

MTEC3230

January, 2020 // A.Girardeau



TABLE OF CONTENT



- **Technology, Reality & Sensemaking**
- **Storytelling & Foundations of VR**
- **XR Creative Tools**
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**TECHNOLOGY, REALITY
& SENSEMAKING**

A photograph of a cave interior. The scene is dimly lit, with a bright opening in the distance where sunlight streams in, creating a lens flare effect. The cave walls are covered in various rock formations, including large, vertical stalactites on the left and smaller, more intricate formations on the right. The floor is rocky and uneven. The overall atmosphere is mysterious and ancient.

TECHNOLOGY

photo Dominique Perugino

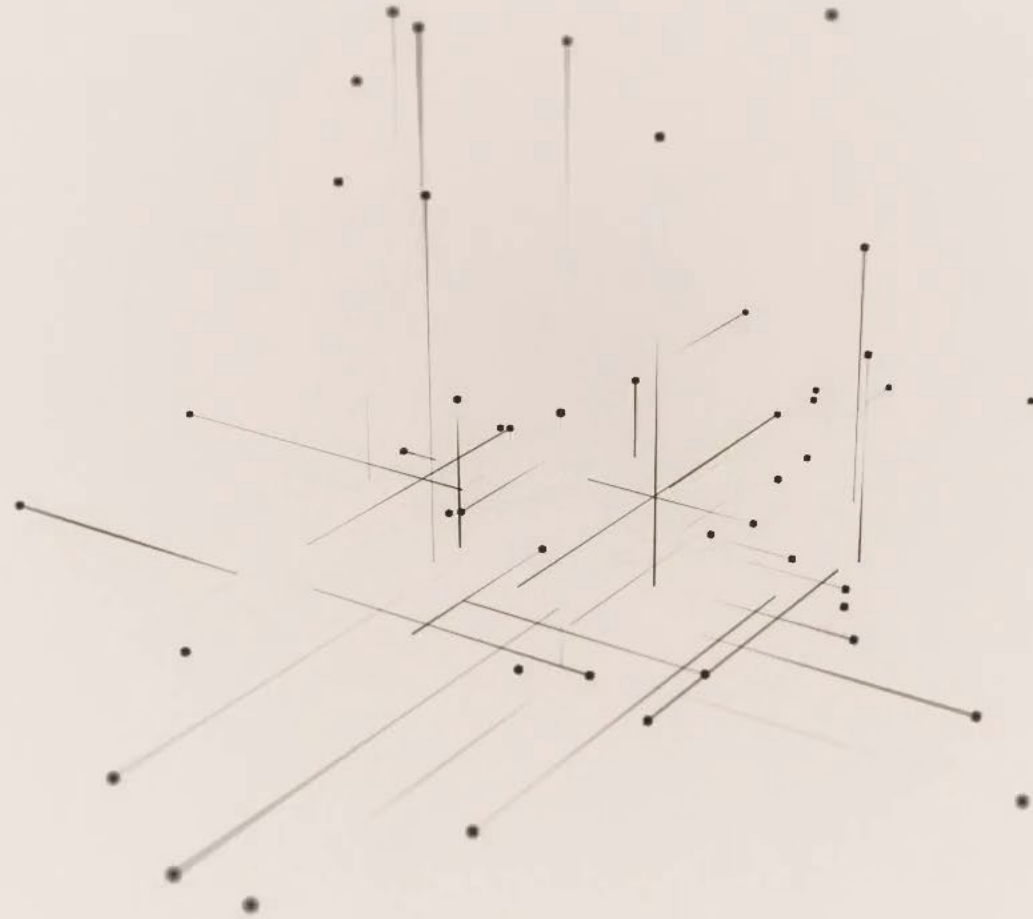
TECHNOLOGY

What is technology?



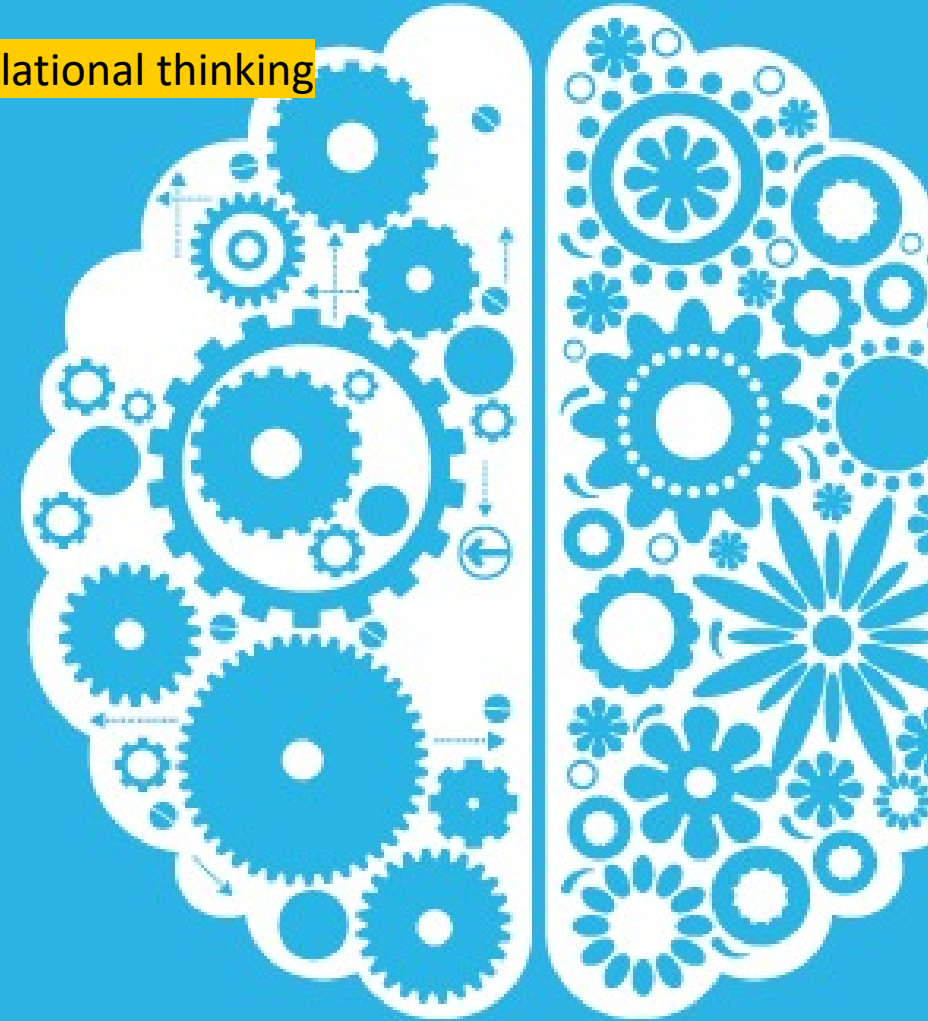
TECHNOLOGY IS NOT A THING

It's a type of thinking



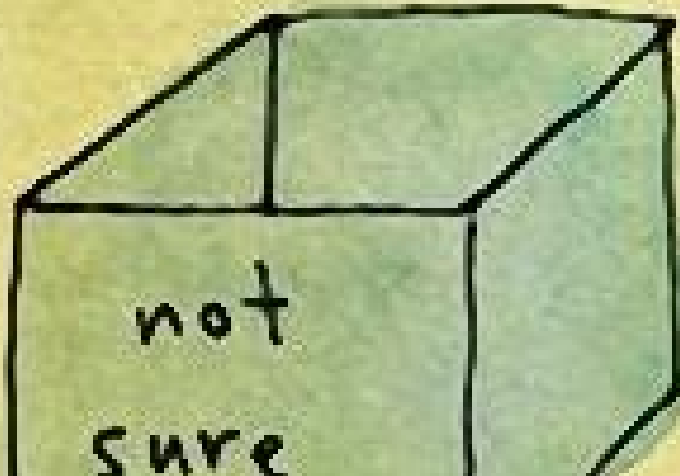
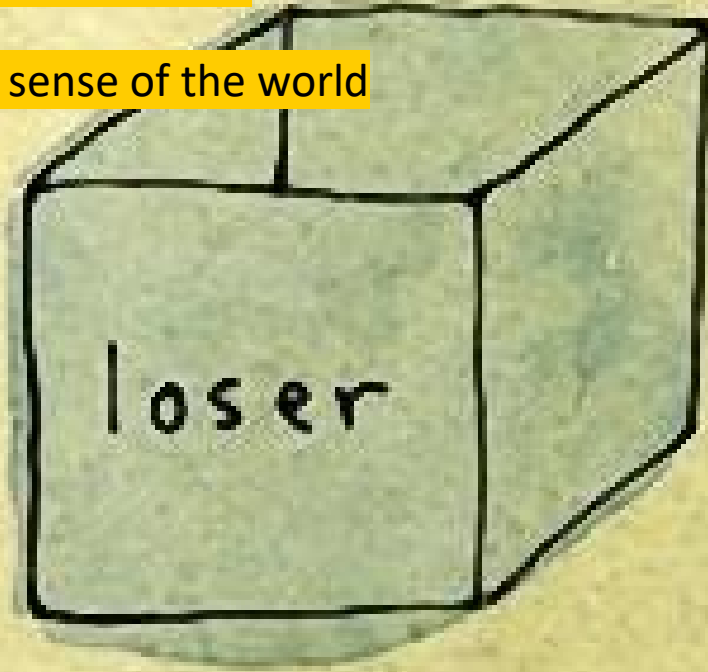
TECHNOLOGICAL THINKING

Two ways to understand technology: enframing & relational thinking



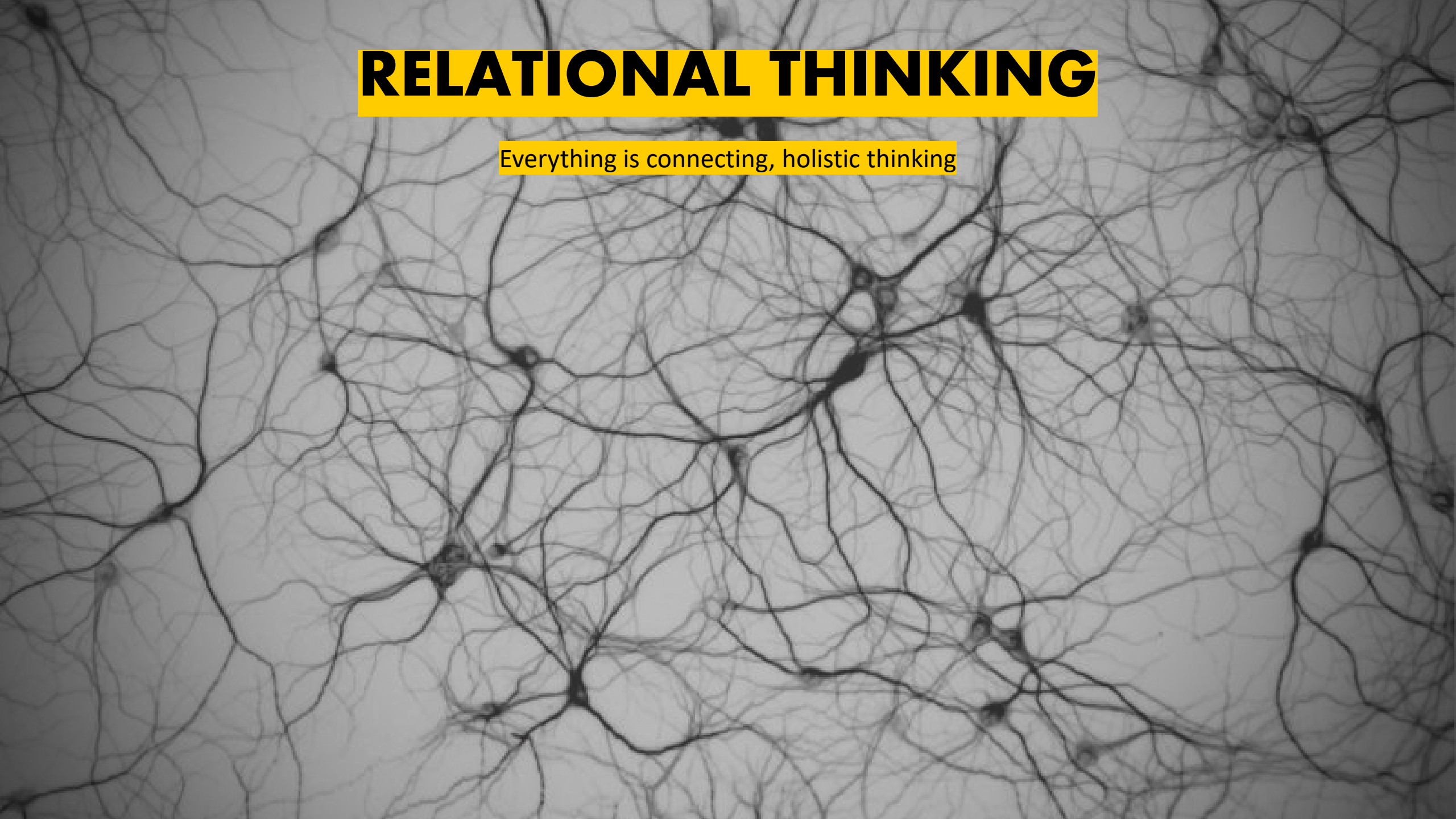
ENFRAMING

An utilitarian view of making sense of the world



RELATIONAL THINKING

Everything is connecting, holistic thinking



PARADOX OF TECHNOLOGY

“Since communication always implies at least two perceptions in any message transaction, paradox may, in fact, be instrumental to any assessment of communications technologies.”

“The cotton gin dramatically increased the efficiency of processing cotton. Ironically, this labor-saving device created a huge demand for more slave labor.”

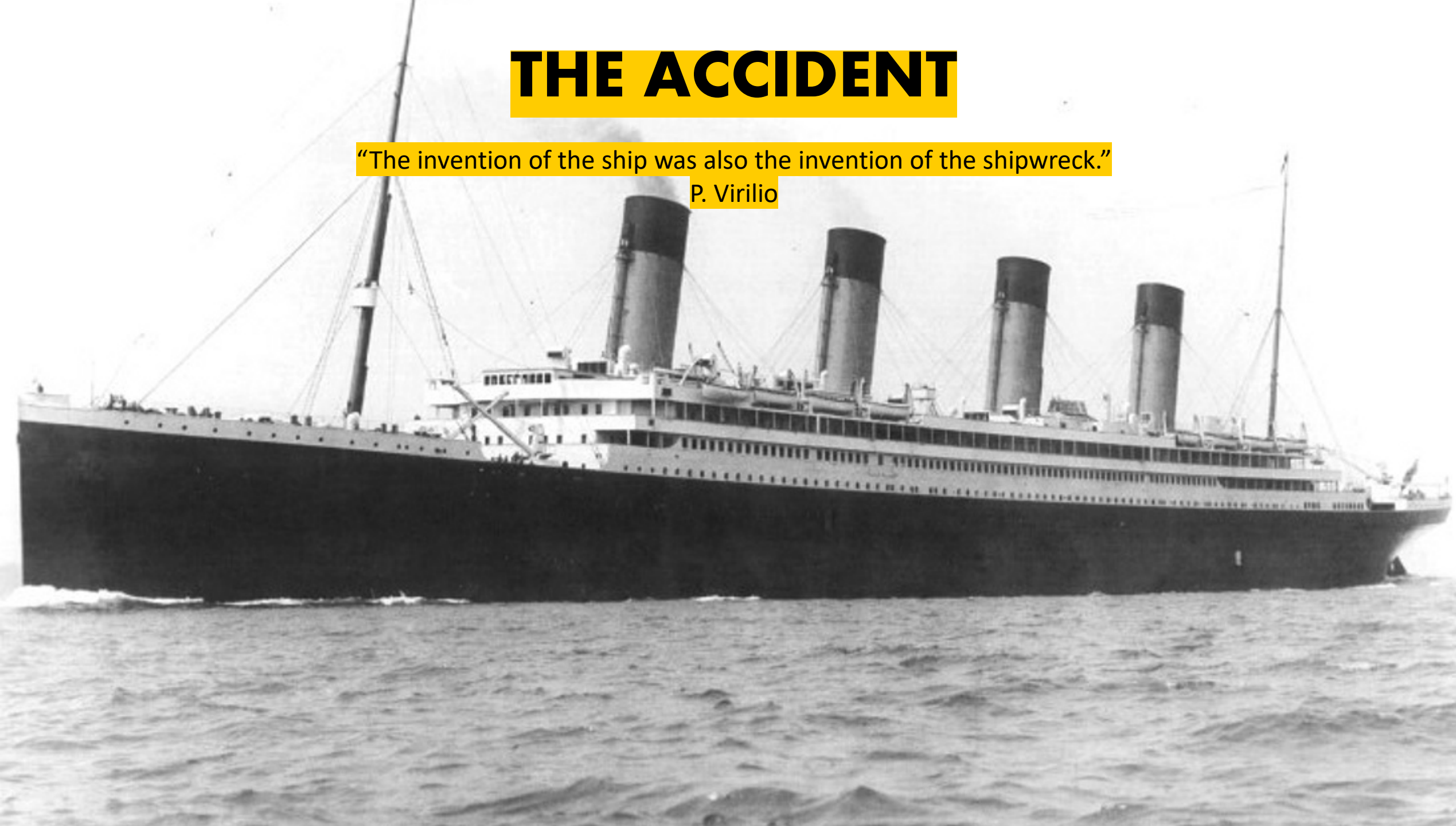
<http://transitionvoice.com/2013/04/the-cotton-gin-paradox/>



THE ACCIDENT

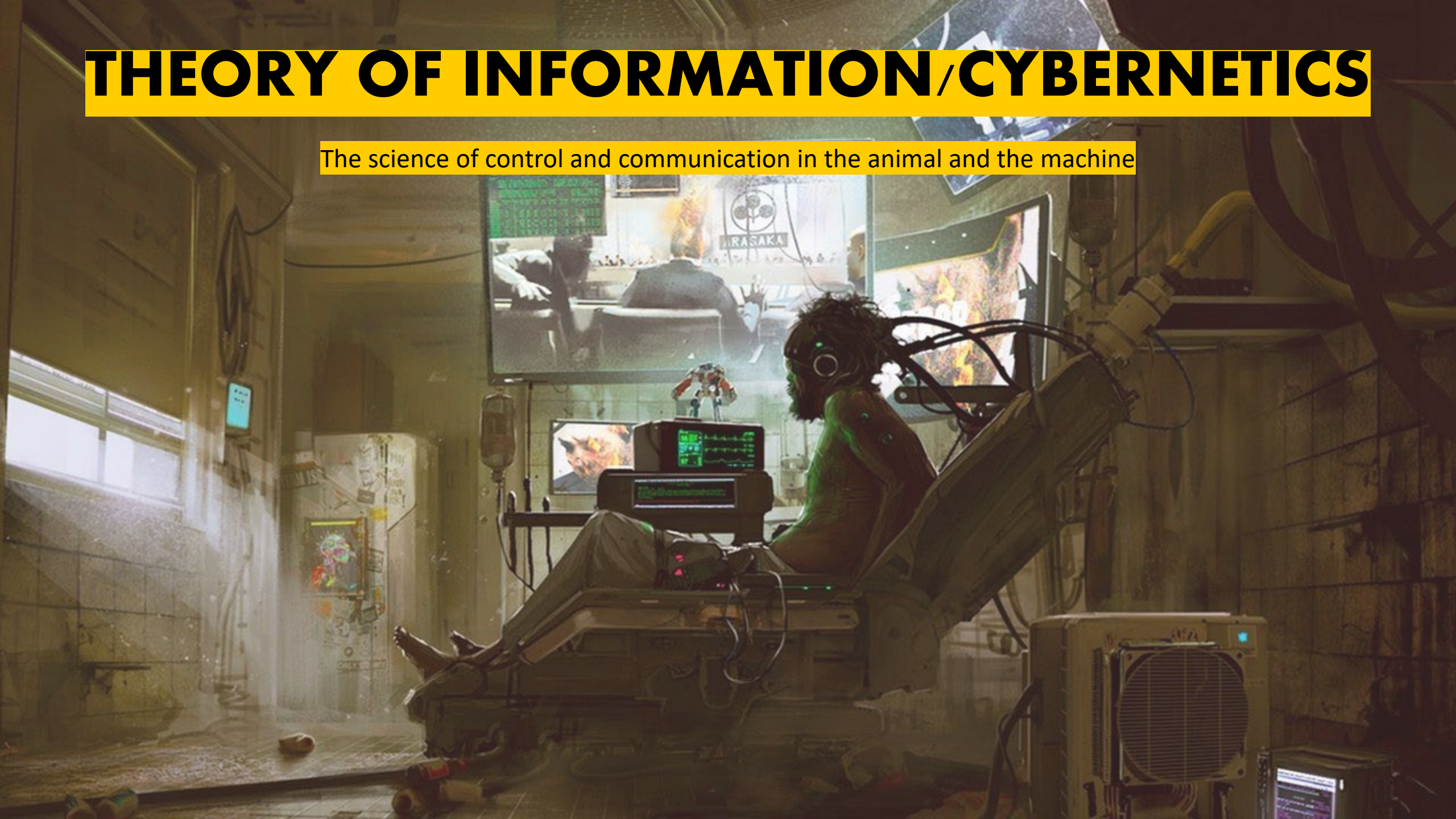
“The invention of the ship was also the invention of the shipwreck.”

P. Virilio

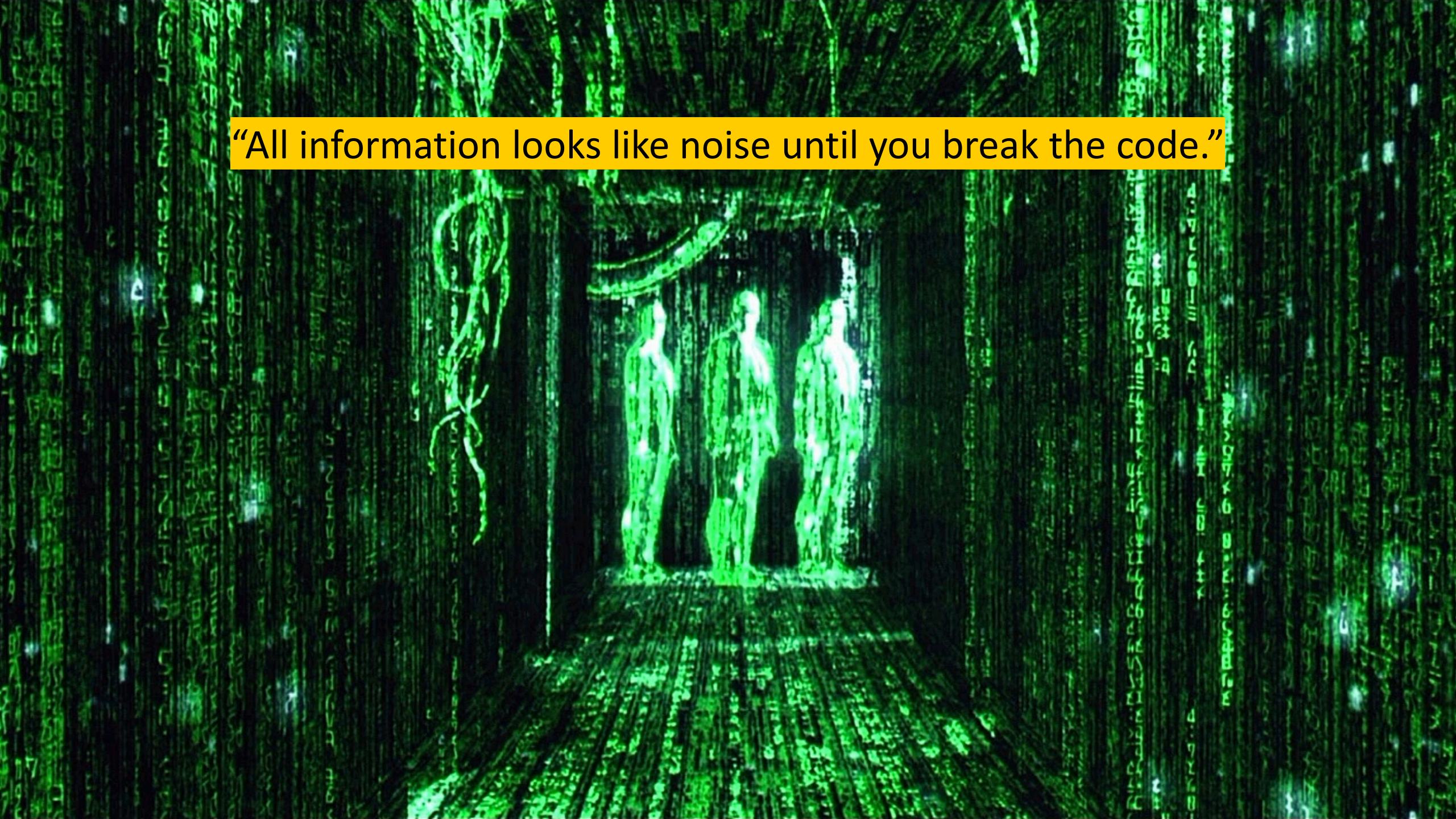


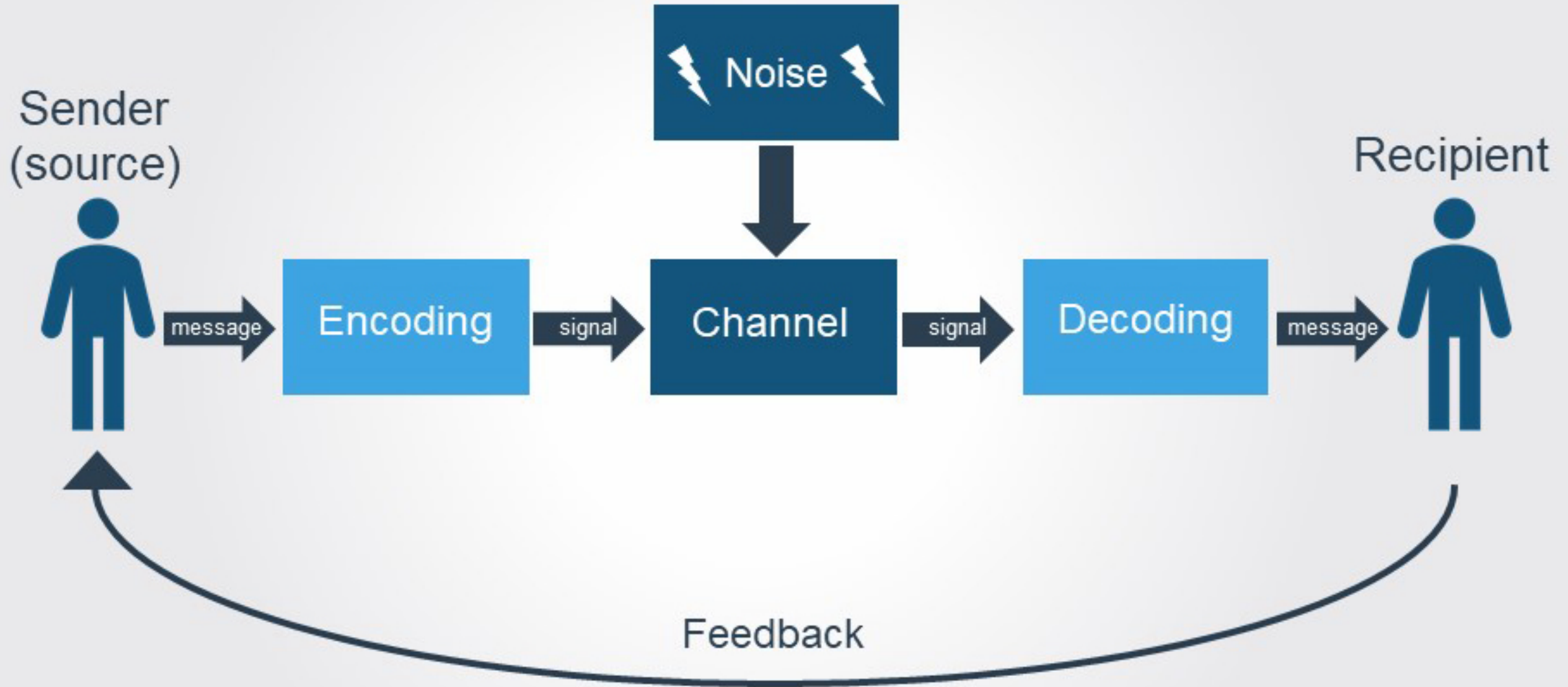
THEORY OF INFORMATION/CYBERNETICS

The science of control and communication in the animal and the machine



“All information looks like noise until you break the code.”





WHAT IS REALITY?

For Plato (400BC), true reality can not be experienced through our senses but beyond our senses



WHAT IS REALITY?

In popular culture, is called real what has a status of existence



WHAT IS REALITY?

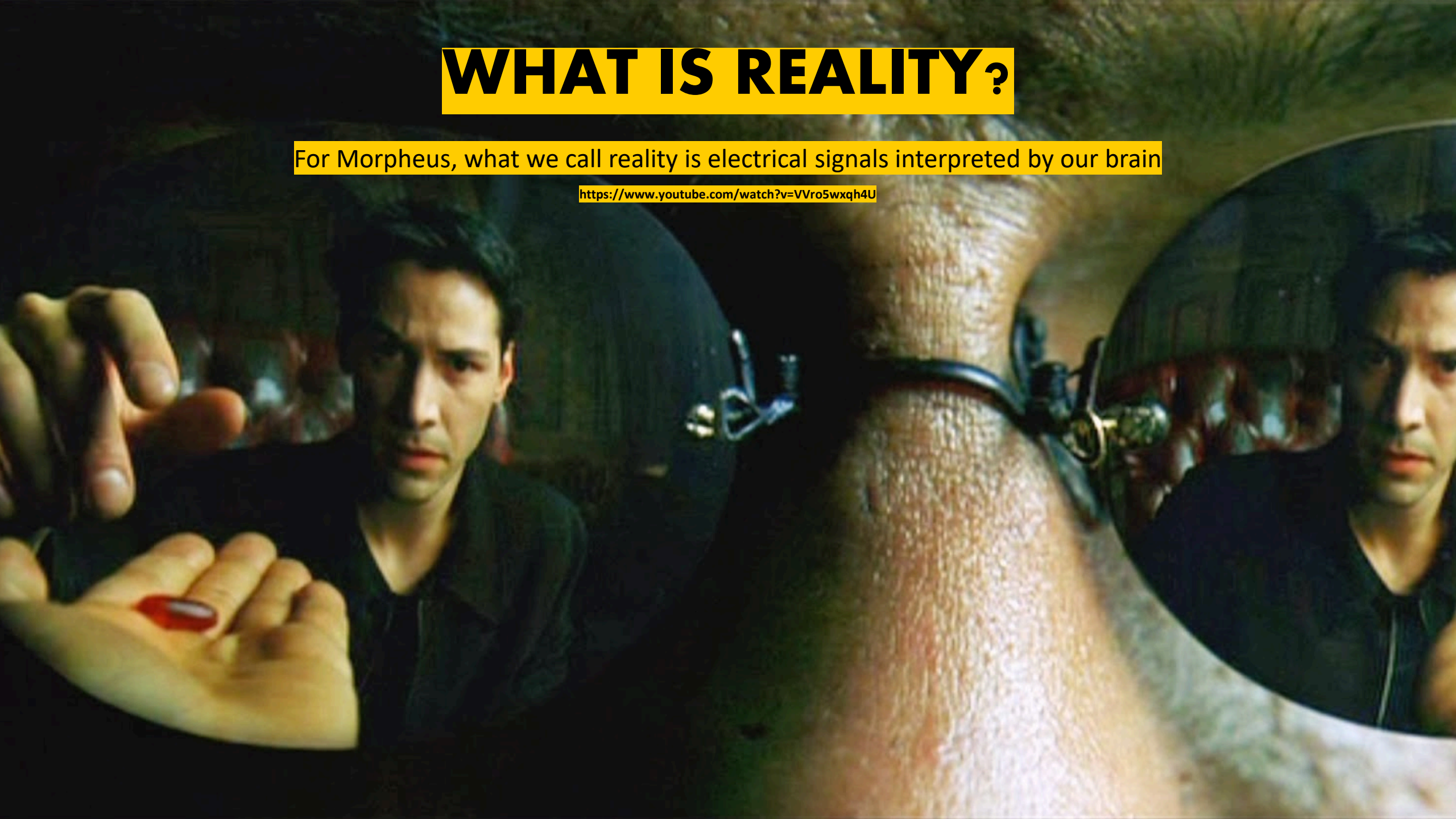
In philosophy, reality is both what is actual and virtual



WHAT IS REALITY?

For Morpheus, what we call reality is electrical signals interpreted by our brain

<https://www.youtube.com/watch?v=VVro5wxqh4U>

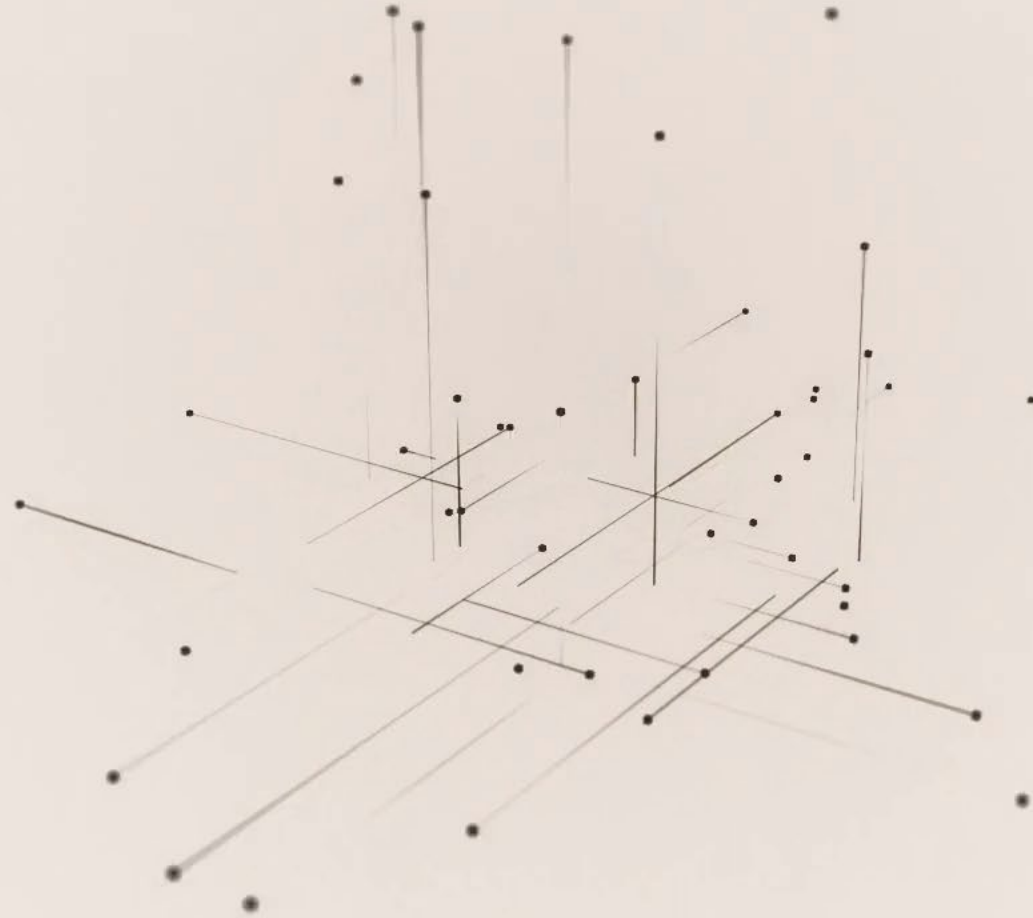




https://www.youtube.com/watch?v=I_JOM-sVbKI

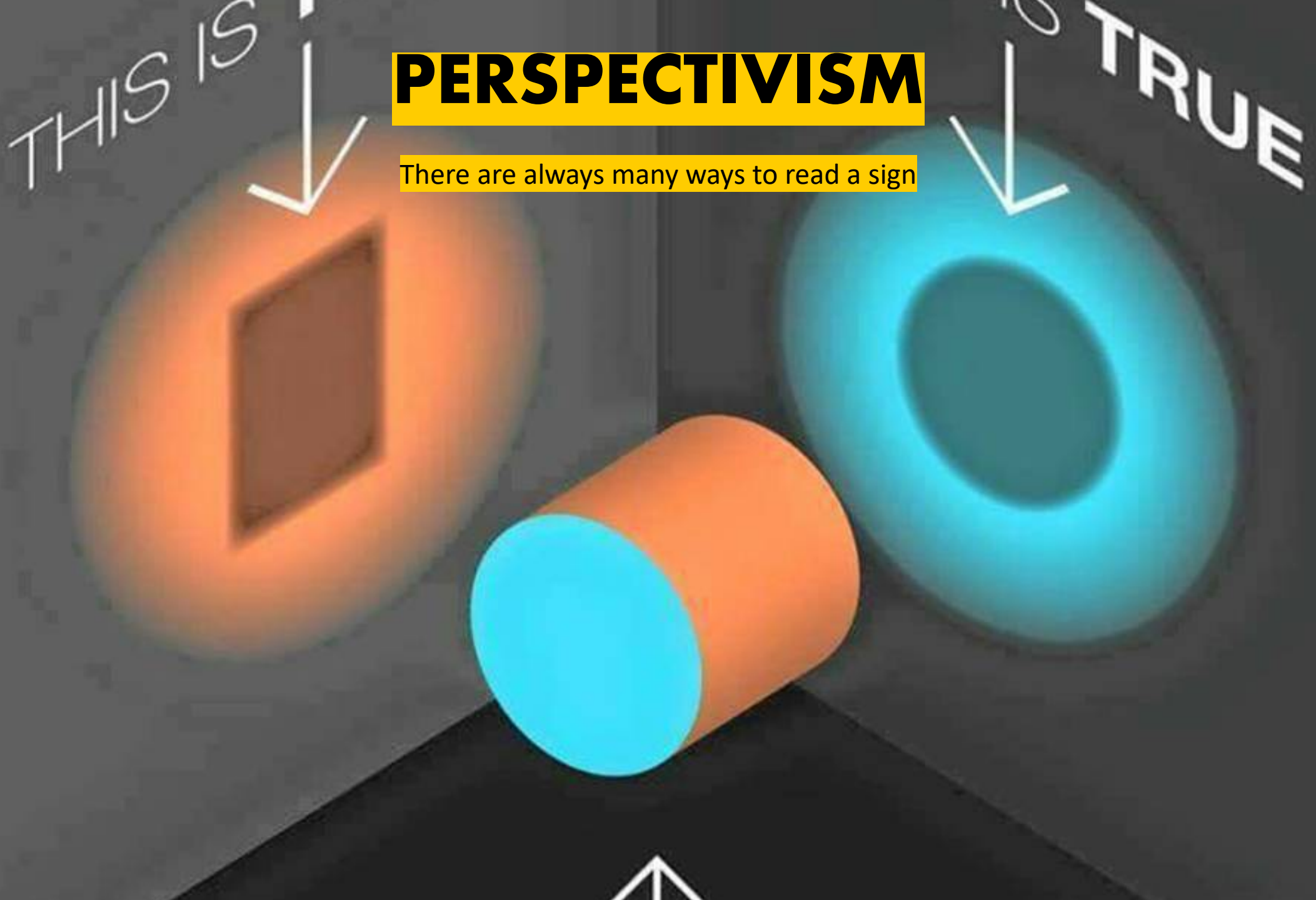
SENSEMAKING

What is reality?



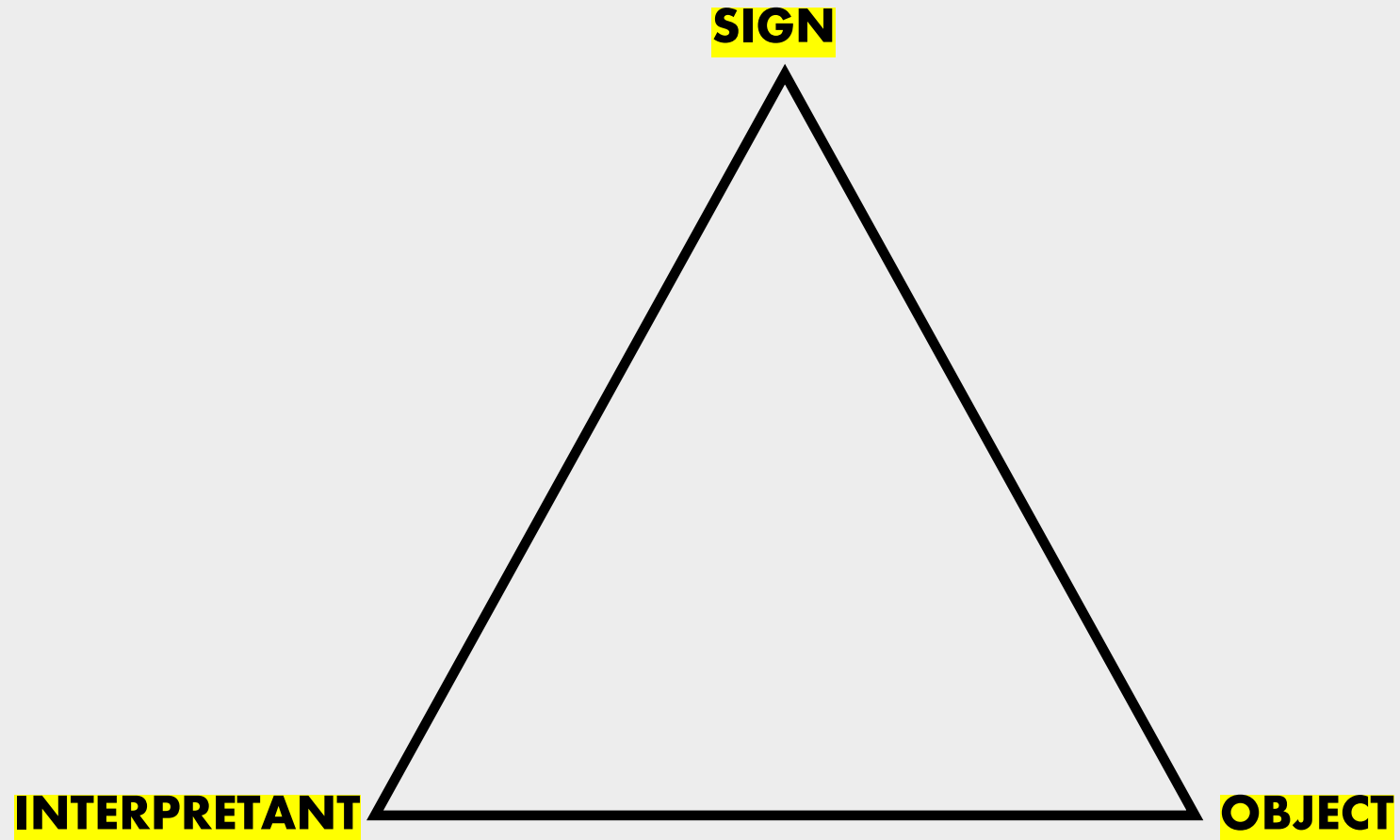
PERSPECTIVISM

There are always many ways to read a sign



C. S. PEIRCE'S THEORY OF SEMIOTICS

The philosophical study of signs (1860)



THE EXPERIENCE



EXPERIENCE/EFFECTS
(your goal)

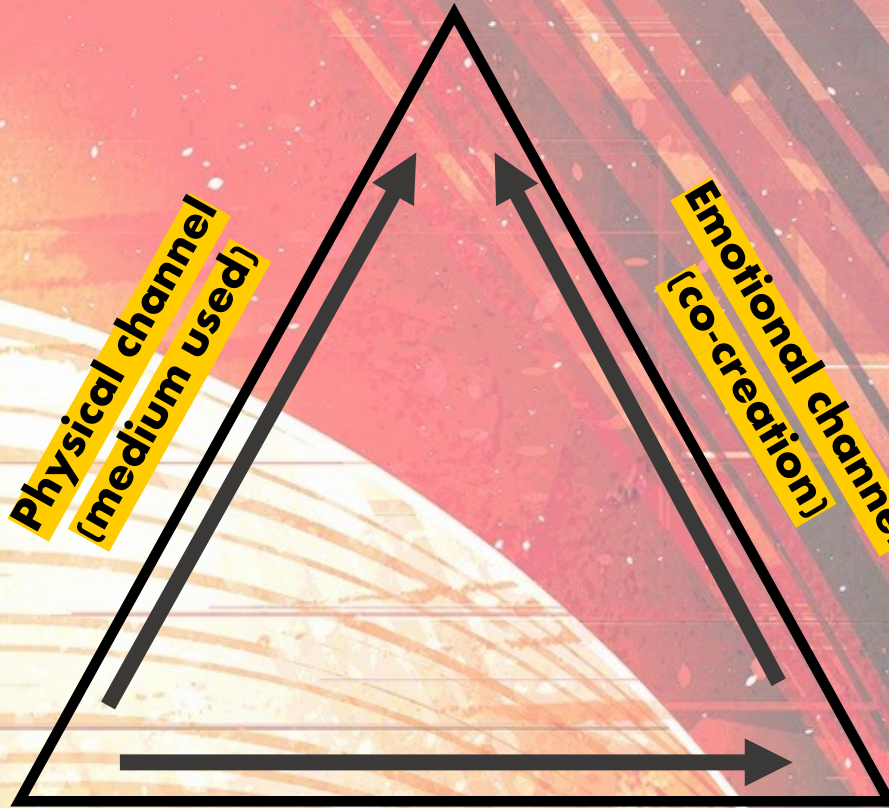
Physical channel
(medium used)

Emotional channel
(co-creation)

STORY/TELLER
Your story

Intellect channel
(system of signs)

USAGE/USER
(your audience)



STORYTELLING & FOUNDATIONS OF VR

PLATO'S CAVE ALLEGORY

For Plato, true reality can not be experienced through our senses but beyond our senses.



CAVE PAINTING

“Why did people start making paintings deep in caves, tens of thousands of years ago?”

Rheingold, 1991

Lascaux, France

ANCIENT EGYPT (3000BC)

“The earliest virtual realities on earth were constructed laboriously, by lamplight, deep underground.”

Rheingold, 1994, 380



JAVANESE SHADOW PLAYS



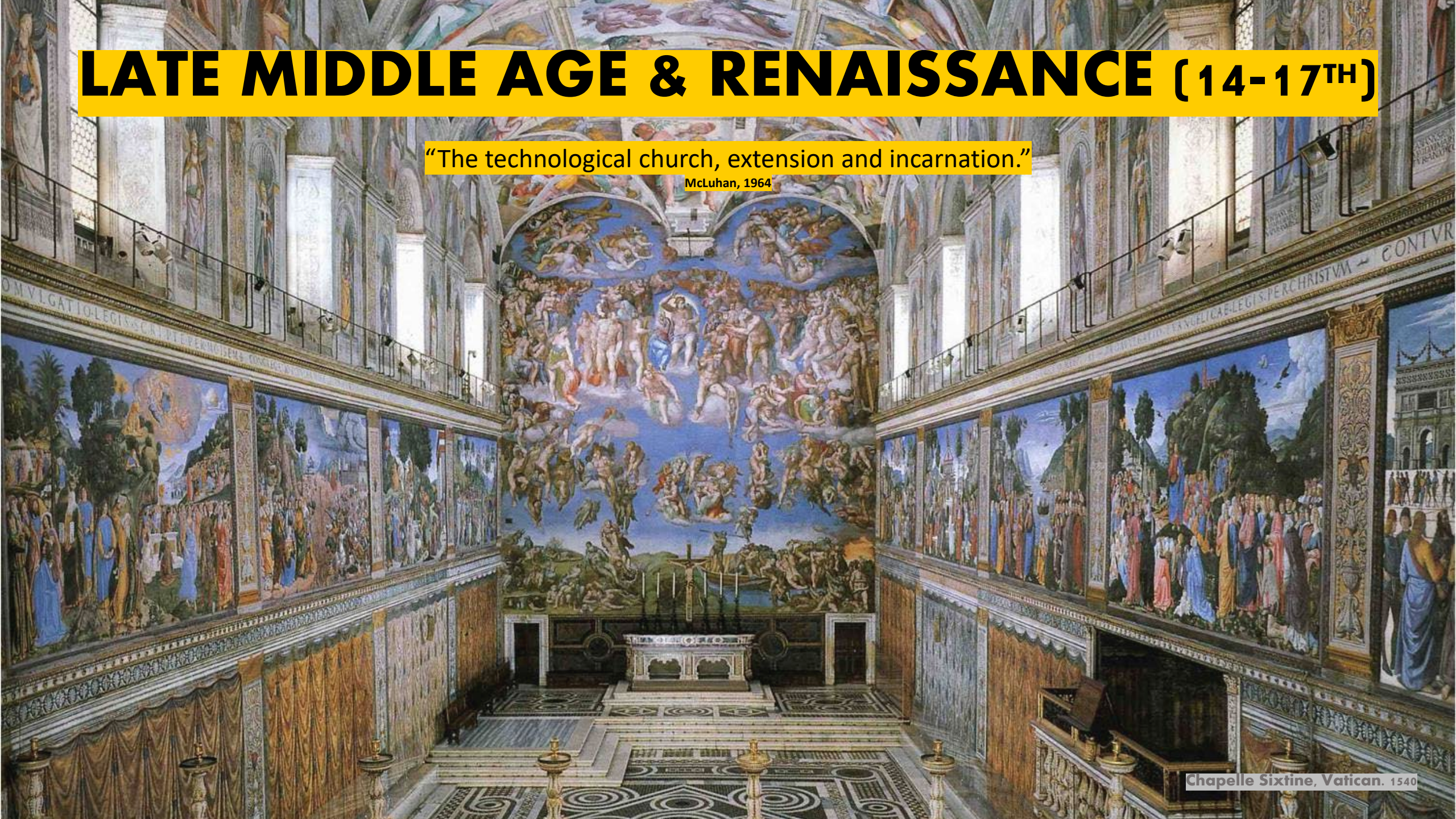
“There are people who weep, are sad and aroused watching the puppets, though they know they are merely carved pieces of leather manipulated and made to speak. These people are like men who, thirsting for sensuous pleasures, live in a world of illusion; they do not realize the magic hallucinations they see are not real.”

<http://education.asianart.org/explore-resources/background-information/history-indonesian-puppet-theater-wayang>

LATE MIDDLE AGE & RENAISSANCE (14-17TH)

“The technological church, extension and incarnation.”

McLuhan, 1964

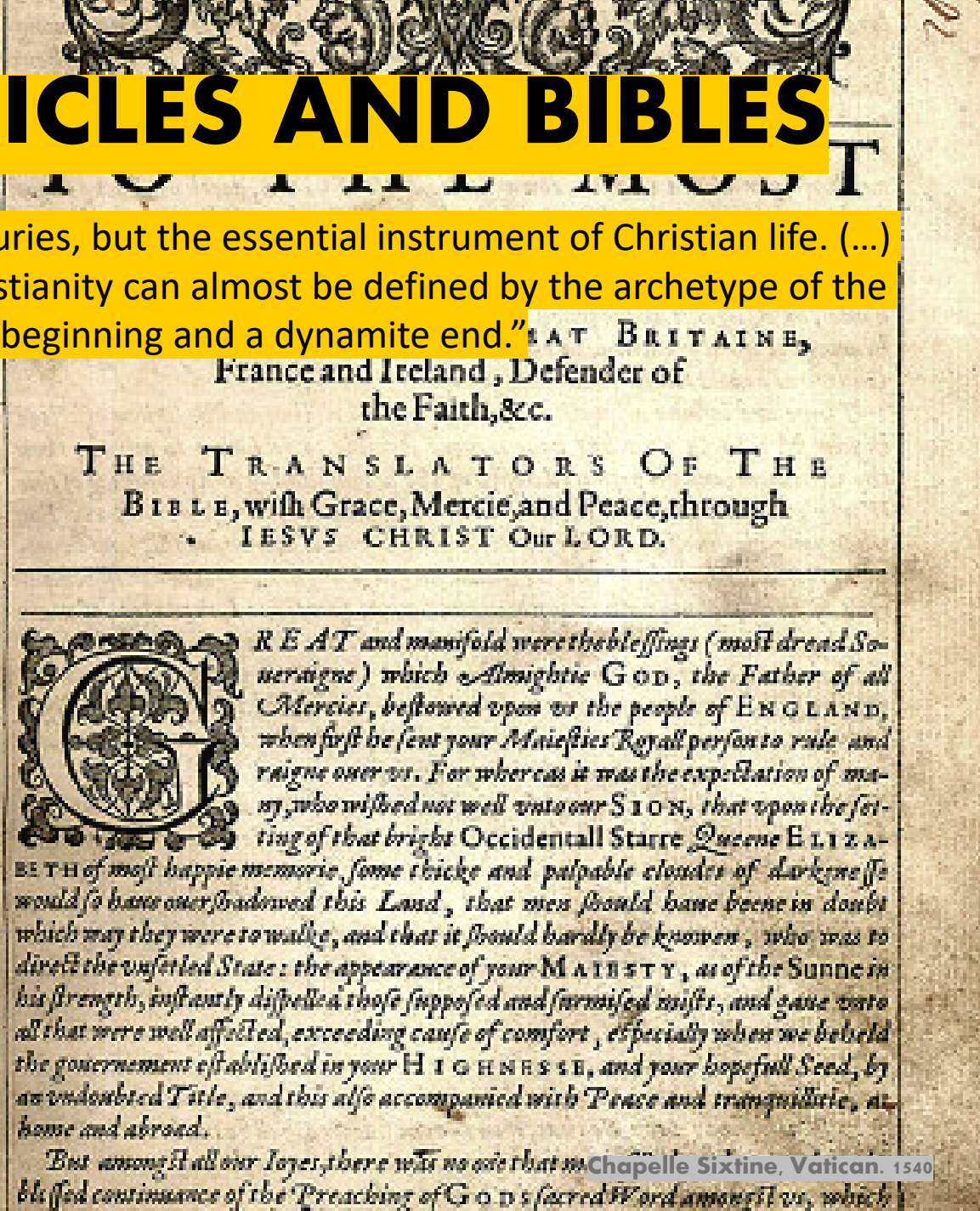
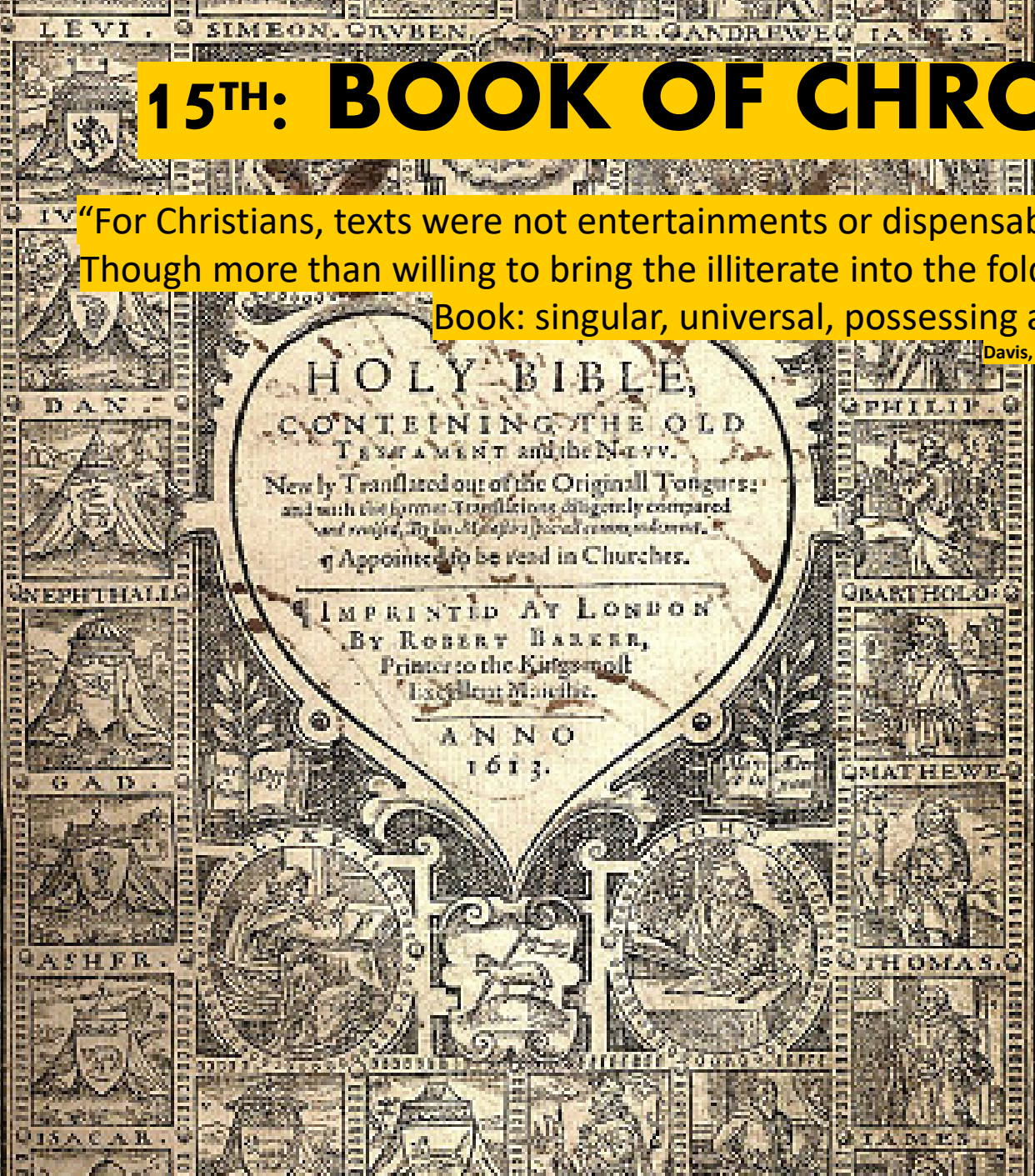


Chapelle Sixtine, Vatican. 1540

15TH: BOOK OF CHRONICLES AND BIBLES

“For Christians, texts were not entertainments or dispensable luxuries, but the essential instrument of Christian life. (...) Though more than willing to bring the illiterate into the fold, Christianity can almost be defined by the archetype of the Book: singular, universal, possessing a crisp beginning and a dynamite end.”

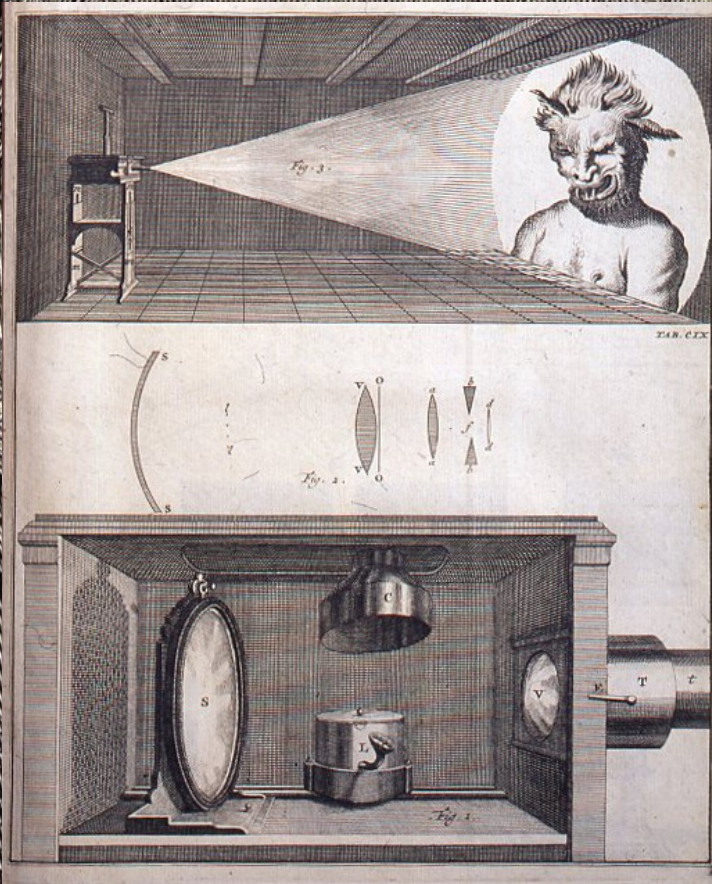
Davis, 1998, 39



17TH: MAGIC LANTERN

“By the 1730s the use of magic lanterns started to become more widespread when travelling showmen, conjurers and storytellers added them to their repertoire. The travelling lanternists were often called Savoyards (they supposedly came from the Savoy region in France) and became a common sight in many European cities.”

https://en.wikipedia.org/wiki/Magic_lantern



THE PANORAMA CRAZE IN THE EARLY 19TH

"Everyone we've showed this to says it's like teleportation."

http://www.baruch.cuny.edu/library/alumni/online_exhibits/digital/2003/panorama/new_001.htm



1826: FIRST PHOTOGRAPHS BY J.N. NIEPCE

“Niepce called his process heliography, which literally means "sun drawing".

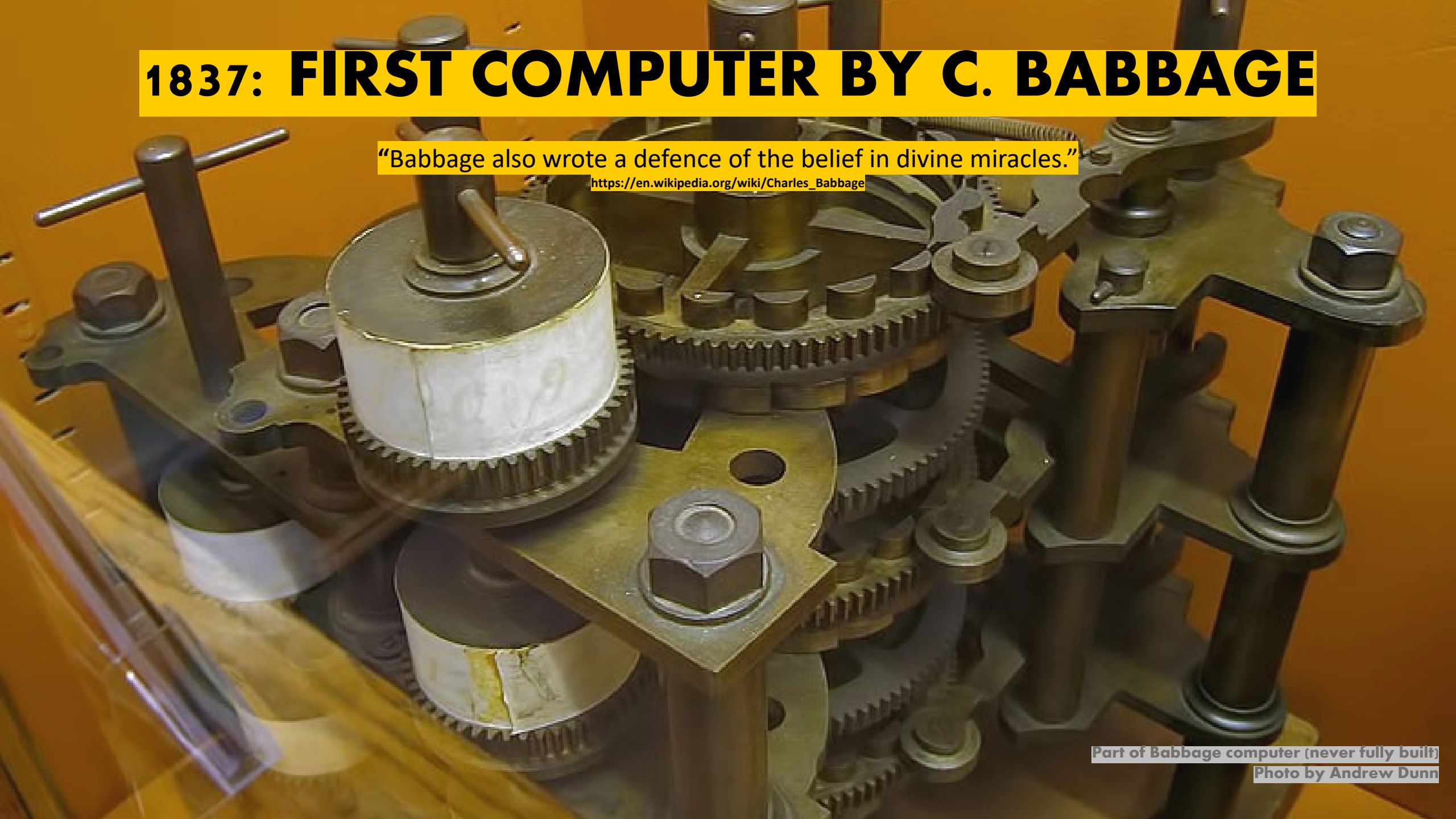
In 1822, he used it to create what is believed to have been the world's first permanent photographic image.”

https://en.wikipedia.org/wiki/Nic%C3%A9phore_Ni%C3%A9pce

1837: FIRST COMPUTER BY C. BABBAGE

“Babbage also wrote a defence of the belief in divine miracles.”

https://en.wikipedia.org/wiki/Charles_Babbage



Part of Babbage computer (never fully built)
Photo by Andrew Dunn

1888: FIRST MOTION PICTURES & SCREENINGS

“To Gus [Louis Le Prince], who came so close, but got lost along the way.”

<http://theconversation.com/louis-le-prince-shot-the-first-film-but-did-he-invent-movies-44863>

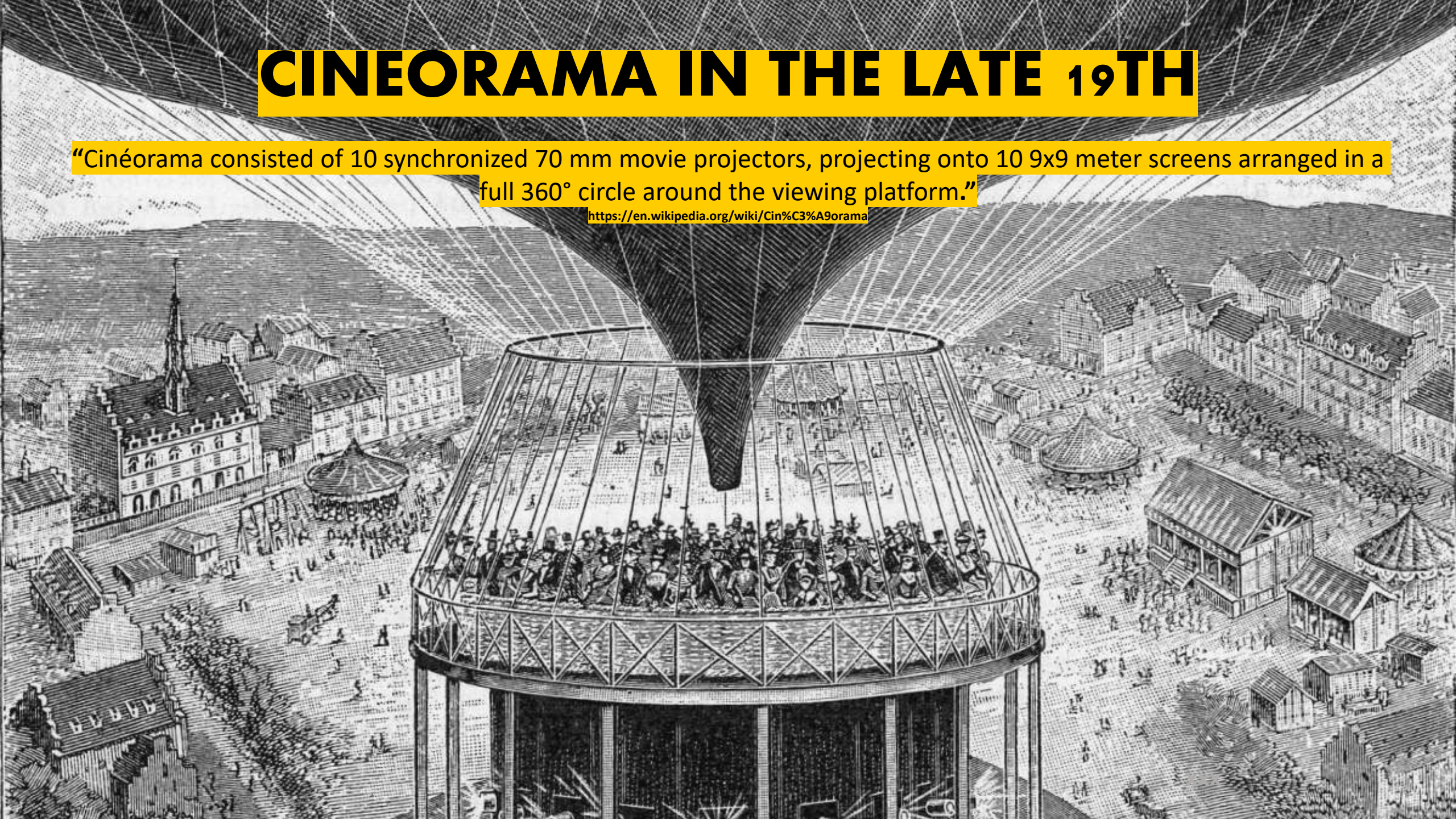


Louis Le Prince

CINEORAMA IN THE LATE 19TH

“Cinéorama consisted of 10 synchronized 70 mm movie projectors, projecting onto 10 9x9 meter screens arranged in a full 360° circle around the viewing platform.”

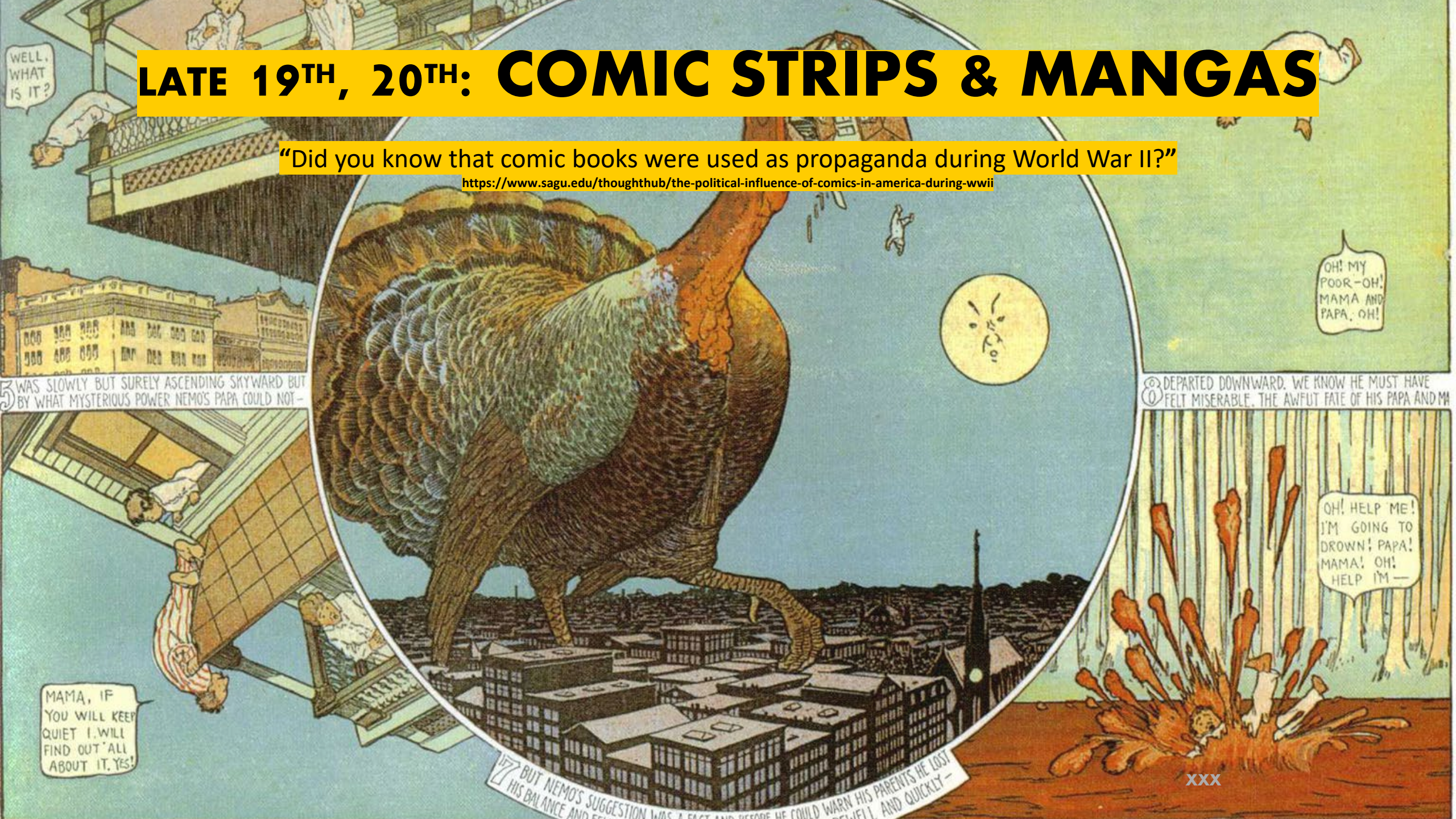
<https://en.wikipedia.org/wiki/Cin%C3%A9orama>



LATE 19TH, 20TH: COMIC STRIPS & MANGAS

“Did you know that comic books were used as propaganda during World War II?”

<https://www.sagu.edu/thoughthub/the-political-influence-of-comics-in-america-during-wwii>



WELL, WHAT IS IT?

5 WAS SLOWLY BUT SURELY ASCENDING SKYWARD BUT BY WHAT MYSTERIOUS POWER NEMO'S PAPA COULD NOT—

MAMA, IF YOU WILL KEEP QUIET I WILL FIND OUT ALL ABOUT IT, YES!

7 BUT NEMO'S SUGGESTION WAS A FACT AND BECAUSE HE COULD WARN HIS PARENTS HE LOST HIS BALANCE AND FELL HELPFULLY AND QUICKLY—

OH! MY POOR—OH! MAMA AND PAPA, OH!

8 DEPARTED DOWNWARD. WE KNOW HE MUST HAVE FELT MISERABLE. THE AWFUL FATE OF HIS PAPA AND MAMA—

OH! HELP ME! I'M GOING TO DROWN! PAPA! MAMA! OH! HELP I'M—

XXX

VIRTUAL REALITY (IN THE LITERATURE)

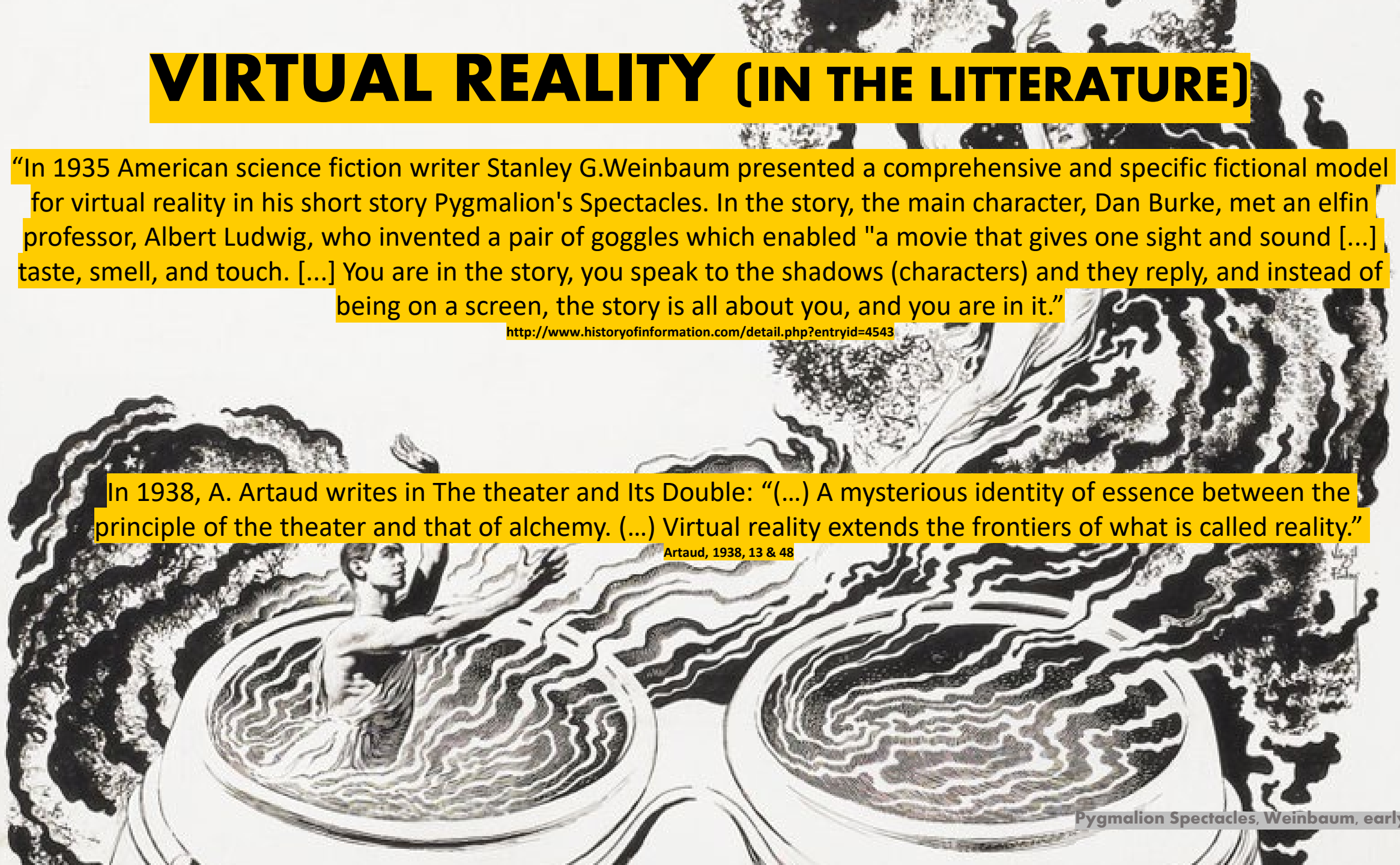
“In 1935 American science fiction writer Stanley G. Weinbaum presented a comprehensive and specific fictional model for virtual reality in his short story Pygmalion's Spectacles. In the story, the main character, Dan Burke, met an elfin professor, Albert Ludwig, who invented a pair of goggles which enabled "a movie that gives one sight and sound [...] taste, smell, and touch. [...] You are in the story, you speak to the shadows (characters) and they reply, and instead of being on a screen, the story is all about you, and you are in it.”

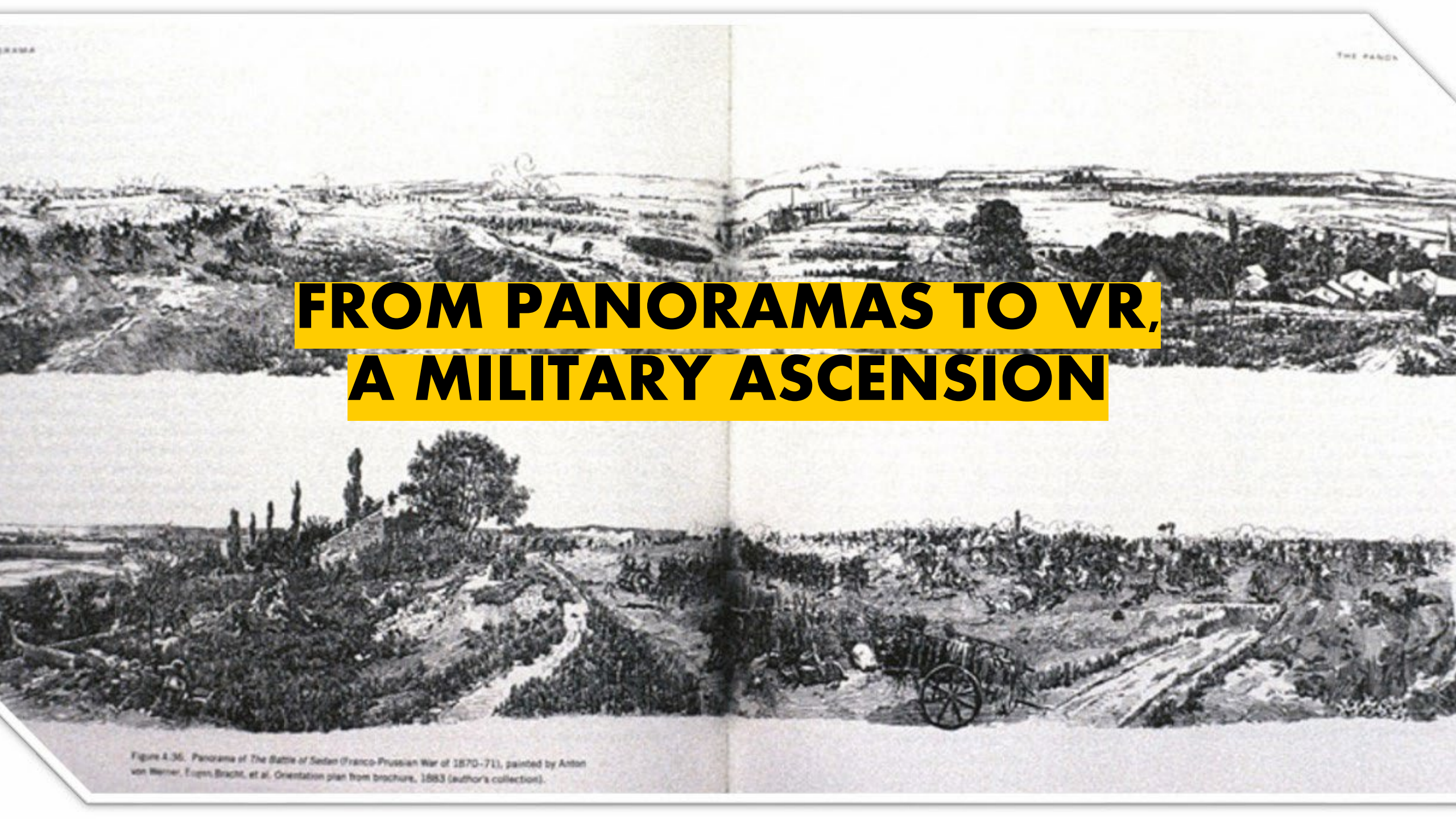
<http://www.historyofinformation.com/detail.php?entryid=4543>

In 1938, A. Artaud writes in *The theater and Its Double*: “(...) A mysterious identity of essence between the principle of the theater and that of alchemy. (...) Virtual reality extends the frontiers of what is called reality.”

Artaud, 1938, 13 & 48

Pygmalion Spectacles. Weinbaum, early 20th





FROM PANORAMAS TO VR, A MILITARY ASCENSION

Figure 4.36. Panorama of The Battle of Sedan (Franco-Prussian War of 1870-71), painted by Anton von Werner. Eugen Bracht, et al. Orientation plan from brochure, 1883 (author's collection).

WIENER

1948: N. WIENER COINS THE TERM CYBERNETICS

GOD &

Or science of control and communication in the animal and the machine

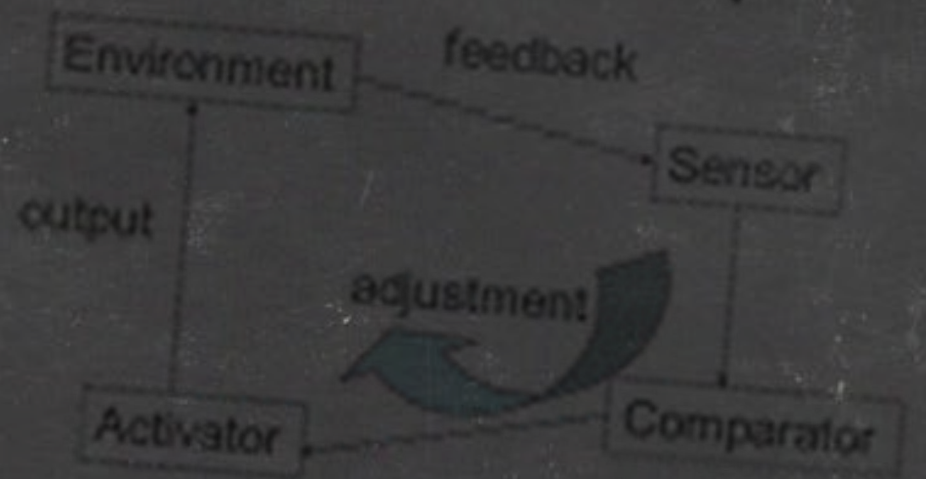
https://en.wikipedia.org/wiki/Cybernetics:_Or_Control_and_Communication_in_the_Animal_and_the_Machine

GOLEM, Inc.

A Comment on Certain Points where
Cybernetics Impinges on Religion



Elements of a Cybernetic System
"The feedback Loop"

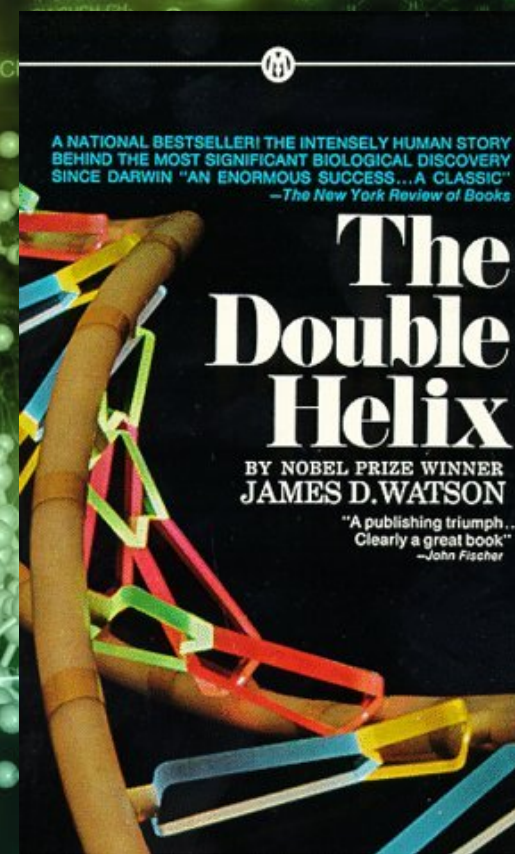


• AC-unit-in-a-room example

1953: WATSON & CRICK DISCOVER CHEMICAL STRUCTURE OF DNA

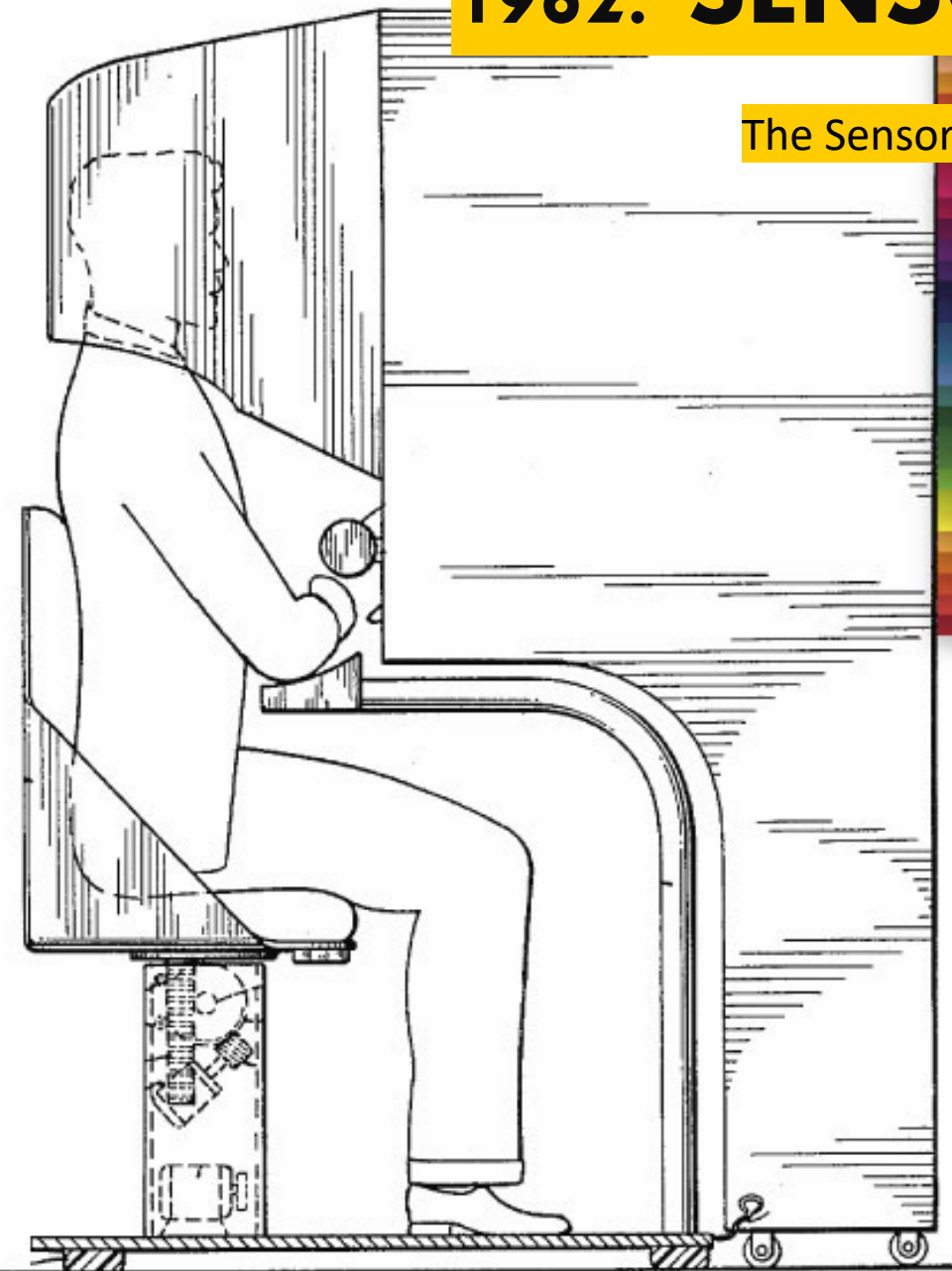
“Francis Crick who died in 2004 (88yrs old), admitted on his deathbed that he had been regularly taking small amounts of LSD when he arrived at the conclusion that DNA must exist as a double helix.”

<http://realitysandwich.com/314873/francis-crick-dna-lsd/>



1962: SENSORIUM & SENSORAMA

The Sensorium is the sum of an organism's perception.



Sensorama

The World's First Virtual Reality Device. Sensorama, Morton Heilig, 1962

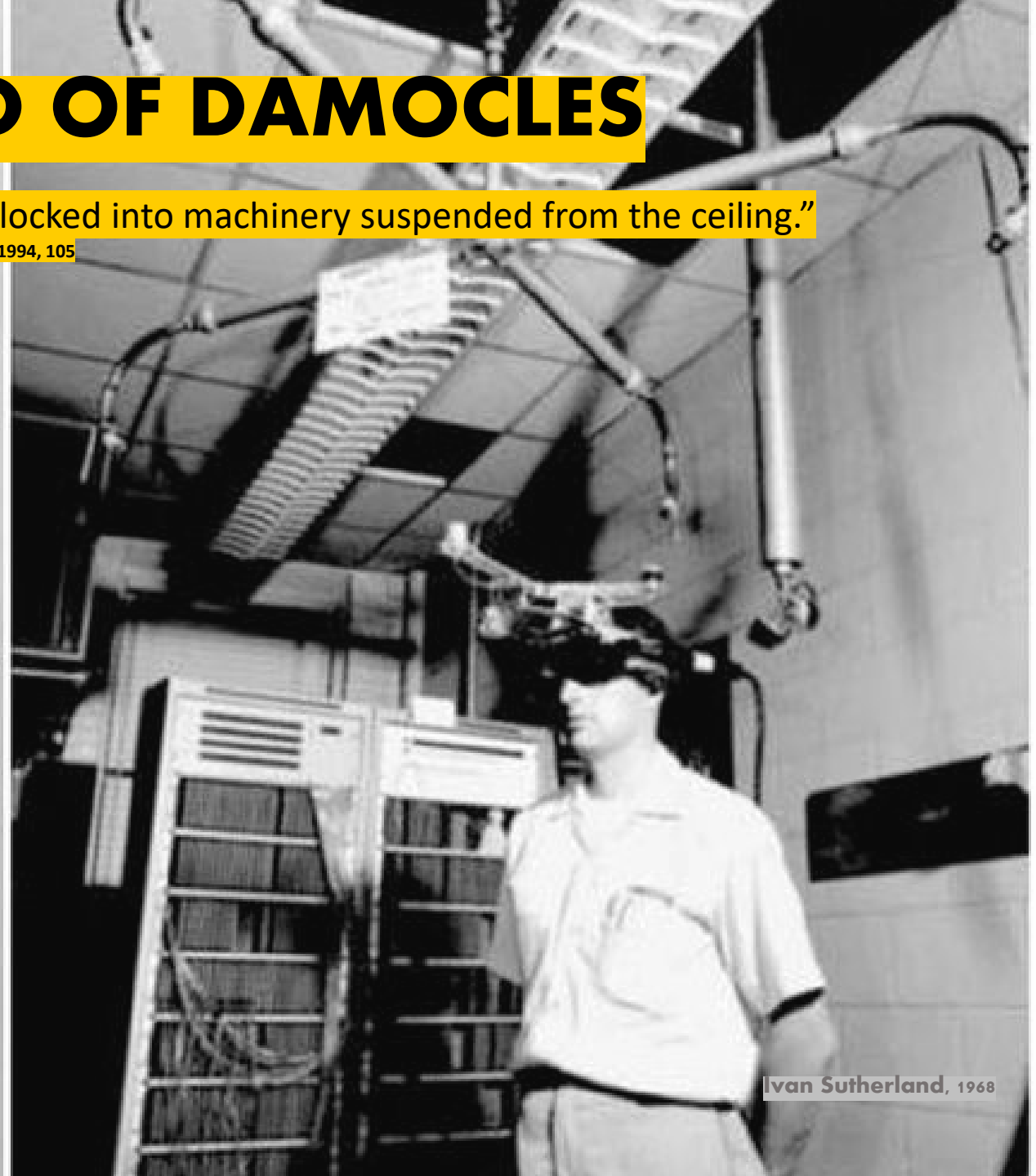
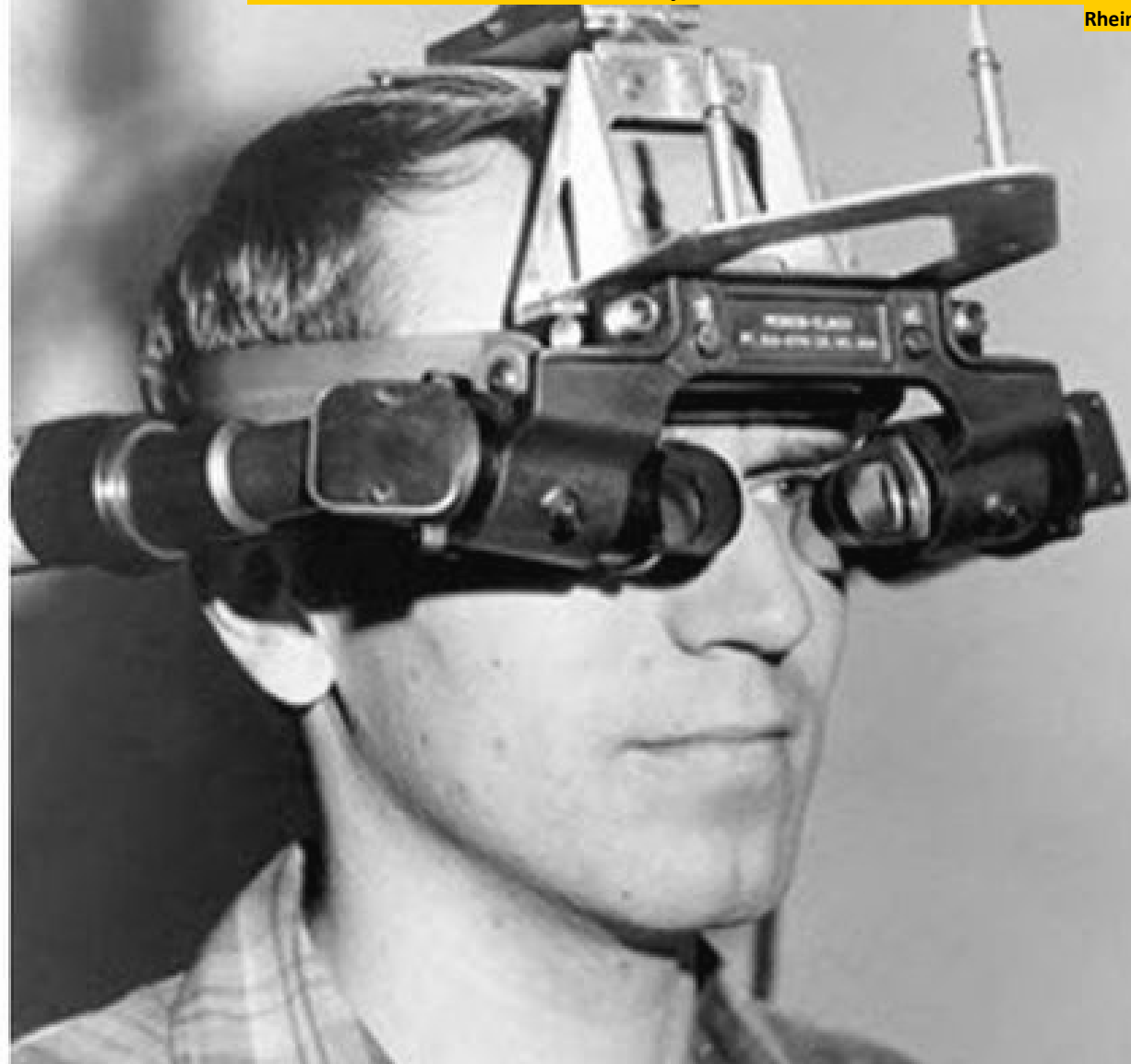
1960S: TV IS AVAILABLE TO MASS MARKET



1968: THE SWORD OF DAMOCLES

“The HMD was so heavy, the users found their head locked into machinery suspended from the ceiling.”

Rheingold, 1994, 105



Ivan Sutherland, 1968

1971: BACK TO THE CAVE

(CAVE AUTOMATIC VIRTUAL ENVIRONMENT)

Instead of taking the virtual reality track of HMD & data glove, he [Myron Krueger] investigated projections onto walls.



1980: NASA'S DARTH VADER HELMET

ARPANET, The Internet, 3D, stereoscopy and VR



1984: NEUROMANCER, BLADE RUNNER, ETC

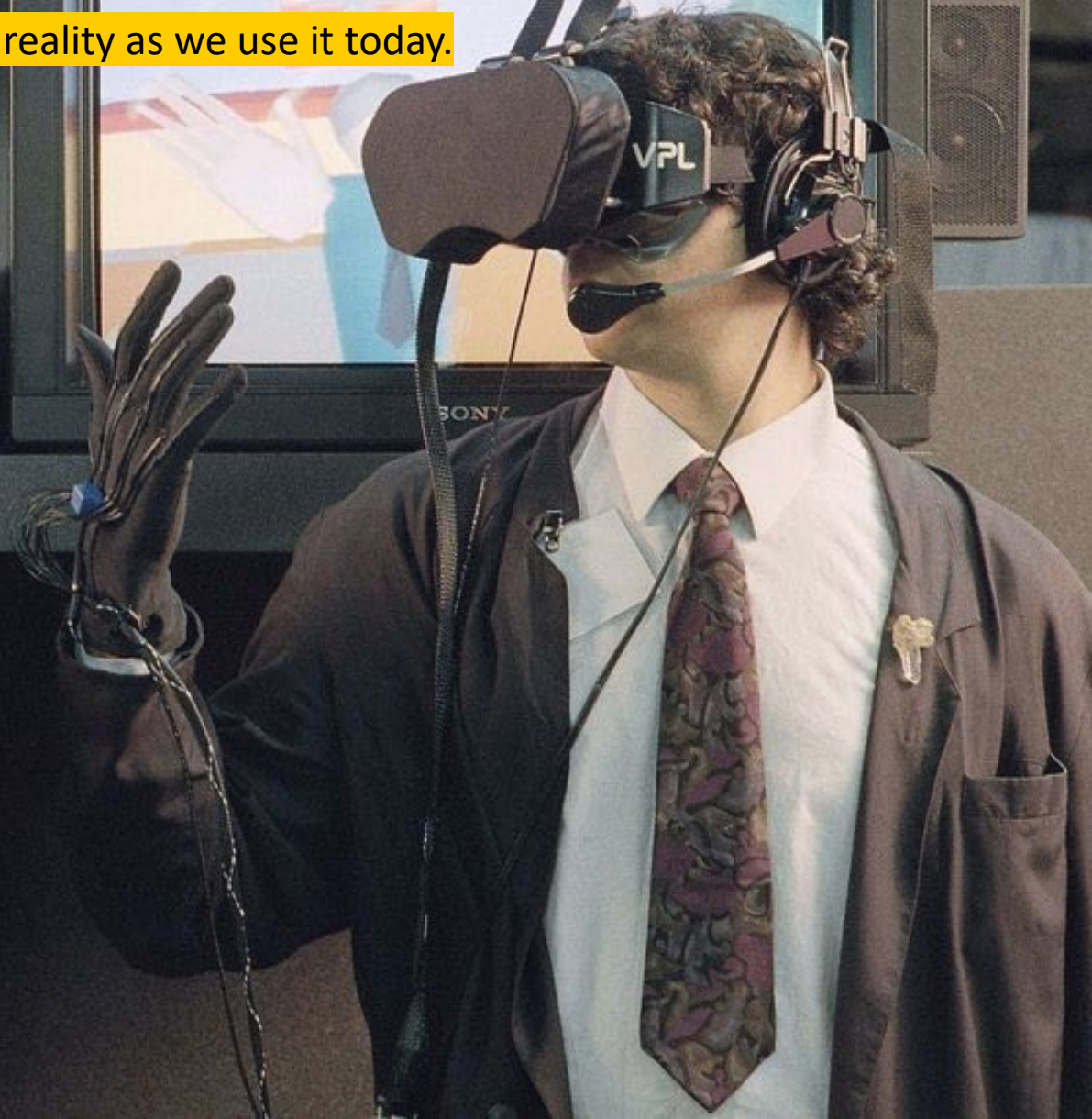
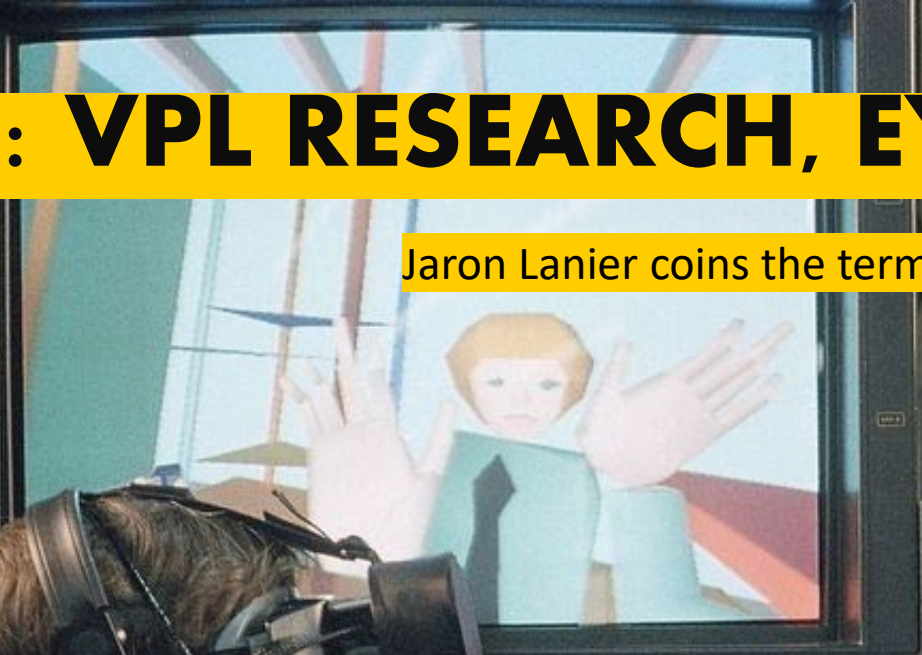
Cybernetics, Cyberculture & Cyberpunk

Rachel in Blade Runner, 1982



1988: VPL RESEARCH, EYEPHONE & DATAGLOVE

Jaron Lanier coins the term virtual reality as we use it today.



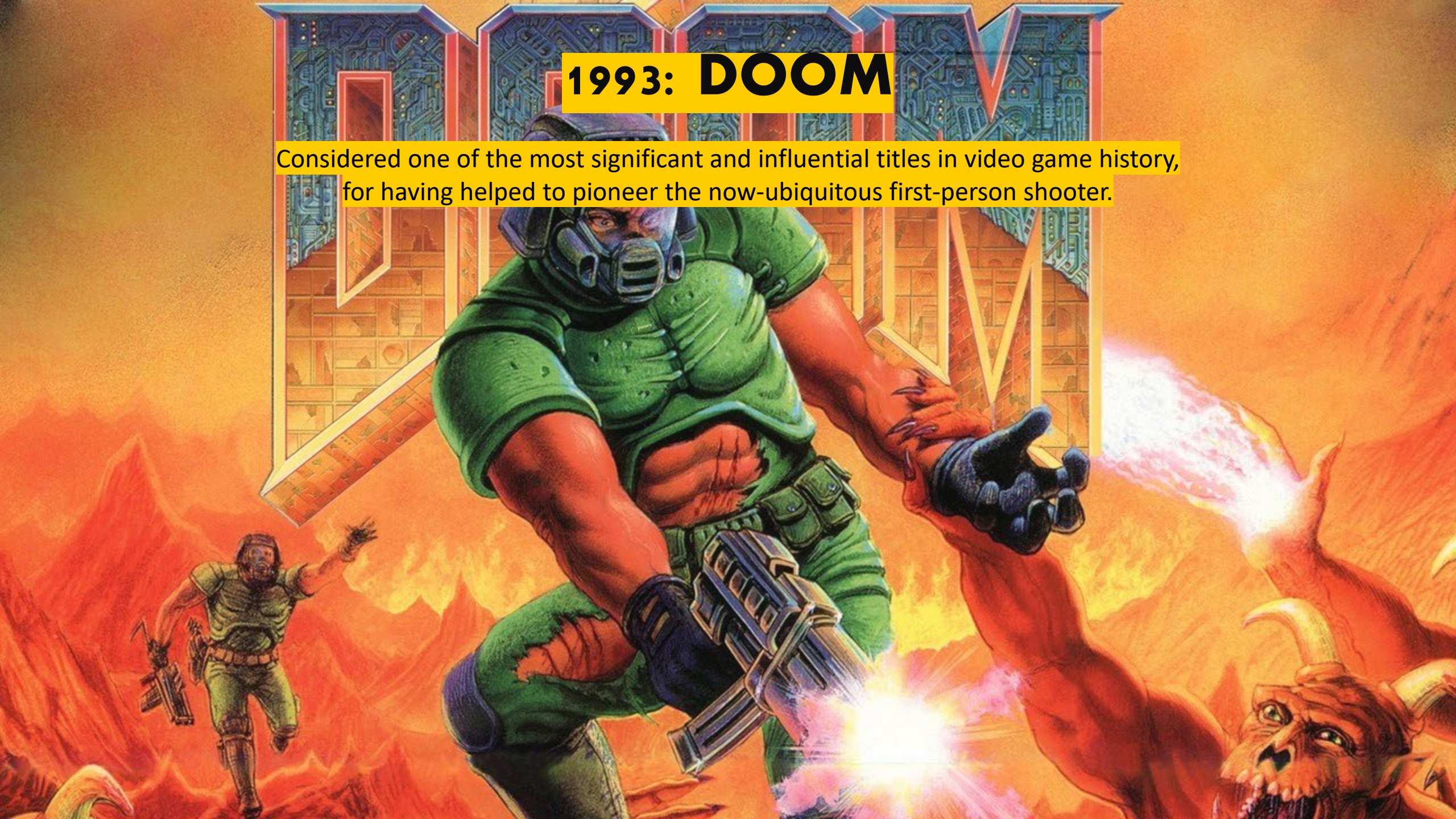
1991: VIRTUALITY PODS & ELYSIUM



The machines deliver real time gaming via a stereoscopic visor, joysticks, and networked units.

1993: DOOM

Considered one of the most significant and influential titles in video game history, for having helped to pioneer the now-ubiquitous first-person shooter.



1994: MYST

“*Wired* and *The New York Times* were among the publications that pointed to *Myst* as evidence that video games could, in fact, evolve into an art form. *Entertainment Weekly* reported that some players considered *Myst*'s "virtual morality" a religious experience.”

<https://en.wikipedia.org/wiki/Myst>



COSMIS TRIP

EXCLUSIVE
TO

VIRTUAL BOY™

WAVE 01 INCOMING!

VIRTUAL BOY

1994: **SEGA & NINTENDO**

The Virtual Boy was recognized as a commercial failure and was not released anywhere else [than Japan] despite price drops.

1995: **WINDOWS 95**



Microsoft®
Windows®95

“I think it was the first realization that we were not just building computers for people. We were building things that would look good enough that you wanted to *buy* them.” D. Curbow (Windows95 UI Engineer)

<https://www.cultofmac.com/386189/how-apple-responded-to-the-release-of-windows-95-twenty-years-ago-today/>

LATE 90'S: FIRST LAPTOPS

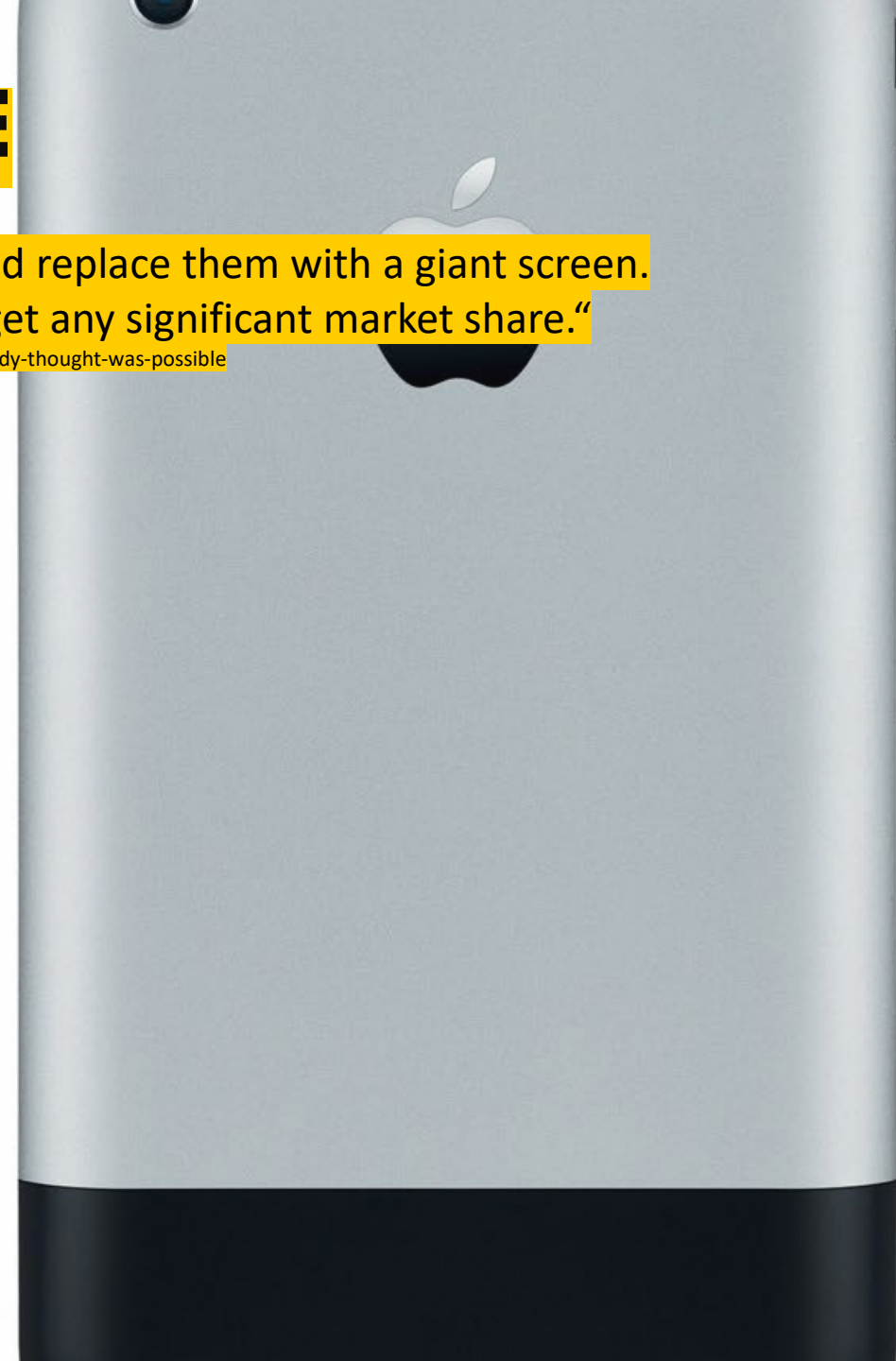


2007: IPHONE

“[Steve Jobs]: What we're going to do is get rid of these buttons and replace them with a giant screen.”

“[Steve Balmer]: There's no chance that the iPhone is going to get any significant market share.”

<https://appleinsider.com/articles/18/06/29/the-story-of-the-original-iphone-that-nobody-thought-was-possible>



2011: READY PLAYER ONE (NOVEL)

There are no map for where we are going."

E. Cline, 2011



2013: GOOGLE GLASS



2016: OCULUS RIFT HEADSET



2016: HTC VIVE VR HEADSET



2016: PLAYSTATION VR HEADSET



2016-18: HOLOLENS & MAGIC LEAP MIXED REALITY HEADSETS



2016: CARNE Y ARENA

A VR experience by A. G. Inarritu



2016: POKEMON GO

POKÉMON



2017: BEAT SABER



2017: 3D HOLOGRAPHIC DISPLAY

By the Looking Glass Factory, Brooklyn, NYC



2019: NINTENDO VR LABO KIT



**NINTENDO
LABO™**

2019: OCULUS QUEST



2020: PANASONIC



XR CREATIVE TOOLS



Film

Game

Animation

Installation Art

Dance

Immersive Theater

Architecture

Health



...

...

...

- Web VR

- VR Painting

- VR Animation

Sound Spatialization

- VR Sculpting & 3D Printing

3D Scanning/Photogrammetry

Mixed Reality Video Capture

- Volumetric Capture

360 Video Capture & Live Streaming

- Game Development for XR

...

...

XR CREATIVE TOOLS

3D / Rendering

Blender*
Maya
3ds Max
C4D
Keyshot*
Octane
Substance Painter
Marmoset Toolbag
Adobe Dimension*
Sketchup
Rhinoceros
SolidWorks
Sketchfab*
MakeHuman
Meshmixer
Meshlab
Mixamo &
Adobe Suite*

Game Engine

Unity 3D*
Unreal*

Online Authoring Tool

PlayCanvas
Spoke
Wonda Spaces
Norman VR
Madefire
Threejs.org/editor

VR Native Apps

Medium*
Quill*
Tilt Brush*
Blocks
Gravity Sketch
Tvorl*
AnimVR
Mindesk
Masterpiece VR
Maquette*
Unbound
Kingspray
Virtualist
NeosVR*
Shapelab
OVA (soon)

Motion Tracking

Glycon*
Mindshow
Flipside
Mymesis*
Leap Motion SDK*
Kinect Studio*

Photogrammetry

Metashape*
Capturing Reality
Meshroom

Video 360/MR

Mistika
Adobe Suite*
MantraVR
Insta360
PTGui
MochaVR
Kolor
(deprecated)
LIV/SteamVR*
OBS*
Depthkit

Resources

Facebook*
Sketchfab*
Facebook Spaces
Youtube**
Poly
Reddit
XRArtistToolkit.com*
TiltBrush Unity
Package
Quill Unity Shader
Alembic Unity
Package
FBX Converter Unity
Package
GLTF Unity Package
Scale-o-matic GLTF
Glitch.com
OBS*
SteamVR*
Oculus*
UploadVR*
Instagram*

REVIEW OF SELECTED XR WORKS

ALEX MARTIN'S SCI-FI



NOTES ON BLINDNESS



<https://www.youtube.com/watch?v=9ViFoGBt6fQ>

Atlas V, Arte, 2016

BATTLESCAR



https://www.youtube.com/watch?v=0qfs72lpf_M

Atlas V, Arte, Kaleidoscope, 2018

THE VOID



https://www.youtube.com/watch?v=0qfs72lpf_M

The Void

DISPATCH



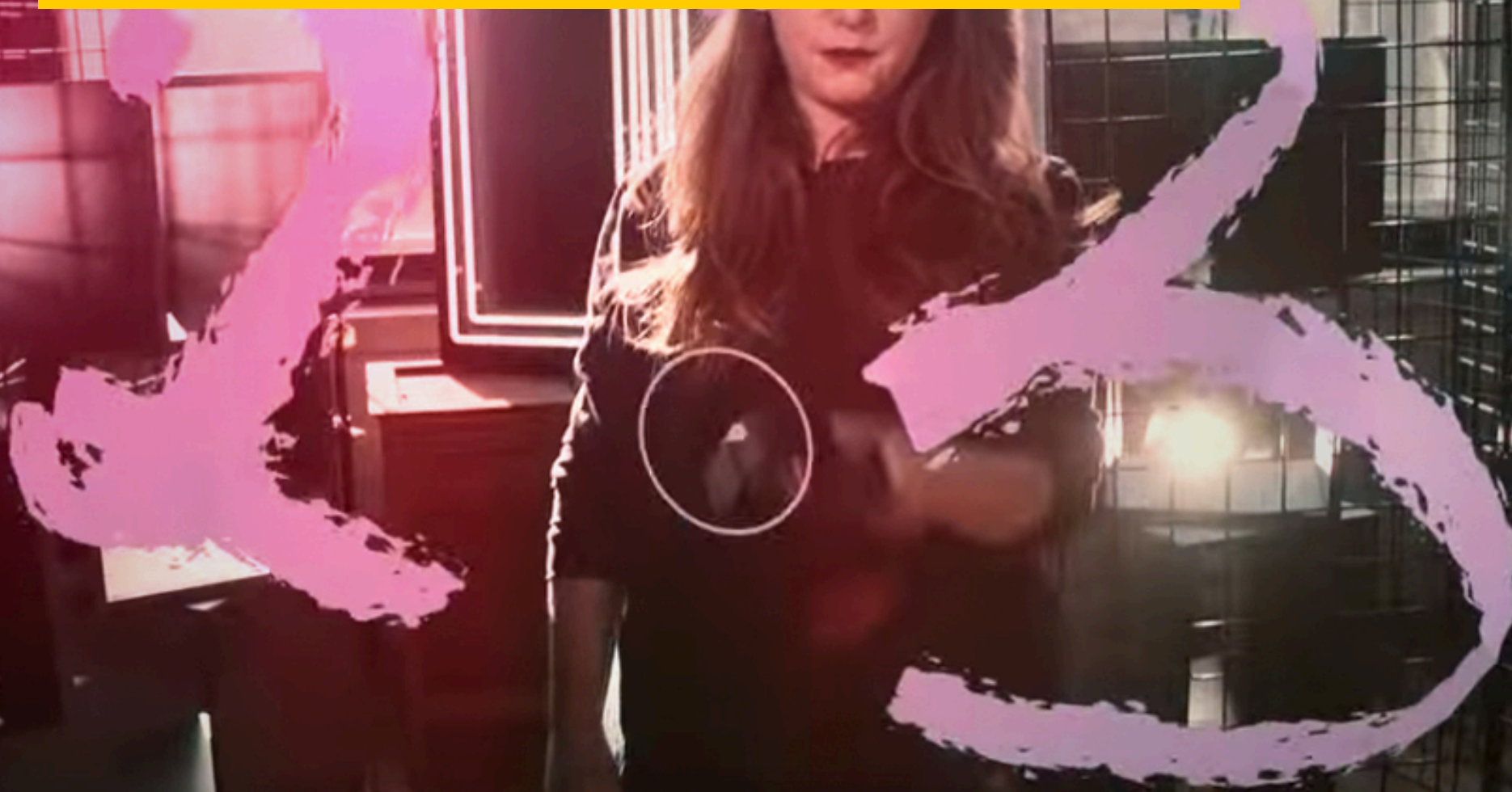
DEADMAU5 MUSIC VIDEO



APOTU



DEBORAH BASCKIN



<https://youtu.be/SNIUgMyg8R8>

Deborah Basckin, 2018

HYPERREALITY

JOBMONKEY
inspiration
guru

SYSTEM OPERATIONS AVAILABLE

3 NEW MESSAGES
Marly Lopez
Camilo Alvarez
push here to open your inbox

JOB MONKEY

URGENT

HURRY! DUE IN: 23:16

BUY GROCERIES FOR MR D. JURADO

GET OFF AT DOWNTOWN

shopping list
7 items; autoNAV enabled for faster shopping

- pineapple
- yoghurt

DOWNTOWN
EXITO
EL POBLADO

7 MONKEYPOINTS

NEXT

USER TESTING FOR DOGS
Report to Canine Lifestyle inc. for registration

12 MONKEYPOINTS

BONUS JOB

MASCOT
Costumed Retail Assistant, select to accept

8 MONKEYPOINTS

BONUS JOB

PROOF READING
premium only

8 MONKEYPOINTS

BONUS JOB

ELDERLY CARE
special offer on now!

8 MONKEYPOINTS

You're late!
Better hurry for a good rating

ONGOING CALL WITH INSPIRATION GURU

Microphone icon, End call icon, Mute icon

POINTS MANAGER

JOB MONKEY LEVEL 4

LEVEL 23

LIGHTNING: A VR STORY





WIRED

IS ANNA OK?



OTTO!

AGE OF SAIL



<https://www.youtube.com/watch?v=TH3HOcRayC8>

Google Spotlight Stories, 2018

DEAR ANGELICA



SPATIAL

Collaborate from anywhere in AR



CHAINED



AYAHUASCA



MANNAHATTA VR



Lionel Smit
MORPHO

Bronze
1998-1999, 2001 - Arts & Letters Center
City of New York

<https://www.youtube.com/watch?v=tvmbdYOslZM>

Alec Girardeau & Beatrice Glow, wip

EXTRA RESOURCES

XR ART ONLINE RESOURCES

XR ARTIST TOOLKIT

<http://www.xrartisttoolkit.com>

XR ARTIST FACEBOOK GROUP

<https://www.facebook.com/groups/xrartists/>

VIRTUAL ANIMATION FACEBOOK GROUP

<https://www.facebook.com/groups/virtual.animation/>

WIRED

<https://www.wired.com/>

See syllabus for more links

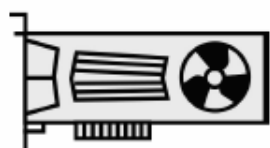
Getting Started

Minimum Equipment Requirements



Processor

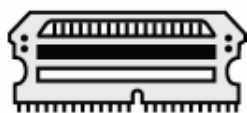
Intel Core i5-4590/AMD FX 8350 equivalent or better



GPU

NVIDIA GeForce GTX 1060, AMD Radeon RX 480 equivalent or better

Note: See [Nvidia's list of VR ready graphic cards](#). (Please scroll down to the Support section, click on supported GPUs)



Memory

4 GB RAM or more



Video Output

HDMI 1.4, DisplayPort 1.2 or newer



USB Port

1x USB 2.0 or newer



Operating System

Windows 7 SP1, Windows 8.1 or later, Windows 10

htc VIVE



oculus

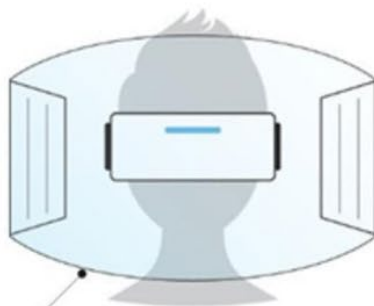
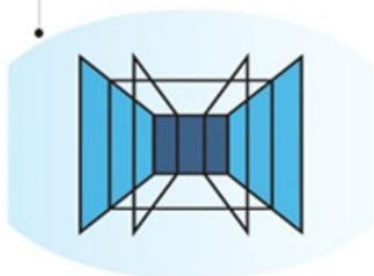


Windows Mixed Reality



VIRTUAL REALITY (VR)

Completely digital environment



Fully enclosed, synthetic experience with no sense of the real world.

AUGMENTED REALITY (AR)

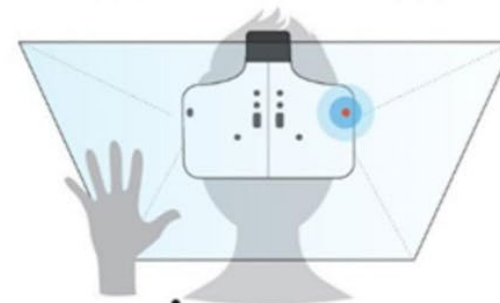
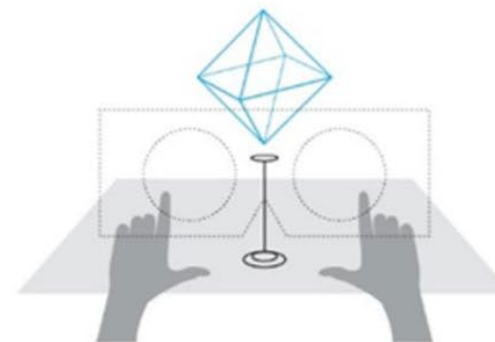
Real world with digital information overlay



Real world remains central to the experience, enhanced by virtual details.

MERGED REALITY (MR)

Real and the virtual are intertwined



Interaction with and manipulation of both the physical and virtual environment.

Activate Windows
Accédez aux paramètres de l'ordinateur pour activer Windows.

Story Map

Write notes in each section.

Setting: Where: When:		
↓		
Major Characters: Minor Characters:		
↓		
Plot/Problem:		
↓	↓	↓
Event 1:	Event 2:	Event 3:
↓	↓	↓
Outcome:		

Story Map

Write notes in each section.

Setting: Where: When:		
↓		
Major Characters: Minor Characters:		
↓		
Plot/Problem:		
↓	↓	↓
Event 1:	Event 2:	Event 3:
↓	↓	↓
Outcome:		

THIS, WHEN YOU
LOOK AT A PHOTO OR
REALISTIC DRAWING
OF A FACE--



--YOU SEE IT
AS THE FACE
OF *ANOTHER*.

BUT WHEN YOU
ENTER THE WORLD
OF THE *CARTOON*--



--YOU SEE
YOURSELF.