

FUTURE MUSEUMS NOW — AUGMENTED REALITY MUSINGS

by Geoffrey Alan Rhodes, 2015.

PREFACE

The following text is a performance script. Since 2012, I have performed a series of self-reflexive media essays on Augmented Reality, using AR technology, live, to talk about AR as an expressive media phenomenon. For these presentations I use a special deck of cards printed with 52 individual markers; I do not physically talk in these AR presentations— the lecture is presented and performed through the manipulation of the Augmented Reality cards and software, and a superimposed, pre-recorded performance. This script reflects the planning of the exposition as cut up and presented in 52 pieces, comprising video and photographic performances and examples. When presented to my computer, the cards are mapped and super-imposed in the live camera feed with this pre-recorded media. Here, for this publication of the script, these 52 markers have been inserted in-line so that you can see the videos as you read, using a smartphone app.

Augmented Reality is typically and insufficiently defined as a medium in which 'real' places and objects are combined with virtual content. Yet, physical spaces are already frequently augmented with image, sound, and text without any special technology, such as the use of captions and commentary complementing objects in the museum. AR, on the other hand, refers specifically to an augmentation done with new technical gear and, in almost every instance, the 'real' places and objects that are subject to augmentation are seen through a screen. AR relies on a technological novelty tinged with an air of technoutopianism and fantasy. In this presentation, *Future Museums Now*, I discuss the adoption of AR technologies in museums and I specifically reference the ARTSENSE project, a major European Union venture to develop these technologies to seamlessly deliver commentary on museum artifacts based on users' emotions and attentions. The ARTSENSE project exemplifies an AR fantasy in a museums setting.

It is an attractive medium for use in museums. Augmented Reality both expresses and changes our contemporary relationship to the virtual. Images can be tethered to real places and objects. Real world borders can be virtually invaded. Intertextuality can be designed and simulated. For museums, digital databases challenge existing archives with obsolescence; digital information might be reconciled with traditional, physical databases through the promise of AR. But the dream of providing a complete AR media commentary for museum objects— a commentary that is simultaneously immersive yet at the same time invisible— is spurious, and exemplifies a fear and a desire present throughout contemporary mediated culture.

In *Future Museums Now*, I find in these proposed enhancements of the museum not only an anxiety of obsolescence, but also what W.J.T. Mitchell calls "ekphrastic fear." Media and mediation are never truly invisible, and commentary can displace the objects of commentary, covering up not just the mystery of the object but also the experience of it. These are the problems facing the museum and also the emerging AR medium— problems we experience every day when engaging with contemporary media, bombarded with virtuality mixing with the real. In

Future Museums Now, I perform this confluence of virtual and real; the formal media juxtapositions are as much the message as the content.

A note on reading this script:

The original media comprising the *Future Museums Now* AR performance has been compiled into a streaming AR channel through the popular AR smartphone app, *Junaio*. To view the media, simply scan the QRcode below to both download the app and to open the channel (it will take several minutes to load depending on your connection). Then view the in-line markers in the script with your smartphone to reveal the media.



<http://futuremuseums.geoffreyalanrhodes.com>



Still from *Future Museums Now - Augmented Reality Musings*, 2013, Geoffrey Alan Rhodes, augmented reality performance, ©G.A.Rhodes.

Future Museums Now - Augmented Reality Musings is part of a performance lecture series, group titled *AR on AR*. It was first presented October 22, 2013 at the Yeongwol International Museum Forum in South Korea. The video documentation linked below is the output of the piece as performed and projected live for an international audience of museum educators, curators, and researchers. The piece was camera augmented with the custom software, *SnapDragonAR*, produced at the Augmented Reality Lab at York University, Toronto.



<http://www.youtube.com/watch?v=A69odckykoo>

INT. PRESENTATION HALL

The HUMAN stands behind a lectern. On a screen behind him, a video projection shows live video streaming from the webcam of his laptop set before him: we see his torso twice, in reality within the room and large projected behind. Without speaking, the HUMAN draws a playing card printed with a special marker and shows it to the web-camera. Behind him, in the projection from his computer, CARD#1 is augmented with a video of the HUMAN in the same outfit standing against a bright white background. The HUMAN in CARD#1 speaks:

CARD#1

I will begin with a quote.

HUMAN draws another card and holds it beside CARD#1. The CARD displays the text: "'To seize the essence of history, it suffices to compare Herodotus and the morning newspaper.'
—Arthur Schopenhauer"¹



CARD#1

(looking to his right towards
the other card)

Like Schopenhauer's formula, my presentation today will compare an institution with a technology in order to seize an idea of our changing perception of history.

The subject of my talk and the form of my talk are the same. I'm interested in Augmented Reality, a medium in which real places and objects are combined with virtual content. Like the real me is being combined with a virtual me right now.

Here are a few examples of
Augmented Reality works.

The human in CARD#1 gestures to his right where HUMAN draws a succession of CARDS, each showing video documentation of AR art works and installations: Jeffrey Shaw's 1994 Ars Electronica installation, *The Golden Calf*, Manifest.AR's 2010 smartphone installation, *We AR in MoMA* installed in the New York MOMA; Janet Cardif's 2012 iPod installation in the Alter Bahnhof for DOCUMENTA-13. While these videos

play, the virtual HUMAN inside CARD#1 continues to talk.



CARD#1

(cont'd)

Though my one line definition of AR is typical, with a little examination you can tell that it is insufficient. Real spaces are frequently augmented with image, sound, and text without any special technology. In a museum, an artifact might be complemented with a paragraph of text, a captioned image, and explained by a museum docent. Or in the case of the Chinese Folk Culture Villages of Shenzhen, the installations are augmented by 7,000 employees and performers, each providing additions of voice, costume, interaction, information, and so on.

CARD#1 is discarded. HUMAN draws another CARD which now shows the HUMAN outfitted with fanciful AR gear— a screen is attached to his head; he wears massive headphones.



CARD#2

Instead AR refers to an augmentation done with new technical gear and almost always the real places and objects are seen through a screen... like it is now. AR relies on a certain technological novelty and is frequently subject to an air of techno-utopianism and fantasy. Like in the description of the ARTSENSE Project— a major EU venture to develop AR technologies in museums.

HUMAN draws a card which displays the ARTSENSE logo.

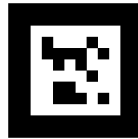


CARD#2

(cont'd)

ARTSENSE proposes to "bridge the gap between the digital world and the physical in the cultural heritage domain." They plan to use, quote, "cutting-edge technology that enables overlaying reality with digital information transparently, ... so that visitors have the feeling that physical objects are directly responding to them. In that way artworks become active artifacts that react on users' attention and emotions and provide more information about them! This leads to the new generation of mobile museum guides ..." ²

HUMAN discards and draws another. In CARD#3, the HUMAN again appears virtually in his normal attire.



CARD#3

I will return the ARTSENSE project and their plans to combine transparency with media immersion, but I first want to draw out the relationship between AR and museums.

AR is an attractive medium for museums. A medium through which the ever-growing tide of digital information can be reconciled with the traditional, physical database of the museum.

It is a reasonable concern...
Libraries and archives have been

challenged with obsolescence by digital databases. Like the museum, they are institutions that have historically served as physical database and index of information.

HUMAN draws a CARD which shows a set of Encyclopedias. Below, when mentioned, HUMAN draws cards showing the grand architectures of the New York Guggenheim interior, the Milwaukee Art Museum, the Guggenheim Bilbao, and a rendering of the Museum of Alexandria as featured in the first episode of *Cosmos*.



CARD#3

(gesturing to his right)
 The 'Poster Child' of digital obsolescence... Before Wikipedia, the encyclopedia was a bound compilation of annotated images and text. The museum also serves as a database of annotated objects. As we have seen with the encyclopedia, a physical institution or object no longer serves as the exclusive site for access to information— basic information is more efficiently accessed online. In response, museums have come to emphasize their other role, as a space for inspiration with grand architecture and more minimalist curation... not just a database, but a site for inspiration. According to Wikipedia, the first Museum in Alexandria was both a both a library and a shrine to the Muses.³

The HUMAN discards and draws two cards. When held together, the CARDS show a panorama video of the HUMAN floating through the halls of the Art Institute of Chicago.



CARD#4

In his book, *Do Museums Still Need Objects?* Steven Conn notes that though there are more museums doing more things for more people, "the place of objects in museums has shrunk as people have lost faith in the ability of objects alone to tell stories and convey knowledge."⁴

Museums have become less about artifacts and more about art. The contemporary museum is a new arcade for the flâneur... the observant wanderer. Individuals, overwhelmed by media consumption and technology, in the museum find interconnected minimalist almost Luddite rooms filled with the aura of authenticity and History with a capital 'H'. ...Romantic, fictional spaces. In the museum we can again wander, enchanted by the romance of Humanity.

In Walter Benjamin's depictions in *The Arcades Project*, the flâneur's wandering relaxed observation of history matches exactly the feeling of wandering the Art Institute of Chicago. I quote: "It opens up to [me] as a landscape even as it closes around [me] as a room." "The space winks at [me]: What do you think may have gone on here?" "By this melody [I] recognize what is around [me]; it is not a past coming from [my] own youth, from a recent youth, but a childhood lived before then that speaks to [me], and it is all the same to [me] whether it is the childhood of an ancestor or [my] own."⁵

This is the experience of wandering the great museums today...

Inside the CARD, the HUMAN draws out a tablet computer, the following lines play from a video of him played on his tablet screen:

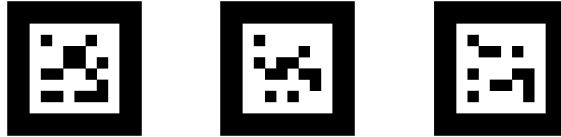
CARD#4

(cont'd)

To these sites, Augmented Reality offers the temptation of invisibly

connecting these inside worlds with
the hyper-mediated world outside.

HUMAN discards. Another CARD is drawn. CARD#5 shows the HUMAN again against a white background. Below, when mentioned, CARDS are drawn to show documentation videos of *StreetMuseum* (2010) and *iTacitus* (2009).



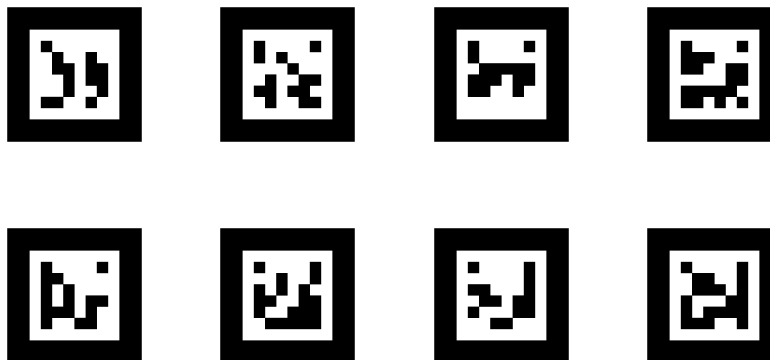
CARD#5

Augmented Reality could attach the parallel reality of the technosphere with the museum space while remaining separate. It could be for Audio Visual and Interactivity what the audio wand is for oral commentary: discrete, minimalist, individual, portable. In addition, it offers the possibility for a museum to publish its collection into the surrounding world... projects like The Museum of London's *StreetMuseum* that published a collection of photos to be seen via iPhone in the locations at which they were historically created, or *iTacitus* which, via smartphone, shows historical 3D visualizations and audio superimposed on those same sites.

The dream is of a parallel but connected media environment that is both invisible and immersive. Augmented Reality literally means, more reality. More things with which to visualize the increasingly large world of information and culture. And like the media technology innovations that have come before, there are expectations that this new technology can solve for us the contradictions of public and private, connected but individual, desiring to be immersed in culture but still able to withdraw ourselves.

While CARD#5 continues to speak, HUMAN draws a series of cards exemplifying the progress of AR technologies and AR museum experiences: an AR museum guide in the Guggenheim

Museum, Bilbao, the Andy Warhol Museum Layar app, Brilliant Before Breakfast's Rijksmuseum hijack AR app *Paint Job*, Google Glass, Canon's *Dinosaurs-Miracle of the Desert* exhibit in Chiba, Japan, the Oculus Rift.



CARD#5

(cont'd)

It's hard to find an imaging technology that was not predicted to revolutionize the museum. Andre Malraux created a photographic 'Museum Without Walls'. H.G. Wells, the English science-fiction author, predicted that libraries would be replaced with databases of microfilm containing all information. DW Griffith, the American filmmaker, predicted libraries would only contain films by the 1940s.⁶ If someone wanted to learn about the life of Napoleon, he would push a button and "be present at the making of history." Frederick Kiesler, the Surrealist, proposed a home 'Telemuseum' through which "you will share in the ownership of the world's greatest art treasures."⁷ Stereographic 'travel systems' and databases, phonographic 'auditive museums'...

In his essay, "On the Origins of the Virtual Museum," Erkki Huhtamo cites a series of ventures that sought to transform the museum through technology from the early 1900s through to CD-ROMS and Virtual Reality.⁸ All at one time held the promise of replacing the physical archive with a technological one.

In AR technology, one could see another iteration of this dream, or the promise of its final achievement.

...Personally, I can go either way.

HUMAN discards and draws another. CARD#6 shows the HUMAN superimposed onto a 3D graphical environment of dense vegetation. As he speaks, the 3D vegetation slowly pierces his body and grows until it covers the entire image.



CARD#6

But it is true, there are some fundamental challenges for AR in the museum— challenges particular to the medium. One is occlusion. Occlusion is a term used in 3D modeling to refer to foreground features blocking out background features. This problem is well visualized in Steven Spielberg's film, *Minority Report*.

A card is drawn which shows a scene from *Minority Report* (2002) in which Tom Cruise, his character on the run, is hounded by a set of holographic AR advertisements.



CARD#6

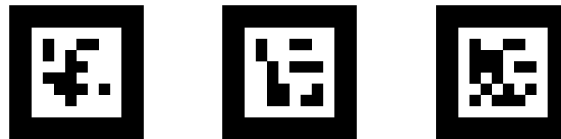
(cont'd)

Media cannot be invisible. Parallel content— especially visual— occludes real content. It stands in the way. After all, one of the goals for AR is to make transparent the invasive world of digital media... to solve for us the problem of smartphones, which the comedian Louis CK recently described as "taking away the

ability to just sit there... To just be yourself and not be doing something."⁹

And even if the media were somehow made transparent, the technological gear must be invisible. These apparati are evocative. They mean something. Ghislane Lawrence, in her essay "Rats, Street Gangs and Culture: Evaluation in Museums" states, "Every convention used in the museum medium is likewise a borrowed one ... the very wallpapers and carpets carry meaning."¹⁰

HUMAN draws a card which shows Peter Campus' 1974 installation, *Shadow Projection*. When mentioned, HUMAN draws cards displaying the installed computer screens of *Movable Screen* at Allard Pierson Museum, and the iPhone AR app experience *ARTour* at the Stedelijk Museum.



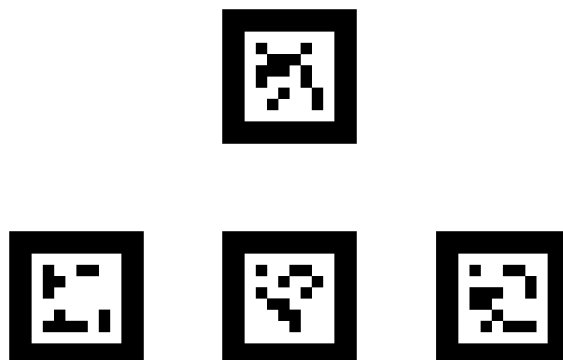
CARD#6

(cont'd)

Media artists since the 70s have embraced the fact that the materials of communication must be part of the art if it is to seem authentic. Stuart Reeves, in his 2004 paper "Research Techniques for AR Experiences" complains of the computer kiosks installed in museums creating a feeling in visitors of being at the office because they are surrounded by the same office apparati.¹¹ Imagine goggles and head displays... iPhone tourism is a common complaint; instead of looking at a site, a tourist holds their phone in front of their face and watches their phone look at the scene.

Regardless of the content, media devices create an environment full of uncontrolled references that can be in direct contrast to the minimalist authentic space of the museum.

HUMAN discards. Another card is drawn. In CARD#7 the HUMAN is green-screened onto a scene from *Star Trek the Next Generation* showing the 'Holodeck'. When mentioned, a card is drawn showing video documentation of Jeffrey Shaw's *The Virtual Museum*, a still from the *Louvre Palais et Peintures* CD-ROM, and a walk-through video of the Art Institute of Chicago as seen through *Google Art Project*.



CARD#7

The other problem is that of authenticity. To the extent that a museum achieves a complete *Star Trek* 'Holodeck' immersive experience, the real existence of the institution is superfluous. In 1990, the media artist Jeffrey Shaw created an installation titled 'The Virtual Museum': a chair attached to a screen through which a user could virtually move through the rooms of the Brucknerhaus without leaving the chair. The physical museum was just a wrapper for the virtual experience. Like the Telemuseum proposed by Kiesler, other 90s projects of CD-ROM museums like the *Louvre Palais et Peintures* by Montparnasse Multimedia, or the contemporary *Google Art Project*— these virtual museums do away entirely with the physical structure of the museum to recreate it virtually.

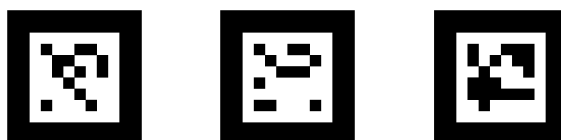
HUMAN discards and redraws. CARD#8 shows the HUMAN again against a white background.



CARD#8

These two challenges— the problems of occlusion and of simulation— are the hurdles for bringing AR in to the museum. There is an in-progress three year initiative in the European Union to engage these challenges in a new way called ARTsENSE.

When mentioned, cards are drawn showing slides form the ARTsENSE 2012 ISMAR presentation.



CARD#8

(cont'd)

ARTsENSE was begun in 2011, as an EU sponsored collaboration between three major museums and seven research institutions and industrial partners. New AR technologies and systems would be developed at the University of Karlsruhe, the Fraunhofer Institute, Liverpool's John Moores University, the Polytechnic University of Valencia, the CEDRIC Computer Science laboratory in Paris, the CIM design group in Serbia, and the Corvinno Technology Transfer Center in Budapest. These systems would be deployed in specific trial installations at the Museum of Arts and Crafts in Paris, the Foundation for Art and Creative Technology in Liverpool, and the National Museum of Decorative Arts in Madrid. ...so a lot of partners combining academic researchers, curators, industry designers and scientists working to collaboratively invent the next

generation of museum media
augmentation.

The centerpiece of their proposals,
and the method through which they
hope to solve the puzzle of
bringing media into the museum in a
way that is both immersive AND
invisible, they call A-squared-R:
Adaptive Augmented Reality.

The idea is to use a host of
bio-monitors: eye-tracking,
heartrate sensors, galvanic skin
response, wireless brain EEGs.
These, together with seethrough and
hear-through displays and
headphones will allow the system to
adapt to the individual user. To
only show them what they want to
see, based on where they are
looking and how they feel about it.
They call this "Affective
Monitoring."¹²

HUMAN discards and redraws. In CARD#9, the HUMAN appears
wearing multiple sensor apparati: an eye magnifier and an
EEG screen attached to a helmet. The HUMAN draws a card
displaying an EKG readout which he holds to the side.



CARD#9

There are, of course, a host of
problems with this: technical,
conceptual, and ethical— and many
of the ARTSENSE partners
acknowledge this, and think of the
project as an experiment and
propositional. To name just the
largest issues:

HUMAN holds the CARD showing an EKG readout first next to
his head, and then over his heart.

CARD#9

(cont'd)

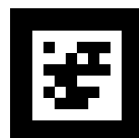
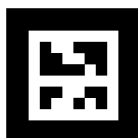
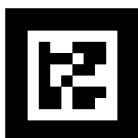
One, it doesn't work. Cognitive
Science labs the size of this room
with real-time MRIs can't figure
out what a person is feeling, much
less a wireless EEG connected to a

personal computer and a smartphone. When used, ARTsense projects deal with this limitation by making extremely simplified deductions, like left hemisphere brain activity means enjoyment, right means dissatisfaction, or by having the system react to major physical conditions, like a heartrate indicating movement instead of rest.

Two, there must certainly be divergent agendas with such a group of partners: engineering research departments, industry, government, cultural heritage institutions... It allows for a costly experiment, but combines methods and goals not all in line with those of a museum.

Three, the ethics concerning surveillance are troublesome. Not all visitors want to be surveilled and analyzed, or worse, those that are could be found abnormal—indicate brainwaves of excitement when bored, for example. As well, they propose to track user responses in order to assess curation, which raises the specter of questionable quantitative metrics of the museum experience, museums and exhibits rated on the success of their galvanic skin response numbers or such.

HUMAN discards and redraws. CARD#10 shows the HUMAN again against a white background. When mentioned, CARDS are drawn showing documentation and visualizations of the ARTSENSE projects.





CARD#10

But my interest in the ARTsense project is as a propositional design, putting forward a possible system through which to augment the museum invisibly with media immersion. These three projects represent vectors in the dreams and realities of bringing Augmented Reality into the museum.

Here are the proposed projects:

At The National Museum of Decorative Arts in Madrid, the team has decided to augment a popular exhibit, a late 18th century tiled kitchen from Valencia. Using eye-tracking and AR see-through glasses, the system will deliver parallel media content related to the features at which the visitor is looking. Their goal is to make visible related content in their archives and in other exhibits. The visitor will receive both contextual information and information about related artifacts not present in the room.

At The National Museum of the History of Science and Technology in Paris, they propose to augment The Lavoisier Laboratory which displays the 18th century inventor's experimental machinery. The augmentations will primarily seek to make visible what can not be seen or allowed: the mechanical functioning of these artifacts that are behind glass.

At the Foundation for Art and Creative Technology in Liverpool, which is the site of a large media archive but no permanent exhibition, a column that holds the signatures of past visiting artists will be used as a type of index to access media related to these

artists using image recognition. Videos, documents, photos, and sound from their database would be accessed through an AR interface in the museum. This would turn their media archive in to a type of permanent exhibition.

We can ask of each of these projects what they are trying to provide and what they are trying to repress. In the case of the Valencia Kitchen, it is the dream of a perfect Ekphrasis— that is, a complete rhizomatic commentary on the artifact that makes connections between the tiled wall and all the related artifacts and information in their collection. It is a commentary that would be overwhelming if provided through posters and screens, graphs and maps, but if it could be provided as a sort of 'just in time information' based on monitored users, then perhaps the ekphrasis could be without being: the artifact could be covered in commentary without being covered up with commentary.

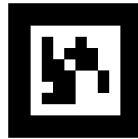
In the Lavoisier Laboratory they seek to provide a science center experience without physically becoming a science center. If the simulations of Lavoisier's equipment were physically constructed, those simulations would lack the authenticity and aura of the originals in their glass cases. But if presented virtually they could both be present and not, as if specters of the real artifacts.

At FACT in Liverpool, the signature column augmentation could create a visual installation from the immaterial holdings of audio video data in their archives. In a sense, it could give an experience of wandering perusal to those holdings that are not objects for display and are too many and diverse to become such.

All of these are common desires and concerns for museums— the desire to educate visitors as to

historical context, make visible connections that are not obvious. Museum mission statements, though diverse, tend to combine the goals of both inspiring and also educating the public through exhibition of objects— both a library and a shrine to the Muses. Inspiration and education can be at odds with each other. The space that inspires self-directed wanderings may not provide much framework for the communication of anthropological and historical context or intertextual connections to other works. Augmented Reality with its hybrid of place and not-place is tempting (and attempting) to fill this gap invisibly.

While CARD#10 continues, HUMAN holds up a card which displays the 2012 Google Glass video demo.



CARD#10

(cont'd)

So, before concluding, I want ask of all this: So what? Who cares?

There is a real desire, maybe a techno-utopian desire, that these projects are trying to address. We want to be flâneurs of digital culture, observant engaged wanderers of the technosphere. And, at least for some, there is a dream of doing this without spending eight hours a day staring at a phone or laptop screen, scanning Tumblr and Facebook and the things rhizomatically linked out from them. In *Do Museums Still Need Objects?* Steven Conn proposes that contemporary museums may have served as the prototypes for contemporary architecture. The museum has become the exemplar of public space in which society tries to achieve a romantic vestibule for wandering through history. If this

could be wed with the other contemporary world— the 'digital' contemporary world— we could make a new mini-metropolis within our cities, one made for resolving the modern hysterias of objects without objects, social spheres without bodies, History without history.

And this is, of course, closely tied to 'Who cares?' The contemporary museum seems in a tenuous balance of maintaining an experience of education and a feeling of being current, while providing a space of history, minimalist, romantic, and spiritual. We live in a fickle accelerated age in which one valued trend, like Friendster, might suddenly become vacant and un-needed. We all know kids love their phones... if museums can become part of that world then it is a hedge against obsolescence.

HUMAN draws a card which shows a video review of the Oculus Rift immersive 3D game environment with universal treadmill.



CARD#10

(cont'd)

It sounds a bit impossible to combine all these desires into an experience through technology. But I'm not sure it is so different than other great trends of the past decade: self-surveillance through phones to serve social networks, complex portable computers designed simply enough to be used by almost everyone.

But I don't want to simply end on a hopeful note. Instead I want to 'call the question' ...this dream of perfect connected information. I think that the joy of viewing an object at a museum is in its lack of information. We enjoy our own ignorance, because in that

ignorance we find we are not
 reduced to nothing; instead there
 is still a feeling, an impression,
 a response from deep within us. To
 reprise Louis CK, "You need to
 build the ability to just be
 yourself and not be doing
 something."

HUMAN draws a card which shows a film still from *Percy Jackson & the Olympians: The Lightning Thief* (2010), in which Medusa uses an iPhone as a mirror. Then a CARD is drawn which shows a scene from *Minority Report* in which the protagonist expertly navigates a complicated 3D multi-screen environment searching for 'future crime'.



CARD#10

(cont'd)

I feel, what W.J.T. Mitchell might call, contemporary "ekphrastic fear"— a term coined in his essay, "Ekphrasis and the Other." In it, he warns that the commentary that is ekphrasis can displace the objects of commentary. He writes, "Even those forms of ekphrasis that occur in the presence of the described image disclose a tendency to alienate or displace the object, to make it disappear in favor of the textual image being produced by the ekphrasis."¹³ Commentary covers up not just the mystery of the object, but the experience of it. You could argue that this is, exactly, the main problem of the contemporary digital world. The problem from which the museum stands as a respite.

NOTES

1. Benjamin, *The Arcades Project*, 14 (the quote is misattributed to Schopenhauer by Benjamin, see "Translator's Notes" on page 957).
2. ARTSENSE, "ARTSENSE.eu," <http://ARTSENSE.edu/About>.
3. Wikipedia, "Musaeum," <http://en.wikipedia.org/wiki/Musaeum>.
4. Conn, *Do Museums Still Need Objects?* 7.
5. Benjamin, *The Arcades Project*, 417-19, 880.
6. Griffith, "Five Dollar 'Movies' Prophesied," 34.
7. Kiesler, *Contemporary Art Applied*, p59.
8. Huhtamo, "The Origins of the Virtual Museum."
9. Louis C.K., in an interview on *Conan*, September 20, 2013.
10. Lawrence, "Rats, Street Gangs, and Culture," 27.
11. Reeves, "Research Techniques for Augmented Reality Experiences," 3.
12. Damala et al., "Adaptive Augmented Reality for Cultural Heritage."
13. Mitchell, "Ekphrasis and the Other," 157.

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