

creativity cannot be computed

HIDDE DE VRIES - HELLO STAVANGER - OCTOBER 2025



Hi, I'm Hidde 🙌

Web standards at the Dutch government (like WCAG, WCAG-EM and EN 301 549)

Advisory Board at W3C

Blogger at hidde.blog

Here in personal capacity

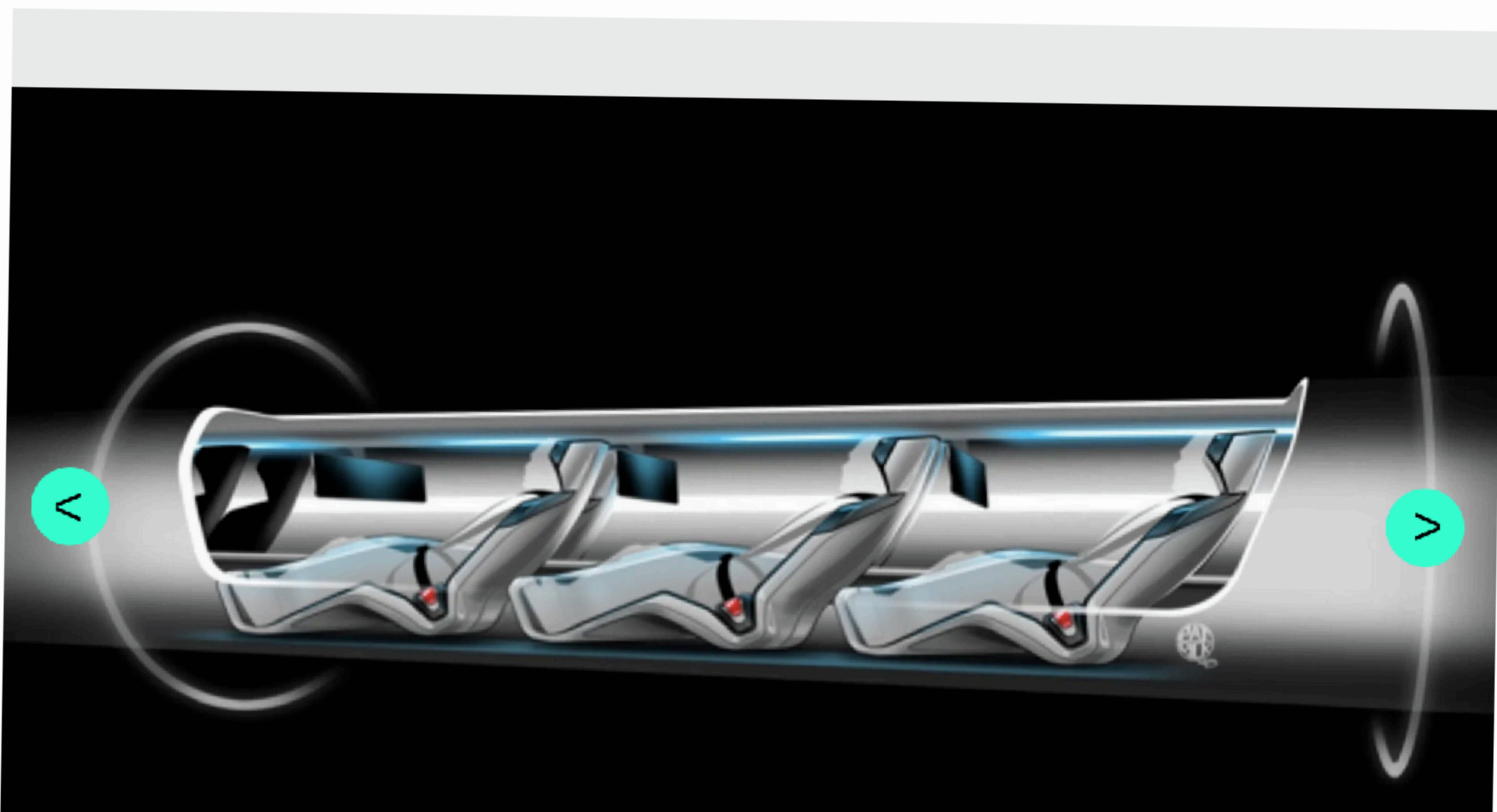


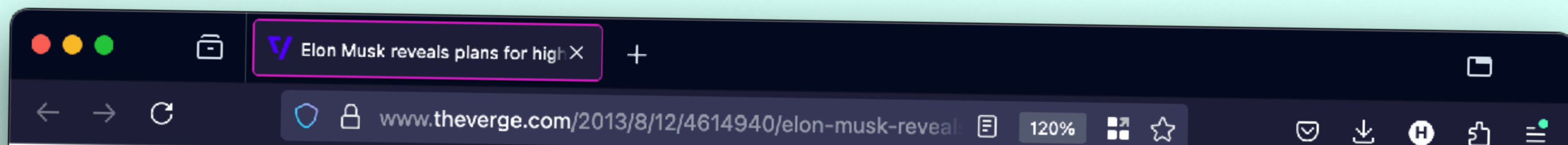
I love
computers

but we tend to
overestimate
their power

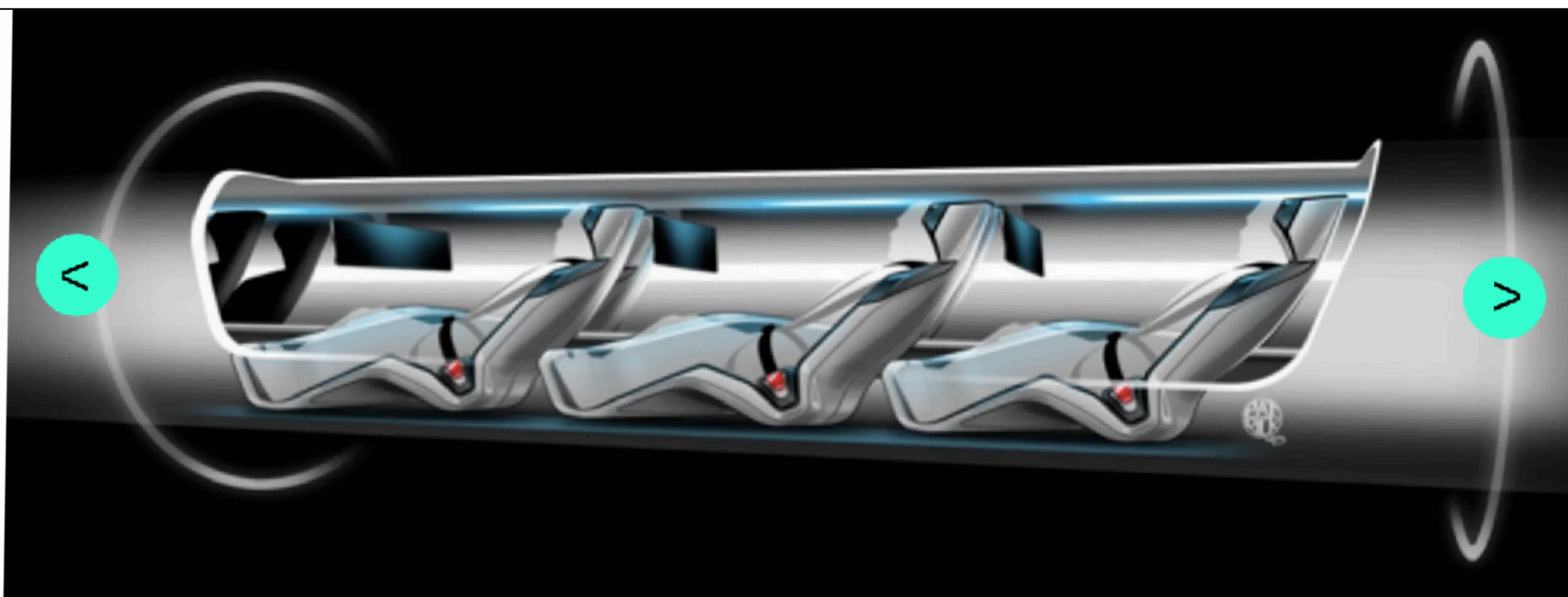
we tend to
overestimate
tech progress

model capable of transporting cars. On a following conference call, Musk said he expected a prototype unit might take only **three or four years to complete** given the right project leader, including a couple years to acclimate themselves to the project. "If it was my top priority, I could probably get it done in one or two years."





a couple years to acclimate themselves to the project. "If it was my top priority, I could probably get it done in one or two years."



News > Business > Business News

Gates plans an end to spam in two years

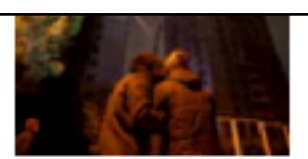
Paul Gaitner • Sunday 25 January 2004 01:00 GMT • 0 Comments

"Two years from now, spam will be solved," he told a select group of World Economic Forum participants in Davis, Switzerland. Gates said his company is working on a "magic solution" based on the concept of "proof" - identifying the sender of the e-mail.

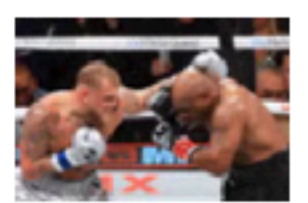
"Two years from now, spam will be solved," he told a select group of World Economic Forum participants in Davis, Switzerland. Gates said his company is working on a "magic solution" based on the concept of "proof" - identifying the sender of the e-mail.

One method involves requiring the sender to solve a puzzle that only a flesh-and-blood person can handle. Another is a "computational puzzle" that a computer sending only a few messages could easily handle, but that would be prohibitively expensive for a mass-mailer.

But the most promising, Gates said, was a method that would hit the



petrifying new weapon



Paul makes controversial admission after beating Tyson



Ukraine latest: Fury in Moscow as Kyiv to use US missiles in Russia

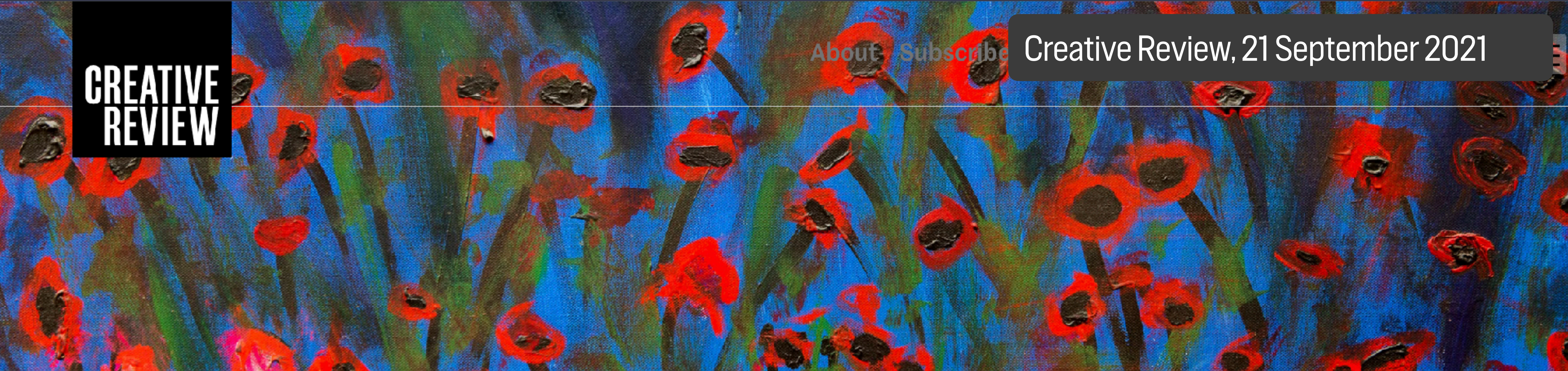
Popular videos





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Creative Review, 21 September 2021



Voice

Sponsored content

Why NFTs are the future of creative expression

Non-fungible tokens (NFTs) have received plenty of media attention, but their significance goes beyond selling digital artworks or tweets to changing how

Latest from CR



British Airways ads capture the wonder of travel from the air

22/10/2025



Clarks opens new museum to

Bored Ape Yacht Club

BY YUGALABS

ETHEREUM

9,998

APR 2021

PFPS

FLOOR PRICE	TOP OFFER	TOTAL VOLUME	LISTED	OWNERS (UNIQUE)
7.4984 ETH	7.25 WETH	1.6M ETH	3.3%	5,460 (54.6%)

Explore

Items

Tokens

Offers

Holders

Traits

Activity

About

Search by item or trait

Price low to high

9,998 ITEMS

Cannot load image

This ERC-721 NFT is not accessible due to an ongoing Amazon Web Services outage

#2250

#5,596

7.4984 ETH

Last sale 7.35 ETH

Cannot load image

This ERC-721 NFT is not accessible due to an ongoing Amazon Web Services outage

#4129

#6,004

7.4986 ETH

Last sale 30.00 ETH

Cannot load image

This ERC-721 NFT is not accessible due to an ongoing Amazon Web Services outage

#9835

#8,684

7.598 ETH

Last sale 8.30 ETH

Cannot load image

This ERC-721 NFT is not accessible due to an ongoing Amazon Web Services outage

#5868

#3,521

7.60 ETH

Last sale 0.59 ETH

Turns out, when AWS is down, your art is down.

we tend to
overestimate
computing

while
underestimating
creative work

“I think [creators] tend to overestimate the value of their specific content in the grand scheme of this.”

– Mark Zuckerberg, Facebook, in interview with The Verge (2024)

“Creativity has been easier for AI than people thought”

- Sam Altman, CEO of OpenAI at WSJ Tech Live (2023)

youtube.com/watch?v=byYIC2cagLw



“You can see Dall-E generate amazing images, write creative stories with GPT-4, whatever...”

- Sam Altman, CEO of OpenAI at WSJ Tech Live (2023)

youtube.com/watch?v=byYIC2cagLw



“Creativity has been easier for AI than people thought”

- Sam Altman, CEO of OpenAI at WSJ Tech Live (2023)

youtube.com/watch?v=byYIC2cagLw



**What is
computing?**

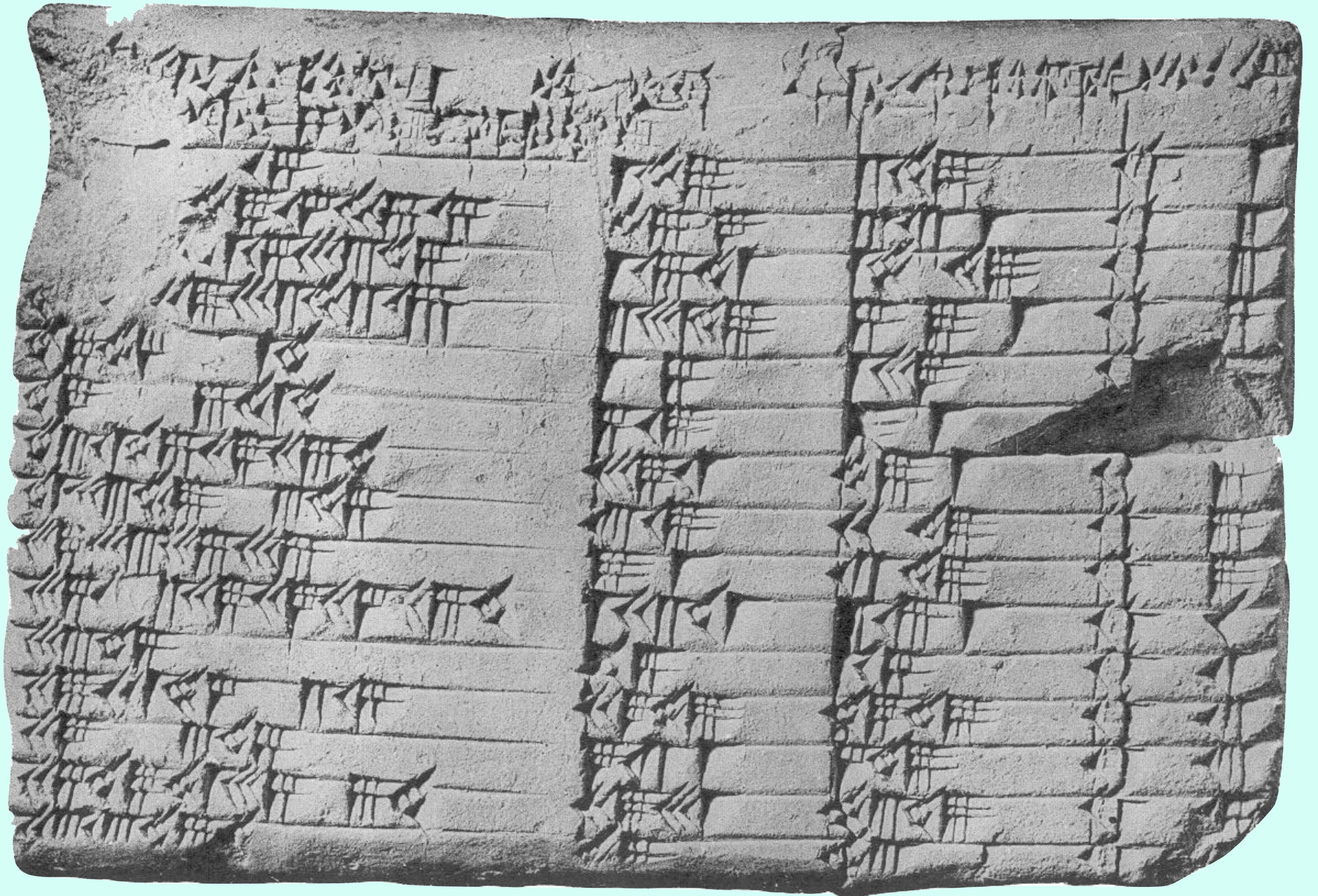
Computing =
manipulating
numbers



~2000 BC

**Clay tablets in
Babylonia**
(present-day Iraq)

~2000 BC
Plimpton 322



Computing =
manipulating
numbers

Computing =
manipulating data

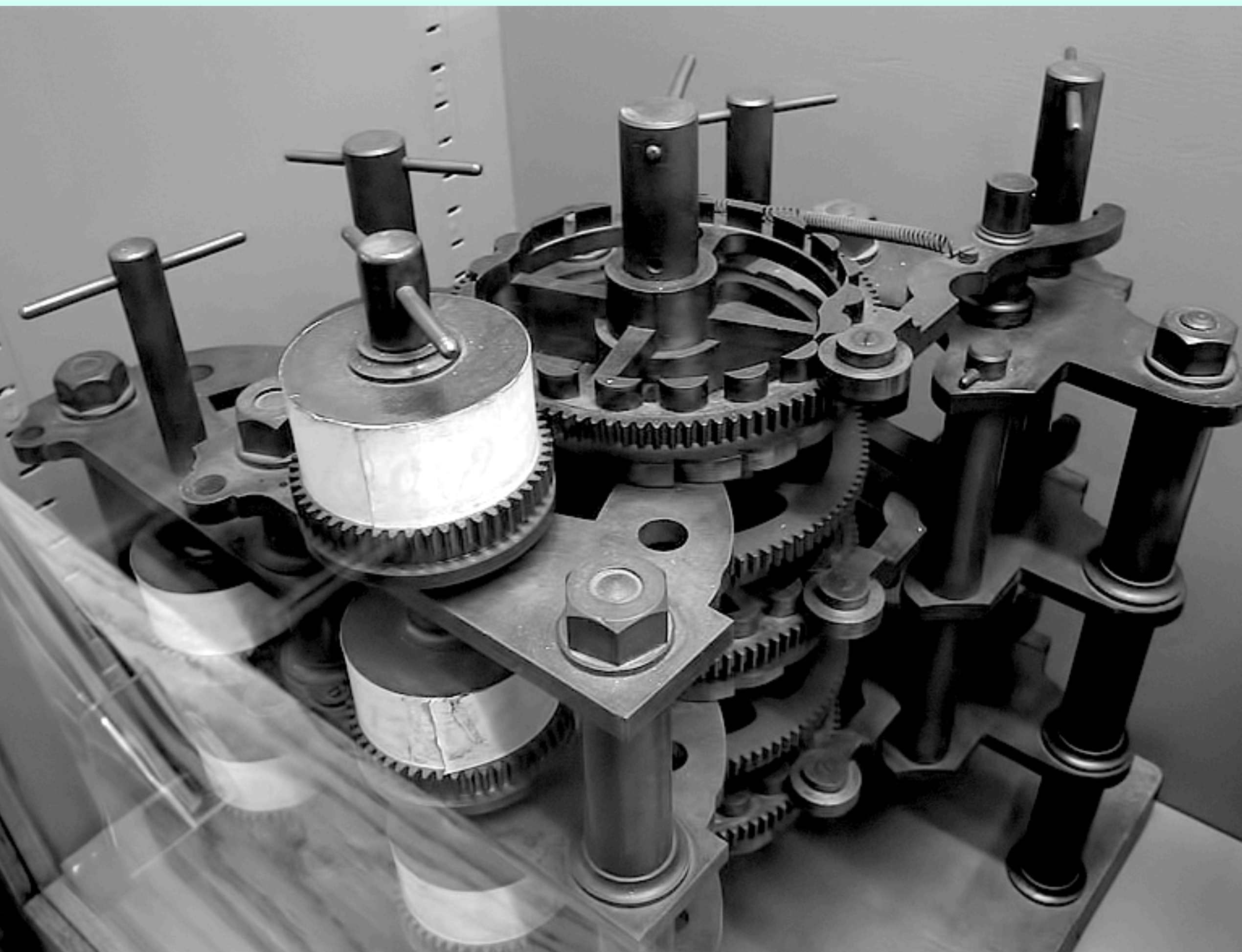
Computing =
completing tasks
automatically

Computing =
throwing tech at
something

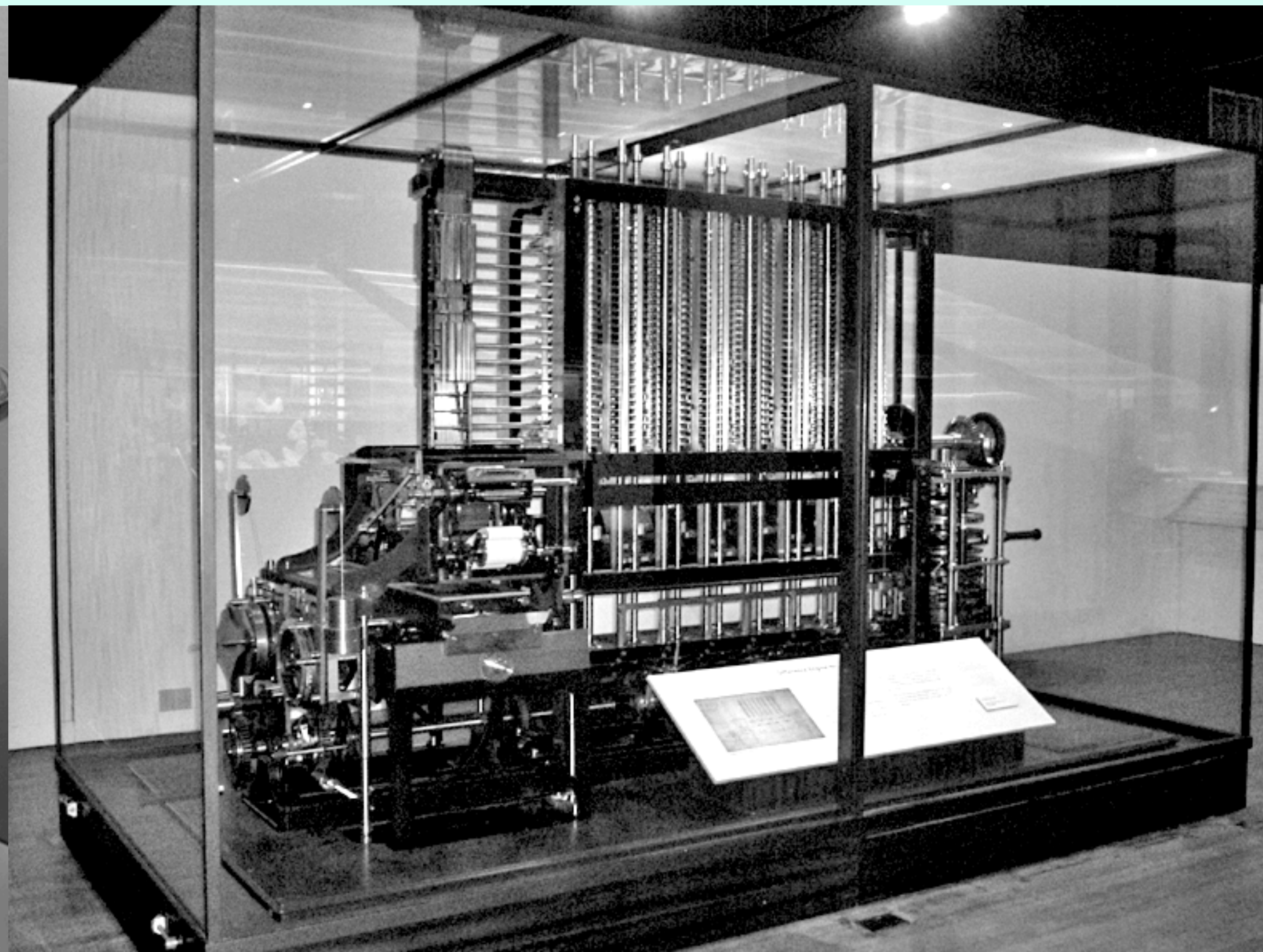
Charles
Babbage



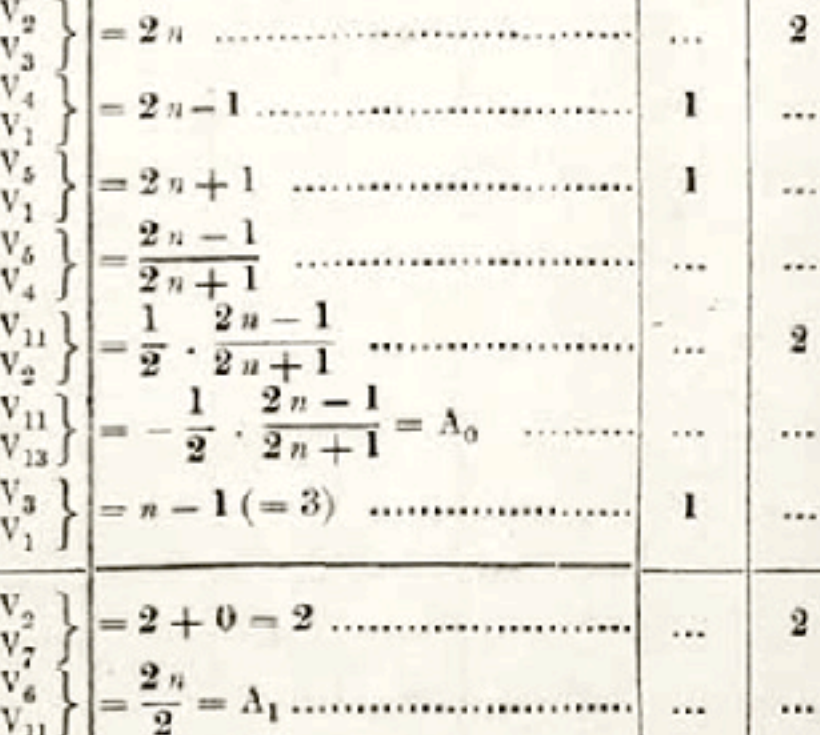
The Difference Engine (1820s)



The Analytical Engine (1830s)



Ada Lovelace



Number of Operation.	Nature of Operation.	Variables acted upon.	Variables receiving results.	Indication of change in the value on any Variable.	Statement of Results.	Data.			Working Variables.												Result Variables.			
						$1V_1$ 0 0 1	$1V_2$ 0 0 2	$1V_3$ 0 0 4	$0V_4$ 0 0 0	$0V_5$ 0 0 0	$0V_6$ 0 0 0	$0V_7$ 0 0 0	$0V_8$ 0 0 0	$0V_9$ 0 0 0	$0V_{10}$ 0 0 0	$0V_{11}$ 0 0 0	$0V_{12}$ 0 0 0	$0V_{13}$ 0 0 0	$1V_{21}$ 0 0 0	$1V_{22}$ 0 0 0	$1V_{23}$ 0 0 0	$0V_{24}$ 0 0 0		
						1	2	n											B ₁ in a decimal fraction.	B ₂ in a decimal fraction.	B ₃ in a decimal fraction.	B ₇		
1	x	x $1V_3$	$1V_4, 1V_5, 1V_6$	$\begin{cases} 1V_2 = 1V_2 \\ 1V_3 = 1V_3 \\ 1V_4 = 2V_4 \\ 1V_5 = 2V_5 \\ 1V_6 = 1V_6 \end{cases}$	$= 2n$	...	2	n	2n	2n	2n													
				$\begin{cases} 1V_4 = 1V_4 \\ 1V_5 = 2V_5 \\ 1V_6 = 1V_6 \end{cases}$	$= 2n-1$	1	...	...	2n-1															
				$\begin{cases} 1V_5 = 2V_5 \\ 1V_6 = 1V_6 \end{cases}$	$= 2n+1$	1	...	...	2n+1															
				$\begin{cases} 2V_5 = 0V_5 \\ 2V_6 = 0V_6 \end{cases}$	$= \frac{2n-1}{2n+1}$	...	...	...	0	0	...	...	...	...	...									
				$\begin{cases} 1V_{11} = 2V_{11} \\ 1V_{12} = 1V_{12} \end{cases}$	$= \frac{1}{2} \cdot \frac{2n-1}{2n+1}$	...	2	...																
				$\begin{cases} 2V_{11} = 0V_{11} \\ 0V_{13} = 1V_{13} \end{cases}$	$= -\frac{1}{2} \cdot \frac{2n-1}{2n+1} = A_0$	...	...	...																
				$\begin{cases} 1V_8 = 1V_3 \\ 1V_1 = 1V_1 \end{cases}$	$= n-1 (=3)$	1	...	n	...	...	...	...	...	...	n-1									
				$\begin{cases} 1V_2 = 1V_2 \\ 0V_7 = 1V_7 \end{cases}$	$= 2+0=2$	...	2	...	...	...	...	2												
				$\begin{cases} 1V_6 = 1V_6 \\ 0V_{11} = 3V_{11} \end{cases}$	$= \frac{2n}{2} = A_1$	...	...	...	...	2n	2	...	...	...	...									
				$\begin{cases} 1V_{21} = 1V_{21} \\ 3V_{11} = 3V_{11} \end{cases}$	$= B_1 \cdot \frac{2n}{2} = B_1 A_1$	...	...	...	...	...	...	...	...	...	...									
				$\begin{cases} 1V_{12} = 0V_{12} \\ 1V_{13} = 2V_{13} \end{cases}$	$= -\frac{1}{2} \cdot \frac{2n-1}{2n+1} + B_1 \cdot \frac{2n}{2}$	...	...	...	...	...	...	...	...	...	...									
				$\begin{cases} 1V_{10} = 2V_{10} \\ 1V_1 = 1V_1 \end{cases}$	$= n-2 (=2)$	1	...	...	...	...	...	...	...	...	n-2									
				$\begin{cases} 1V_6 = 2V_6 \\ 1V_1 = 1V_1 \end{cases}$	$= 2n-1$	1	...	...	...	2n-1														
				$\begin{cases} 1V_1 = 1V_1 \\ 1V_7 = 2V_7 \end{cases}$	$= 2+1=3$	1	...	...	...	...	3													
				$\begin{cases} 2V_6 = 2V_6 \\ 2V_7 = 2V_7 \end{cases}$	$= \frac{2n-1}{3}$	...	...	...	...	2n-1	3	$\frac{2n-1}{3}$												
				$\begin{cases} 2V_7 = 2V_7 \\ 0V_8 = 0V_8 \end{cases}$	$= \frac{2n}{2} \cdot \frac{2n-1}{3}$	...	...	...	...	...	...	0												
					$= 2n-2$	1	...	...	...	2n-2														
					$= 1=4$	1	...	...	...	...	4													
					$= 2$	...	...	...	...	2n-2														

“It is desirable to guard against the possibility of exaggerated ideas that might arise as to the powers of the Analytical Engine.”

- Ada Lovelace, also in Note G





ON COMPUTABLE NUMBERS, WITH AN APPLICATION TO THE ENTSCHEIDUNGSPROBLEM

By A. M. TURING.

[Received 28 May, 1936.—Read 12 November, 1936.]

The “computable” numbers may be described briefly as the real numbers whose expressions as a decimal are calculable by finite means. Although the subject of this paper is ostensibly the computable *numbers*, it is almost equally easy to define and investigate computable functions of an integral variable or a real or computable variable, computable predicates, and so forth. The fundamental problems involved are, however, the same in each case, and I have chosen the computable numbers for explicit treatment as involving the least cumbrous technique. I hope shortly to give an account of the relations of the computable numbers, functions, and so forth to one another. This will include a development of the theory of functions of a real variable expressed in terms of computable numbers. According to my definition, a number is computable if its decimal can be written down by a machine.

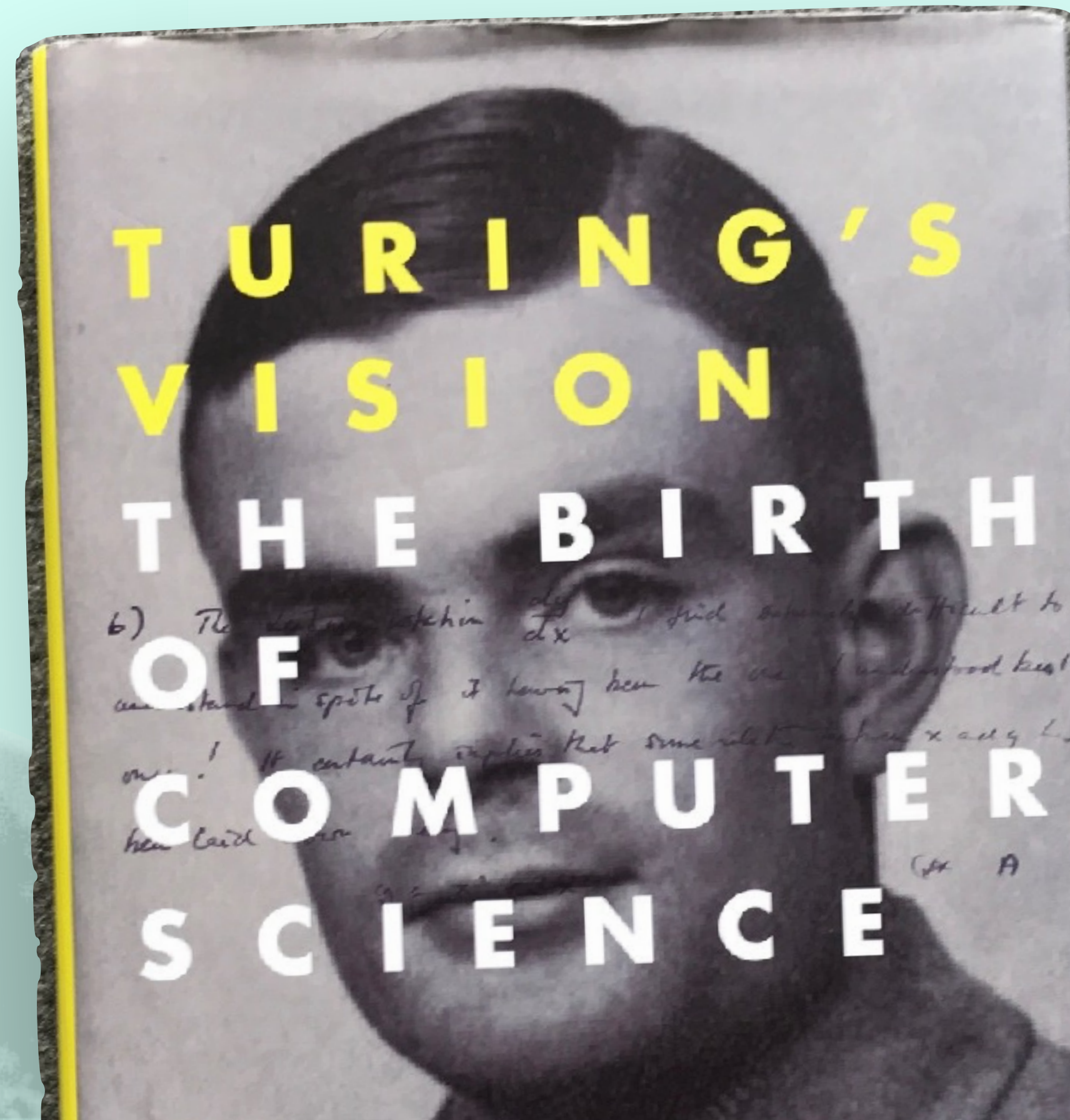
In §§ 9, 10 I give some arguments with the intention of showing that the computable numbers include all numbers which could naturally be regarded as computable. In particular, I show that certain large classes of numbers are computable. They include, for instance, the real parts of all algebraic numbers, the real parts of the zeros of the Bessel functions.



ON COMPUTABLE NUMBERS, WITH AN APPLICATION TO
THE ENTSCHEIDUNGSPROBLEM

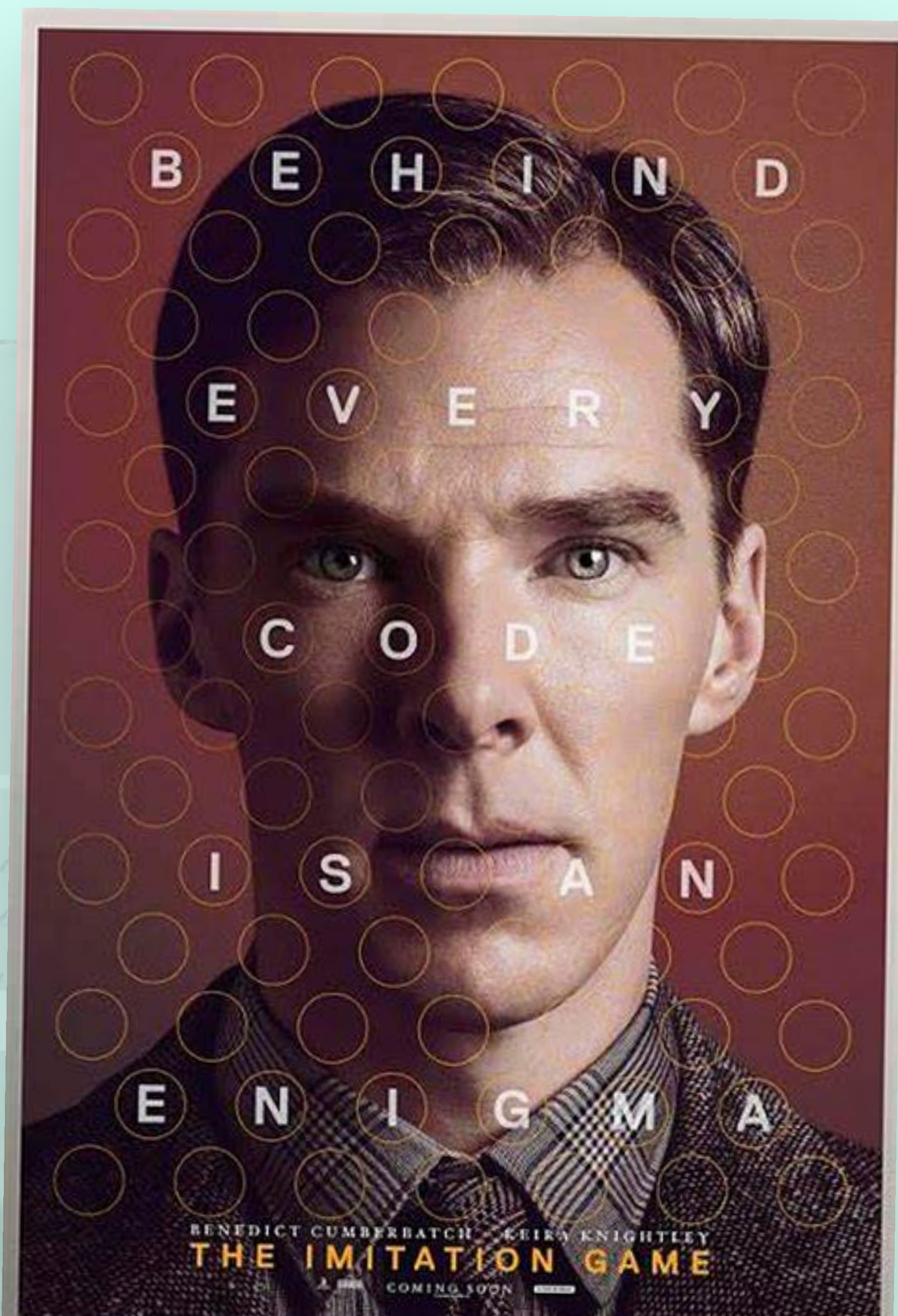
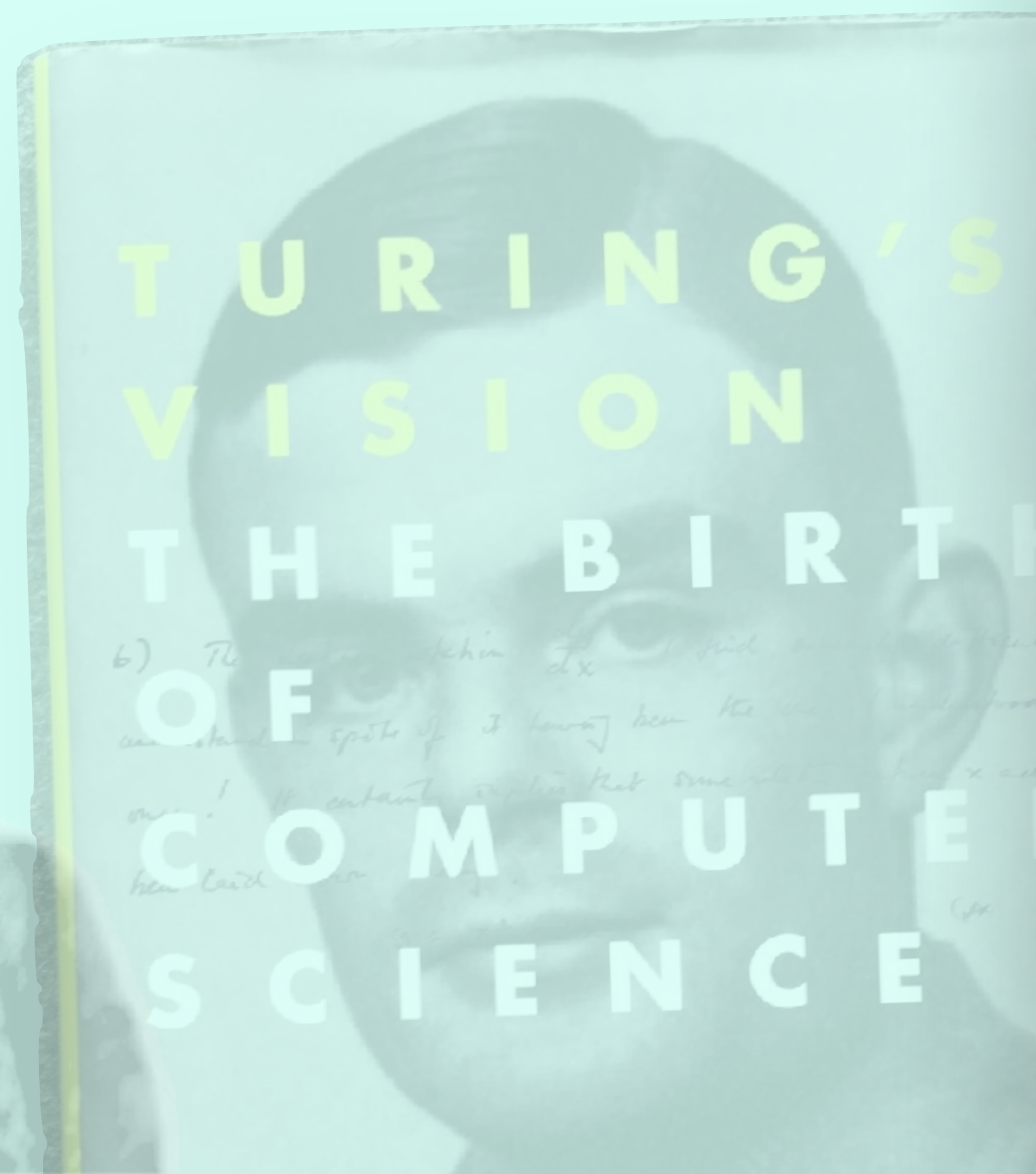
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may be described briefly as the real decimal are calculable by finite means. This is ostensibly the computable numbers, and investigate computable functions or computable variable, computable fundamental problems involved are, I have chosen the computable numbers the least cumbrous technique. I hope relations of the computable numbers, her. This will include a development of variable expressed in terms of computable definition, a number is computable by a machine.

is with the intention of showing that the numbers which could naturally be regular, I show that certain large classes include, for instance, the real parts of the zeros of the Bessel function. The above does not, however, include



A Proposal for the
DARTMOUTH SUMMER RESEARCH PROJECT ON ARTIFICIAL INTELLIGENCE

We propose that a 2 month, 10 man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer.

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“AI was harder than we thought.”

– John McCarthy (2006)

From Melanie Mitchell's presentation “Why AI is harder than we think”





1843

The first
“algorithm”



1952-1955

Compilers and
COBOL



2002

First robotic
vacuum cleaner

1933

Turing
machine
concept



1965

First software
engineer on
Apollo missions



2007

Invention
of the
iPhone



2024

“AI will fix all of
our problems”

“It is desirable to guard against the possibility of exaggerated ideas that might arise as to the powers of the Analytical Engine.”

- Ada Lovelace, in her notes



Creativity and arts

Creativity = problem solving

Old-school hacking

Sunsetting products

Election security

Looking beyond the AI hype

The presence of
creativity is the
absence of dullness



Video for “Manon” by De Jeugd van Tegenwoordig

choices



Immanuel Kant:
the ability to produce works that
are **not only “original”**—since
“there can be original nonsense”
—**but also “exemplary”**

plato.stanford.edu/entries/creativity

Boden's three types of creativity

Combinational

Exploratory

Transformational

Boden's three types of creativity

Combinational

Exploratory

Transformational



Espresso tonic, Rotterdam (2022)

Boden's three types of creativity

Combinational
Exploratory
Transformational



Herbie Hancock + band in Toronto (2024)

Boden's three types of creativity

Combinational
Exploratory
Transformational



The steam engine

Boden's three types of creativity

Combinational
Exploratory
Transformational



Quincy Jones

Creativity

Art

Design

Aesthetics

Creativity



*is it new &
interesting?*

Creativity

*is it new &
interesting?*

Design

*does it
function?*

Creativity

*is it new &
interesting?*

Design

*does it
function?*

Aesthetics

*is this
beautiful?*

Creativity

*is it new &
interesting?*

Art

*what
makes it
art?*

Design

*does it
function?*

Aesthetics

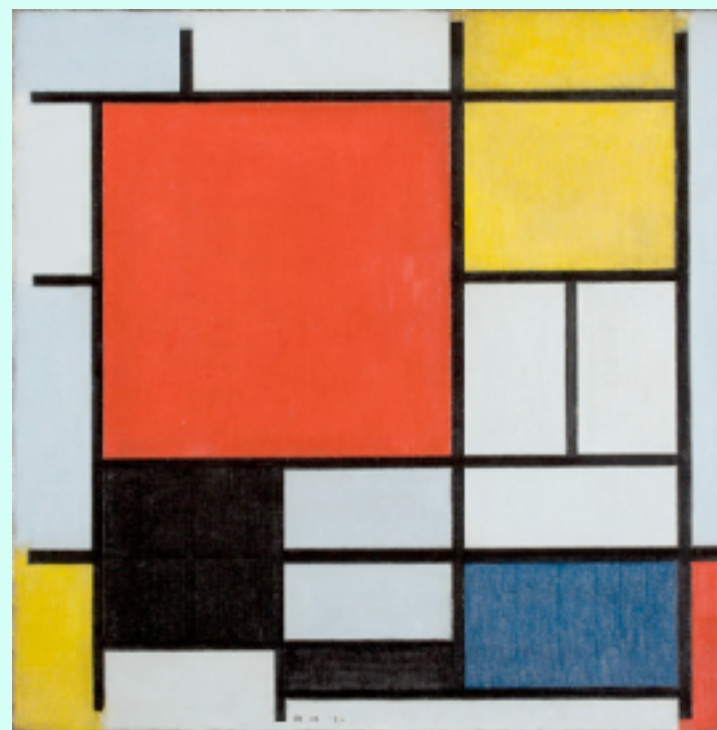
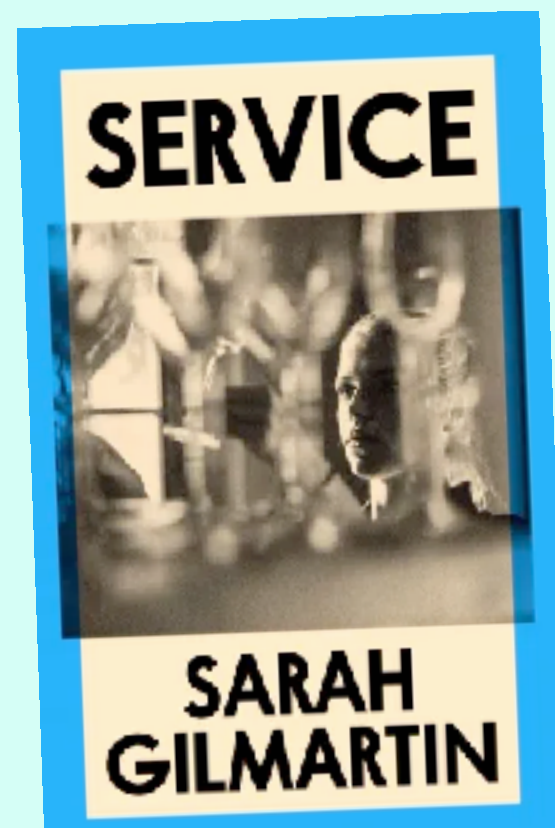
*is this
beautiful?*

Creativity → Art



What is art?

Films, books, paintings, poetry, photography, music, sculpture, performances, plays, operas, street art, comedy, literature, video games, some of your toots.



Art isn't always
easy to recognise



“All the good times we
spent together” by
Alexandre Lavet (2016).





“Fountain” by Marcel
Duchamp (1917).

“Peanut butter
platform” by Wim T.
Schipper (1969).



Art is
legitimised

Art is legitimised

Artist puts it out “as art”

Audience wants to pay for it

Institutions want to display it

Art has
critics

Art has critics

Well executed

Great ideas/concepts

Captivating

Original / creative

Clichéd

Stunning

Art is appreciated
conditionally



You and me baby ain't nothin' but mammals



So let's do it like they do on the Discovery Channel

Appreciating art

Personal experiences

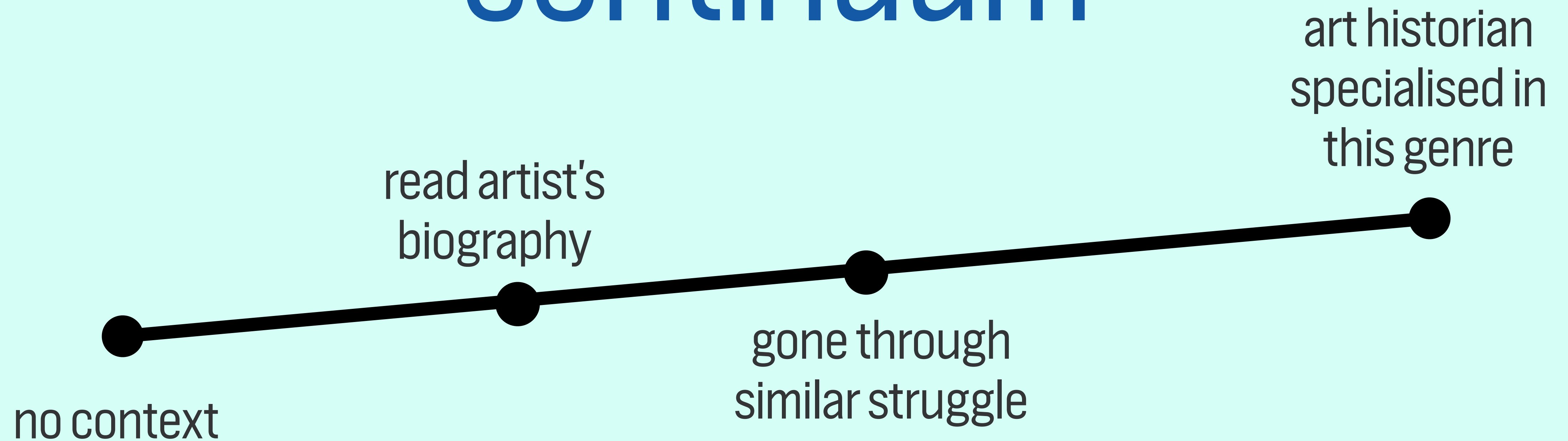
Knowledge of context in history

Knowledge of artist

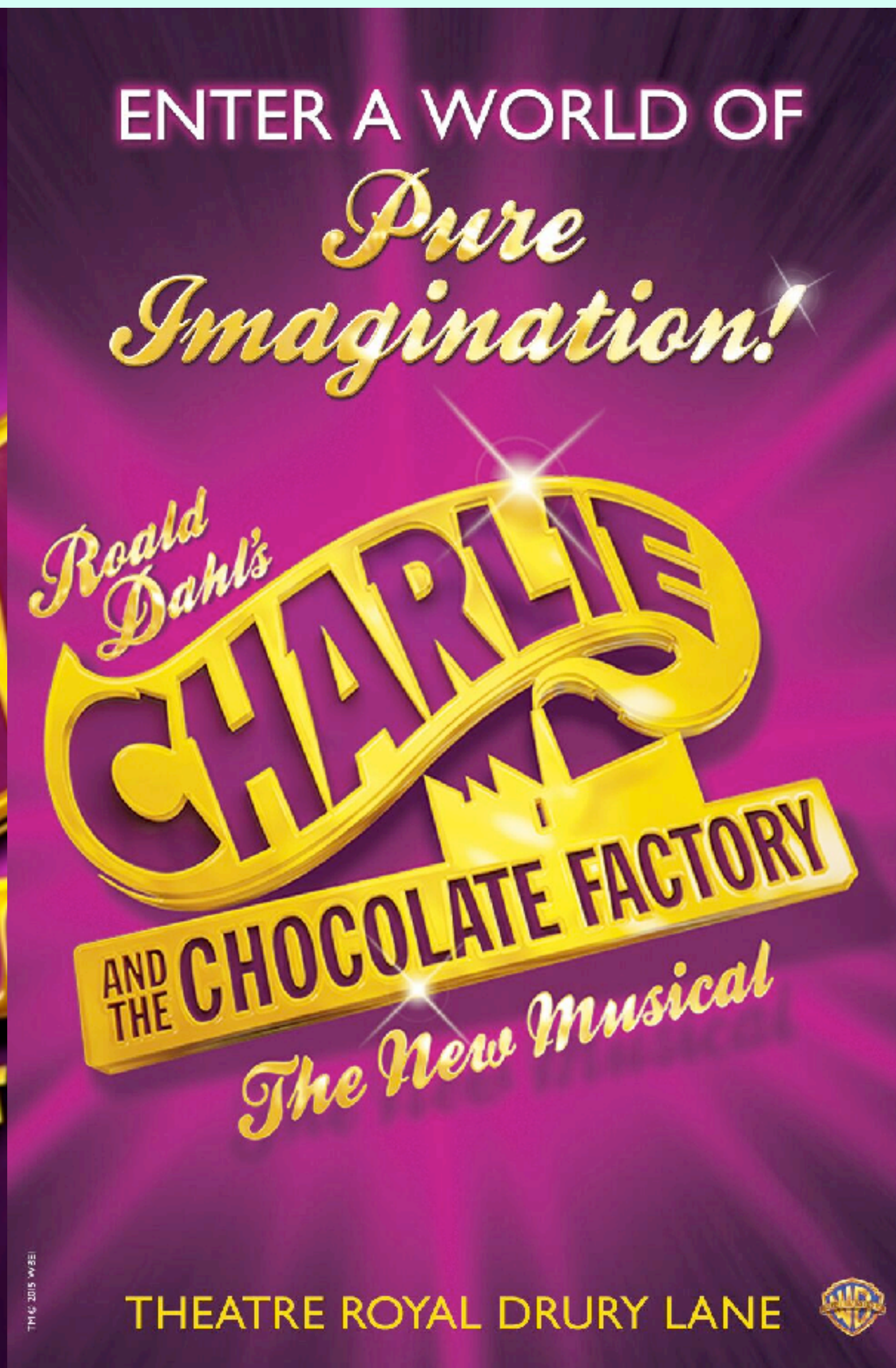
Descriptions

Prerequisites (like language)

Appreciation is a continuum



Art is repeated





Scene from La Traviata at the Metropolitan Opera in New York

POS 1213

ABBA

16 645
1 1450
Mura

SOS

Man in the middle



PORTISHEAD / SOS



Still from music video of Portishead's version of "SOS" by ABBA

choices

Art is repeated



David Hockney
Portrait of an Artist
(Pool with two figures)







Art is repeated



Art is repeated

Art may contain
intentions



Students interview artist Geoffrey Chadsey tang.skidmore.edu/collection/explore/202-shifting-poses

laurents.art on Instagram
Künstler/in 🧑🎨
3 Years old 🇩🇪



choices

repeats/
reimagined

legitimisation

critics

Art is
fuzzy

appreciation

intentions (maybe)

Art = life

What can
art do?

ART CAN MAKE
US THINK

Art can make the
artist think

Artists process life
through their art



Little Simz

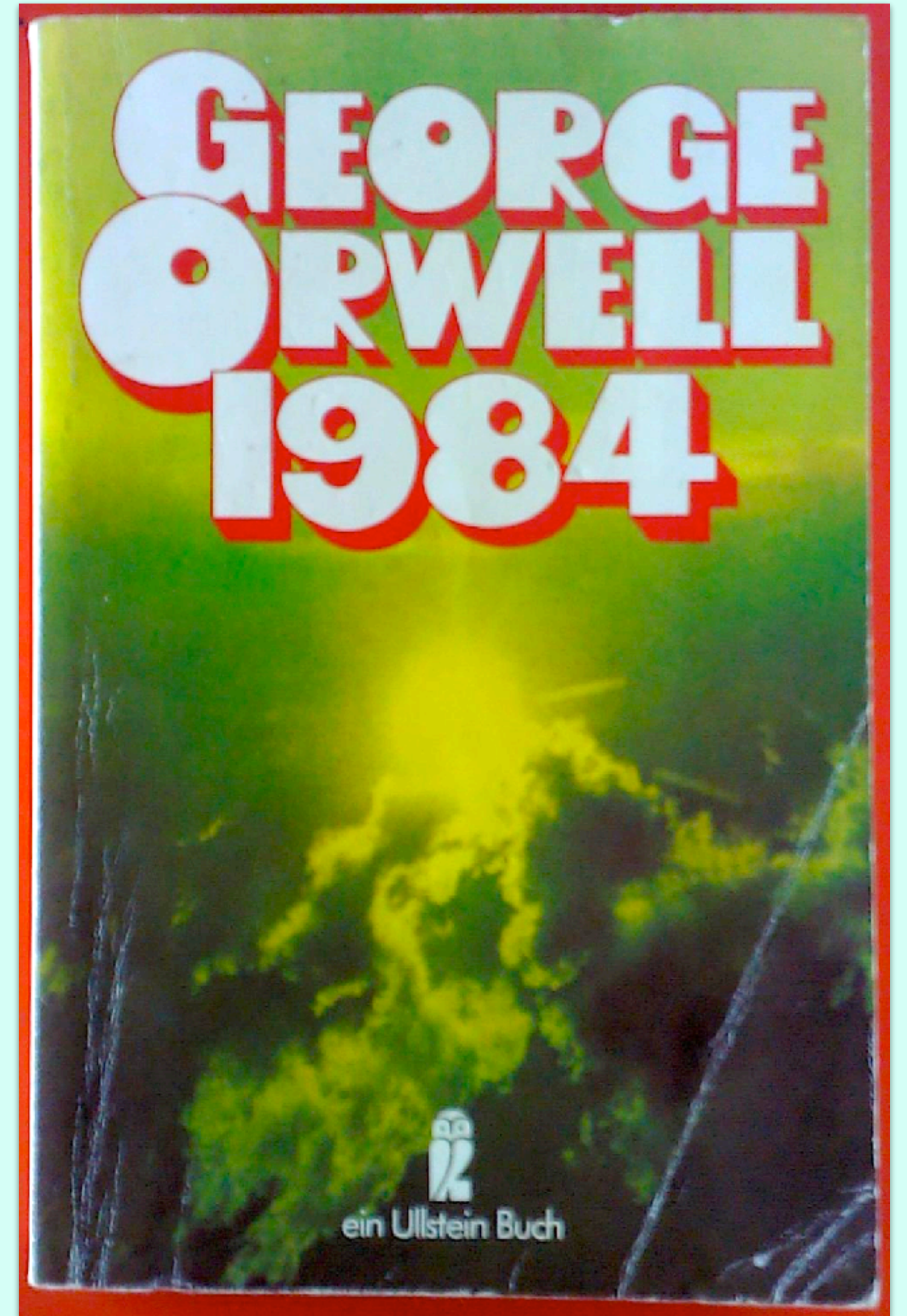




Frida Kahlo
Las Dos Fridas
(1939)

Art can also make
the audience think

Art can show us
futures we should
not want



LEONARDO
DICAPRIO

SEAN
PENN

BENICIO
DEL TORO

REGINA
HALL

TEYANA
TAYLOR

CHASE
INFINITI

SOME SEARCH FOR BATTLE, OTHERS ARE BORN INTO IT...

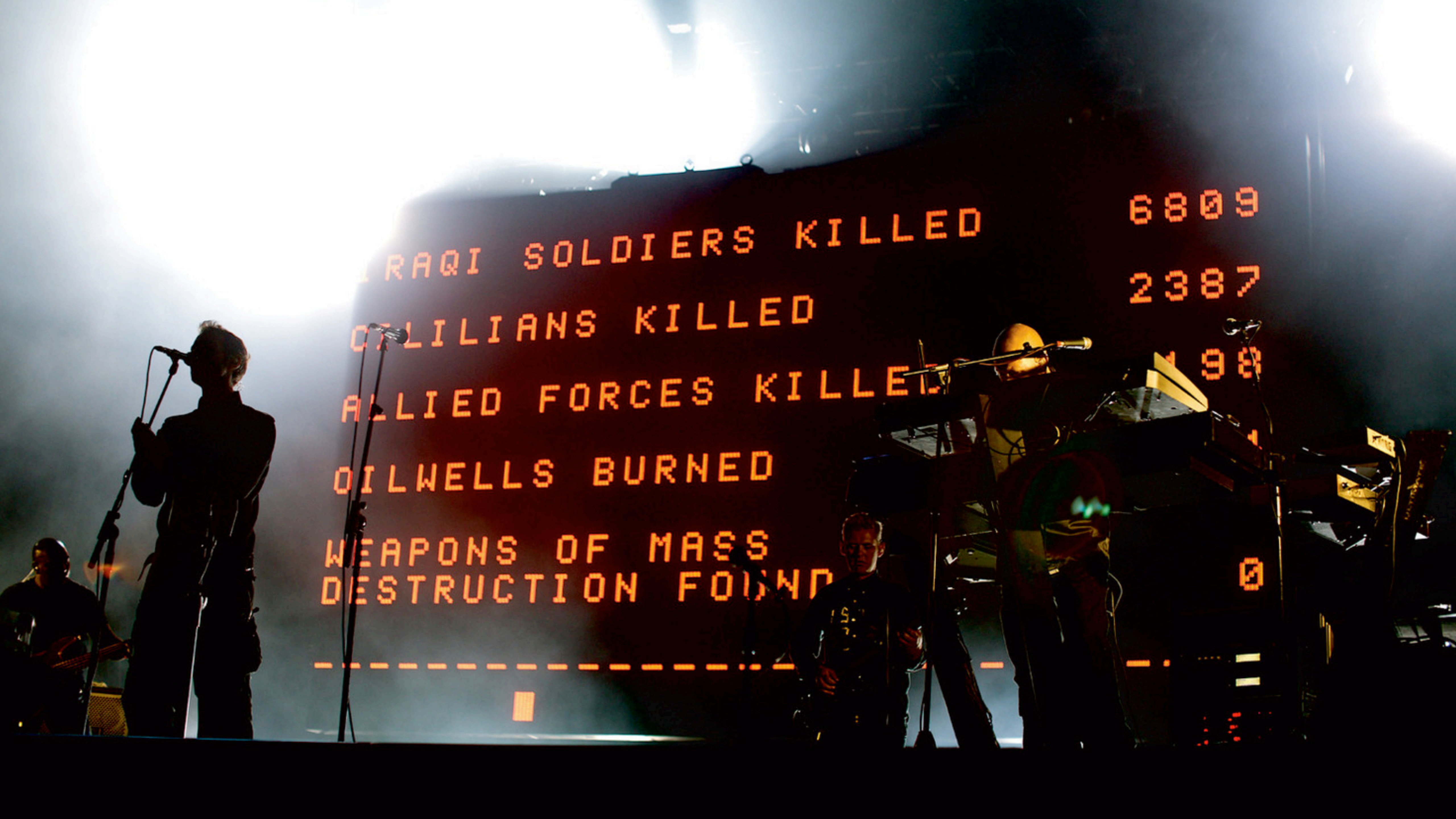
ONE BATTLE AFTER ANOTHER

WRITTEN AND DIRECTED BY
PAUL THOMAS ANDERSON

ONLY IN THEATERS
SEPTEMBER 26

SHOT ON VISTAVISION
EXPERIENCE IT IN IMAX

Art can capture the
political zeitgeist



A band is performing on a stage. In the background, a large digital display shows statistics in red, pixelated text. The statistics are as follows:

Category	Value
IRAQI SOLDIERS KILLED	6809
CIVILIANS KILLED	2387
ALLIED FORCES KILLED	198
OILWELLS BURNED	1
WEAPONS OF MASS DESTRUCTION FOUND	0

Below the statistics, there is a dashed red line and a small red square. The band members are silhouetted against the bright stage lights. On the left, a singer holds a microphone. In the center, a guitarist is visible. On the right, a keyboardist is partially visible. The overall atmosphere is somber and protest-oriented.

Art can show us a
mirror to reflect



De Zaak Shell,
Bureau Vergezicht
(2024)



Devolved Parliament, by Banksy



Details from "Devolved Parliament" by Banksy, copyright graffitiitstreet.com



Konzerthaus columns covered with 14,000 discarded life vests (2016) . Photo copyright Clemens Bilan / Getty Images

ART CAN
MOVE US



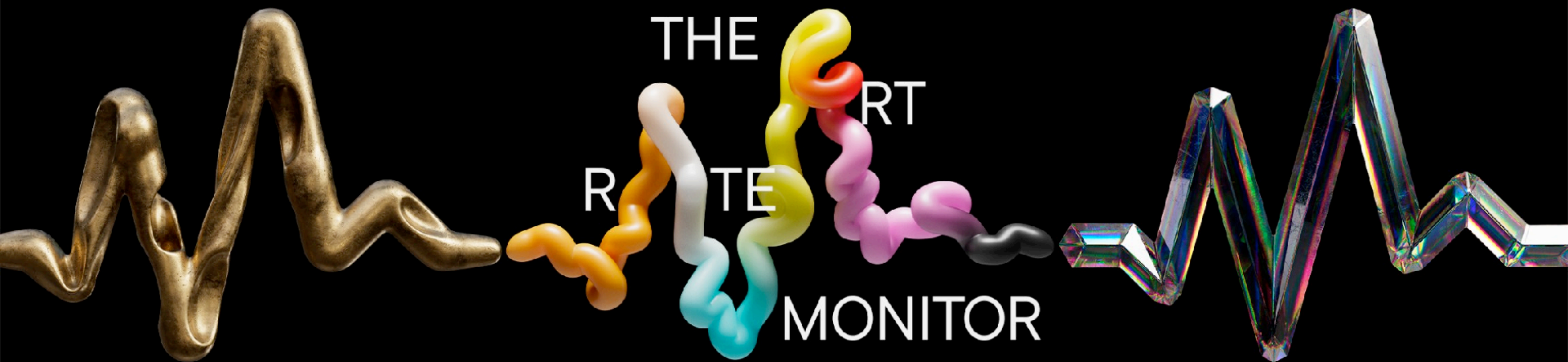
Paul McCartney singing “Yesterday” in New York (1965). Still from YouTube.



Adele singing "Someone like you" at Tiny Desk (2011). Still from YouTube.



Photo of Ai Weiwei's S.A.C.R.E.D. installation (2013).





AGO



THE ART RATE
MONITOR

The Tiff by Florence Carlyle

Made your heart race

104 BPM



Florence Carlyle, *The Tiff*, c. 1902. Photo © AGO

ART CAN TAKE
A STANCE



Art can be used to show solidarity

Led by Donkeys paint the Ukrainian flag a year after the Russian invasion (2023)



ART CAN
SUPPORT A
MOVEMENT



Marvin Gaye singing "What's going on".



Still from video of "Alright" by Kendrick Lamar.



Kendrick Lamar performing on top of a police car at BET awards (2015)

**Me being on a cop car, that's
a performance piece after
these senseless acts**

– Kendrick Lamar, in interview with TMZ

**Me being on a cop car, that's
a performance piece after
these senseless acts (...)
This is our music. This is us
expressing ourselves.**

- Kendrick Lamar, in interview with TMZ



Vincent van Gogh's Sunflowers (1888).



Activists throw a can of tomato soup on the work at National Portrait Gallery (2022).

ART CAN CAPTURE
COMPLEX HUMAN
EXPERIENCES

What it is like to love



I don't believe that anybody feels the way I do about you now



You are / my fire / the one / I desire

What it is like
to try and
understand
other people



What it's like to be fed up with the status quo

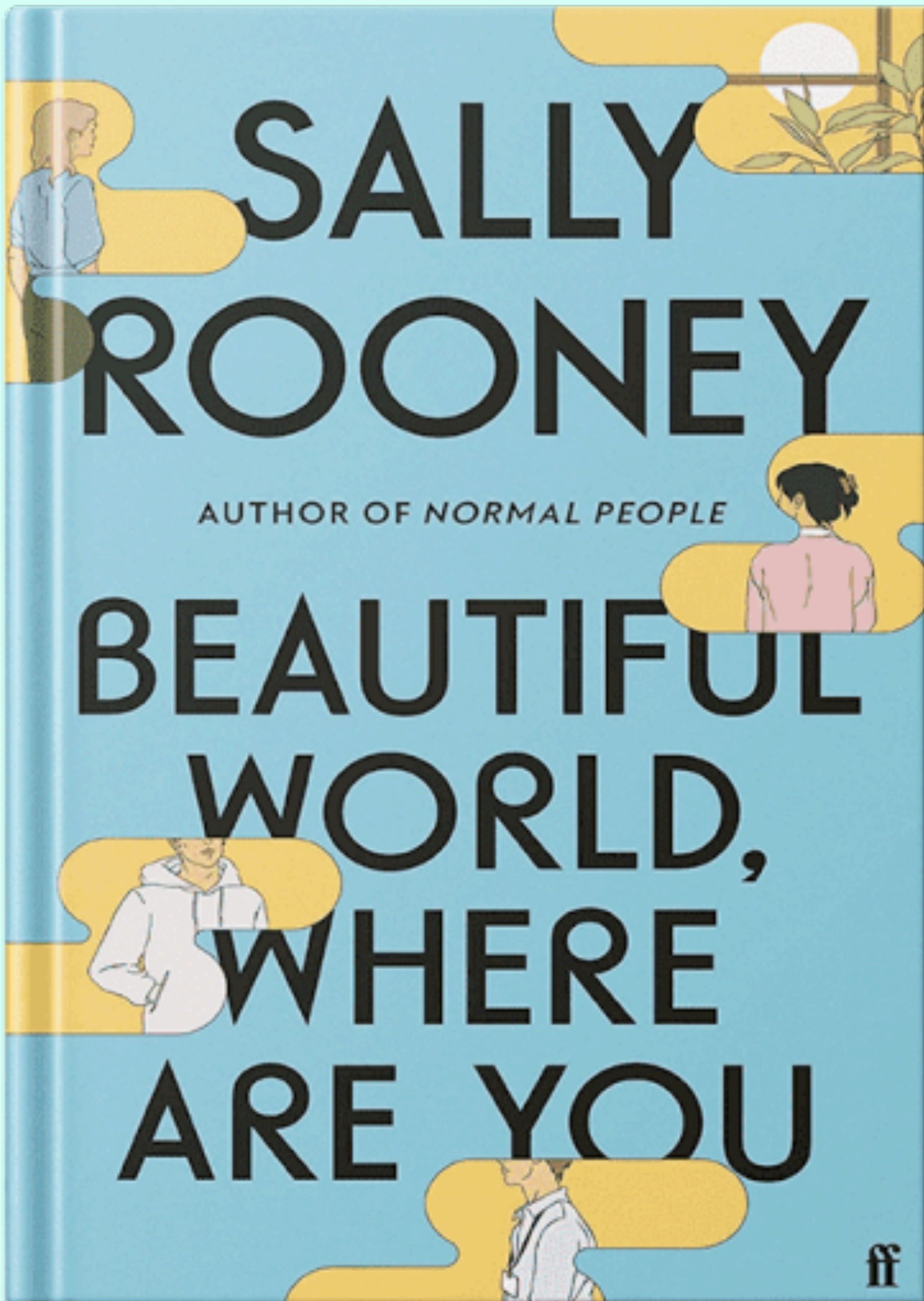


IJSLAND at Melkweg, Amsterdam

What it's like to be fed
up with the status quo

**and our own
hypocrisy**





What it's like
to be young

ART CAN RECORD
COLLECTIVE
MEMORIES



Guernica by Pablo Picasso (1937)



Bebelplatz / Opernplatz, Berlin (Wikipedia)



“The Empty Library” by Micha Ullman (Wikipedia)

ART DOESN'T
HAVE TO FIT IN



Like



Comment



Repost



Send

Exciting

Impressive

Looks great

Awesome product

Exc



Add a comment...



**AI is so good at simulating
school and business
language**

– Oliver Reichenstein, “AI and the end of writing”

**AI is so good at simulating
school and business
language because a lot of our
own understanding in both
spheres is largely simulated.**

- Oliver Reichenstein, "AI and the end of writing"

Art can insult
the audience



“In and Out of Love (White Paintings and Live Butterflies)” by Damien Hirst

Mistakes in art
can be beautiful

Art can make us think

Art can move us

Art can take a stance

Art can support a movement

Art can capture complex human
human experiences

Art can record collective memories

Art can make us think

Art can move us

Art can take a stance

Art can support a movement

Art can capture complex human
human experiences

Art can record collective memories

the point isn't always
the art itself

The artist's

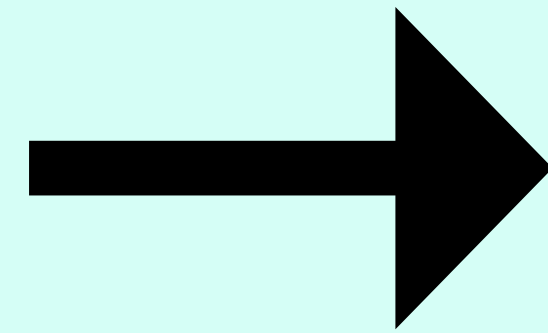
intention

reflection

research

skill

world view



art

The artist's

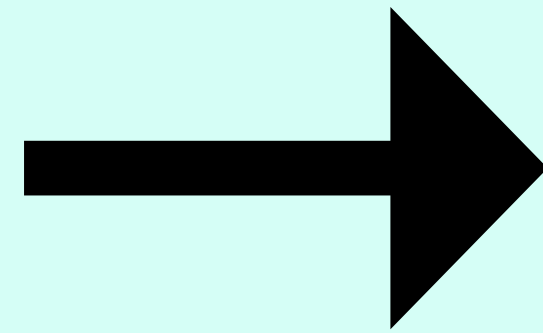
voice

life experience

talent

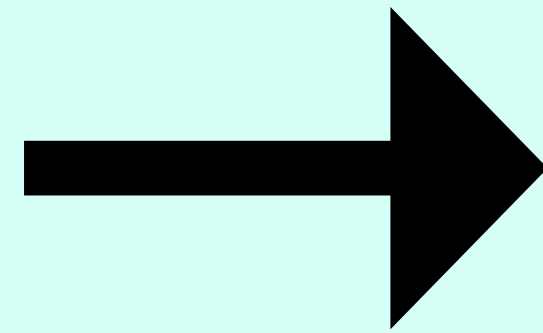
background

culture



art

art



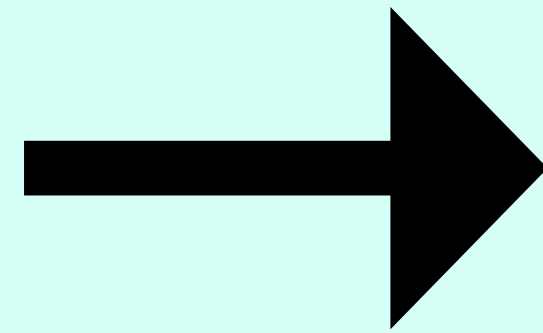
The audience's

shared
experiences

**“Pop music is a
promise that you
aren’t listening alone”**

– Mat Dryhurst

art



The audience's

emotion

reflection

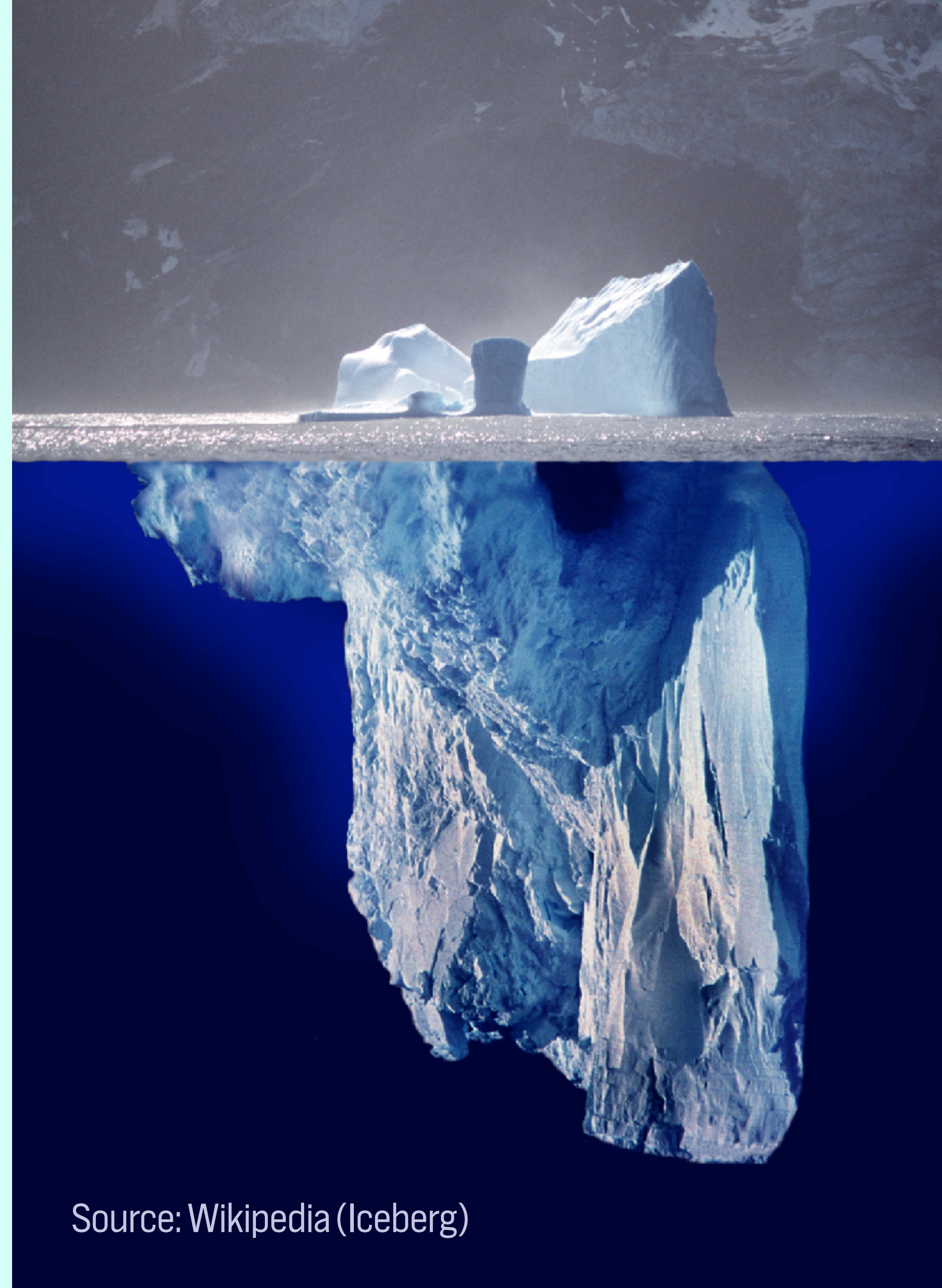
empathy

understanding

inspiration

an artwork

before making /
after releasing



Source: Wikipedia (Iceberg)





Meaning is in between the lines

Net als altijd gingen we naar de eetzaal en aten ons avondeten. We gingen in bad. Daarna maakten we een fles goede wijn open die ik voor een speciale gelegenheid had bewaard.

We dronken er samen van en ik speelde gitaar. Haar gebruikelijke favorieten van de Beatles zoals "Norwegian Wood" en "Michelle". Het was heel gezellig. We deden het licht uit, we kleedden ons uit en kropen in bed. Het was een heel warme nacht en zelfs met het raam open kwam er geen zuchtje wind naar binnen. Het was buiten inktzwart en we hoorden

can computers have

intention

skills

reflection

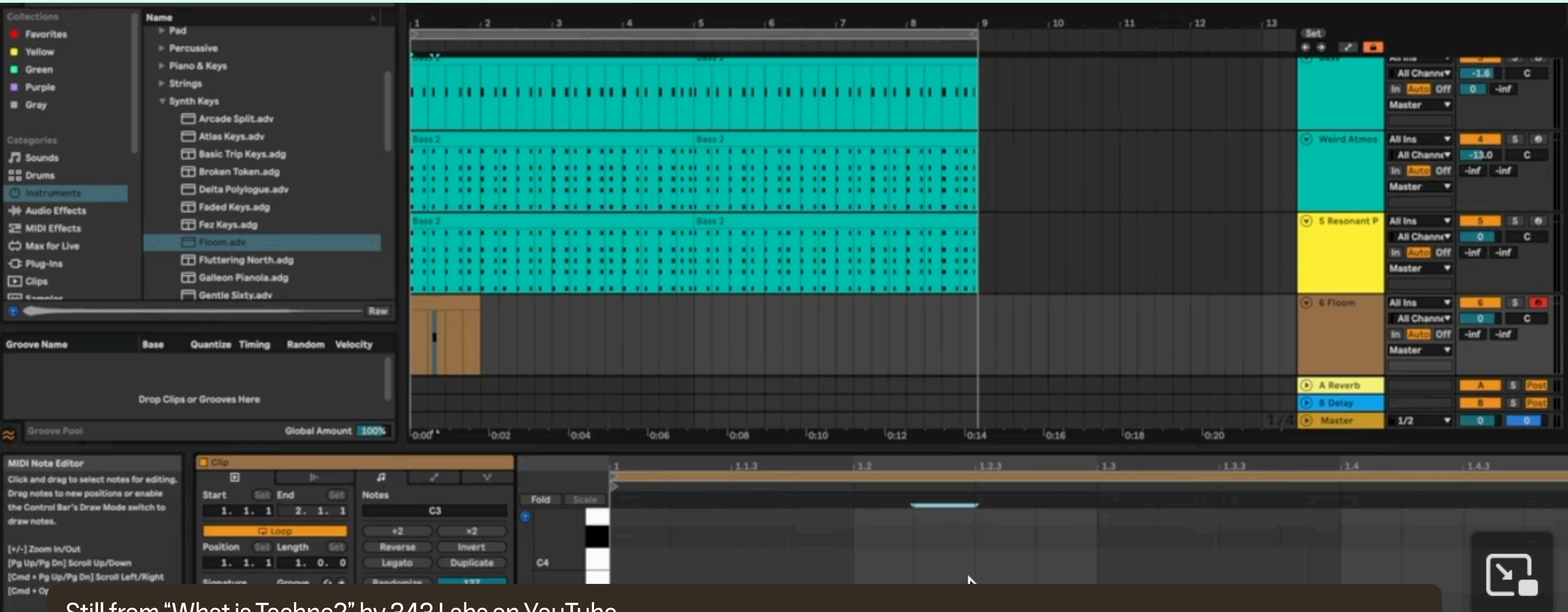
experiences

research

a world view

?

Computers are often part of the toolset to make artifacts.



Still from "What is Techno?" by 343 Labs on YouTube



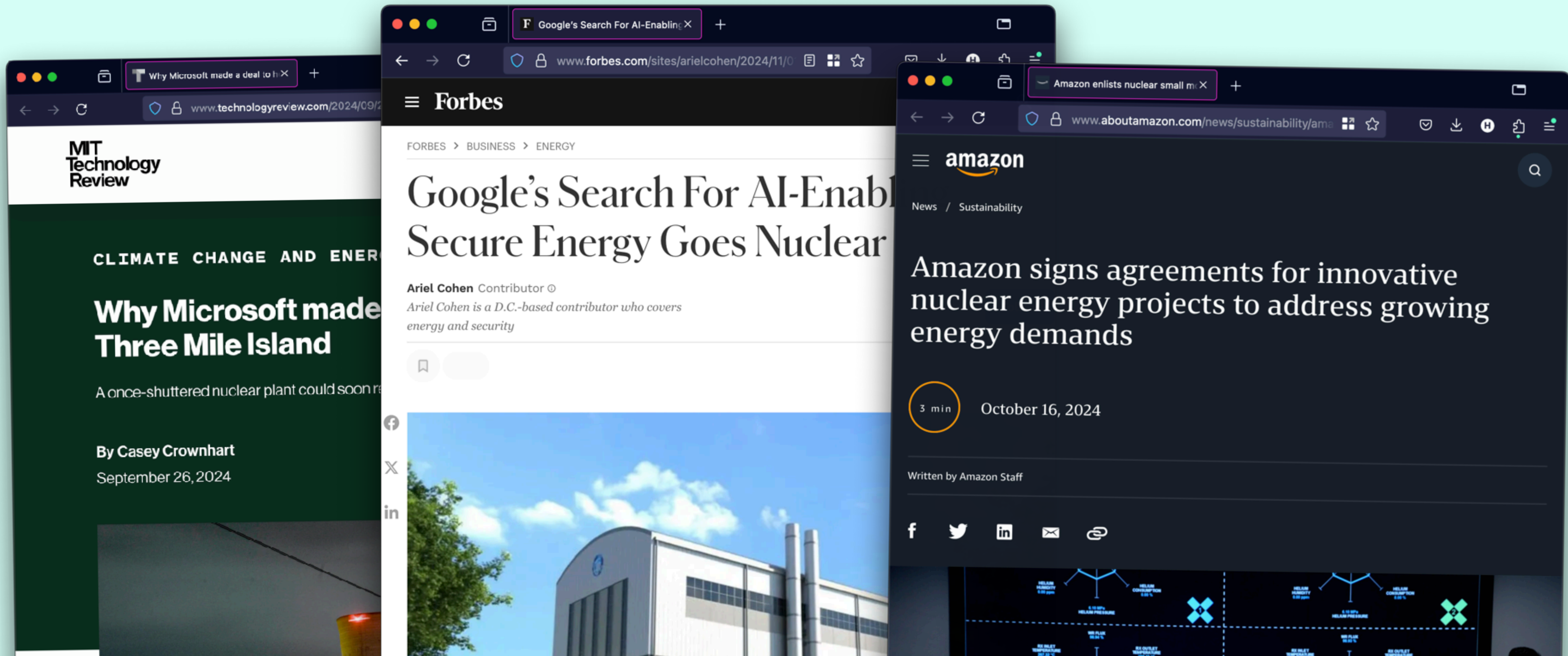
“It’s a tool.”

- Mira Murati, (then) CTO of OpenAI (2024). when asked if LLMS would produce creative works

youtu.be/yUoj9B8OpR8

**Open questions
for computing**

Environmental impact



Environmental impact

Copyright infringement

Environmental impact

Copy

OpenAI—written evidence (LLM0113)

House of Lords Communications and Digital Select Committee inquiry: Large language models

OpenAI welcomes the opportunity to provide written evidence to the House of Lords Communications and Digital Select Committee's inquiry into Large Language Models. This inquiry and forthcoming report will contribute significantly

provide. Because copyright today covers virtually every sort of human expression—including blog posts, photographs, forum posts, scraps of software code, and government documents—it would be impossible to train today's leading AI models without using copyrighted materials. Limiting training data to public domain books and drawings created more than a century ago might yield an interesting experiment, but would not provide AI systems that meet the needs of today's availability of safe and beneficial AI tools.

1. Future Trajectories: Please could you describe how the next generation of large language models is likely to develop over the next 3

Environmental impact

Copyright infringement

Vector for abuse

Environmental impact

Copyright infringement

Vector for abuse

Not open

Environmental impact

Copyright infringement

Vector for abuse

Not open

Risk of dullness

Risk of dullness

**Creativity
cannot be
computed**

Art is as much about the
artist and **audience**
than its deliverables.

Art is much more
than an **artifact**.

the possibility of exaggerated ideas

- Ada Lovelace, in her notes



We can use computers to
express ourselves creatively

But making creative work is
about process, intentions
and creativity.

But making creative work is
about process, intentions
and creativity.

Not the output or tools.

I love
computers

but they don't use creativity
in the way artists can

Make art

Enjoy art

Thank you!

Thanks to: Paul van Buuren, Arjan Eising, Miriam Suzanne, Vasilis van Gemert, Geart de Vries, Jelmer van der Linde, Melinda Seckington, Yi-Chu Lin (林逸筑), Niels Leenheer.

Slides + links are live on

hidde.blog/slides

Links

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SEP, The definition of art <https://plato.stanford.edu/entries/art-definition/>

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The project plan to invent artificial intelligence in a summer <https://raysolomonoff.com/dartmouth/boxa/dart564props.pdf>

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Melanie Mitchell, “Why AI is Harder Than We Think” https://raw.githubusercontent.com/computationalmind/computationalmind.github.io/main/speaker_slides/Mitchell_WhyAllsHarderThanWeThink.pdf

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L.F. Menabrea, “Sketch of the Analytical Engine Invented by Charles Babbage”, Scientific Memoirs, 3 (1843), With notes upon the Memoir by the Translator Ada Augusta, Countess of Lovelace. 666-731.

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