

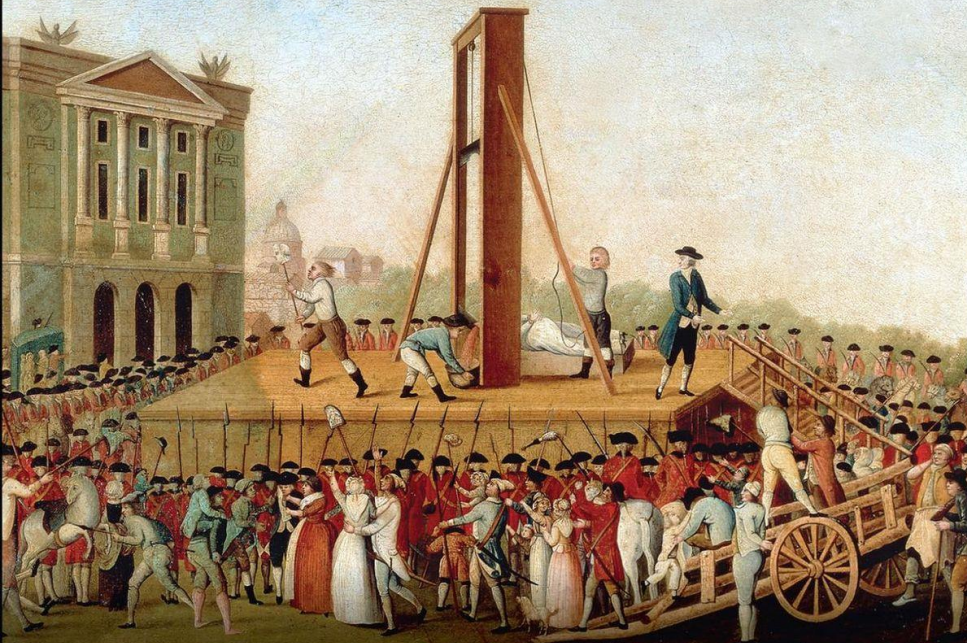
*Thoughts on Technology, These Times,
and
The Future of our Species:
Good, Bad or Other*

ASSFN Presidential Address

Robert E. Gross, MD, PhD

ASSFN Virtual Meeting
The Zoomosphere | June 28, 2020

A Tale of **Two Cities**



Charles Dickens

It was the best of times, it was the worst of times,

It was the age of wisdom, it was the age of foolishness,

It was the epoch of belief, it was the epoch of incredulity,

It was the season of Light, it was the season of Darkness,

It was the spring of hope, it was the winter of despair,

We had everything before us, we had nothing before us,

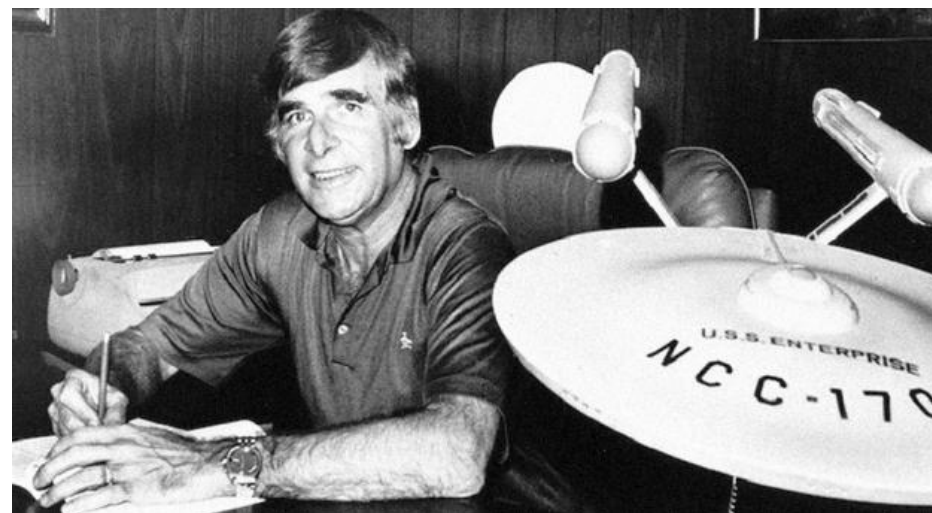
We were all going direct to Heaven, we were all going direct the other way –

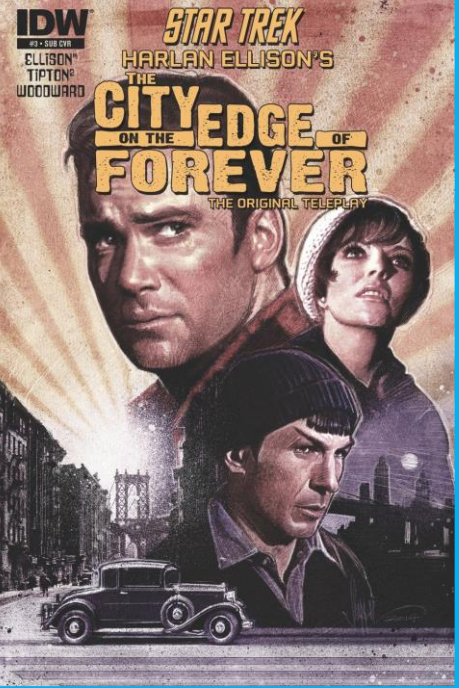
In short, the period was so far like the present period....



STAR TREK

CREATED
BY GENE
RODDENBERRY





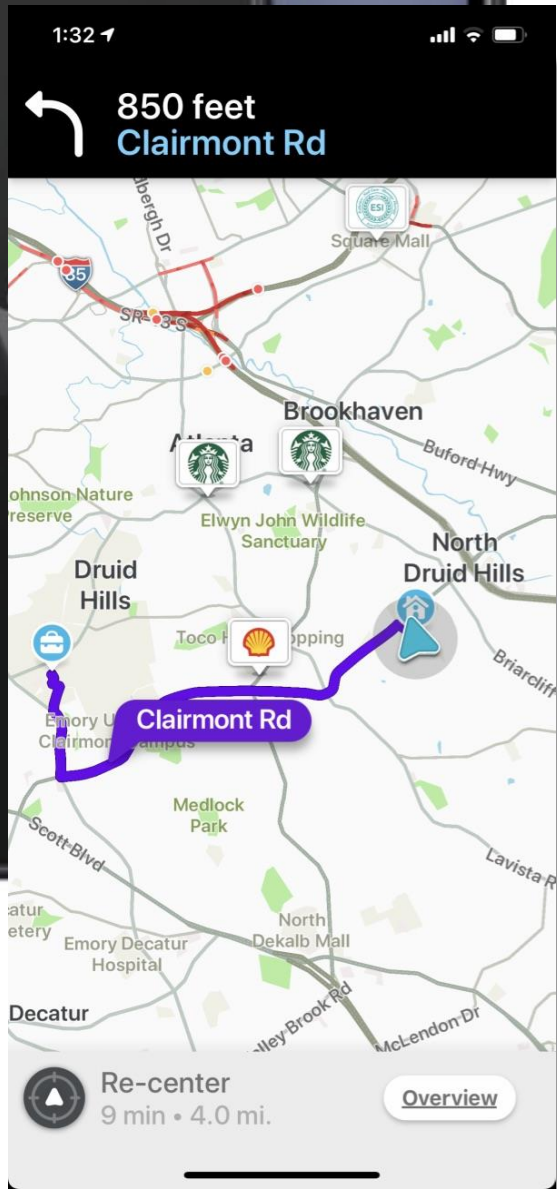












“The revolution will NOT
be televised
The revolution will not
be brought to you
By Xerox in four parts
without commercial
interruptions...”

-- Gil Scott Heron



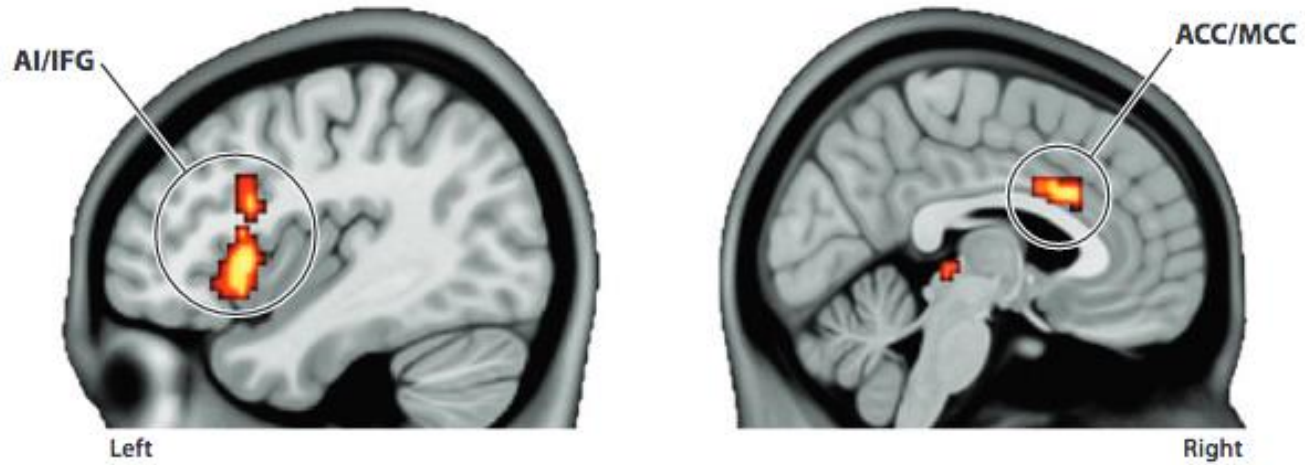
The Neural Basis of Empathy

Boris C. Bernhardt and Tania Singer

Department of Social Neuroscience, Max-Planck Institute of Human Cognitive and Brain Sciences, Stephanstraße 1a, 04309 Leipzig, Germany; email: bernhardt@cbs.mpg.de, singer@cbs.mpg.de

Annu. Rev. Neurosci. 2012. 35:1-23

a



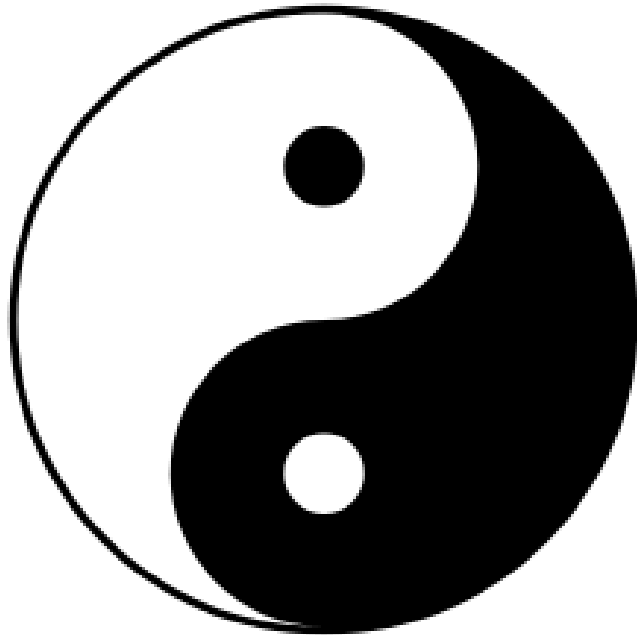
b



c



“Disruptive technology” ...

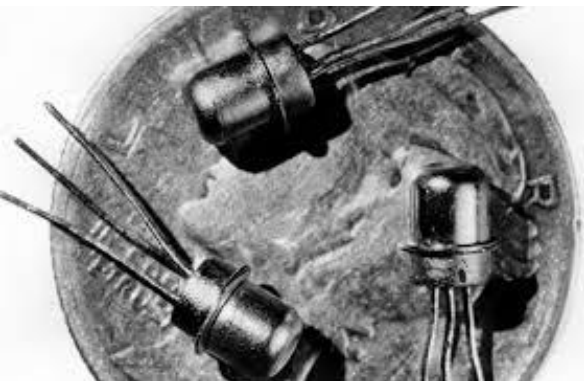
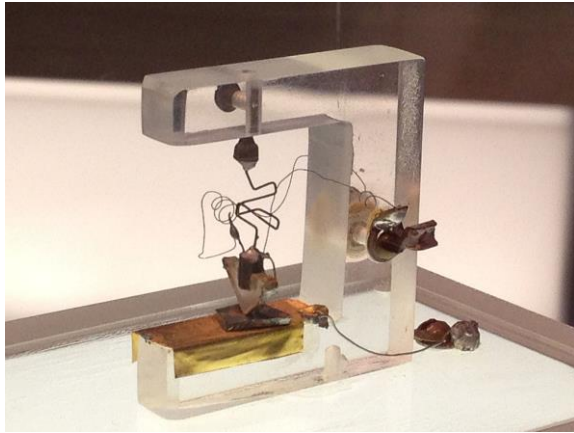
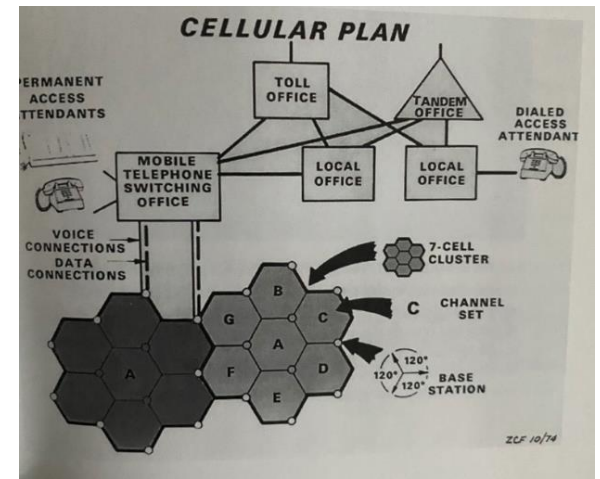


In Ancient Chinese philosophy, yin and yang is a concept of **DUALISM**, describing how seemingly opposite or contrary forces may actually be complementary, interconnected, and interdependent in the natural world, and how they may give rise to each other as they interrelate to one another. [Wikipedia](#)

“We can keep two thoughts in our heads at the same time!”



Bardeen Brattain & Shockley



ENTICe

Emory Neuromodulation Technology
Innovation Center

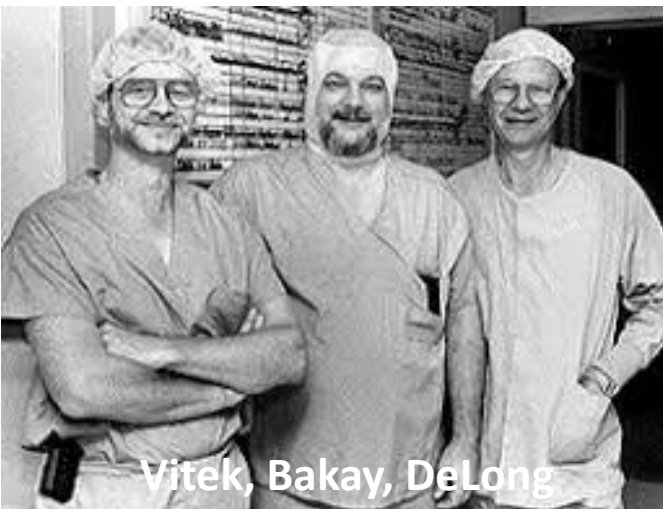
A **Collaboration** between Emory University
and Georgia Institute of Technology



EMORY
UNIVERSITY



Lasker Prize, 2015



Vitek, Bakay, DeLong

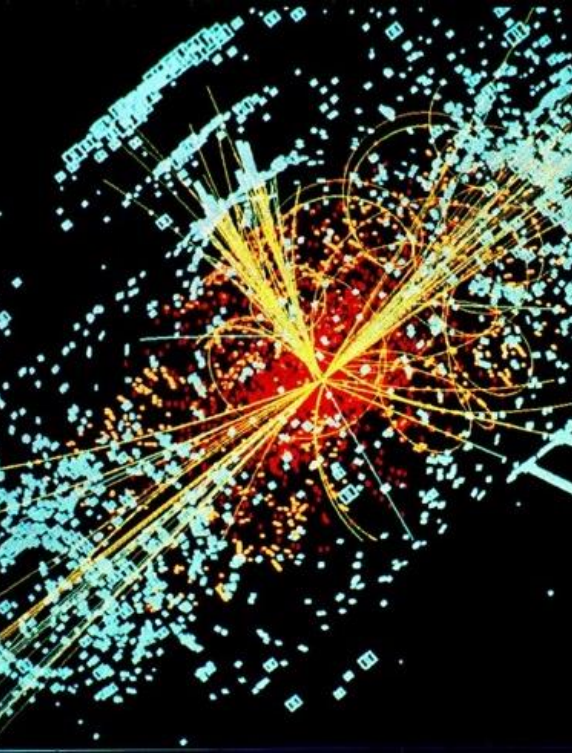
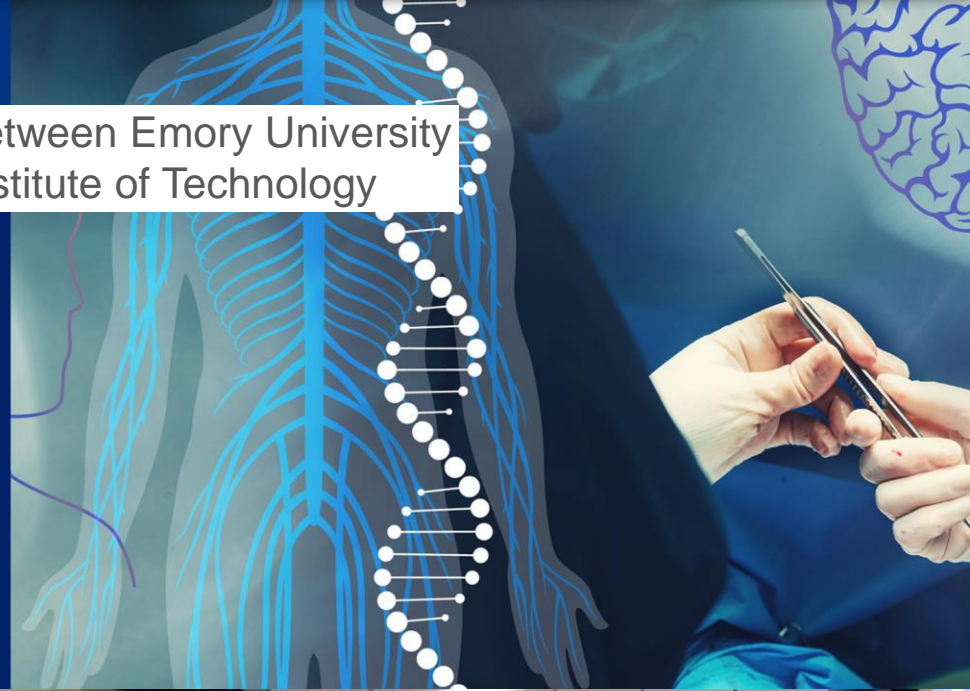




Roy A. E. Bakay, MD
1949 - 2013

A **Collaboration** between Emory University
and Georgia Institute of Technology

Emory Neuromodulation Technology Innovation Center (ENTICe)



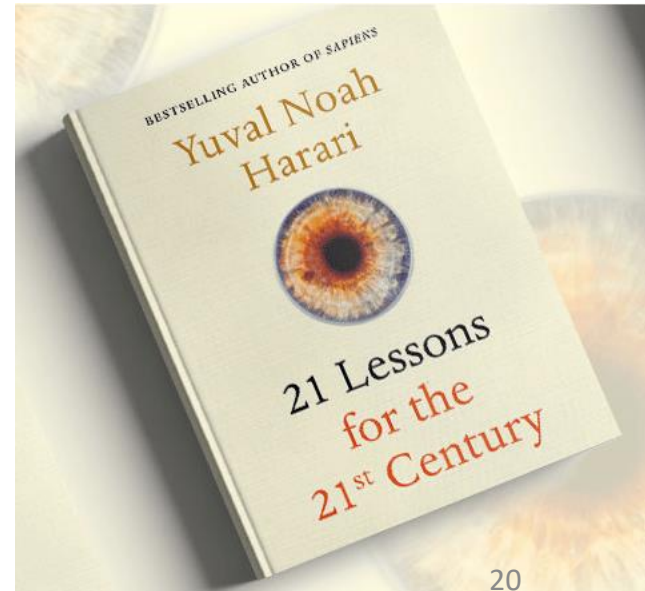
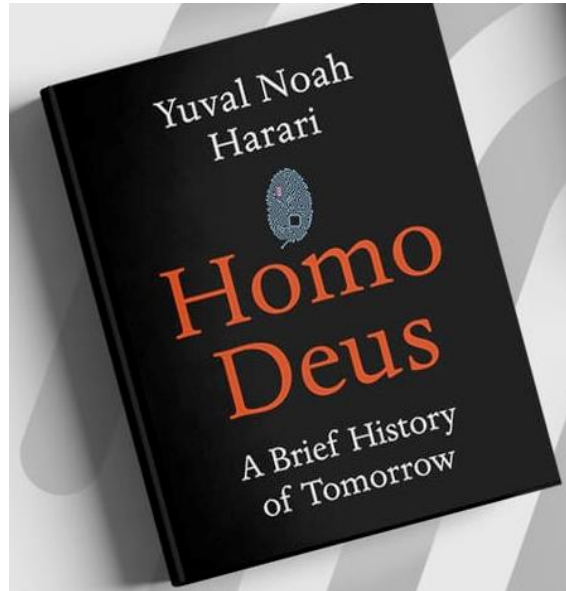
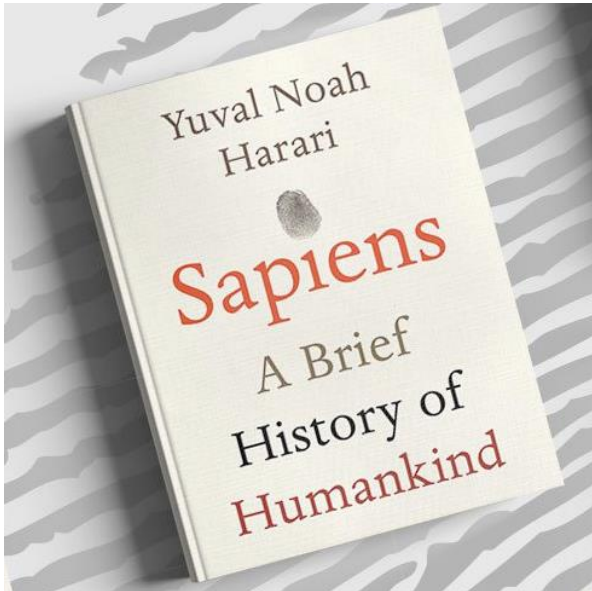


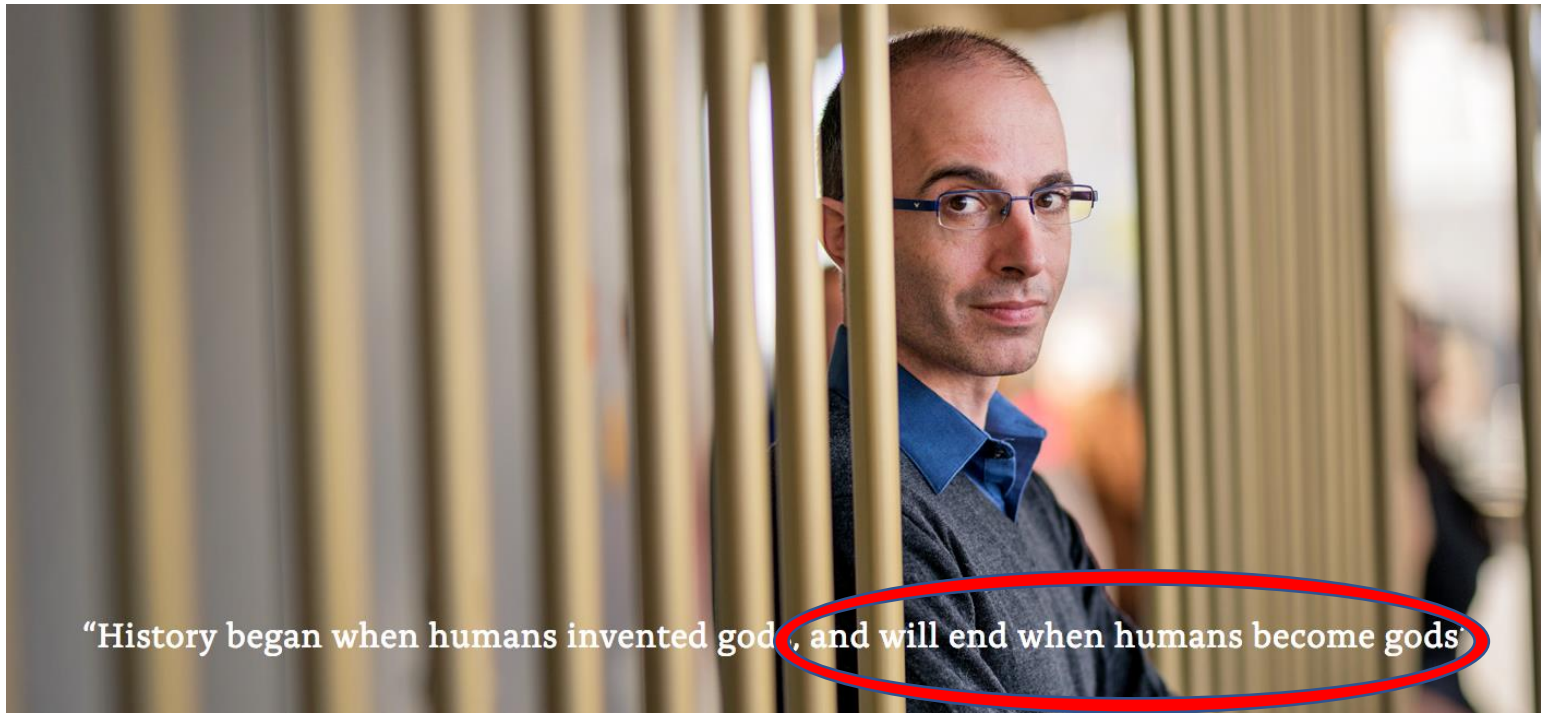
GUESS WHO INC.

Earl Bakken's first pacemaker
Minneapolis, 1957

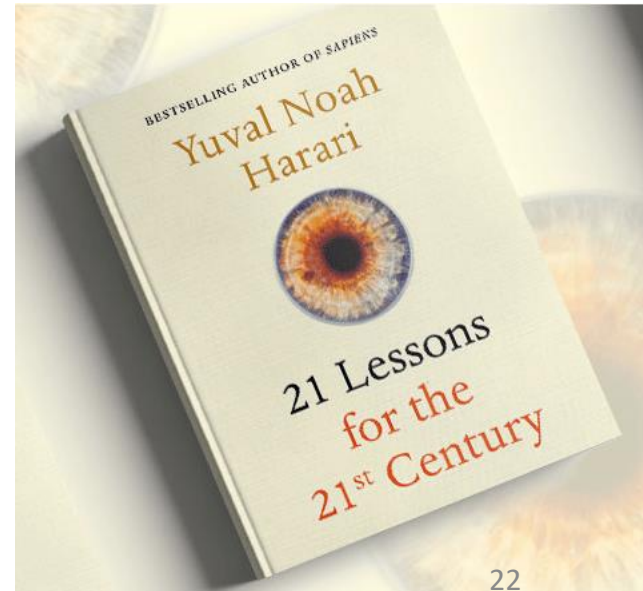
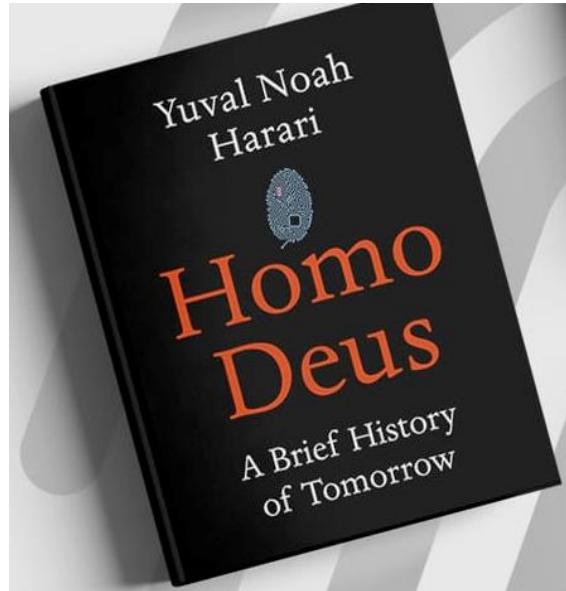
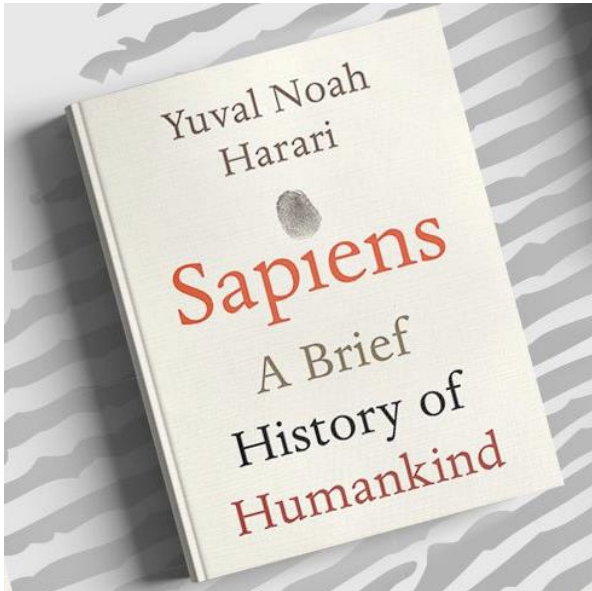


“History began when humans invented gods, and will end when humans become gods”





“History began when humans invented gods, and will end when humans become gods”



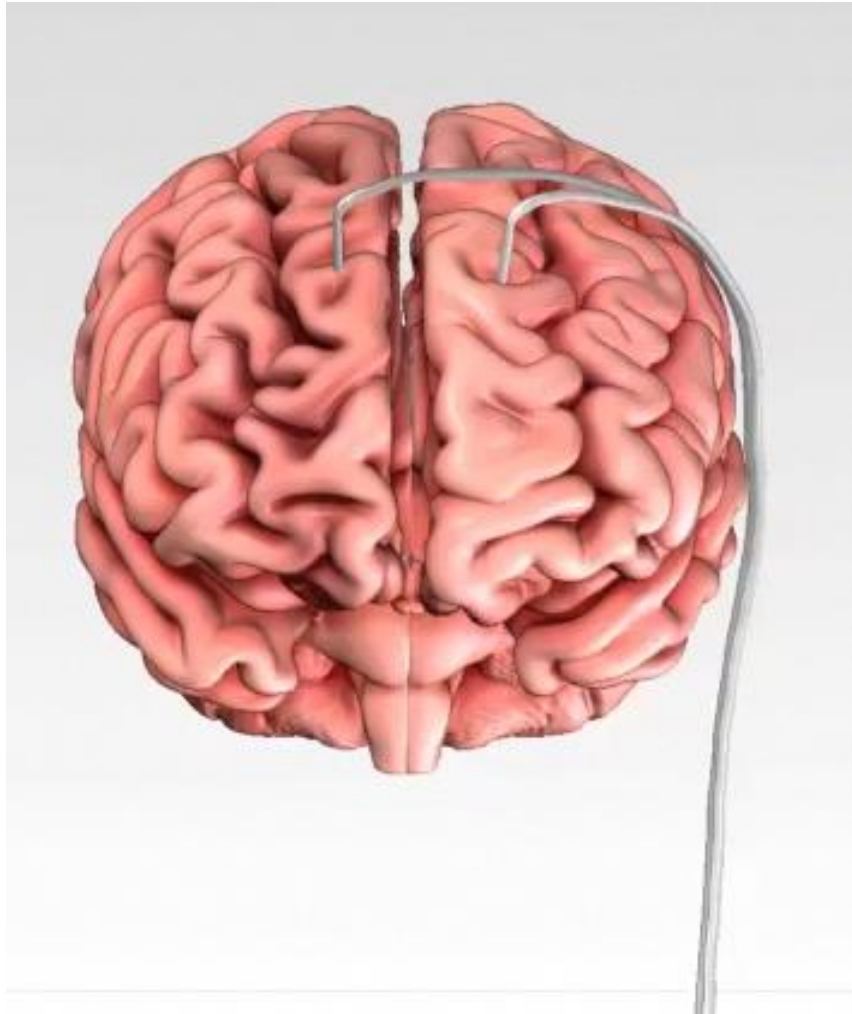


Immortal Cyborgs: Is This Humanity's Future?

ISTOCK.COM/MENNOVANDIJK

Transhumanists say we could engineer ourselves to live forever.

BY ANDREW MIILLER • APRIL 21, 2017





[External] Re: Invitation to Biennial Meeting of American Society for Stereotactic and Functional Neurosurgery - Robert Elkan Gross, MD, PhD



Event Booking <booking@ynharari.com>

Gross, Robert

Sunday, August 18, 2019 at 5:40 AM

[Show Details](#)

→ You forwarded this message on 8/18/19, 11:57 AM.

Show Forward

Dear Robert,

Thank you so much for this kind invitation.

The prospect of such an opportunity is exciting, and under 'normal' circumstances we would've loved to consider it.

Unfortunately, time is the one thing we cannot buy, and next year's calendar is now completely full in terms of long-haul international travel. Prof. Harari is involved in multiple initiatives, and we as his team find ourselves having to regretfully decline 99% of the offers he receives - not only in order to conserve his energies and well-being, but also to protect his ability to write, teach, think and volunteer.

I'm really sorry that we won't be able to make this happen in the foreseeable future, and hope you understand the operational constraints at our end.

Please thank the all your colleagues at the American Society for Stereotactic and Functional Neurosurgery on behalf of our entire team.

Very best wishes,

Michael



**Michael Zur
Events Team**

Yuval Noah Harari International Office, Yahav-Harari Group LTD.

50 Dizengoff St., Top Tower, Tel Aviv 6433222,
Israel

[ynharari.com](#)

...and **next year's calendar** [bold added by me] is now completely full....

Please thank the all your colleagues at the American Society for Stereotactic and Functional Neurosurgery [smaller font NOT added by me] on behalf of our entire team.

NEW YORK TIMES BESTSELLER

"MY NEW FAVORITE BOOK OF ALL TIME." —BILL GATES

STEVEN PINKER

ENLIGHTENMENT NOW

THE CASE FOR
REASON, SCIENCE,
HUMANISM,
AND PROGRESS



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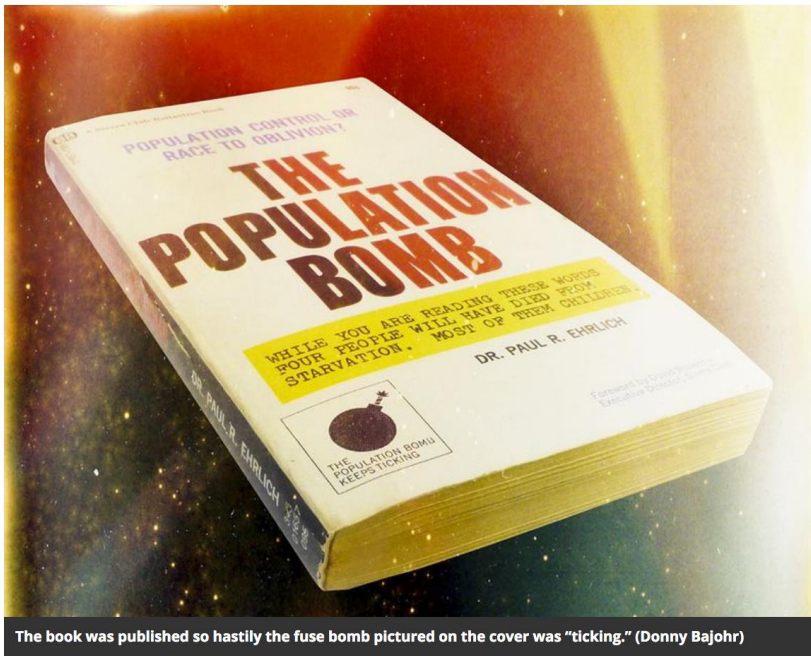
...Humans are ... better off in myriad ...
ways...all thanks to the **spread of science
and reason.**

It's a book that maintains Pinker's devotion
to data...

Source: "Why Do People Love to Hate Steven
Pinker?" By Tom Bartlett, *The Chronicle Review*

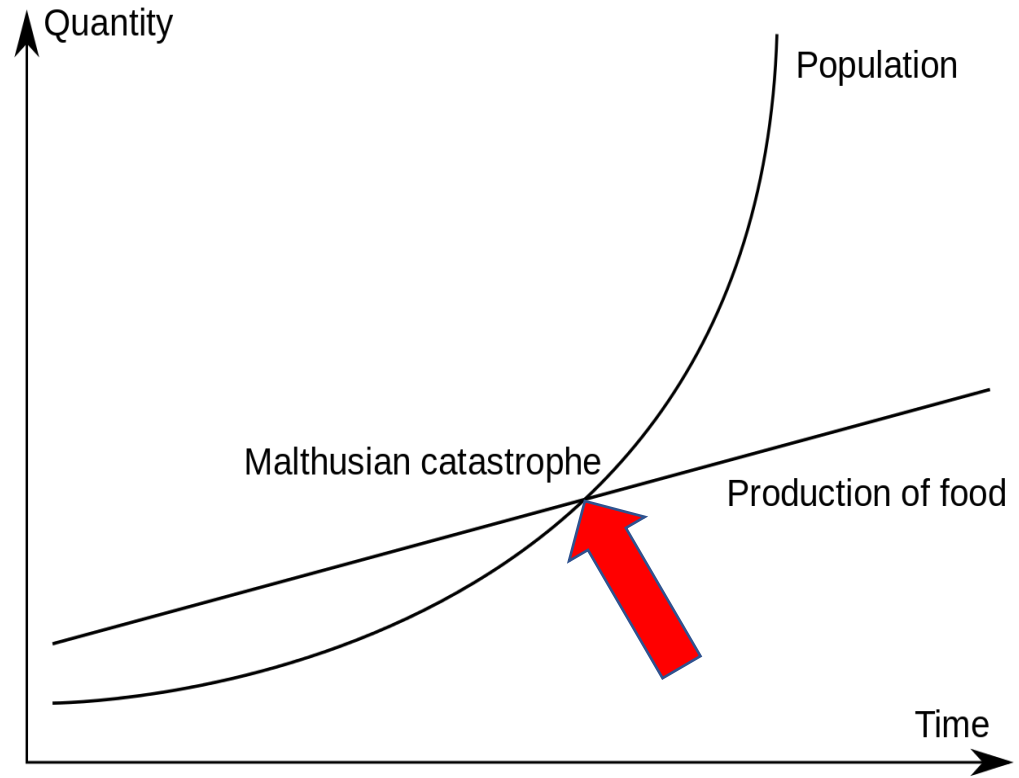
The Book That Incited a Worldwide Fear of Overpopulation

'The Population Bomb' made dire predictions—and triggered a wave of repression around the world



The book was published so hastily the fuse bomb pictured on the cover was "ticking." (Donny Bajohr)

Source: smithsonianmag.com



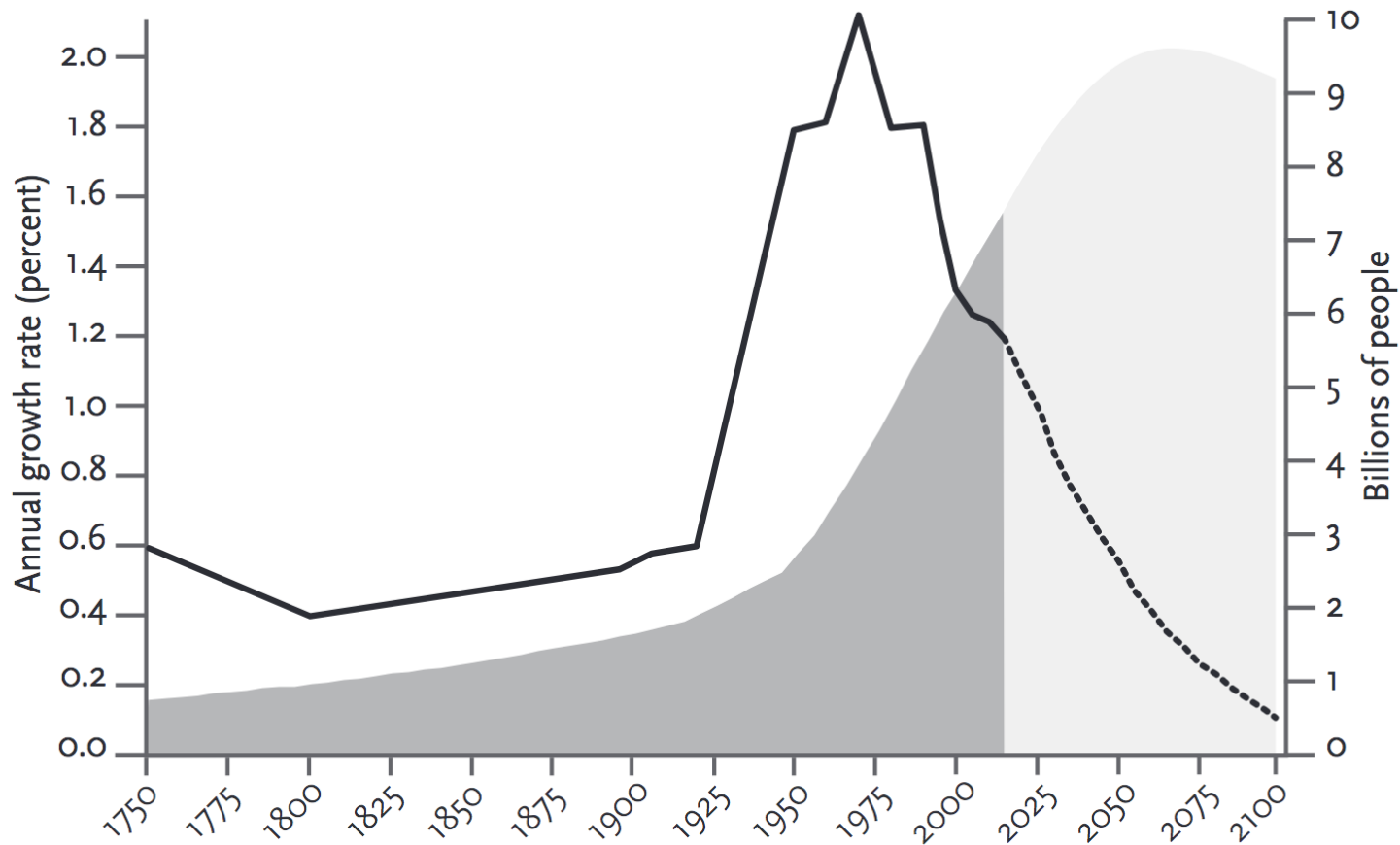
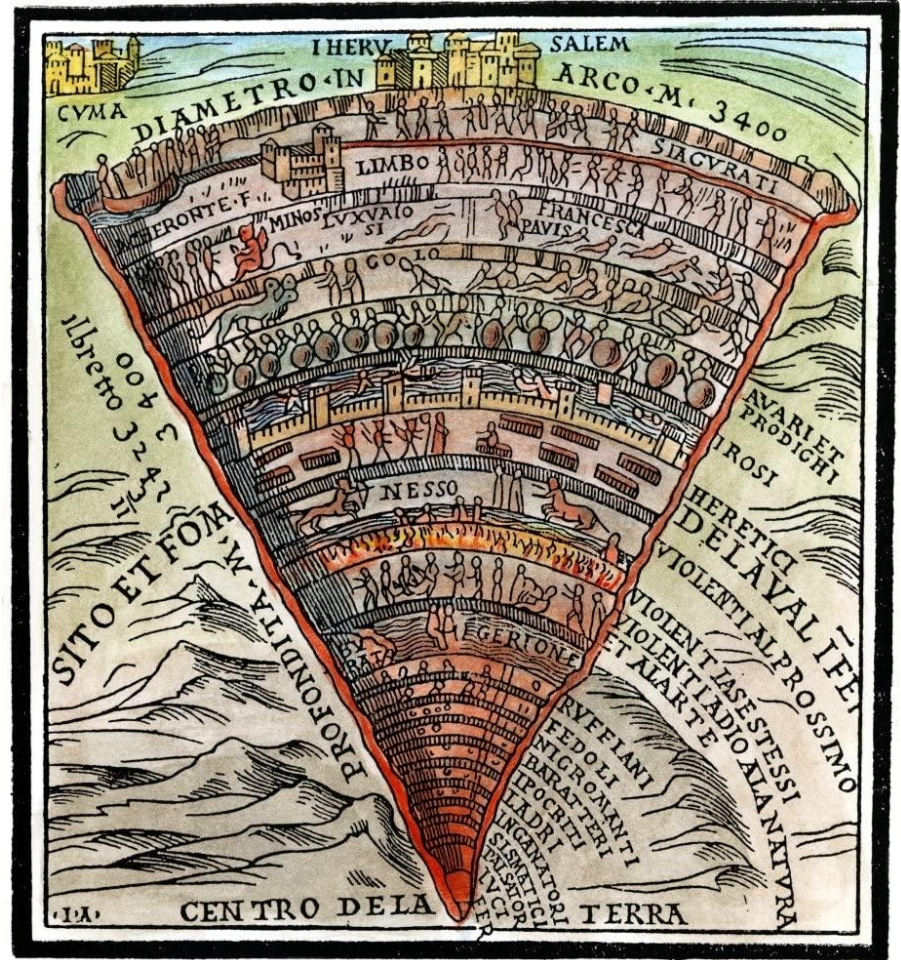
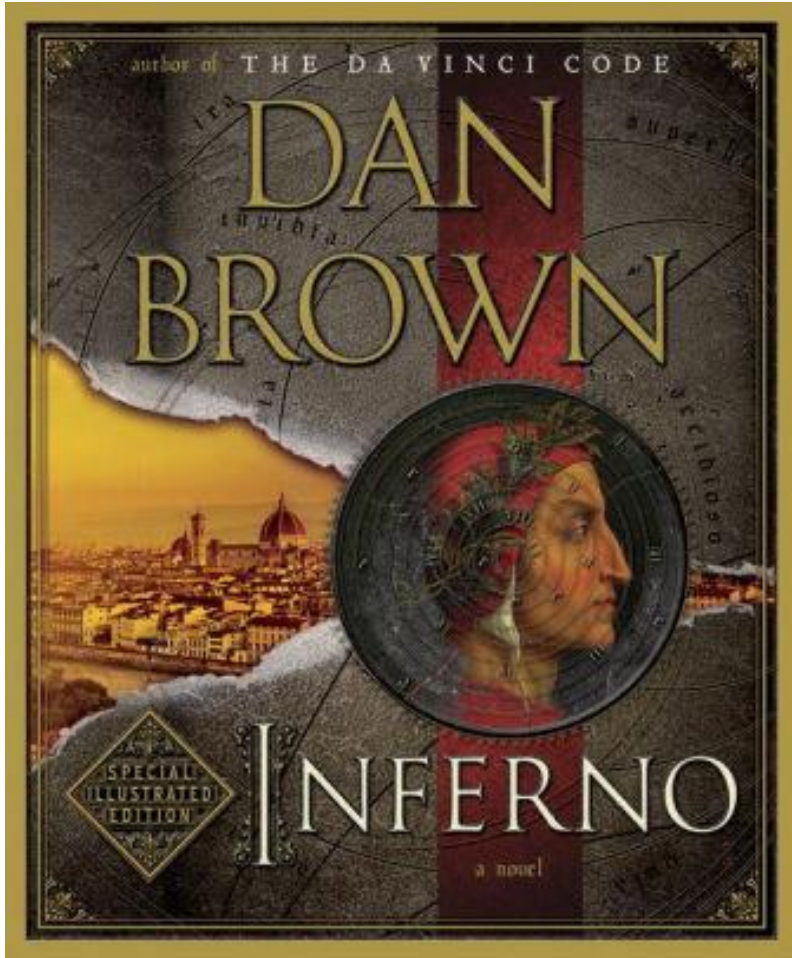


Figure 10-1: Population and population growth, 1750–2015 and projected to 2100

Sources: *Our World in Data*, Ortiz-Ospina & Roser 2016d. **1750–2015:** United Nations Population Division and *History Database of the Global Environment (HYDE)*, PBL Netherlands Environmental Assessment Agency (undated). **Post-2015 projections:** International Institute for Applied Systems Analysis, Medium Projection (aggregate of country-specific estimates, taking education into account), Lutz, Butz, & Samir 2014.

From: Pinker, S. *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress*. Penguin Random House LLC. 2018
 “My new favorite book of all time.” -- Bill Gates



“DANTE’S INFERNO”

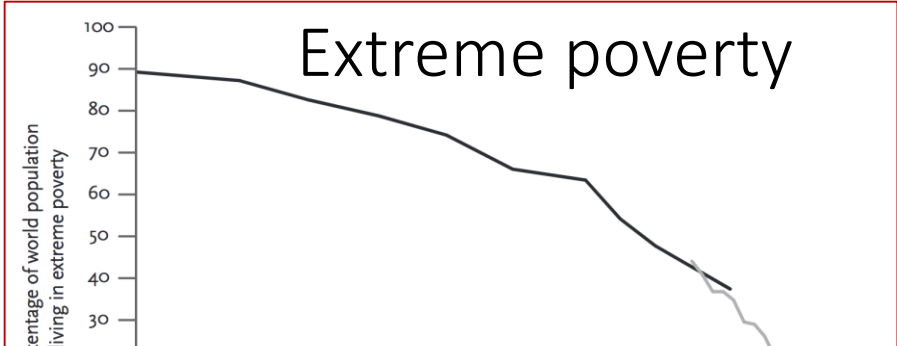


Figure 8-4: Extreme poverty (percentage of world population living in extreme poverty)

Sources: *Our World in Data*, Roser & Ortiz-Ospina 2002 (1820–1992), averaging their “Extreme poverty” with data on “Extreme poverty” for 1981–2015.

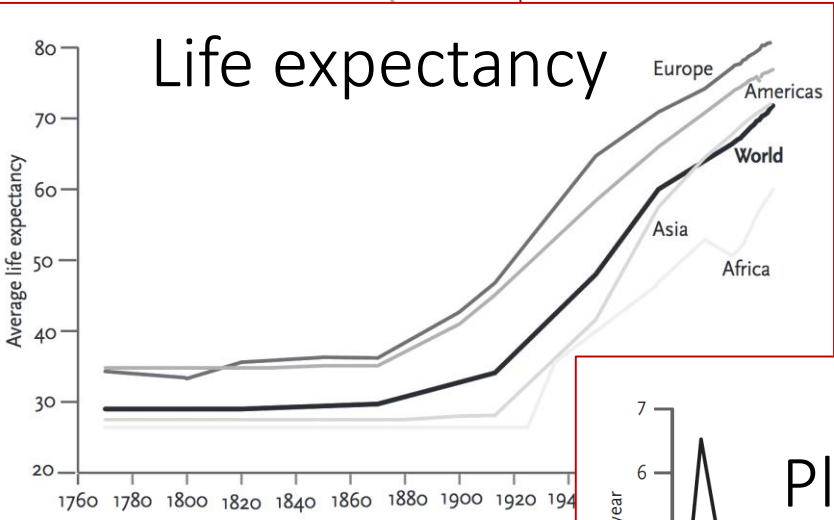


Figure 5-1: Life expectancy, 1771–2015

Sources: *Our World in Data*, Roser 2016n, based on data from Riley 2005 from the World Health Organization and the World Bank for the subsequent years provided by Max Roser.

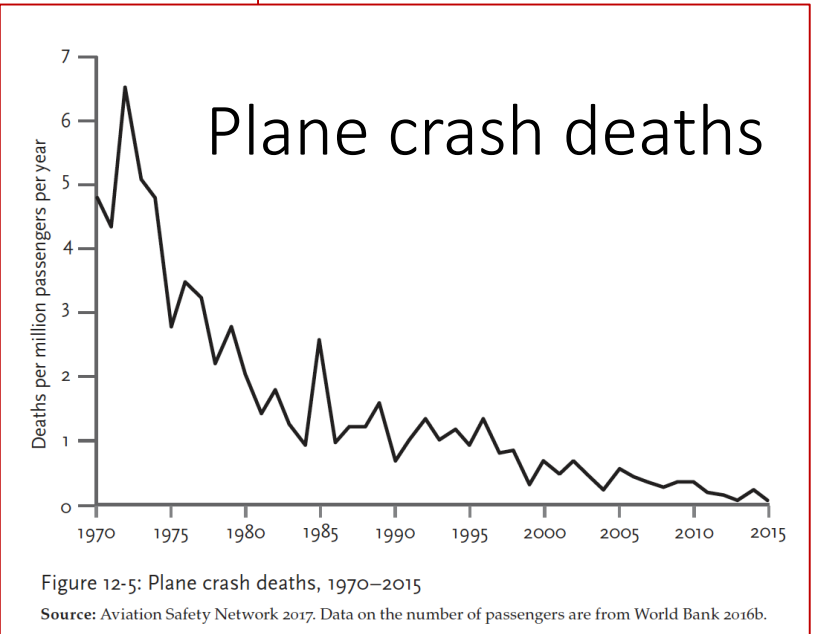


Figure 12-5: Plane crash deaths, 1970–2015

Source: Aviation Safety Network 2017. Data on the number of passengers are from World Bank 2016b.

From: Pinker, S. *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress.* Penguin Random House LLC. 2018

“If we keep trying to solve problems... then humanity will get better”



Source: “Why Do People Love to Hate Steven Pinker?” By Tom Bartlett, *The Chronicle Review*

TeleHealth | TeleNeurosurgery???



HI, WHO JUST JOINED?	CAN YOU EMAIL THAT TO EVERYONE?	IS ____ ON THE CALL?	UH, ____ YOU'RE STILL SHARING...	HEY, GUYS, I HAVE TO JUMP TO ANOTHER CALL
(SOUND OF SOMEONE TYPING, POSSIBLY WITH A HAMMER)	(LOUD, PAINFUL ECHO/ FEEDBACK)	(CHILD OR ANIMAL NOISES)	HI, CAN YOU HEAR ME?	NO, IT'S STILL LOADING.
NEXT SLIDE, PLEASE.	CAN EVERYONE GO ON MUTE?	I'M SORRY; I WAS ON MUTE	(FOR OVERTALKERS) SORRY, GO AHEAD	HELLO? HELLO?
SO (cuts out) I CAN (unintelligible) BY (cuts out) OK?	SORRY I'M LATE (INSERT LAME EXCUSE.)	I HAVE A HARD STOP AT...	I'M SORRY, YOU CUT OUT THERE.	CAN WE TAKE THIS OFFLINE?
I'LL HAVE TO GET BACK TO YOU.	CAN EVERYONE SEE MY SCREEN?	SORRY, I WAS HAVING CONNECTION ISSUES.	I THINK THERE'S A LAG.	SORRY, I DIDN'T CATCH THAT. CAN YOU REPEAT?

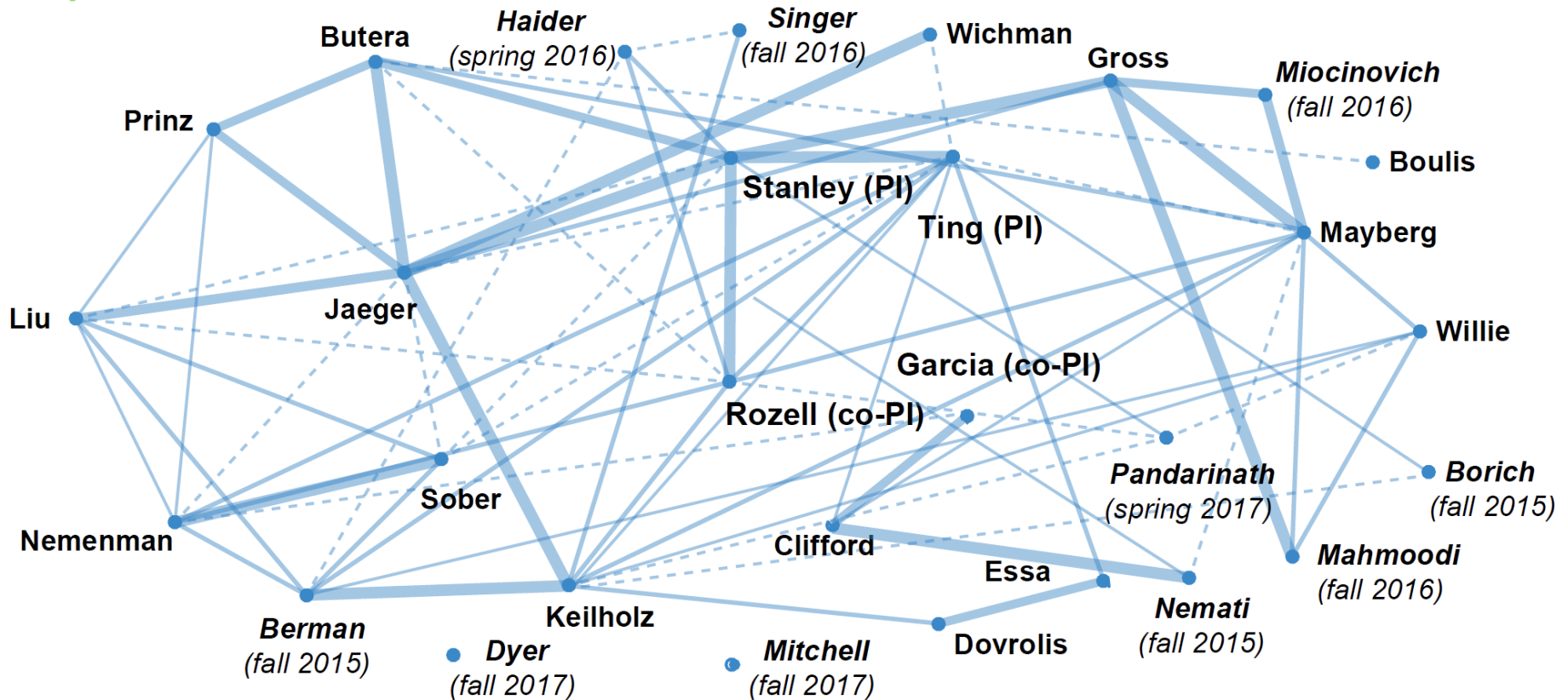
CONFERENCE CALL BINGO

© E GILLIAM

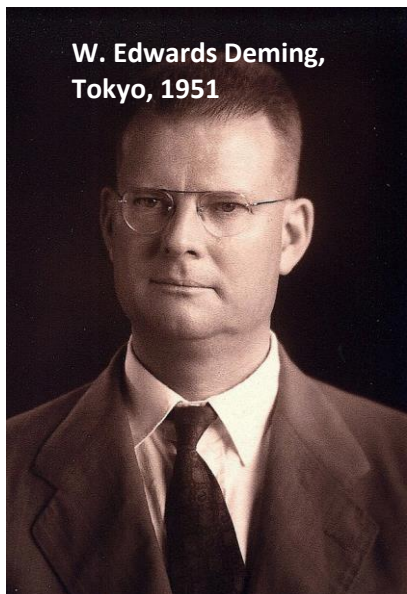
Figure 2: Collaborations in Computational Neural Engineering at Georgia Tech and Emory

Computational Neuroscience

Clinical Neurophysiology



W. Edwards Deming,
Tokyo, 1951

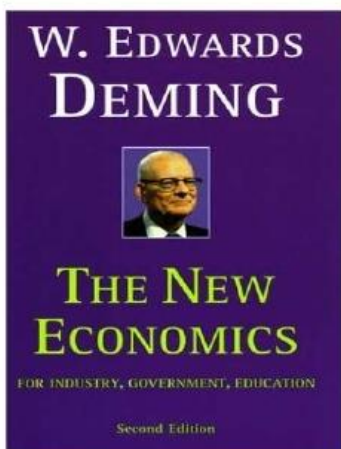


Cooperation, Optimization using **Systems Thinking**

“It would be better if everyone worked together as a system, with the aim for everybody to win.”

— Dr. W. Edwards Deming

Deming’s System of Profound Knowledge



*“The first step is transformation of the **individual**... The individual, transformed, will perceive new meaning to his life, to events, to numbers, to **interactions between people.**”*

Theory of a System:

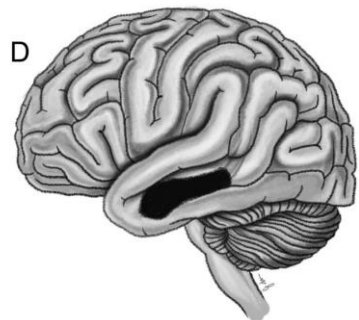
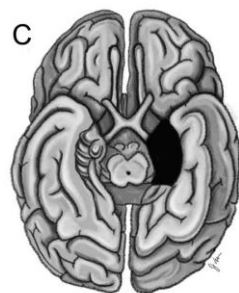
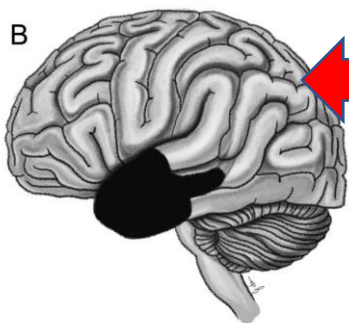
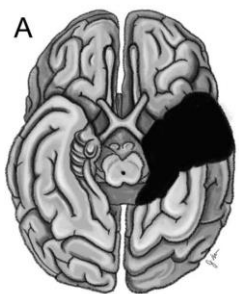
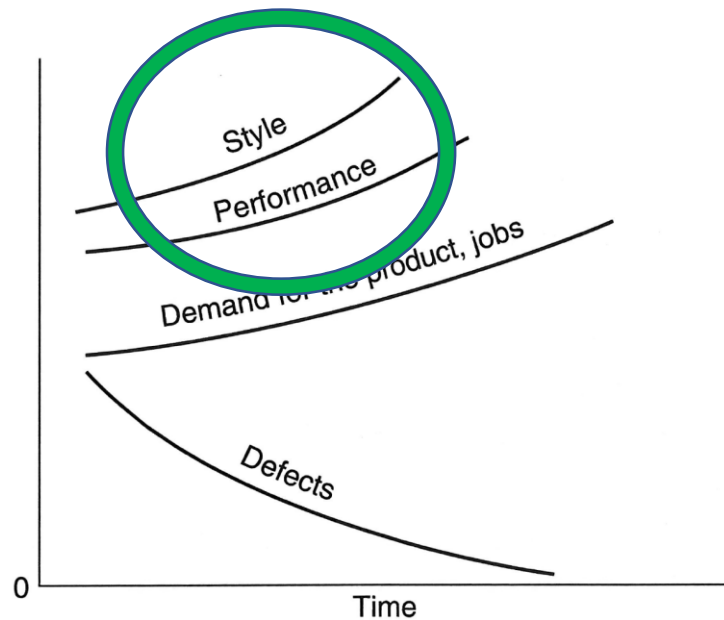
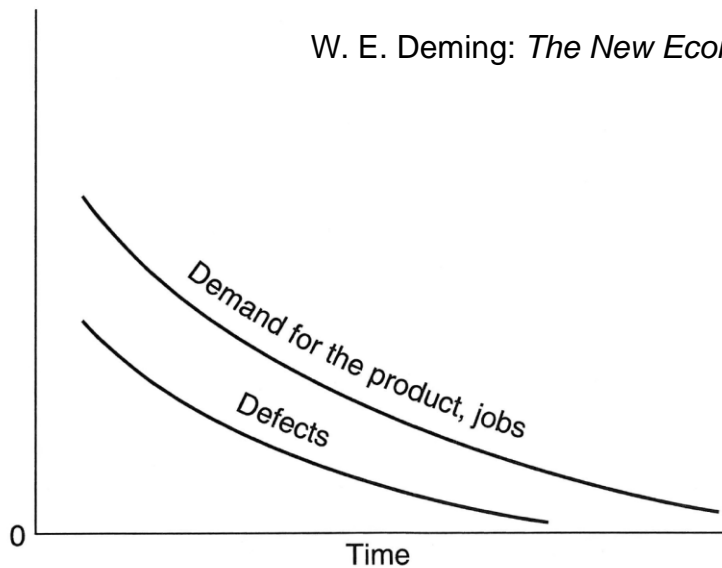
In an optimized system, everybody benefits: stockholders, suppliers, employees, customers

Optimization of one part of a system may compromise another part of the system – and may not optimize the WHOLE system

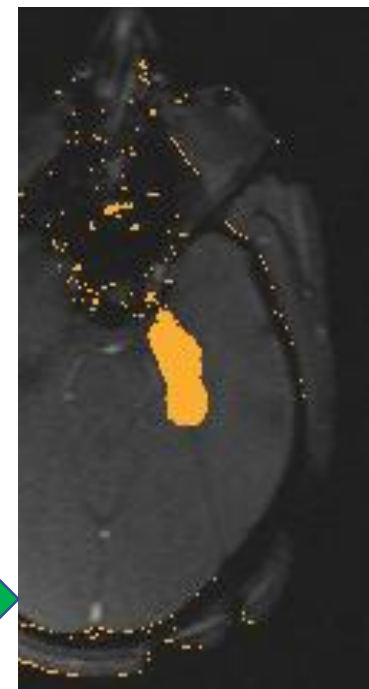
The problem is how to achieve a **balance**, a tolerable level for every part of the system

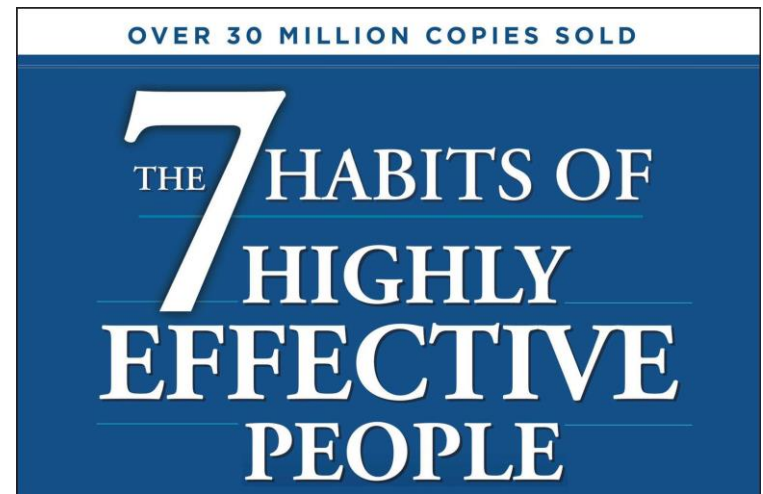
To optimize a system requires cooperation, connection, and communication

W. E. Deming: *The New Economics*, 3rd ed.

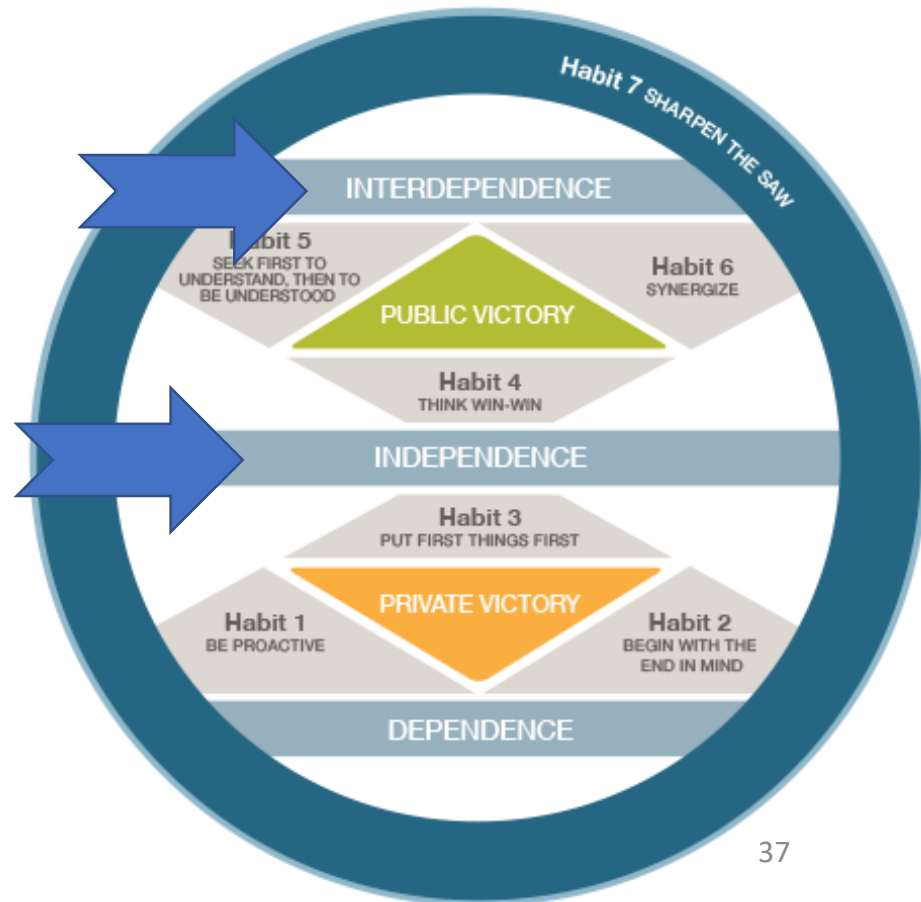


- Decreased 'defects'
- What does the customer "want"?
 - 75% vs. 60%
- Minimally invasive

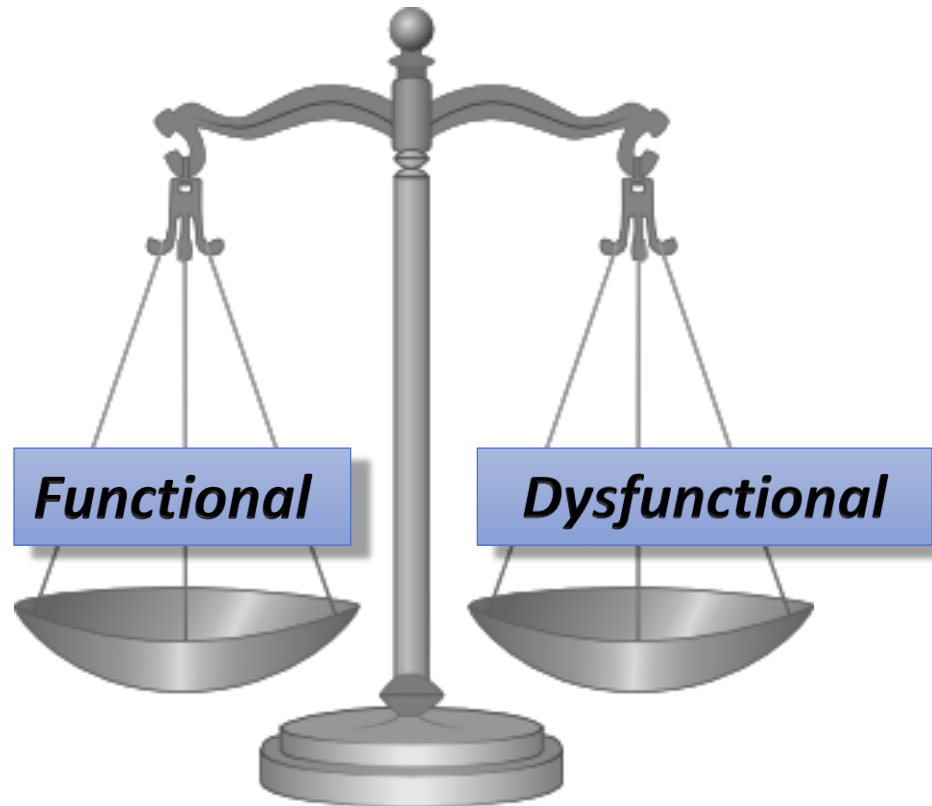




- Named the #1 Most Influential Business Book of the 20th Century
- >10 million copies sold
- *Time* magazine's 25 most influential Americans

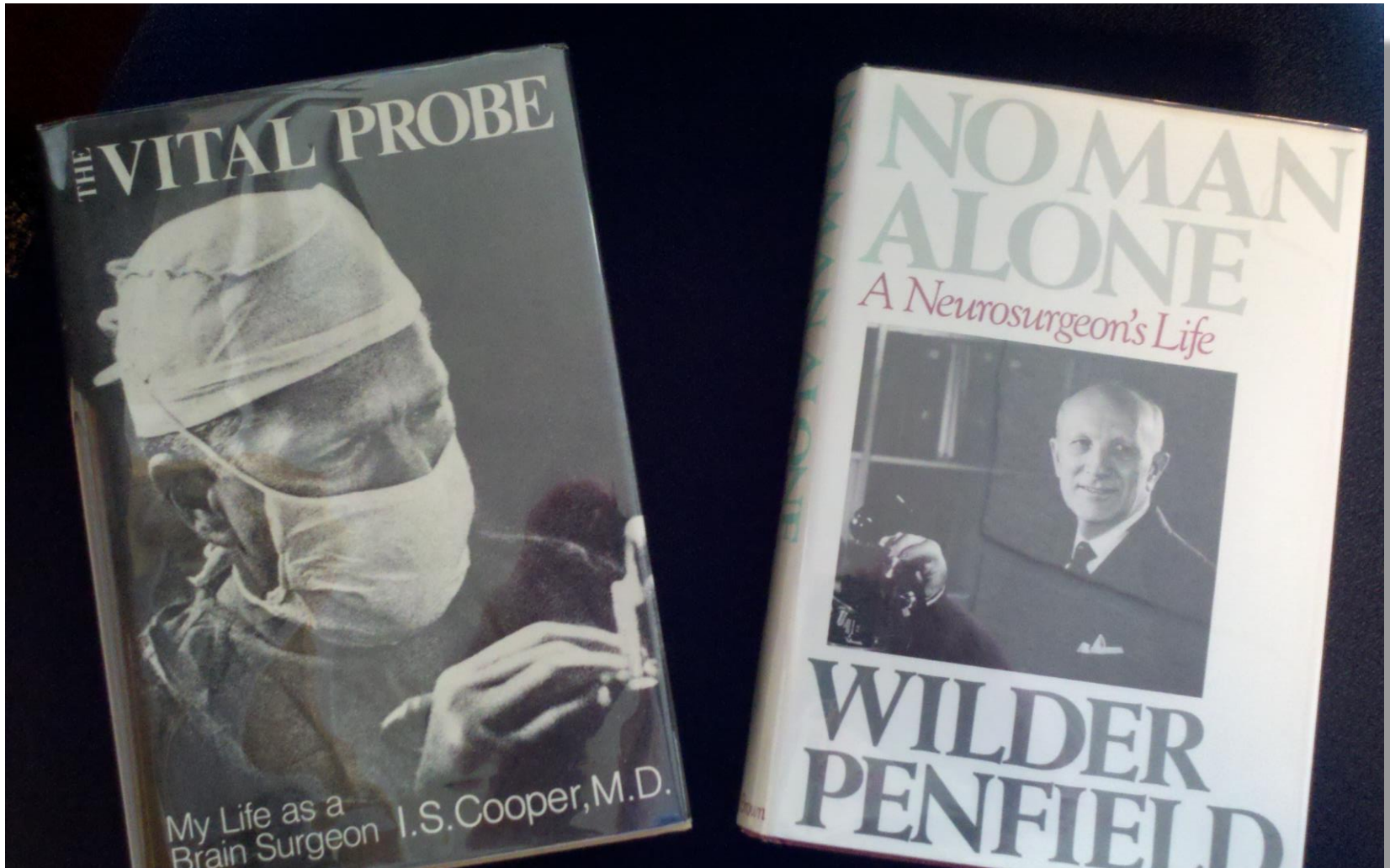


The 7 Habits of Highly Functional Neurosurgeons

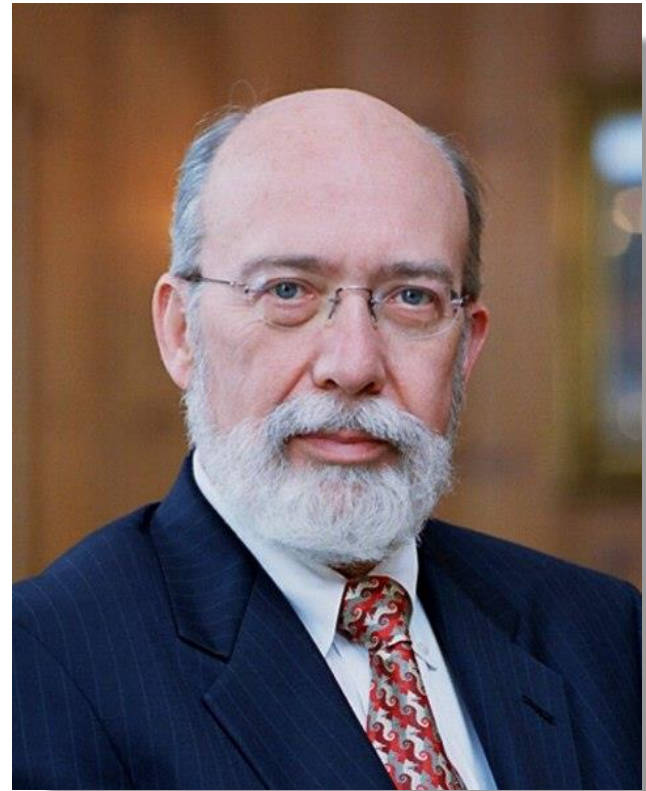


Alone....

...or in a Team?

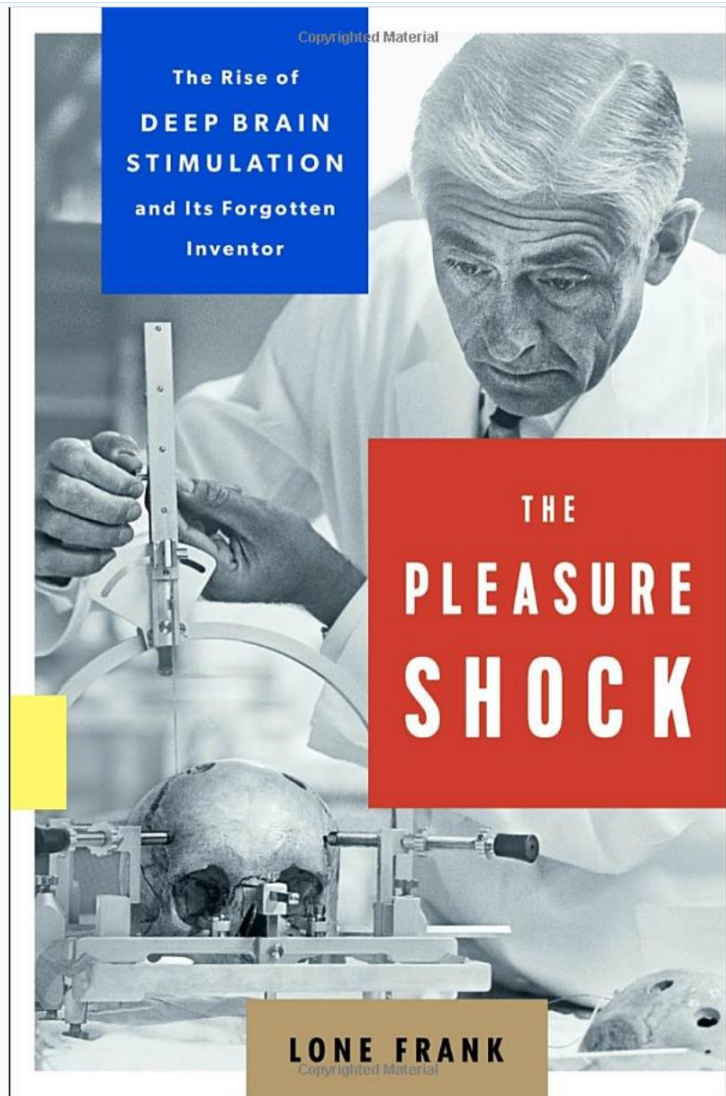


Work with teams

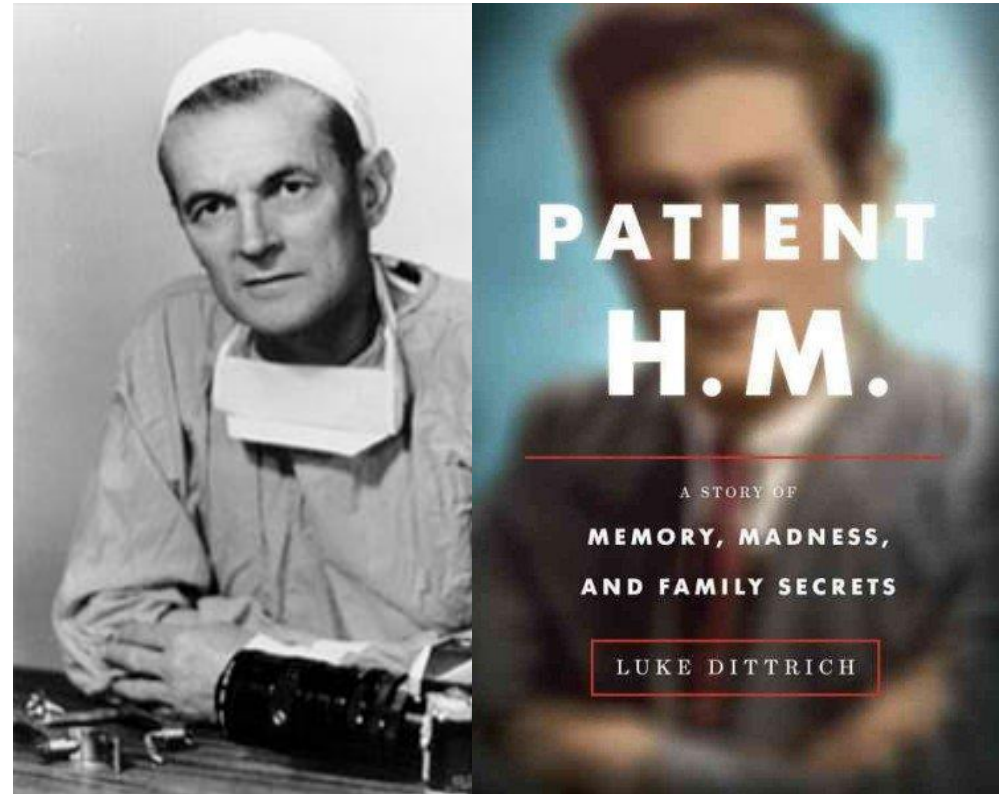


Worked alone

Robert Heath



William Scoville





It is true practically if not altogether without exception that the changes studied by any science tend to **equilibrate** or neutralize the forces which bring them about, and finally to come to rest. – Frank Knight

Dictionary

equilibrate

All Dictionary Thesaurus Apple Wikipedia

equilibrate | ə'kwɪləbrāt |

verb [with object] technical

bring into or keep in equilibrium.

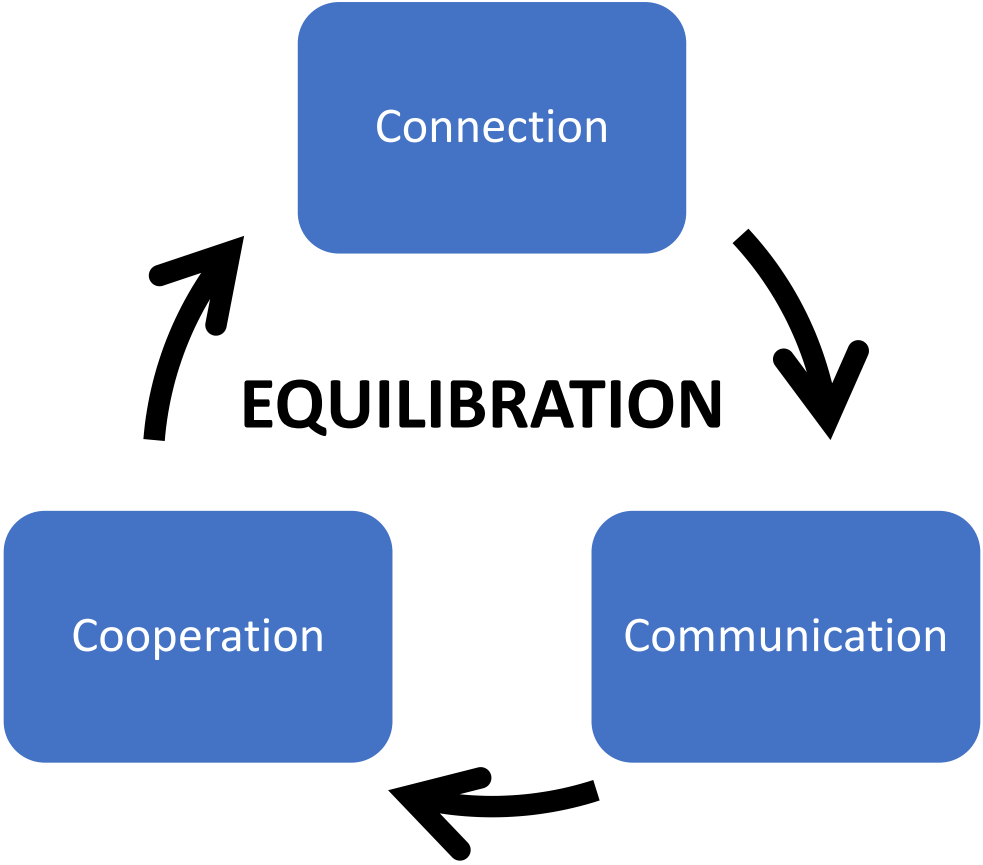
- [no object] approach or attain a state of equilibrium.

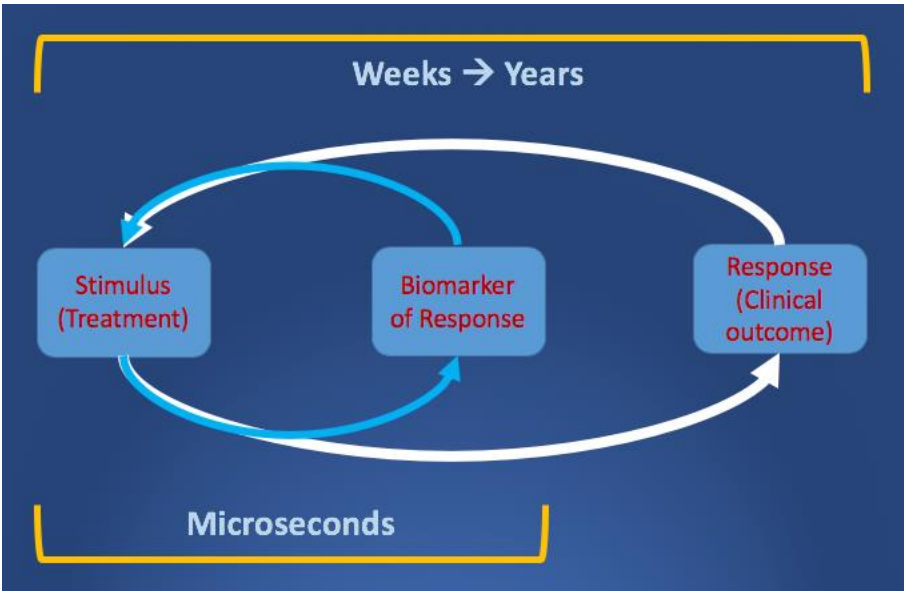
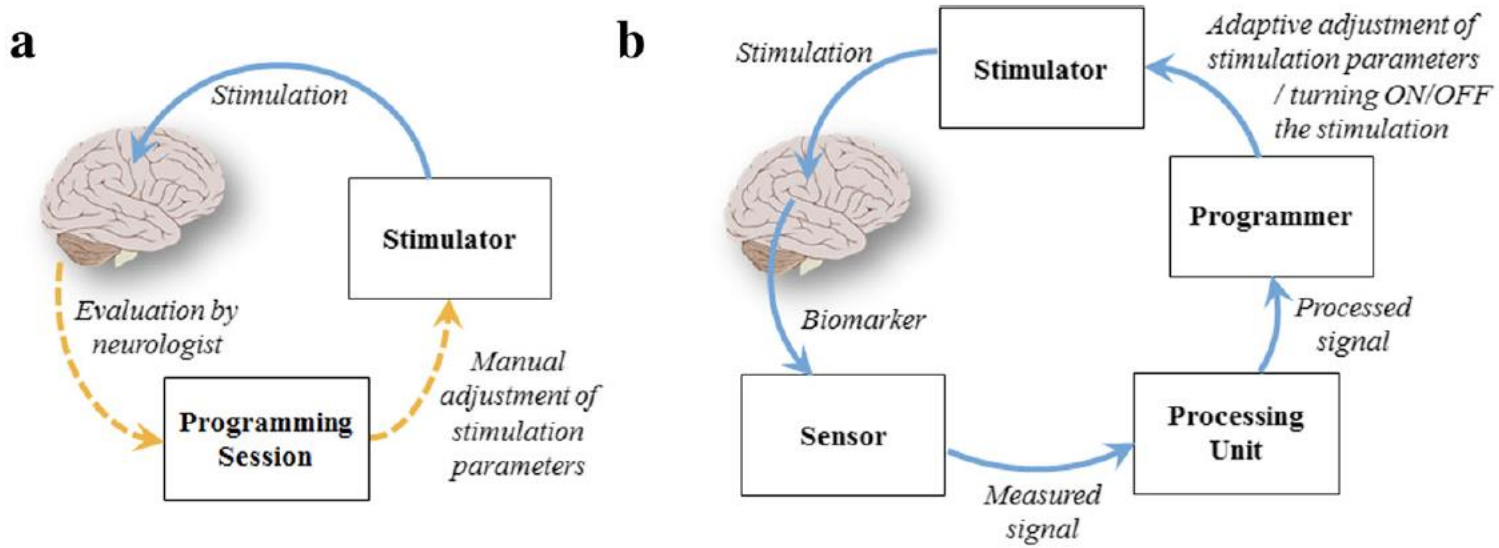
DERIVATIVES

equilibration | ə,kwɪlə'brāSHən, e,kwɪlə'brāSHən, ē,kwɪlə'brāSHən | noun

ORIGIN

mid 17th century: from late Latin *aequilibrat-* 'made to balance', from the verb *aequilibrare*, from *aequi-* 'equally' + *libra* 'balance'.







A Wall Street Journal Bestseller

LIBERATING THE HEROIC SPIRIT OF BUSINESS

CONSCIOUS CAPITALISM

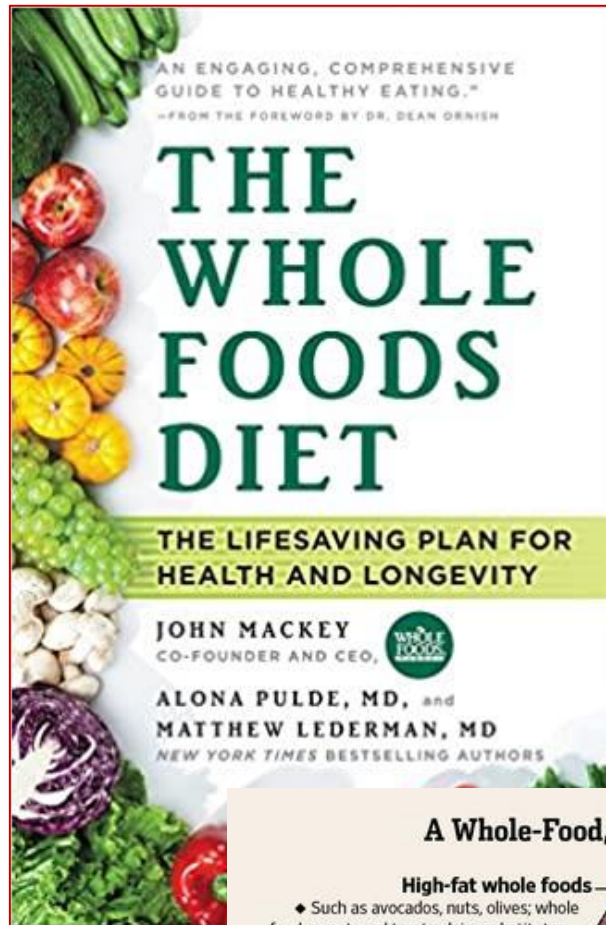
FOREWORD BY BILL GEORGE

JOHN MACKKEY

Co-CEO, Whole Foods Market

RAJ SISODIA

HARVARD BUSINESS REVIEW PRESS



AN ENGAGING, COMPREHENSIVE GUIDE TO HEALTHY EATING.
—FROM THE FOREWORD BY DR. DEAN ORNISH

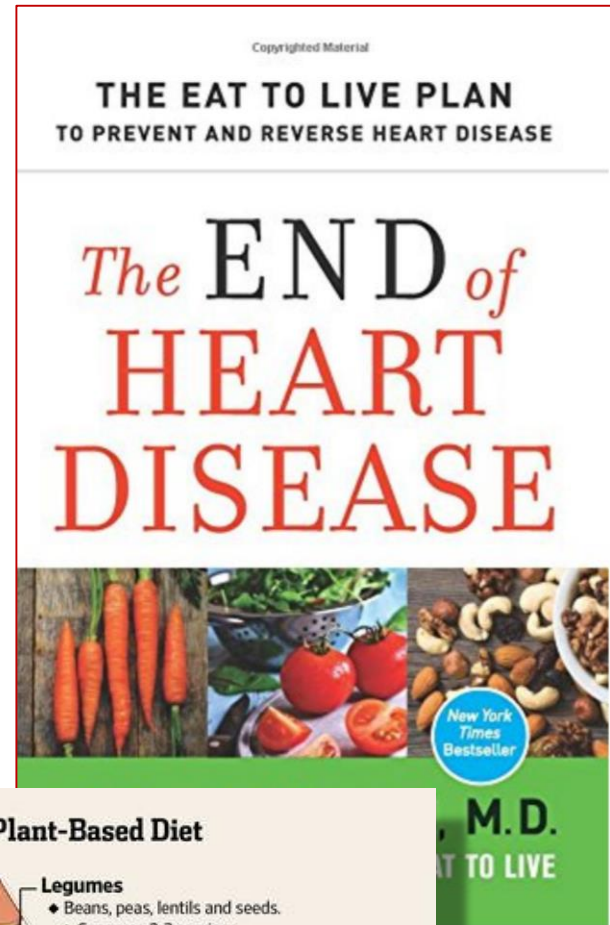
THE WHOLE FOODS DIET

THE LIFESAVING PLAN FOR HEALTH AND LONGEVITY

JOHN MACKKEY
CO-FOUNDER AND CEO,



ALONA PULDE, MD, and MATTHEW LEDERMAN, MD
NEW YORK TIMES BESTSELLING AUTHORS



Copyrighted Material

THE EAT TO LIVE PLAN TO PREVENT AND REVERSE HEART DISEASE

The END of HEART DISEASE



New York Times Bestseller

M.D.
EAT TO LIVE

The four guiding principles include:

- A higher purpose
- Stakeholder orientation
- Conscious leadership
- Conscious culture

A Whole-Food, Plant-Based Diet

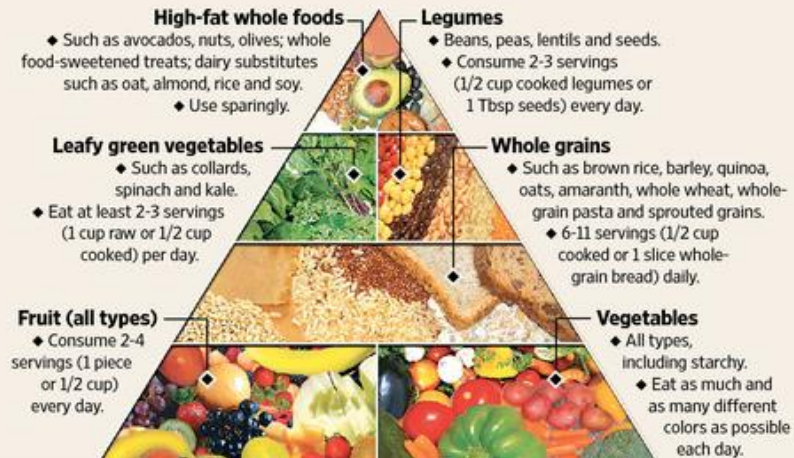


Image: Sherri Nestorovich

The Wall Street Journal

ASSFN

Strategic Planning Retreat

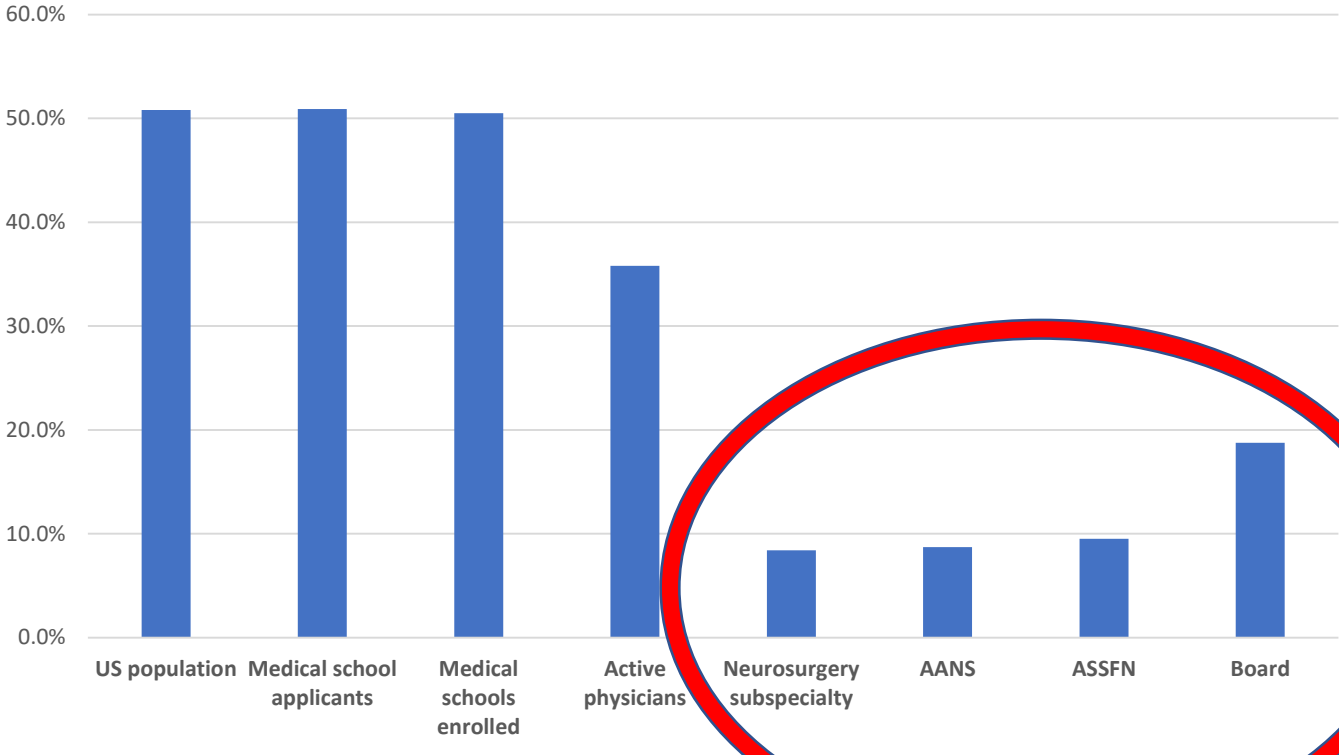
Creating the Future

MARCH 1, 2020

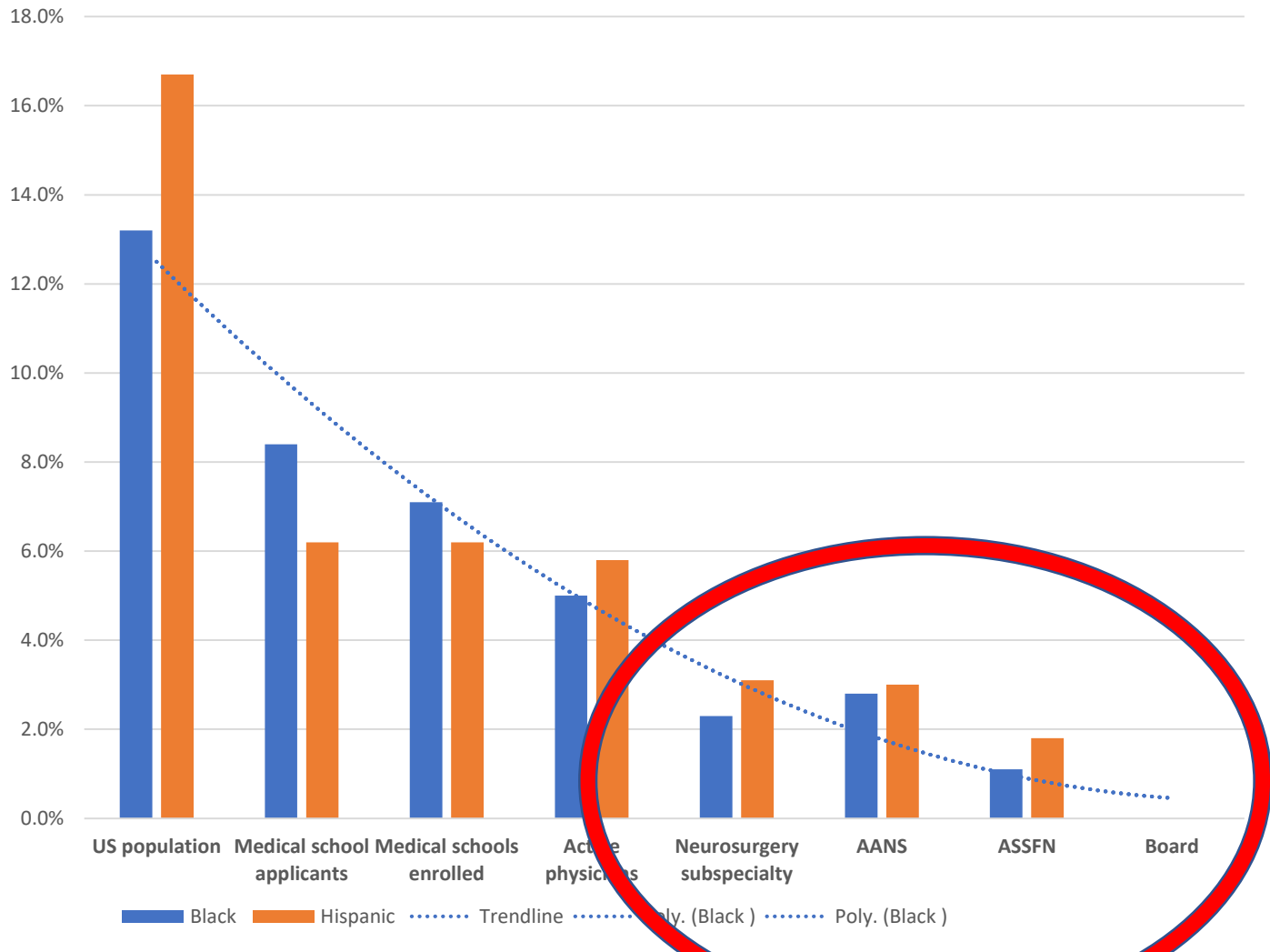




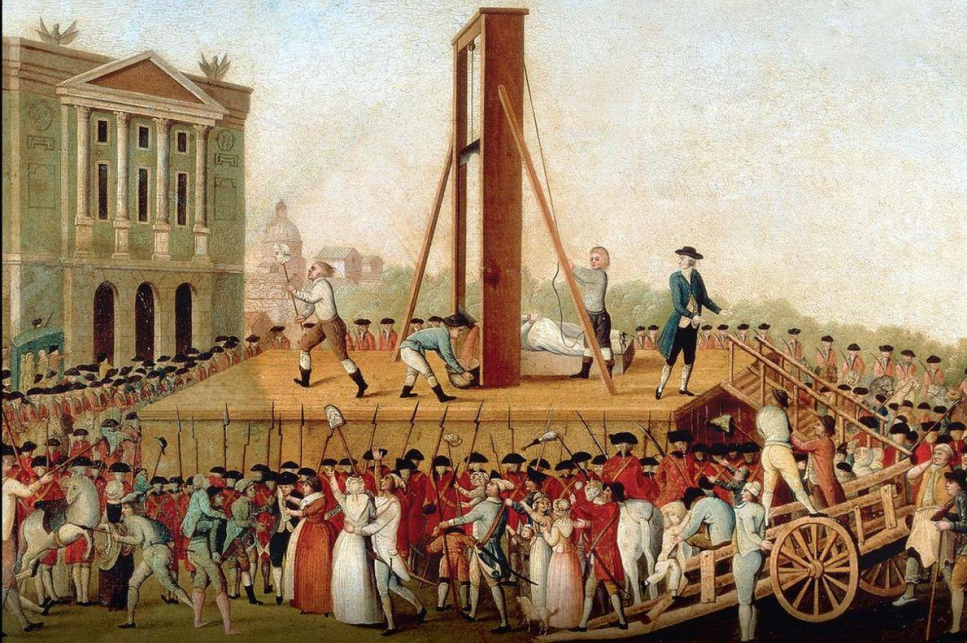
Females in Functional Neurosurgery



Blacks and Hispanics in Functional Neurosurgery



A Tale of Two Cities



Charles Dickens

It was the best of times, it was the worst of times,

It was the age of wisdom, it was the age of foolishness,

It was the epoch of belief, it was the epoch of incredulity,

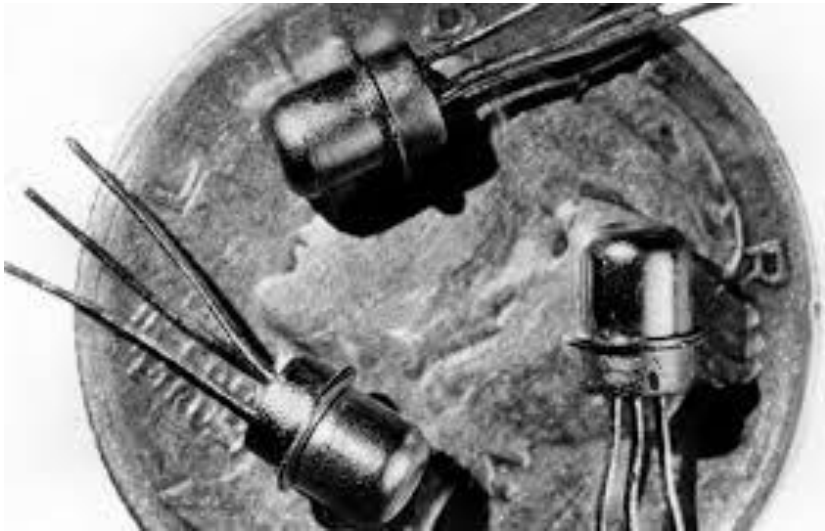
It was the season of Light, it was the season of Darkness,

It was the spring of hope, it was the winter of despair,

We had everything before us, we had nothing before us,

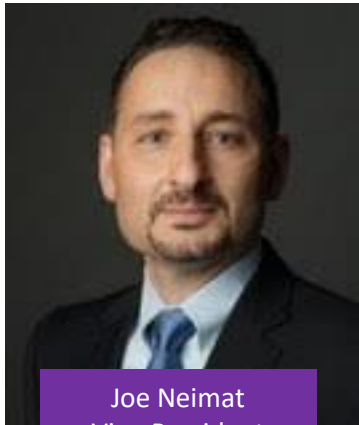
We were all going direct to Heaven, we were all going direct the other way –

In short, the period was so far like the present period....





Emad Eskandar
Past President



Joe Neimat
Vice-President



Andre Machado
Secretary-Treasurer

The peaceful transition of power is one of the hallmarks of our democracy.

— Barack Obama —

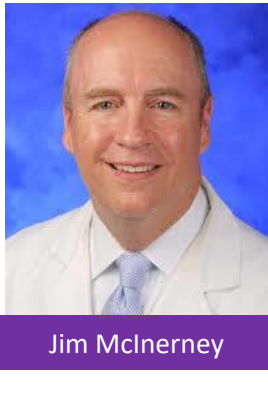
BOARD OF DIRECTORS



Ellen Air



Jorge Gonzalez-Martinez



Jim McInerney



Guy McKhann II



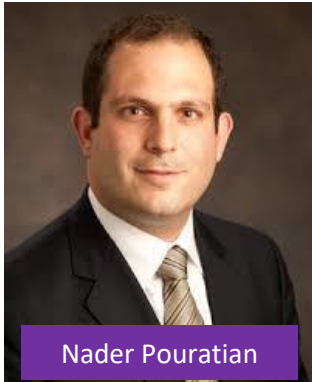
Jonathan Miller



Alon Mogilner



Julie Pilitsis



Nader Pouratian



Mark Richardson



Jason Schwalb



Sameer Sheth



Jennifer Sweet