Cosmological Immortality:
Evolutionary Developmental Ethics on a Universal Scale

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- Last chapter of my PhD
  - work in progress!
  - “The Beginning and the End:
    the Meaning of Life in a Cosmological Perspective”

- Time scope
  - Human ethical principles, religious or not, are based on a few millennia.
    - insignificant from a cosmological perspective
  - Evolutionary ethics uses millions of years
    - still not enough

Stapledonian Thinking

Scale	Duration
Human	100 years
Historical	10 000 years
Anthropological (Evolutionary)	10 million years
Geological	5 billion years
Astronomical	14 billion years
Stapledonian (Astronomical + Biology & Culture)	14 billion years

Time Scales in Human Thought
Adapted from (Dick 2009, 464)

See **Chronozoom for a dynamical view**
http://eps.berkeley.edu/~saekow/chronozoom/launch/index.html

Cosmic ethics?

- Ethics valid for 14 billion years of cosmic evolution?
- What is the ultimate good in the universe?
  - Evolutionary ethics concludes that **survival** is the most important value.
  - Survival of **what**?
  - Survival for **how long**?
- How can we aim for infinite survival, that is, for immortality?

Outline

1. **Evolutionary values**
   - Five trade-offs
2. **Developmental values**
   - for individuals
   - for societies
3. **Entropic values**
   - Information ethics
   - Thermodynamic ethics
4. **Towards cosmological immortality**
   - Spiritual, individual, creative, evolutionary, cosmological

1. Evolutionary values

Descriptive and Prescriptive Ethics

- Descriptive ethics
  - empirical recording of people's values
- Prescriptive ethics
  - giving values for people to act on

Five Trade-offs
1. Internal vs External fitness

- Internal fitness: **Stability** Values
  - equilibrium, robustness, durability, autonomy, self-organization
    e.g. : Health

- External fitness: **Adaptability** Values
  - Variation, innovation, exploration, experimentation, diversity, growth, (re)production
  - E.g: Wealth

(Heylighen 2004)

Increase internal or external fitness?

2. Generalist / Specialist Trade-off

- Generalized
  - fit because you can adapt to different niches
- Specialized
  - fit because you can adapt to very specific niches

e.g. engineers or doctors can be generalists or specialists

3. r-K selection
Trade-off

- Evolution is about survival and reproduction.
- Do we want more *qualitative* or *quantitative* survival and reproduction?
  - r: fast reproduction, short survival
    - better if the environment is risky.
    - e.g. insects
  - K: slow reproduction, long survival
    - better if the environment is secure.
    - e.g. mammals

4. Exploration / Exploitation Trade-off

- Exploitation
  - use of known affordances (e.g. resources) to maximize utility
- Exploration
  - search for affordances (e.g. opportunities).

How to divide the energy expenditure between the two?

5. Competition / Cooperation Trade-off

- **Competition** = I win, you loose! "Win-Loose”
- **Cooperation** = We win! "Win-Win”

- **Tit-for-tat** is better than the **golden rule**!
  - **Golden rule**: Do unto others as you would have them do unto you
  - **Tit-for-tat:** Cooperate with others first (Golden rule), then do unto them as they do unto you.

  You don't let people take advantage of you, yet you seek maximal cooperation.

  Game theory (Axelrod 2006)

  Win-Loose players have a tendency to self-annihilate.

  Win-Win players survive

Limitations of evolutionary ethics

- Hard to build a prescriptive ethics with evolutionary values.
- Evolutionary values allow adaptation to any circumstances, for any purpose.

- We need clearer goals, values, purpose, directions to construct a prescriptive ethics.

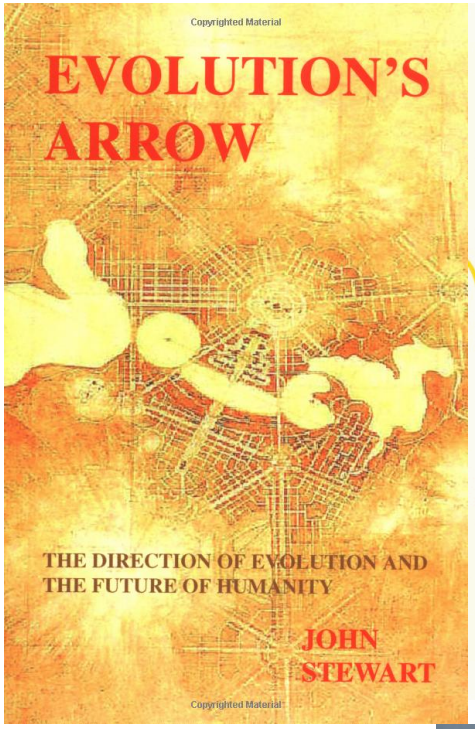
2. Developmental values

Outdated evolutionary picture

- Evolution = **competition**
- Nature is cruel
- Evolution is a merciless struggle for survival

Modern evolutionary picture

- Evolution = **cooperation** (and competition)
  - What cooperates outcompetes others
    - Evolution can't go in any direction
    - It will go in the direction of greater cooperation... or stop (Stewart 2000)!
- Progress in Evolutionary Progress
  - a cell is less complex than a human being composed of trillions of cells, capable of more adaptation, capable to surf the web he is weaving with millions of social partners.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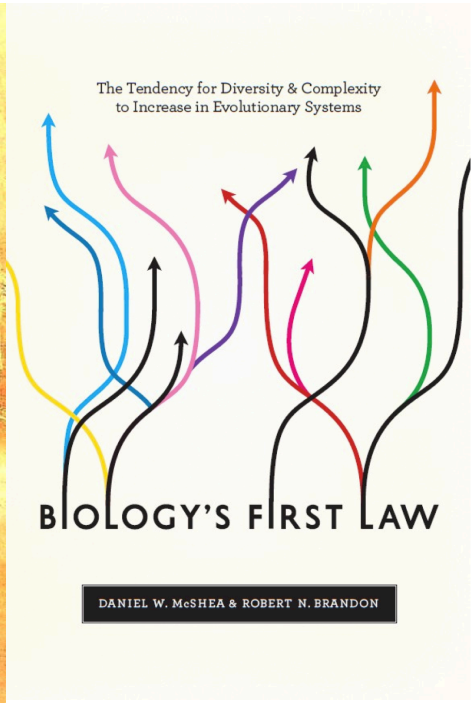
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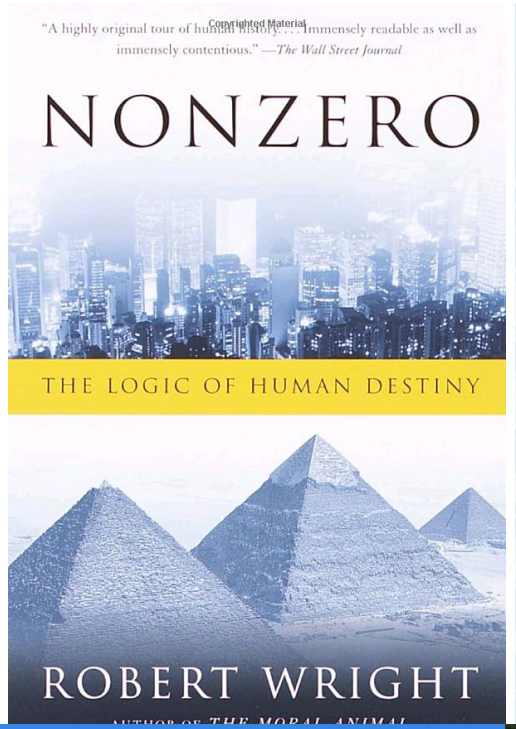
BIOLOGY'S FIRST LAW
DANIEL W. McSHEA & ROBERT N. BRANDON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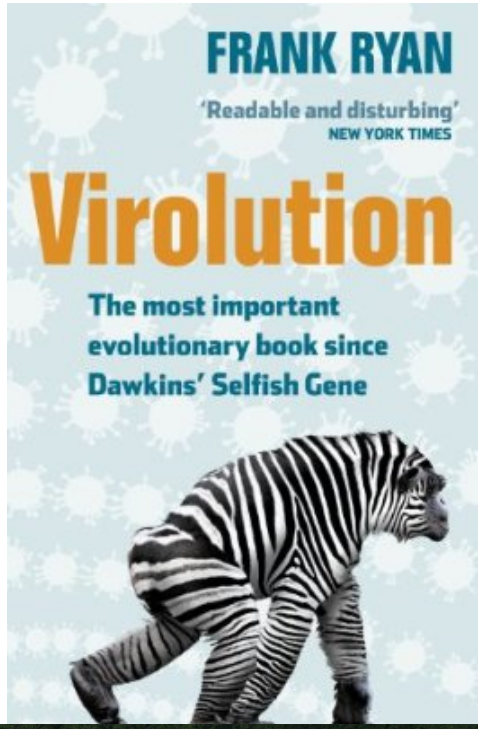
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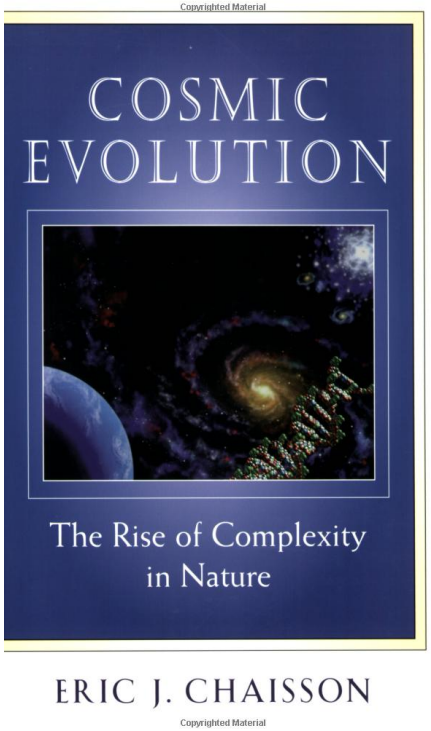
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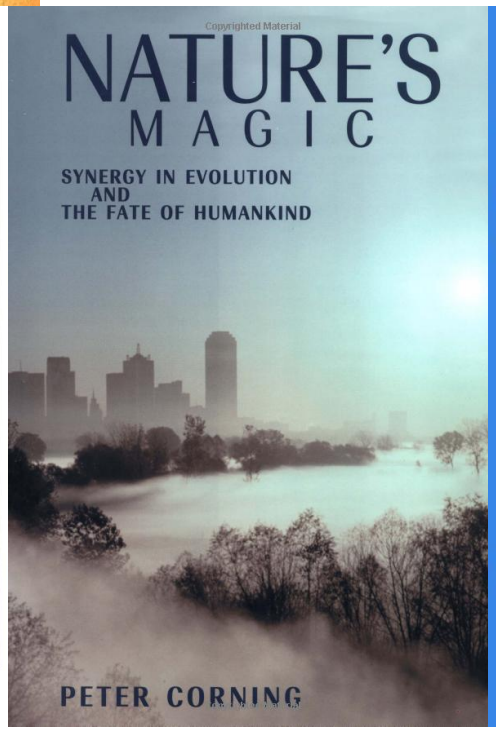
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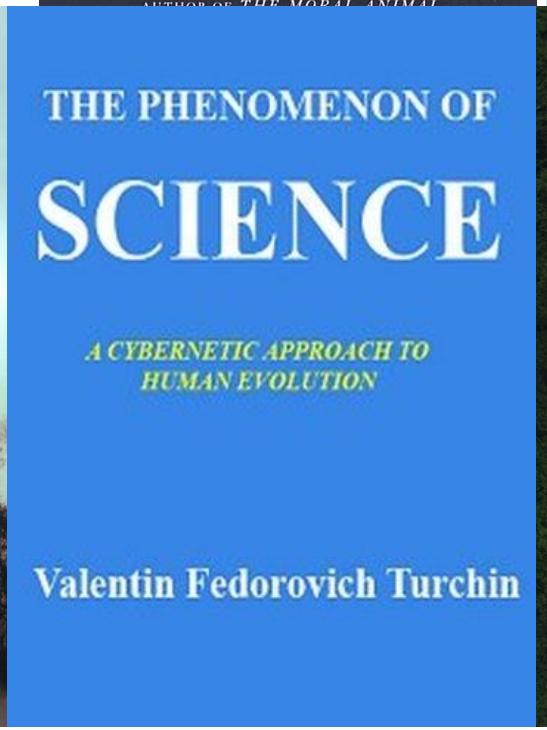
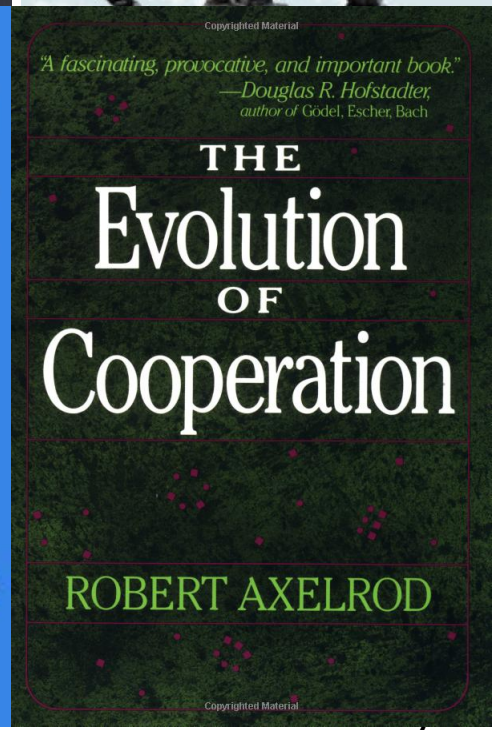

THE PHENOMENON OF
SCIENCE
A CYBERNETIC APPROACH TO HUMAN EVOLUTION
Valentin Fedorovich Turchin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Cybernetic values

- Values for goal directed systems
  - control, self-control
  - reserves, buffers
  - sensitivity, power of observation
  - knowledge, intelligence
  - power, energy, power to act.
  - insight into one's own goals or preferences
- ... which goal?

(Heylighen 2004)

Development in humans

- What are the ultimate **cognitive**, **emotional** and **moral** developments intelligent beings can achieve in this universe?

- **Self metasystem transitions?**

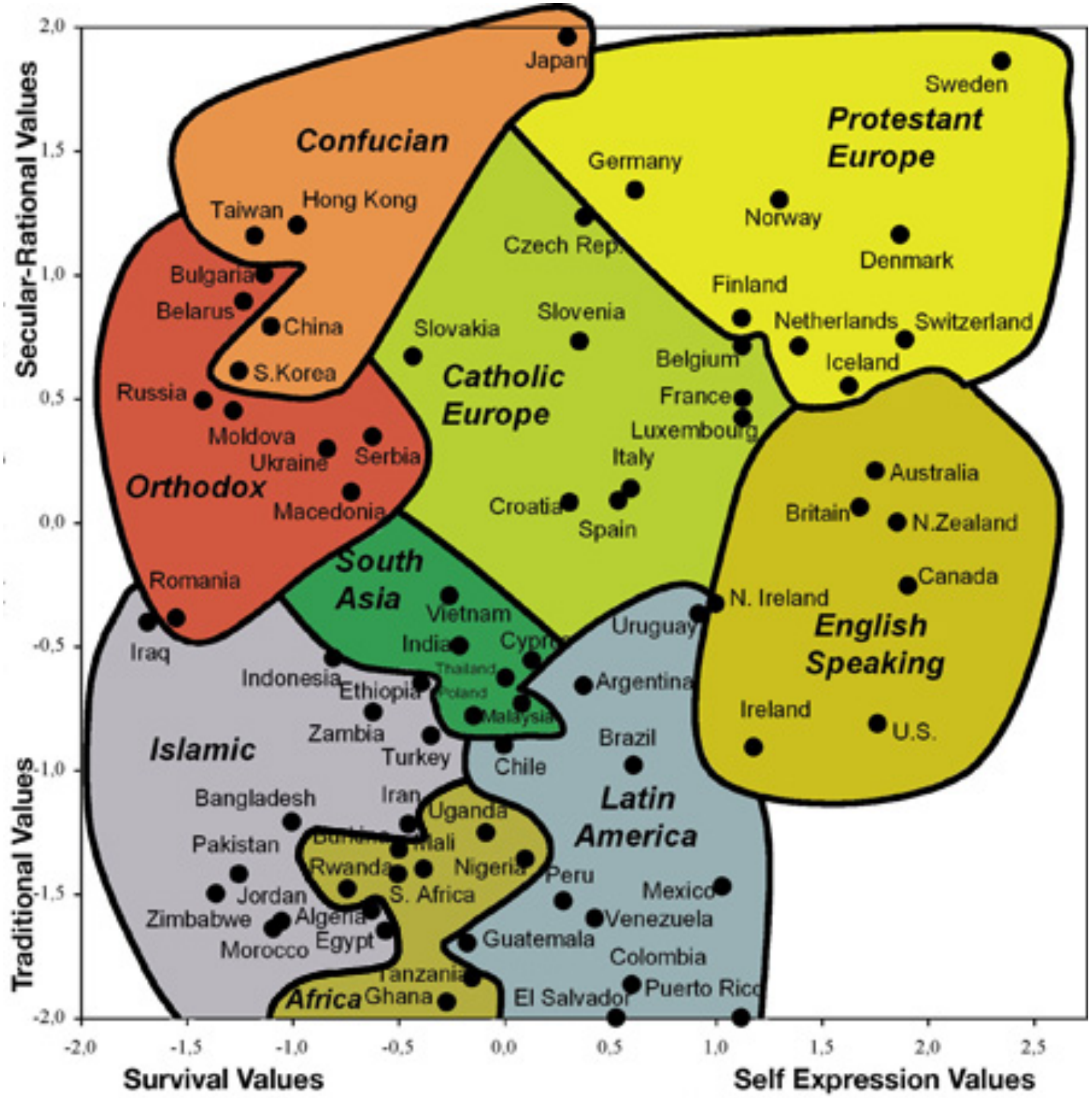
Development in humans (2)

- Develop **cognitively**
  - Piaget's stages of cognitive development.
  - Critical attitude
    - question beliefs, values, knowledge
    - The scientific method and the rational tradition of thinking
- Develop **socio-emotionally**
  - Kegan, Gebser, Cook-Greuter, Loevinger, etc.
  - Buddhist tradition
    - emotional awareness, have emotions instead of them having us.
  - Internal family system therapy
    - Psychotherapeutic method, higher level of self. (Earley 2009)

Development in humans (3)

- Develop **morally**
  - Kohlberg's (1981;1984) stages of moral development
  - Fowler's (1981) stages of faith

  - BUT not enough since it's not prescriptive, just formal.


Secular-Rational Values
Traditional Values
Survival Values
Self Expression Values
2,0
1,5
1,0
0,5
0,0
-0,5
-1,0
-1,5
-2,0
-2,0
-1,5
-1,0
-0,5
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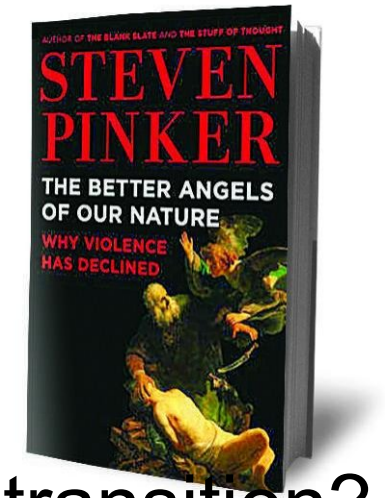
1,5
2,0
2,5
Confucian
Protestant Europe
Catholic Europe
Orthodox
South Asia
Islamic
Latin America
English Speaking
Africa
Japan
Sweden
Germany
Norway
Denmark
Finland
Netherlands
Switzerland
Iceland
Belgium
France
Luxembourg
Italy
Spain
Croatia
Slovenia
Slovakia
Czech Rep.
Taiwan
Hong Kong
China
S.Korea
Bulgaria
Belarus
Russia
Moldova
Ukraine
Serbia
Macedonia
Romania
Australia
Britain
N.Zealand
Canada
N. Ireland
Ireland
U.S.
Uruguay
Argentina
Brazil
Chile
Peru
Mexico
Venezuela
Colombia
Guatemala
El Salvador
Puerto Rico
Vietnam
India
Cyprus
Thailand
Poland
Malaysia
Indonesia
Ethiopia
Zambia
Turkey
Iraq
Iran
Bangladesh
Pakistan
Uganda
Mali
Nigeria
Rwanda
S. Africa
Jordan
Zimbabwe
Algeria
Egypt
Morocco
Tanzania
Ghana

Development in societies

- Rationality increase
  - More secular-rational values (instead of traditional values), self-expression values (instead of survival values)

    (Inglehart and Welzel 2005)
- Violence decrease

  e.g. (Pinker 2011)



- Global Brain: next evolutionary transition?
  - Cooperation at a planetary scale.

Universal Development?

- Is there a development at play at a universal scale?
- Open question John Smart & I invite you to explore within the "Evo Devo Universe" research community. (http://evodevouniverse.com)

Conclusion - Evo Devo values

- Evo-Devo values:
  - ***evolutionary***, short term, contextual, adaptive
  - ***developmental***, long term growth.

- Second Law of Thermodynamics
  - Only disorder can increase, not order!
  - But order can increase **locally**, while decreasing **globally**

(Chaisson 2001)

3. Entropic values

Two entropies

- Informational entropy
  - has to do with statistics and order in any system.
  - also called statistical entropy
- Thermodynamical entropy
  - has to do with heat and energy

Information ethics (Infoethics)

0. entropy ought not to be caused in the infosphere (null law);
   - **Spam**: BAD because creates disorder (entropy) in mailboxes.
1. entropy ought to be prevented in the infosphere;
   - **AntiVirus**: GOOD because it prevents information destruction.
2. entropy ought to be removed from the infosphere;
   - Database cleaning and merging: GOOD because less redundancy
3. the flourishing of informational entities as well as of the whole infosphere ought to be promoted by preserving, cultivating and enriching their properties.
   - Less clear!

(Floridi 2008, 58-59)

Thermodynamic ethics (Thermoethics)

- Hammond wanted to make Prigogine's wish true: ***entropy ethics taught to children all over the planet***

(Hammond 2005)

- What is Life?
  - "Life involves the utilization of a flow of energy to draw order from chaos and build internal complexity with an accumulation of information. Living beings thus are anti-entropic, or negentropic, entities."

(Freitas 1979-2010)

Thermodynamic ethics

- Thermoethic Principle

  "All living beings should always act so as to minimize the total entropy of the universe, or so as to maximize the total negentropy."

  (Freitas 1979-2010)

- Thermodynamic imperative

  "waste not free energy; treasure it and make the best use of it"

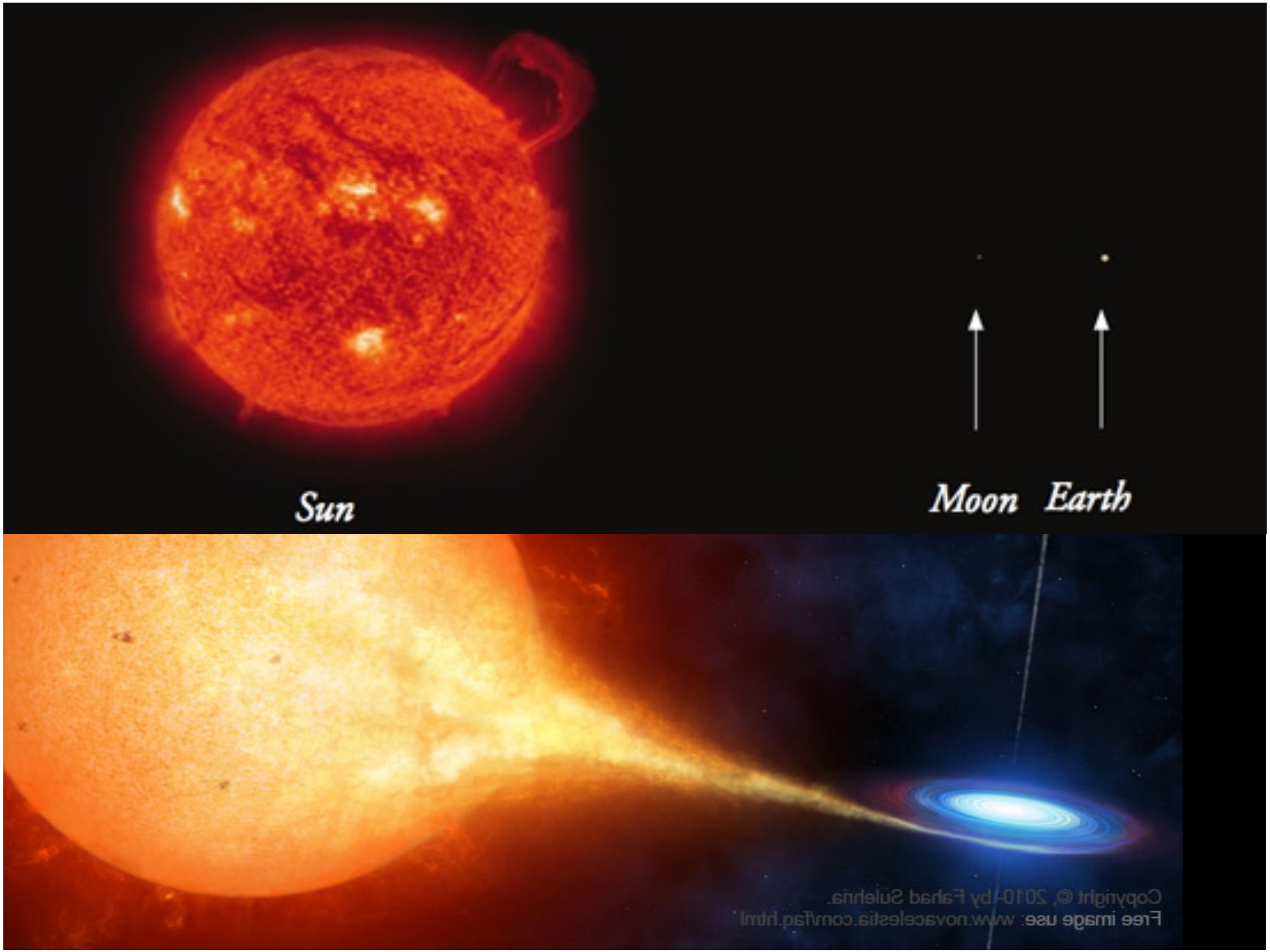
  (Bayliss 1915)

Stellar Energy: don't waste it!

- Compare:
  - Advanced nations energy use 0.00002 GW/person (2×10^{-5} GW/pers)
  - Wasted solar energy: 81, 000, 000, GW/person ($8{,}1 \times 10^{7}$ GW/pers)
  - 12 orders of magnitudes difference!

(Criswell 1985, 63-64)

Could extraterrestrials be more thermoethical than us?


Sun
Moon
Earth

Conclusion

- Ethical principles go towards:
  - the survival of more and more collaborative systems,
  - which use more efficiently available energy.
- But for how long?
  - Of course, we aim no less than at immortality.

4. Towards cosmological immortality

You are going to die.

Immortality: with or without religion?

- Immortality and religions
  - Fear of death => desire for immortality
  - **Afterlife** is present in major world religions like Christianity, Islam, Hinduism or Buddhism.
  - Outside religions, the topic is often taboo.
- Immortality without supernatural order?
  - Propose naturalistic ways to interpret human's ultimate fear, death.

Self and mortality
Which death do you care about?

- **Human death**
  - Story: Imagine that you're sitting in a bus, and you start to have difficulty breathing, make an epilepsy crisis, and you are going to die. To your astonishment, nobody in the bus cares about you. Nobody try to do something, nor call an ambulance, nor try to stop the bus or any other emergency procedure.
  - This horrible situation is barely imaginable, because humans are social creatures able of empathy. They won't let a fellow human die.
- **Creative death** (Death of an idea; e.g a government…)
- **Planetary death** (Death of biological life on Earth; e.g. climate change)
- **Cosmological death** (Death of our Sun or our universe; almost nobody cares... Nowadays)

How to deal with death?

Why was I born if it wasn't forever?
Ionesco

- Accept death as a blunt fact?
  - It leaves open the question of how or why we should learn to accept death.
- Are there stages of immortality?
- **Personal** immortalities
  - Long for a personal afterlife or hope to live forever.
  - **Spiritual** and **Individual** immortalities.
- **Transpersonal** immortalities
  - Long for an immortality beyond the self.
  - **Creative**, **Evolutionary** and **Cosmological** immortalities.

Spiritual immortality

- **Definition**

  Belief of another reality where the soul goes after death. This reality can be supernatural (heaven, hell) or natural (reincarnation).

- Rational materialistic critique

  "I believe that when I die I shall rot, and nothing of my ego will survive. ”

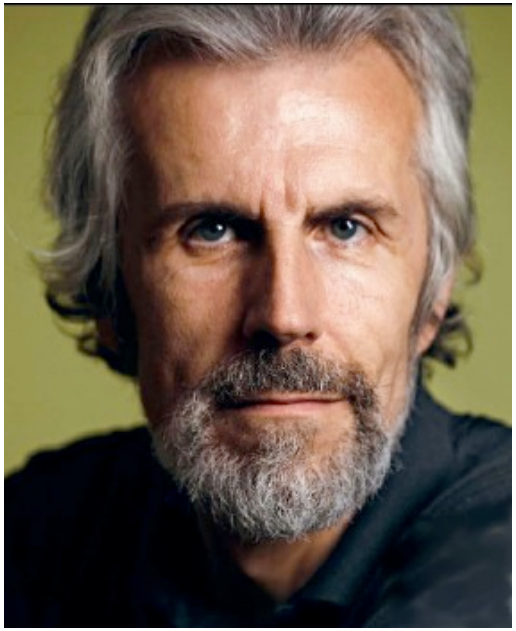
  (Russell 1925)

  - There is no proof of an afterlife.
  - We need to find and define new kinds of immortality.

Individual immortality

Definition

Individual immortality is the continuation of the life of an individual in a biological or digital substrate.



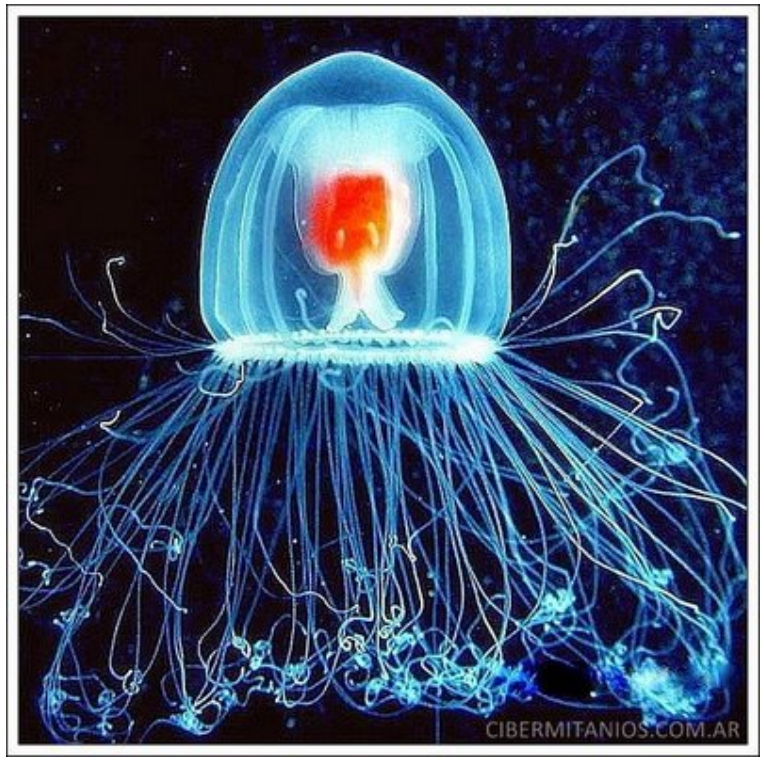
*"most of the information we gather during our lifetime gets lost at the time of death, unless we would develop technologies that either drastically extend our life span (**biological immortality**), or somehow allow us to transfer the whole informational content of our brain into a safe medium (**cybernetic immortality**)."*

(Heylighen, 20/06/2006, Global Brain mailing list)

Biological immortality

Immortal plant?

Immortal animal?



Why not immortal humans?

- no thermodynamic necessity for senescence:
- a defining feature of life is that it takes in free energy from the environment and unloads its entropy as waste.

Cybernetic immortality

- Also called: Mind uploading; Technological immortality; digital immortality; virtual immortality; immortality in silico; etc.

- **Problems**: technological, conceptual (embodied cognition?), societal, ethical, etc.

- Transpersonal immortalities
  - The rational and materialistic mind, the one scoffing at spiritual immortality, realizes that individual immortality is hard, and maybe not worth to achieve.
  - He will seek "transpersonal" immortalities, beyond the limits of the individual.
  - **Creative**, **evolutionary** and **cosmological** immortalities are all transpersonal immortalities.

Creative immortality

- **Definition**

  Continuation of "life" through social, artistic, scientific or intellectual innovations and creations.

- Beautiful!

- Timescales involved are uncertain.
  - Will our creativity be preserved in 100, 1000, 10 000, 100 000 or 1 million years?

    Honestly? It is unlikely…

Evolutionary immortality

- Definition

  Evolutionary immortality (opposed to individual immortality) continues the process of life by replication, in harmony with evolutionary principles.

- Genetic immortality
  - Your genes are replicated to the next generation

Critique of individual immortality

- Individual immortality **freezes variation.**
  - Unfit biologically (see Kirkwood's (1999) thought experiment).
  - Aging as an evolutionary advantage (see Mitteldorf 2004)
- Individual immortality **is incompatible with an evolutionary worldview**

  (Stewart 2000, 320.)
- It is our evolutionary responsibility to be ready and willing to [individually] die.

Critique of species immortality

“God is dead but the human is dying too”
Weaver

- **99,9 %** of species which have existed are now disappeared.
  (Prothero 2003, 83)
  - There is no reason why humans should be an exception.

- **0,1 %** chance that humanity as a species will continue in the far future.
  - It doesn't mean everything we do will be lost.
  - It is not a reason to make it a self-fulfilling prophecy, and self-annihilate!
  - It means we are not the center of cosmic evolution.
- **What next?**

Global Brain immortality

- **Individual + Creative + Evolutionary immortality.**

  "personal knowledge and experience would ultimately be integrated into a collective consciousness, or what I usually call a "global brain", which is itself immortal (or at least does not have an a priori limited life span). This combines the advantages of continuity (none of the good ideas are lost) and innovation (personal experiences may be combined with other personal experiences in order to produce something that is more than the sum of the parts)."

  Heylighen, Global Brain mailing list, 6/7/2006

- The global brain wouldn't work forever.
  - The Sun will run out of energy at some point.
  - We need to think about the cosmological context.

Cosmological immortality

- **Universal Thermoethics** is of central concern.
  - Awareness of limited free energy (Sun, Stars, Galaxies, Universe).
  - Cosmic doom scenarios (Heat Death, Big Crunch, Big Rip, Big Bounce, etc.)

- **Computational immortality**
  - hybernation near black holes
    - (Dyson 1979)
  - Tipler's (1997) omega point theory
    - A mix between individual, cybernetic and cosmological immortality.
    - Modern theology at its climax, naïve philosophizing, scientifically unsound (see Ellis 1994).
    - Falsified by current cosmological models
  - Reversible computation
    - Authors?

Cosmological Artificial Selection

- Speculative philosophical scenario integrating
  - the origin of the universe
  - the future of the universe
  - a role for intelligent life.
- Universal immortality
  - Replication of the universe with artificial selection.
  - analogous to biological immortality through the chain of universes, instead of a chain of living entities.
- Recursive immortality
  - infinite continuation of the evolutionary process.

(Vidal 2008; 2010)

Conclusion: Evo-Devo-Thermo-Info Ethics

- Foundations of a cosmic ethics
  - **Evolutionary**: promote stability, adaptability, cooperation
  - **Developmental**: aim to develop higher-levels, of self and other systems
  - **Thermodynamical**: do the most of available energy
  - **Informational**: protect, preserve and create information

- Cosmological Immortality
  - Infinite continuation of the evolutionary process.

Thank you for your attention!

Questions are welcome now or later:

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