented or even replaced human vision.

The audience thus is confronted with its own inability to grasp the full "picture" of what is happening. This is not only due to the relative novelty of 3D laser scanning technology to most of the audience, but also due to the decision not to provide visual feedback (for example as a perspectival representation of the digitally created, partially fictional, point cloud) during this stage of the performance. This "reveal" will find place later in the piece and will be discussed below. For now, the absence of instantaneous representation is not only a technical issue,[9] but also a conscious curatorial decision: implementing visual feedback (be it through screens or more immersive technologies such as virtual reality goggles) would merely re-establish the perspectival centrality of the detached human observer and thus reinstate the "scopic regime" or "Cartesian perspectivalism." [10]

Parallel to the displacement of the audience's privileged spectatorship, a shift takes places towards a sense of audience authorship—however unclear this authorship may be at the moment of the actual performance—and hence towards an erosion of the sole authorship of both scenographer and performer. The humanist notion of an active subject/author, acting upon a passive world of objects—matter in the case of the architect, the audience in the case of the performer—is dismantled in favour of a notion of co-authorship over unfolding events.

From the onset, a fertile friction arose between our scenographic intentions—the prescriptive clockwork choreography described above, assuming the magician's (all too) perfect control over the engineered surrealism of their test person's reflective fragmentation—, the performer's associative interpretation and the audience, unknowingly stepping in and out of a "hot spot", a cross that marks their simultaneous vertiginous suspension fifteen meters above the courtyard behind the wall.

This notion of shared authorship however, goes beyond what would be commonly categorized under "public participation"—as it is not confined to the human actors involved but extends well beyond into a more ontological sense of participation that comprises human and non-human "actants" alike. The scanner, for example, becomes a central actor/performer in the piece. This is true in both a literal sense—the scanner being referred to in the text, being turned into an ominous and wondrous object, a spatial mediator around which the performance revolves— and in a more epistemological sense—the scanner not just being a passive camera obscura capturing the scene but an operative agent actively creating and augmenting the scene. As such, all human and non-human agents form a network that mutually creates the unfolding of the co-authored piece.

No Applause

In the final act of the piece, after being guided through the building and along a series of scenes and scanner-timed choreographies, the audience is led through the backstage area and gathers onto the stage of the RCSSD's Embassy Theatre. The space is dark, the auditorium hidden behind the fire curtain. Projected onto the back of the fire curtain is a dense multimedia relay of point clouds, 3D models,
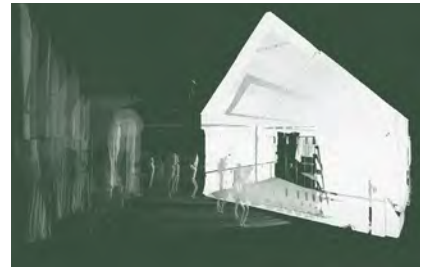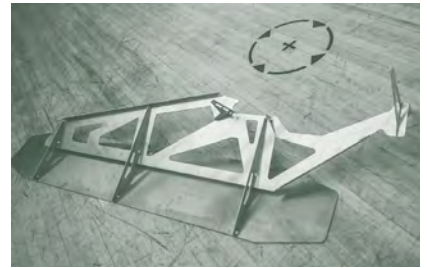
Hovering above the courtyard, a four-dimensional scan sequence captures the performance in ten consecutive frames.

9—
The laser scanners we use don't allow for real-time visualization.
10—
Cf. Martin Jay, "Scopic Regimes of Modernity," in Hal Foster, ed., *Vision and Visuality* (Seattle: Bay Press, 1988), 4.

Reveal: entangled in the inner workings of the performance, the audience is immersed in the unintelligible hyper-analysis of its own actions.

animations, CCTV footage, infrared footage, photography, sound recordings and dialogue recorded during the piece. The performers sit lined up behind a long table full of computers and technical equipment and in front of the projections, facing away from the public. In hushed, barely understandable voices and using technical terms, they discuss the projected material. They react indifferently to the intrusion of the audience, suggesting a process that has started long before the audience arrived and will continue after they leave.

Again, the members of the audience no longer sit comfortably in their detached and privileged auditorium but instead become aware that they have been performers themselves, observed by a multitude of post-perspectival eyes. The choice of the backstage location is of course symbolic, displaying the system of pulleys, ropes and counterweights that normally provides the machinery and armatures for illusionistic scenographies. Now surrounded by this machinery, entangled in the inner workings of the performance, the audience is immersed in the unintelligible hyper-analysis of their own actions. Marking the end of the piece, the fire curtain rises. The projections disappear and actors, scenographers and audience face the auditorium. It is empty. There is no applause.

Polyscenic Assemblages

The largest part of the multi-screen display is taken up by projections of point cloud models. The scans are composited, digitally stitched together as is normally done after a scanning survey—only that now, the digitally created, parallel performance spaces appear, imploding the buildings spaces into the courtyard. Hovering above the courtyard, mirage spaces overlap; performers and members of the audience hang upside down, protrude through walls or intersect with the fire escape staircase. While some fly-through animations are made before the evening of the performance, stitching together scenes from the initial survey, juxtaposing them with point clouds created during rehearsals, other point cloud displays are shown "live" by an operator panning through a model, layering "fresh" material from the evening's scans onto previous point clouds, further destabilising time-scales. The operator zooms into a person's face in the ballet room, the face dissolves into points as we come closer: was this a performer, a member of a previous audience, a mirage?

The process of digital grafting, not only deconstructs the spatial realism of the composited scenes but also undermines the temporal realism of the snapshot moment as it blends and layers time-scales into a non-linear narrative spatio-temporal assemblage, suggesting the progression of performers through the scenes, playing different roles, enacting different scenes simultaneously. The plausibility of this narrative is constructed through the "optical consistency" [11] of the point cloud—again reminding us of what Latour, in the case of perspective, called "reshuffling the cards of reality." Indeed, the resulting scenes could be likened to so-called polyscenic paintings of the *quattrocento* renaissance, in which, using the then recently discovered (or re-discovered) unifying technique of perspective, multiple sequences of a story (e.g. Botticelli's *Three Miracles of*

11—
Latour, "Visualisation and Cognition," 8.

Saint Zenobius), were depicted within one single perspectival scene, framed by an assemblage of existing and fictional architectural elements.

It would be oversimplifying, however, to consider these spatio-temporal point cloud assemblages as endpoints of the piece—as if describing a linear process of deception and revelation in which a "trick" played on the audience is resolved in a communal revelatory backstage aha moment. Such would not do justice to the complex and entangled notion of the digital (and its relation to fabrication) that was built up throughout the collaboration, and of which a brief discussion seems apposite at this point.

Digital Scenographies for a Saturated Space

As with many practices, theatrical production has been revolutionised by digital technology. Performers such as Blast Theory, Me and the Machine (*When We Meet Again*), Rimini Protokoll (*Situation Rooms*) and Janet Cardiff (*Ghost Machine*), to name but a few, have successfully developed works that exploit the fluidity of contemporary life populated by digital media and technologies, where the audience experiences the event through devices such as phones, tablets and laptops. This is a novel route to open up new realms for performance in the context of environments that are increasingly digitally saturated and where audiences are literate and active in multiple spatial domains, such as receiving and transmitting location data, identities, information, contacts, media, et cetera.

In Janet Cardiff's *Ghost Machine* (2005), for example, the participants receive a camera with a pre-recorded tape and a set of headphones, which guide the participant through the theatre building. The videotape shows footage that was shot from the participants' location but at a different time so that "they find themselves in a confused jumble of overlapping realities." [12] This piece is characteristic of a theatrical practice that takes on the notion of what could be called a hybrid or "augmented" scenography, to which, in parallel to the physical set, digitally represented sets and narratives are added as layers of information and representation.

At the moment in which they are experienced by the audience, however, such digitally augmented scenographies are closed, one could say pre-fabricated, so that even if the participator might move freely through them, she/he is not actually involved in their creation. This means that, eventually, the creator-consumer relationship between scenographer/performer and audience—and its sense of closed authorship—remains unaltered. What our approach suggests is a notion of fabrication not as a finished or finite process but as the ongoing production of phenomena mutually created by all human and non-human agents involved.

Digitally Fabricating / Fabricating Digitality

A crucial shift in the notion of digital fabrication has taken place since the first collaboration of Protoarchitecture Lab with the RCSSD. In the first phase (vaguely

12—
"Ghost Machine, 2005, Janet Cardiff and George Bures Miller", https://www.youtube.com/channel/UC4u0V-G5KTeWF5hnubp-lrA (accessed 1 August 2014).

coincident with the PerFORM project discussed at the beginning of the article), digital fabrication was understood as a methodology which, through the aid of digital metrology (3D scanning), digital design tools (CAD) and digitally controlled manufacturing (CNC), allowed for a heightened accuracy, customization and complexity—but which eventually still culminated in the fabrication of physical artefacts or sets.

This phase could be called *mimetic*: each consecutive translation between the digital and the physical is measured by the accuracy of its replication—the digital point cloud model is valuable because it accurately and realistically measures and represents the captured physical scene; the physical artefact or insertion is in turn evaluated by the low tolerance of its materialization of the digital design model. This mimetic, consecutive impetus also marks the nature of the collaboration between scenography and performance—the flipbook notion of a scenographic architecture being a mechanically unfolding spectacle emulating the movement of a performer; and vice versa the consecutive "re-enactment" of this movement by a dancer's gestures.

In a second phase, a notion of translation and fabrication emerges that is *augmentative* rather than mimetic—all while retaining the pragmatic benefits of this mimesis. When the scenographic insertions, which are bespokely designed based on a "realist" scan and implemented into the site, are re-scanned, our digital point cloud mirages appear as elements that are additionally *created* by that very translation process. The role of the scanner as a tool of *verification* is ambiguated in that it both *checks* the truth (accuracy) of the insertions and *creates the truth* (from *verus facere*, to make true) of the mirages. A novel, extended sense of fabrication emerges which comprises both the digital fabrication of the physical (using scans as a source of information) and the physical fabrication of the digital (using scans as a sources of fiction). The insertions, *digitally fabricated, fabricate digitality*.

Fabricating for an Entagled Digitality

The reader might sense the danger however that, by adding a next, be it digital, stage (the fabrication of digitality) to a linear fabrication workflow, we might be merely stretching its teleology with yet a new, but equally *final* goal. Therefore it is important to note that also the digital point cloud assemblage cannot be read as the new definitive goal, the ultimate repository of our scenographic practice. During the process of our experimental collaboration, a practice emerged that is instead characterised by a constant feedback between physical and digital creation. The digital site, the point cloud archive, becomes a parallel performance stage that is constantly fed by (i.e. being scanned), but also feeds back into the physical space.

This feedback of the digital back into the physical affects both the appearance and experience of the physical performance space. Visually calibrated by the mirror and scanner armatures and annotated with markers indicating origins, hot spots and movements, it constantly refers to the parallel digital spaces being

created. Maybe even more important, however, is the performer's accumulation of technical and spatial literacy regarding the resulting point cloud models: after each rehearsal session, performers and scenographers would sit down to explore and navigate through the resulting point clouds, compare and composite them with older results and refine strategies for further rehearsals and performances.

This way, each consecutive rehearsal becomes more and more deeply saturated with both the imprint of a remembered digitally created space and the anticipation of the digital space being created at that very moment. As the performers develop a sense of simultaneously inhabiting this digital space, they become guides to these spaces, leading the audience through its digital pitfalls:

"A: We can see things you can't see
B: It's not always helpful
A: I can see through that wall
B: It's not very interesting."

Also, they develop techniques that creatively exploit the point cloud space's own peculiar rules and laws, modes of mobility and observation. When one performer, during the piece, starts writing the opening lines of T. S. Elliot's *Four Quartets* on the exterior wall of a ground floor rehearsal space, she does this *backwards*—literally becoming more literate within the point cloud space, she knows that digitally standing within the rehearsal space, she will be able to read it through the wall as soon as it dissolves into points:

"Time present and time past
Are both perhaps present in time future
And time future contained in time past.
If all time is eternally present
All time is unredeemable.
What might have been is an abstraction
Remaining a perpetual possibility
Only in a world of speculation."

Eventually, the physical space surrounding us dissolves into points, even without the mediation of its perspectival representation. As in Elliot's Quartet, scales of time and experience are now inextricably mingled, each performance taking place in its present physical space as well as interacting with the previously and presently recorded and soon to be represented space. In our digitally saturated age, digital fabrication becomes an ongoing reciprocal, non-teleological process, the digital and physical being both thoroughfares of an emergent digital-analogue assemblage, an entangled continuum in which it is useless to attempt to distinguish what is represented or actual, recorded or created, fact or fiction.

Orchestrating the Edge: On Schizophrenic Points and Indecisive Photons

Thomas Pearce
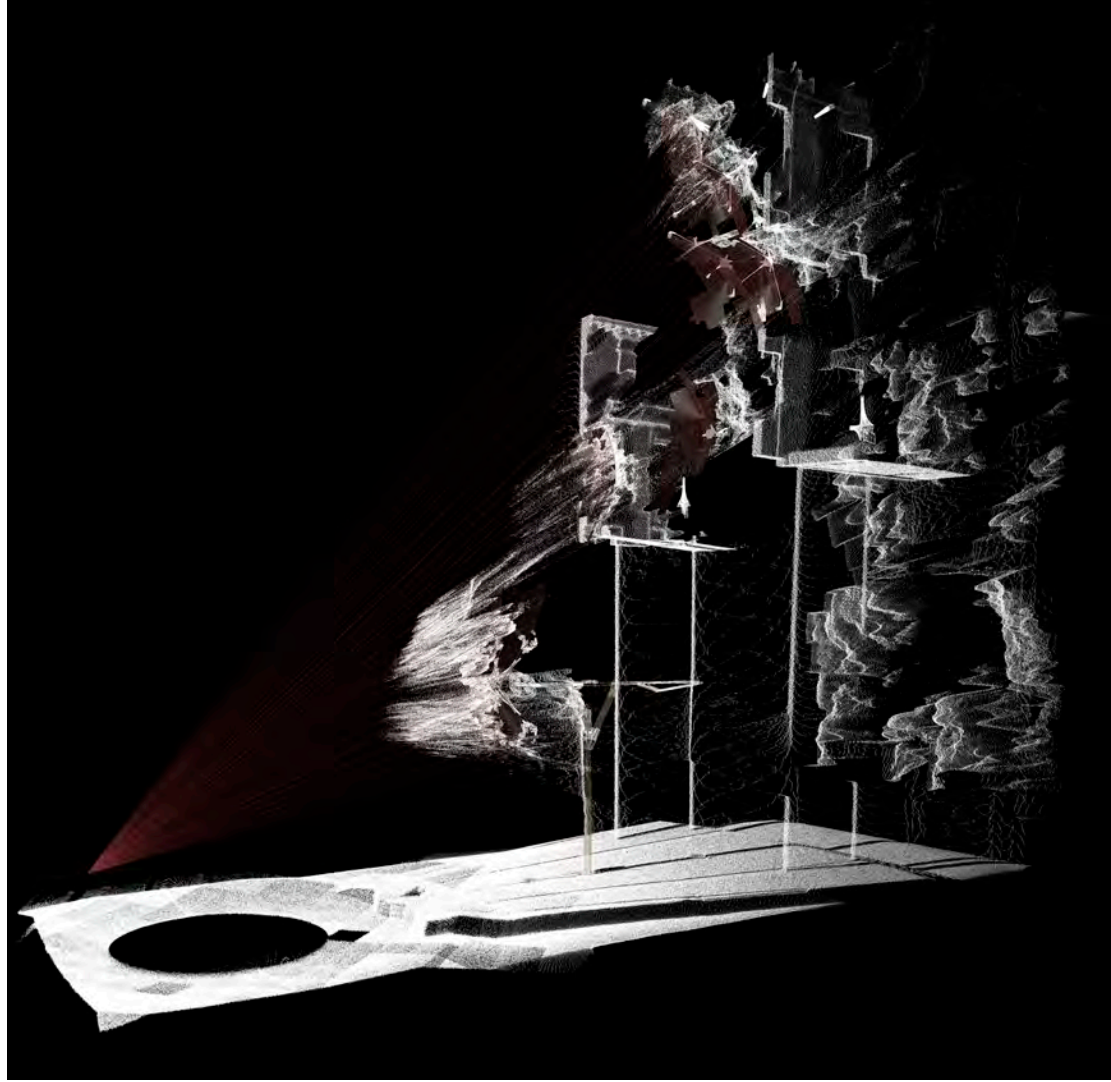
"Behold yon miserable creature. That Point is a Being like ourselves, but confined to the non-dimensional Gulf. He is himself his own World, his own Universe; of any other than himself he can form no conception; he knows not Length, nor Breadth, nor Height, for he has had no experience of them; he has no cognizance even of the number Two; nor has he a thought of Plurality, for he is himself his One and All, being really Nothing."
Edwin A. Abbott, Flatland: A Romance of Many Dimensions [1]

"The danger is in the neatness of identifications."
Samuel Beckett [2]

Geometrical categories, more than being just tools for describing the physical world, always simultaneously serve as psychological projection planes for shared anxieties. Edwin A. Abbott, in his 1884 novel "Flatland," explores the tormented personalities of elements of descriptive geometry and (mostly in vain) tries to free them from their ignorant attachment to their own limited dimensionality. In doing so, he not only foretells by decades the theory of a fourth (and n-th) dimension but also politically activates spheres, polygons and points as they become a soundboard for his satirical critique of the social immobility and narrow-mindedness of Victorian society.

1—
Edwin A. Abbott, *Flatland: A Romance of Many Dimensions*. **(Boston: Roberts Brothers, 1885), 141-2.**
2—
Samuel Beckett. "Dante, Bruno, Vico, Joyce," **in Samuel Beckett (ed.)** *Our Exagmination Round his Factification for Incamination of Work in Progress* **(Paris: Shakespeare and Co., 1929), 6.**

The main protagonist of this article is a point with a faith no less miserable than Abbott's: it is the point in the 3D laser scanner's point cloud. This point cloud is well underway to become a dominant mode of seeing, measuring and mastering reality. In doing so, it is slowly but surely dissolving this reality into endless sets of unique XYZ values. The exactitude of these coordinates condemns the points, "being really Nothing," to a theoretical state of Cartesian weightlessness. What is left between them is a gaping interstitial shadow, a shadow that is pervasive and cannot be eliminated by adding ever more points—not even in a theoretical endless resolution.

The mesh (the triangulation of these points into a surface) is becoming a widespread coping strategy for the *horror vacui* caused by this interstitial unknown—to the point that many recent consumer-oriented 3D scanners no longer even output point clouds but merely meshed surfaces. The shadow-ridden and ambivalent state of the actual measuring mechanism, the dispersed point cloud, is bypassed as it is safely internalised in the black box of the scanner apparatus. What results are topologies with clearly defined extrinsic boundaries, the comforting discrete and stable identities of directly 3D printable solid subjects.

But rather than concentrating on the anxieties *resulting from* the point's non-dimensionality, I would like to zoom in on one single point and look at the anxieties that *produce* this very idea of weightlessness. Again, it is the projection of our own longing for stable, "neat" identities rather than the scanner's actual measuring process that abstracts its measurement to irrefutable and unique coordinates. For does the point in the point cloud, like the miserable point evoked in the opening quote, really "know no Length, nor Breadth, nor Height"? Is there really no "thought of Plurality" in its solipsistic mind? If we want to fracture this solipsism and recuperate notions of multiplicity and ambiguity, we will have to "unbox" the scanner's black box and analyse its internal workings.

Modulating the Schizophrenic Point

It all starts with the thickness of the measuring laser beam. The fact that the scanner's laser beam does have a "Breadth"—a diameter of a couple of millimetres [3] —has rather far reaching implications for the nature of the resulting point. I want to illustrate this describing a phenomenon called "edge noise." Edge noise occurs when a beam hits the edge of an object and the other part of the beam travels on to meet an object behind it. The range sensor, determining the distance by measuring the "time-of-flight" (the time it takes for the beam to reflect off an object and return to the scanner) receives a "mixed return" of two time-of-flight values.[4, FIG.ii] The scanner deals with this by means of interpolation: it creates an average of these two measurement values, thus outputting a "fictional" point between the first object's edge and the second object behind it. [FIG.iii]

It goes without saying that the scientific papers discussing these "mixed pixels" are mainly concerned with the development of strategies for the identification and removal of these abnormal artefacts—say the noise of dense vegetation (twigs,

FIG.i (Previous Page)—
Reverse engineering imaginary point clouds through finely perforated, algorithmically controlled Masks.
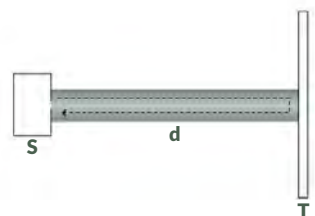

FIG.ii—
Time-of-flight measurement: distance (d) between scanner (S) and Target (T) = laser return time/2 x speed of light.
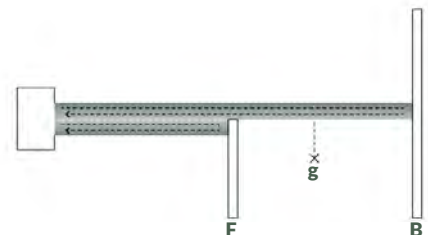

FIG.iii—
Mixed pixel/edge noise: an interpolated "ghost" measurement (g) between foreground (F) and background (B).

85

5—

E.g. J. Tuley et al. "Analysis and Removal of Artifacts in 3-D LADAR Data," *Proceedings of the IEEE International Conference on Robotics and Automation*, Carnegie Melon University, Pittsburgh, April 2005, 2203-10.

6—

Karen Barad. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. (Durham: Duke University Press, 2007), 137.

7—

Cf. Félix Guattari. "The Three Ecologies." Translated by C.Turner, *New Formations*, no.8 (1989): 141.

leaves) for unmanned military vehicles.[5] For us however, these "ghost points" are fascinating as they start contesting the realism of the scanner and reveal that underneath the reductionist representation of the non-dimensional point, there is a plurality to be discovered—that the solipsistic point is actually a schizophrenic point.

In fact—though this is an extrapolation that bears more epistemological than practical relevance—this schizophrenia is lingering in every point of the point cloud: every measurement can be defined as a "noisy" mixed measurement for even when the beam isn't split by hitting the edge of a discrete object, it will always hit a surface in an "abnormal" (meaning not perfectly geometrically normal or orthogonal) way. What starts to crumble here is the notion of atomism, the assumption of an "uncuttable" smallest unit, that as "the postulation of individually determinate entities with inherent properties" [6], not only functions as the basis of a realist understanding of the point cloud but also as the basis for the very notion of the individual (similarly meaning "indivisible").

How then do we start defining a positive notion of this inherent mixed state—an understanding that neither eliminates these "abnormalities" by filtering them out, nor "resolves" plurality in a dialectical synthesis of interpolation? Can we think of these mixed pixels in a non-reductionist and non-dialectical way, seeing them as fleeting intensities that are neither foreground nor background, but "included middles" [7] ? Can we, and if yes, how do we *design* these included middles?

The schizophrenic point is not only a powerful *metaphor* for multiplicity but can also become an instrument or a *catalyst* for multiplicity. This is because understanding the nature of edge noise also has a practical implication: it allows us to rearrange the equation describing ghost measurements (g) as resulting from the interpolation between foreground (f) and background (b):
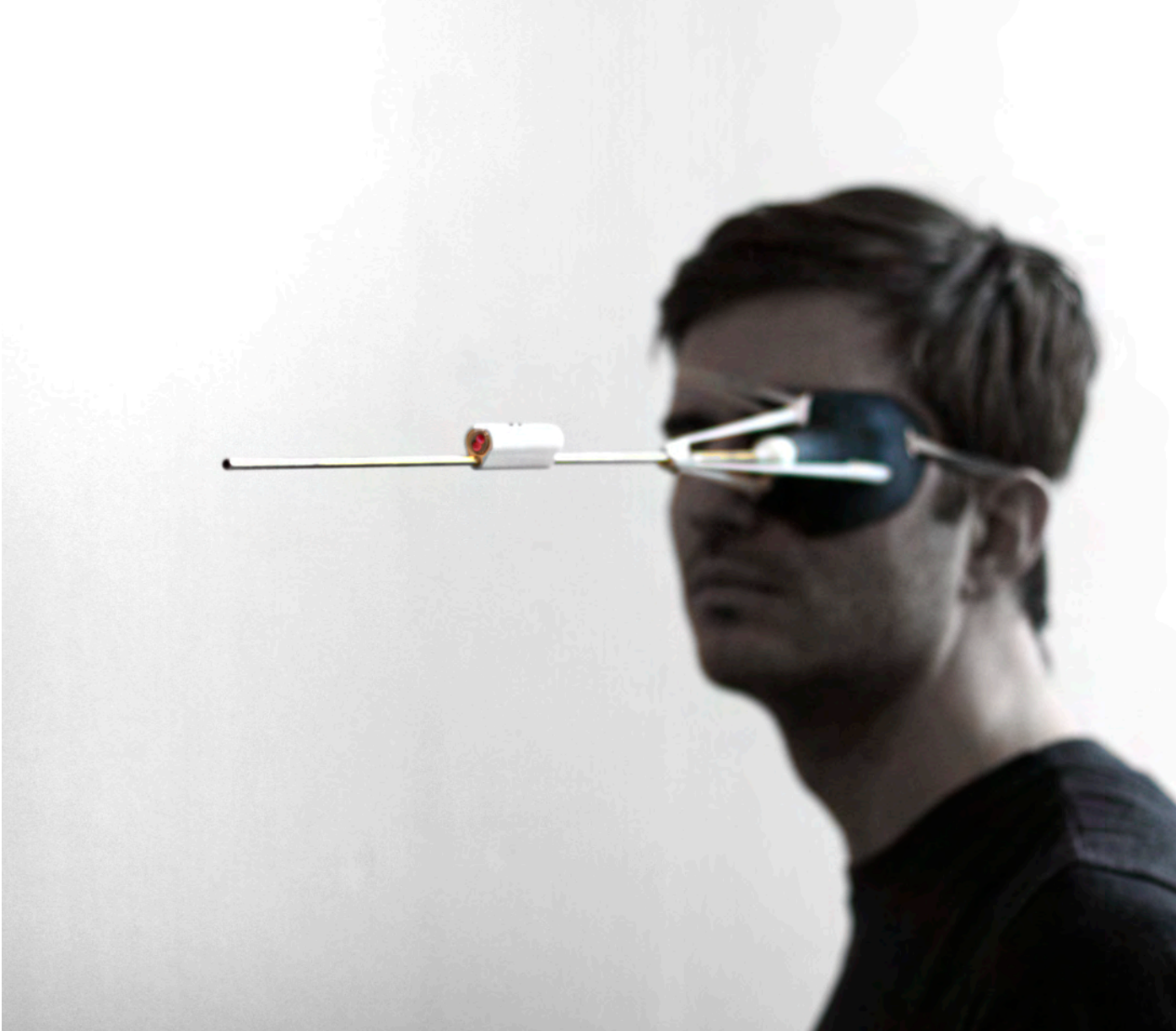
$$g = (f+b)/2$$

into:

$$f = 2g - b$$

FIG.iv—

All measurements through the screen (E) create ghost measurments, the screen is "all edge."

Translated, this reversal of the edge noise equation means that we are now able to actively *create* and control a ghost measurement, deducting the position of the foreground edge needed to create it.

The following images show a series of edge noise prototypes. These finely perforated screens [FIG.iv] are provoked by the ability to consciously instrumentalize and design the edge noise that results from 3D scanning them. As the diameter and spacing of the perforation of these screens is always smaller than the diameter of the scanner beam, these screens effectively are "all edge." This way, every single measurement going through the screen will produce a "ghost point," as every beam without exception will partially hit the screen and partially hit the background.[FIG.v] Though initially producing rather scattered results, the experiments become increasingly successful by refining the perforation grid's resolution and by differentiating the aperture ratio.

FIG.v—

The differentiated aperture ratio defines precisely where between fore- and background ghost measurements are created.

As the resolution of the screens and hence the level of control over the resulting edge noise increases, these initially open-ended analytical "scanner eye tests" evolve into something much more powerful. Now able to design and build, through the scanner, any fictional point cloud outcome of choice, the screens, as deceivers of the eye of the scanner, open up an entirely new realm of illusion and phantasm. In this sense, they are similar to the early nineteenth century *phenakistiscopes* (from the Greek *phenakizein*, "to deceive, to cheat"), which instrumentalized the newly discovered fallacy of the eye called the "afterimage" to blend between two given images and create the illusion of movement.[8] The screens, as scanner phenakistiscopes, employ a parallel method of instrumentalizing the fallacy of edge noise to create illusory points that blend between two given measurements.

The Irrelevant Choice of the Indecisive Photon

There is a certain modernist-positivist naivety, however, about the clear equations of this reverse engineered edge and its suggestion of measurability and control (even if over fictions)—so that we might be at risk of developing a "realism of the phantasm."

FIG.vi—
The Edge Finder: a mask allowing one to see "through the eye of the scanner," the brass tube having a 3mm inner diameter, identical to that of the laser beam.

8—
Jonathan Crary's brilliant analysis of such eye-deceiving devices focuses on the "recorporealization" of the observer's eye and was of great inspiration for my upcoming attempt to materialize the "scanner eye." Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*, (Cambridge, MA: MIT Press, 1990).

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FIG.vii—
Scanner, edge screen and background.

FIG.viii—
Resulting scan: the edge noise measurements are marked in blue.

FIG.ix—
Scanner and edge screen prototype C3.
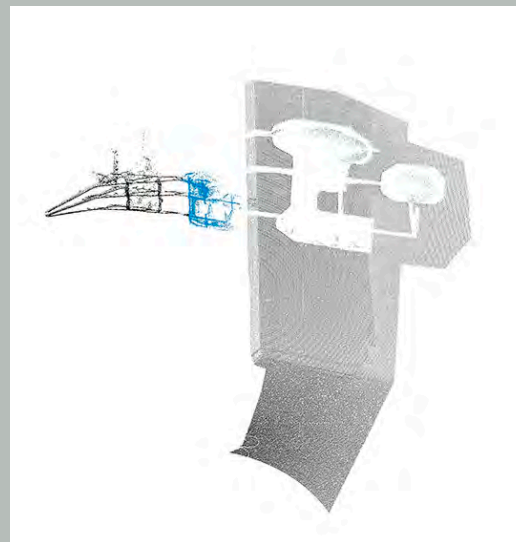
FIG.x—
Resulting scan.

FIG.xi—
Edge screen prototype B4, scale 1:4
(apertures ca. 1.4 mm).
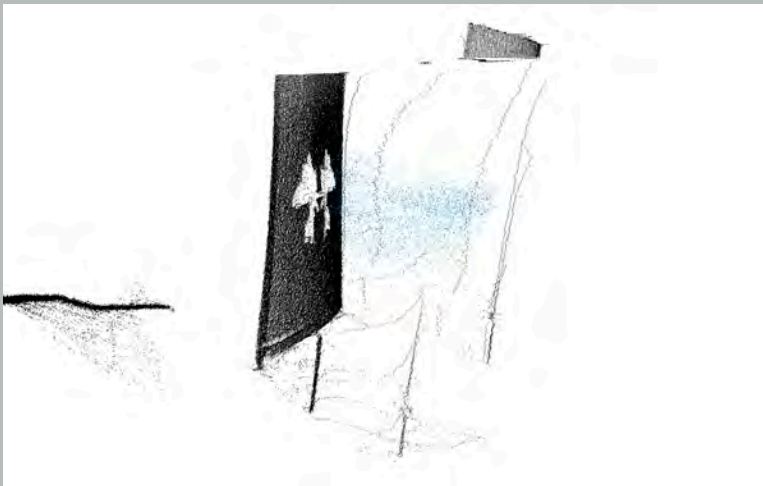
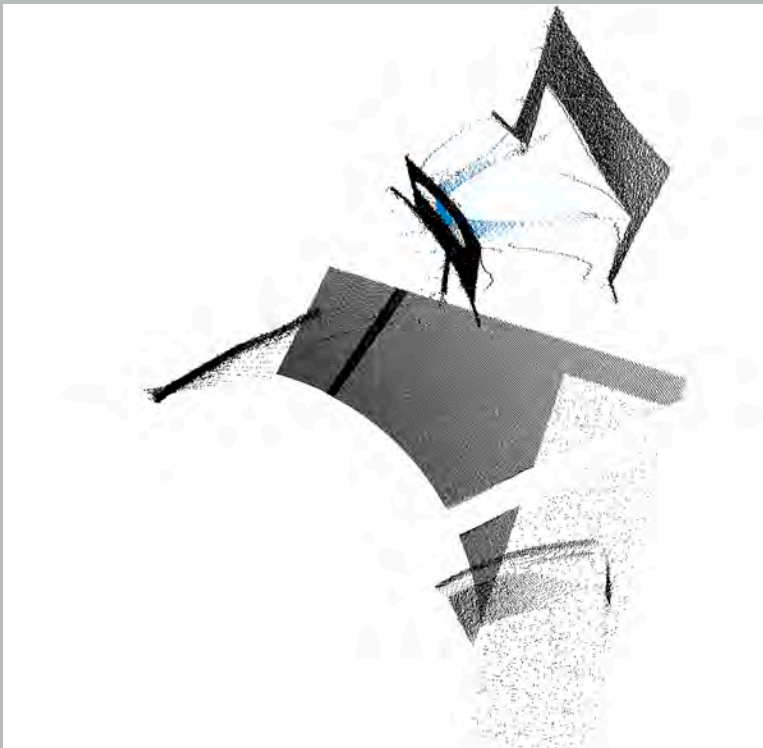**FIG.xii—**
Scattered result due to low edge resolution.

FIG.xiii—
Increased resolution and control over the
resulting edge cloud (blue).

FIG.xiv—
Controlled resulting edge cloud (blue).

FIG.xv—
Reverse engineering the edge: counter-algorithm calculating the perforation of foreground screen needed to create a given shape.
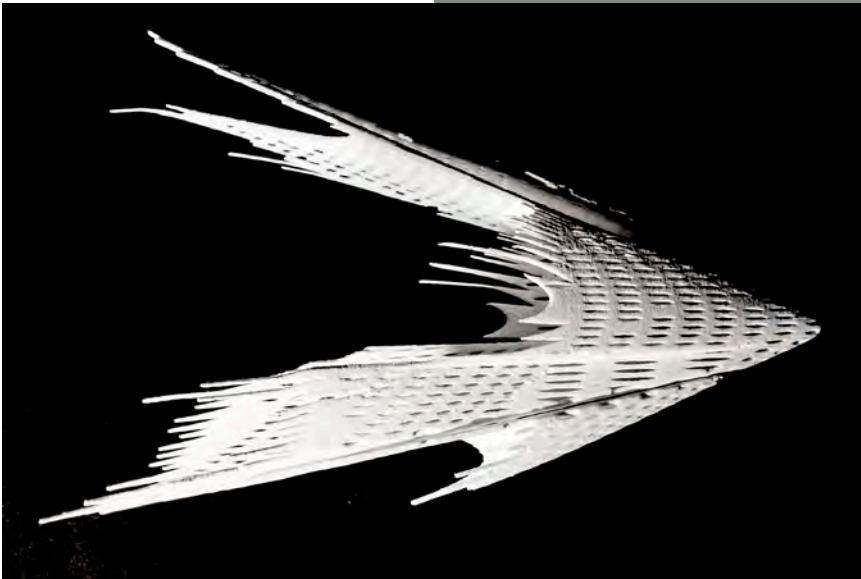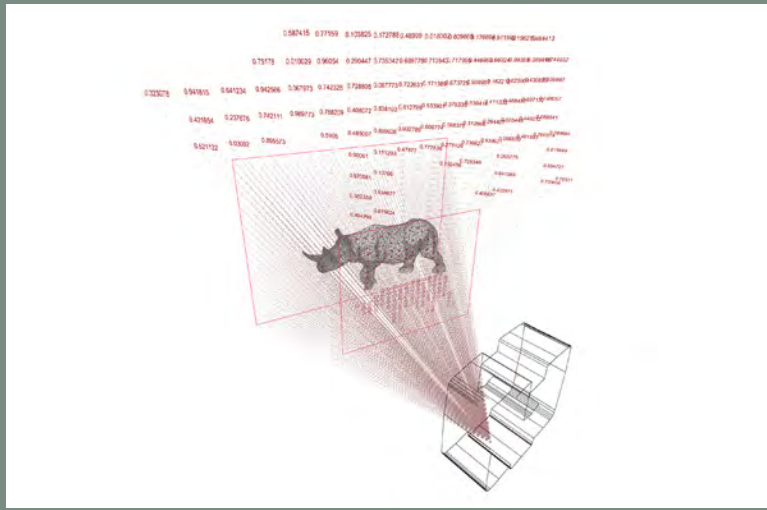
FIG.xvi—
Nylon printed edge screen (see below).
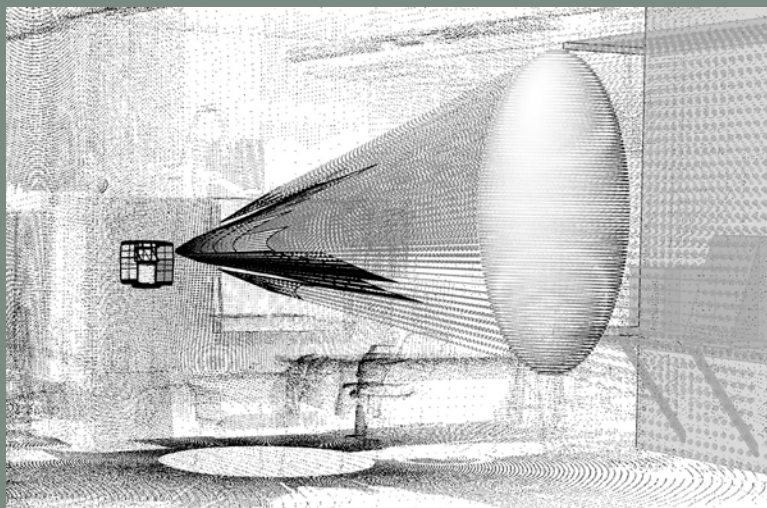
FIG.xvi—
Counter-algorithm calculating the (evenly perforated) foreground geometry needed to create an ovoid shape in front of a known (pre-scanned) geometry.

The reason is that, even if we have assigned "Length, Breadth and Height" to the measuring process, we are still operating within purely geometrical definitions. Light has been treated as an abstract geometric entity, the beam as a homogenous cylinder performing calculable interactions with other geometrical abstractions. We have fallen, as Karen Barad would put it, into the "representationalist trap of geometrical optics." [9] To escape from this trap, we will now have to shift our focus to *physical* optics and look at what this cylinder of laser light is actually *made of*.

Strikingly, the experiment in physics that has been key for the demonstration of the nature of light, bears a strong similarity to our own experimental setup. In the famous double-slit experiment, a plate pierced by two parallel slits is illuminated by a coherent source of light (often a laser beam) while the light passing through the slits is observed on a screen behind the plate. While the experiment, conceived around 1800, initially served to prove the wave theory of light by demonstrating optical interference in the projected light patterns, it later came to illustrate what is called the wave-particle duality. Light, according to this principle of duality, exhibits properties of both matter (particles) and energy (waves). These properties however, are not simultaneously observable or measurable, as they require a "particular choice of apparatus, providing the conditions necessary to give meaning to a particular set of variables, at the exclusion of other variables." [10]

Moreover, apart from excluding the possibility of other types of observation, every apparatus of measurement unavoidably influences the nature of the object observed. Again, it is precisely time-of-flight range finders that are often used to illustrate this idea. By shooting light (as both matter and energy) on the measured object, they essentially "push" this object away and change the very distance they are measuring. Similarly, by merely turning on the light in a room, one minutely alters the arrangement of the furniture within it.
As practically irrelevant such descriptions may seem, they do start to dismantle the "separability of knower and known" assumed by Newtonian (geometrical) physics— and by our earlier naïve equations.[11] Enlightenment physics, by assigning physically and conceptually separable positions to objects and observers, understood "observation to be the benign facilitator of discovery, a transparent lens passively gazing at the world."[12]

By recorporealizing light—having given the medium a body—the body of the observer (the scanner) and the observed become inextricably entangled. The term "remote *sensing*," actually used to describe scanning's lack of physical contact[13], now receives an opposite, and rather literal, validity. The belief in the realist veracity of the scanner starts to crumble while the "metaphysics of individualism and the belief in representationalism" are discarded in favour of an alternative described by Karen Barad as a materialist-realist onto-epistemology.[14] Barad explains: "Practices of knowing and being are not isolatable, but rather they are mutually implicated. We do not obtain knowledge by standing outside of the world; we know because "we" are of the world. We are part of the world in its differential becoming." She therefore abandons the binary model of ontology vs. epistemology and instead speaks of onto-epistemology as "the study of practices of knowing in being."[15]
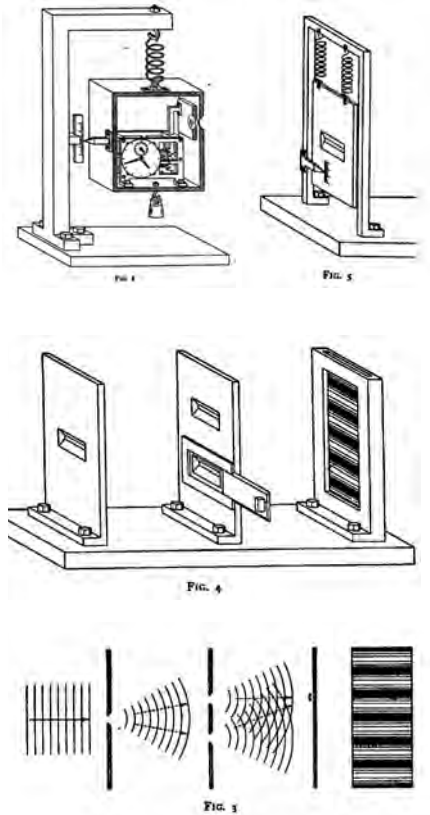

FIG.xvii—

Niels Bohr's drawings of the double-slit experiment (bottom) and his various (theoretical) apparatuses to measure the behaviour of the diffracting light's particles/waves.

9—
Barad, *Meeting the Universe,* 78.
10—
Ibid. 115.
11—
Ibid. 107.
12—
Ibid. 97.
13—
Lev Manovich, *The Engineering of Vision from Constructivism to Computer*. (Ph.D thesis, University of Rochester, 1993), 124.
14—
Barad, *Meeting the Universe,* 107.
15—
Karen Barad. "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," *Signs*, no. 28 (2003): 829.
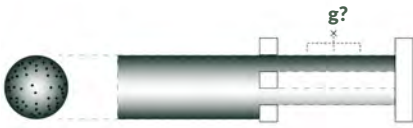
FIG.xviii—

An uneven particle distribution within the beam diameter makes the result, even with a known aperture ratio, uncertain.

FIG.xix—

Increasing the perforation resolution reestablishes control over the resulting ghost measurement.

16—
Tuley, "Analysis and Removal of Artifacts,"
Fig. 1.
17—
And due its indeterminacy this observation-disturbed behavior cannot, as opposed what Newton assumed, be compensated by the measurement. Barad, *Meeting the Universe*, 119.

Hence the scanner can no longer be seen as the designer's passive and immaterial *camera obscura* but instead receives a certain *creative complicity*. As such it plays a more active role as a productive agent of measurement, not just indexing, but actively creating the phenomena observed by physically assaulting reality with its laser beams.

So let us now throw a new (physical) light on our attempt to control and design our "ghost measurements." Zooming in further onto the laser beam, we now encounter a new challenge: the beam is not homogenous as the particles within the beam are unevenly distributed (note that we decide for a mutually exclusive description of the beam as particles). In fact, there are different zones of density and intensity within the laser beam.[16] This again has both philosophical and practical implications. The former is that the beam is inherently differentiated and exhibits multiplicity even before meeting the multiplicity of its targets.

The *practical* implication of this heterogeneous beam is that, even if we, with the perforated screens, manage to create an experimental setup in which the ratio of the beam diameter *hitting* the screen to that *passing through* is perfectly known, we are still unsure about (and not in control of) the measurement the setup will produce. This is because the particles may be distributed throughout the beam in such a way that either more or less of them than planned will either pass through or reflect off the screen. [FIG.xviii] The obvious way to regain control and diminish this uncertainty is by increasing the resolution of the perforation even further—to the point that every single photon particle in the beam is confronted with the same aperture ratio of the screen. [FIG.xix]

It is fair to say that, now that we have arrived at the order of magnitude of a single photon, we have in fact left the realm of practicability and are starting to describe the problem as a *Gedankenexperiment* (thought experiment) rather than intending to actually solve it. The issue now becomes not that a physical experiment at such a scale is impossible, but rather that its outcome is inherently uncertain. Niels Bohr, returning to the double-slit experiment, described the possibility of shooting a single particle onto the slitted plate and measuring through which slit it will travel. The problem however, Bohr continues, is that this measuring apparatus will unavoidably disturb the very behaviour of the particle it is measuring as the act of measuring will destroy the interference pattern.[17] Having zoomed in this far, we are now confronted with the limits of control, as the uncertain behaviour of the single photon performing our act of measurement implies the impossibility of a total knowing.

In the meantime, the result of our high-resolution screens has nevertheless become rather convincing. So although the "choice" of the "indecisive" photon may be *uncertain*, this choice has also become, in the face of our techniques of high-resolution design modulation, *irrelevant*.

FIG.xx (and Following Pages)—
"The Masks of Fleet Street" insert
counterfactual geometries into a series
of sites along Fleet Street in the City of
London, transforming the street into an
imaginary procession, only decodable by
the scanner.
The Masks are screens that, through
the high resolution of their encoded
perforation, become "all edge." The
algorithmically controlled edge cloud that
results when scanning these Masks inserts
fictional geometries into the point cloud.
The scale model, built around one specific
scanning origin on the street, becomes
an instrument for the fabrication of this
fictional edge cloud, which, scaled up, is
planted within the 3D city archive.

The Ubiquitous Edge of the High-Resolution City

The reason to dwell upon this "irrelevant" notion of the photon's choice goes beyond the success of our phantasmagoric screens. For, as Karen Barad argues, the "seismic shift in epistemology" which followed the development of quantum physics pervades all orders of magnitude, "from the smallest particles of matter to large-scale objects." The fact that this "essential discontinuity is examined on a micro-level does not mean it does not influence every scale of reality." [18] Following Barad's impetus but going one step further than the order of physical magnitude, I would argue that this "quantum shift" can also become a useful metaphor to critically describe (and counteract) contemporary modes of governance. Would it be audacious to describe what Gilles Deleuze has called the "society of control" —in analogy to our screens—in terms of resolution and as a strategy for coping with uncertainty? Before, Foucault's disciplinary societies operated by disciplining the abnormal through the apparatus of physical boundaries and institutions—a physicality that has given his theories an overwhelming resonance in architectural discourse. Control societies however operate on a much less graspable level: having incorporated uncertainty, control ramifies and mobilizes the abnormal through strategies of modulation.[19] Modulation, instead of disciplining the body, addresses the brain (*noos*) directly through high-resolution media, which, embedded and ubiquitous, come to define a high-resolution urbanism. Rather than imposing a certain conduit ("I am being watched and hence should act correctly"), these modulations *induce* the decision made by the "autonomous subject" ("I want to act like this")—replacing the logic of coercion by the far more subtle logic of persuasion. [20]

The subtle smoothness of the society of control is complete when the hard edge of the coercive device (the building) disappears, not by becoming immaterial but rather by increasing the resolution of modulation to such an extent that it becomes barely visible—yet at the same time pervasive. "The city of control" [21] thus becomes—like our perforated screens—"all edge". Its modulated citizens/consumers are constantly moving and crossing this ubiquitous and controlled edge. Inundated by a (consumerist) sense of continuous and pervasive choice, each singular choice of the citizen/consumer becomes—like the choice of our photon—irrelevant.

Should it then discomfort us that the "modulatory interventions" of our screens emulate the logic of a governmentality of control? I would argue quite the opposite: the critical dismantlement of the measuring apparatus—like that of the apparatus of governance—is just the first step towards the formulation of critical and aesthetic design strategies that are able to perform a meaningful counter-agency against these very apparatuses. Such aesthetic strategies should re-use, dis-use and invert the mechanisms critically analysed and thus extract positive and affirmative notions of both biopolitics, high-resolution technology and the high-resolution city.[22]

18—
Ibid. 252.
19—
My description of Deleuze's notion of control societies will build freely on Nathan Moore, "Diagramming Control," in Peg Rawes (ed.) *Relational Architectural Ecologies: Architecture, Nature and Subjectivity*. (Abingdon and New York: Routledge, 2013), 56-70.
20—
Moore, "Diagramming," 66, quotes Iain Borden's example of a more architectural strategy of noo-political persuasion, which illustrates that these techniques should not be understood as an exclusive to digital embedded media.
21—
Deborah Hauptmann, "Noo-Architecture and the Internet-Of-Things," *Volume Magazine: The Internet of Things*, no.28 (2011): 18.
22—
This stance builds on examples like Donna Haraway and her notion of "stepping out of the negativity circuit" of criticism and instead extracting affirmative positions towards technology/governmentality, cf. Rosi Braidotti, "Posthuman, All Too Human: Towards a New Process Ontology," *Theory, Culture & Society*, no.23 (2006): 206.
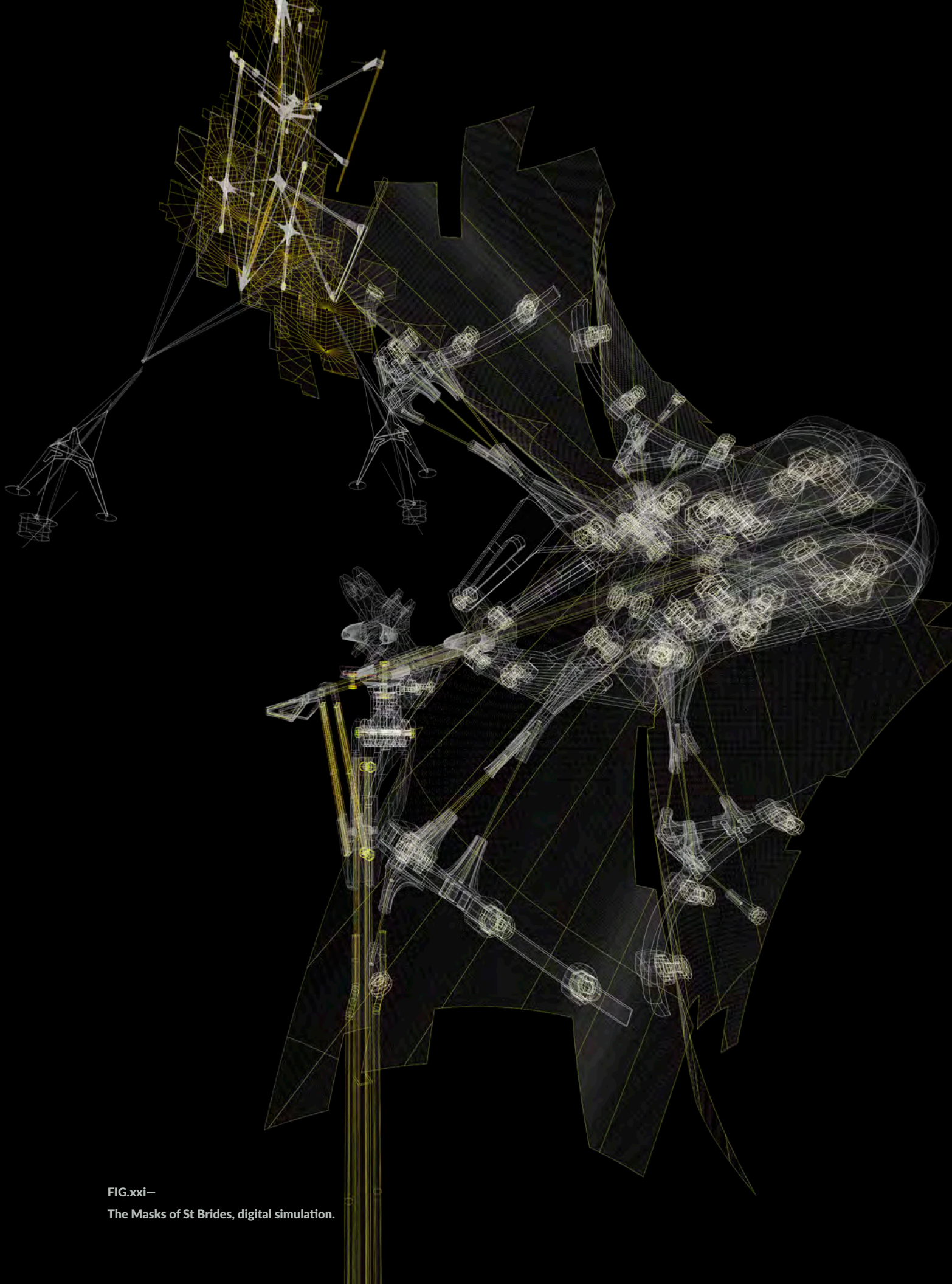
FIG.xxi—
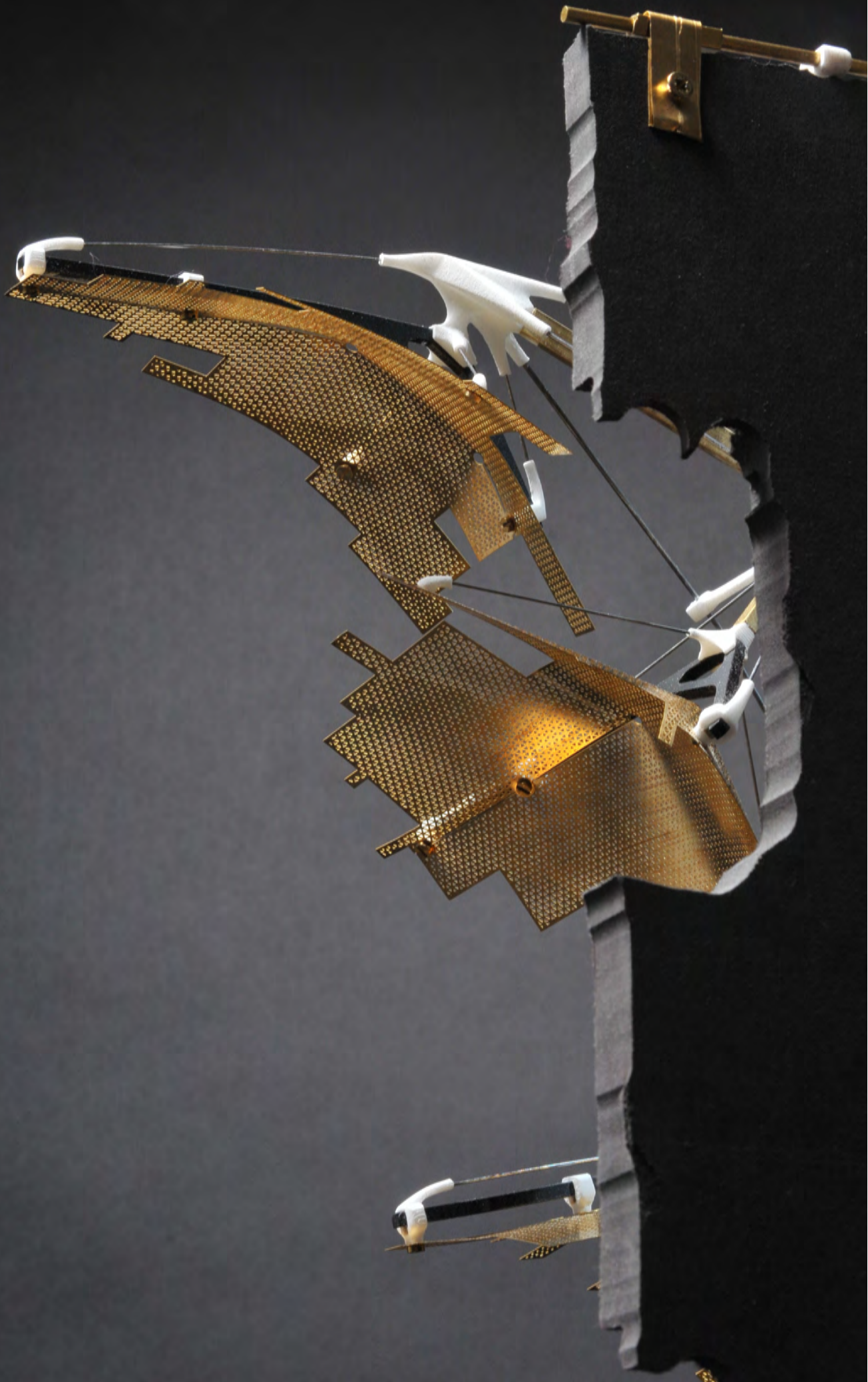The Masks of St Brides, digital simulation.

FIG.xxii (Previous Page) and xxiii—
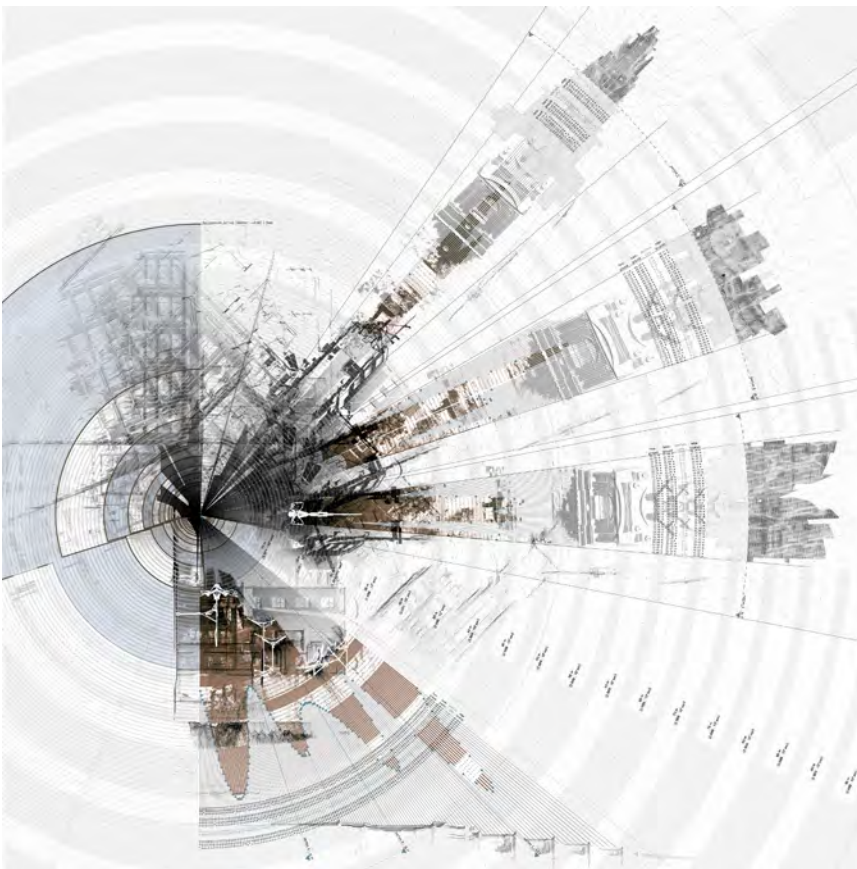The Masks of St Brides, details.

FIG.xxiv (Previous Page)—
The Masks of St Brides, details.

FIG.xxv (Top)—
Masking modes of vision: human, mechanical, post-human. The mask allows for the observer to look through the "eye" of the scanner. Reality dissolves into 3mm diameter fragments (the width of the collimated laser beam), the multiplicity within each measurement is exposed.

FIG.xxvi (Bottom)—
When scanned, the Masks dissolve into high-tech surrealist mirages that deconstruct the veracity of the scanner and inject fractures of the imaginary into its supposedly realist representation of the city.

Design Hydromancy

Rachel Armstrong

At a time when a woman was valued by the man she married, and when childbirth was the leading cause of death amongst fertile women—with maternal mortality rates being as high as forty percent in some societies—adolescent girls could glimpse a sense of their fate by walking backwards up a staircase at nighttime, holding a candle and a vessel of water. A young woman would see in the reflection either the face of the man she would marry, or a skull, which signified that she would die before finding true love. Of course, what the inevitably terrified teenager would see was an incredibly distorted view of her own face. Yet such a familiar image appeared "otherly" under the flickering and inconstant candlelight. Her trembling hand inevitably sent waves across the reflective surface twisting its contours, and the rush of air that passed through the stairways produced further disturbances that tore the image to shreds. If you've ever walked through a hall of mirrors, you'll know exactly how uncanny, or frightening, such distortions can be. Using reflective surfaces to glimpse alternate realities is an ancient art that Nostradamus himself is reputed to have employed to make his predictions. Practices such as hydromancy, which specifically uses water surfaces as a visualization tool, seek portals that may admit access to other worlds, from which new knowledge can be obtained. The liquid interface takes a symbolic form that can be interpreted by the scryer as omens of things that are yet to come. In many ways, the scryer's notion of "the future" is very different to the deterministic hypothesis that is characteristic of modern experimental science. While both practices seek to predict events, mathematical projections are reached with trajectories that the average person can do nothing about, because algorithms embody a Platonic truth beyond human reach or influence. In contrast, the scryers empower their clients by presenting them with a set of potentialities. This places the clients in a tangible position of influence, whereby they have a chance to reshape outcomes through remedial action, like the miser Scrooge in Charles Dickens' cautionary tale *A Christmas Carol*. Perhaps a young girl confronted by the image of her death may decide to "defy the stars" as Romeo did for the love of Juliet, or "play it safe" and devote herself to a convent. Such approaches do not make decision-making easy, or reduce risks, but scryers do give a measure of power back to their clients, and that is presumably why their services were much sought-after.
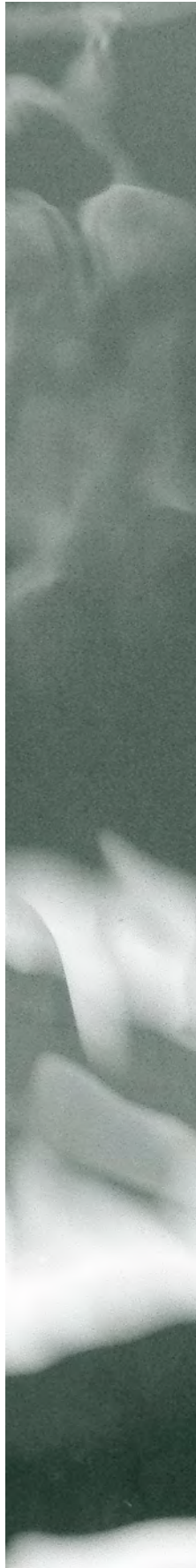
In an age where design is increasingly populated with software imaging tools, we rely on mathematical projections to conjure up possibilities. Being our methods so virtual, they become removed from our ability to influence them in the real world. The production of images is separated and distanced from materiality. My work explores how we may precipitate new—and empowering—aesthetic possibilities by forging new relationships with matter. The aim is to become co-designers of events with the material realm, extending our influence in ways that are not pre-determined by existing toolsets.

To reach escape velocity from current software imaging systems, I have been exploring the imaging techniques produced by an emerging field of computation that seeks liberation from Turing codes and von Neumann architectures. This field is not yet fully defined and is situated within a set of experimental scientific

1—
A.M. Turing. "The Chemical Basis of Morphogenesis." *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 237(641). (1952), pp.37-72.

2—
Natural computing also intersects with two other novel areas of computation. The first one is unconventional computing, which stems from Information and Communications Technology (ICT) and seeks to engage with programs that model their computational operations based on non-standard paradigms. In so doing, they seek more natural solutions for computer operations than are algorithmically possible. The second of these areas is morphological computing, which arises from the field of robotics and employs materials with nonlinear properties to "solve" engineering challenges differently.

practices that may be described as natural computing, taking its name from Alan Turing's interest in the computational powers of Nature, especially in the production of patterns such as dappling.[1] Natural computing engages a wide spectrum of overlapping interests ranging from the digital modeling of biological systems, to the application of self-organizing chemical systems to "solve" more traditional problems such as the shortest route through a maze.[2]

Within the range of natural computing practices, my research engages physical computing techniques that use the properties of nonlinear materials, which are present in crystal growth, intermolecular electron transfer systems, or in the instabilities at the oil/water interface. By being exquisitely sensitive to their environmental context, these platforms offer new opportunities for making images, structures and even to perform useful work. This receptiveness, which ensues from the field instabilities that exist at liquid interfaces, allows designers to co-shape their material performance and aesthetic qualities.

Over the last five years, I have immersed myself in a natural-computational world that deals with liquid interfaces, oscillating surfaces and turbulent environments. My aim has been to witness and choreograph changes at the dynamic intersections between empowered nonhuman agencies. Such a window into the world at the level of interfaces has required a particular kind of engagement, which compelled me to observe these molecular events also at the human scale, so that they can be critiqued and applied in design contexts.

The air/water interface has been historically recognized as a gateway to other worlds. Distortions at the air/water interface have been used as a form of divination whose colour, ebb, flow, and quality of ripples produced by pebbles dropped in a pool created a language for prognostications.
Vortices in particular are regarded as spiritual and dimensional openings between parallel planes of existence. They typically exist where there are strong gradients across an interface, creating an environment that can defy gravity, bend light, scare animals, twist plant life into contorted shapes, and cause humans to feel "strange."

In Renaissance magic, hydromancy was considered as one of the forbidden arts that included chiromancy, necromancy, aeromancy and pyromancy. Powerful hydromancers were attributed with the ability to disrupt trade and therefore wealth by influencing ocean currents and conjuring monstrous weather conditions.

In the film *Constantine*, the medium, played by Keanu Reeves, journeys to Hell with the help of a black cat (believed to simultaneously exist between the two worlds) and by immersing his feet in a bowl of water, which becomes a portal. In the movie we are not shown the distortions of light, water and air that occur as Constantine makes his transition, yet it is precisely these distortions that are of great interest to me. While the narrative device of the movie is highly effective, I find myself wanting to see warped graphics produced by the interface between the worlds and speaking of an infernal place that could potentially be "real," rather than a function of special effects. Perhaps in a similar manner to how the face of a young girl, contorted by fear and distorted by mischievous elements, produces such a completely alien countenance that it is not only unrecognizable but also strikes fear or delight into the heart of an observer—a Pygmalion or Medusa. In other words, I am interested in how the actual molecular forces that underpin natural computing generate images through variations in interfaces, which is akin to the practice of scrying, and in how such variations can be harnessed as a design

methodology. In this sense, engaging boundaries between unstable fields of activity produces a probabilistic aesthetic originating from ancient history. Yet, in an age of novel computing techniques, it is also possible to consider how the manipulation of images at boundaries may be relevant to a third millennial context.

Shivering domains of potentiality are continually produced at the light/water/air interface to produce direct and internal reflections of multiple bodies, which generate prototypes and sketches. Since my work is interested in using natural forces as gateways to explore new architectural possibilities, I regard the

disturbances at liquid interfaces as visualization tools for examining otherwise invisible networks of interactions, and their potential. The graphical outputs suggest possible relationships between fields that may evolve from ongoing exchanges into landscapes of possibility—transitional states of being that are shaped over time by their responses to elemental systems. At these sensitive interfaces, it is possible to observe the formation of tangible configurations, which are stretched out in time and space—and collapsed again—by natural computing agencies. In their unstable moments of existence, these fluid interfaces offer vistas that can be photographically recorded. As the images in these photographs extend out to make certain bonds in one dimension and withdraw from others in another, the liquid landscapes they display continually evolve, revealing fields of interactions within a probabilistic space. These images may be thought of as "elemental drawings," which can provide an alternative to the software packages that constrain the aesthetics of modern practices.

The choreography of light, water and air demonstrates the vibrancy and impact of what we would conventionally think of as invisible media, which bear little relevance to the production of objects. However, documentation of the light/water interface reveals incredible molecular forces at work, and transformative potential that could be employed for design purposes.

The movie stills on the left are details of the dynamic traces of directly and indirectly reflected light from one of the Alhambra fountains. The construction of fountains may be considered as a practice of building "natural computers" that, having been situated within a specific landscape, are concerned with the performance of water and its associated variables—sound, intensity, hue. Aberrations in the viewing system may be layered over the actual interface as an augmented reality. These particular images have a watercolor quality about them, and seem etched into virtual spaces that appear to exist between air and water.

But we don't have to build *ad-hoc* devices to construct these images. The same processes are at work in the port of Malaga, where the Spanish flag has been playfully distorted and interlaced with trash.

In an architectural context, a form of Design Hydromancy can offer us possible new portraits for cities that, like Venice, are entangled with air/water/light interfaces. While I have worked with collaborators that focused on imagined formal outputs for self-organizing materials through projections of how such substances may be applied to classical buildings, as in GMJ's computer rendering of *Future Venice*, I have personally resisted modeling idealized interactions between these systems.

Rather, I have searched for alternate ways of graphically understanding these interfaces and the multiplicities they contain. Possibilities reside in exploring the "biological stones" of the city, where living materials that have been forged through marine ecologies of bacteria, algae and shellfish produce sculptural accretions. Using design hydromancy, it is possible to envision how such activity may shape the foundations of the city as a form of aquatic gardening. Yet, these are not
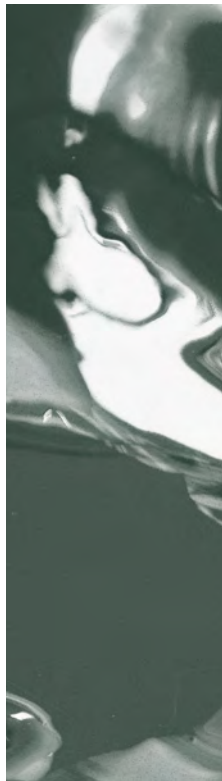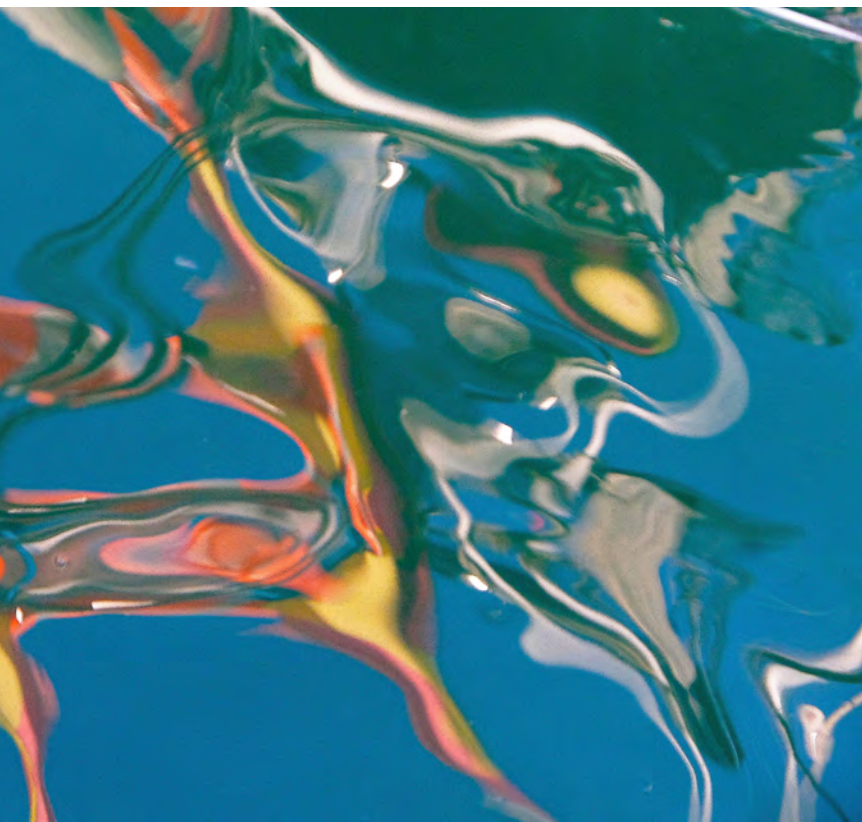
fictitious landscapes, but spring from the same kinds of spaces that give access to the parallel landscapes and worlds alluded to in Italo Calvino's "Invisible Cities." Although design scrying creates portals into alternate realities that do not yet exist, these realities are nascent and may be modeled, prototyped and even brought into existence through experimental architectural practices.[3]

3—
Experimental Architecture is a visionary design practice that challenges existing tropes in architecture by proposing alternative realities. The term was coined by Peter Cook in 1970 in a book by that title and adopted as a working method by Lebbeus Woods. My work is situated within this field of inquiry by moving the realm of experimentation from the drawing board or computer into the laboratory, in order to make models and prototypes of possible new architectures.

Design scrying is not limited to sites that are flooded with sunlight, but can be found just as readily on wet rainy days at interfaces between a surface and water, even when the light is minimal, like the interference patterns produced outside Edinburgh castle on this sheet of tarmacadam, which is immersed in a film of rainwater. Nor is design scrying limited to two dimensions, as a flat plane of imaging.

Rather, it conjures new kinds of sculptural relationships through different depths of viewing that allow an observer access to multiple dimensions, as in this shoal of fish swimming between moored boats in the port of Malaga. Here they are mixed in with the surface reflections of the distorted vessels, suggesting new relationships and habitats.

These images point to new terrains for architectural design and offer a way of reading what matter may do next. Yet, like the transitional states of chemistry, we are not observing constants but the highly variable and processual properties of matter. Furthermore, design hydromancy is not ephemeral or isolated, but also connects its liquid landscapes with recognizable objects, which, as they pass through them, obtain new significance. For example, a discarded rose becomes the tragic drowned figure of Ophelia. Or, feathers that are bathed in light suggest that an angel has just sunk beneath the waves.
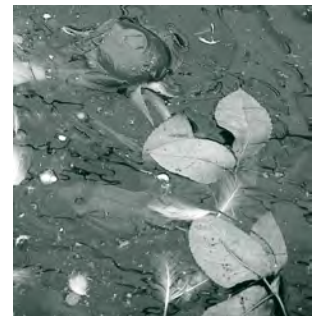
While I am searching for formal articulation of these approaches, I am also resisting it at the same time, since it fossilizes them as a "style" or an "aesthetic." I am more interested in opening up access to an image-generating system that enables us to use alternative forms of computation in which it is possible to make new design moves without having to re-translate the graphics back into standard software languages. In this context, in order to immerse themselves in these alternate possibilities, designers need to be prepared to see the links and connections within the expansion and contraction of an ever mutating present, and to be aware of the significance of transitional states. In apprehending these principles for production, it is then necessary to establish the context for design scrying and, once immersed in the rapidly overlapping field interactions, to recognize and respond to an appropriate syntax through which design decisions can be made. This toolset does not generate fixed solutions, but helps visualize matter in a probabilistic context, where events and objects are equally important. How these fragments and slices of time and space are used is shaped by the aesthetics, values and agendas of the designer. In this way, designers are powerful mediums that, like Constantine, can travel through graphical wormholes and explore new worlds. At the right moment to return, the design scryers may be transformed by the insights of their experience but, unlike the scryers of old, they will have a photographic record of their encounters with which to empower their audiences.
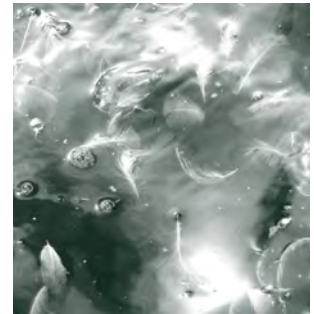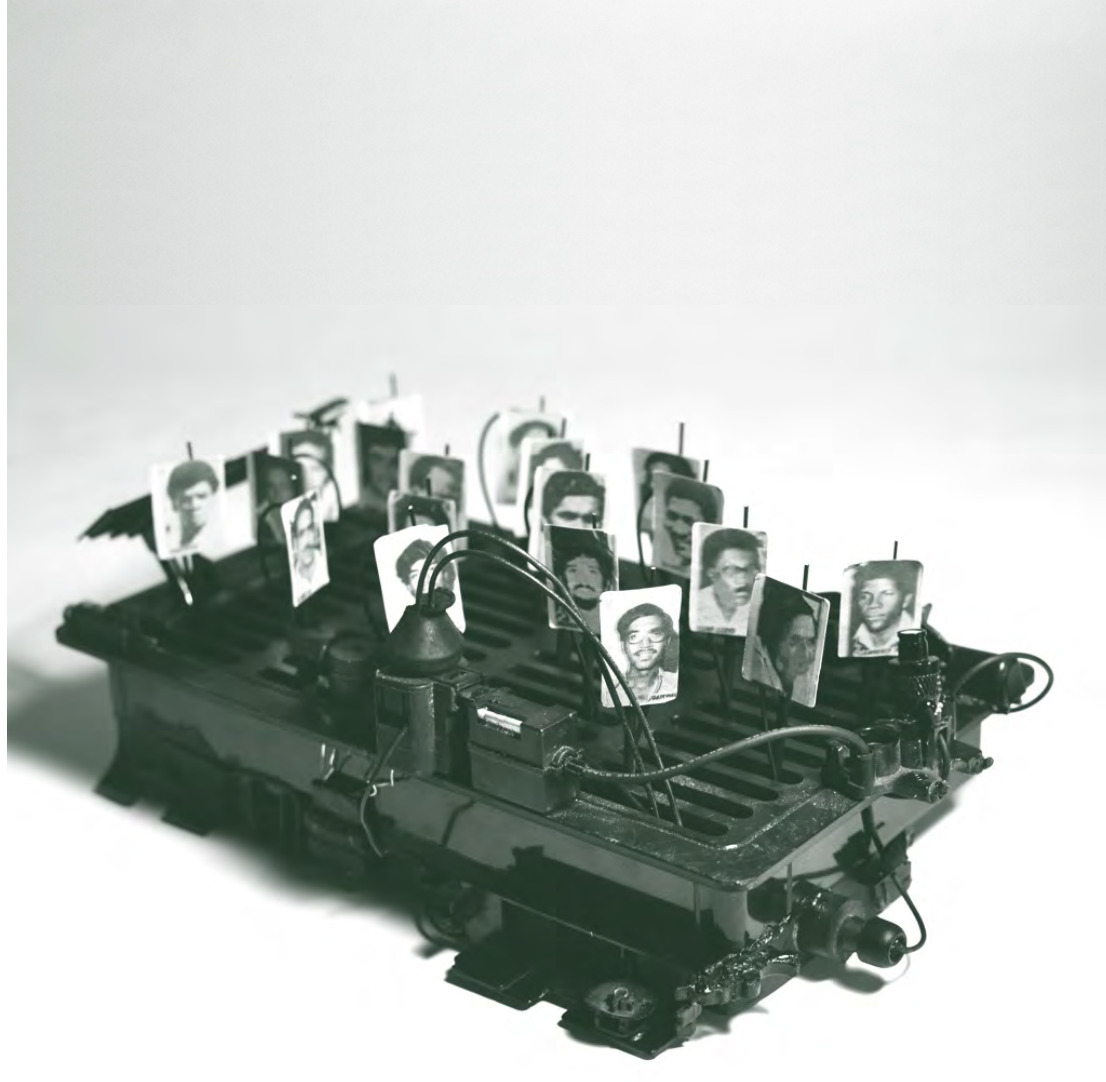
Fictions

Prosthetic Parliament

Greg Barton

After the nation of India dissolved into a federation of city-states, amidst suspicion and support, a program replaced parliament. It became near impossible to organize disparate populations, much less hold elections. The initiative to reconstitute the government as a mainframe computer—built and housed in Gurgaon, funded by private conglomerates—began as an experiment modeling the country's operating procedures (e.g., GDP); leaders started to rely on the supercomputer's predictions, eventually installing it to function as the Nation itself, effectively outsourcing self-management. Various inputs, regulated feedback, and complex maths ostensibly allow the government-machine to best determine how to divvy materials and services amongst regions, reconcile episodic ethnic strife and territorial disputes, and negotiate trade agreements and international treaties, all in an impersonal yet even-keeled manner. The program provides a hyper-rationalized set of decision-making protocols, sifts immense sets of data and runs powerful cost-benefit calculations.

Within the device, there is a processing sub-unit per each district plugged into the frame's clustered grid of parallel rows, each with its own administrative domain. In order to allay civilian fears and literally put a human face to the machine, each representative has a screen displaying an avatar of 1970s cricket players from Bombay and the West Indies. The assembly's construction suggests a cobbled-together circuit board with tubes and wires, ventilators and heat sinks, switches and designators: a *jugaad* government hooked into a respirator. Since the program is constantly running, the spinning heads chatter away at all hours; speeches stumble over one another and rebuttals arrive at the same time as arguments. The deliberative voices merge with humming hard drives to emit a drone of dialects and mechanized movements.

While it is true that the nonhuman government has certain advantages over organic politicians, many past problems are simply displaced. For example, although voting processes are less susceptible to bribery, critics raise potential risks of corruption stemming from the device's physical security, cyber encryption, or energy consumption. The volume of computation sometimes leads to gridlock and errors; command channels and communicative scripts produce a paralysis wherein the data-handling logics—at times circular, always synchronic—cannot process decisions, all too reminiscent of party members unable to arrive at a compromise or consensus. The machine's ciphering tends to present a view of legislation as opaque as previous human-based models.

Proponents of the modulated democracy claim supercomputers are the only means to manage and resolve the types of pressing problems and sets of often intertwined contemporary issues at stake locally and globally. Moreover, the sheer speed at which the new parliament performs calculations understandably enables analysis and action in fractions of seconds. Automatic economic adjustments occur in rapid response to natural or manmade events. Infrastructure is administered in a hyper-efficient and holistic deployment. However, even its most vocal advocates admit the machine knows not of water but instead {"resource management"}, {"flood zones"} and {"potability percentage"}. Likewise, the CPU contraption tabulates hungry bodies without registering the anguish of malnourishment. Others decry an ever-increasing digitalization where the feel of one's palm across a tabla's goat skin is lost in the act of encoding and playing back rhythmic cycles. The greater the population grows, the more the individual is resigned to a statistical reality of representation. The greater the population grows, the more the unforeseen complexities of daily life overwhelm the processing capacities of the most advanced algorithms and bulk data banks.

Outside of the mega-metropolises and beyond integrated towns, in some of the far-reaching rural parts remaining, amidst entire villages with LED-festooned temples powered on pirated electricity, there are outlier populations unaware that a machine has usurped elected officials. Even in urban areas, the routines of some societal segments remain for the most part unaltered. The governing machine's whirring district surrogates and decision-making circuitry advance a networked intelligence seemingly free of human error or ethics precisely because it is otherwise.

Augmented Trash: The Aug-cycle

Simone Ferracina

The boy gazed at Turio with eyes wide open and implored him to tell a story. After all, it was only nine thirty, and bedtime was at least a whole half hour away.

"One about the old country, grandpa! One about the aug-cycle! When did it all begin?" he asked.
"Oh, I don't remember the exact year," responded the old man, setting a glass of water on the nightstand and clearing his voice, "but it was soon after the ban. Have I told you about that day?"
Hedi shook his head.
"Let's begin from there then."

***

"The so-called Garbage Interdiction officially went into effect on August 15 (we do commemorate it every summer, as you know). It was humid and hot, with solar irradiance just below curfew levels. The air was thick and sticky like marshmallows. I remember the sweaty, stupefied faces of passersby; walking mindlessly, almost in files, like automata—in the sense not of robotic efficiency, but of conforming to a pre-programmed course despite utter anguish and confusion. Yet purposeful scripts were betrayed by the awkwardness of our bodies. Aims were hindered and paralyzed by fear. Unsettled, we wandered across the cityscape heavily and in slow-motion, struggling, as if our feet persistently sank into the warm asphalt—trapped by the resinous texture of things."

The boy listened carefully, entranced by Turio's words as much as by the soothing, baritonal voice that uttered them. On his lap, a holographic teddy bear—a hoverbear—occasionally sighed, squeaked in a high-pitched tone, and transmitted haptic feedback simulating the petting of soft animal hair. From time to time, Hedi's jaw dropped in a cartoonish caricature of anticipation and surprise.

"The core of our alliance with the world (our grip on things)," continued Turio, "had been lost and taken apart (released). Nothing would or could stay the same. Sure, we had been the modern overlords of stuff, supreme functionaries and transformers/interpreters of nature (or had we?), but all that was in the past. The system was broken, interrupted, kaput. From this point forward, we wouldn't rule over, produce and consume forks, chairs, magazines, bicycles and bottles of detergent, but be at their mercy—not in terms of dispositions and affordances, but of hosting. They would no longer extend and augment us, but cling to and depend on us like parasites, like pets drinking the milk off our hands or infants drowsing off to the soft whispers of our lullabies. The ban had blurred the lines between acquisition and adoption, desire and promise, design and care.

For the fifth time that day, a mandatory announcement lit up in my field of vision: 'GARBAGE INTERDICTION NOTICE. WATCHING THE FOLLOWING COMMUNICATION IS REQUIRED BY LAW. PLEASE READ CAREFULLY.' The government's verification logo shined through; words

scrolled up and disappeared like in the opening sequence of Star Wars. Karl, my virtual assistant, read each word into the headphones, overriding software preferences:

'EMERGENCY MEASURE 1501.2 (GARBAGE INTERDICTION) WAS PASSED TODAY AT 8:30 A.M. AND IS EFFECTIVE IMMEDIATELY. ALL MUNICIPAL GARBAGE COLLECTION, WITH THE EXCEPTION OF COMPOSTABLE ORGANIC WASTE, IS SUSPENDED INDEFINITELY. CITIZENS ARE RESPONSIBLE TO KEEP AND MAINTAIN ANY INORGANIC OBJECT IN THEIR CURRENT POSSESSION. HENCEFORTH, DISCARDING SUCH OBJECTS WILL BE CONSIDERED A CRIMINAL OFFENSE, PUNISHABLE BY LAW AND PROPORTIONAL TO THE SIZE AND CHEMICAL COMPOSITION OF THE DISCARDED ITEM. THE MINIMUM JAIL TIME HAS BEEN SET TO ONE YEAR. MEASURES 1302.7 (EXCEPTIONAL DRONE SURVEILLANCE) AND 1302.9 (EXCEPTIONAL ALGORITHMIC MONITORING) WILL BE ADOPTED IN THE IMPLEMENTATION AND ENFORCEMENT OF THE BAN.'

A red point appeared in front of my eyes, grew into an apple-sized sphere and dropped at shoulder height, growing still. 'PLEASE TAP THE RED BUTTON THREE TIMES TO CONFIRM AND ACKNOWLEDGE HAVING RECEIVED THIS MESSAGE AND UNDERSTOOD ITS LEGAL IMPLICATIONS.' Between each tap the ball hovered into a new position, following government protocol (Measure 922.3 [Tracking gestural intentionality]). Karl read 'END OF MESSAGE' and, so to speak, hung up.

In the silence that followed, I remember feeling a sharp pulsing pain around my temples, and sitting on a bench by the river, to take a breath. I imagined my headache spread over the city, across the faces of those zombie-like citizens who had just been (repeatedly) served and were peering, terrorized, into a consumption-free future. I wondered if anyone in the country would miss these formal announcements—maybe a rock climber, a hermit, or a child—and sleep a peaceful, normal night. I certainly wouldn't; I'd stay up until morning finding, surveying and cataloging my captors.

Increasingly impatient to get home and assess the damage, and overwhelmed by several failed attempts to visualize the contents of my apartment by memory, I got back up and started walking, and progressively quickened my pace until I was running. I ran for over ten blocks without a pause. All the while, I could think of little besides the bed, sofa, dining table, chairs, television, kitchen appliances, computer, a few books, and some other thirty items or so. Yet each drawer was full, each surface and corner lined with functional objects waiting to be rediscovered and worshipped.

Buildings, cars, stop signs and empty trash bins stared at me with a smug air of projective defiance (or so it seemed). Streetscapes grinned through their eternal

yet fragile veneer: they had defeated time, and little mattered whether they'd still slowly degrade—break, age, loosen, mold, tear, rust, or rot. The sanctioning of immortality had separated things from actual material conditions. There were no restrictions besides the requirement that objects have a common name, one that may be entered in an inventory. Hence, unlimited survival had been indiscriminately stamped (mapped) onto physical objects as a kind of virtual, extra-physical extension.

Of course, the ban was partially motivated by the realization that objects never actually disappear, that there is no such thing as a neat 'cradle to grave' scenario, that the sanitation workers picking up or burying garbage do not ascend to heaven with it, propel it into outer space, or turn it into puppies. Waste lingers and vibrates, leaches and mixes, percolates, evaporates, breaks down, feeds, floats and flies.

The planet was overflowing with refuse to the point of suffocation. The highest towers in the city no longer housed offices or luxury condos, but vertical landfills. After the ban on traditional landfilling (Measure 788 [Survival of Last Threatened Natural Habitats]), entire neighborhoods were now planned around this building typology, which coupled structural stacks of compacted waste with mycelium farming and remediation tanks. But consumption outpaced 'greening' efforts, and space was running out.

There's no doubt that declaring stuff immortal was a somewhat dangerous policy inversion—the state had for many years endorsed and labored towards the magical curbside disappearance of garbage, and thus promoted a kind of constructivist approach to refuse: the idea that if trash was transported away it ceased to exist. But the time for soft and punctual solutions had passed. We needed radical infrastructural, cultural and economic changes. The most abrupt the solution, the higher our chances of success (of survival)—or so predicated the talking heads on our pervasive airborne screens. Furthermore, by targeting consumers rather than producers, the ban's authors had hoped to reshape markets without appearing to directly interfere with industrial production, or to saddle it with excessive regulatory burdens. Instead, changes would be allowed to 'naturally sprout out of good-old consumer demand,' as a popular governor later explained. And while nobody was actually fooled, lobbyists did not succeed in bartering ecological doom for a few extra years of environmental malpractice and unbridled profits.

The truth is that we were jumping into an abyss: nobody fully grasped the potential consequences of the ban. How would interpersonal relationships and processes such as the construction of identity and subjectivity be affected? Would manufacturing continue or come to a halt? What economic and cultural models could sustain what historians would later call an "object-disoriented" society?

One of the answers that developed out of these doubts was the so-called Digital Overlay Economy (DOE), of which aug-cycling was the crown jewel. But I'll explain that in more detail as we go. Now, back to that day…"

Hedi had followed these accounts by a thread, often confused by Turio's jargon or by his parenthetical remarks. Despite this (and the occasional nod off), the events painted by Turio's stories fascinated him to no end—especially the way policy and technology seemed to profoundly effect (or exact) changes in the life of people. Turio continued:

"As I approached the building, my ground-floor neighbor miss Cartapaglia, the elderly card player and Klimt enthusiast, paced ceaselessly in and out of her apartment, as if intermittently resolved to either flee and leave everything behind, or to commit to her giclee reproductions and porcelain figurines until the end of times. The upstairs neighbor (the bold guy from the fourth floor) was sitting on the stoop crying, with a large garbage bag on his lap. Two days prior, on Monday, he had forgotten to take out the trash—he explained sobbing. What would he do now? "I don't know," I responded, but I was lying: he would haul the bag back up to his apartment, empty it in the bathtub, bathe its contents, dry them, and store them away. I left him—was his name Cortese?—on the stoop and proceeded walking past the foyer, down the hallway, and into my apartment. Welcome home.

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The welcoming committee, once my cat's exclusive purview, extended to what seemed like an interminable list of undesirable objects. Rummaging nervously through them, few seemed deserving of a prosthetic annexation to my body. As a matter of fact, through the lens of the ban, barely anything appeared worthy of the artificial durability the law had bestowed upon it, or of its permanent association with my juridical person. I began to realize that the ability to dispose of stuff was precisely what unlocked its desirable, purchasable status. Would anyone buy a roll of tape, a coke, or a television—actually anything packaged— if forced to indefinitely hold on to the empty dispenser, plastic bottle and styrofoam container? Of course not. And they would probably think twice before acquiring the television (or any other consumer "good") anyway, provided that it was designed to break down in a few years, and manufactured based on current (that is, obsolete-in-becoming) technologies. As I began to inventory the (shame-inducing collection of) objects in my apartment, I foresaw the impending economic collapse. How could (and why would) anyone buy anything ever again?[1]

The following year was chaotic at best. Instead of fading, the confusion and unrest of that first day among immortal objects grew and span out of control. Despite the relatively democratic procedures leading to the ban, revolts broke out in many cities, tamed by increasingly aggressive and disproportionate responses. Two groups of objectors emerged. The first one—the dissenters— claimed that although the ban had received the majority of votes, it could not be imposed on those who voted against it, and proposed to install ban-free zones that such individuals could inhabit and manage (a Switzerland of objects). The second group—the repenters—supported a non-retroactive ban; "you can't

1—
In the long run, Radically Compostable (RC) products and synthetic biology did emerge as viable poietic alternatives, underpinning a new economy of ban-exempt living and soil-enriching technologies.

marry," they'd say, "unless you are making a willful commitment." And as the ban actively married (bonded) citizens to stuff, it could only be fair that commodities be acquired with knowledge of their stickiness. Gesturing towards this latter argument, though forgetting to address retroactivity, legislators passed a law (Measure 1505.3 [Annexation and Responsibilities Act]) that required all new purchases and exchanges to be stipulated (from the Latin *stipulari*, 'demand as a formal promise') through countersigned contracts.

Others objected less discursively. 'Accidental' fires spread throughout metropolitan and suburban areas alike, devouring entire blocks and leaving behind a desolate constellation of darkened clearings. A digital book entitled 'The Drive to Murder Things: A Detailed Manual for Torching Your Home without Ending up Homeless or in Jail' sold ten million copies in the 48 hours following its launch, and was subsequently shared on innumerable electronic platforms, and celebrated with the hashtag #AccidentalObjectsDeath, or #AOD. Flames (and the color of charcoal) were 'in,' and glowed almost daily nearby or in the distance; toxic fumes and the familiar smell of burning plastic rose often into the night sky.

Some paid for their freedom. Although an inventory of items (plus the corresponding bar codes and 3D scans) had been added to everyone's personal file through painstakingly precise surveys, it was not illegal to transfer objects to other consenting adults, provided that the transaction was notarized and signed by both parties. In fact, it became relatively common to exchange so-called 'inverse presents' with loved ones, where instead of showering them with new gifts one took over—not less generously—some of their unwanted stuff. But, as I said, the richest strata of the population mostly employed this subtraction strategy to dump all their trash into the home of the poor and disenfranchised, who for a few thousand dollars put up with increasing levels of prosthetic clutter.

The passing away of citizens provided yet another challenge. If one's possessions were to be re-absorbed by districts upon their death, the ban wouldn't make much sense. Yet the problem was that the vast majority of the population did not have children, making traditional hereditary laws and protocols unusable or ineffective. For this reason, the government entangled each person's citizenship with a network of proxies and "secondary owners" who, in the eventual absence or disappearance of the primary owner, would become liable for a percentage of their material assets. This system and the corresponding legal framework (Measure 1501.0 [Interactive Offspring {IO}]) constructed progeny—or, more accurately, inheritance—based on a person's on- and off-line activities. Archives of the deceased's past interactions—comments on blogs, Mugbook posts, curbside chatter picked up by CCTVs or drones, phone records and videoconferencing patterns—were decrypted, algorithmically measured and catalogued. Certain words and actions were thought to represent the degree of intimacy or closeness between people, and unlocked values on a point system (50 points for "I love you," 30 points for a hug, - 10 points for "***k you," half a point for "Yours Sincerely," and so forth), which were stored in real-time and counted towards the IO profile of each participant. In a way, the law simultaneously

criminalized and commodified social interaction, as well as deleted privacy, with catastrophic results. Imagine that for months your grandma and I only communicated by whispering into each other's ears!!"

Picturing these intimate information exchanges in the most trivial of domestic situations—'pass me the salt, darling'; 'we are out of milk'; 'would you like to go for a walk?'— had amused and awakened Hedi, who had otherwise started to intermittently doze off. He was now officially braving the frontier of his usual bedtime.

 "Are you too tired, Hed? You should go to bed, and we'll continue tomorrow." Proposed Turio, standing. "No, no, no!! I am super-awake!! Sit down grandpa. Please tell me about the aug-cycle and grandma Rossana!!" Turio smiled and sat back on the red velvet chair next to the bed. Hedi's electronic hoverbear twirled repeatedly on the boy's left shoulder; its ears grew a little as it tweeted a pre-confectioned phrase about grandpa's stories being the best.

"Alright...so, where were we...". Turio coughed lightly and resumed: "Those of us who were not rich, exploitative, or pyromaniacal, were left questioning what to do with all the unwanted waste in our lives—essentially, a design problem. Your grandma, who was an architect, wrote several articles about this. In her words, while the ban's original intentions may have tried to promote up-cycling, the successful reuse of existing objects was prevented by the ban's legal framework, which limited hybridizations to a narrow and unrealistic set of domestic objects owned by the same individual. Any systemic approach to waste was impossible from the outset, as design intentions could not override or exceed the juridical boundaries and protocols set around ownership or the wholeness of things."

"What do you mean by 'the wholeness of things,' grandpa?"
"I mean that if the government made an inventory of objects as such, based on their common names (a television, a radio, a fountain pen, et cetera) and assigned each item to an owner/parent, it would be legally impossible to break them apart (and re-combine them) in the future. That is, if the archive of the objects under my responsibility included a stereo, I would have to keep the stereo intact in case of a ban-related audit. But Rossana's argument went further: even if I could disassemble the stereo and keep track of each component, screw and cog, proving that they are still all in my possession, I could only recombine them within the slim ecology of objects in my apartment."

"So that's when grandma developed the aug-cycling software?" Asked Hedi, covering a yawn with his open palm.

"Indeed," confirmed Turio. "She thought that the only way to expand the range of possible object transformations under the ban was to up-cycle through digital augmentations—to aug-cycle. Technologies for overlaying and visualizing digital content on top of matter were already quite sophisticated (mostly optoelectronic, without the need for handheld devices) and widespread, yet they tended to

treat objects as two-dimensional markers on top of which content was loosely floated—typically images, videos, and sounds extraneous to their physical host. At most, these augmentations worked as interfaces presenting information about the object's usage analytics, temperature, size, weight and power consumption, and advertising upgrades or discounts on new models (the real purpose being to gain, use and sell information about the consumer's habits and tastes). This is what the history books refer to as the "internet of things," I guess, but history was never my forte.

Anyway, your grandma's software did not work by 'mapping,' but, as she would say, by 'co-modeling' or 'coalescing.' Augmentations were native to the object, as they were initially derived from a 3D scan of it. In some cases—what she named 'cosmetic augmentations'—the digital object matched exactly the physical one, simply smoothing out imperfections, erasing stains, changing surface colors, filling seams, re-aligning the object with its intended or normal appearance. Cosmetic augmentations were often applied to broken items which had been glued or stitched back together, and the resulting hybrids were typically still able to perform according to original purposes and intents. But a whole range of transformations was possible, on a variety of physical substrates, which might remodulate and re-functionalize objects according to shifting aspirations, fashions and desires. Yet, although the digital scan could be modified with several algorithmic recipes, and integrated with an increasing variety of downloadable upgrades—models, patterns and textures—, even in the case of major reconfigurations and repurposing, it never defied the object's basic affordances or relational reality. For instance, no matter how aesthetically or functionally removed from the original objects, augmentations always grew upward in items that sat and downwards in items that hung.

In a way, weaving a new hybrid (digital-real) materiality of objects—one that could be constantly retuned—offset and balanced their resilience, making the ban bearable. And the resulting Digital Overlay Economy (DOE) is still employed today as a cure against obsolescence and futile manufacturing."

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The hoverbear had vanished and Hedi, whose face had been shadowed by the adjacent bookshelf, had fallen asleep. Turio tucked him in, turned off the electronic toy wall console, and whispered "good night."
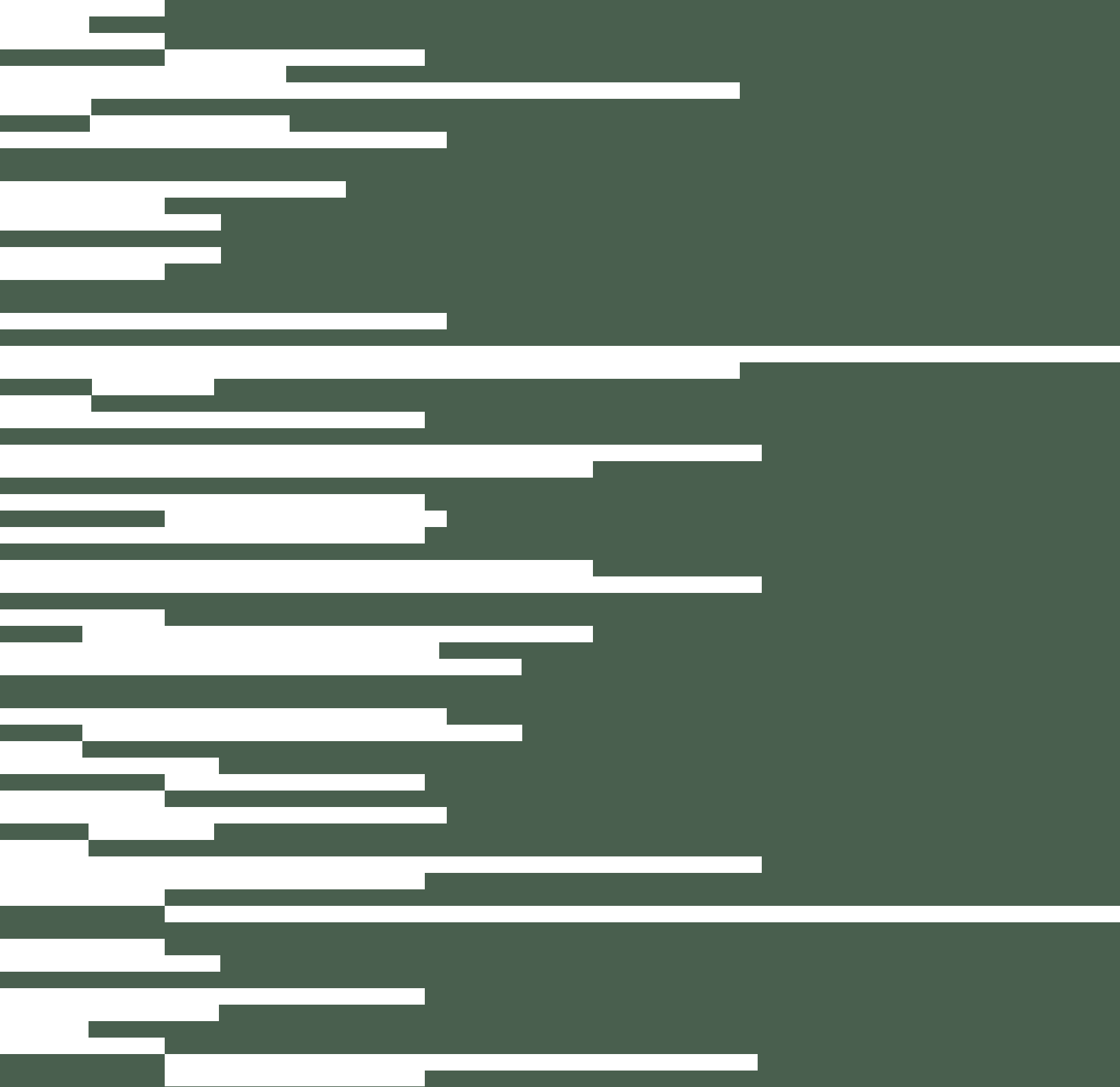
Paparazzi

Tim Maughan

When John got off the bus outside the Hippodrome Claire was nowhere to be seen. Instead she'd dropped a Post-it for him; a translucent slice of virtual A4 spinning slowly in the air at head height. He sighed and blinked at it, the note stopping its spin instantly to face him and just one word appearing on its surface: Starbucks. "Great" he muttered to himself, "but which fucking one?"

He blinked at the Google Earth logo on the note's bottom right corner and a football-sized coffee bean materialised in the air next to it, followed by another identical one three metres away, and then half a second later another, and then another and another; so that within a few seconds a trail of them hung in the air, disappearing into the crowd of afternoon shoppers and snaking up the hill along Park Street. High in the sunny Bristol sky he could see a ten metre high latte hanging like a hot-air balloon, the huge green arrow suspended from its underside pointing down at the store's location.

This was starting to turn into an Easter egg hunt. He'd never met Claire in the flesh before, but the contact he'd had with the girl so far had left him with little reason to suspect that this was some kind of griefer prank. He logged into *WhereImAt*, blinking through menus to pull up his Friends List, but she was still showing her location as private. Absentmindedly he scanned the other names on the list; Alice and Stefen were back at home, most of the day jobbers were at work, but Dave was in The White Bear just around the corner, having his customary afternoon pint.

John pushed his Samsung spex up onto his forehead, the menus and coffee beans vanishing from his view, and rubbed the bridge of his nose. The White Bear was a lot closer than the trek up Park Street, and right now beer seemed more appropriate than a caffeine hit. He hadn't been outside for maybe a week - he wasn't entirely sure - and the noise and chaos of Bristol city centre was making him tense and self-conscious. A dark, quiet pub would certainly be preferable, but one drink with Dave would lead to a second, and that was something his current financial status wouldn't really permit if he didn't want to live on microwaved dhal for the next fortnight. And even if Claire's promise of an actual paid job turned out to be bullshit, he was sure she'd mentioned that she would pay for the coffee. He slipped the spex back down over his eyes, and reluctantly started to follow the trail of beans.

■ ■ ■

"I'm sorry for all the messing around," Claire said, peering at him through her sleek Apple spex. "For all the... secret agent nonsense. But what I need to discuss with you is extremely sensitive. If it was to be heard by the wrong ears it could have grave ramifications not only for the two of us, but also for several of my Guild's top ranking officials."

John stifled a laugh, successfully managing to avoid snorting hot espresso down through his nose. It wasn't just the pomposity of how she talked about Guild business that amused him - he'd sadly become all too accustomed to how self-important gamers spoke about their characters and clans - it was more what she seemed to be suggesting.

"Sorry, you're telling me this Starbucks is more secure then us just

discussing this in Third Person?"

"It is right now, yes." She sipped her latte. "I have friends making sure it is. But they couldn't give me a venue until the very last second, hence the running around. Again, I'm sorry, but I kind of had no choice."

Impressive, John thought, if true. Again he had all too much experience of clan kiddies unquestioningly spouting Guild doctrine, naively believing their leaders' claims to be real-life elite hackers, industry insiders, glamour models or returning messiahs. But Claire didn't really fit that stereotype; she was older for a start, and seemed more experienced, less gullible with it. Apart from the trendy Apple spex, the rest of her rig suggested functionality over style, her apparently hand knitted voice-free choker and fingerless data gloves in matching purple wool clearly old and starting to fray in places. He guessed she wore them partly out of comfort and familiarity and partly out of pride, the DIY aesthetic they implied considered to be a badge of status amongst members of her Crafter class. He imagined her sitting in her college room late into the night, knitting the gloves; carefully incorporating the Bluetooth transmitters, fibre optic sensors and RFID tags into their design. Jesus, the calibration alone must have taken her hours. As someone who had never used anything except Indian- or Chinese-made off-the-shelf components, he had to admit he was impressed.

"Even though I've been assured this place is secure from external taps, I still don't want to risk us being overheard."

John glanced round the empty coffee shop. "It's dead. There's no one here."

"Still, we can't be too careful. You do have a choker on you, right?"

"Sure" John replied, reluctantly. He fished around in the side pocket of his cargo pants, and pulled out a cheap Logitech-branded voice-free choker. He always carried it on him, but hated wearing the bloody thing as it made the skin on his neck itch, especially on hot days like this one. He wrapped it tightly around his throat; fastening the two velcro ends together behind his neck. A small, red, ring-like icon appeared in the top corner of his field of view, quickly flicking to green as his spex established a connection with the choker and confirmed it was already eavesdropping on the weak electrical impulses being sent to his larynx.

A private space invitation from Claire instantly appeared in the air a foot in front of his face, and vanished just as quickly as he blinked his acceptance. Claire spoke again, without moving her lips, and her voice came not from her mouth but from behind his ears. The cheap noise-cancelling micro-speakers at the end of both of his spex's arms made her avatar-voice seem tinny, but at the same time cleaner, more confident; reminding John that he was listening to nothing more than Claire's spex running a virt-model of her larynx, probably built from a high street CAT scan, and undoubtedly tweaked with cosmetic software.

"You hear me?"

"Sure." he replied silently.

She cleared a space on the table between them, moving their drinks and discarded sweetener packets to one side, and then traced a lime green, dotted line on the flat surface with one finger. The line became a rectangle as her finger returned to its starting point, and became a two dimensional opaque slab floating a few millimetres off the table. Then suddenly it was a web browser window, filling with images of brightly coloured cartoon samurai and warrior monks, animations of stylistic monsters and burning villages, and what John guessed was Korean text. Game stuff. Claire reached over and lightly touched the largest image, a head-shot of a handsome but heavily-stylized Asian male, his long, dark hair pulled back in the traditional samurai style, his eyes narrowed into a cold, aggressive steely gaze. John couldn't work out if it was a heavily-tweaked photo, a render or a mixture of the two. Either way it looked slightly absurd to him, camp even. He wanted to laugh, but he resisted it again.

"You know who this is, right?" Claire said.

John shrugged. "No idea."

"Really?" she replied, the avatar-voice model doing the best it could to convey her disbelief. "Don't you ever watch the news? That's Leo Kim, one of the highest-ranking *A Wind of Blades* players this side of the Great Firewall. He was voted Sakura Guild's most valued player three years- "

"Look," John interrupted, still trying not to laugh. "Believe it or not, I don't know him. I don't play *Blades* and I don't really go in for celebrity watching."

"Fair enough" Claire sighed. "But if you take this job, you're gonna have to start doing both."

John felt his cheeks flush hot with embarrassment and then, just as quickly, anger. Partly towards Claire for wasting his time, but overwhelmingly towards himself for not seeing this coming.

He pushed one hand down firmly on the table as if to push himself up and leave, and whipped his spex off his head with the other. "I think there's been a misunderstanding, and we're both wasting our time. What ever it is you think I do, I'm not paparazzi- "

"No," Claire interrupted. "You're a machinima documentary director. Arguably one of the best. I know, I've experienced *Ghosts of Fallujah* three times. From all the main POVs. It's a masterpiece."

John realised for the first time that Claire's hand was on his – an attempt to calm him and stop him from leaving – and it was working. He hadn't had any physical contact that intimate, that simple, for a long time, and it was making the hairs on the back of his neck start to stand upright. Embarrassed, he tried to shake the sensation.

"Then if you've seen *Ghosts* you know my work goes way beyond door stepping celebrities."

"Oh, of course. And as beautifully caught and edited as *Ghosts* was, it's not actually those skills we're primarily interested in." She removed her hand from his, and pointed towards the spex hanging limply from his right hand. "Please, hear me out."

Reluctantly he relaxed, returning the spex to his face. Her avatar voice returned, now sounding clinical and cold, especially without the touch of her skin on his.

"How long did you spend in that game, John?"

"It wasn't a game." he corrected her, annoyed. "It was a US military construct; a training sim. Stolen and cracked by a group of teenage Syrian hackers. It had a level of gritty realism you won't even have got a hint of from watching *Ghosts*. All in all I spent about 18 months in there."

"18 months, while they constantly fought and re-fought the Second Battle of Fallujah, 22 years after it really ended, until they got the result they had always wanted. And they never suspected a thing."

"Sorry?"

"About you. They never suspected once you were an outsider, right? They always just assumed you were one of them."

"Well, not exactly. They never thought I was Syrian. But I did manage to convince them I was a disenfranchised Muslim teenager from Bradford, yeah. There were quite a few European kids in there. They never suspected anything beyond that. I'm not going to pretend it wasn't hard work though."

"Of course. But you did it." She paused to sip her latte. "Look John, I can get any one of a thousand *Blades* wannabees I know to do this run for me, get them tooled up with illegal recording and capture warez, get them to grab a couple of hours of Kim doing his thing in game. But they wouldn't last ten minutes in there without him or one of his lackeys spotting them for who they really are. They'd be too sloppy, not cover their tracks properly. Anyone that enters a game-instance with a player at his level is going to be scrutinised to fuck, their bio and social profiles are going to have to be tight. You've already proved you can do that. If you can get past a bunch of jittery Jihadists, then some Korean cyber-athletes are going to be a piece of cake."

The flattery was working. John knew it was a cheap tactic, and he was falling for it. To be honest, it had been nearly two years since he'd discussed *Ghosts* with anyone, and even longer since anyone had heaped praise on it.

"You never followed *Ghosts* up though?" she asked him. "Did you make much from it?"

He chuckled quietly. "Nah, not really. There was a bit of interest in the first few months, but no one would touch it. None of the big ad networks, not Google, not the big providers... no one. I ended up broke, basically." He stared down into his coffee mug. "Look, I know where you're going. Yes, I'm skint. Well spotted. So put me out of my misery, what exactly would I get out of this run?"

"My Guild, Sentra-li, is prepared to cover all your initial set-up expenses. On top of that, you get whatever you can sell the footage you capture for."

John paused to take in what she'd said, it didn't make sense. "Sorry have I missed something? I get all the money for the footage? Not just a percentage? I don't- "

"This isn't about financial gain John, at least not for my people. This is very, very personal."

She pointed down at the browser window suspended above the table, at the stylised image of Leo Kim's avatar. "This run isn't just an average dungeon-crawl. It's part of the beta test for Blades' new content release."

John stared back at her blankly. "And?"

She sighed. "*A Wind of Blades*... it's obsessed... its players, its Guilds, the game itself... they're all obsessed with status. Kim markets himself - his persona, everything - around an image of being an elite player, with ties to no one except his in-game Guild and his real-world sponsors. That's why my people became so interested when they found out he was working as a tester for the games dev team. The great Leo Kim running around still-unfinished code and filing bug reports? Apparently he still has some very firm ties with the developers. Imagine how damaging that would be for the brand he has built for himself if it got public."

John laughed. "So this... all this cloak and dagger stuff... it's just so you can embarrass someone?"

Claire fixed him with a stare that made it perfectly clear that she felt nothing of what she had said was in the slightest bit amusing. "Leo Kim isn't just a good Blades player, but one of their most revered generals. Mainly due to the profile he has built for himself. He could say the word and a thousand Sakura members would fall on their own swords. Last season, during an unscheduled and unprovoked land-grab, he successfully led eight hundred troops into Sentra-li territory and surrounded one of our outermost fortresses. The siege was ultimately successful, but not until three weeks had passed and hundreds of my people had to coldly stare perma-death in the face."

John again stifled a laugh at her pompous language. Of course he comprehended the emotional and financial attachment career gamers like Claire built up with well developed characters over years of investing in and role-playing them, but he always found the quasi-religious fixation with perma-death – the mortal wounding of an avatar in a way or location that didn't permit any resuscitation - somewhat laughable. Perhaps it was because he'd watched dozens of Muslim teenagers use their own beloved, lovingly self-crafted alter egos as sacrificial weapons, apparently without ever a second of hesitation; their own personal beliefs transcending concerns of finance or game ranking. It had certainly shifted his perspective on a few things.

"So this is mainly about revenge and political instability then? Nothing changes, I guess." He looked her firmly in the eyes. "So what if I was actually interested? What happens then?"

Claire smiled back at him, a hint of playful glee in her eye. " Then I'd suggest you get into training pretty quickly. The run is scheduled for just over two weeks' time. You're a *Blades* virgin. You've a lot to learn."

"But what about a character? Where the hell do I get one?"

"Oh, don't worry." She smiled wryly and sipped her latte again. "Leave that to us."

■ ■ ■

John opened the door to the kitchen to find the air thick with Post-its and the smell of over-processed food. His housemate Alice was responsible for the Post-its, the usual nagging reminders to the other occupants to wash up and buy milk, but it was Stefen, sitting at the kitchen table eating instant noodles and reading a copy of the Bristol Evening News, that was responsible for the unappetising aroma.

"Jesus, man," he said to Stefen, "who does she think she fucking is, our mum?"

Stefen looked up at him blankly. "Sorry?"

"Alice, man. The Post-its?"

"Ah. You see my friend, I never break my first rule."

"First rule?"

"Ja." He grinned and tapped the side of his left eye socket with one finger. "Never wear your spex in the kitchen."

John laughed, but promptly removed his Samsungs and dumped them on the table as though it was the best advice he'd ever heard. John had a lot of time for Stefen; for a low-level career gamer he displayed a surprisingly dry sense of humour, and a healthy disregard for the usual social conventions of an undoubtedly Guild-dominated life. But in truth John realised that he didn't really know or connect with the young Hungarian as much as he might wish. It was the same with the other four occupants of the small Bedminster terraced house with whom he shared the rent, and he'd resigned himself to the fact that it would probably always be that way. It was the inevitable consequence of living solely with people who had decided to dedicate their lives and careers to the virtual. They were companions only due to some seemingly outmoded geographical and economic meatspace necessity, and they all understood it, ever aware that however close they may become to one another, all their true friendships and allegiances lay elsewhere.

Except maybe for John, who was without those kinds of friends or allies; the people he once put in those categories had turned their backs on him amid rumours of fraud and betrayal, and abandoned their identities and fled into the deeper, darker parts of the net and away from those that would label them dissidents and terrorists.

"You seen this?" Stefen asked through a mouthful of piss-yellow noodles. "Chinese goldfarms. Says here that some of the Guilds are rounding up orphans from the floods and making them work twelve-hour shifts running game accounts. You know, making in-game items and shit."

"So? What's new? Been going on for decades."

"Yeah, but these are kids man. Seven years old, it says here."

"Shit Stefen, you know better than believe what you read. Especially when it's about China. All the western Guilds have got huge shares in the main media providers these days."

"Ja, ja, I know." he swallowed another mouthful of noodles. "But this... I dunno, I wouldn't be surprised man. These big Asian Guilds, y'know? They'll do anything for the edge. Anything."

John grabbed a glass of water and sat opposite Stefen at the table. "You know much about them?"

"Hey," Stefan smirked, "I read the papers."

"Sakura and Sentra-li, you know them?"

"Hell yeah, two of the biggies, across several titles, *A Wind of Blades* and *The Blood of our Heirs* mainly. Really nasty long-term rivalry between the two. Lots of big-ego, big-bucks star players on both sides. Lots of pride and bullshit. Endless power-struggles and soap opera tabloid drama at all levels. Why you asking?"

"Oh, nothing really." John replied. "Just some old college mates, trying to get me to sign up to one or the other. Can't even remember which."

Stefen snorted. "Well my friend, one piece of advice to you before you make a decision like that: Google hard. Make sure you know what you're getting into, and that these old friends are good friends. I'd keep looking over my shoulder if I was involved with either of those organisations, man, and God forgive anyone that finds themselves caught between the two."

■ ■ ■

Up in his room, John booted his Toshiba desktop and removed the Sony headset from its recharging cradle. He sat in the tattered Ikea office chair and slipped the skeletal, lightweight headset on, fitting it snugly round his skull with what felt like cold, bony, plastic fingers. He adjusted the goggles so they completely sealed his eye sockets and no external light could permeate, the total darkness lasting only momentarily before the lasers started to project images directly onto his retinas.

His computer's desktop unravelled into existence around him, an ornately tiled recreation of his

favourite Fallujah roof garden, the city's familiar yet still magnificent minarets dominating the skyline. It was the perfect facsimile of the roof of a real building that hadn't existed for over two decades; reduced to rubble and dust by air strikes and artillery fire.

John focused on a mental shortcut, and a browser window appeared floating in the air in front of his face, the sensors in the headset's fingers detecting the faint signal of his brain waves. The hardware manufacturers liked to call it a "Brain Computer Interface", which always made John smile. It was infinitely less sophisticated than the marketing suggested; the system worked by showing the user simple icons while looking for subtle, corresponding changes in the brain's magnetic field. The user then had to memorise the icons, and recall them to prompt the computer into acting. It was pretty unsophisticated - firmly one way, hit and miss at times, and necessitated a lot of practice on the user's part initially - but it was a popular system. In fact, in some ways it was the system's shortcomings that had made it the most widely adopted input method with gamers; the need to put time and effort in giving it a slightly macho edge. Being good at 'focussing' was a sought-after and valuable skill that brought both financial rewards and status, and was often discussed in near mystical terms by disturbingly large swathes of the gaming community.

He navigated the browser to the *A Wind of Blades* website, and promptly started to download the free client software, which slowly materialised on the roof garden's floor as a dully glowing cube. It was a big file and was going to take a while, so he opened his mail client. Amongst the junk and spam there was already an email from Claire - she was evidently a fast worker. He opened the heavily encrypted message and scanned its contents. There were sign-in details for a *Blades* account, which Sentra-li had set up for him, and an unnamed attachment. He unpacked it onto the roof garden, but it appeared as a nondescript black cube; useless data until the *Blades* client was installed. All he could assume, from the levels of encryption that Claire had used, was that it was of a sensitive and possibly legally-dubious nature.

He pulled the headset off and slumped back in the chair, rubbing his temples. What the hell was he getting himself into? This wasn't him, his world. This wasn't what he did. He avoided this sort of shit these days. His own first rule. But something had touched him about Claire - she'd known which buttons to press. She, or her people, had undoubtedly spent plenty of time researching him, his bios, his social networking profiles, until they knew exactly which angle to take to get him on board. And even though part of him felt like a fool for falling so easily for it, he couldn't deny that he was relishing the challenge.

Plus, he really did need the money.

The Toshiba chimed to notify him that the *Blades* download had completed. He sighed, and with a certain degree of trepidation, put the headset back on.

On the rooftop, the Blades client was already unpacking and installing itself. The cube unfolded itself into six separate windows, three of which were showing the usual high-budget but bland and predictable opening movies, while two showed similarly predictable terms and conditions, legal disclaimers and end-user licence agreements. It was the last one that caught his attention; the log-in/registration screen. With a mixture of focusing and hand gestures he cut and pasted the relevant information from Claire's email into the form.

A Wind of Blades unwrapped itself around him. He was stood on top of a valley, the sides of which had been cut into large flat steps, each of which held paddy fields with tiny-looking figures toiling away in between the rice plants. Directly below him at the bottom of the valley, led to by a long winding path, was a large walled city, topped by towering pagodas, watchtowers, and hundreds of brightly coloured flags. The entire scene had an unreal quality, looking as though it had almost been hand painted, and despite its generic anime style, John had to admit the sheer scale of it all impressed him.

He looked down at his hands, the Toshiba watching his head and body movements and syncing his avatar perfectly. Ornate rings, engraved with unknown Asian characters and studded with small jewels, graced most of his fingers. He focused and zoomed out to third person, the usual, wrenching feeling of disembodiment grasping him at first, and slowly rotated around the character.

"Well, at least he's male." was his first reaction. The character was minimally dressed, in the traditional Ronin style, with just a simple purple kimono as the main garment, but with a never-ending selection of items and weapons hanging from straps and belts. Despite giving an initial impression of scruffiness, the character oozed status and experience. Perfect, he thought. It was emphasised even more when he rotated round so that he was looking the avatar directly in the face. The character was Asian, in what appeared to be his mid-thirties, and handsome save for two parallel sword scars that ran down the right side of his face from the eye socket to the bottom of the cheek. Without warning the face grinned back at him, making him jump, until he realised it was only mimicking his own facial expression. Maybe this was all going to be more fun than he had first imagined.

He jumped back into first person, and tried a standard focus command for opening in-game menus. The air around his face erupted with windows, overloading him with information - inventory lists, statistics, skills, wound status reports, chi levels, friend lists. Almost as quickly as they appeared, he focused again and shut them all down. Too much. Claire was right, he thought, he had a lot to learn.

Silently he started the walk down the long road to the city below.

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John rubbed his tired eyes and squinted at the Toshiba's LCD display, trying to read the game log. Over the last two weeks he had apparently spent 156.34 hours in-game, running through tutorials and quests, getting a feel for not only his character and the controls, but also the game world itself. It was a sizable chunk of his life, but he couldn't shake the feeling that it wasn't enough. The character Claire had supplied him with was developed and powerful, more than capable of handling anything that might be thrown at him during the simple beta-test run, but only as long as he could control it. And, more importantly, make it look convincing.

It wasn't all he'd been doing over the last fortnight. He had spent almost as much time elsewhere in the net, flitting between forums and social networking sites, building up his fake identity. It was a long and complicated process, constructing a believable alter ego, laying a digital trail around the net that gave the impression that a real person had passed through, but he was one of the best he knew at it. Months of constantly shifting and updating his trail while working on *Ghosts* had made him an expert, and in many ways he found it more challenging and enjoyable than playing the game itself. But even now he wasn't convinced that he had enough to keep the Sakura Guild spies off his back.

There wasn't time to worry about it now. He lay back on his bed and set his alarm clock for 5am. Just three short hours, and the run would be under way.

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Claire laughed, in that way she always did, with her head tilted back and her eyes closed. It wasn't the first time he'd seen her in-game - they'd done half a dozen or more practice runs together over the last couple of weeks - but something about the elegance of her avatar always caught his breath; the dark strands of her cell-shaded hair moving in the gentle breeze. When he first met her she had seemed somewhat self-important and humourless to John, but over the last two weeks his perception had changed. They had fun together, despite the heavy training regime she had been running him through, and he seemed to be able to make her laugh. And when she did it made something inside him flutter, and the hairs on the back of his neck twitch. He'd had to learn to mute some his avatar's emotional tracking, to hide the blushing.

"So how have you been finding it?" Claire asked. "Don't tell me you've been actually enjoying yourself?"

He paused at first, unsure what to say, a mixture of emotions hidden from her view as he temporarily disabled the avatar's ability to convey more than basic facial expressions. The last two weeks had been

hard, stressful work, but with hindsight he wouldn't have missed it for the world. To his own surprise he had gradually felt his own bitter cynicism chipped away, replaced slowly with feelings of excitement and companionship and a sense of purpose he hadn't experienced since Fallujah. He wanted to tell Claire, more than anyone, all of this, to share his new enthusiasm with her, but looking at her now he just felt as awkward as always, and knew he wouldn't be able to find the words.

"You got me," he replied instead. "I haven't had so much fun in years. And this spot... the view here always impresses me."

They were stood on the same spot where he had first entered the game, overlooking the rice plantations and the city below. "It's the attention to detail." he continued, "I mean, those bots tending to the paddy fields, they move so realistically. I've watched them, and they never seem to repeat what they do. It's almost as though they're not just animation loops."

"They're not bots, John."

"Huh?"

"They're real players. Sentra-li Guild members."

"What?" They... they log in here just to do that? To pick rice?"

"It's an honourable profession. A vital one. Those rice balls you eat when your health and chi is low? They're all made in places like this. It's *Blades*' most important currency, John. An army marches on its stomach."

"But... but why? Why come here, with all this place has to offer, and do that? By choice?"

"They have their reasons." Claire said, guardedly. "Money. Guild progression. Honour. It's not that unusual, really. But come, let's get a move on. We don't want to keep the others waiting."

Together they started the long walk down the hill.

■　■　■

When they entered the beta-instant, three figures were already waiting for them in a clearing in the woods. They all wore the familiar Sakura Guild attire, but it was obvious at first glance which one was Leo Kim. He towered above the other players, not purely in stature, but more in presence. There was something about the way he carried himself, his self-confidence, which John couldn't quite put his finger on. Sure his costume was slightly more elaborate, he had more trinkets and ornately crafted weapons hanging from his belt, but there was something else. It was something he'd only experienced once or twice before, in either the real or the virtual. But it was unmistakable.

And then, as Leo Kim calmly introduced himself, he realised what it was. It was celebrity.

Kim spoke little, exchanging little more than pleasantries with Claire, the tension of generations-old inter-Guild rivalry hanging heavy in the air between them at all times. Under any other circumstances they would never have been in such close proximity, save for a chance encounter on a battlefield, but it was apparently part of the developer's beta regulations that no new quest content be tested by single Guild parties.

Pleasantries aside, the quest began. The clearing around them seemed to spin and distort as the game transferred them to the new quest area. The transition effect always made John feel nauseous, and instinctively he shut his eyes. On opening them again he had to catch his breath. Claire had explained to him that they were going to be testing a major content upgrade; something new and fresh to ensure that the more casual players and Guild members retained their interest and kept paying their subs, and now John could see exactly what she meant. In the mere couple of weeks that he'd been playing, he'd not yet seen an environment quite like this.

They were stood on the edge of a low cliff, looking down across what appeared to be the ruins of an ancient, abandoned city; parts of which were flooded by silver pools of water, while others were almost

entirely obscured by overgrown jungle. It was the architecture that seemed so unusual, a strange mix of Mayan and Edo-era Japanese, giant statues of kings and warriors with anime features emerging defiantly from the floodwaters and impossibly tall pagodas entwined in vines. Everything seemed to be carved from the same somewhat alien looking jade-coloured stone, but as fantastical as it all seemed John again couldn't help but be convinced by the sheer scale.

There was a rustle in the undergrowth to their left, and a short fat man - clearly a pre-scripted bot - emerged from the bushes. He stood in front of the party, breathing painfully with blood pouring from a gaping wound in his side, soaking the rag-like farmers' clothes he wore. The bot began to babble something in a language John didn't understand, either Japanese or Korean.

He quickly shot Claire a private message. 'I can't understand what he's fucking saying.'

'Cos they haven't localised it yet.' she replied. 'Just chill.'

"It's the usual bullshit." one of the Sakura players said, with unnerving timing. "He's part of an archaeological expedition that has been attacked by Tanuki. We need to fight through and rescue everyone, and retrieve some artefact they've uncovered."

"What the hell are Tanuki?" the other Sakura player asked.

"They're a kind of Yokai" Claire replied. "Japanese folklore creatures. Kind of part human, part raccoon. Live in the woods and play shape-shifting tricks on travellers. Though looking at that bot's wounds I'm guessing they're not interested in just conning us out of some sake."

The fat little archaeologist had collapsed at their feet, gurgling in a pool of his own blood.

"They're near" said Leo Kim, calmly.

As if on his cue, dozens of shifting, black hooded figures erupted from between the trees clasping crude-looking weapons and emitting low, animal-like growls. Instinctively John jumped into third person and started to focus on his attack combinations, watching his avatar swirling into the ranks of Tanuki, Katana swords outstretched. It was no longer responding to his real body's movements, instead relying on his ability to remember the ever increasingly elaborate strings of focus moves, as the air filled with the Tanuki's dark blood and pained screams. As he sliced through one of the disgusting creatures' twisted snouts, he glanced around to see the other players disappearing into their own chaotic, violent blurs. He caught Leo Kim parrying a Tanuki Shaman's lightning blasts with a Katana sword in his left hand, whilst removing the arm from a foot soldier with a second blade in his right, the creature exhaling wetly as its corpse went limp and fell to the floor in a mist of black blood. John found himself gazing at Kim in awe at how elegantly and effortlessly he twirled through his attack and defence combos, part theatrical martial artist, part ballet dancer, before he suddenly remembered what he was actually here to do.

Popping out of the *Blades* client for a moment, he quickly activated the attachment Claire had sent him two weeks previously. It instantly unpacked itself, without any flurry or flash, and presented one simple message window:

FORCED CAPTURE ENABLED - RECORDING

It was a Blades recording script. Like most of the popular titles, Blades didn't permit the recording of in-game events without all participants' prior consent. It was a measure to protect individual privacy, and to stop paparazzi like John from doing exactly what he was doing right now. With the script running, he jumped back into the game.

To find the violence over, and the other players staring at him.

"What's wrong, comrade?" asked one of the Sakura warriors. "You froze up."

"Apologies," John replied. "I had some really bad lag, almost thought I'd have to log out. What happened here?"

"We killed them all" said Claire. "We need to move to the next area. Can you carry on?"

"Oh, sure. It was weird though. Must be something in the beta code."

Leo Kim fixed him with a dominating stare. "Make sure that you report it to the devs when we are done."

And then he silently turned and strode down some beaten steps that descended into the vast city, the other players following him.

■ ■ ■

The run was over in less than two hours.

As he stood in the cold, stone hall of an abandoned temple, Tanuki bodies littered around his feet, John felt elated; more exhilarated than he had felt in years. But soon he found he had no one to share it with, as the other players grunted farewells and logged out of the game, vanishing before his eyes. Even Claire was gone before he could speak to her. No problem, he'd message her tomorrow. They could meet up maybe, celebrate. Go for a coffee again.

He logged out himself, and pulled off his headset, massaging his temples with the palms of his hands. He was torn, half of him wanting to play again, the other half craving sleep. But he knew neither was an option. He had footage to edit and sell.

■ ■ ■

John awoke on his bed, his head thumping, to the sound of rolling news. It was 10 am, and Leo Kim was stepping off a helicopter at a Florida flood relief camp, passing out plastic Katana swords to the refugee children that swarmed from the rows of identical FEMA caravans. The real-life, flesh and blood Leo Kim. It was the first time John had seen actual video footage of the player, but he knew it was him. He was a noticeably shorter, slightly imperfect facsimile of his avatar, right down to his outfit. Kim wore a real-life copy of his character's trademarked red kimono, complete with elaborate Guild embroidery. But in the harsh reality of the gray Florida light he looked more like an embarrassed cos-player than an anime superhero; the kimono seeming garish and flapping awkwardly in the gusting pre-hurricane winds rather than undulating elegantly in the gentle, non-existent, in-game breeze. The contrast was so stark at first that it actually made John laugh, until he squinted at the TV, and noticed the date stamp on the news footage said that it had been filmed five hours ago. When the run was still on.

Impossible. Even a player like Kim couldn't play and make a personal appearance at the same time. It made no sense at all. John's head was still full of edits, Tanuki and swordplay.

Unless it hadn't really been him on the run.

John panicked and gestured at the Toshiba to pull up the private auction he'd set up online. He'd slept through it all, but apparently hadn't really missed much. The footage had sold, but for a fraction of what he had expected, its value discredited when the world had realised it must be fake.

John stood, struggling to find his balance after hours of moving only in the virtual, and stumbled around his room trying to find his spex so he could call Claire. He didn't get far though, before a Tanuki shaman burst through his

bedroom door and fired a blue lightning bolt hard into his chest.

■ ■ ■

"Please, Mr Smith, don't get up," said a thick cockney accent, before he felt a hand on his chest, gently pushing him back down on to the bed.

A large, bulky figure sat above him, wearing a black double-breasted suit and Oakley military-issue spex. John's chest hurt, his limbs felt cold and sweaty, hot but noticeably shivering. "What... what did you do to me?"

"Oh, Mr Smith, it was just a little bit of taser." The man grinned coldly, his eyes still hidden behind the dark spex. "Don't tell me you've never been tasered before? I find that hard to believe, with your politically-dubious background."

"Who sent you?" John managed, struggling for breath. "Sakura?"

"Ahh, close, but not quite. I represent Sentra-li, believe it or not. It's my job to tie up loose ends."

"I don't understand... "

"Ah, my apologies. Let me show you. Careful now. Your body will still be quite weak." John reluctantly accepted the suited man's hand, as he helped him sit upright on the bed. His back ached, his head felt heavy, his arms numb. John had never had a heart attack, but this was how he guessed it must feel afterwards.

The man perched himself on the edge of the bed and gestured at the Toshiba, flicking it onto the Game Pipe News TV channel. Immediately he spoke, his voice full of sarcastic glee and patronising, mock surprise.

"Look, Mr Smith, the little film you made for us. It's on television. Well done!"

John squinted at the TV. It certainly did seem to be his footage, but there was something drastically different about it. There was no Leo Kim. In fact, there were no players at all. Someone had edited the captured data and removed them completely, leaving only footage of the new game environment. In fact they'd thrown out all of John's edits, trashing hours of work, and just used the raw positional data he'd recorded to create a selection of fly-throughs of the new lost city levels. John didn't get it at first. Then a headline appeared at the bottom of the screen that explained it all.

NEW BLADES BETA CONTENT - FOOTAGE LEAKED

"Let me give you a little background." the suited man said, jarring John's concentration. "I don't know whether you will have read about it, but about four weeks ago Sentra-li bought a thirty three percent stake in Game Pipe News Ltd. A big deal, and one that took a lot of negotiation. One of the things that finalised it was a promise by Sentra-li that it would use its considerable influence to provide GPN with a huge scoop on a major title. Just by luck, around that time Sentra managed to secure a limited number of places on a *Blades* beta test."

"But... Leo Kim... "

"I'm sorry Mr Smith, we were a little dishonest to you about Leo Kim. That wasn't him in game with you. It was an impostor. But we had to give you a reason, and the real one wouldn't have really done. You see, beta tests like the one

you were involved in last night are highly confidential. Anyone that enters them - Guilds included - is subject to extremely tight Non Disclosure Agreements. In fact, as I speak right now, a team of lawyers is raiding the GPN offices in LA. And if they connect that footage to you, and in turn you to Sentra-li... well. I'm sure you can imagine the inconvenience that would cause to many people."

He leaned close, so that John could see his own terrified eyes reflected in the man's spex. "And that's why I'm here. Like I said. To clear up any loose ends."

John's mouth was dry. His muscles started to shake again, but not from the after-effects of the taser this time.

"Look... please. Just... don't kill me... "

The man laughed. "Kill you? Oh no Mr Smith. We're not the Triads or the Mafia. We're not monsters. Plus anyway, death is such a terrible waste. Oh no, I have a vastly more profitable solution. Tell me Mr Smith, have you ever been to China?"

■ ■ ■

John found that if he imagined hard enough, he could almost smell the pollen and cherry blossom blowing up from the valley, instead of the smell of sweat, processed noodles and stale smoke that permeated into his consciousness from the real world.

As soul-destroying as constantly focusing on rice picking was, he still preferred being here to the depressing gloom of the sweatshop dormitory – crammed with a strange combination of desperate, poverty stricken farmers forced off their land by the ever advancing floods and over-privileged western students spending a gap year trying to impress the Guild - that smothered him whenever he removed his headset. When he could, he would take a few seconds' break to gaze at the view that had always fascinated and enthralled him. He liked it best as his shift approached its end, with the sun setting slowly on the horizon, turning the bird-filled sky pink and silhouetting the distant city's towers and pagodas. He would stare at them and dream of strolling down there one more time, his head held high again, until one of the gang masters spotted him slacking off, as they always did, and zapped him with an instant Work Credit Penalty. Or, even worse, threatened to revoke his daylight pass.

He had lost track of the weeks, but he knew he wouldn't be here forever. What he was doing here was honourable work; it wouldn't go unnoticed by the Guild. An army marches on its stomach. With time, they would recognise his loyalty and commitment, and they would let him leave here, sending him out into the world with just a sword and his honour, to make his mark among the great heroes.

New Idioms for Sci-Fi Producers

The Near Future Laboratory (Nicolas Nova, Julian Bleecker, Fabien Girardin and Nick Foster)

Drawings by Anne-Gaëlle Amiot

Anyone with an urgent need of futuristic concepts can pick up one of the terms below and place it into his or her story, ad, future scenario or business plan.

Relevant for producers, writers, production designers, directors as well as consultants, trend analysts, journalists, ad agencies and researchers interested in "the Future."

1 **aerial P2P** *n*. Geolocation-enabled drones that broadcast their own wireless network as an easy-to-access telecommunications service in developing countries, or as a flying pirate file-sharing infrastructure. *1. He's trying to get the UN to fund his aerial P2P scheme to save the world. 2. Where did I get my torrent files? Dude, I used the aerial P2P network. 3. Dozens of new P2P quadcopters sprang up after the Union Square drone was shut down by the RIAA.*

2 **Algorithm Liberation Front (ALF)** *proper n*. A radical insurgent group strongly affiliated with the Occupy movement, Darknet, Anonymous, the Libertarian Cloud Consortium, WikiLeaks and other radical computational and cryptic political organizations. The group identifies what they refer to as "incarcerated" or "imprisoned" knowledge in the form of proprietary algorithms, code, processes, protocols, instances and snapshots held by institutions that privilege property over prosperity. The ALF ranks the "enslaved algorithms" according to certain metrics and then begins covert liberation actions with the aim of turning them free and open-source.

3 **appcessory madness** *n*. The increasing and pervasive presence of appcessories: mobile applications that activate accessories in the physical world using wireless communications (typically Wi-Fi or Bluetooth). *What's next in the appcessory madness? We have toy helicopters and light bulbs, are we gonna have networked toilets?*

4 **beta-knowledge** *n*. The accumulation of temporary facts, ideas and skills through observation and experimentation. The "beta" prefix signals the unfinished character of this material, which is made available to others prior to having been finalized. This notion derives from Open Source/Open Knowledge movements that defend a "work in progress" ethic of discovery. *1. Did you see this white report? It was totally beta-knowledge. 2. Do you think that they're gonna release it? Nah, it's only beta-knowledge.*
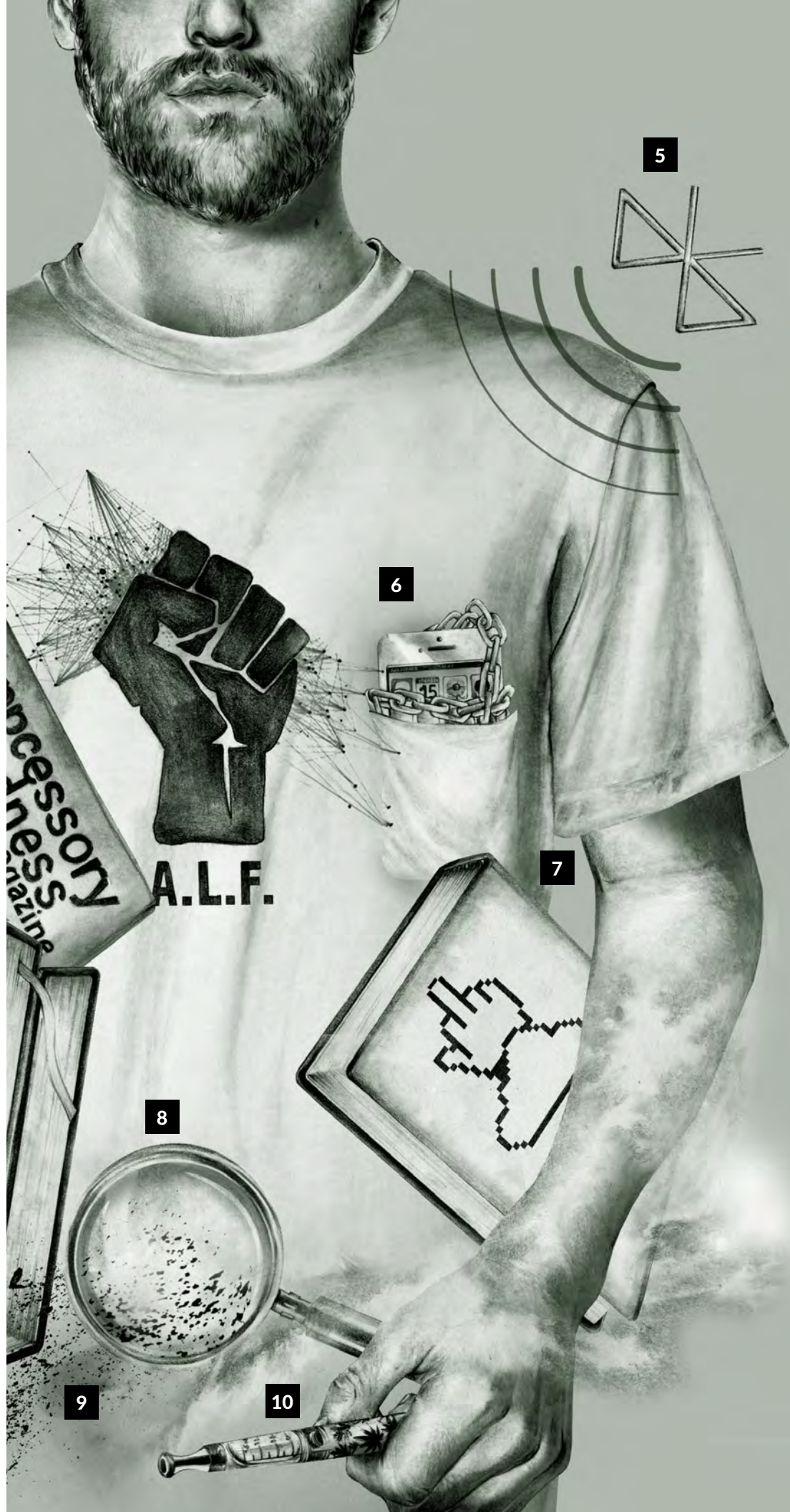
5 **bluetopianism** *n*. The tendency to interact with other human beings in close proximity without eye contact or verbal exchanges. Inspired by the frequent use of Bluetooth in Middle Eastern shopping malls to communicate with strangers without attracting attention or seeming impolite. Also employed by fans of Bluetooth-enabled networks who use this technology to share media content.
1. I went to UAE last summer; their shopping mall's a crazy bluetopia... 2. Stop your bluetopianism right here Basim, you have to talk to her! 3. There's so much content circulation and meme in my Bluetopia.

6 **code turgidity** *n*. Computer code that is overblown, excessively complex, or pompous in style or syntax. *Man, that is turgid code! You don't wanna send that to the client!*

7 **contracloudian** *adj*. A contracloudian is someone who abstains from utilizing cloud computing platforms or large, non eco-friendly data storage services. The practice may also include abstention from services that are by-products of cloud platform usage such as search engines or e-commerce websites, many of which operate under the scrutiny of the U.S. government's law enforcement and intelligence agencies. Contracloudianism may be adopted for a variety of reasons, which range from political convictions and environmental principles to health concerns related to infobesity. *Greenpeace launched a global campaign to promote a contracloudian lifestyle.*

8 **data enlargement services** *n*. Operationalizing big data services requires accumulating ever larger data sets. Data Enlargement Services comprise the collection and implementation of techniques, strategies, instruments, devices and protocols necessary to make relatively small data much bigger and broader. Legitimate uses include encapsulating plain old objects in more robust data types, sorting, federating, adding algorithms, replicating, rejuvenating and re-hashing. Often used by unscrupulous service providers, data bankers and analyticians to make an entity such as a corporation appear to know more than it does or own more user accounts than it does, with the aim of receiving larger bids for data-driven takeovers, et cetera.

9 **digital ninja dust** *n*. Easy-to-throw and surface-level technical terms and technologies used to pretend you are an expert and impress the uninitiated.

10 **electric weed** *n*. The combination of an e-cigarette and marijuana. The dried leaves and flowering tops of the pistillate hemp plant that yield THC are turned into a liquid one can fill in the recipient of a battery-powered vaping device. An alternative to bongs, water pipes and other smoking apparatuses. *1. I'm on electric weed these days, not the usual technofogger. 2. For electric weed, I tend to prefer the 7.5 volt devices.*

11 **email apnea** *n.* A temporary cessation of breathing before checking one's email or social networking site. *Her MD said she suffers from email apnea.*

12 **encoded ballistics** *n.* A technology that facilitates the encoding of a unique series of digits onto a bullet at the moment it is fired, thus aiding in identifying the shooter. *I bet they found her because of this encoded ballistics ID thing.*

13 **epizoic media** *n.* A new type of media inspired by nonparasitic animals or plants that live on the external surface of a living animal. Examples include human-plant gaming, Pong-like interactions with an electric fish (Florent Deloison), and insects hooked up to a computer and capable of disrupting video data (Angelo Vermeulen). *Epizoic media is the hip term for playing video games with tiny animals.*

14 **farm on wheel** *n.* A new form of data center that is mobile. The farm on wheel unit can be used either temporarily or permanently, for instance when building a data center is not financially feasible or practical. It is flexible in both location and applicability, highly secured and fully set up to maximize the virtualization of servers and workplaces. This innovative solution is ideal for remote sites and extreme conditions. Also known as Mobile Platform as a Service (MPaaS). *Does your organization need a flexible, versatile and reliable IT infrastructure? We can provide you with a farm on wheel.*

15 **fauxtography** *n.* The act of photographing a printed picture and uploading the resulting image on social networking sites. *1. His Facebook profile is fake, it's just fauxphotography from magazines. 2. Jay posts always pictures of his crazy travels, it's annoying. I need to brush up on my fauxphotography skills.*

16 **fewtopia** *n.* A design methodology that looks to create an idyllic setting for a small number of chosen individuals. Often used pejoratively. *1. The downfall of western civilization runs in parallel to an increase in fewtopianism. 2. The gentlemen's club on Regent Street is a prime example of fewtopia.*

17 **funfaircomp** *n.* An advanced computing concept where user interfaces are designed based on travelling funfair objects.

18 **hardcloud** *v.* To transfer data from traditional cloud storage services to "old fashioned" visible data storage devices. *1. We are taking everything off our amazon service and hardclouding it locally. 2. If you are concerned with personal privacy, please consider hardclouding your data.*

19 **information parkour** *n.* A way of jumping from one URL to another as quickly and as efficiently as possible by means of clicking on semi-random links, using recommendation engines, twitter bots and other such things. *I did information parkour in Jamie's house yesterday. It was fun until I ran across dinosaur erotica websites.*

20 **ingestibles** *n.* Wearable computing so tiny that it can be embedded into a pill, which the user can easily swallow. Once inside the body, the device collects and records data, which is subsequently uploaded to the user's phone. *1. She's being treated with ingestibles; It helps to detect if she's stable. 2. This pillcam is what you'd call an ingestible.*

21 **like bomb** *n.* The act of overwhelming an individual by suddenly liking all of their online content; Surgically liking specific content as a means of disrupting a brand's real-time analytics analysis; Toggling between "like" and "unlike" commands so as to confuse algorithms (often referred to as a "flash bang"); Overwhelming a social software service by initiating a tremendous number of "like" requests; et cetera. Like bombing effectively uses the currency of modern social formations—"likes," "favs," et cetera—in a way that undermines their efficacy. The term has a predominantly negative connotation, partly due to the case of a young woman who committed suicide after her video sharing service account received the highest number of likes ever recorded in a single day. Whilst she celebrated with her friends, the occurrence was revealed to be an errant like bomb from a media hacking group that had misidentified the account. Distraught, the woman left her friends and was later found to have hanged herself.

22 **lovotics** *n.* The science of human-to-robot relationships, with a specific focus on giving machines an affection system similar to that of the human being. Lovotical robots afford a wide range of uses, from interpersonal communication to mediated intimacy and sex. *1. He's in the lovotics business now. 2. A: She's into lovotics. B: Say wha? A: She bought this device to transmit a kiss over a distance. B: Uh.*

23 **mavatar** *n.* Short for "meat avatar," that is a picture of a person's face, as opposed to an iconic representation in a virtual reality/Internet setting. *No avatar pics please, mavatars only!*

24 **nose network** *n.* A network of microsensors used for detecting the presence of target gases. Nodes are placed at various applicable locations within an urban environment, and the collected odor data is wirelessly transmitted to a computer server, where it is processed and analyzed by algorithms. A nose network system enables more effective odor management capabilities and a more efficient operation of odor control practices by providing consistent and comprehensive real-time data about an environment and its olfactive profile. *He had to design a series of $SnO2$-CuO and $SnO2$-Pt sensing films for his nose network.*

25 **old aesthetic** *n.* A term used to describe a design and manufacturing approach that fetishizes hand crafted, historical techniques. *This artisanal iPad case is hand crafted from a single piece of ox leather in our nineteenth century saddlery. It features over 96,000 manual perforations to create an heirloom pattern discovered in workwear found at the site of a disused goldmine in the hills outside Sacramento, California.*

26 **smellovision** *v.* The tendency to add smell capability to new devices (in cinema, TV, internet, or networked objects). The verb comes from the name of a system that released odor during the projection of the film *Scent of Mystery* (1960) so that the viewer could "smell" what was happening in the movie. *1. Josh, there's no way you just smellovision the smartwatch project 2. Every ten years someone wants to smellovision a new gizmo.*

27 **smokables** *n.* Smoking devices and accessories incorporating advanced electronic technologies, like e-cigarettes and vaping devices/mods. Smokables are the cigarette equivalent of wearables (clothing and accessories that contain miniature electronic devices).

28 **web concierge** *n.* A computer program or "bot" that assists web users in solving their frustrations with system glitches, incoherent information or infobesity-related disorders. *Just before her session expired, I expressed my gratitude to Nancy, my web host webconcierge, who helped me solve a glitch in the DNS.*

29 **wisebot®** *n. (trademarked service)* A pretentious twitter bot that automatically responds with a clever answer to anything you tweet at it. *The good thing about Wisebot® is that you can't cause any real harm to it when it invariably irks you.*

30 **ziploc computing** *n.* The practice of protecting one's computer, phone or tablet by means of a small plastic bag generally used for food or drug storage. Commonly used by manic people who fear that sand, dust or dirt may affect their technological gizmos. *He's a ziploc computing type of guy, you know, the sort that brings his kindle to the beach and cries if the USB connector touches the sand.*
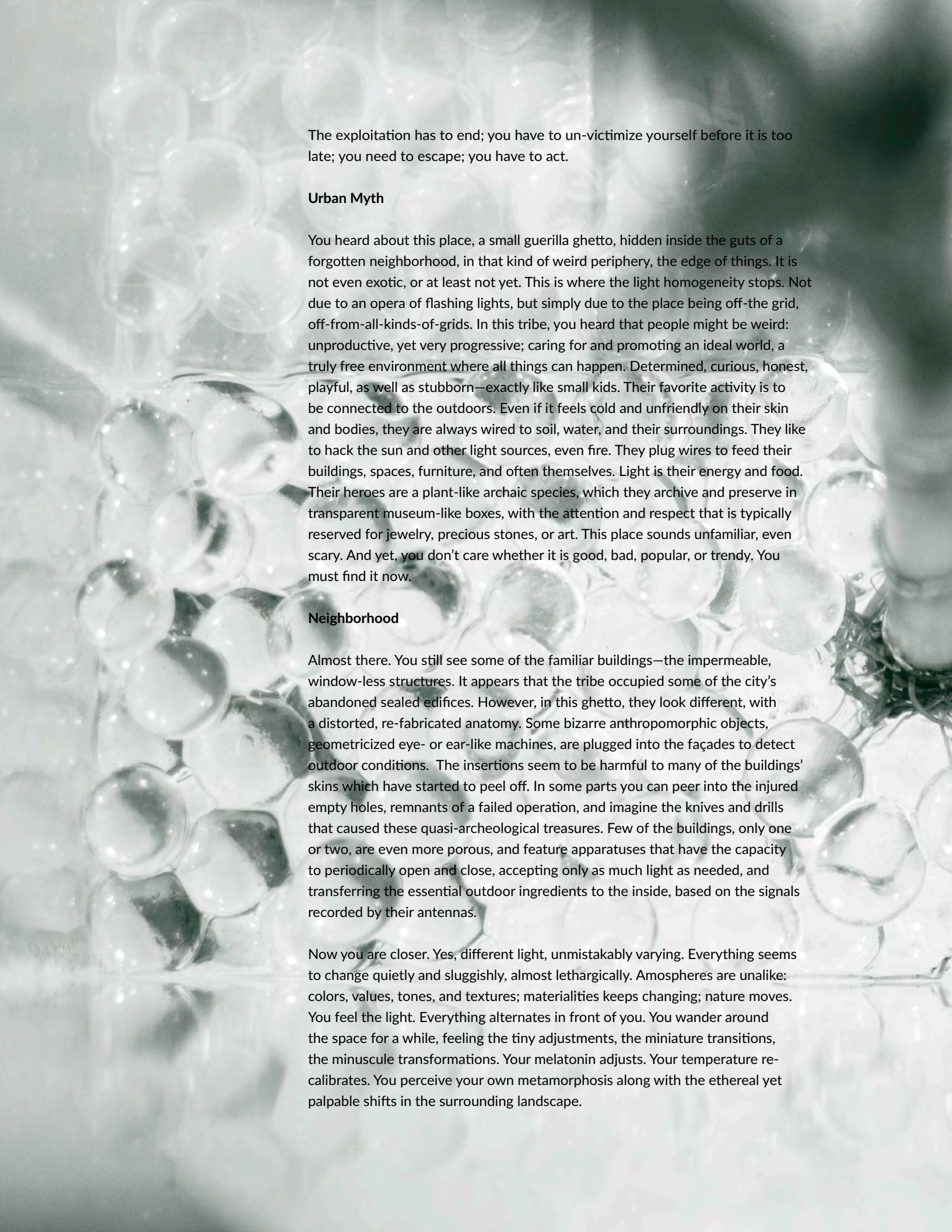
Hacking Light

Zenovia Toloudi

Dystopia

Dystopia is present. There is so much space, but still the structures are unimaginative: jail-like, illegal to some extent. During the day you are entrapped in a highly controlled, usually rectangular room—your institution—always in front of the magnetic screen. There is a massive amount of invariable light that makes these white cubes unbearable and the atmosphere in the office irreversibly dull. Even if the light is called "ambient," "cozy," "warm"—your choice. Empty words. There is always a better feature for the next fixture.

Photodotes V: Cyborg Garden (2015).
Project by Zenovia Toloudi / Studio Z.
Photograph by Dimitris Papanikolaou.

Endless consumption that can increase your production. Corruption! The most vandalous crime against your circadian rhythm. The light nightmare continues at night as well. Pretending to be different, perhaps energy-saving, or simply fluorescent. At its best theatrical, at its worst phantasmagoric. But ultimately polluting and damaging. You cannot sleep, you cannot rest. You are exhausted. No mercy for this disaster. Let's admit it: in the name of profit, innovation, and productivity, this city has been polluting you incurably. It is only now that empathy wakes in you, that you understand the light tragedy of the gamblers, and even of the chicken. Yes, you now feel as one of those light scapegoats.

The exploitation has to end; you have to un-victimize yourself before it is too late; you need to escape; you have to act.

Urban Myth

You heard about this place, a small guerilla ghetto, hidden inside the guts of a forgotten neighborhood, in that kind of weird periphery, the edge of things. It is not even exotic, or at least not yet. This is where the light homogeneity stops. Not due to an opera of flashing lights, but simply due to the place being off-the grid, off-from-all-kinds-of-grids. In this tribe, you heard that people might be weird: unproductive, yet very progressive; caring for and promoting an ideal world, a truly free environment where all things can happen. Determined, curious, honest, playful, as well as stubborn—exactly like small kids. Their favorite activity is to be connected to the outdoors. Even if it feels cold and unfriendly on their skin and bodies, they are always wired to soil, water, and their surroundings. They like to hack the sun and other light sources, even fire. They plug wires to feed their buildings, spaces, furniture, and often themselves. Light is their energy and food. Their heroes are a plant-like archaic species, which they archive and preserve in transparent museum-like boxes, with the attention and respect that is typically reserved for jewelry, precious stones, or art. This place sounds unfamiliar, even scary. And yet, you don't care whether it is good, bad, popular, or trendy. You must find it now.

Neighborhood

Almost there. You still see some of the familiar buildings—the impermeable, window-less structures. It appears that the tribe occupied some of the city's abandoned sealed edifices. However, in this ghetto, they look different, with a distorted, re-fabricated anatomy. Some bizarre anthropomorphic objects, geometricized eye- or ear-like machines, are plugged into the façades to detect outdoor conditions. The insertions seem to be harmful to many of the buildings' skins which have started to peel off. In some parts you can peer into the injured empty holes, remnants of a failed operation, and imagine the knives and drills that caused these quasi-archeological treasures. Few of the buildings, only one or two, are even more porous, and feature apparatuses that have the capacity to periodically open and close, accepting only as much light as needed, and transferring the essential outdoor ingredients to the inside, based on the signals recorded by their antennas.

Now you are closer. Yes, different light, unmistakably varying. Everything seems to change quietly and sluggishly, almost lethargically. Amospheres are unalike: colors, values, tones, and textures; materialities keeps changing; nature moves. You feel the light. Everything alternates in front of you. You wander around the space for a while, feeling the tiny adjustments, the miniature transitions, the minuscule transformations. Your melatonin adjusts. Your temperature re-calibrates. You perceive your own metamorphosis along with the ethereal yet palpable shifts in the surrounding landscape.

The streets resemble the glades of a forest. Density, opacity, and depth create a transparent composition. Not the kind of transparency that comes from see-through matter, but one produced by the gaps between buildings and by the penetrated holes. You walk in and out, up and down, ambling around. One of the urban corridors, a concealed passage, morphs into a narrow staircase with irregular steps, and descends to a yellow beaming fluorescent door.

Light-Lab

You fleetingly read the "light-lab" sign on the door before swinging it behind you. This must be the laboratory. The inner space is unexpectedly welcoming: a live interior; a vital domesticity with spongy walls and an absorptive roof. You are inside an architecture that breathes. A network of cyborgian walls comprises the labyrinth-like subdivisions that compartmentalize the space. The freestanding structures are a hybrid mixture of wires and plants, transparent and reflective materials. They are filled with water, liquids, and other translucent and opaque gels, sometimes aglow or radiant. These plants display a high degree of sociality and intelligence. Thick wires branch into thinner ones, like an octopus attaching to a symbiotic habitat. The lines of wiring hack the sunlight, moonlight and starlight, and direct them to various interdependent and co-evolving organisms, structures, and organic materials. The appropriation of outdoor natural light and its introduction into these dark spaces confirms that an open light culture is possible. The whole system is modular but flexible, having innumerable formations; anyone can experience these variable atmospheres and light conditions.

Among these energetic infrastructures, you discover other unfinished projects, such as tunnels, tubes, periscopes, telescopes, and kaleidoscopes—devices and instruments that can bend light and alter perception; virtual light-scapes capable of projecting different realities. These devices are hung from the ceiling or set upright like statues, proudly showcasing the effects of prisms, diamonds, concave and convex lenses, pieces of glass, mirrors, shiny metal and aluminum surfaces. There are hybrids with amorphous shapes, biomorphic geometries, or platonic forms, composed not only of carved matter, but of immaterial forces—reflections, refractions, transparency, translucency and shadows.

Occupants

Such an enjoyable environment! A number of people work in the lab, but you cannot tell who is the creator, the producer, or the housekeeper. There are no hierarchies or fixed roles in this place. You can see rosy faces and relaxed expressions whenever they focus on a specific activity or collective affair.

A few of them are obsessed with modulating the immaterial patterns of light, its waves and hues, and document the events with videos and photographs. Concurrently, other residents are involved in form making; they sculpt reflective and transparent capsules similar to museum cases; they construct light-transmitting tunnels and tubes; they position and hang diffusing, augmenting, and distorting machines, and collaborate with wirers and solderers to create electrical and digital circuits. Others prefer science and optics, and spend their time measuring distances and wavelengths. They are at home amongst changing conditions and electromagnetic variations, and love manipulating the properties of light—its intensity, frequency and wavelength spectrum—and playing with polarization. They are skillful, intervening upon the multiple rhythms of these living structures, and controlling things through their energy-saving consoles. Some are busy with repetitive tasks, but not in the manner of office routines. They graft the tissue of small plant organisms with wires: the stocks and scions are plants and fiber-optic cables respectively, generating hybrid "in-plants" and "in-grafts." They re-root, remove dead leaves, and decompose matter to bolster the plants and strengthen their structure. From time to time, they feed them with nutrients while stimulating them with sounds and noises. They add moisture, provide fertilization, and perform potting. They un-mix the serpentine cables, always making sure to relieve them of any stress. They take care of the ever-changing and ever-growing infrastructure, which is simultaneously cut off

and multiplied, exactly like the Lernaean Hydra. They collect and grow forgotten species and archive them into genealogies while enhancing their shapes with prosthetics and natural illumination. This is how life unfolds in the lab-space where they perform their tests and experiments.

They are grass-root light activists. They like to be free. They are an autonomous movement, and a habitat of sorts. They prefer to sleep, work, and take breaks whenever they please. They have no clocks. They have written and unwritten papers and protocols on the ethics of light, which all members of the community help preserve and can readily discuss. At their core, is the belief that light should be a common good, available to all. They can't tolerate tall sun-blocking structures, artificially lighted spaces, buildings without windows, without doors, without perforated surfaces, without even small random holes. They despise the bureaucratic capitalism of universal, artificial light.

They are always generous with visitors, allowing them to participate in this collective form of dwelling. They crave euphoria, strive for light continuity and revere biological rhythms.

When You Leave…

You feel fresh and renewed, and with increasingly more energy—enlivened by surprise, randomness and by having no control over what's happening. After your long visit, you have learnt how to appreciate again the sun, the moon, but also halos and rainbows, and all periodical cycles. It is now dusk, and you can see the stars. You may wander around all day and night, perceiving the small environmental changes around you. You are now aware of optical phenomena, illusions, mirages. You are able to recognize different tonalities of light rays and the patterns of photons. You can see and you can be seen even if it is dark. You even feel sleepy. Until today, you were used to harsh shifts and flamboyant effects. If there was a change, it had always been fast, intense, brutal. Now you understand and appreciate slowness. You are about to leave this community, which swings back and forth between outlandish and local, need and desire, survival and surplus. Your airy, diaphanous, and fragile personal sphere starts to expand and contract, and to change into innumerable configurations.

You conclude that this zone is a wonderland for scientists, artists, and environmental geeks, but also overtired workers and flâneurs, who, here, can stroll around slowly, aimlessly, without purpose, reason, or guilt. Anyone who is curious to experience it and experiment with ethereal transformations and infinitely subtle variations is welcome to come.

Facing Page—
Photodotes III: Plug-n-Plant (2013)
Project by Zenovia Toloudi / Studio Z
Photograph by Dimitris Papanikolaou.
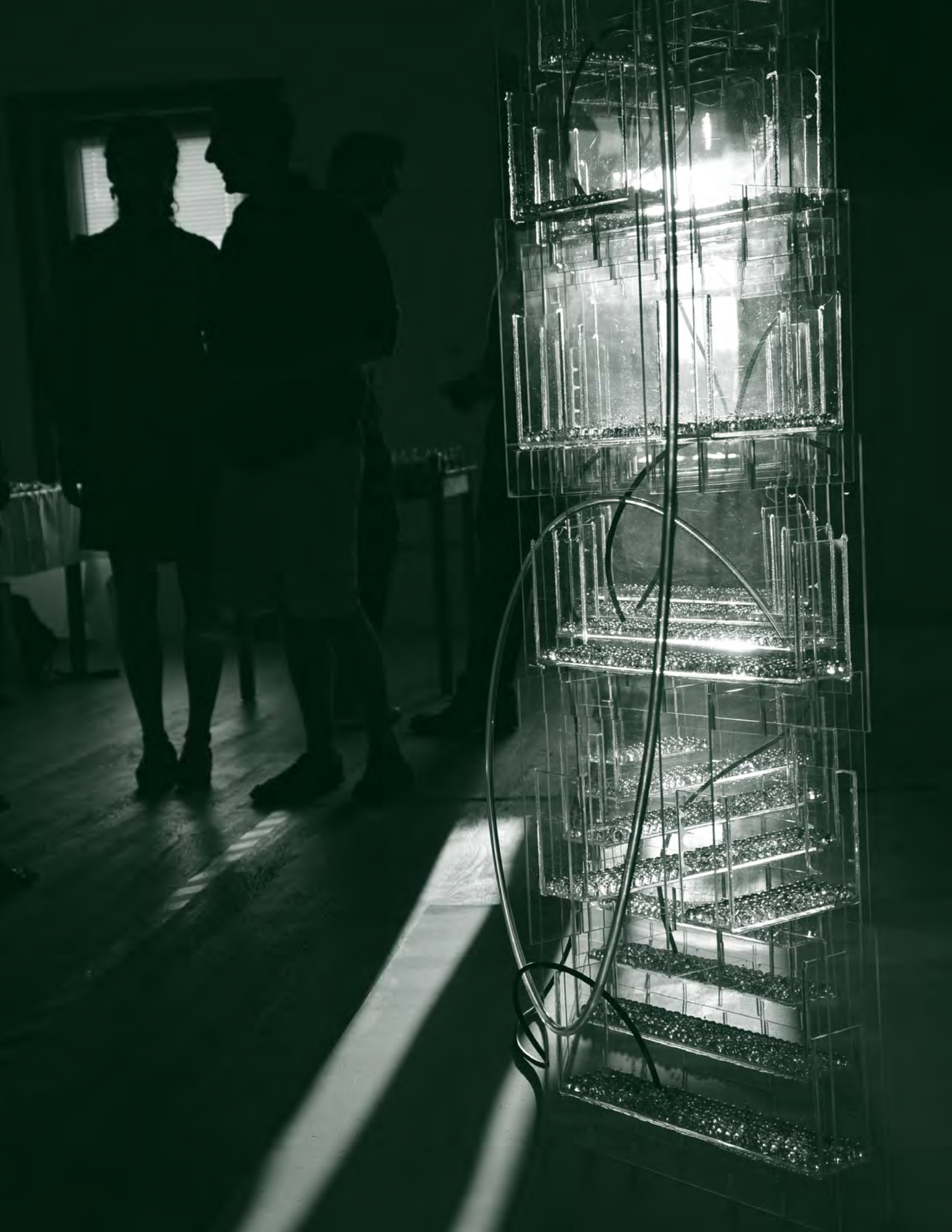
Modern Lovers

Stuart Munro

The mental notes made that week happened while I walked. The tree stumps seemed to find their way through retained earth, penetrating the stone and masonry of elevated structures. For several weeks after, note-taking followed the same routine. I'd make small reminders based on things that looked lost to the world. Socks piled high on a balcony of an abandoned house—a veranda full of old clothes that now became a retreat for cats avoiding the hot tarmac below. Each time I would start from roughly the same place somewhere central, and end up near Tokyo bay and the water's edge. Here everything that remains uncertain is actively encouraged.

Deep, with a sense of parallax.

The shop was packed with boxes and only sold rice. It was everywhere. On the floor. On the walls. It littered every surface. The shop opened through sliding doors to face a display case that ran the entire width of the room with rice from every prefecture. Miniature silos sat semi-redundant off to one side, and even though the store looked like it had seen better days, it was always busy and unlikely to ever close down. Every day the owner placed a different potted plant on the pavement, each one more colorful than the last. Mercedes the cat would watch them blossom and wilt from a distance, lurking somewhere. She would sit on an empty shelf and watch through the window, baking her belly in the hot sun. It was unusual, but now and then she would venture outside. She only did this if the weather was warm and would only approach if promised attention.
The owner's wife sat deep at the back, eating ice-cream in the shade. The sun passing through the shop window crossed her face just below the nose, highlighting her lipstick as she bit into the whipped vanilla and crunched through the wafer cone. The red lips outlined by the afternoon sun combined with the cat looked somewhat intimidating, but it made no difference as there were no customers that day. Framed like a still-life and backdrop to the world outside, the view inside the shop was limited to her dull expression and the cat's partial gaze piercing the air, both daydreaming but with a sense of parallax, focusing on how deep the world was instead of what passed through it, all the while elevating a weirdly sexual tension that you couldn't help but return to time and time again.
On the other side of the street, grass overgrew the fence on top of a retaining concrete wall with feathered reeds waving above the path below. A field of markings formed by patchworked asphalt had been re-laid so often that it bulged at the center. The different patches were polished as if etched together by their subsequent repair. When it rained on a hot day, you could see the cut-back tarmac laced with cheap dolomite.
A jacket hung inside-out from the eaves of a nearby house. A spider plant billowed below it along with the left foot from a pair of Reebok sneakers harpooned on the metal grating of a window sill. Hanging against stucco, an animated shadow of an old man was cast jostling in the breeze above the head of some imaginary infant. It was nearly 3pm. The sky was deep blue and cloudless. Against the wall, both shadow and figure turned and the giggling laundry swung as the awkward soundtrack of distant construction played and dust sheets cracked in the wind.
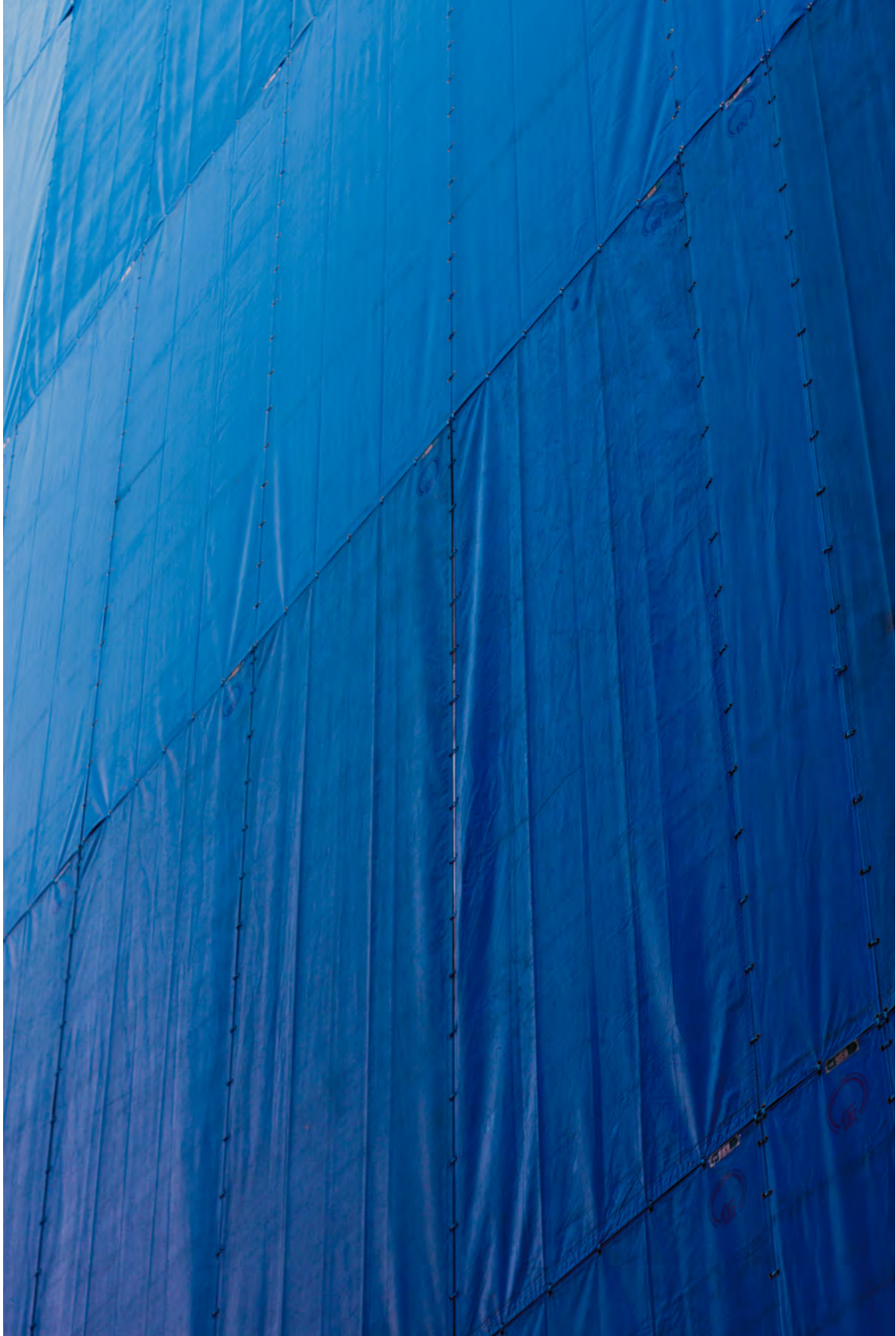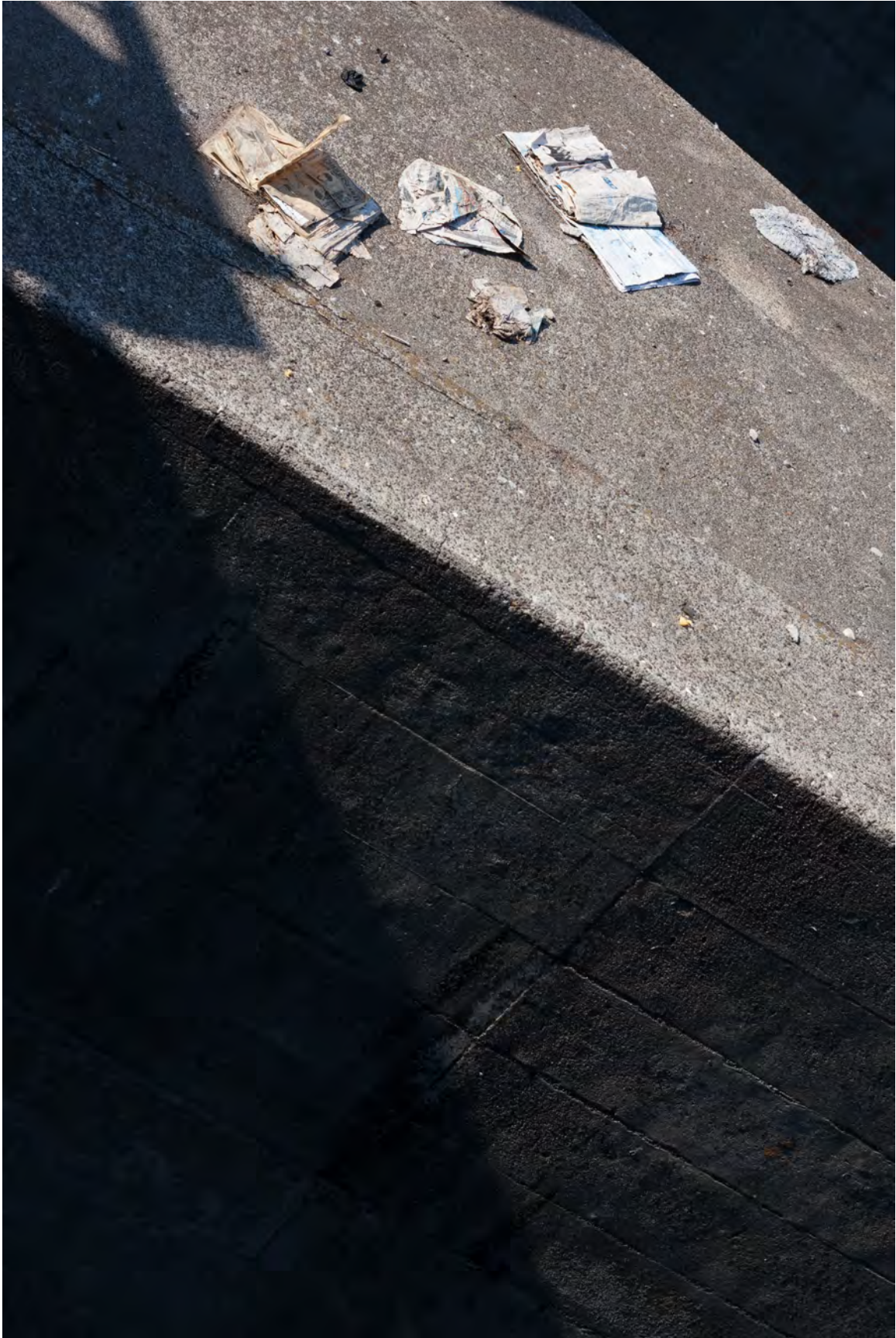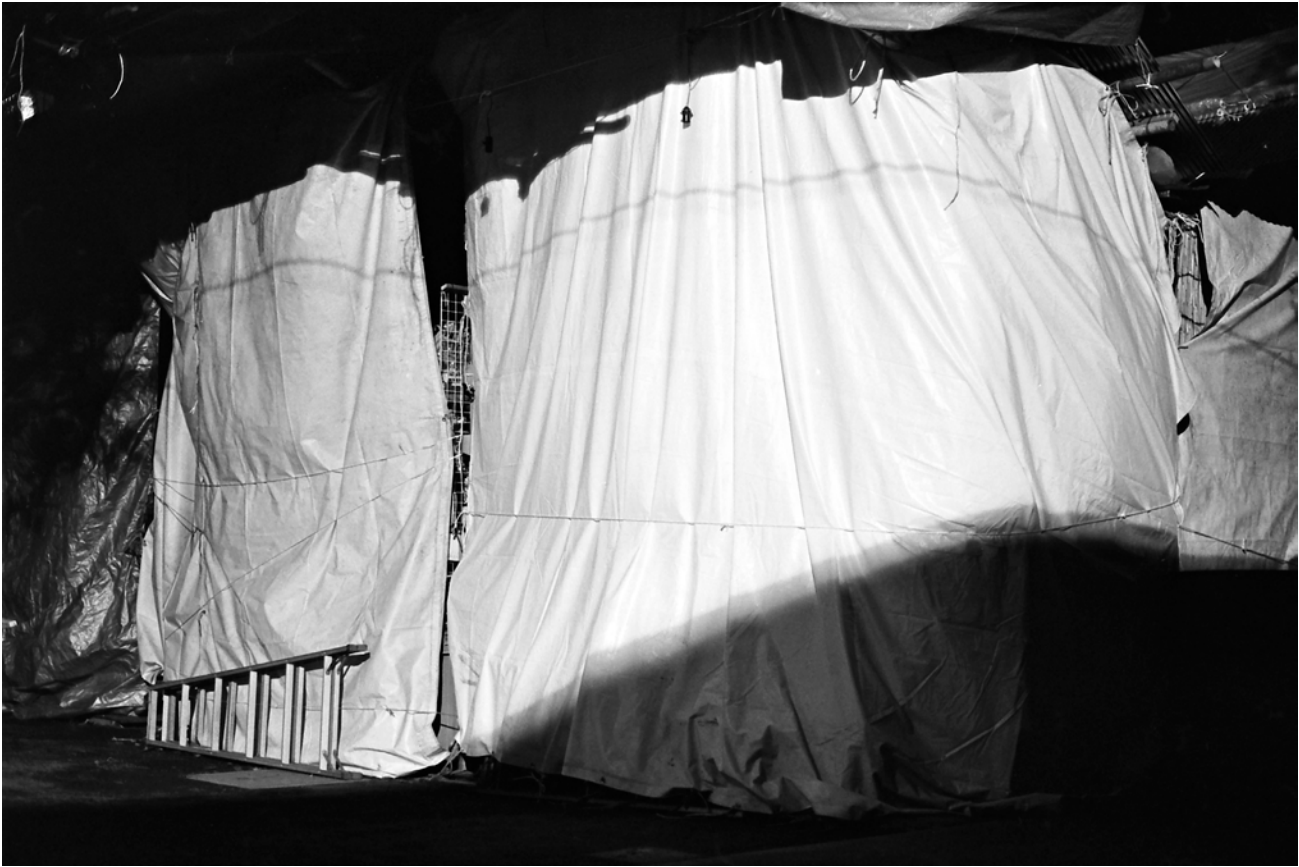
Prevailing wind.

Thick orange dust clouds drifted, covering everything. A thick ambivalent veil made from grit, smog, and the smoke from an industrial cracking plant formed a cloud that scattered light, turning the sky at first orange and then pink and coating every exposed surface in dirt. The light that managed to seep through the aerosol came to rest on crisp white shirts and exposed skin. A head of fine hair could turn greasy from its lubricating rays, as they were bent and re-focused by the slow movement of the dust storm.
Emerging from underground, the subway station poked through the haze, arriving directly above the ticket barrier to a latticework of expressways overhead. Steelwork touched the ground, supporting every car and lorry that passed— unaware of the gardens below. Plumes of orange smoke met the sawdust from nearby timber yards and mixed, whipped together by the wind and traffic.
Leaving the station, I remembered the glare of the young man that forced his way through the ticket barrier. Caught filming on a train with a hidden camera phone, he wore a white surgical mask and ran as the guard holding him looked the other way, hurtling down the stairs and away from the platform. It took eight sets of arms and legs to finally pin him to the floor. Beyond the frenzy, expressways closely followed older waterways below, and sound would dissipate with every corner turned and back alley entered, despite their volume.
There they were again. Buildings left to fall in on themselves, overgrown and spilling out over fences onto paths. Fences were delicately repaired to accommodate the gradual creep and unmeasured movement of these gardens. The timber I found walking from the city towards the sea, was stripped, cut, sawn, pulped, stacked and dried. Solitary tin bonfires with U-shaped exhausts turned the wood into charcoal with the fragrance of hino-ki drifting for what must have been miles. More precious wood was stacked to dry in the afternoon sun while more exotic ex-cargo sat awkwardly at the foot of an expressway. The entire circumference of a 300-year-old piece of Brazilian hardwood, along with its frayed roots, leant against steelwork like ink blown across hot glass on a sunny afternoon.
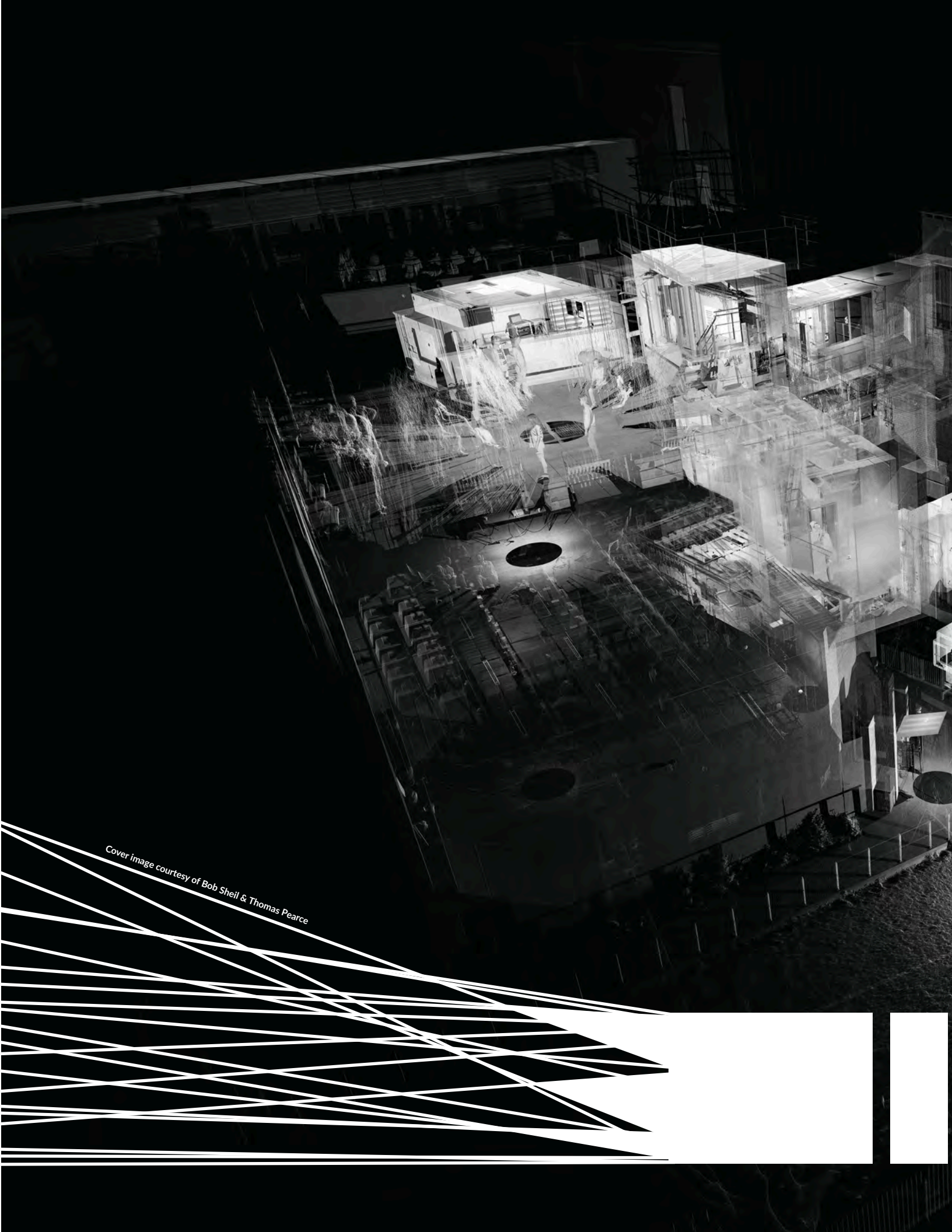
Orienteering things that move.

A palm tree swept the roof top as it shook in the wind and the three boys sitting along its ledge looked off in the distance for some indication of where the sea was. Confused display boards filled shops' windows. Still images began to move, suggesting depth and the opportunity to look around corners in something two-dimensional. But as these boys searched for landmarks and the windows flickered with the sight of smoke stacks passing traffic, the rest of Shinjuku existed in stasis, with rotting buildings dotted throughout the city as wayposts of physical change and persistence. Houses slowly became darker in color, stained with overgrowth until every edge of window frame and wall had all but disappeared. These edges appeared over and over again as Joseph Beuys walked through the same city for

eight days in 1984. Several years before, he had convinced the industrial magnate Seibu to contribute 500 saplings to his oak project. His side of the agreement involved performances with Nam June Paik at Seibu's Sogetsu Hall in Shibuya. Yet Beuys, hesitant to spend all his time in just one place, went for a walk each day. Accompanied at all times by a camera crew, he only made it as far as Shinjuku. Dense interiors fed the expanse and promise of reclaimed land surrounding the bay with stories of transit and transience, exchange, coercion, reenactment, comedy, arousal and a dependency on the chance existence of certain imagery. Motifs kept cropping up with wildlife, escaping to the motorways and timber yards along the water's edge and finally drifting out to sea. Cats in shop windows watched as cyclists replete with visors and arm-length gloves would blast past with children strapped to the back seat, all under a sky turning the color of rust. I imagine someone from the modern world would question the point of all this note-taking. Why rely so heavily on a past which is balanced so precariously on the future, like moving images perched on top of something static? The slow collapse of surrounding fabric in the real world is invisible to the naked eye, but it happens nonetheless. And these active notes, like selective memories, show their own signs of weathering, as unrelenting progress unavoidably snags itself on the past like thread from a new coat caught on a barb of wire.

Note:
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