5. Light Projections: On the Matter of Light and the Lightness of Matter

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5 Light Projections: On the Matter of Light and the Lightness of Matter

Abstract
This chapter explicates light projections as the third instantiation of the post-screen. The chapter’s argument premises on light being the matter of light, namely, light as transformational in the convertibility between materiality and immateriality; matter and energy; rigidity and fluidity, whereby the corporeal is not only rendered impalpable but – its body energized, vitalized and volatile – turned inside out; consumed; deposed. The chapter thus argues for the post-screen through contemporary light projections and projection mapping technologies as the transformation of a variety of surfaces – the urban (e.g. building façades); the amorphous (e.g. water droplets and ash); the biological (e.g. bodies and faces) – giving rise not only to dynamic interrelations between materiality and immateriality, but also a radical convertibility between matter, energy, solidity, mass, and body that signals a moment of media history today.

Keywords: light projections; projection mapping; energy; mass; materiality; immateriality

The City Rises

In 1910, the Italian painter and sculptor Umberto Boccioni completed his painting, The City Rises.¹ A monumental work spanning almost ten feet across, it is a major statement of Italian Futurism and its main themes: technological progress, speed, energy, movement, violence, destruction and youth.² Boccioni’s city rises with the relentless drive for modernization that

1 Umberto Boccioni, The City Rises, 1910, oil on canvas, 199 cm x 301 cm, Museum of Modern Art (MoMA).
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coloured the Futurist movement, its vision writ large across the smokestacks and construction scaffolding in the painting’s background as, in the foreground, human (read as male) labour harness horses and machines towards their dream of industrial and technological development.

But it is the painting’s light that catches my attention. Boccioni uses the technique of Divisionism which separates colour for optical interaction to achieve maximum luminosity. His rapid directional brushstrokes and the brilliant colours cast across the painting emphasize the power, dynamism and destructive promise of the rising city. But light also represents several beliefs held by Boccioni and Filippo Tommaso Marinetti (who led the Futurist movement and authored its first manifesto). One of these was how, following “recent scientific and pseudoscientific theories of matter,” such as those by Gustave Le Bon’s The Evolution of Matter (1905), a text well known to the Futurists, the structure of matter could “dissociate” into energy. Matter became “particles endowed with immense speed, capable of making the air a conductor of electricity, of passing through obstacles, and of being thrown out of their course by a magnetic field.” According to Le Bon, matter could dematerialize into electricity, light, heat or other “unstable forms.” The spillage and collision of light in The City Rises thus reflect not only the city’s dynamism, but also its transformative capacities in terms of the dissipation, even vaporization, of matter and materiality – from stability and fixity to energy and volatility. They set a literal scene for the reversibility or convertibility between matter and energy – materiality and immateriality – which, as we shall see, also substantiates the matter of the post-screen through light projections.

These interplays in the city under the transformation of light thus constitute the theoretical underpinnings of this third and final iteration of the post-screen through light projections, completing its triangulation with the other two iterations through virtual reality (VR) and holographic projections. The chapter will argue that contemporary illumination and projection mapping technologies diminish the perceptibility of screens’ boundaries by fusing image and light into the materiality and solidity of the structures on which the light is projected. This fusion thus forms a virtual

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5 All quotations from Le Bon in this paragraph are from his Propositions of Force and Matter, as quoted in Poggi, Inventing Futurism, 102.
skin which, energized by light, deposes of the structure’s materiality, whereby the structure is turned inside out and itself consumed – *swallowed whole* – by the light. The process of transformational light on the post-screen through projections and projection mapping is thus of vitality and dynamism, but, more than that, also a kind of volatility that comes from devouring and senseless ingurgitation. Hence, this third instantiation of the post-screen emerges as not merely an ambiguous surface on which the light reposes, but an unbounded territory for the image in the city which, like Boccioni’s colour in his painting, takes on a destructive life in its morphing, dematerialization, instability and gluttonous desire. With this metamorphic energy, the city rises again, this time drawn not from physics and pseudo-science, but the unique coalescence between screens, images, media and materiality. As solidity diminishes, something else appears: a new space for the scribing of solidarity, but also for the deliquescence of solidity.

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The Light Rises, or, Light as the Matter of Light

There is a certain essentialism inherent to Architecture, a certainty that after the weather has washed the informing decorations off the stones of the Acropolis, erased the strident colours from the striated columns of Durham Cathedral, that the play of light, from the rising of the sun to the setting of the moon, across the remaining ‘dumb platonic solids’, will animate the structures for us; imbue them with a poetic that chimes with our inescapable one-ness with the universe.

~ Leon van Schaik

Light transforms life. Van Schaik writes, as above, of the “play of light” as a force of life-giving animation, almost mythical in its cosmic connection. But light also transforms in palpable socio-cultural ways. For example, Wolfgang Schivelbusch, in his vaunted account of the industrialization of light, describes how various developments of street lighting changed the life of the European city. These developments range from the use of lanterns

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6 William J. Mitchell’s *City of Bits: Space, Place, and the Infobahn* (Cambridge, MA: MIT Press, 1995) also comes to mind here as a related idea, albeit connected more to digital telecommunication and electronics rather than specifically to media environments.

displayed outside each Parisian house “to identify itself” in the sixteenth century to lanterns fixed on the streets in the late seventeenth century to the use of reflector lanterns (or réverbère, its original French name) in the eighteenth century with its technical advancements of multiple wicks and dual reflectors. Each level of street lighting beckoned an observably different aspect of city life. For instance, street lanterns tightened absolutist police authority as their lighting allowed authorities to patrol and control the streets at night – “the lanterns showed who lit the streets and who ruled them.”

Street life also changed with the phenomenon of “lantern smashing” which appeared in eighteenth-century Paris, where réverbères were frequently destroyed as “a small act of rebellion against the order that it [the street lantern] embodied,” and whose destruction became “a collective, plebeian movement” during the nineteenth-century revolutions and rebellions in Paris.

Conversely, commercial and advertising lighting in the cities of eighteenth-century Europe transformed night life for shopping, entertainment and pleasure. As Schivelbusch (again) writes, night life “derives its own, special atmosphere from the light that falls onto the pavements and streets from shops..., cafés and restaurants, light that is intended to attract passers-by and potential customers.” The English pleasure gardens in the 1700s such as those at Vauxhall and Ranelagh “only really came alive at night,” lit with the attractions of “concerts, illumination and fireworks.” The bright lights of the city ushered the late hours of baroque culture into a nocturnal whirl of operas, theatre, late evening meals, soirées and other late night pleasures for the leisured classes. Commercialized and festive illumination enabled shops, warehouses and entertainment businesses to run deep into the night for the masses.

However, it was electrification which capped the transformation of the lit city. Electrical light was first pioneered in 1800 by Humphrey Davy as arc lighting, “produced by a discharge of electric current between two carbon electrodes.” In 1879, Thomas Edison developed the carbon filament lamp which, on its showing at the Paris Electricity Exposition in

9 Schivelbusch, Disenchanted Night, 87.
10 Schivelbusch, Disenchanted Night, 100.
11 Schivelbusch, Disenchanted Night, 142.
12 Schivelbusch, Disenchanted Night, 140.
13 Schivelbusch, Disenchanted Night, 52.
1881, introduced the electric bulb to the wider public. Replacing the carbon filament with tungsten brought about the greater brightness of modern illumination.¹⁴ As central electricity stations, and then remotely built power stations, supplied electricity not only to a single town but whole regions, the city transformed yet again. As with gaslight but with greater effect and popularity due to its relative safety, lack of odour and centralized supply, electric lighting galvanized shopping areas as “shopkeepers understood lighting as a weapon in the struggle to define the business centre of the city, dramatizing one sector at the expense of others.”¹⁵ Among numerous other changes, electricity supplies also re-constituted the city’s economic structures: Schivelbusch, for instance, describes how “the concentration and centralisation of energy in high-capacity power stations corresponded to the concentration of economic power in the big banks.”¹⁶

Of greater interest, though, for this chapter is how electrical light transformed the city’s materiality, particularly, as Boccioni envisioned (via Le Bon) in The City Rises, in terms of evanescing the solidity of its buildings and structures as a way of expressing its politics, aliveness and energies. These connections between light, energy and the city occur as common themes in various accounts and descriptions. As Scott McQuire writes, “[t]he experience of the modern city seen under electric lights conferred a novel sense of mutability on the previously immutable and monumental... To some observers, light seemed capable of dissolving their mass entirely.”¹⁷ A key transfiguration of the city by electrical light is thus to render, as McQuire puts it, the city’s “growing sense of architectural ephemerality.”¹⁸ By its electrically lit urban buildings, McQuire argues that the city becomes fluid, immaterial, ethereal, oneiric.¹⁹ He quotes from Ezra Pound (amongst

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¹⁴ Schivelbusch, *Disenchanted Night*, 58.
¹⁶ Schivelbusch, *Disenchanted Night*, 74.
¹⁸ Ibid.
¹⁹ This, in turn, ties into large amounts of literature on the city as more generally occupied by dreams and ghosts – see, for instance, Steve Pile, *Real Cities: Modernity, Space and the Phantasmagorias of City Life* (London: Sage, 2005) – and the persuasive interrogation of cities’ realness, or the consideration of their being “a state of mind” in terms of, for example, “a kind of psychophysical mechanisms in and through which private and political interests find not merely a collective but a corporate expression”: Robert E. Park, Ernest W. Burgess and Roderick D. McKenzie, *The City* (Chicago: The University of Chicago Press, [1925], 1984), 1-2. The references quoted in the text, however, more specifically refer to connections between the city and its immateriality in direct relation to media and its effects.
others): “It is then [in the evening, when the lights come on] that the great buildings lose reality and take on their magical powers. They are immaterial; that is to say one sees but the lighted windows.”

In her inimitable 1925 novel, *Metropolis*, Thea von Harbou describes how Georgi first saw the city of Metropolis — “wonder of the world” — almost blinded and drugged by the city’s light and energy: “by night shining under millions and millions of light,” Metropolis was “the ocean of light which filled the endless trails of streets with a silver, flashing lustre”; there was “the will-o’-the-wisp sparkle of the electric advertisements”; “an ecstasy of brightness.”

In these imaginations, the materiality of the urban melts away in the energy of almost too-bright light, as ice by fire. Sergei Eisenstein, too, alludes to this liquefied quality of the lit city in his description of the “modern urban scene, especially that of a large city at night” as he points out its “absence of perspective” where all sense of perspective and of realistic depth is washed away by a nocturnal sea of electric advertising... these lights tend to abolish all sense of real space, finally melting into a single plane of colored light points and neon lines moving over a surface of black velvet sky.

Hence, besides spurring the myriad palpable social, cultural, economic and architectural transformations of the city, projections and emanations of light also transform and convulse the city into ontological flux between the materiality of monuments, bridges and other physical structures, and the immateriality of flow, momentum and dynamism of energy. Therein as well lie the nuanced differences between light as the matter of light and light as lighting, whereby, cf the latter, the former constitutes the basis of the argument of the post-screen through light projections. Light as lighting is the concern of analyses such as those of Schivelbusch’s, namely, the transformation of night into day whereby light reveals the environment

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20 As quoted in McQuire, *The Media City*, 122. The imagery of ethereality in these lines also recall Ezra Pound’s other famous Imagist poem, evoking the same sense of the apparitional and the palpable: “The apparition of these faces in the crowd;/ Petals on a wet, black bough,” from “In a Station of the Metro” in *Personae: The Shorter Poems of Ezra Pound* (London: Faber & Faber, 1952), 4.


22 Sergei Eisenstein, *The Film Sense*, ed. and trans. Jay Leyda (New York: Meridien Books, 1957), 98. More precisely, Eisenstein’s comparison of the city at night was made to jazz, where similarly conventional perspective is lost as “in jazz all elements are brought to the foreground,” 96.

23 Ibid.
around one which would otherwise be in the dark, and in so doing triggers profound social, cultural and economic transformation.

In comparison, light as the matter of light argues for thinking through the whole relationship between matter and energy and, in turn, the play between the material (i.e. of matter) and the immaterial (i.e. of light/energy). Matter is thus not merely revealed by light; it is also both dissolved – i.e. converted into energy per Einsteinian physics – and constructed by light; or de-materialized and materialized. In turn, this interplay between dissolution and construction becomes crucial to the conceptualization of the post-screen through light projections. In this conceptualization, the fluid and dissolving boundaries of matter against energy form the conceptual framework through which the boundaries of the image may be similarly conceived in alternative relationships against object, or as screen against image.

This interplay of materiality and immateriality per light as the matter of light may already be seen in numerous examples across existing architectural and artistic spheres. One example out of many is the use of electrical light to literally substitute the solid volumes of urban structures, where buildings are not dissolved by light but “constructed” of light. Materiality thus shades into immateriality in paradoxical interplay – visible yet incorporeal; concrete structure against ethereal reflection. Perhaps the most prominent instance of such paradoxical construction is the Tribute in Light installation set up in New York City to memorialize the 9/11 attacks, whereby two giant beams made up of eighty-eight 7,000-watt light bulbs and reaching “up to four miles into the sky” are set up at the site of Ground Zero in New York City to commemorate and represent the absent World Trade Centre towers. The specific immateriality of light thus becomes “a building material” in itself. There are many other examples; a further one from a different era might be Robert Krebs’s Sky-Pi, a ten-day long light project created as part of the Greater Philadelphia Cultural Alliance’s 1973 May Festival. Using a composition of lasers and strategically placed reflective surfaces, Krebs’s Sky-Pi beamed various lengths of laser light connecting the mile-long stretch between the Philadelphia Museum of Art and City Hall, described “to form


an intricate lattice that almost abolishes any sense of bodily space.”26 Instead, the lines of lights themselves, as matter in their immateriality, become the markers and constructors of physical space. In the domain of art, we might also think of Robert Irwin’s 1998 (and re-exhibited in 2015) art work, *Excursus: Homage to the Square*, for which Irwin created sixteen (and later eighteen) chambers,27 all divided by scrim-like walls made of delicate, translucent fabric. As with the use of light which perplexes the materiality of building structures in *Tribute in Light* or even Albert Speer’s “Dome of Light,”28 light similarly accords *Excursus’s* chamber walls a peculiar texture and luminosity in the work’s deliberate play between materiality and immateriality, whereby “[t]he material [of these scrim-walls] is fundamentally luminous in the way it reflects and absorbs the natural and artificial light that constitutes an important part of the installation’s architecture.”29 Not only do the walls take on light to layer and confound their own solidity, but the light itself, as it falls on the fabric, also acquires its own materiality: “Filtered through scrims that are essentially veils, light itself appears layered, coated, and textured.”30

In these myriad manifestations across diverse contexts, *light as the matter of light* is thus seen to be transformative of mass and materiality, convertibly connective to energy in flux against immateriality. To now tie together Boccioni, light-city-life-transformation and, of course, the post-screen, of primary interest in this chapter is the work of light in both the transformative constitutions of screens and screen boundaries, and their ensuing paradoxes not only of materiality and immateriality, mass and energy, but also the themes by now familiar in this book: space and non-space; animation and being inanimate; skin and object; two and three-dimensionality. As light subverts screen boundaries in the city, the post-screen emerges out of not only the urban environment, but also the space of these multiple binaries and the folds between their paradoxes. Like steel on flint, the sparks of life and energy in the interplay of such subversion and paradox become important constitutions of the post-screen. Where Pound and Harbou et al. write of the lit city’s fluidity and dream-like state of dazzle and blinding

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27 The installation in 1998 appears to have 18 chambers, while its exhibition in 2015 features 16.
30 Bruno, *Surface*, 74.
brilliance, the post-screen likewise breaks down the city’s brute solidities through media, light and diminished boundaries. What also bears out in this constitution of the post-screen through light projections is a strange parallel between the development of media and that of science, where Einsteinian physics of matter, light and energy – immortalized via “the most famous equation in the world”31 of $e=mc^2$ from Einstein’s 1905 paper and, incidentally, practically contemporaneous with Boccioni’s The City Rises completed in 1910 – breathes the same air as the post-screen. As does physics render the material into the immaterial – of subatomic particles and quantum mechanics – so does media, qua the post-screen, convert the solid into energy, as likewise pictured in The City Rises. The same intuition thus runs through physics and art history and, via the post-screen, through media too: the reversibility or convertibility between matter and energy which literally scribes new rules of constituting, thinking about and looking at our material realities.

Cities of Screens

*When the screen becomes our dominant quotidian interface, there is an understandable desire to extend that interface into the public, urban sphere – so that all surfaces, animate and inanimate, likewise become screens.*

~ Abigail Susik32

The city is replete with screens. One need only stand for a few minutes at the Shibuya Crossing in Tokyo or in the middle of Times Square in New York to appreciate the density of screens in urban surroundings as illuminated with a constant flow of still and moving images, invariably crammed with advertising, and always in fierce competition for attention. Screens appear in myriad other places in the city too – along passageways in subway stations, buses and trains, hotels and shopping centres, as well as in the form of large screens for events in sports stadia, outdoor concerts in parks and open air film screenings, among many others. Their omnipresence, however, seems to backfire as the sheer multitude of street screens conversely causes them to fade instead into visual background noise.

Christoph Kronhagel describes Times Square as “a cacophony where nothing is attuned to anything else...merely generat[ing] a white blur.”\textsuperscript{33} As Erkki Huhtamo writes: “Passers-by glance at the screens, but don’t get easily ‘absorbed’ into them. The wall-mounted screens form an ambience rather than a set of targets for sustained attention.”\textsuperscript{34} Malcolm McCullough takes up the entire theme of ambience in his book, \textit{Ambient Commons}, to argue for a new era of contextual media and information environments which warrant a different kind of attention and tuning in, or at least “to re-examine the urban citizen’s distraction.”\textsuperscript{35} A chief element of this environment of ambience is the electrically lit city as “glowing forms,” where “with electrification, walls were not only written on, but lit up as well,” and as media façades, “when huge electronic displays become a persistent part of physical architecture.”\textsuperscript{36}

As these scholars have shown, the wall-mounted or fixed screen forms a part of the long history of public media displays, reaching back from large banners displayed for travelling shows in the nineteenth century to broadsides in sixteenth-century Britain to signboards by ancient Romans “to identify craftsmen’s workshops and various services.”\textsuperscript{37} However, Huhtamo, with characteristic nuance from his media archaeological approach, connects the “proto-screen” not only to these billposters but also the practice of what is called “placard advertising” in England, where companies bought legal rights to use divided “lots” of space for their advertising in a bid to bring some order to “decades of billposting anarchy,” where broadsides in England in the first half of the nineteenth century were pasted and layered over all available surfaces with unrestraint.\textsuperscript{38} As Huhtamo points out, a screen is “an information interface,” and so “should function both as a frame and a gateway through which messages are transmitted and retrieved.”\textsuperscript{39} 


\textsuperscript{35} Malcolm McCullough, \textit{Ambient Commons: Attention in the Age of Embodied Information} (Cambridge, MA: The MIT Press, 2013), 23.

\textsuperscript{36} McCullough, \textit{Ambient Commons}, 143-152.

\textsuperscript{37} Huhtamo, “Messages on the Wall,” 16.


\textsuperscript{39} Huhtamo, “Messages on the Wall,” 17.
broadside or billposter by itself as pasted on a public wall, while a medium of textual and visual message, is indeed not quite a screen in the sense of images and text contained in an enclosed frame. Yet as has also been the thesis of this book, a screen is the conceptual vehicle for a frame which contains information within it, and in particular the boundaries of which acquire significance in terms of what they include, exclude, protect against and gets leaked through. In that respect, the billboard, in terms of where and how its frame divides the advertising against the rest of the wall, is certainly germane to a prototypical urban screen in terms of the ubiquitous rectangles of light that we see across today’s cityscapes, flashing advertising, news, art and other information.  

Most fixed screens in the city – attached to subway walls, shop windows and so on – have obvious boundaries, marking the borders around the information they contain against their surroundings. Where urban screens edge closer to the post-screen is in their not being self-contained units with clear boundaries, but re-purposed from the surfaces, façades and framings of buildings in the urban environment. The post-screen in this case thus emerges where a particular surface in the city doubles up or becomes read as a display of information akin to a screen, and whose boundaries, then, merge between the virtuality of the display and the physicality of its surroundings.

Such re-purposing may take place in one of three ways. The first is how, as McCullough points out, the architectural and aesthetic aspects of buildings become screens by their architectural framing of information and content: “Because a [building] façade may bear inscriptions, whether in stone, calligraphy, fresco, flyposting, neon, or LED meshes, its full extent also becomes a frame.”  

As we think about a building façade being a screen in terms of its framing, Anne Friedberg’s work in her book, *The Virtual Window*, comes to the fore in her argument relating the perspectival apertures of architectural window frames via openings in walls and rooms to cinema and virtual computational (Microsoft) Windows onscreen. Uta Caspary, citing Martin Pawley, also explicitly parallels building façades (as media architecture) with gothic cathedral windows by way of how they

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40 See also Nikos Papastergiadis et al., “Mega Screens for Mega Cities,” *Theory, Culture & Society*, 30 (7/8) (2013): 325-341, where the authors, in their case study of linking large screens between Melbourne and Incheon to explore “the creation of an experimental transnational public sphere,” discuss urban screen use beyond advertising, specifically in three forms, or what they call “alternative models”: (i) public space broadcasting; (ii) civic partnership; and (iii) art.

41 McCullough, *Ambient Commons*, 154.

both frame and present information: “Both are perceived as originating in a radical change – societal as well as technical and artistic – caused by the advent of new information technologies for the public or a mass audience.”43 This idea is also clear in the self-explanatory title of Denise Scott Brown and Robert Venturi’s 2004 book, *Architecture as Signs and Systems*, which argue for architecture “as sign or communication.” Whether thinking about the hieroglyphics on the surfaces of ancient Egyptian temples or the sculptures in Greek and Roman temples, buildings framed as both architectural façade and aperture constitute what Brown and Venturi call “billboards for a proto-Information Age,”44 and in that respect a clear pointer towards being screens for information or communication. Hence, even before being filled with any projected or electronic light for practical display of visual information, a building façade can itself already be framed as a screen on an abstract level by way of its architectural framing and features.

The second and more contemporary way in which buildings may re-purpose into screens is where the façade itself becomes literally lit as a screen. Where a single wall-mounted screen in its relatively modest dimensions might form an electronic window on the building surface, with electrification and, more significantly, the development of the light-emitting diode (LED; as well as its associated technologies and materials such as gallium for its semiconductors),45 many buildings today have large areas of their façades illuminated with LED displays, turning into what various scholars call “media façades.”46 In essence, the building wall, in its entirety, becomes itself a screen. In other discourses, the term “mediatecture” has also caught on – a portmanteau word of “media” and “architecture” – for this phenomenon of “something else” that is “no longer just film or pure architecture, design or communication,” but encapsulates all of them in a practical and disciplinary amalgamation. As “a mediator between the worlds of built and physical realities on the one hand and of imagined identities and visions on the

“mediatecture” thus already contains fragments of the imagined and the immaterial in its built materiality. Here is where we get closer to the idea of the post-screen city of energizing and dematerializing light.

Examples of “media façades” abound from around the world as grabbing attention with skyscraper-height swathes of electrical light becomes a kind of marker of world stage prominence. In Jeddah, Saudi Arabia, the King Road Tower building currently holds the record for the world’s largest LED screen, featuring 9,850 square metres of LED screen stretched over twenty-one floors on the north and south façades and sixteen floors on the west façade. Another notable example is the Grand Indonesia Tower in Jakarta, a fifty-seven storey skyscraper covered with two LED videoscreens which together comprise of approximately 5,500 square metres of LED coverage along its exterior wall. In 2016, a 3,065 square metre LED screen was installed on the 163-storey Burj Khalifa in Dubai, completed in 2010 as the tallest building in the world (and, at time of writing, still is) to cover its outer façade. On 31 May, 2019, Samsung presented “massive five-screen LED displays” along a face of the twenty-five storey One Times Square building in New York, measuring “more than 1,180 square meters when combined.” Urban LED screens also exist out of illuminations of other kinds of surfaces. The “sky screens,” for example, in the Chinese cities of Suzhou (located in the Harmony Times Square) and Beijing (The Place mall) are LED “video walls” which run along the underside of overhead walkway covers stretching across shopping malls and plazas, a common architectural feature in East Asia to shelter shoppers against sun and rain.

The expansion of LED screens on urban buildings shows no sign of abating – scrolling through the Pinterest account of “LED Screen” reveals seemingly never-ending arrays upon arrays of media walls and façades from around the world. There is multiple rationale for their popularity – lit buildings attract night-time shoppers, tourists and passers-by; earn revenue through

displaying advertisements; exude technological “cool”-ness; and continue the exhibition of the building’s size and monumentality which otherwise get swallowed into the darkness of night. But these scenes of LED screens also constitute a different urbanscape – not one of building structures, but an urbanscape of visual media in terms of what McLuhan calls “light through,” as opposed to “light on.” In *Understanding Media*, McLuhan first cites how artist, designer and educator György Kepes, through his experiments with photography, photomontages and photograms, “developed these aerial effects of the city at night as a new art form of ‘landscape by light through’ rather than ‘light on.’” Later in the book, McLuhan again picks up these phrases in his chapter on television, connecting “the ceaselessly forming contour of things” in the TV image as appearing “by light through, not light on,” with “the quality of sculpture and icon.” McLuhan thus differentiates between two kinds of illumination which constitute media: light *on* – in the sense of a landing or resting on a surface; and light *through* – in the sense of a permeation, such as how Kepes’s photographs showed the infusion of light in the city, or, indeed, in the ever-changing, flickering plasticity of television images.

In this “lit-through” urbanscape of giant “screens” appearing out of illuminated building façades, the contours of a border-less post-screen start to emerge. On one hand, the boundaries of these LED grids-as-screen are clearly defined by way of the building’s edges. In that sense, they are really just massively scaled-up common LED computer screens that happen to be attached to huge buildings, displaying a combination of text, still and moving images amplified in width and breadth for maximum attention grab in today’s era surfeit with media. As McCullough points out, these screens “belong to an architecture for the age of YouTube,” designed for “one-minute video clips going viral on the Internet.” They are continuations of the glut of conventional screens all around us – just much bigger.

Yet, even as clearly defined screens of light – the “thing that glows and attracts attention with changing images, sounds, and information” – these “media façades” also evoke two paradoxical senses of the post-screen. The first is in terms of cover and protection as discussed in chapter 2. With LEDs spread over the building’s surface constituting its “screen”-ness, its

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53 McCullough, *Ambient Commons*, 149.
construction invariably recalls the idea of a skin or mesh over the wall.\textsuperscript{55} The technologies’ patented names, such as “MediaMesh\textsuperscript{®}” or “IlluMesh\textsuperscript{®},”\textsuperscript{56} likewise reflect this idea, as do the breathy descriptions of their capabilities: the Iluma building (now known as Bugis+) in Singapore features a digital façade called “The Crystal Mesh” where “LEDs integrate well with tiled skins” to combine visual display with “a breathable mesh of polycarbonate polygons, overlaid outside a conventional structural façade.”\textsuperscript{57} Already, the boundaries of the media façade appear fragile and on the verge of disintegration: it is a cloak of light which covers and wraps the façade, yet as a skin of mesh covering is also permeable, porous, flimsy, and penetrable, per human skin.

The second paradox of these (post-)screens on buildings is that which more directly heralds the post-screen through light projections and projection mapping in its core argument of interplay between materiality and immateriality; of animation and being inanimate. This interplay ultimately reduces to one idea about these lit-through buildings: the more the building is lit, the more it disappears. While the brightness of the LED grids renders the lit parts of the building maximally visible at night, the rest of the building structure, shrouded in darkness, becomes invisible in the night. It both appears and disappears. As with the post-screen and its other paradoxes discussed in earlier chapters, the buildings and their boundaries thus disappear in this interplay of light and night, display and concealment.

In this post-screen-esque fluidity, a sense of animation also arises. Thinking here of Boccioni’s city whose light gives rise to its specific energies, the LED lights of the city similarly emit a vitality in the appearance and dis-appearance of its structure and boundaries. As Seitinger et al. write, “[a]t the urban scale, strategically deploying ambient light makes the night-time city landscape editable.”\textsuperscript{58} While their statement primarily refers to using

\textsuperscript{55} Cf Laura Marks’s response to discussing the screen as skin in an interview: when asked specifically about how the screen can “be thought of as skin,” Marks replies that she “wouldn’t over- emphasize the screen, for it is just one part of the material way the image reaches the viewer”; the skin of the film covers a more extensive range of materiality in connecting image and viewer. See Laura U. Marks with Dominique Chateau and José Moure, “The Skin and the Screen – A Dialogue,” in Screens: From Materiality to Spectatorship – A Historical and Theoretical Reassessment, eds. Dominique Chateau and José Moure (Amsterdam: Amsterdam University Press, 2016): 258-63, 259.

\textsuperscript{56} Two patented names for LED technologies which can be applied onto steel meshes for day-and-night illumination of large surfaces. See their brochure at GKD UK, https://gkd.uk.com/services/mediamesh-and-illumesh-media-facade-systems-with-leds/.

\textsuperscript{57} McCullough, Ambient Commons, 149.

“programmable points of light” as design opportunities for urban displays of text and images, it also gestures to a quality of fluidity and variability of the city’s material buildings animated out of the interplay between the dazzling cover of LED screens and the dissolving cloak of darkness. This is not, or not yet, about how buildings and urban structures “come alive” (which arises in more substantive discussion later in relation to projection mapping). Rather, the quality of the post-screen here refers to a vitality out of which lit buildings become changeable, evanescent and ephemeral between darkness and light, particularly as manifested against their structural solidity and monumentality. Paving the way for the paradoxes of the post-screen through light projections, the material and the immaterial thus become convertible: what appears to be solid becomes deliquesced. In this fluid roil of mass, energy, matter and dynamism, the screen itself in these urban spaces thus also collapses in its boundaries: the post-screen emerges.

In more recent years, as interactive media increasingly takes the fore, this dynamism of light in the energizing of buildings becomes ever more visible, where LED façades take on palpably reactive and interactive properties as “a ‘skin’ that responds to stimuli from outside.” For example, the LED façade of the Hotel WZ Jardins in São Paulo, Brazil, responds in real-time to noise and real-time changes in the local air quality as picked up by microphones and sensors installed around the building, and translates the stimulants into different manifestations (such as warmer tones of red and orange to indicate more polluted air; blues and greens for less). Users may also interact with the building via a smartphone app by voice or finger taps. Self-dubbed by its own architects as “The Light Creature,” the tension between the nature of the inanimate and the alive-ness of urban structures becomes literal as its boundaries qua a screen fall away into the energy of a living surface, or even urban beast.

The “lit-through” urban-scape of media façades thus portends the post-screen, where its scaled-up illuminations already interrogate boundaries between their paradoxes of disappearance and appearance, immovability and dynamism. In the discussions over the next sections on light projections in terms of “lit-on” media, we will see how the post-screen comes to fruition – a skin and body that, with light, becomes alive, pulsating, energized and ultimately self-devouring.

Light Projections (1): Light that Dissolves and Constructs... and of Latency

The suddenly stopped rays find their own screen against the darkness.

~ E.H.G. Barwell

The section above outlined two perspectives – namely, architectural framing; and being “lit through” – in which urban surfaces may thus re-purpose into screens. The third perspective with which to relate buildings and screens, then, is via the other half of McLuhan’s bisectional distinction between “light through” and “light on,” whereby building façades turn into screens simply by having light projected or shone onto them. Again, this is neither new nor contemporary. Erkki Huhtamo, for example, traces the history of urban large-scale public projections to the nineteenth century use of magic lanterns in the United States, where “slides were projected outdoors on screens, blank walls and even public monuments from the 1860s.”

Many of these projections took place as advertising: citing E.S. Turner, for instance, Huhtamo describes how “ads for ‘pills, blacking, and watches’ were projected on the side of Nelson’s Column and the pillars of the National Gallery [in London].”

As with LED grids, on one level the boundaries and sense of the screen for such projections are straightforward – the virtual boundaries are the outlines of the projected light; the physical boundaries, if at all relevant, are the edges of the material surface. However, contemporary light projections, particularly in their creative and political messaging, actively subvert screen boundaries so that walls and façades become not simply re-purposed

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bordered screens – or brute surfaces for the opportunistic displays of light to hawk and advertise – but a dismantled and unsettled *post-screen*, giving rise to dynamic interrelations between the materiality of urban structures and the immateriality of light which trace and scribe new energies across the city. Here, screen boundaries are subverted not so much by the concealment of their edges, as with the totalization of the VR media environment or by the hidden screens and strategic reflections of holographic projections. Rather, they diminish by being writ large in electrical light across the otherwise blanketing darkness of city walls and building surfaces obscured in the night. In the process, they enable a different city to emerge – one whose materiality becomes fluid, as with Metropolis melting under its dazzling light; whose structures become dismantled into different energies and volatilities which pulse the city, as with Boccioni’s city; whose walls fall apart in media’s convertibility between light and mass to reveal new media-engineered political and democratized spaces: the border-less city of the post-screen.

The key to the post-screen through light projections is thus the conveyance of this dissolving touch. As usual, cinema – the apparatus par excellence of light and projection – had always known this convertibility between light and matter, and demonstrates it in creative self-reflexion. There are many examples; a brief highlight here of a prominent example would suffice. In a celebrated scene from Giuseppe Tornatore’s *Cinema Paradiso*,65 film projectionist Alfredo (played by Philippe Noiret) faced an angry crowd denied entry to their film screening due to the cinema theatre being full. Using his knowledge of film projection and reflection (and to the delight of Salvatore (played by Salvatore Cascio), a child who had struck up a friendship with Alfredo), Alfredo cleverly deflected the image to project the movie onto the wall of the building opposite the theatre. As Alfredo moved the projector, the image drifted and undulated across the walls of the darkened projection room, as if possessed of its own life force. Alfredo’s and Salvatore’s eyes – and certainly the audience’s own as well – could not tear away from the hypnotic vitality of its serpentine movements. As the images of the film finally snaked across to the opposite building, the ecstatic crowd gathered and set up their chairs, their eyes glued to the now-transformed wall-as-screen.

For those moments in the film-within-the-film, the actuality of the building is imperceptible; what completely takes over is the virtuality of the projected light, its energies manifest in its animated movement, to which

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65 *Cinema Paradiso*, directed by Giuseppe Tornatore (1988; Shenley: Arrow, 2019), DVD.
the audience is irresistibly drawn. Then, it happened: halfway through the viewing, a resident opened his balcony door which happened to be in the middle of the “screen,” only to be befuddled by the light beaming onto him and the audience’s ensuing indignation at the disruption. The resident promptly retreated and shut the door behind him, and the viewing resumed. The incident lasts a mere few seconds in a scene which ultimately sets up a disaster to come, but it expresses an important message about screens and projected light: the screen under the power of projected light becomes a post-screen of capricious boundaries that plays between materialization and de-materialization in its metamorphic magic. The opened door abruptly re-materializes the building by (literally) rupturing the light, exposing and undoing its transformation: on the shredding of the light, the screen reverts to the actuality and real-ness of the wall as an urban structure. As the door shuts, the wall-as-screen manifests once more, its light intact and spellbinding. The post-screen here through light projection thus asserts its knife-edge physics of the material and the immaterial, balanced between latency and assertion in the energies of the moving light, and their equally easy dismantling of one state for the other.

*Cinema Paradiso* is a toast to cinephilia and the inherent magic of projected immaterial light on material surface via the mediated architecture of cinema. Other light projections similarly manifest this interplay of materiality and immateriality via the post-screen, if out of different inspirations, motivations and politics. For instance, Shimon Attie’s 1991 art project, *The Writing on the Wall,*

...[slid] projected portions of pre-world war II photographs of Jewish street life in Berlin onto the same or nearby addresses where the photos were originally taken 60 years earlier... Thus parts of long destroyed Jewish community life were visually simulated, momentarily recreated.

Here, in echoes to *Tribute in Light* for 9/11, the projected light becomes a restorative im-material – or, we can say, a material of immateriality – for its post-screen surfaces: the light becomes the bricks, mortar, panes and bodies of nostalgia and pastness, shot through with the horror and tragedy

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66 Immediately after this scene of the re-directed movie, the film strip in Alfredo’s projection room catches fire and the original cinema hall goes up ablaze. As the audience empties the cinema in panic, it is left to the child, Salvatore, to rescue Alfredo, who suffers life-changing injuries.

to come; after all, this light is the writing on the wall. In the meantime, though, the light re-constructs, restores and refurbishes: ruined walls are made whole; abandoned doorways are occupied with people in activity; empty windows are filled with thriving businesses. The light projections here thus differ from Cinema Paradiso, where the materiality of the wall gives way to the immateriality of the light, whose hypnotizing energies of animated life dissolve the physical into the virtual. In The Writing on the Wall, the projected light reconstitutes lives and activities in the virtual, through which material and bodies return with their own energies, borne, of course, by the light.68 The physical spaces become reanimated, charged with their own life force of historical presence and inexorable strain of their bleak futurity.

In other cases, though, these forces take the form of hope and solidarity. In the many dark and deserted nights of Covid-19 lockdowns across the world for much of the first half of 2020, light projections took on another peculiar life force, their brightness substituting the vitality of still cities emptied of life by enforced lockdown. In late January 2020, across Wuhan, the then-epicentre of the virus and one of the first cities in the world to undergo lockdown, the message “Wuhan Jiayou” (meaning “Wuhan, keep going”) and other variations were lit across various buildings in the city.69 Many similar examples followed across the world in the months to come – again, as a random sampling: in February 2020, “Wuhan Jiayou” was projected on Tehran’s Azadi Tower as a message of solidarity;70 in March 2020, “merci” was lit on the Eiffel Tower in Paris as a thank you to key workers;71 in April 2020, “thank you” was again flashed on the Burj Khalifa skyscraper in Dubai.72 Light projections also appeared in the form of artwork, such as “LIVES” by Manoel Enrique which featured an illustrated message of “Clean Hands/Save Lives” projected on the NYU Langone Hospital in Manhattan in April 2020.73

68 The tragic irony being, of course, that this re-constitution via light also only lights the horrors in store for these people, businesses and lives.
72 Burj Khalifa, Twitter post, April 1, 2020, https://twitter.com/BurjKhalifa/status/1245405341636005888?ref_src=twsrc%5Etfw.
73 Amplifierart, “CLEAN HANDS SAVE LIVES by @mane_fissurinha projected outside of the NYU Langone Hospital in Manhattan by @the.illuminator.” Instagram, April 20, 2020, https://www.instagram.com/p/B_BjW5FJx_R/.
In all these instances, as with *The Writing on the Wall*, immaterial light takes on not representation or re-presentation, but reconstituted presence – of the material, of the living, and of filling in the absence of life on the streets. In these projections, the literal boundaries of the “screens” are evident, even if, such as for *The Writing on the Wall*, effort was made to incorporate and merge the images into their surrounding environment. However, the insertions are not seamless, but neither is that the point. The post-screen here is not about melding the virtual with the actual into the same space-time, as is the case, for instance, with holographic projections. Rather, it is a kind of re-animation of the inanimate with projected light, a revitalization of absences with presence, a filling of emptiness with bodies. Here, as part of the convertibility through light between mass and energy, the interplay of the material and the immaterial through the ambiguous screen borders of the post-screen lies in reconstruction, rather than dissolution. This play thus presents another dimension of the transformational convertibility of light as the matter of light – not only between materiality and immateriality, but also between presence and absence of the corporeal and the structural.

However, in other kinds of projections, the immateriality of the light itself does become the point. In *The Writing on the Wall*, the light serves as an im-material of reconstruction which re-writes the definitions, effect and boundaries of the wall-as-screen. In other cases, such as that of digital graf-fiti, the light serves as the im-material of immateriality itself. For instance, in 2007 the design studio Graffiti Research Lab (GRL) set up a large-scale projector to enact what have since become very high-profile digital takes on spray-painted street graffiti. Using a vision tracking camera to pick up laser light as beamed by a user onto an unlit surface (such as a darkened building façade or garage door, or the underside of a bridge), the camera tracks the laser beam’s movements as it appears on the physical surface.74 The camera then feeds the data into a computer, whose software mirrors the laser’s movements on its own screen. The projector, connected to the computer, finally casts the computer-generated image as “inked” graffiti writ large on the selected urban surface.75

74 As with Pepper’s Ghost projections which rely heavily on appropriate lighting for the illusion to work, the surface for this likewise has to be dark enough for the set-up to work, as it is critical that the camera picks out the brightness of the laser beam in order to register it accordingly onto the computer.

As with *Cinema Paradiso* and *The Writing on the Wall*, the projected light of GRL for “digital graffiti” transforms building façades and urban surfaces into screens for this “lit on” play of light. One such transformation is the now-familiar deliquescence of the building façade into its surrounding darkness, rendered as a screen only by the graffiti: as Susik writes in relation to these “projection bombing” graffiti sessions, “the ‘screen’ dissolves into an indexical record of the performative act of reinscribing the city space with the life and consciousness of its dwellers.” (emphasis added)\(^76\)

However, the transformation from light in this case goes beyond the dissolution of the material and, for that matter, its restoration. Rather, the light transforms the im-material as immateriality – a showcase not of the paradoxes of a surface-screen but of its sheer ephemerality, as the digital graffiti appear and then disappear without a trace, as does the darkened “screen” of the building surface itself correspondingly dis-appear and disappear. The post-screen here is thus apparitional in every way – the light on the building surface demonstrates neither its actuality nor virtuality but its latency of creativity and potential; of what *could* be written on it out of the unseen vitality of users’ energies and efforts (graffiti itself also a longstanding instantiation of subverted creativity); of where and how the screen *could* emerge. In this space of potentiality between building-façade-screen and light, the post-screen thus not only re-scribes graffiti itself – as tags of ephemeral light from a laser pointer rather than paint from a spray can, applied across much larger distances and scale – but also the spaces on which it appears. It re-forms urban surfaces into the fleeting double-ness of the post-screen between the material and the immaterial, and between the present and the absent, re-drawing the boundaries not only of where and how images appear, but where and how screens *could* appear...and disappear.

**Light Projections (2): Walls that Fall Apart... and Re-Form**

In more recent years, these re-forming of urban surfaces out of the post-screen through light projections has taken on another level of significance, namely, the signalling of new political spaces whose boundaries navigate

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different vacillations not between materiality, but the establishment of power and the challenges to it. In what has been called “protest projections,” text and images are projected onto significant buildings to register various kinds of dissent. While such projections have gained recent prominence, protest projections can be traced as far back as 1989, where protesters gathered at the then Corcoran Gallery of Art (today the Corcoran School of the Arts and Design) to protest the cancellation of a Robert Mapplethorpe retrospective “over concerns that its content [featuring sexually explicit images with homoerotic and sadomasochistic themes] would affect the museum’s government funding.”77 In resonance with the holographic protest marches discussed in chapter 4, the protesters at the Corcoran projected images of Mapplethorpe’s photographs on the museum’s exterior walls, using the light as a defiant substitution of protested virtual presence for mandated actual absence.78 Once more, the post-screen through projections emerges in fluid fluctuations of boundaries between wall and screen. Here it is not so much a statement on light in transformative flux between the materiality and immateriality of urban surfaces and spaces, but, rather, a re-drawing of space with light as energized by dissent, objection and challenge. Projected light in this case is thus a charge of politics between the virtual and the actual; the post-screen, in turn, becomes the mutable and adaptable space for it.

As mentioned, such projections for political messaging and protest have only gathered apace in recent years.79 Just to cite a few examples: in October 2010, the Glass Bead Collective projected a sequence of images and text on the J. Edgar Hoover Building, also known as the headquarters of the US Federal Bureau of Investigation (FBI), in protest of FBI raids and


79 Although light projections which function as protest may also do the work for the entrenchment of power, as social media shared images of live projections of the current Russian President Vladimir Putin as he made a speech on January 15, 2020: see Soviet Visuals, Twitter post, January 16, 2020, 9:40 a.m., https://twitter.com/sovietvisuals/status/1217743912922784640?lang=en. As social media users noted, the images of Putin’s face in such largeness of scale staring out from the buildings inevitably invoke the dystopic surveillance of George Orwell’s 1984.
tactics against activists, including claims of intimidation, imprisonment and murder.80 In 2011, artist Mark Read, with help from other video projection artists, used a 12,000 lumen projector and dedicated software to project a series of messages supporting the Occupy Wall Street movement onto the side of the Verizon Building in Manhattan, New York.81 In May 2017, another artist, Robin Bell, projected anti-Trump messages onto the side of the Trump International Hotel in Washington DC;82 in 2018, he again projected slogans onto a Washington DC courthouse which related to the nomination (and subsequent appointment in November later that year) of Brett Kavanaugh as a US Supreme Court judge in the wake of allegations against him for sexual assault.83 In October 2019, artist Jenny Holzer, famous for her many light projections of text and poetry on public surfaces from the 1990s, set up VIGIL, a two-night display, and also part memorial, of projected light onto landmark buildings of the Rockefeller Centre in New York City which shared “testimonies, responses and poems by people confronting the everyday reality of gun violence.”84 Across the Atlantic to the United Kingdom, in early September 2019, an anti-Brexit activist group called Led by Donkeys projected onto the walls of Edinburgh Castle an image of then-House of Commons leader and Conservative Member of Parliament Jacob Rees-Mogg’s “infamous Commons slouch.”85 This “slouch” was a reference to the reclining position in which Rees-Mogg took and was photographed (and rebuked by other MPs) on the front benches of the House of Commons during a significant parliamentary debate on the Brexit process.86 The projection was accompanied by an appropriately punned slogan: “Lying Tory.”

80 See also Susik, “Sky Projectors,” 87-88.  
85 Sarah Turnnidge, “Huge Picture of Jacob Rees-Mogg As ‘Lying Tory’ Projected Onto Edinburgh Castle,” Huffpost, September 5, 2019, https://www.huffingtonpost.co.uk/entry/jacob-rees-mogg-edinburgh-castle_uk_5d70bc33e4b09bb49e9fe47.  
There are also variations to such projections of slogans and messaging in terms of the nature of the surface used, the content of messages involved and/or the mode of the light’s production. One variation projected illuminations not in a city, but on the Alpine mountainside of the Matterhorn in early 2020. Nightly, with weather permitting, for more than three weeks from March 24, 2020 to April 19, 2020, the light artist Gerry Hofstetter, in co-operation with Zermatt Tourism, beamed light projections onto the Zermatt peak as an artistic response to the Covid-19 pandemic which had then been escalating to its gravest heights that year throughout Europe. These projections consisted of succinct text messages, such as “#hope,” “solidarität” and “#grazie” (to key workers), and images of various countries’ flags to demonstrate solidarity in the face of their respective Covid-19 crises. In a similar vein, “Stay Home” and “Stay Safe” messages in text were also projected onto the Great Pyramid of Giza in Egypt in April 2020. As another variation, one night in the summer of 2019, anti-government protesters in Hong Kong directed laser pointers onto the exterior walls of public buildings, such as the Hong Kong Space Museum, to protest the arrest of a student leader, Keith Fong, for buying laser pointers which the Hong Kong police then labelled “offensive weapons.” Unlike the other protest projections, the lights in Hong Kong were not organized projections, but “crowd-sourced” laser lights beamed by protesters in a collective yet uncoordinated effort – a mass of laser light dots dancing across the exterior wall of the Museum that neither spelt out any particular slogan nor put together any coherent image.

Through all these light projections which befuddle site and screen, the post-screen emerges. More importantly, the shuffle and flux of materiality against immateriality via the post-screen here come into being as screen-sites of politics, hope, solidarity, media and transformational light: as with the projection of Il Pompieri di Viggiù on the building wall in Tornatore’s Cinema Paradiso, in these moments of light appearing on a physical surface, their virtuality becomes the relevant visual realities – here as political resistance and/or energies of hope and solidarity – while the actuality of the structure
dissolves into the night. The unstable boundaries of the post-screen through urban “protest projections” thus highlight not only the flux between the material and the immaterial per the post-screen, but also their slippages between the meanings of space and the spaces of meaning. Moreover, the projections are invariably made on buildings which in themselves contain significant meaning. As buildings meld into screens, screens also converge into the buildings. The projections as text (via the slogans of “Pay Trump bribes here,” “Brett Kavanaugh is a sexual predator,” “Lying Tory” and so on) remind the viewer that the “screen” on which they receive these messages is also a brick construction of symbolic meaning (such as the rule of law and legality from a courthouse) and functional identity (i.e. upholding law, rules and justice as a courthouse). The post-screen through light projections thus also unsettles the boundaries of the sitting (as against the screening) of meaning that vacillate between material structure and lit screen. In turn, these sites finally emerge as screen-sites in their simultaneous convergences and contrasts against each other.

Nor need this reminder take only the form of projected text; the resonances of meaning against screen and surface may also take place through image and sound. For instance, in *Hiroshima Projection* (1999), artist Krzysztof Wodiczko projected the hands of atomic bomb survivors onto a wall of a river bank next to the Atomic Bomb Dome memorial in Hiroshima. This memorial building, originally known as the Hiroshima Prefectural Industrial Promotion Hall building with a distinctive dome at its highest part, is historically significant as one of the few structures left standing in Hiroshima near the bomb’s hypocentre. Wodiczko’s projections were further accompanied by voice recordings of the bombing’s survivors relating their stories.

As with the protest projections, the post-screen via the bank wall converges the meanings of place (i.e. the symbolism of the Dome as memorial, as well as the building’s indexical traces of the historic bombing) with the meanings from the audiovisual projections per their filmed images and recorded stories. In this case, though, the post-screen takes on an additional form – not just wall or screen, but a further layer of reality, more in the sense of a thin coating. Architect and architectural historian Eran Neuman gestures to this additional layer in the following way: “the [Hiroshima Projection] did not derive from the memorial’s formal or geometrical contexts. Instead it suggested an addition to the site’s physical presence... and added another layer to the memorial’s content.” (emphasis added)89 Neuman does

not elaborate on what he means by this “added layer,” although, in the context of the article as a piece on architectural façades, he presumably refers to the projections as adding architectural (visual and aural) content to the memorial building. At the same time, the artist also refers to the idea of layering in how he places image over surface. To Wodiczko, the projections become a “skin” of separation, specifically to signify the disengagement of empathy:

The images are not projected on the white screen, but on the facades that are carved. They have their own iconic arrangements or texture, made of bricks or mortar. And this is important. There is an image; there is a building. There is a body of the person, projected; and there is a body of the building or the monument, animated. But it is also the skin of the building, the surface, which is seen as something in between. And that’s a very important protective layer—that separates the overly confessional aspect of the speech of those who animate the building and our overly empathetic approach towards the speakers [emphasis added].

However, another way to look at this layering of light is in terms of the boundaries of the post-screen within which the image rests. Or, rather, the multiple transmuting iterations of those boundaries – the surface that becomes the screen that becomes a skin. By virtue of its siting/screening, the post-screen here through this projection amalgamates surface, wall and its coating of light as an organic membrane that fuses between viewer, place and history; a layer, moreover, that is weighted by the sheer heft of the events’ historicity. This characterization of the post-screen as skin also recalls Serge Daney’s description of the cinema screen as hymen – another piece of skin charged with significance and meaning, and, as discussed in chapter 3, is paradoxically protective while breakable. The post-screen through the Hiroshima projections beckons to those same paradoxes, if in an entirely different context of vulnerability and exposure. It is not a skin in the sense of a palpable – safeguarding yet fragile, all with tremendous significance – surface between image and viewer; the post-screen, in its fluid transmutations, does not take that literal iteration here. Rather, the skin of the post-screen here is the skin of history itself – taking “skin” not from Daney, but from André Bazin’s metaphor of recorded images as “the

extraordinary shedding” of the world by “tens of thousands of cameras” each day. The result of Bazin’s metaphor is a remarkable re-characterization of the recorded image as skin, particularly recordings of events of war and history: “As soon as it forms, the skin of history peels off as a thin film.”91 The light projections in Hiroshima can thus also be read as that thin film par excellence that is the skin of history; in turn, its screen, as the post-screen, is not just a surface for an image, but the very lodging of that skin of history in the sheer historicity of place. The post-screen here becomes something temporally organic – not simply a sterile façade for an image, but a living and ephemeral membrane conjoining image, place, history and time.

In all these light projections, surface, screen and image come together as a tripartite convergence energized by the light. The heat of their amalgamation also reveals the hidden natures of the surface. As also cited in chapter 2,92 David Theo Goldberg writes of political walls as dual-facing: on one side “is to be found the shaping of conduct, commercial and social, the social regulation of circuits of mobility both of people and their products”; on the other, walls are also “potentially screens for projecting commercial and political messages both propagandistic and critical or resistant.”93 The transformative energies of light in these projections thus also facilitate the continual passage between such dual sides of the wall’s surface – a constant interchanging between engineering and functionality, politics and information, materiality and immateriality, establishment and resistance, power and challenge.

Indeed, that flux continues in perpetuity: even as the light transforms – deterritorializes – the meanings and political spaces of the post-screen surface, the surface also re-asserts itself – re-territorializes – in interminable fluctuation. As the projected lights get turned off, the walls are again structures of material bricks, cement and concrete. More insidiously, the power structures inherent in material infrastructure endure and re-assert, such as the increasing enforcement of law by police and governments over light projections, deeming


92 See footnote 33 of chapter 2.

them to be, for example, “unlawful posting of advertisements.” In 2016, police arrested three members of a New York-based art-activist collective on that basis of unlawful advertising after they projected the message, “KOCH = CLIMATE CHAOS,” onto the exterior of the Metropolitan Museum of Art. The Museum had recently named its redesigned plaza the David H. Koch Plaza, and the protest was made in reference to Koch’s role in Koch Industries, a conglomerate heavily involved in fossil fuels and with alleged records for breaking environmental regulations and illegal pollution. In March 2019, police arrested the projectionist Robby Diesu (and also one of Robin Bell’s collaborators) for projecting protest slogans (including “discrimination is wrong”) onto the side of the Rayburn House Office Building in Washington on the basis that the building is regulated as part of Capitol Grounds, protected by US Capitol Police, with its own regulations governing protests. Even as the wall becomes the post-screen as a materialized/dematerialized screen-site of diminished boundaries between media, image, text and politics, the post-screen also reverts into a wall as a material structure of power. The only state of plausibility for the post-screen is thus its unrelenting flux between its tenets of meanings, media, materiality and political power.

Light Projections (3): Particles that Gain a Body... and Transform

A segue, then: where light transforms concrete flat surfaces into immaterial screens, it may also be projected onto amorphous particulate materiality, such as masses of ash, clouds and sheets of water droplets, to be turned into surfaces of screens. As ever, this is neither a new nor contemporary phenomenon. As Abigail Susik writes, in the late 1920s, British inventor Harry Grindell Matthews put together what was called the Sky Projector, an “oversized” projector that “had to be transported like a wartime cannon on the back of an industrial truck.” Consisting of a powerful arc lamp, a focusing lens and a plane mirror, “the Sky Projector would project an image


high into the sky [onto clouds] without the need for a screen to project the image onto." Of course, other projections onto clouds have since followed. For instance, on four evenings in late 2005 as part of the “Interesting Times” exhibition at the Museum of Contemporary Art (MCA), Australian activist-artist Deborah Kelly projected a large white beam of light from the roof of the MCA spelling out “BEWARE OF THE GOD” in the sky for “one to two hours, depending on the weather.”

In more recent years, such inchoate “screens” have morphed out of various kinds of particulate matter, generally leveraging their novelty for publicity and marketing purposes. Sheets or “curtains” of water, for instance – consisting of a layer of fine water droplets up to twenty-five metres in height, discharged downward through nozzles or upwards from pumps, onto which light is then projected to display images – are particularly popular. As with LED screens on buildings, a seemingly ceaseless array of images on Pinterest demonstrates the innumerable instances around the world of projected light on water screens. They tend to be large and intricately designed outdoor displays, held for maximum visual excitement and buzz. Two relatively high-profile examples will suffice here as illustration. In 2009, Paramount Pictures UK projected images of Dr. Manhattan, a major character in the Watchmen comics series, onto a water screen twenty-two metres in height and thirty metres across in the middle of the River Thames in London to publicize their then-newly released film of the same name. In September 2014, Polo Ralph Lauren launched a light show at the Cherry Hill section of Central Park in New York City as part of the city’s fashion week, projecting images of models against an eighteen metre high “wall of water” (really more like a sheet of water droplets), formed from a sprinkler head. A variation of this is the “fog screen,” whereby water is pumped into a

96 All quotations in this paragraph are from Susik, “Sky Projectors,” 80-1.
97 Through precise control of the water droplets, these projections are even becoming 3D displays: see Michelle Bryner, “New Technology Turns Water Drops into 3-D Display,” Live Science, July 12, 2010, https://www.livescience.com/8396-technology-turns-water-drops-3-display.html#:~:text=A%20new%20%E2%80%9Cscreen%E2%80%9D%20made,be%20viewed%20without%20special%20glasses.&text=But%20instead%20of%20pixels%2C%20this,water%2C%20the%20higher%20the%20resolution.
98 Albeit the projected image of Dr. Manhattan is from the film adaptation Watchmen, directed by Zack Snyder (2009; Hollywood, CA: Paramount Home Entertainment, 2009), DVD.
fog tank which converts it into “a thick fog made of tiny water particles 2-3 microns in diameter.” Once incorporated with fans to spread the particles, the screen essentially becomes a wall of mist not dissimilar to the water screens per the other examples. Nor are such inchoate screens limited to water or water particles. In April 2015, a group called The Illuminator Art Collective projected an image of Edward Snowden’s face onto a cloud of ash they had scattered above a column in “a Brooklyn park.” The projection occupied the empty space of what should have been a four-feet tall bust of Snowden that had been erected on the column by anonymous artists a few days prior, but had since been removed by the city park’s employees.

While clouds in the sky and clouds of ash may constitute a more amorphous “screen” than elaborately designed and calibrated jets of water, the key in this segue is that these inchoate screens are formed not from a solid surface, but a collective mass of atomized matter by way of water droplets or ash specks. The post-screen here thus appears in perhaps its most definitive state: a display surface for images with no literal boundaries, nor, in the case of clouds and ash, even a firm or enduring shape. The images do not so much merge or totalize with their environment as they are already a constituent part of it in both material and immaterial affiliations. As with screens out of urban surfaces, the post-screen of inchoate matter is caught in similar flux between materiality and immateriality, if on the opposite directional vector: the post-screen in this case does not render the material surface as immaterial per the previous examples, whereby light dissolves the materiality of building structures. Rather, it is the other way around so that, with light, the particulate gains a body. With that body, the inchoate acquires coherence; the collective mass contains sense. Where the post-screen had previously turned from being seen to becoming hidden, here the post-screen emerges from being hidden to becoming seen, with the boundaries of the screen thus roiled in that flux. As quoted earlier, Abigail Susik comments that “the Sky Projector would project an image high into the sky [onto clouds] without the need for a screen to project the image onto.” Susik refers to the absence of a screen in the sense of a designated screen or a solid surface on which light may appear. But the Sky Projector, with its vision well ahead of its time of visual culture and display, was not for the screen;

102 Segal, “Projection artists,” np.
it was for a more contemporary amalgamation of image and surface, and of where and how images appear today against their environments. Namely, it was for the post-screen, and for all the comments by the post-screen, as through light projections, on the increasingly complex appearances and dis-appearances of images in designating realities, in giving voice, and in propping up power.

A final point: the post-screen through the projection of light is a transformation of not only surface and matter, but also transformation itself. The light comes on and goes off, rhythmic against the movements of light and day as in the rising and setting of the sun; or the dispersal and dissipation of the masses of particles; or the shifting of the clouds in the formation of different shapes, but also of different matter, such as the precipitation of water vapour into rain and evaporation back into water vapour. The state of change in the transformation of light is thus constant and relentless, so that change itself changes: no longer merely a transition from one state to another, but a non-stop loop of ephemerality in the turns of becoming and un-becoming, appearance and dis-appearance. If McLuhan had envisaged the shifting of mediated meaning from text to medium in terms of how “the medium is the message,” here we might think of another deviation, where meaning emerges from this ceaseless flux between materiality and immateriality, between matter and ephemerality, between form and shape. Here, transformation is the message. The projected light, and the words and images it forms, is ephemeral, even spontaneous. However, what matters is neither the text nor even the light, but its sheer appearance out of nowhere and then its inevitable disappearance into somewhere. What matters is the flux and contestations in the amorphous boundaries of the post-screen. It is in the friction of that transformed transformation that the energy of the projected light truly manifests itself in the post-screen, or in finding, per Barwell’s words in the opening quotation of this section, “their own screen against the darkness.”

Projection Mapping (1): The Image that Devours Structure; the Voracity that is a Media History

In the examples discussed above, light is projected onto a relatively flat wall or building façade, whose display of image and text on a two-dimensional surface transforms it into a (post-)screen. However, from the 2000s, a method
known as “projection mapping” or “video mapping”\textsuperscript{104} enables the projection of images onto \textit{irregularly} shaped objects so that the light superimposes a visual output onto a \textit{three-dimensional} surface. By mapping a spatial replica of the object with specialized software, an image is then produced by computer graphics programs that take into account the elements and attributes of the surface, such as colour, shadow, angles and unevenness.\textsuperscript{105} By aligning the projection with the features of the source object or façade, the result is the presentation of an image which conforms to, or “wraps” around, the uneven surfaces of the object. The object thus appears with a virtual “skin” of light which not only covers it, but \textit{is mapped directly onto its surface},\textsuperscript{106} so that the whole object appears transformed with the illumination of this “skin” that irradiates the object, otherwise appearing neutral in ordinary light, with a laser-like brilliance. More spectacularly, the virtual “skin” may also be animated, so that the image’s movements induce the perception that the object \textit{itself} is moving even as it is grounded solidly as a stationary mass, such as a building. However, unlike Wodiczko’s “Hiroshima,” this “skin” of light is not so much a \textit{pellicule} of history as shed by the camera onto the historicity of place. Rather, it is a skin in a more constitutional sense – as “mapped” to the object, it forms or is bound to it as an organic component. The post-screen here in terms of this “skin” thus merges with the object whose amalgamation, in turn, dramatically changes the notion of the object’s solidity or object-ness. As such, the monumental turns enlivened; the material becomes zoetic.

As with every new media discussed here, projections of images onto three-dimensional objects likewise have their pre-millennial precedents and prototypes. In 1969, Disneyland premiered its Haunted Mansion

\textsuperscript{104} The terminology is still in flux, and there are various other names for the technology, such as “urban projection mapping,” “3d video mapping projection,” “3d architectural projection mapping,” or “spatial augmented reality,” with the last being apparently the first term of reference: see Oliver Bimber and Ramesh Raskar, \textit{Spatial Augmented Reality: Merging Real and Virtual Worlds} (Natick, MA: A.K. Peters, 2005).


\textsuperscript{106} This effect of augmentation of objects can be traced to the technique of Spatial Augmented Reality (SAR) first proposed in the late 1990s, whereby “the user’s physical environment is augmented with images \textit{that are integrated directly in the user’s environment}, not simply in their visual field [emphasis added]”: Henry Fuchs, Ramesh Raskar and Greg Welch, “Spatial Augmented Reality,” First International Workshop on Augmented Reality, San Francisco, November 1, 1998, MIT Media Lab, 1, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.439.7783&rep=rep1&type=pdf.
attraction with a projection of a looped film featuring the face of Madame Leota onto a static neutral-coloured object inside a crystal ball. Madame Leota, the character of a psychic medium who resides as a disembodied head inside a crystal ball in the Haunted Mansion, thus appears on the attraction as an appropriately dislodged head, glowing and chanting from inside its bauble.\footnote{Jeff Baham, *The Unauthorized Story of Walt Disney's Haunted Mansion* (USA: Theme Park Press, 2016).} In the 1980s, artist Michael Naimark experimented with superimposed projections on objects and furniture for various iterations of an installation titled *Displacements*. Here, Naimark first used a rotating movie camera to film a living room with all its furniture and occupants in it, including the latter's various movements in the room – a mother who bends over her teenage child with a hug; the teenager who picks up a guitar, and so on. The room's walls and furniture were then painted white as a neutral colour, and the recorded imagery was projected back onto its walls “using a rotating projector that was precisely registered with the original camera.”\footnote{See Michael Naimark, *Displacements*, as exhibited at the San Francisco Museum of Modern Art, San Francisco, CA, 1984; and M. Naimark, “Spatial Correspondence in Motion Picture Display,” *Optics in Entertainment II* SPIC 462 (1984): 78-91.} That precise coordination is important, for the subsequent projection of light as rotated onto the white walls and furniture of the room effectively “layers” them with a “skin” of projected images. Appearing with physical and positional coherence, this “skin” over the surfaces of the room thus appears to not only correspond but also belong to its walls and objects. Yet the virtuality of the images – their second order reality – is also clearly distinct and separate from the physical actuality of the room: as with biological skin, the layer of images becomes a constituent of the now whitewashed room, yet also sheddable. Just as significantly, as with projection mapping, this layer of imagery also triggers “enlivenment” as objects in the room acquire colour and the moving images of the room’s occupants, in precise correspondence to the objects and the space in the room, animate the otherwise empty and static space.

The post-screen through such projections onto three-dimensional surfaces or objects thus emerges in its most nuanced iteration. With projections on flat surfaces, the screen of the surface presupposes between appearance and dis-appearance; it materializes and dematerializes in the oppositional terms of darkness and illumination. Here, the screen merges into the “skin” of images over the object; it is the object. The iteration of the post-screen in three-dimensional projections is thus the simultaneous enfolding, through
transformative light, of image, object (as subject of the image) and object (as the surface on which the image forms). Where boundaries were blurred or hidden in previous instantiations of the post-screen, the case of projection mapping presents a step beyond that level of obscuring: here, the image is the frame; the frame is the image. Where Baudrillard’s hyperreality of images envisaged the dominance of an order of simulacra stemming from the loss of connection to or differential from their origins, these projections of images herald a different order of simulacra, whose images directly correspond to and overlay their origins. Where in conventional light projections, the screen shares nebulous boundaries with its surroundings through the interplay of light and darkness, here the screen is encased entirely in the object itself; it forms its organic skin: the screen is the object as the object is also the screen.

In some ways, the post-screen here is not only the screen which subsumes the object; it also appropriates the screen itself. For instance, in 2013, researchers at Microsoft developed a proof-of-concept system to project what they call “peripheral projected illusions.” Using a wide field-of-view projector and a Microsoft Kinect sensor, the system calibrates the furniture and surfaces of the wall against which the conventional television or computer screen, connected to the Kinect, is placed. The system then projects images onto the three-dimensional surfaces along the wall so that the wall and its furniture re-appear to the user in various effects. One of these, harking to the totalizing effect of the panorama, extends the images of the game beyond the boundaries of the conventional screen onto the wall surfaces around it, so that the images fill the user’s visual field. Another effect uses projection mapping to “augment” the surfaces of the wall so that the objects in the room appear “wrapped” in an animated “skin” of imagery coherent with what is shown on the screen. Here, the post-screen broadens into the furniture along the wall. Not only does the image spread from beyond the confines of the screen, it also consumes the conventional screen itself, which disappears visually and functionally into its surroundings thus “skinned”: the image now pulses from across the entire wall, rather than simply from within the boundaries of the television screen. In this way, the post-screen absorbs its own screen: even the secondary layer of virtual images in the screen gets devoured into the virtualization of its larger, more encompassing post-screen version.

Finally, the post-screen through projection mapping reaches monumental heights when applied to city buildings and other large-scale urban façades. The last decade from the early 2010s featured a rash of 3D projection mapping displays across the world on large building surfaces, usually in the context of high-profile events such as marketing launches of new products or light night festivals held to promote cities. In every case, the projection mapping is set closely to the architectural features of the façade and encases the building surface in a “skin” of lit imagery. The skin illuminates the surface with uncanny brilliance so that the building appears virtualized, endowed with a cartoon-like effect. As with conventional light projections, the light transforms the boundaries of the surface into a flux between wall and screen, in the process also muddying between their being artefacts of architecture and of media.

However, as alluded above, there is more. The “skin” of images may also be animated, inducing perceptions of movement so that the building façades themselves appear to change, pulsate and morph, even fold and collapse, creating a dramatic shock of the object’s light and lightness against stability and solidity. As usual, there are many examples of projection mapped light displays; a few here will suffice as illustration. One of the earliest displays of large-scale projection mapping is the project Perspective Lyrique, a light presentation shown in 2010 at the annual Festival of Lights (Fêtes des lumières) in Lyon, France. The display featured projection mapping which applied an animated “skin” of light to the uneven façade of a former lyrical theatre, transforming it into a humanoid face that twisted and pulsated, and moreover morphed in response to spectators’ voices via a microphone (and an audio analysis algorithm).\textsuperscript{110} In the same year, Nokia and Windows promoted the launch of the Nokia “Lumia 800 with Windows” phone by projecting a light show on the Millbank building in London. Close-mapped to the (not coincidentally) 800 windows of the 120 metre building,\textsuperscript{111} the projection created multiple illusions of the windows – and thus the building itself – shifting, collapsing and coalescing. At one point, all the windows of the building were lit only to have the Windows logo “crash” through them, with the projection presenting flying shards of glass and a dark “hole” in the middle of the illuminated building. In 2011, a 6’05’ minute projection


mapping installation was presented at the opening ceremony of the Tel Aviv Museum of Art’s new wing, the Herta and Paul Amir Building. As with *Perspective Lyrique*, the projection “addressed, played with and subverted the notion of the façade” that the architect Preston Scott Cohen had created, particularly in the warping and thwarting of geometrical shapes that make up the building’s “twisted and tessellated surfaces.” As Neuman describes, the animation of the display as mapped to the façade confronted the physical materiality of the building, producing

...a discrepancy that challenged the relationship between the façade’s physical dimension and the virtual screening. The façade in its physical dimension was present in the background of the screening, but the projection’s virtual dimension disavowed their mutual logic.

Prominent projection mapping light displays also featured in Shanghai during the city’s Western New Year countdowns to 2012 and 2013, attracting much global attention out of coverage by international media outlets such as CNN, BBC and NHK. The light show was projected on two historical buildings – the Customs House and the SPD Bank Building – along the Bund, a waterfront area by Shanghai’s Huangpu River on which are located dozens of historical buildings housing banks and trading houses; the Bund itself used to be a British settlement. As with the other projections, the building façades were closely mapped so that, in being illuminated with its “skin” of imagery and with the illusion of movement induced by the animation of light, the buildings themselves appeared to be in motion – morphing, shifting, folding and collapsing to dizzying effect.

The projection mapped imagery thus fuses with the three-dimensionality of the uneven building façade, and, more significantly, infuses it with the vitality of its animated movements. In turn, the animation co-opts the physical bulk of the structure into the manipulability and lability of light – the buildings appear to warp, flex, contort and stretch in defiance of their rigidity and mass: the walls pulsate, bricks fly off their foundations and

114 These celebrations along the Shanghai Bund have since stopped after a tragic stampede due to overcrowding at the New Year’s Eve celebrations of 2014; see Reuters, “A Year After Stampede, Shanghai Opted Out of New Year Celebration,” December 29, 2015, https://uk.reuters.com/article/us-new-year-shanghai/a-year-after-stampede-shanghai-opts-out-of-new-year-celebration-idUSKBN0UCoDS20151229.
columns fold down like giant origami. The light temporarily transforms the building wall into an animated creation, warping the boundaries not simply between the inanimate and the animate, but also between the concrete and its disintegration. The building does not disappear as with conventional projections, but is amalgamated with the image as the post-screen in a virtualized vitality of disintegrating matter and atomization of structure – a contradictorily edge-less and impossibly weightless mass.

Connecting movement, matter and life as theoretical strands through media is, of course, not a new combination. Sergei Eisenstein, for instance, had proposed that movement in cinema and in architecture share theoretical provenance, where dynamism in the architecture of buildings can also be seen in cinematic terms. The movement of cinema’s moving images likewise renders its subject as animated and alive. However, the combination of virtualized animation, induced movement and the “skin” of the building in the post-screen through projection mapping asserts another kind of vitality – one closer to Boccioni’s sense of transformative light that splinters and disintegrates matter towards a peculiar sense of life. The post-screen here effectively colours a specific triangulation of light, material solidity and movement into a statement on the nature of matter itself as between affiliation and disconnection, substantiation and atomization. It is a statement which links to the very relational essence of matter as fundamentally particulate, as assemblages of connections and disassociations that relate the foundational matter of matter – particles, subatomic particles, quanta, microbes, microbiomes. In the process, the post-screen through these large-scale projection mappings depicting the virtualized collapsing of building façades also becomes a visual proclamation of the breakdown or annihilation of those connections under the power of the projected image through it. With that destruction thus also emerges the Boccioni-esque sense of vitality with which these projection mapping images are enlivened to the point of voracity.

In other words, the resonance of the post-screen here is neither with architecture (whose dynamism is essentially imagined out of its structures) nor cinema (whose presentation of images is about a passing through, such as the movement of film through its gate or a DVD through the laser beam that reads it). Rather, its reverberations are of Boccioni’s The City Rises and the Futurist manifesto of vitality and light, where, taking on Le Bon, matter transforms and dissociates into energy, in turn stamping out a statement

about their desired society. Here, media transforms matter and dissociates into energy. This sense of volatile weightlessness in media has been noted before, such as Vivian Sobchack’s comments in relation to electronic media as she writes of the electronic “instant” creating electronic space as “abstract, ungrounded, and flat – a site for play and display,” where “its flatness” is for “spectator interest at the surface.” To Sobchack, electronic space “disembodies,” or rather, it orientates the body with “a purely spectacular, kinetically exciting, often dizzying sense of bodily freedom.”

The “bodiless exultation of cyberspace” of William Gibson’s cyberpunk classic *Neuromancer* also comes to mind as its protagonist recalls his dizzying exploits as a “cyberspace cowboy” – “all the speed he took, all the turns he’d taken and the corners he’d cut in Night City.” In this sense, the immateriality of the digital and the flatness of electronic media presage the effortless transformations of projection mapping, whose contours of light transmogrify the solidity and three-dimensionality of objects into the same sense of disembodied and weightless energy.

However, in the contemporary account of the projection mapped image, such transformational atomization of building structures characterizes another kind of energy – not simply one of disembodiment and bodily freedom, but a wholly more perverse voracity of rendering matter into image, and the devouring of all structure into the spectacle and immateriality of digitized media. The vitality of the projection mapped light display thus signals another kind of virtualized viability, namely, the energy of the image which consumes, demolishes and otherwise swallows whole, whereby the (large) object (of the entire building façade) is co-opted with the image to itself move, collapse and transform. On this post-screen, the image is not displayed, but wraps around, merges with and thereby consumed by the screen. Where the indiscernible relations between the image and the screen signal their convertibility is also the point of a devouring where one becomes absorbed or swallowed up by the other.

The post-screen as screen fused to the object – or where matter, with this grotesque vitality, becomes the image – thus stamps out a statement of another kind of transformation. This is not a statement *qua* Boccioni of a society shot in the veins with the energy of Futurist youth and violence. Rather, it is one whose gluttony for media, and in particular for images,
corrupts the object so utterly that its image dissociates completely from the reality of the object while still being the object. The virtuality of the image takes over the actuality of physical materiality – and in that sense draws out new grounds of their contestation, a theme reflected throughout this book – to become a vitality which encompasses all. Bazin had similarly identified such a comprehensive totalization of reality via his vision of “no more cinema” (mentioned previously in the introduction), which stemmed from the desire to clarify cinema’s ontology as the seeing of reality – or “the pre-existence of the narrative,” “the ‘integral’ of reality” – through the window of the cinema screen. Bazin – via De Sica’s Ladri di Biciclette, his tutor text – thus sought reality in that unadulterated sense of the image through what he calls “pure cinema,” with the “cinematographic dialectic capable of transcending the contradiction between the action of a ‘spectacle’ and of an event.” The post-screen here through projection mapping thus echoes that sense of the all-consuming image over event or spectacle – where the image is the spectacle; it is the event; and it is the object itself. The projection-mapped image through the post-screen encompasses them all.

Yet, this gluttony is also more than merely a summation of greed in the takeover by the virtual of the actual. The dominating consumption of the image is not just about its totality; it is also about the formal implications of this convertibility between media and screen as a crucial chapter of media history. As mentioned in the introduction, the fourth argument of this book on constructing media history through this trajectory of screen boundaries is about the modes through which human activity across its spectrum may be thought or construed to be modulated through media. The gluttony of media, signified here through the post-screen’s all-consuming domination of the virtual over the actual, is thus one such modulation that specifically signals the ease of convertibility that is colouring much else of twenty-first century living and the forming of its histories, namely the slippages of truth against lies; of post-truth and misinformation and

119 In my introduction to this book, I had referred to the four arguments I wanted to make in relation to the post-screen: firstly, that the growing imperceptibility of screen boundaries leads to an obscuring of difference between image and surroundings; secondly, that virtual realities of the post-screen re-draw relations between the virtual and the actual, and re-shape imaginations of the real; thirdly, that the changing virtuality out of disappearing screens also changes affect and subjectivity; and fourthly – on media history – that the first three arguments can be threaded into an imagination of the post-screen that is indicative, as a discursive object, of contemporary lives, ways of living and understandings of ourselves.
disinformation; of the accelerating volatility of shifting values and their terms; of the reverberating echoes of social media against all other kinds of discussion; of the dominance of spectacle and the televisual against the event. These are all the signal fires of a moment of media history to which there has yet to be a name or framework, but which we might actually be able to connect to the state of contemporary media and specifically, per this chapter’s argument, the convertibility of the post-screen. If we may speak of a post-screen politics, it might just be one shot through with this convertibility between screen and media per the post-screen, as with the translation in physics between mass and energy where the terms of solidity change and the basis of previous values irrevocably shift. In this sense, the post-screen – in relation to its convertibility and the gluttony of the virtual – thus perhaps holds up a reflecting shard of a bigger picture. Media and history – not as an unfolding account of events nor even as the occurrences that we live through, but as that which lives through us, as that in which we are, perhaps even without our knowing that we are in it – thus also connect to each other in this sense. The former is the canvas for the latter’s colour, shape and form; one weathers, erodes and stratifies the ground for the other. The post-screen here might thus be one such moment of history in the politics of the twenty-first century or at least certainly of its second decade; it forms even as I write.

**Projection Mapping (2): The Exterior that Reveals; the Permanence that Fades**

If the outcome of projection mapping on building walls and façades is the apparent evisceration of solidity and materiality, projection mapping on human faces and bodies draws the opposite effect. Deployed thus far primarily in art installations and stage performances, the image as projection mapping onto human skin similarly takes over its object. However, in this case, projection mapping renders the somatic surface of skin into molten yet solid material, so that the skin appears to shed its biological properties to become an unnatural, inorganic yet animated layering over the face or body, appearing as both part of yet distinct from the face or body.

To date, there have only been a few examples of such projection mapping, though they have attracted substantial attraction and publicity. Thus far the most prominent usage of face projection mapping is work by Japanese artist Nobumichi Asai of WOW INC, a visual design studio based in Tokyo, evidenced through his creations of several projection mapping projects over
the last five years. In 2014, for instance, Asai’s art installation, *Omote* (in collaboration with Hiroto Kuwahara and Paul Lacroix), first tracked and captured a human model’s face in detail via numerous sensors on the face to capture and process marker data in operations akin to those by motion capture systems. The software then produced a virtual replica of the model’s face rendered with various animated textures by computer graphics (CG). Those rendered images are finally projected back onto the model’s physical face, appearing as a “skin” due to the image’s close correspondences to and alignments with the face’s features, such as its eyes, nose, lips, shadows and contours.

As with other instances of projection mapping, the “skin” of light which virtualizes the face renders it similarly transformative, here mutating the face from biological to technological object. The model’s face – and their skin as a *material* of human likeness – disappears into, or gets covered by, its mask of light, which shifts and morphs the face in real-time into different colours, structures and patterns. The meaning of this projection resonates further in terms of how masks or exterior displays (“omote” moreover being the Japanese word for face or mask) are – in the Japanese context or otherwise – culturally specific external vehicles for signifying interiority or inner life. The *exteriority* of this transformation in rendering permeable skin into seemingly impenetrable casings thus takes on a further meaning – an exteriority reflecting not the interior, but an *additional* exteriority doubled down: an encasing of light which removes further from the humanness

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120 Nobumichi Asai, Hiroto Kuwahara and Paul Lacroix, “Omote / Real-Time Face Tracking and Projection Mapping,” http://www.project-omote.com/. Asai has also created several other facial projection mapping projects, albeit all displaying similar effects which use projection mapped images to dramatically change the external appearance of the models’ faces and/or bodies. A further example of Asai’s work is “Connected Colors,” part of an advertising campaign by Intel Corporation: see https://www.w0w.co.jp/en/art/connected_colors. Asai also collaborated with Intel and Nile Rogers to create a similar effect for Lady Gaga’s tribute performance to David Bowie at the 58th Grammy Awards in February 2016, where the singer opened her performance with projection mapping over her face in the motifs of “lightning, sun and spider make-up” to symbolize Bowie: https://www.nobumichiasai.com/works/136/. Another work, *INORI (Prayer)*, is “a dance performance video that uses real-time facial projection mapping to change the look of the dancer’s faces. Over the course of about one minute, the dancers are made to look like skulls with empty eye sockets, big-toothed clowns, and terrifying dolls with their jaws unhinged”: see Lizzie Plaugic, “Watch A Dance Performance Change in Real Time with Facial Projection Mapping,” *The Verge*, April 1, 2017, https://www.theverge.com/2017/4/1/15155962/inori-prayer-music-video-facial-projection-mapping-how.

of skin; or which reflects an external environment, such as the ethereal landing of a virtual butterfly on the model’s cheek.

In this sense, the post-screen here transacts between the interior and the exterior of humanness, specifically refuting the display of humanness via skin, membrane and face for the technologically rendered human physical form, closely encased almost to perfection. On the last, we may also recall Barthes’s ascribing (albeit, in his view, seemingly only to the face of Greta Garbo) no less than a Platonic essence to the face – specifically, “the essence of [a] corporeal person descended from a heaven where all things are formed and perfected in the clearest light.” In this respect, facial projection mapping through the post-screen thus conducts its ultimate dissonance, where the face and its features remain – if still with some kind of essence – in residual form even as transformed into virtualized object, encased with its inorganic animated skin. Where projection mapping in *Perspective Lyrique* morphs the infrastructural façade of the lyrical theatre in Lyon into a humanoid face of the building, here the human face transforms into *a humanoid face of the human*. As with the other displays of projection mapping, the face here is not simply a surface for the landing of light. It is a statement of the post-screen and the transformation it heralds, where the image is now capable of absorbing biological epidermis, or even the essence of forms, and where it speaks now of a world of even biological matter, substantive in their own terms of life and of the living, as consumed into image.

As a variation to Asai’s facial projection mapping, the work of Oskar & Gaspar, “a collective of visual art specialized in video mapping and motion graphics,” similarly focuses on projection mapping the uneven surfaces of the face and, in particular, the whole human body. To date, they have produced several projects along these lines, including a turn on the competition television show, “America’s Got Talent,” where they demonstrated projection mapping techniques on the body of one of the show’s judges. One of their more remarkable pieces of work, a 2015 project in Lisbon, *Ink Mapping: Video Mapping Projection on Tattoos,* was labelled “the world’s first live tattoo

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video mapping event.\textsuperscript{125} During the event, the artists projected coordinated animated images over models’ tattooed bodies so that the projections appeared as animations, or in some cases live continuations, of the models’ body markings. Flowers or patterns burst into life with animation or uncanny brilliance; snakes or manta rays appear to slither up torsos or float across thighs. Oskar & Gaspar’s work demonstrates the usage of the whole human body as a screen for images, closely mapped and in correspondence not only with its bodily features but also to its markings, enlivening them under the transformational properties of the light.

Projection mapping across the body thus continues the post-screen of the face – here the body becomes a screen in the sense of a surface for the landing of light, but whose boundaries between media and biological organism become particularly muddied. As with facial projections, the post-screen here makes a statement of the copious virtualization of matter by the projection of light. Yet it is also a different kind of virtualization. Where facial projection virtualizes the face as a membrane or revelation of interiority into an opaque surface, the projections on the tattooed body virtualize permanence into impermanence, and in the process wipe out their significance. Like the hymen, tattoos appear with cultural and social significance: in non-western tribal cultures generally, they may be indications of social roles; in western societies, they may also function more as “a mechanism for demonstrating one’s disaffection from the mainstream.”\textsuperscript{126} Yet the virtualizations of these tattoos in the image swallow not only the body and the markings, but also their meanings, embedded as they are in the permanence that body modification tattooing entails but now transformed into the ephemerality of the projected light. Again, invoking Baudrillard’s notion of the all-consuming image, this is not a virtualization of an order of simulacra far removed from the original; this is the virtualization directly of the original itself to the point where even forms of enduring signification themselves get caught up in its all-encompassing sweep. What we have here is not an order of simulacra or of the copy, but of a transformation of ontology itself, where faces and bodies lose their biological groundedness and matter – \textit{qua} carbon, water, blood, skin and epidermis – as absorbed into image. The image no longer appears and dis-appears in the post-screen; it consumes all.

The Ground Beneath Our Feet

The ground, the ground beneath our feet. My father the mole could have told Lady Spenta a thing or two about the unsolidity of solid ground. The tunnels of pipe and cable, the sunken graveyards, the layered uncertainty of the past. The gaps in the earth through which our history seeps and is at once lost, and retained in metamorphosed form. The underworlds at which we dare not guess.

~ Salman Rushdie

Through my long sojourn all these years as a film enthusiast, it was always the light to which I returned. Barthes wrote of the darkness of the cinema theatre as “truly a cinematographic cocoon,” the blanket of blackness in which he, the film spectator, is sustained precisely by being shut in it, swathed in this stuff of alternate reverie and eroticism. The light of the cinema screen hits the spectator with assertion – an “imperious thrust” out of the luxury of darkness – which, even in its forcefulness, fascinates and hypnotizes: “we are entranced by this brilliant, immobile and dancing surface, without ever confronting it straight on.”

The assemblage of light and darkness – light out of darkness; light against darkness – harks to ancient binaries, those which, like bimetallic strips, necessarily make sense only with and against each other: good versus evil; fire against the night; ignorance and knowledge. The light at the end of the proverbial tunnel is precisely what makes the tunnel a tunnel: its light enables both coherence and affirmation, whose message, short and profound, is simply “this is what things are and how they make sense.” The light from the cinema screen – as ratification and revelation – is also a central part of the intense love cinema solicits: Susan Sontag’s accounts of 1960s and 1970s cinephilia, for instance, describe “the full-time cinephile always hoping to find a seat as close as possible to the big screen, ideally the third row center.”

The character of Matthew (played by Michael Pitt) in Bernardo Bertolucci’s romantic tribute to cinephilia, The Dreamers, specifically sought the screen: “Why do we sit so close [to the screen]? Maybe it was because we wanted to receive the images first. When they were still new, still fresh.”

130 Dialogue line from The Dreamers, directed by Bernardo Bertolucci (2004; Burbank, CA: Walt Disney Studios, 2004), DVD.
Matthew was a balm of complete absorption, the surrender to which was not a mindless capitulation, but the acceptance of a life-giving and world-renewing energy. The cinema – beyond all of its ever-evolving technologies, standards and markers of industry, and apparatus of ideology – ultimately is, if in unabashedly romanticized terms, a grand source of light against the enveloping darkness. Its light is transformational in its invoking of the elemental and its rejuvenating of the primal, with the screen as the magical fount of those unspoken expressions. I sit in the cinema in the midst of that primitive contest between light and darkness, my modern and personal equivalent of a campfire against the blanket of the terrorizing night and its hidden beasts. So many years later, even when the practices and habits of my film consumption expanded to the television screen (and then the computer, and then the tablet), I am still thus captured by the light.

As a cinephile, I gazed on Boccioni’s *The City Rises* with deep shivers of recognition of *that light which transforms*, whose rays carried all those hopes of a new city and society borne out of new energies and new futures. Those chills of recognition swelled again when I watched the projection mapping display of the buildings in Shanghai for the first time in 2012, clearly born of cinema in its apparatuses of projector, image and surface, and with unmistakable echoes of its institution in the form of sizable audiences gathered before an enlarged, encompassing image lit against the darkness. But the display was also radically different: with the light mapped to the building, the screen moulded into the object, and the light on it became angry, transforming the building with aggression and a ferocious plasticity. The long history of light projection in art, architecture and media demonstrates the role of light in constant assertion and subversion of solidity and matter, in play between presence and absence, and in the constitution of space between material and immaterial structure. Light itself has always been transformative. Yet, the light of projection mapping emanates from its contemporary screen with a visuality which erupts out of the very object of the screen itself and makes its very point in deriding the object’s solidity. As the post-screen begins to take on increasing amounts of contemporary society’s images, the regime of the image likewise stirs – first in minuscule degrees, almost imperceptibly but also affectively, but which now threatens a tectonic heave. Where it once bathed my face like an open window of air, the light now asserts itself from the darkness by collapsing the ground beneath my feet.