

Het Geheugen van de Toekomst



**ARCHIEF
DAGEN**

Welkom in onze gastlocatie Beeld & Geluid



ARCHIEF
DAGEN

Een jaarlijks congres van

KVAN

KEY NOTE



ARCHIEF
DAGEN

Een jaarlijks congres van

KVAN

WORKSHOPS

Ronde 1: 13.30 - 14.30

- AI en Archieven
- Code Diversiteit & Inclusie
- Zet werken die niet in de handel zijn online
- Voorbij het nepnieuws



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WORKSHOPS

Ronde 2: 15.00 - 16.00

- Linked Data: actie!
- Van grijs naar groen: CO2-impact digitaal archief
- De studiezaal sluit zichzelf
- Europeana - DE-BIAS



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KVAN

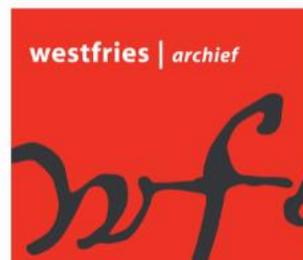


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Archief als nutsvoorziening!

WOO en actief openbaar maken van overheidsinformatie

Panelgesprek



KEY NOTE



Dina Zielinski:

'Nature's
oldest
storage
device: DNA'



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Digital DNA storage

Memory of tomorrow

KVAN

12 June 2023

Data by the minute



**4 million videos
streamed**



47,000 photos

NETFLIX

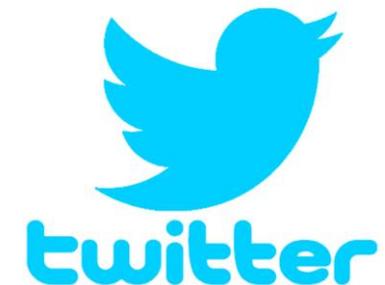
**69,000 hours of
video streamed**



**120 new
professionals**



**156 million
emails sent**



456,000 tweets

Storage vocabulary

1 byte = 8 bits

Megabyte

1,000,000 bytes

Gigabyte

1,000,000,000 bytes

Terabyte

1,000,000,000,000 bytes

Petabyte

1,000,000,000,000,000 bytes

Exabyte

1,000,000,000,000,000,000 bytes

Zettabyte

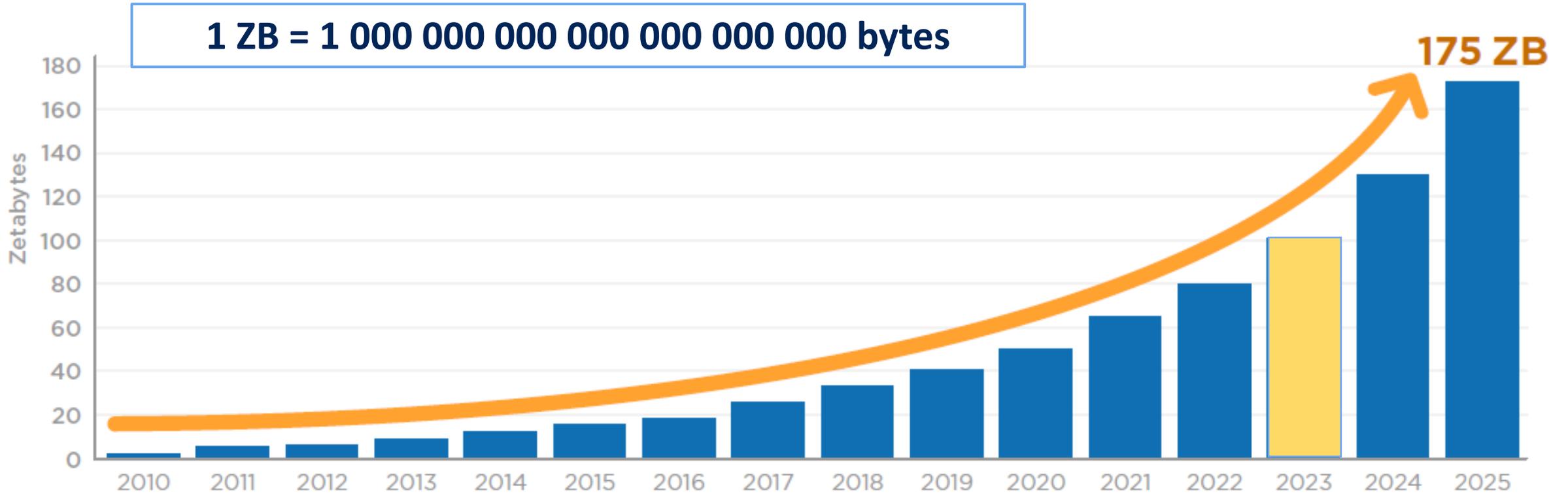
1,000,000,000,000,000,000,000 bytes

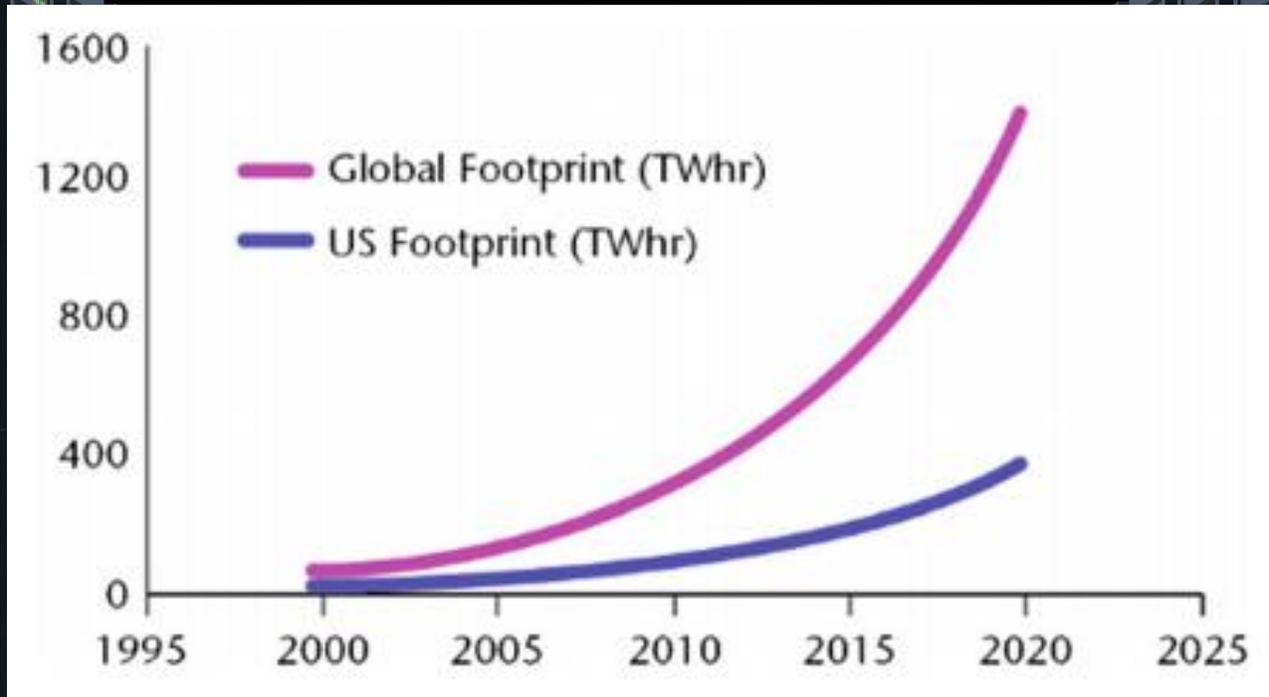
Yottabyte

1,000,000,000,000,000,000,000,000 bytes

Hellabyte?

The global datasphere





Ismaeel et al 2018

1994

“This CD-ROM can hold more information than all the paper that's here below me”

Bill Gates
Co-Founder, Microsoft



Human designed storage media



stone tablet
~3200 BC



punch card
1890



hard drive
1956



floppy disk
1967



compact disc
1982



SD card
1999



miniSD
2003

2000 BC
paper



1951
magnetic tape



1962
cassette



1978
solid state drive

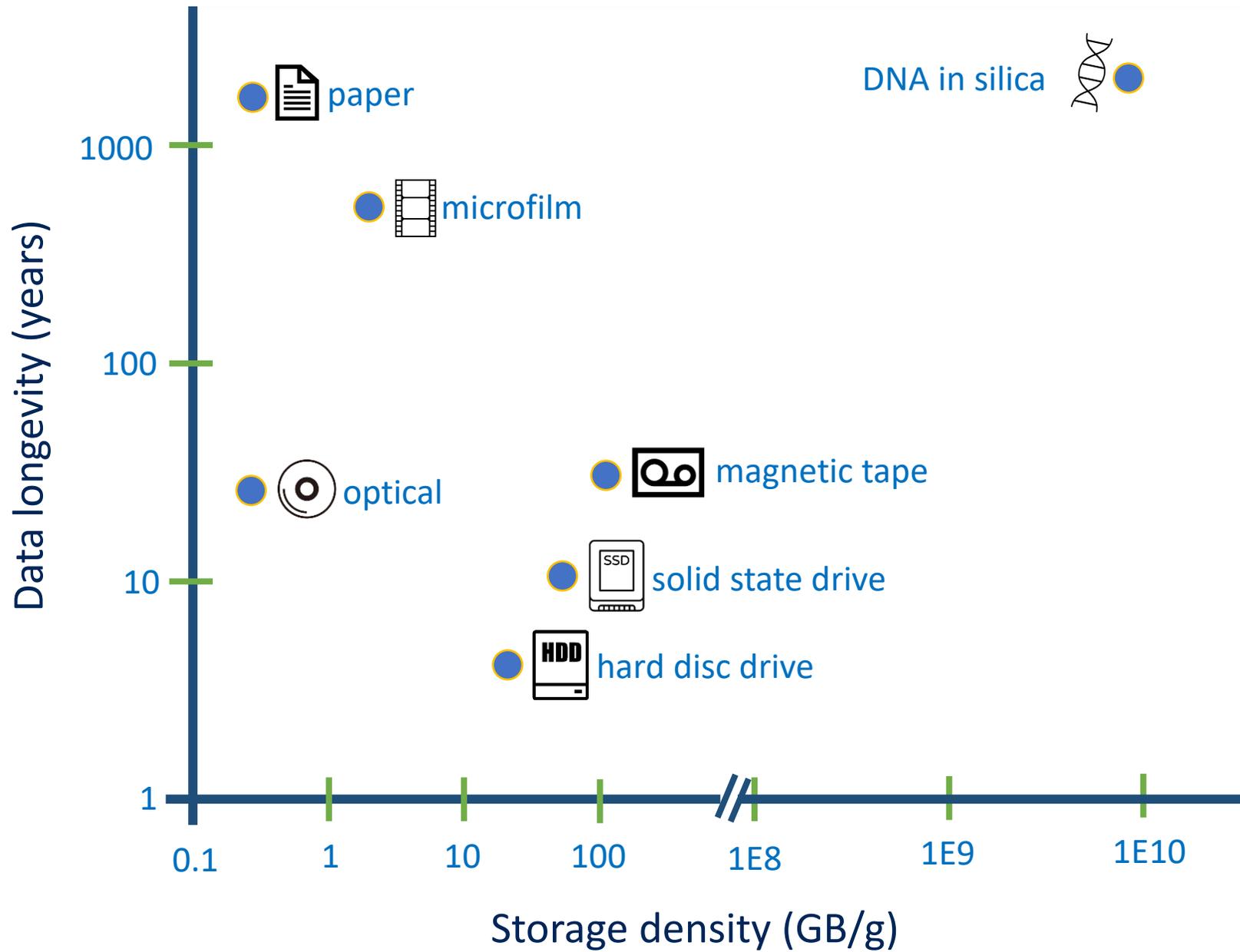


1999
USB drive



2004
microSD

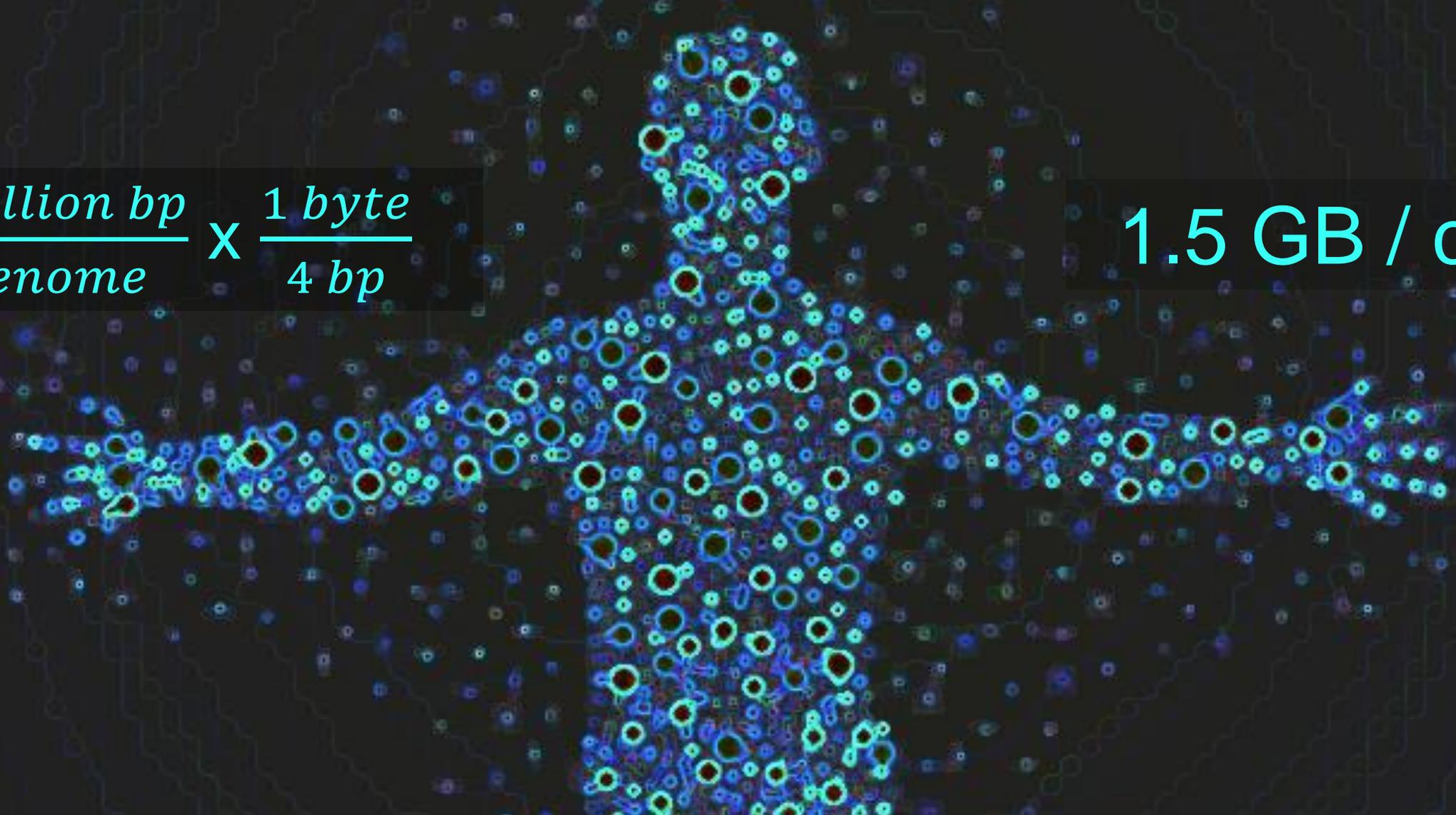




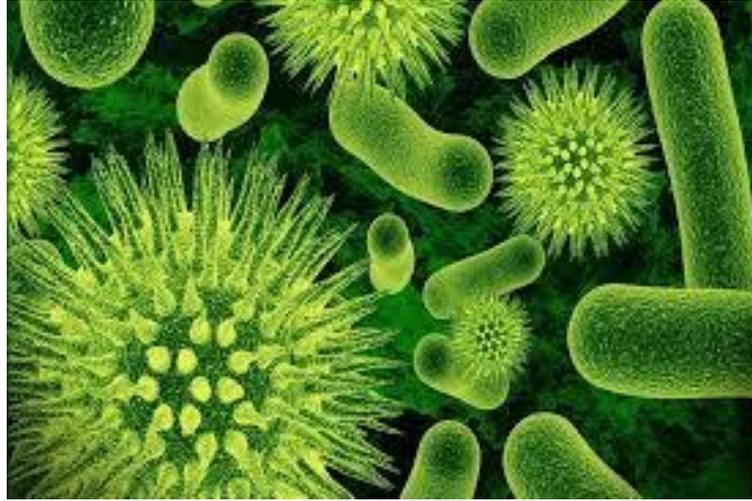
30,000,000,000,000 cells

$$\frac{6 \text{ billion bp}}{\text{genome}} \times \frac{1 \text{ byte}}{4 \text{ bp}}$$

1.5 GB / cell



Every living thing is a DNA storage device



load more comments (29 replies)

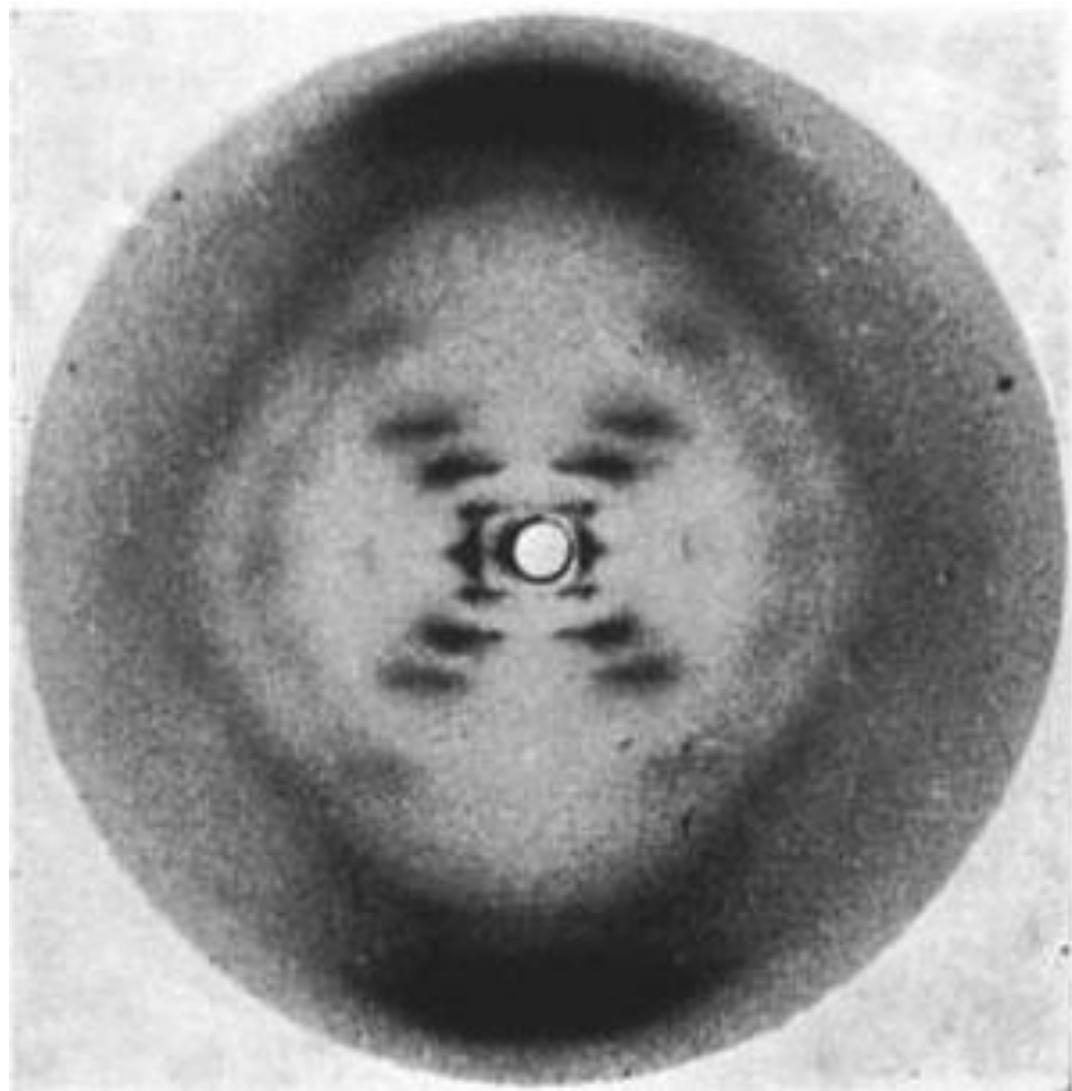
↑ [-] [caddy666](#) 808 points 7 months ago

↓ How long before I can literally have a thumb drive?

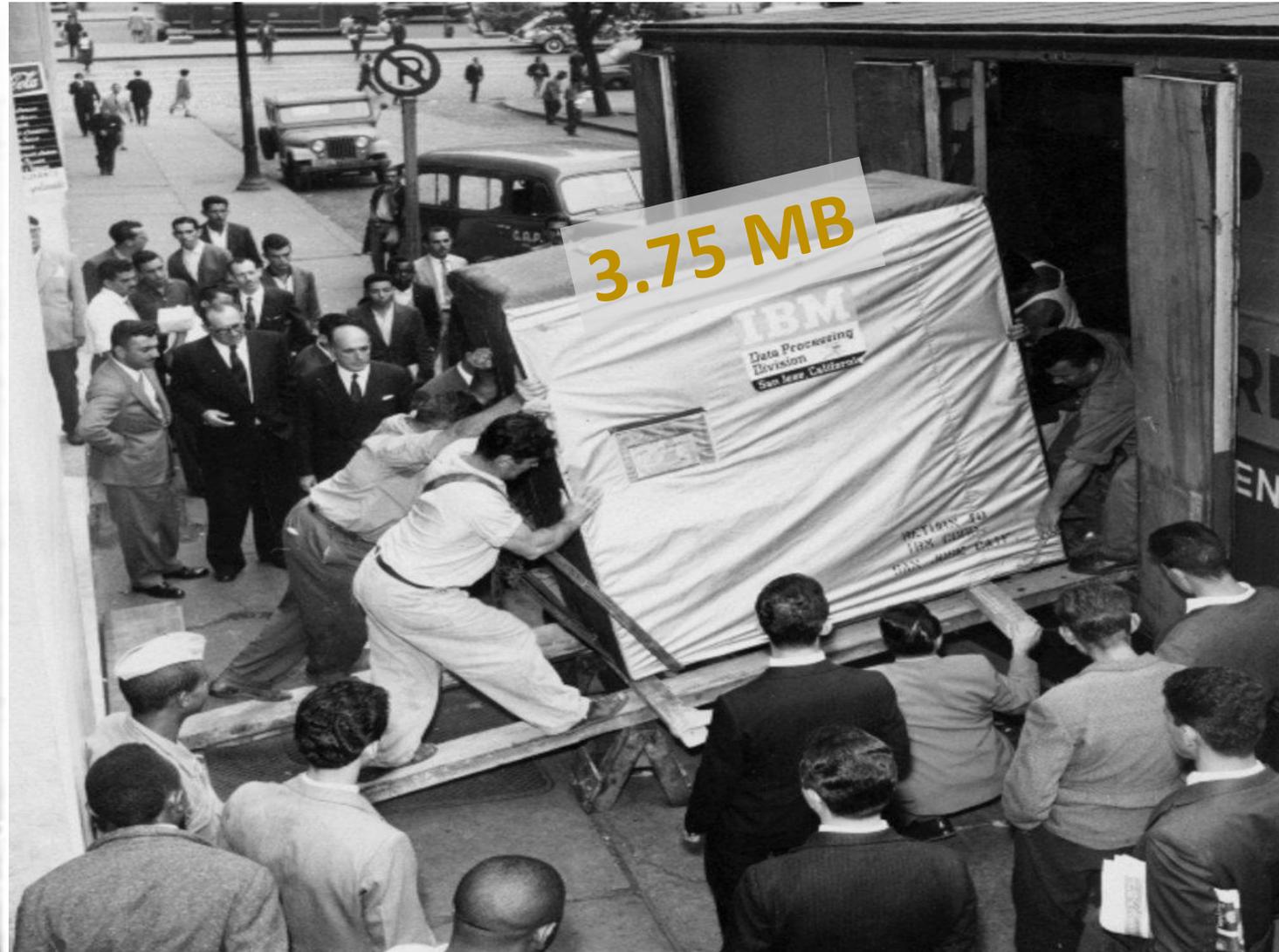
[permalink](#) [embed](#)



1953



1956







01 11 10 00

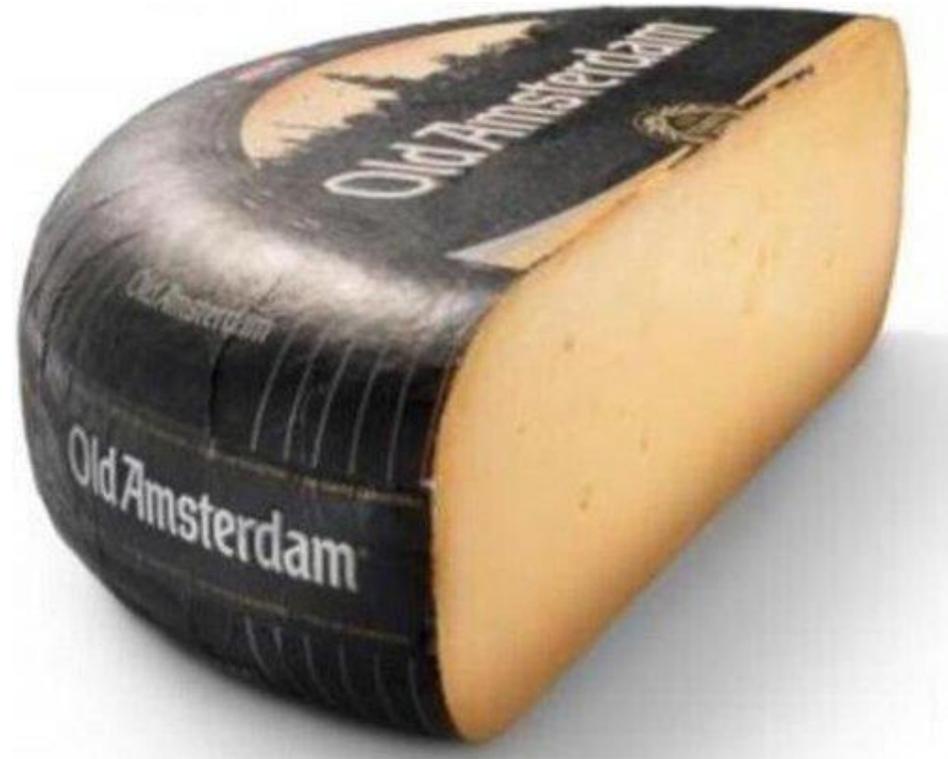
60 ZB of data



~ 3.5 kg of DNA



5 kg



1,000,000,000
45 TB Tape Cartridges (€100 each)



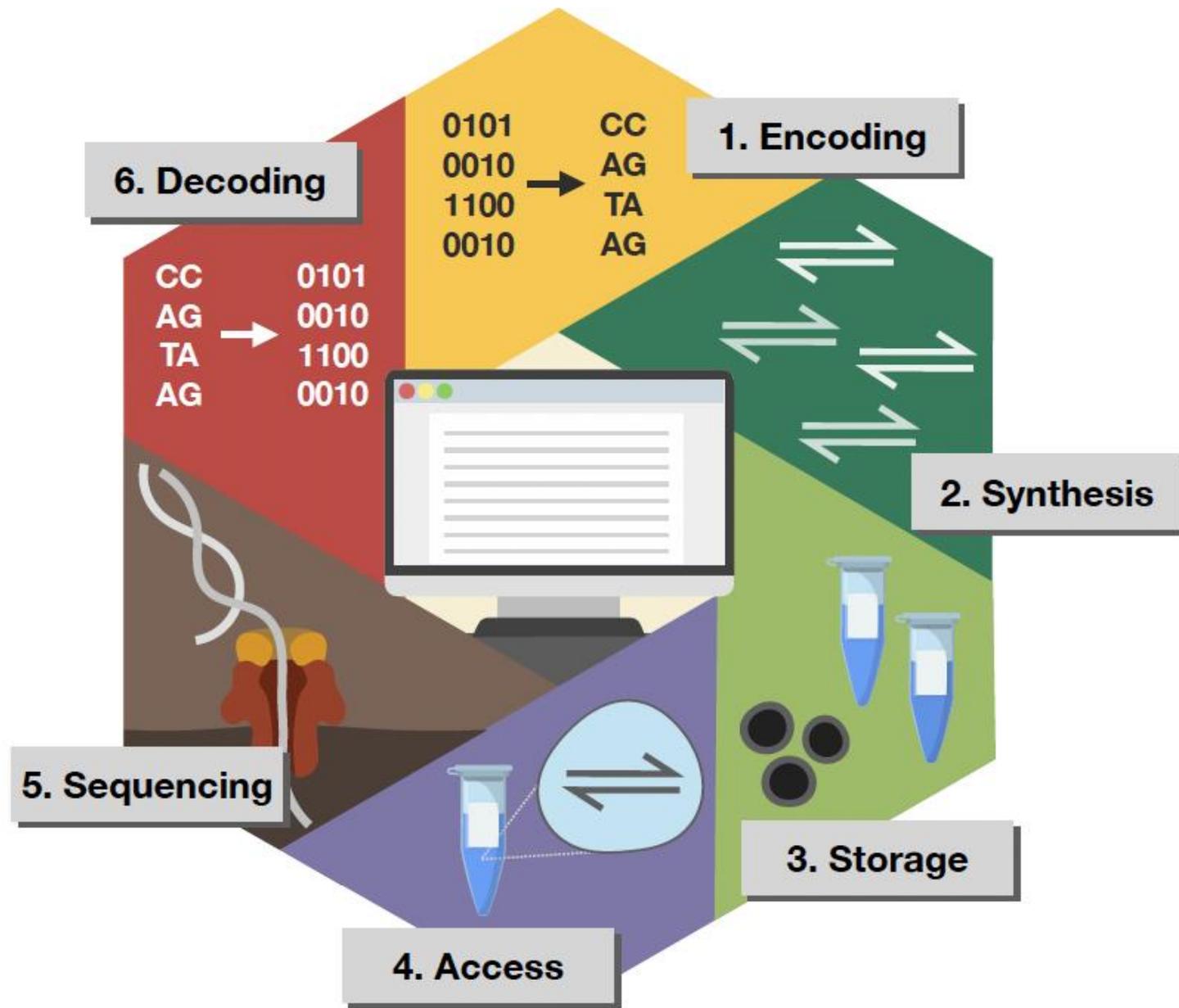


10-50 years
3 GB/cm²
\$0.05/GB
read=seconds
write=seconds



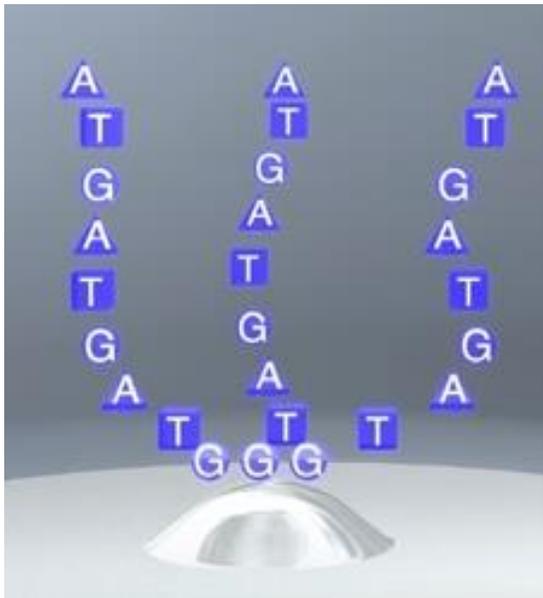
>100 years
455 EB/g
\$1 million/GB
read=hours
write=hours

HOW DO YOU STORE STUFF IN DNA?

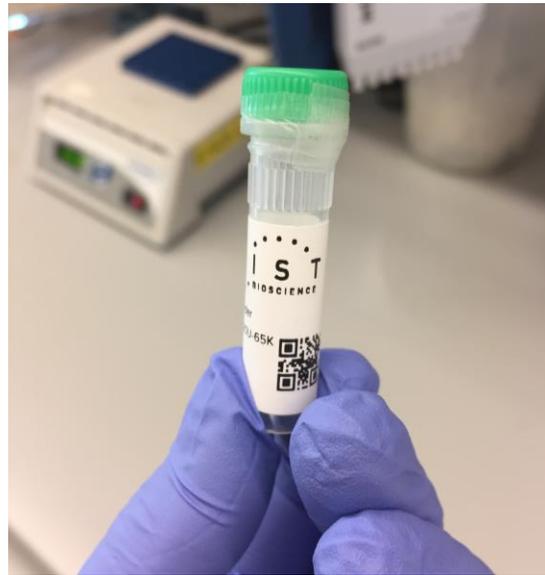


FILE: 00 01 10 11
↓ ↓ ↓ ↓
DNA: A C G T

WRITE



STORE



READ



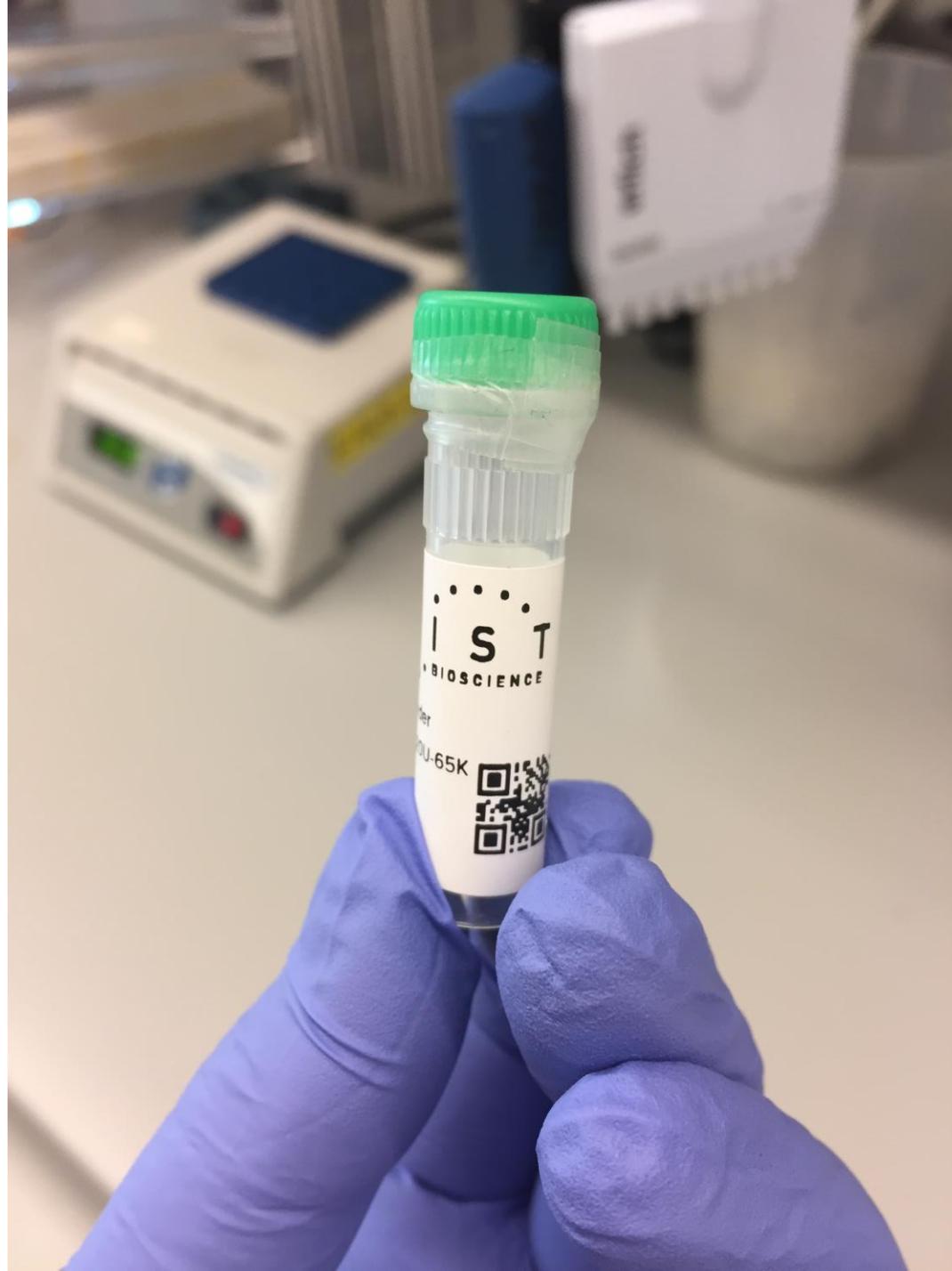
dina@hdm\$

dina@hdm\$

4

2 Megabytes

\$ 7500



19 PB

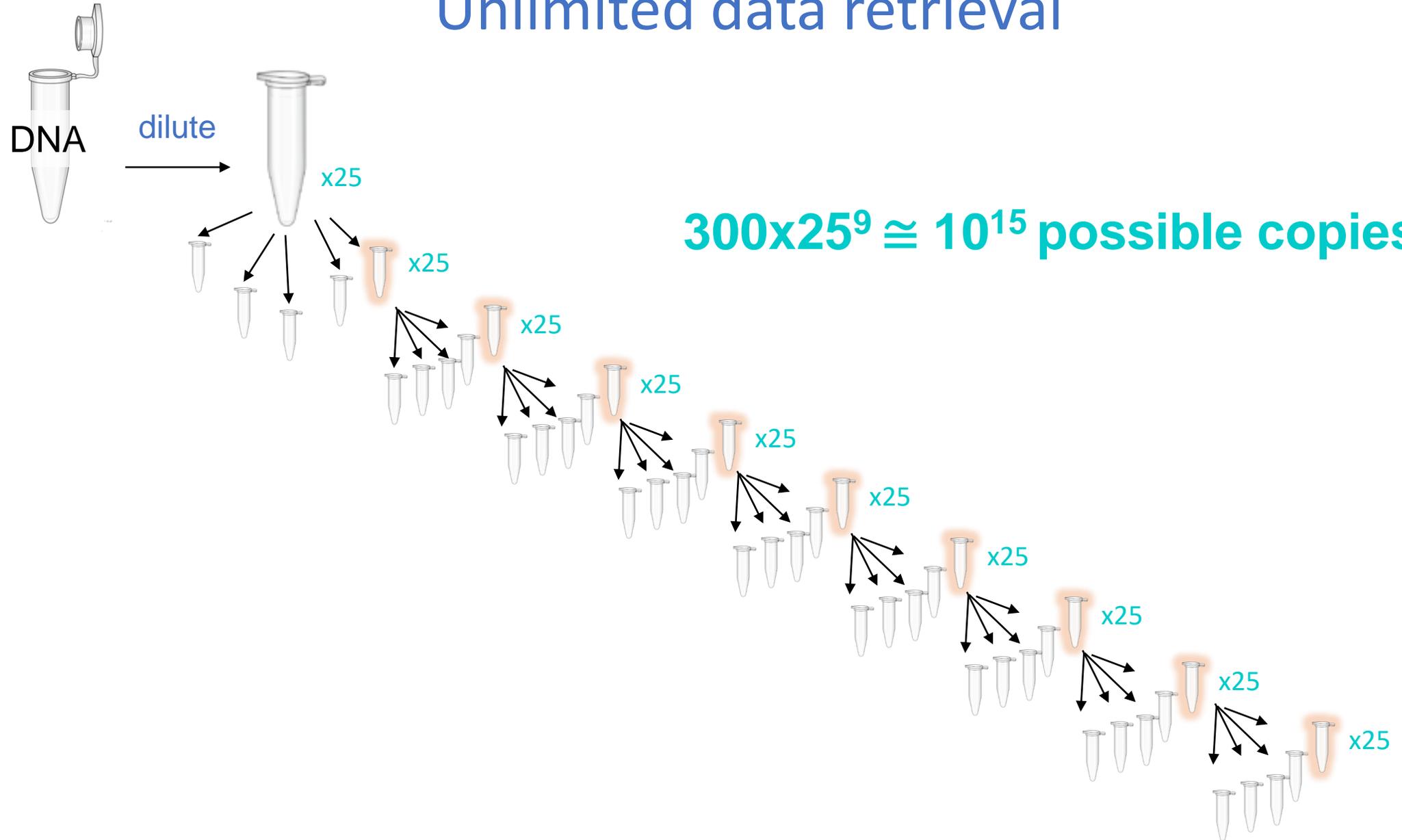
\$ 19 trillion



A printing revolution



Unlimited data retrieval





WHAT SHOULD WE STORE IN DNA?



United Nations
Educational, Scientific and
Cultural Organization



Memory of
the World

The 'web cradle prints' of the Dutch internet: web collection of XS4ALL homepages

The web collection of XS4ALL homepages is the largest interrelated digital heritage collection from the early days of the Dutch web that has been preserved. The pages have been collected by the Koninklijke Bibliotheek.



Tim DeHaan

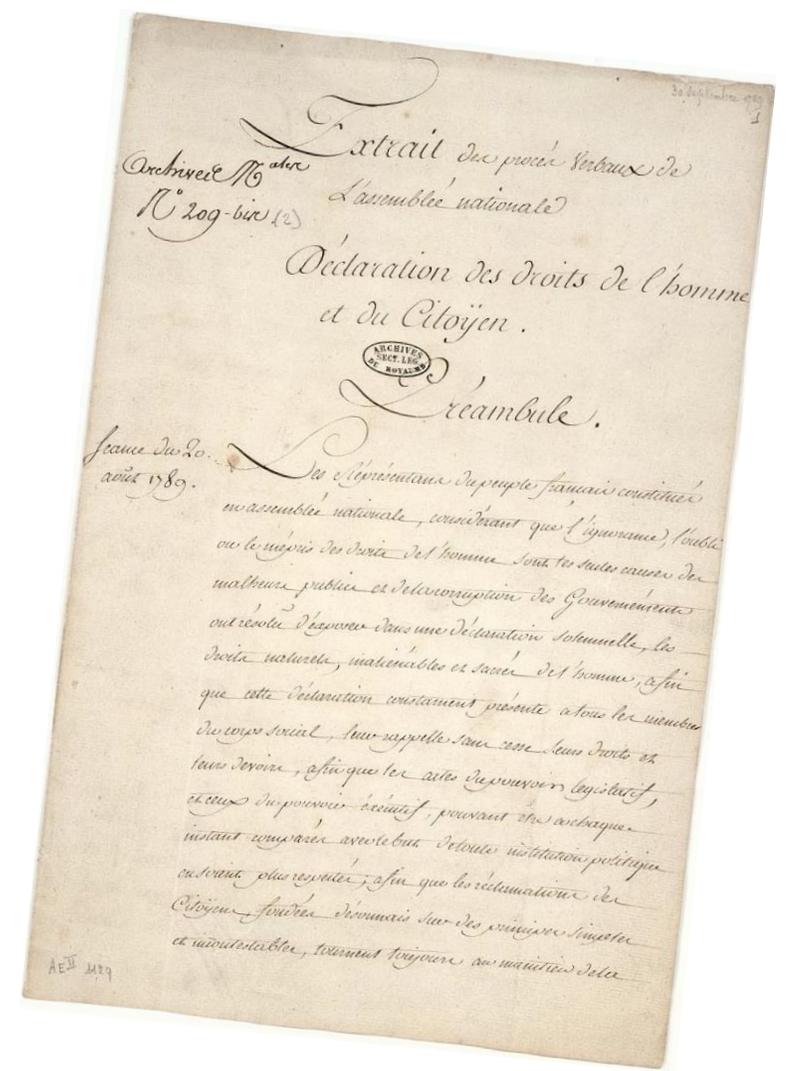


Nov 01, 2022

KB } nationale
bibliotheek

A world first: DNA-encoded digital archives enter the French National Archives

23 November 2021



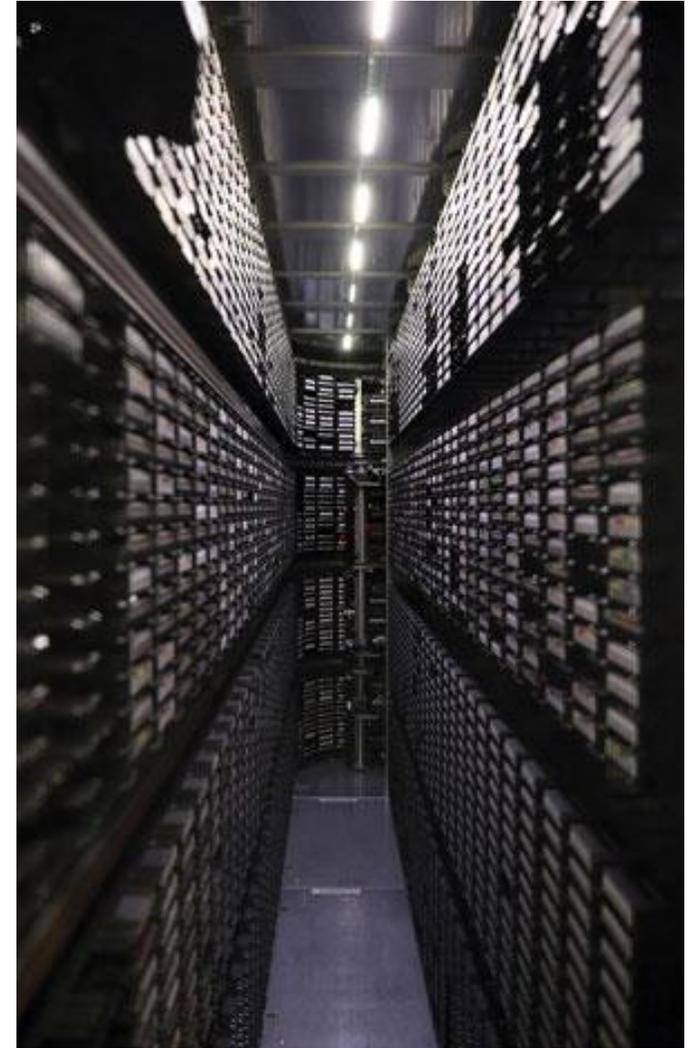
DDHC - 1789

DDEC - 1791

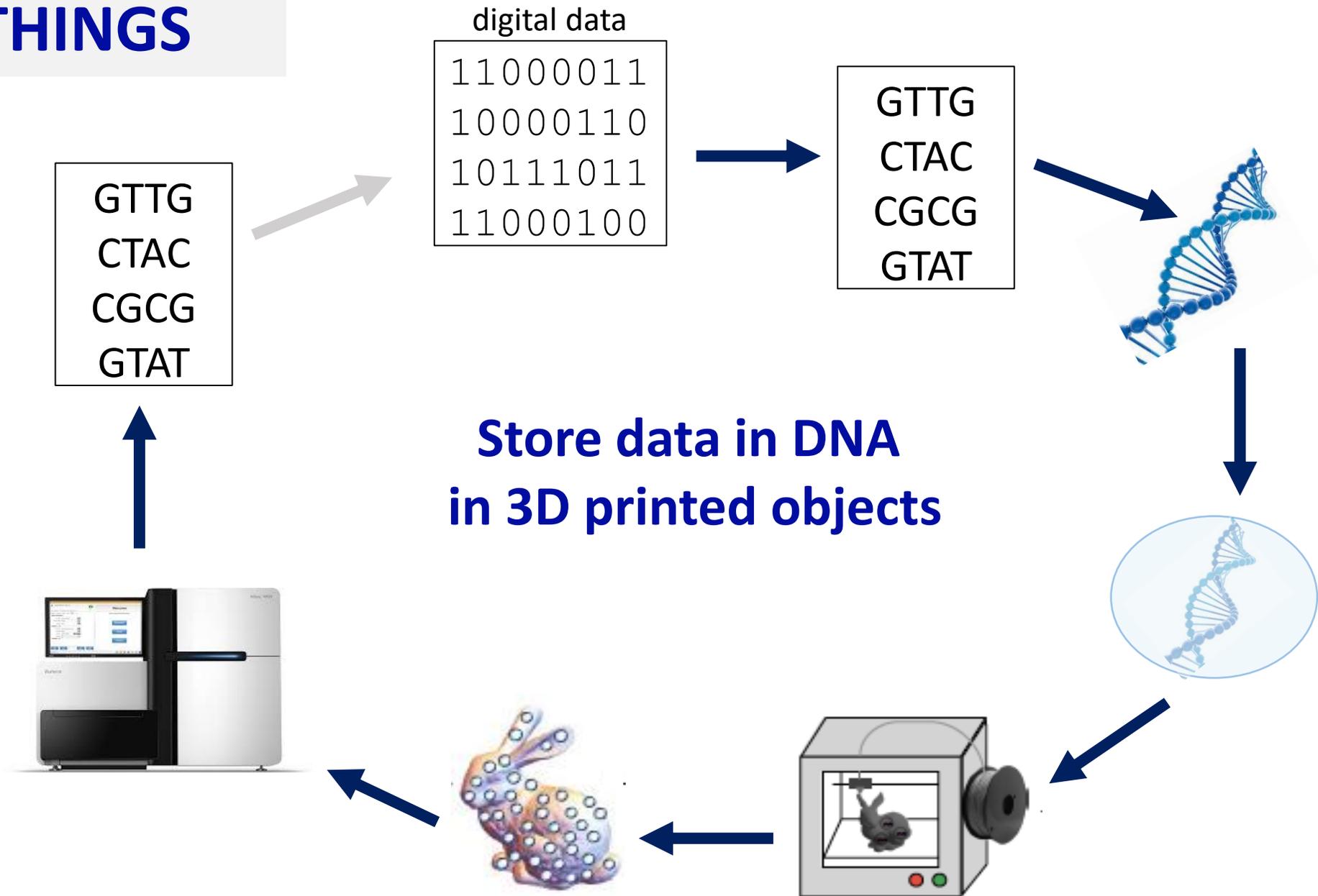
The Lost Picture Show: Hollywood Archivists Can't Outpace Obsolescence

Studios invested heavily in magnetic-tape storage for film archiving but now struggle to keep up with the technology

By **Marty Perlmutter**

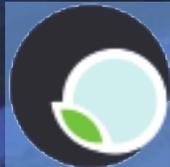


DNA OF THINGS



ARCHIVAL STORAGE

-18°C ~ 0°F
> 2 million years



Svalbard
Global Seed Vault

KEY NOTE



The socio-
technical
archive

Mrinalini Luthra:



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Humanising Archival Practice Towards an Accessibility of Care

Mrinalini Luthra | Data Ethics Specialist
GLOBALISE, Huygens Institute, KNAW

The Truth of Fact, The Truth of Feeling

I Remem: search tool for lifelogs

“Justice is an essential part of the social contract and one cannot have justice until one knows the truth.”

“The point is not to prove you were right; the point is to admit that you were wrong.”

“Digital memory will not stop us from telling stories of ourselves. What digital memory will do is change those stories from fabrications that emphasise our best acts and elide our worst.”

EXHALATION
EXHALATION
EXHALATION

TED CHIANG

‘Chiang makes us experience each story with immediacy and calm passion’ China Miéville

The Truth of Fact, The Truth of Feeling

Scribes are unreliable, archives are not neutral

Histories are prone to revisionism

What do histories need to do?

Dayanita Singh, *The Museum of Chance*, 2013



Collaborators

Charles Jeurgens

- Prof. Archival Sciences, UvA

GLOBALISE

- NWO funded infrastructure project
- Researchable VOC archives

Dayanita Singh, *I am as I am*, 1999



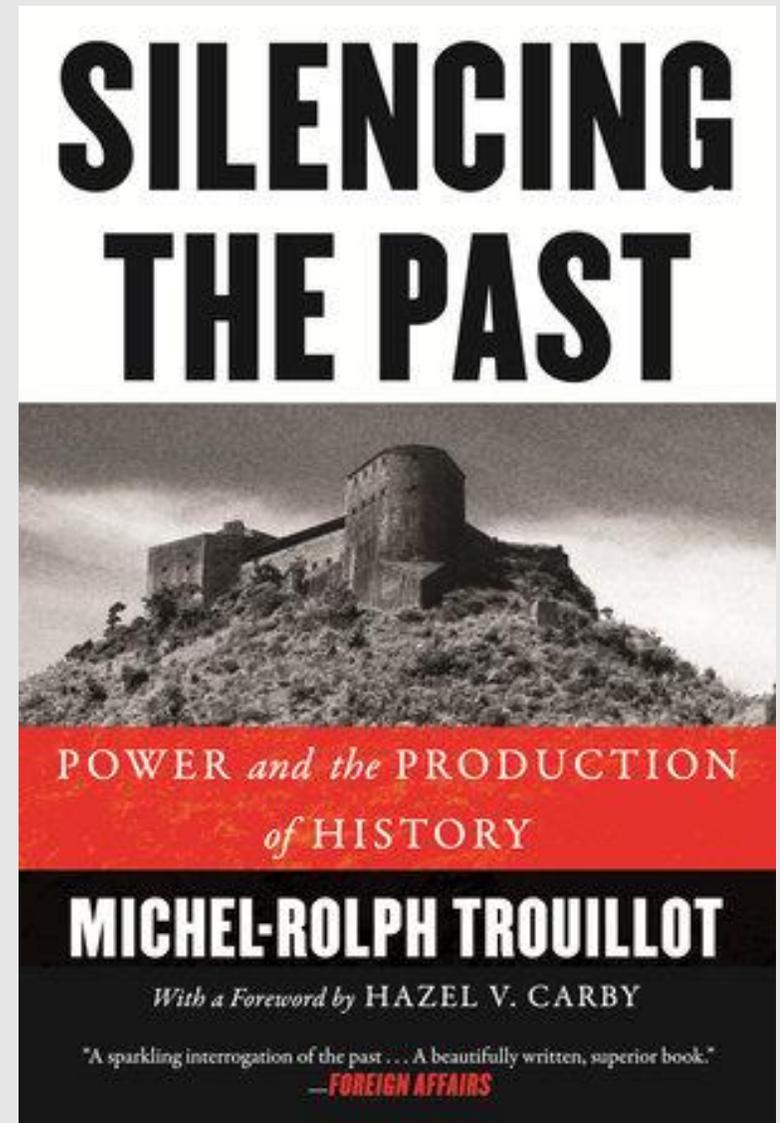
Silences in the Archive

History not an objective account of the past

- Selective and subjective process
- Power Dynamics
- Social Context
- Political

Moments of silencing:

- Fact Creation
- Fact Assembly
- Fact Retrieval
- Retrospective Significance



Archive of the Future

“History is the fruit of power, but power itself is never so transparent that its analysis becomes superfluous. The ultimate mark of power may be its invisibility; the ultimate challenge, the exposition of its roots.”

“The focus on The Past often diverts us from the present injustices for which previous generations only set the foundations.”

La Vaughn Belle, *In the Place of Shadows*, 2022



Power, Silences and the Digital Archive

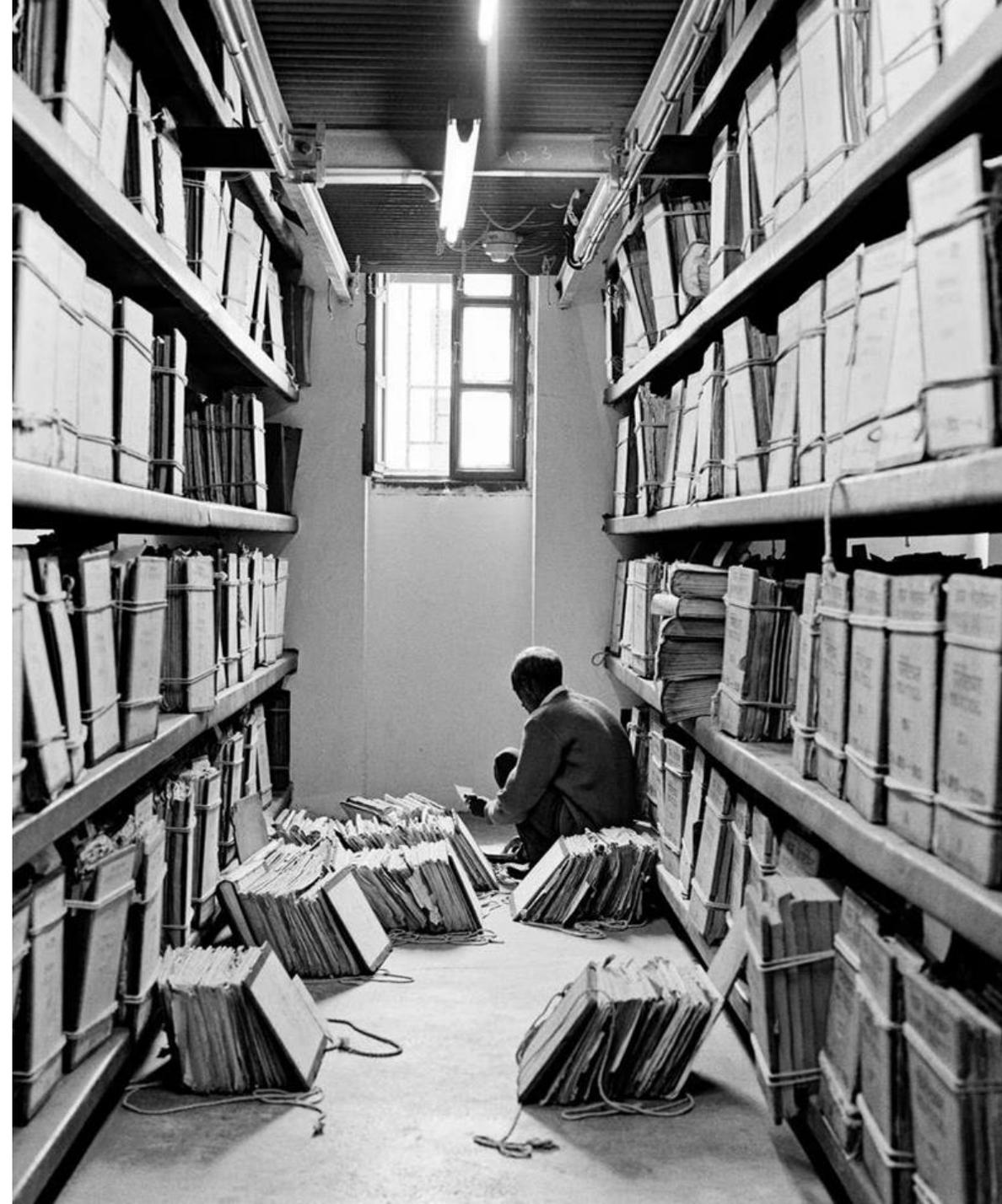
Digital Cultural Heritage

- Protecting fragile documents
- Reaching larger audiences
- 'Accessibility for everyone'

Digital adoption without examination of the socio-political implications:

- Perpetuate existing power imbalances
- Replicate same ideologies and biases

Dayanita Singh, *The File Room*, 2013



Digitised VOC Testaments Inventory

[Home](#)
[Onderzoeken](#)
[Beleven](#)
[Archiveren](#)
[Menu](#)

[Home](#) > [Onderzoeken](#) > [Indexen](#)

[Terug](#)

VOC: Oost-Indische testamenten

Periode: 1698 - 1807

[Download index ZIP \(548,27 KB\)](#)

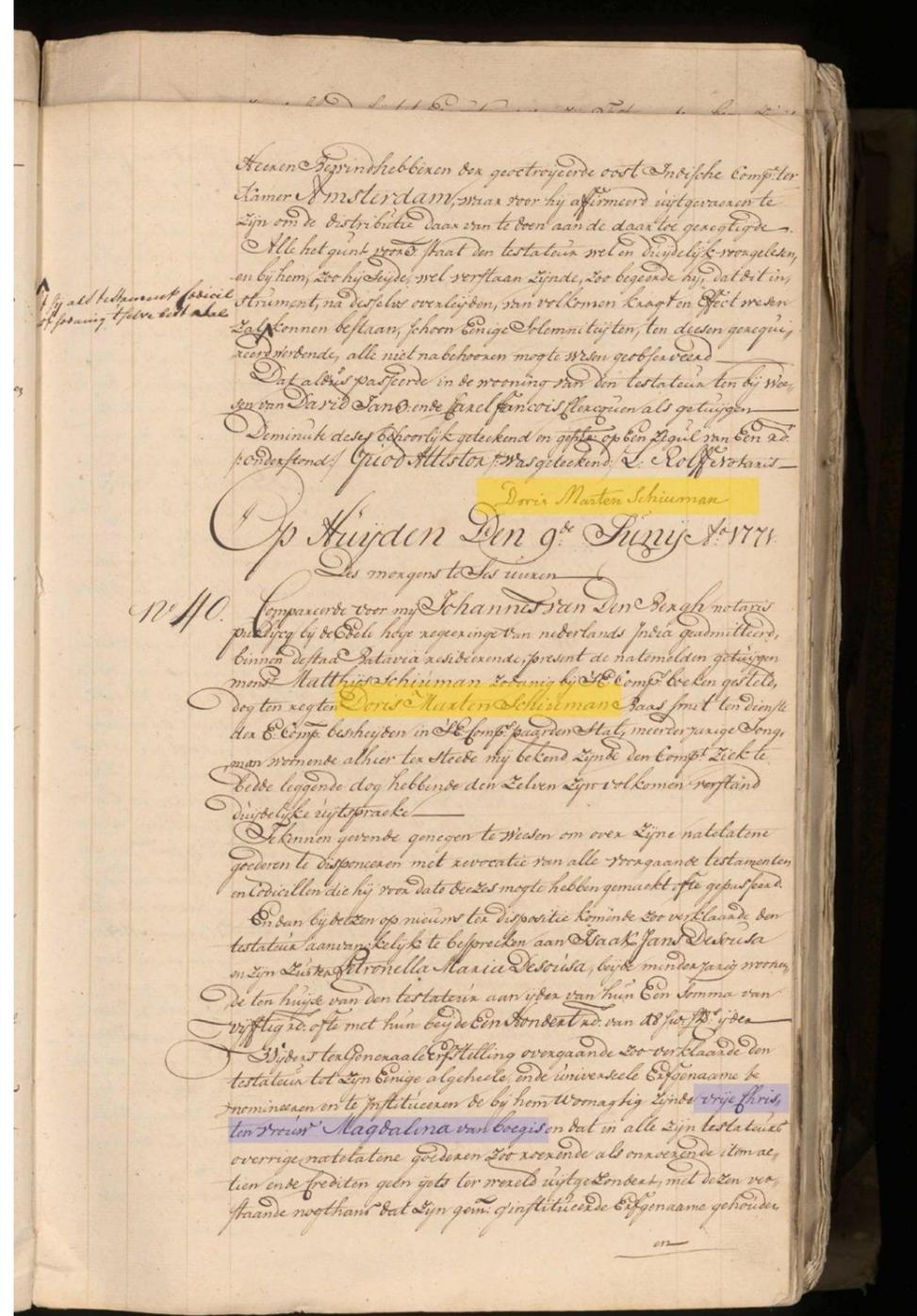
Zoekresultaten (1)

[Filters](#)
[Sorteer](#)

1 resultaten in **Zoekresultaten**

Testamenten (1)

Achternaam	Tussenvoegsel	Voorletters	Jaar
Schiuman		D.M.	1771



Zoeken in Transcripties

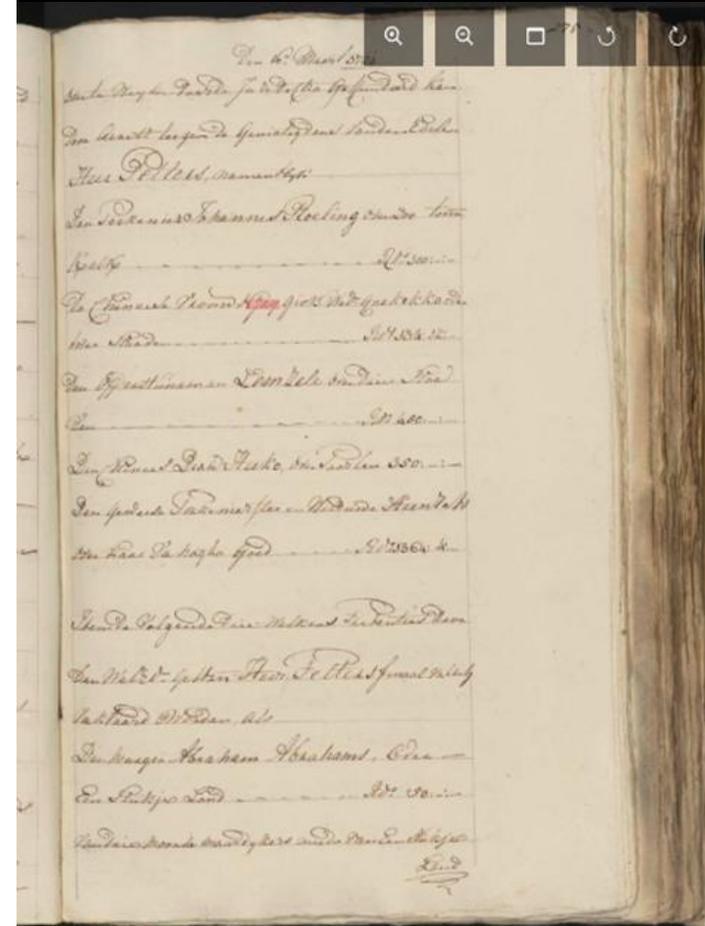
Image → text via HTR

Benefits

- Free text search
- No palaeographic expertise
- Available without paywall

Downsides

- Lack of contextual knowledge
- Search through offensive language



Transcriptie

- 1 den 16-e Maart 1781.
- 2 serte Weysen daarde Jaridictie Gesfundeerd kan
- 3 door Arrast teegen de Gematagdens van den Ed
- 4 Heer Petters, namentlyk
- 5 Den Terkenier Iohannes Roeling over 200 tonn:
- 6 Rd=s 100:—
- 7 Kalk
- 8 de Chinesee Vrouw Njai giok Wed=e quekekkooc
- 9 Rd=s 134: 12:—
- 10 twee slaaden
- 11 den Opperstuurman Lemzele over drie Staa
- 12 Pd=s 450: —
- 13 Ven
- 14 Den Chinees Deau Heeko, over Paerlen 350: —
- 15 Den Geweese Terkenierster en Weiduwe Steenra
- 16 Prd=s 1364: 4:—
- 17 over haar Verkogte Goed
- 18 Item de Volgende Drie welkers Pretenties door
- 19 Den WelEd=e gestrn: Heer Telters finaal valkeh
- 20 verklaard worden, als
- 21 Den Burger Abraham Abrahams, Oder
- 22 - . Rd=s 50: —
- 23 Een stukje Land
- 24 van drie moorse maardykens meede van Een stu
- 25 Land

UnSilencing Dutch Colonial Archives

Collection

- VOC Testaments
 Court Case Documents

Person(s)

Legal Status

- Unfree
 Formerly Enslaved
 Freedom Unspecified

Gender

- Female
 Male
 Other

Role

- Notary
 Testator
 Beneficiary
 Witness
 Other

[Non-offensive Terminology](#)

Search Results

[NL-HaNA_1.04.02_6883_0573](#)Javaansche **meijden Serbia** en **Ragim**[NL-HaNA_1.04.02_6890_0073](#)**moeder, njai boetje, chineese vrouw**[NL-HaNA_1.04.02_6849_0924](#)Aan de Vrije **vrouwe Catharina van batavia** ...[NL-HaNA_1.04.02_6890_0735](#)**Slavine Calistra van balij** met haare **dogters Rooje** en **Roosemond**

Ethics of Practice for Digital Archives

Digital Archives

- Socio technical artefact
- Archival silences: outcome of the intertwined social, cultural, and material factors
- Policy, practices and politics are invisible
- Efficacy of scholarship and social action



The Mission Statement

Well-crafted mission statement:

- Social justice as starting point
- Framework for collecting and preserving archival material
- Prioritization of work
- Transparency and accountability to communities
- Explicit commitment to user groups and histories

Hendrik Conelisz. Vroom, *De terugkomst in Amsterdam van de tweede expeditie naar Oost-Indië*, 1599



Positionality

Social circumstances shape knowledge and actions:

- Gender
- Ethnicity
- Class
- Culture
- Education
- Status

Knowledge situated within “web of differential positioning”

Dayanita Singh, *I am as I am*, 1999



The Participatory Archive

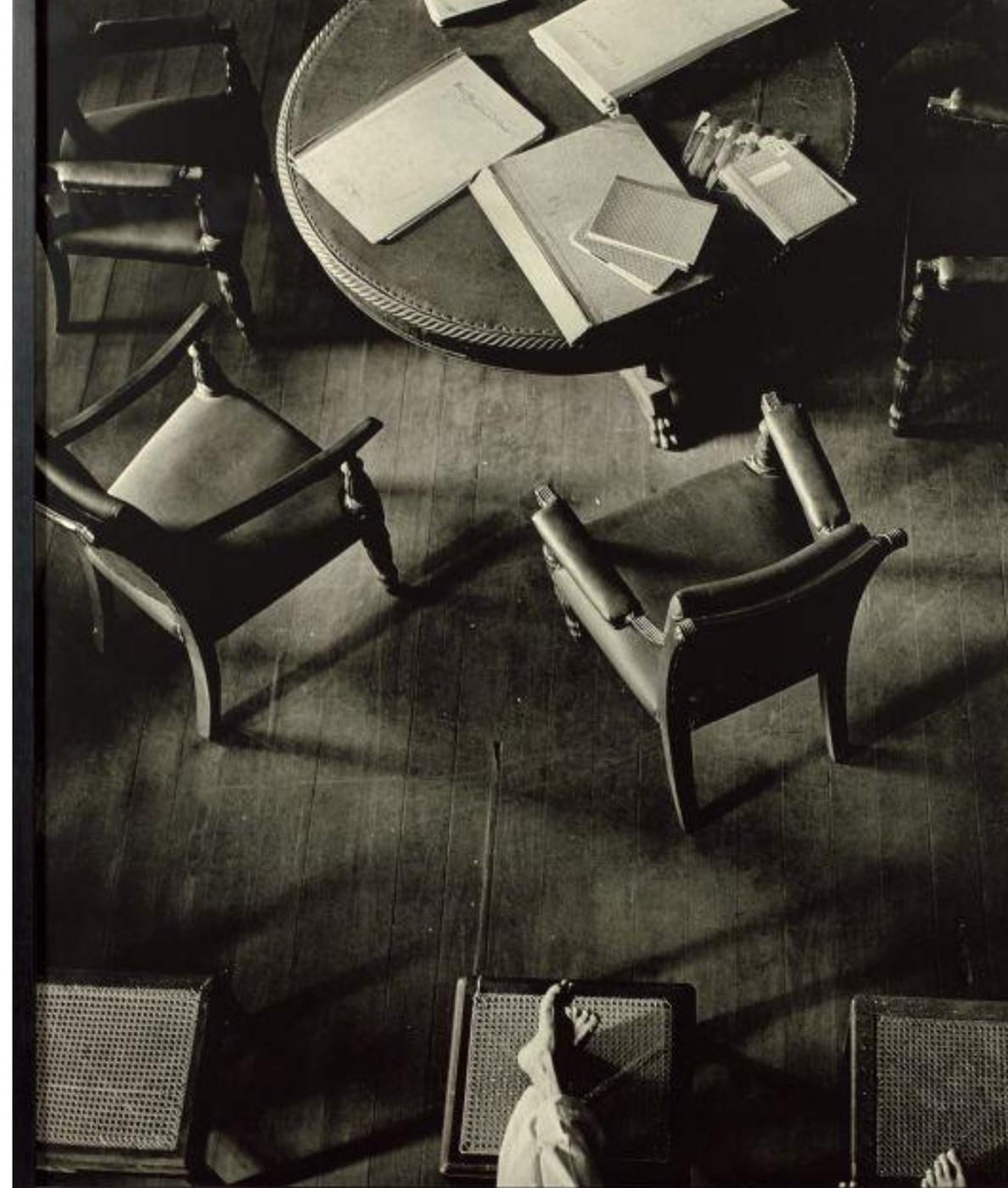
Archives 2.0

- Epistemological shift
- Decentralised, access-oriented archival arrangement and practice
- Issues of marginalisation, representation, professional passivity, and power

“Co-Creation of Cultural Heritage”

- Feedback into established narratives
- Involvement in research design process

Dayanita Singh, *Asiatic Library Reading Room*, 2000



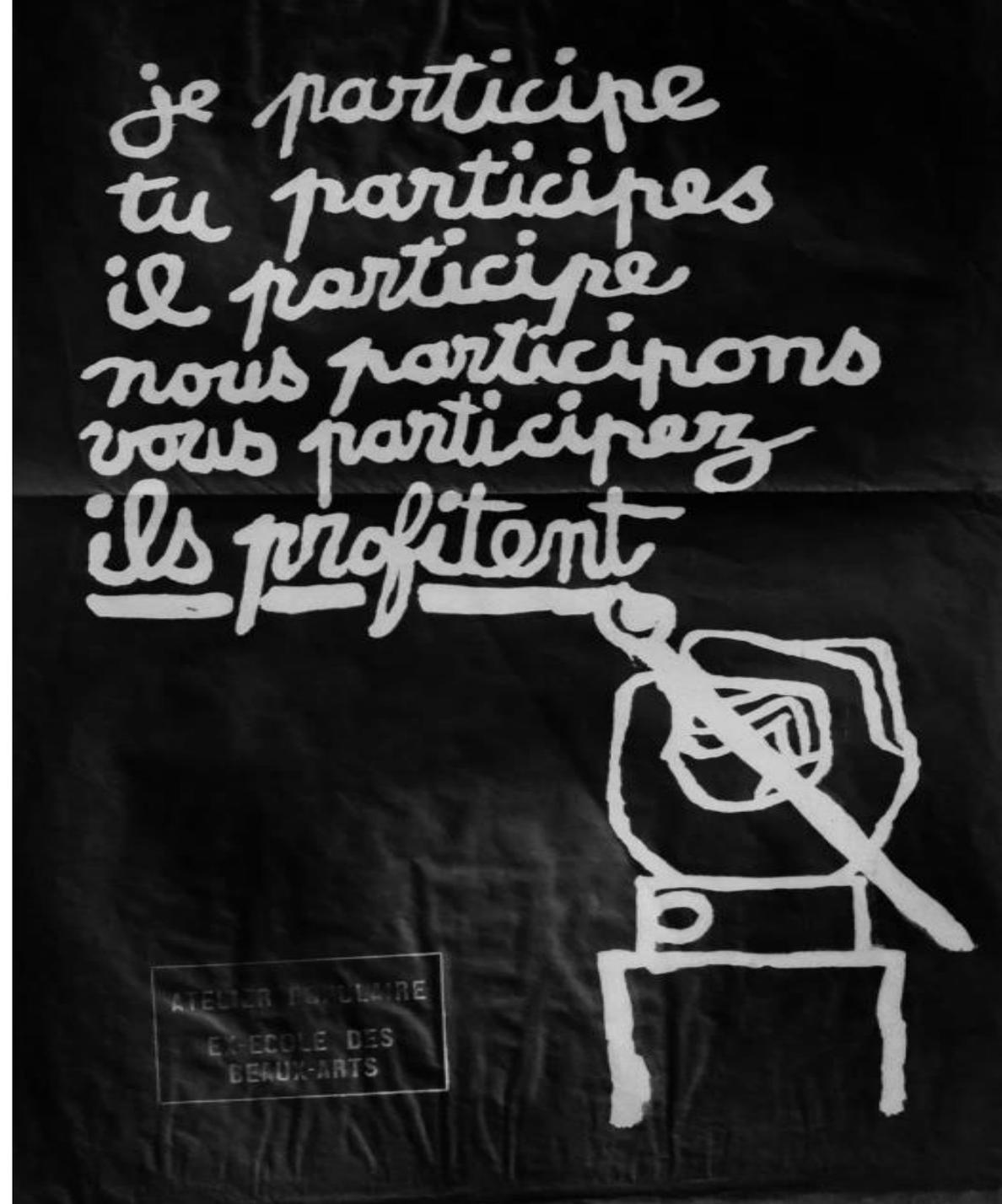
Power

Who has the influence over the archival work and who does not have influence even while being affected by it?

Whose power is increased through the work and whose power is diminished?

How does the transformed field of power reorient identities, relationships, and life chances?

French student poster, 1960s



Transparency

Policies, practices, politics are invisible

Transparency to address social or relational aspects of infrastructures

Critical part of infrastructures

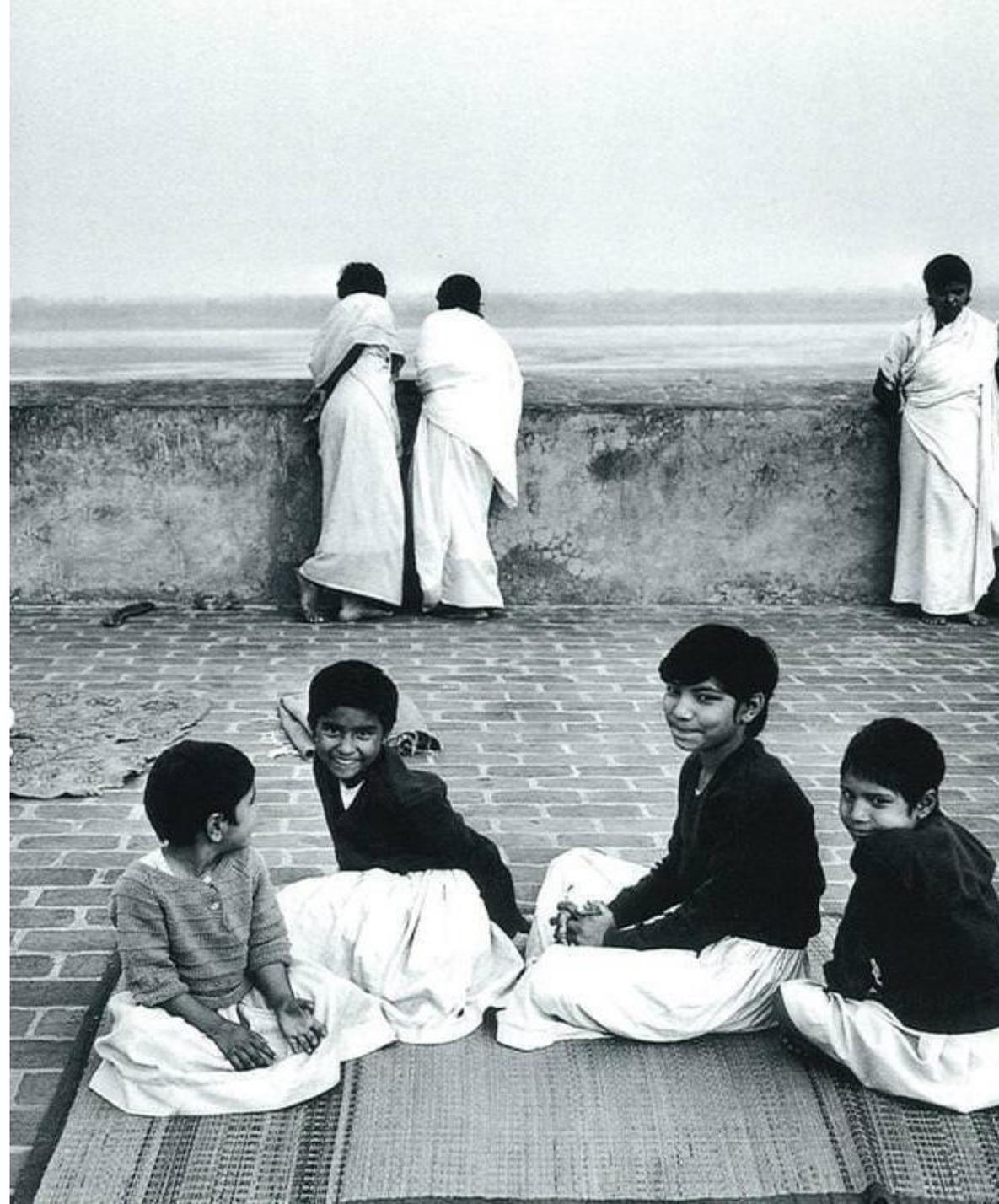
Ethics by design

Dayanita Singh, *Sea of Files*, 2022



“While some of us debate what history is or was, others take it into their own hands.”

Dayanita Singh, *I am as I am*, 1999



Het Geheugen van de Toekomst



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BEDANKT

BEDANKT



**ARCHIEF
DAGEN**

Een jaarlijks congres van

KVAN