Are We In Control?

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Fear and Hope

The fears:

- Runaway superintelligence will sideline humans.
- AIs will take over human decision making.
- AIs will outstrip human creativity.
- Constant surveillance will be ubiquitous.
- …

Meagre mitigations:

- Keep humans in the loop in decision making.
- Teach ethics to engineers.
- Regulate technology.
- …

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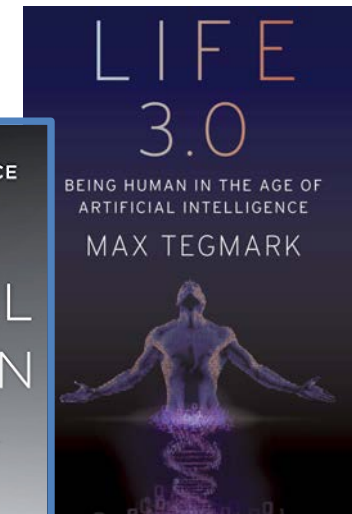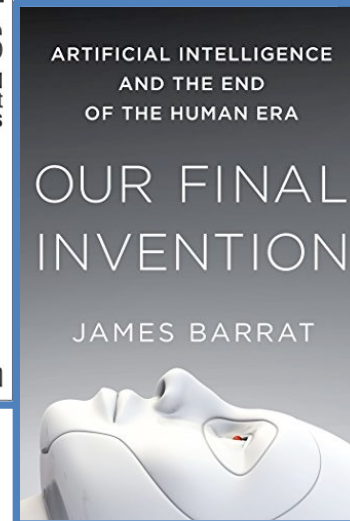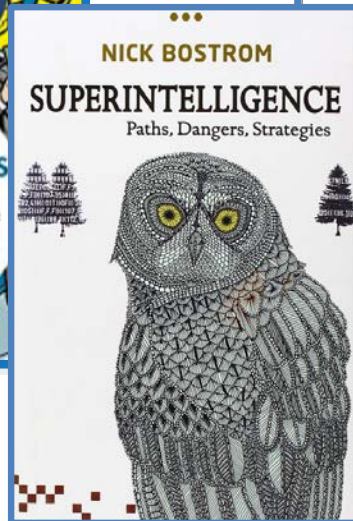AI-generated artwork that sold at Cristie's for $432,500 in 2018.

AI-generated artwork that won first place in the 2022 Colorado State Fair.

Existential Threat?

Are we being annihilated?

Or are we evolving?
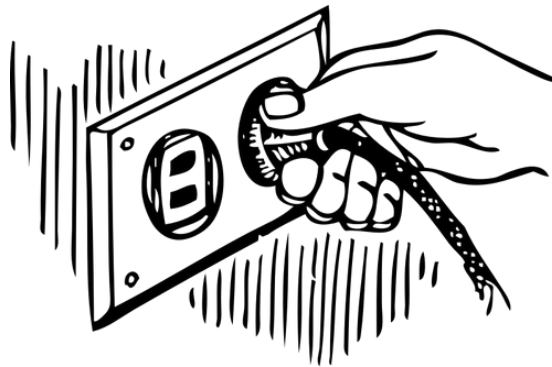
Are we in control?
What do we mean by "we"?

- Humanity? All 8 billion?

- Engineers? Programmers? Business leaders? Users?

Can 8 billion people control anything?

Are we in control?
What do we mean by "control"?

- We can pull the plug?

- We design the systems? We choose to use them?

Can we pull the plug? What would happen today if we had to shut down all the computers on the planet?

The Question, Clarified

Do the engineers, programmers, business leaders, or users determine the outcome of technology development?

Technology as Evolution rather than Top-Down Intelligent Design

Vasa

"Every boat is copied from another boat ... Let's reason as follows in the manner of Darwin. It is clear that a very badly made boat will end up at the bottom after one or two voyages and thus never be copied. ... One could then say, with complete rigor, that it is the sea herself who fashions the boats, choosing those which function and destroying the others."
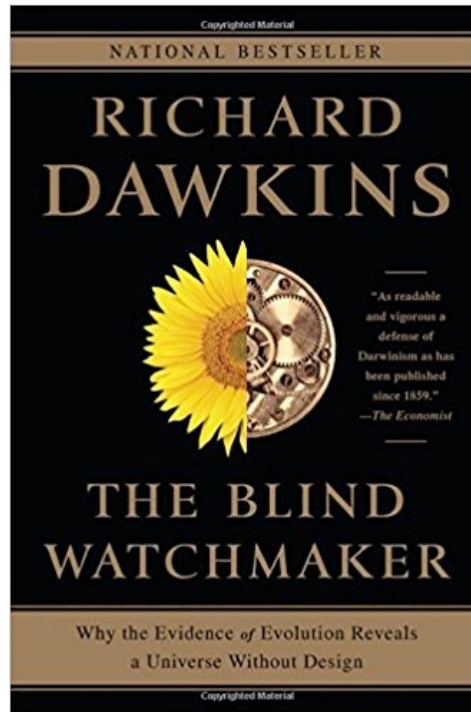
French philosopher Alain

Richard Dawkins

"A chicken is an egg's way of making another egg."

Is a human a computer's way of making another computer?

The Coevolution

The Entwined Futures of Humans and Machines

Edward Ashford Lee

Digital creationism: The thesis that technology is the result of top-down-intelligent design.

"We do not like seeing our mental cognitive processes as themselves cogs in a relentless purposeless evolution. But is this what they are?"
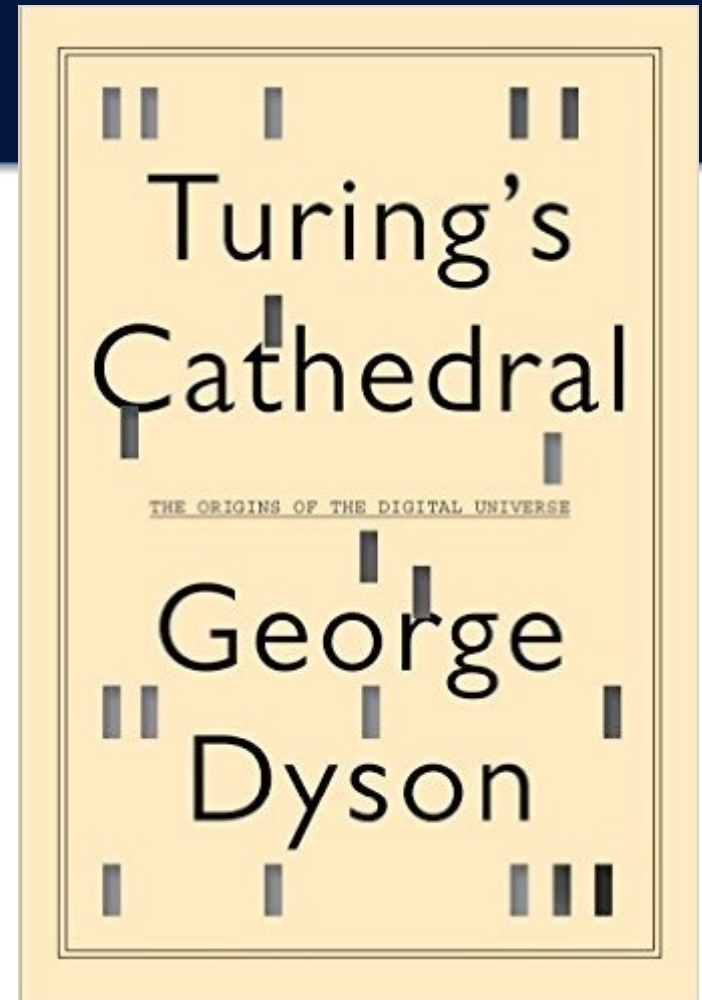
MIT Press, 2020

Coevolving???

By Jamesmorrison at en.wikipedia - Transferred from en.wikipedia, CC BY-SA 2.0, https://commons.wikimedia.org/w/index.php?curid=9431677

Turing's Cathedral
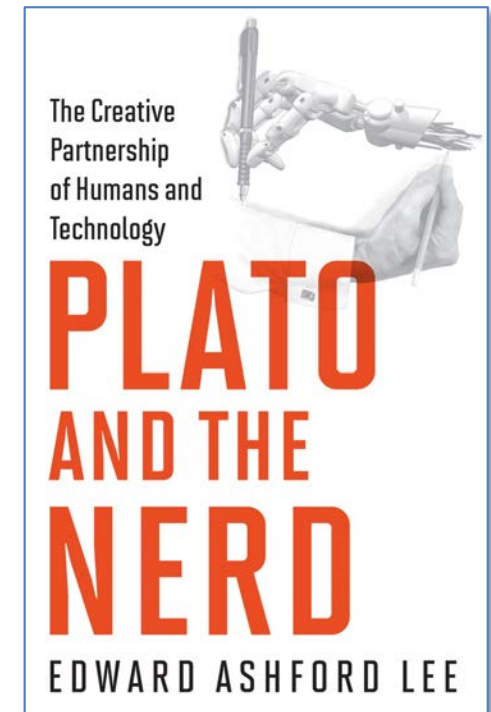
THE ORIGINS OF THE DIGITAL UNIVERSE

George Dyson

Coevolving???

"If computers and software form organisms, then they depend on us for their procreation. We provide the husbandry and serve as midwives. In exchange, we depend on them to manage our systems of finance, commerce, and transportation. But more interestingly, the machines make the humans more effective at the very husbandry that spreads the software species.

….

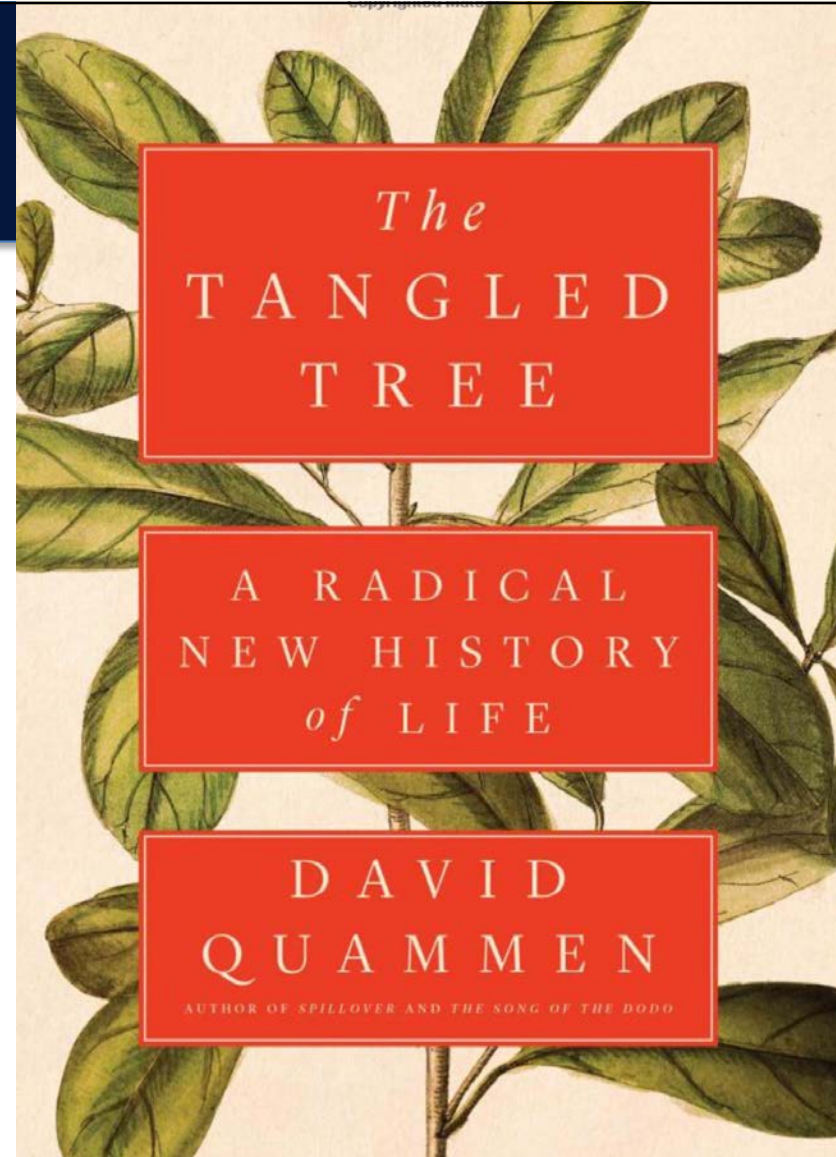the software survives and evolves only if the company survives and evolves, and vice versa."

The Creative
Partnership
of Humans and
Technology

PLATO
AND THE
NERD

EDWARD ASHFORD LEE

Coevolution

Biological (co)evolution isn't as simple as we once thought.

The
TANGLED
TREE

A RADICAL
NEW HISTORY
of LIFE

DAVID
QUAMMEN

AUTHOR OF *SPILLOVER* AND *THE SONG OF THE DODO*

Rapid Evolution

Cambrian Explosion
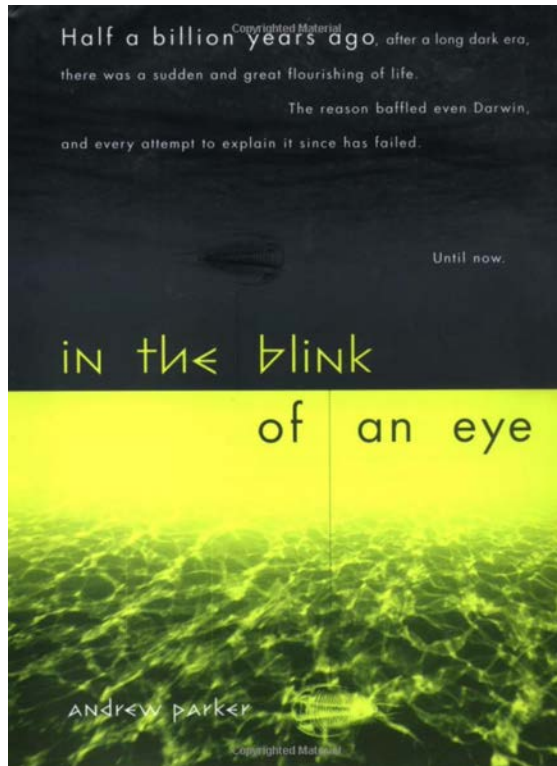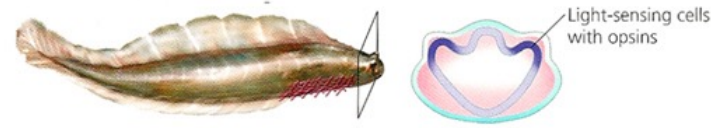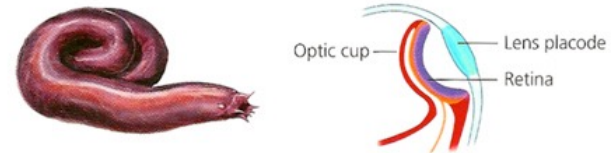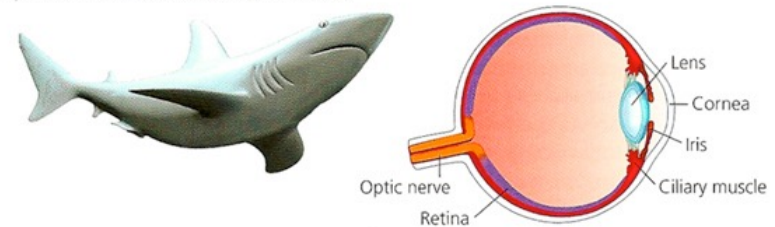
HGT: Horizontal
Gene Transfer.

1. Bactériophage

Bactérie

2.

3.

4.

5.

6.

■ ■ ADN bactériens   ■ ADN viral

Bactérie au génome recombiné
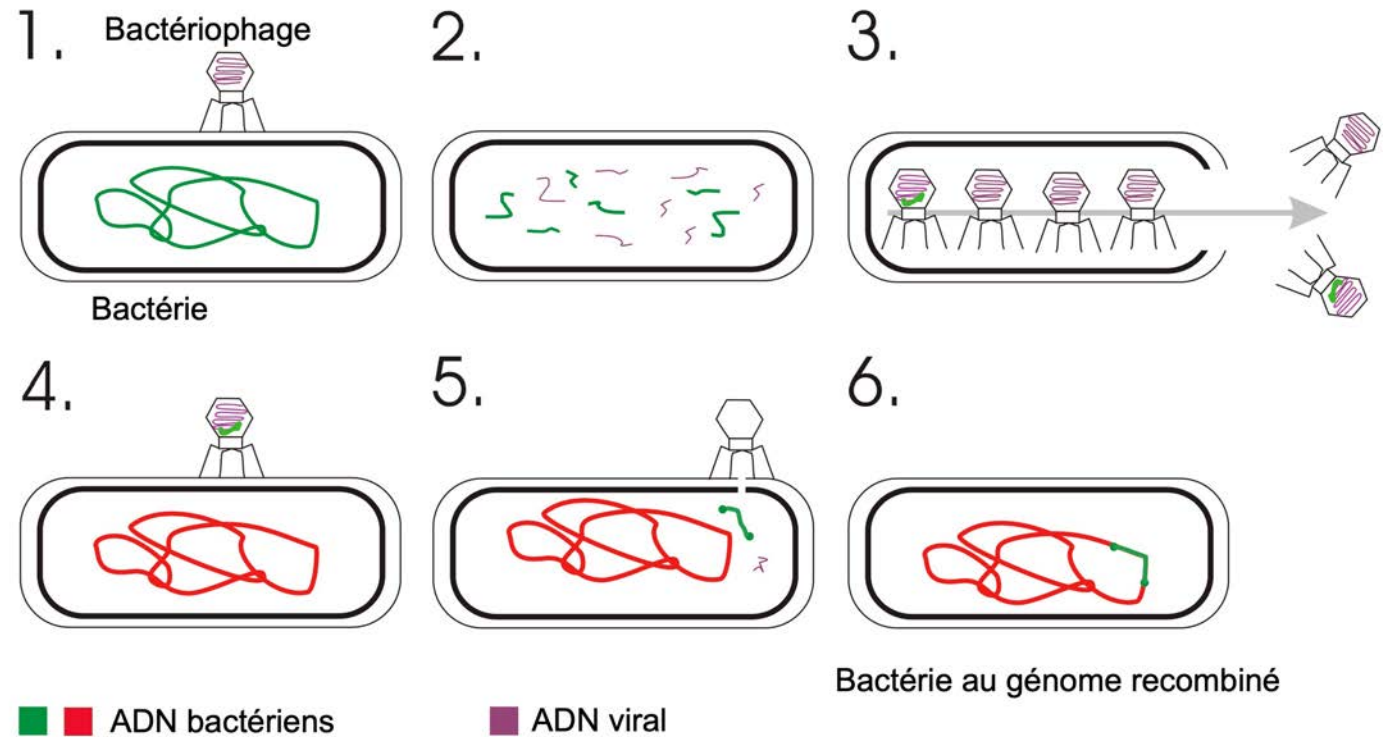
Humans As Sources of Mutation
Horizontal Code Transfer (HCT)

GitHub

stack**overflow**
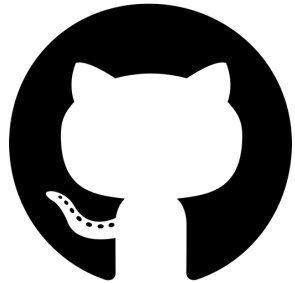
STL
Java Library
Python Modules
JS Modules

Virus?

A Singularity Question

We humans have learned to edit our own genes.

By Analogy:
Can we teach computers to write programs?

Can computers teach humans to write programs?

Computers Already Teach Humans to Program

Eclipse

VS Code

Jupyter

Github

Stack Overflow

Google

...

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Symbiotic Coevolution

"Are we playing God, creating a new life form in our own image, or are we being played by a Darwinian evolution of a symbiotic new species? Are humans the purveyors of the 'noisy channel' of mutation, facilitating sex between software beings by recombining and mutating programs into new ones?"
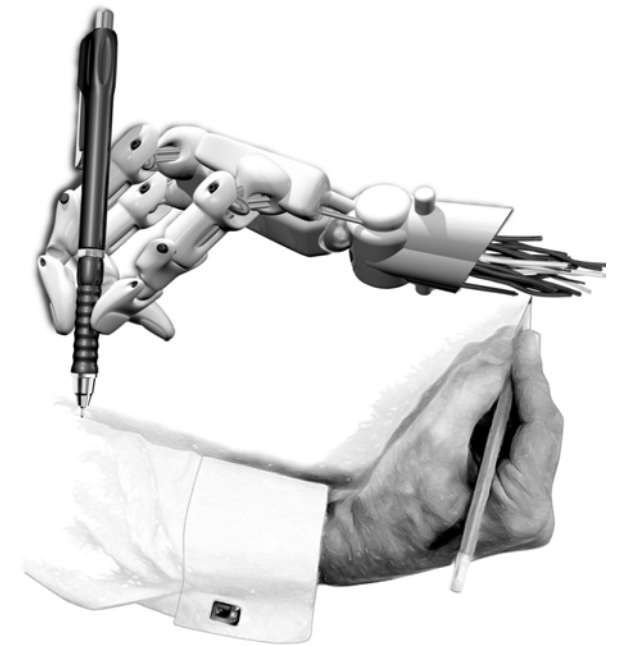
The Question, Clarified

Do the engineers, programmers, business leaders, or <mark>users</mark> determine the outcome of technology development?

Users are part of the ecosystem within which
"survival of the fittest" determines which technologies win.

So… Are *they* in control?

Technology as Evolution rather than Top-Down Intelligent Design

Vasa

"One could then say, with complete rigor, that it is the sea herself who fashions the boats, choosing those which function and destroying the others."

French philosopher Alain

Users form the "sea" that technology navigates, but technology shapes this sea.

Machines Manipulate their Users

- Today's **information flood** makes the use of AIs to filter information both *necessary* and *inevitable*.

- The **information economy** leads AIs to filter to manipulate humans.

- Human decision making is *no longer independent of the machines.*

Hannes Werthner
Erich Prem
Edward A. Lee
Carlo Ghezzi *Editors*

Perspectives on Digital Humanism

Artificial Intelligence and the Problem of Control

Stuart Russell

**The Attention Economy and the Impact of Artificial Intelligence**

Ricardo Baeza-Yates and Usama M. Fayyad

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Machines Manipulate Humans
This is not just a prediction for the future.

- Predictable humans can be reliably presented with advertisements they will click on.

- Political extremists are more predictable than moderates.

- Feedback: the machines make you more predictable so that their predictions are more accurate.

- The result is an **information apocalypse**, where humans live on **islands of disjoint truths**.
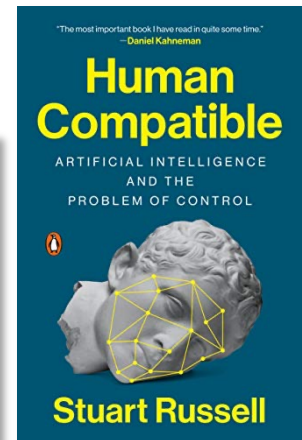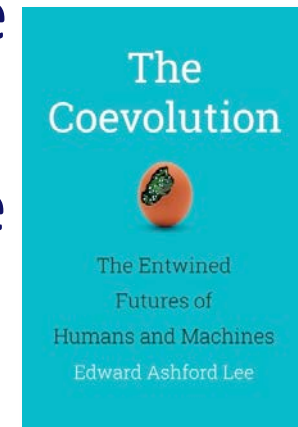
Endosymbiosis

Lynn Margulis (1938-2011)
[Photo by Jpedreira, CC BY-SA 2.5]
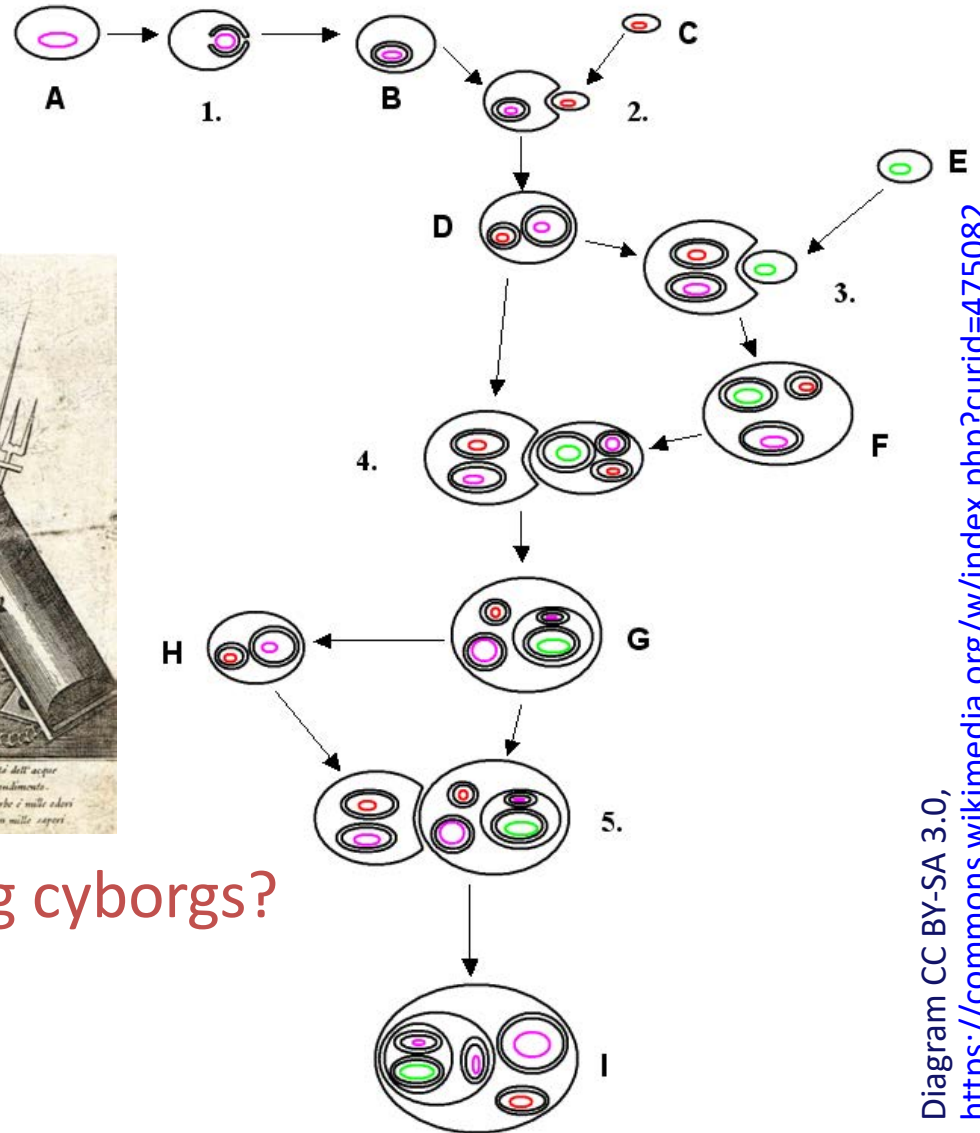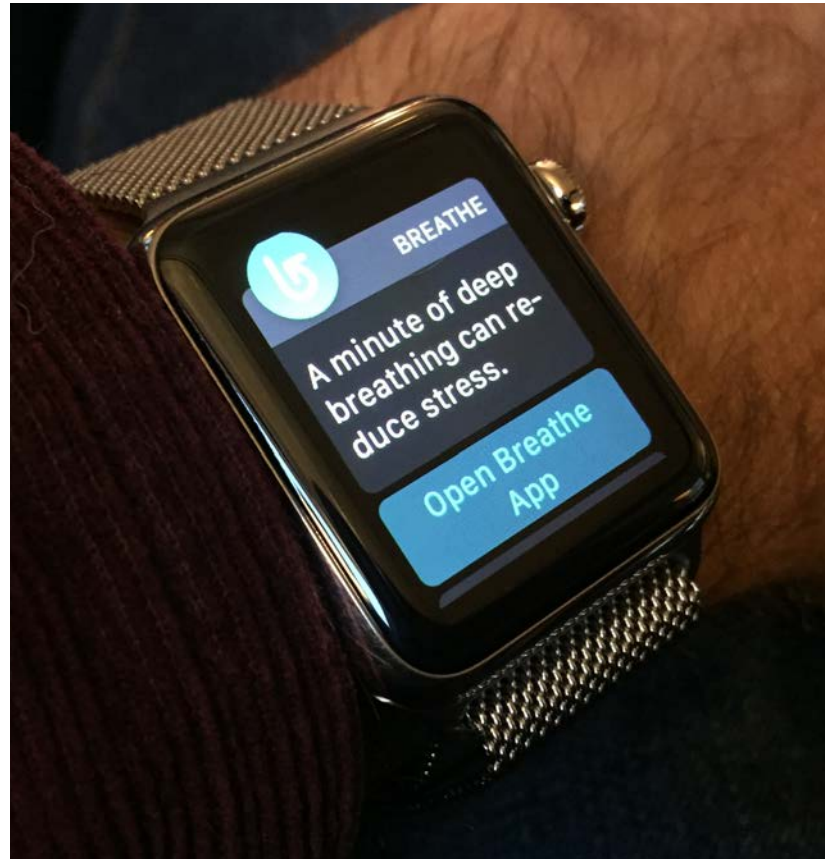
Are we becoming cyborgs?

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Symbiosis?

Intellectual Prostheses

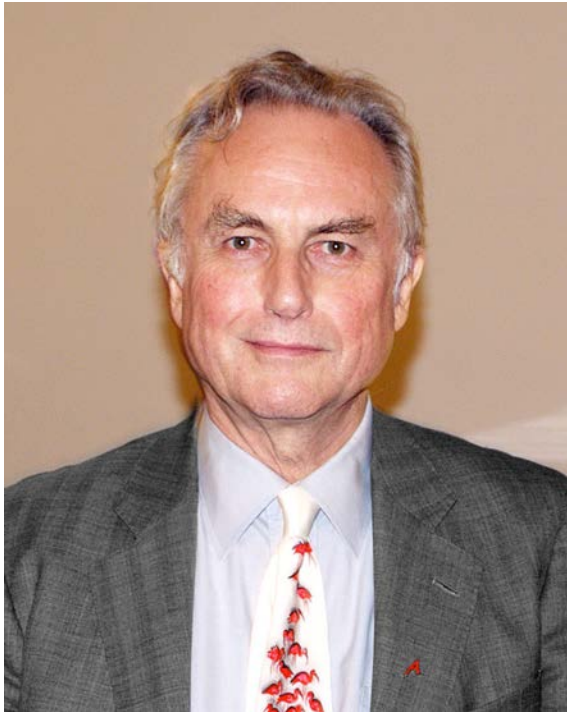## Richard Dawkins
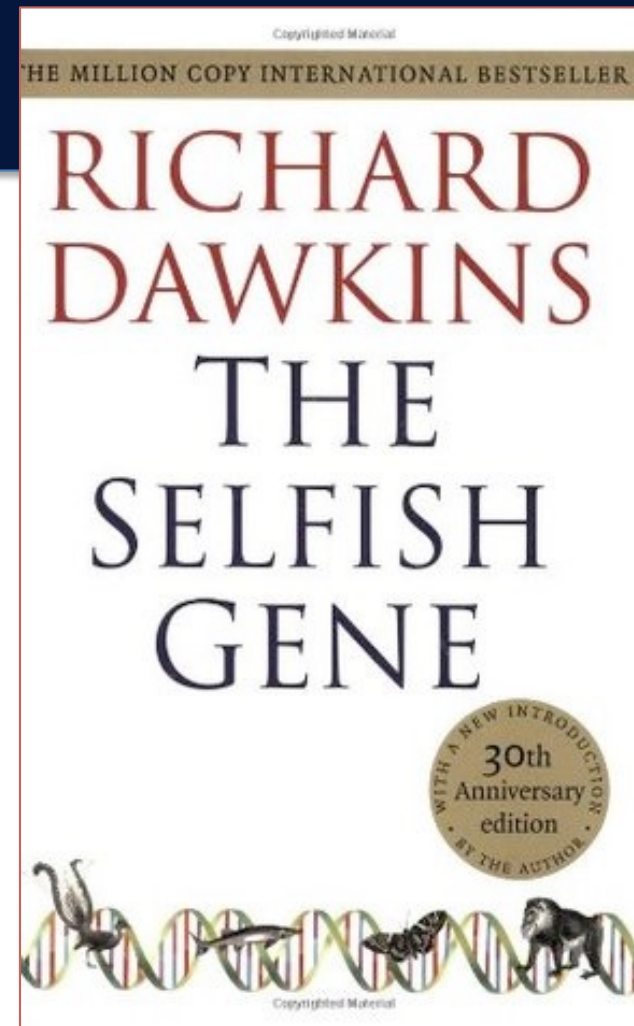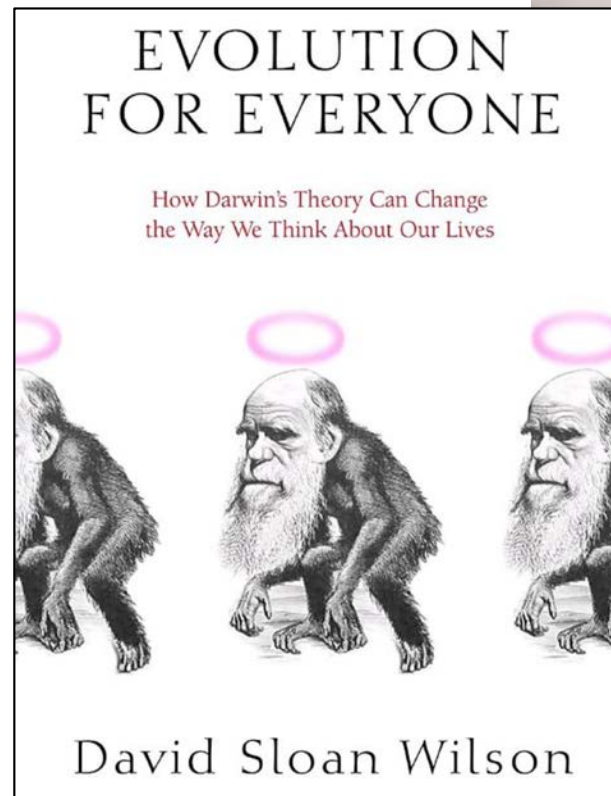
Evolution for Everyone

David Sloan Wilson: Evolutionary interpretation of economics, sociology, science, mathematics, etc.

EVOLUTION FOR EVERYONE

How Darwin's Theory Can Change the Way We Think About Our Lives

David Sloan Wilson

Life: Autopoiesis

Life is about self-sustaining and reproducing processes, not just about durable molecules (DNA).
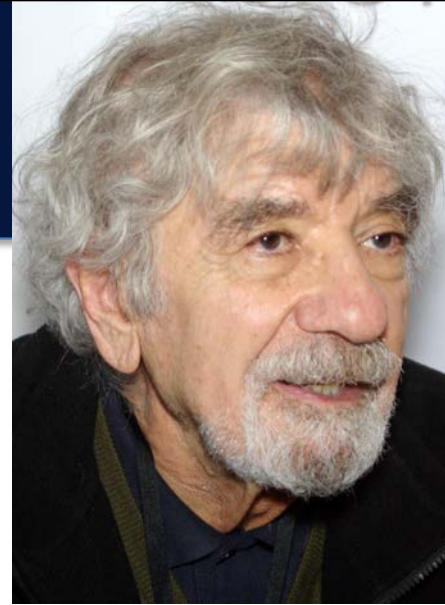
Humberto Maturana
Photo by Rodrigo Fernández, CC BY-SA 4.0

Francisco Varela
Photo by Joan Halifax (Upaya), CC BY 2.0

As the machines and software increasingly design and maintain themselves, are they developing autopoiesis?

So who is the artist?

Pierre Fautrel of OBVIOUS with
"Portrait of Edmond de Belamy."
https://obvious-art.com

Generative Adversarial Networks (GAN)

"Bel ami" means "good friend" in French, hence the name "Portrait of Edmond de Belamy" is a tribute to Ian Goodfellow, known as the "GANfather"

Ian Goodfellow

DeepDream

Prior attempts at AI-generated synthetic images

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Robbie Barrat

Open source GAN software on Github
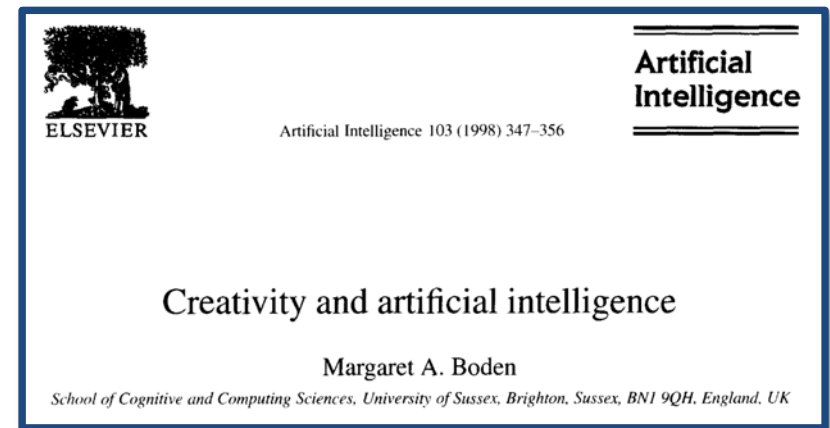
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Found Objects

Marcel Duchamp,
Fountain, 1917

Margaret Boden
AI as a Better Paintbrush

"AI techniques can be used to create new ideas in three ways:

- *by producing novel combinations of familiar ideas;*

- *by exploring the potential of conceptual spaces; and*

- *by making transformations that enable the generation of previously impossible ideas."*

Can we just blame Mark Zuckerberg?

Accountability: credit or blame for the actions of a technology.

We must not oversimplify!

Photo by Anthony Quintano, CC BY 2.0

Conclusion:
Technology is Coevolving With Humans

Evolutions:

1. Biological (genes)

2. Cultural (memes)

3. Technological (code)

The third is distinctly different because the machines are developing an autonomous agency and form of autopoiesis.

The Coevolution

The Entwined Futures of Humans and Machines

Edward Ashford Lee