Biodiversity and Human Evolution

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My previous study subjects

Originally from bioanthropology

Chimpanzees in Tanzania

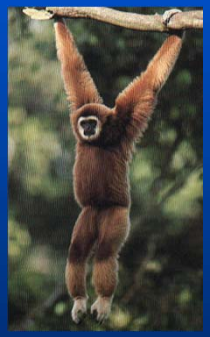
Moved to behavioral ecology
Soay sheep
Fallow deer
Peafowl

My recent research interest

- Human evolution
  - Deference between chimps and humans
- Human universals
  - Traits we all have
- Human adaptational traits
  - Human specific adaptation
- Adaptive decision-making in humans

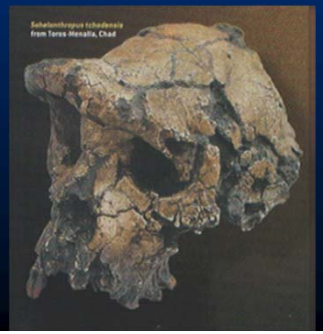
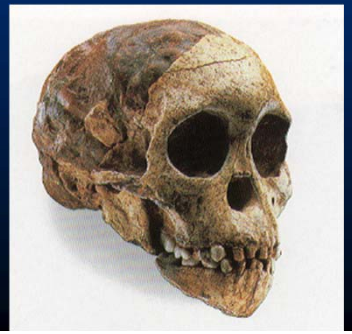
Human evolution

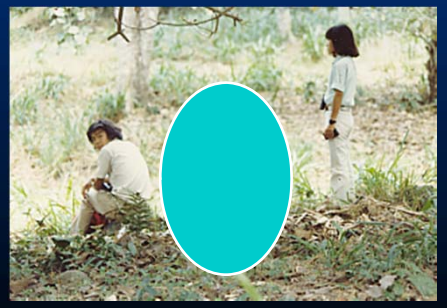
- Mammals
- Primates
  - Hominids (apes and humans)



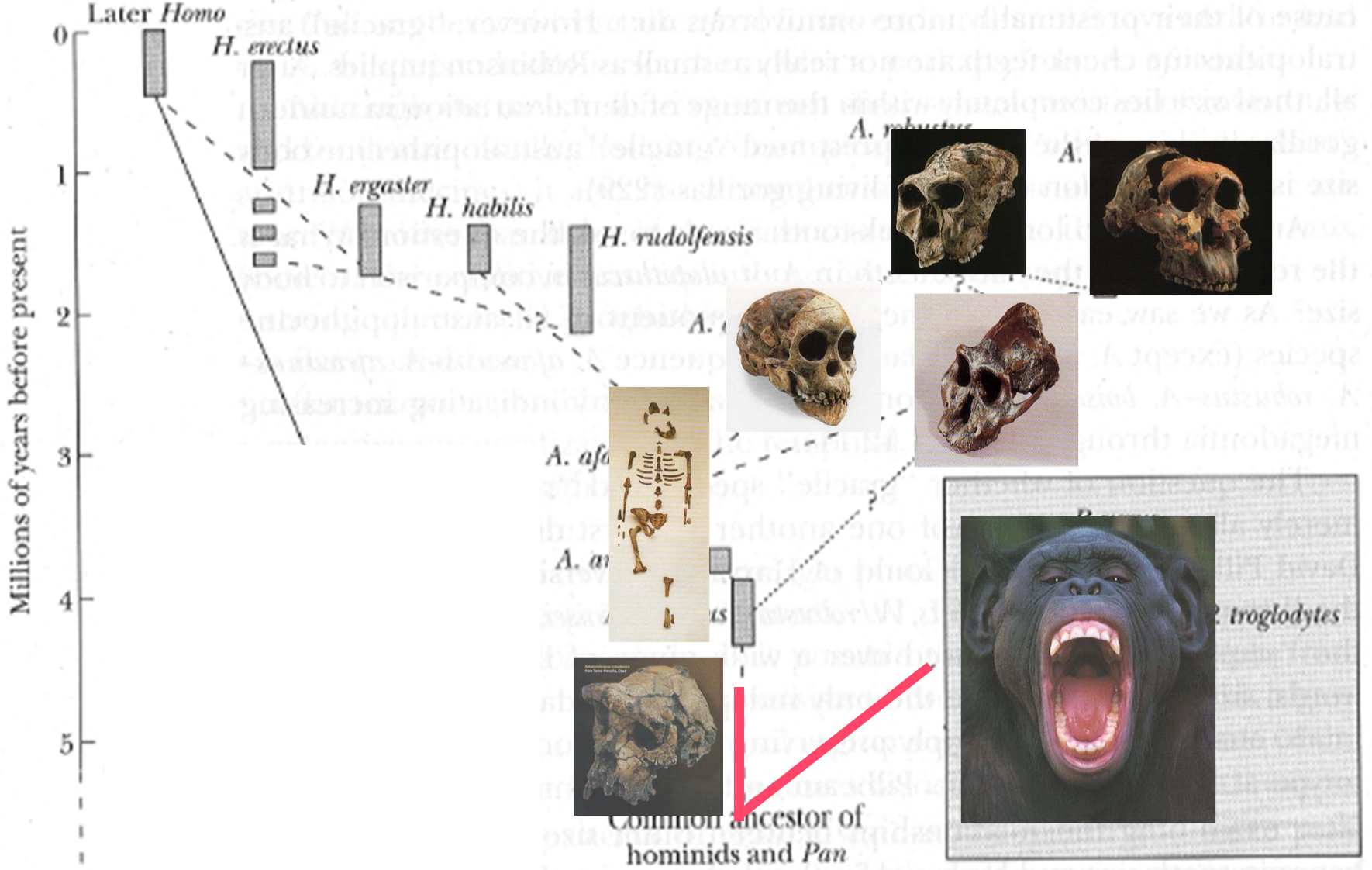


» Homininis (fossil humans and modern humans)

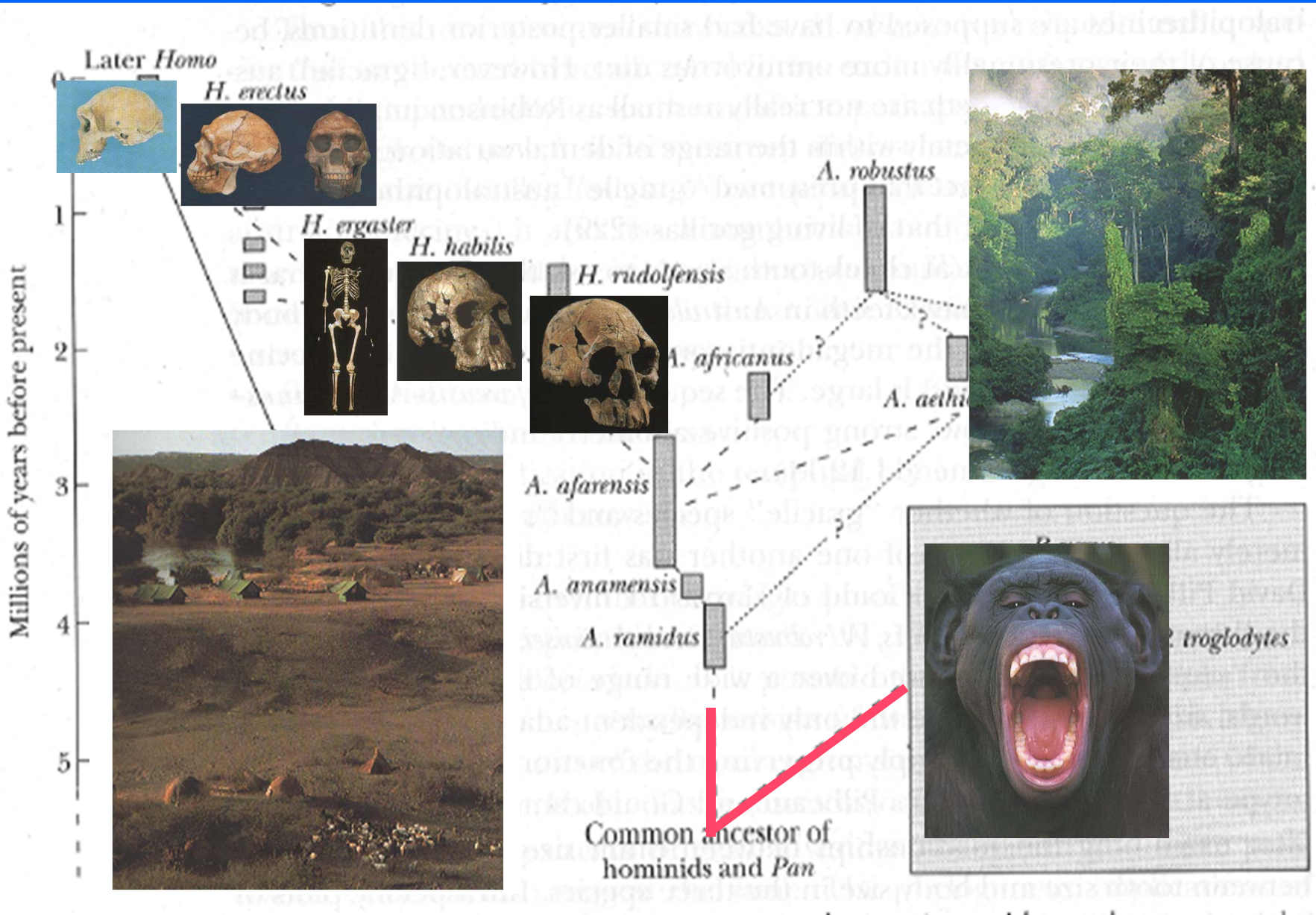





Side lines (*Australopithecus*)



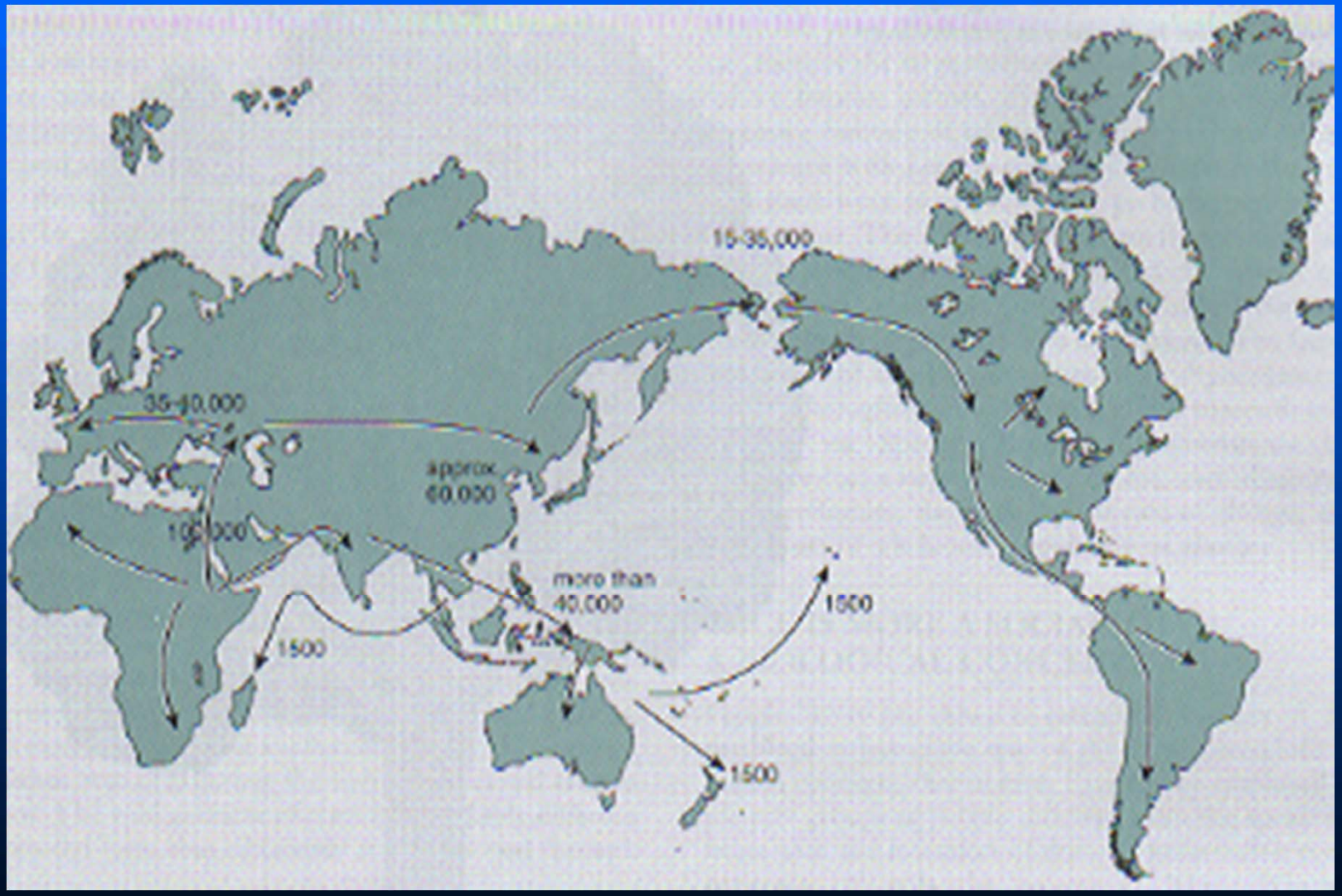
Genus *Homo*


Later *Homo*
H. erectus
H. ergaster
H. habilis
H. rudolfensis
A. robustus
A. africanus
A. afarensis
A. anamensis
A. ramidus
troglodytes
Common ancestor of hominids and *Pan*
Millions of years before present
1
2
3
4
5

Subsistence ecology of *Homo sapiens*

- Out of rain forests and into savannah
- Hunting and gathering
  - Meat-eating and tuber-eating
- Tool use
- Use and control of fire
- Home base and shelter
- Clothes
- Out of Africa, all over the world

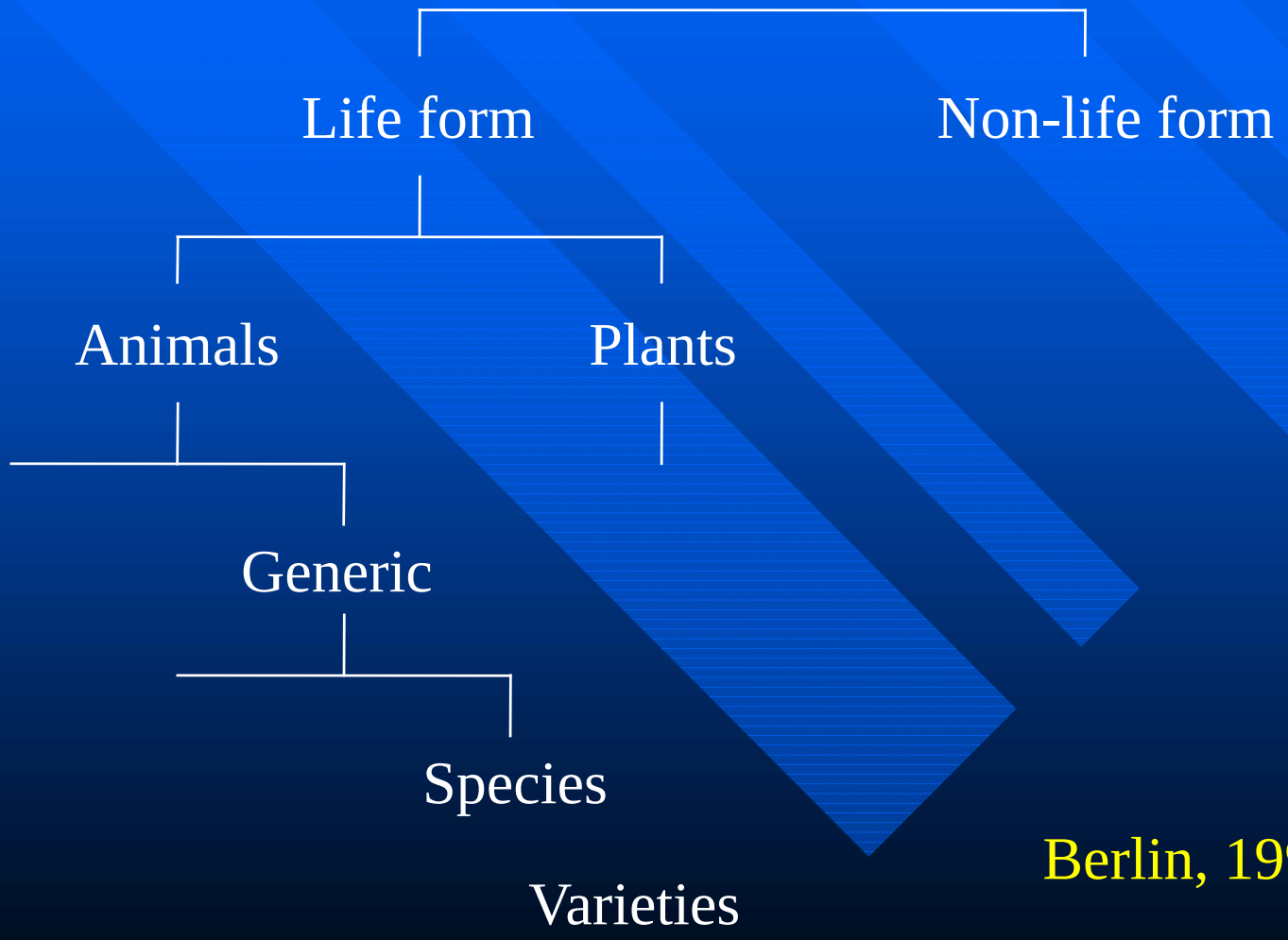
Out of Africa



Natural history intelligence

- Cognition of life
  - Self-moving (animals move, plants grow)
- Knowledge about life
  - Food, predator, poison, various utilities
- Folk biology
  - Universal patterns of classification of biodiversity (fairly corresponding to scientific classification)

Universal system of folk biology



Berlin, 1998 etc.

Intention, desire and sympathy

- People have intentions and desires.
- Intentions and desires move people.
- We read people's mind according to this "theory of mind"
- We attribute those intentions and desires to animals other than people as well, and feel sympathy toward them.

“Noble savage”?

- Are traditional hunter-gatherers the guardian of biodiversity?
- The popular notion that indigenous people were conscious conservationists and the European idea destroyed the harmony. Is it true?

Mass extinction in New Zealand

Since millions years ago,

- Moa
- Another 3 flightless birds
- Several species of frogs
- Giant snail
- The crickets twice as large as the rat
- A huge bat running with its wings folded
- A huge raptor

- All those creatures have gone extinct by AD 1000
- Maori people since AD 1000
- Excavated old Maori sites contained bones of 100,000 to 500,000 moas

Extinctions in Pacific islands

- Hawaii after AD
- Tahiti, Fiji, Tonga, New Caledonia, Marquesas, Solomons, Cooks, Bismark, Henderson….

Mass extinction in Madagascar

- Since millions years ago,
  - Epiornith
  - Huge testudos
  - Megaladapis（a lemur with the size of Gorilla）
  - Pygmy hippos
  - Mongoose-like carnivore

Epiornith and Megaladapis

7 species (the largest: 3m hight, 400 kg weight

The thickness of the shell: 3mm
Egg weight: 10kg
Equivalent to 180 chicken eggs

マダガスカルにおける大量絶滅

- Those fauna went extinct around 2000 to 900 years ago
- Epiornith went extinct during the 19th C

- Malagasi people moved from Indonesia about 2000 years ago

Mega fauna in the Americas

All extinct after the peopling
Of Americas

Probably human activities were
deeply involved

Studies on the subsistence ecology of current hunter-gatherers

- The Piro people in South America by Michael Alvard (1998)

Conclusions

- They pursue the animal species with best return rate (kcal)/hour.
- They hunt immature individuals of large prey because they are large.
- They hunt in longest hours in the highest-density area and move to lower-density areas when the return rate/hour decreases.
- Optimal foraging, causing local extinction

Conclusions

- Indigenous people are not exactly the guardians of biodiversity.
- Their foraging behavior is best explained by the optimal foraging theory.
- They don’t consciously overexploit resources, but neither consciously conserve resources.
- Limits of technology, low population density

Monetary economy

- Money: novel invention (abstract value capable of trading anything)
- Once market economy was introduced, indigenous people started to overexploit resources everywhere.
- Probably no evolved psychological mechanism?