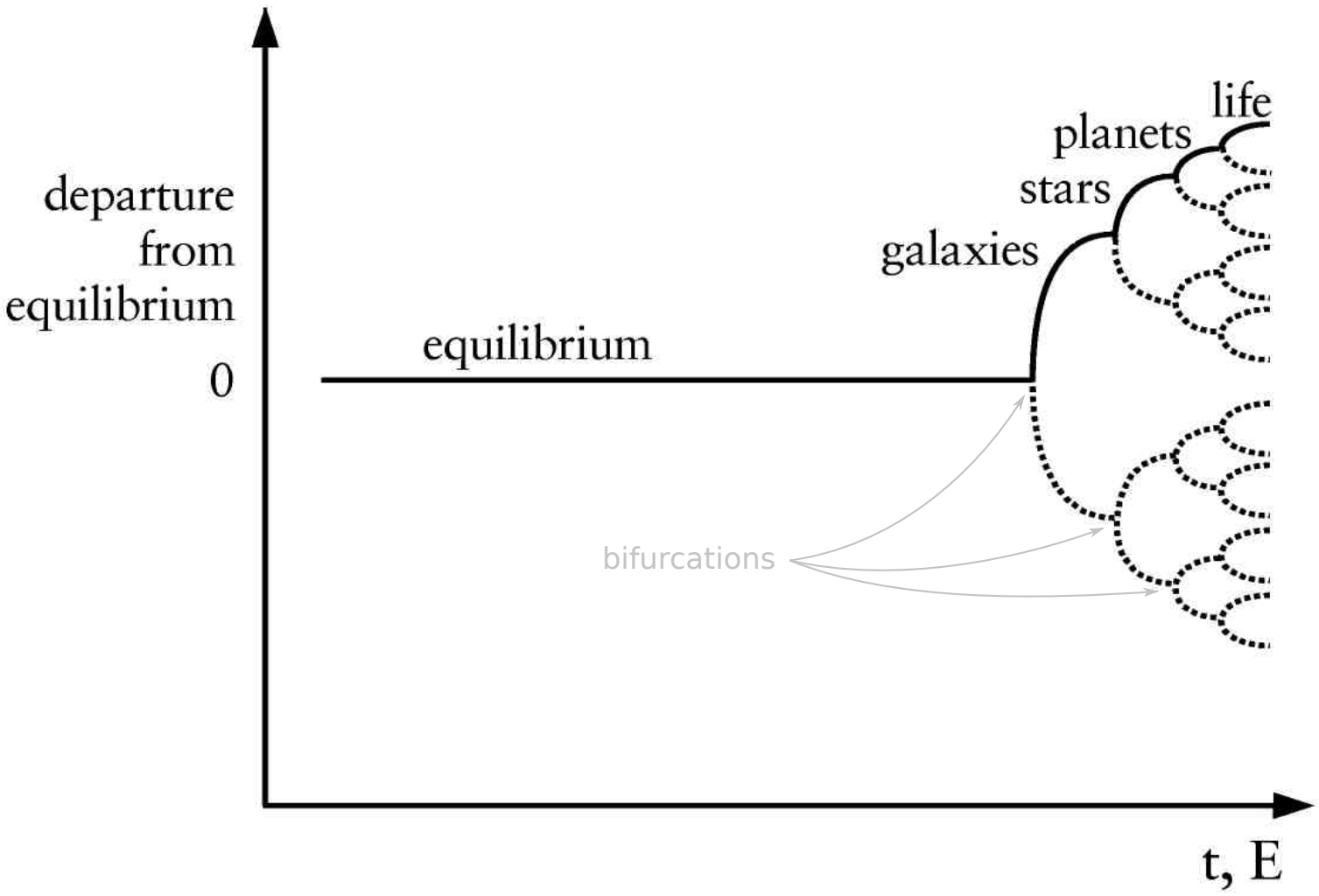
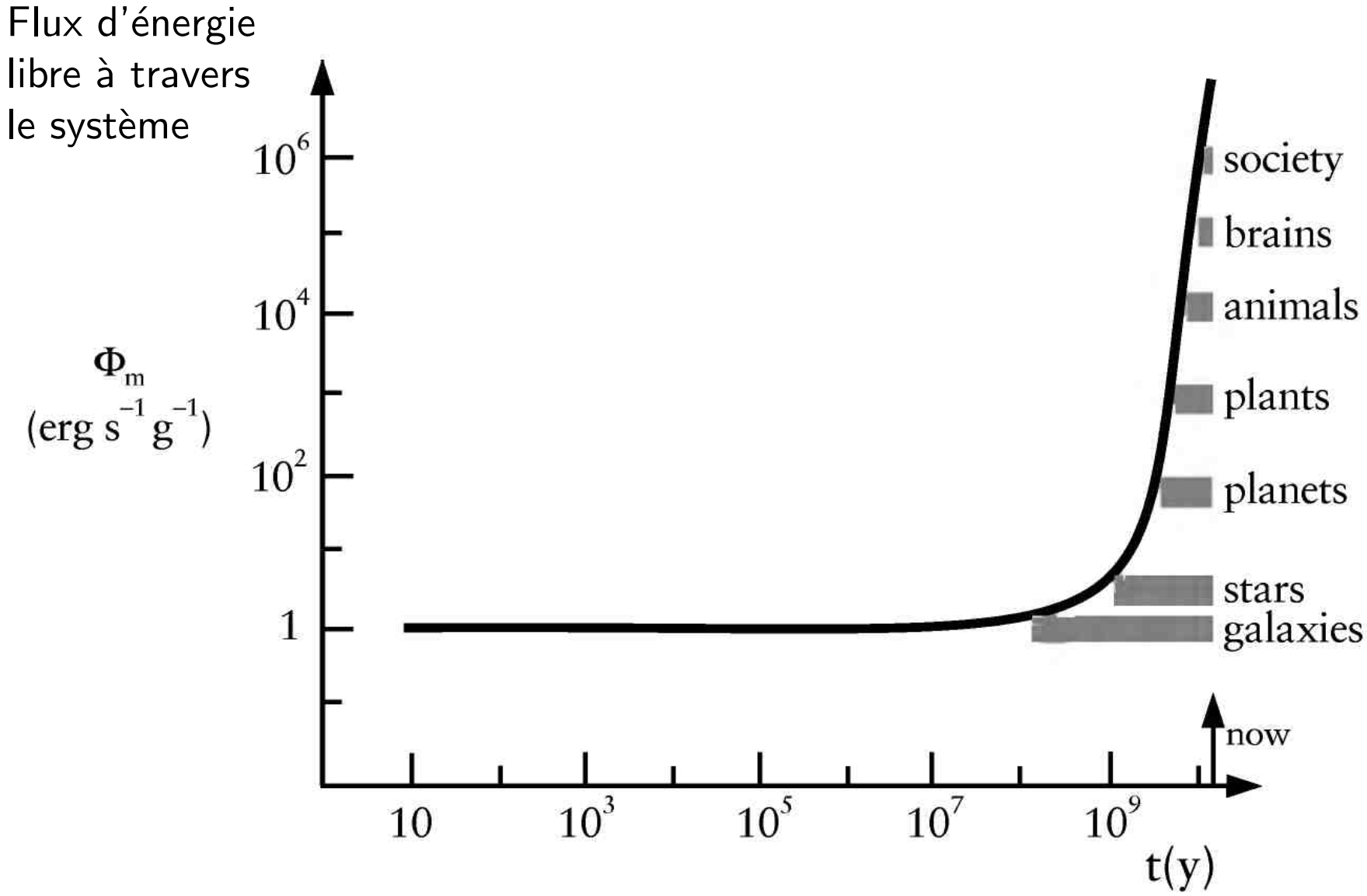
La croissance de la complexité



Chaisson, *Cosmic Evolution : The Rise of Complexity in Nature*, Harvard University Press, 2001

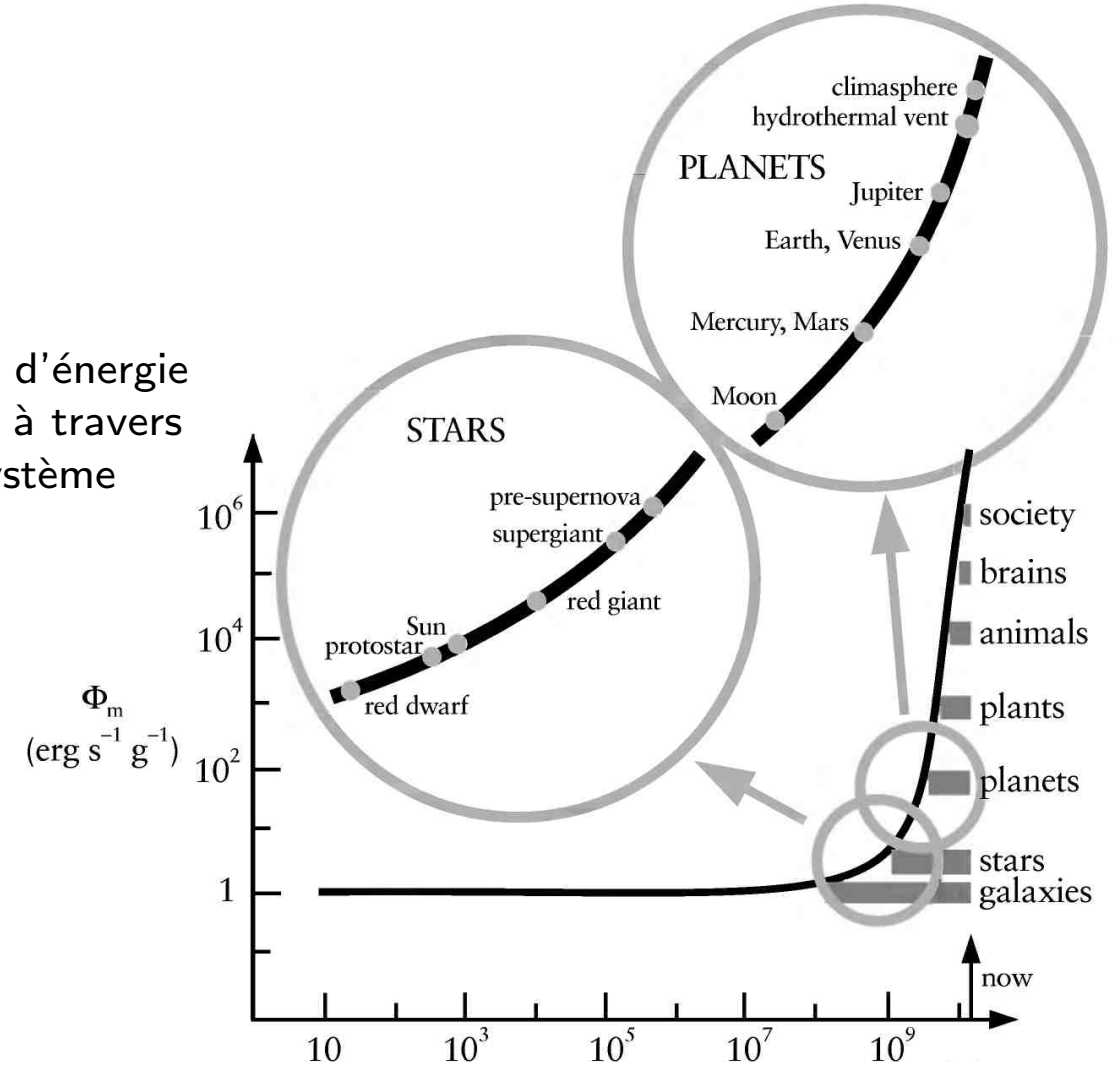
La croissance de la complexité



Chaisson, *Cosmic Evolution : The Rise of Complexity in Nature*, Harvard University Press, 2001

La croissance de la complexité

Flux d'énergie libre à travers le système



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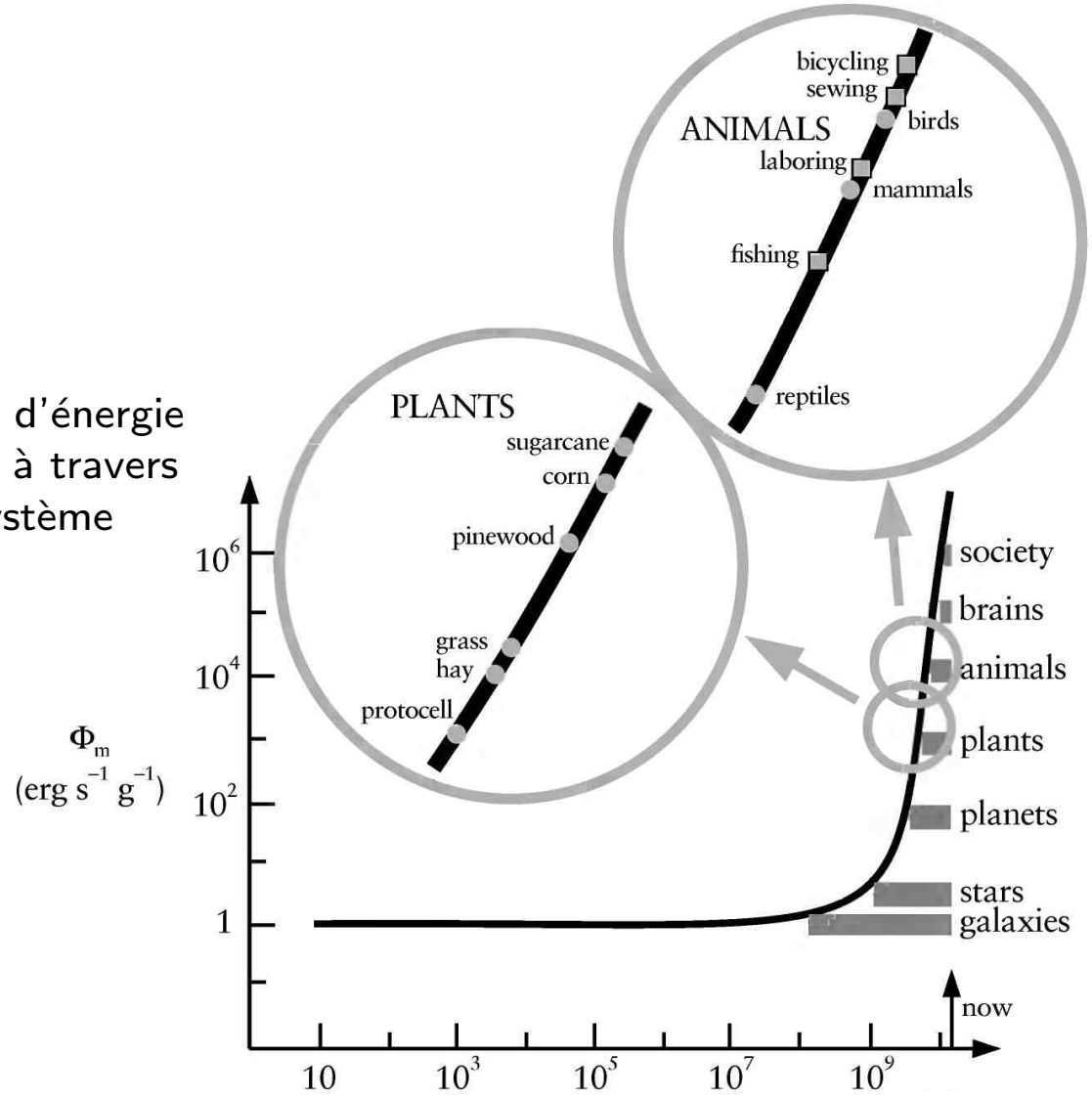

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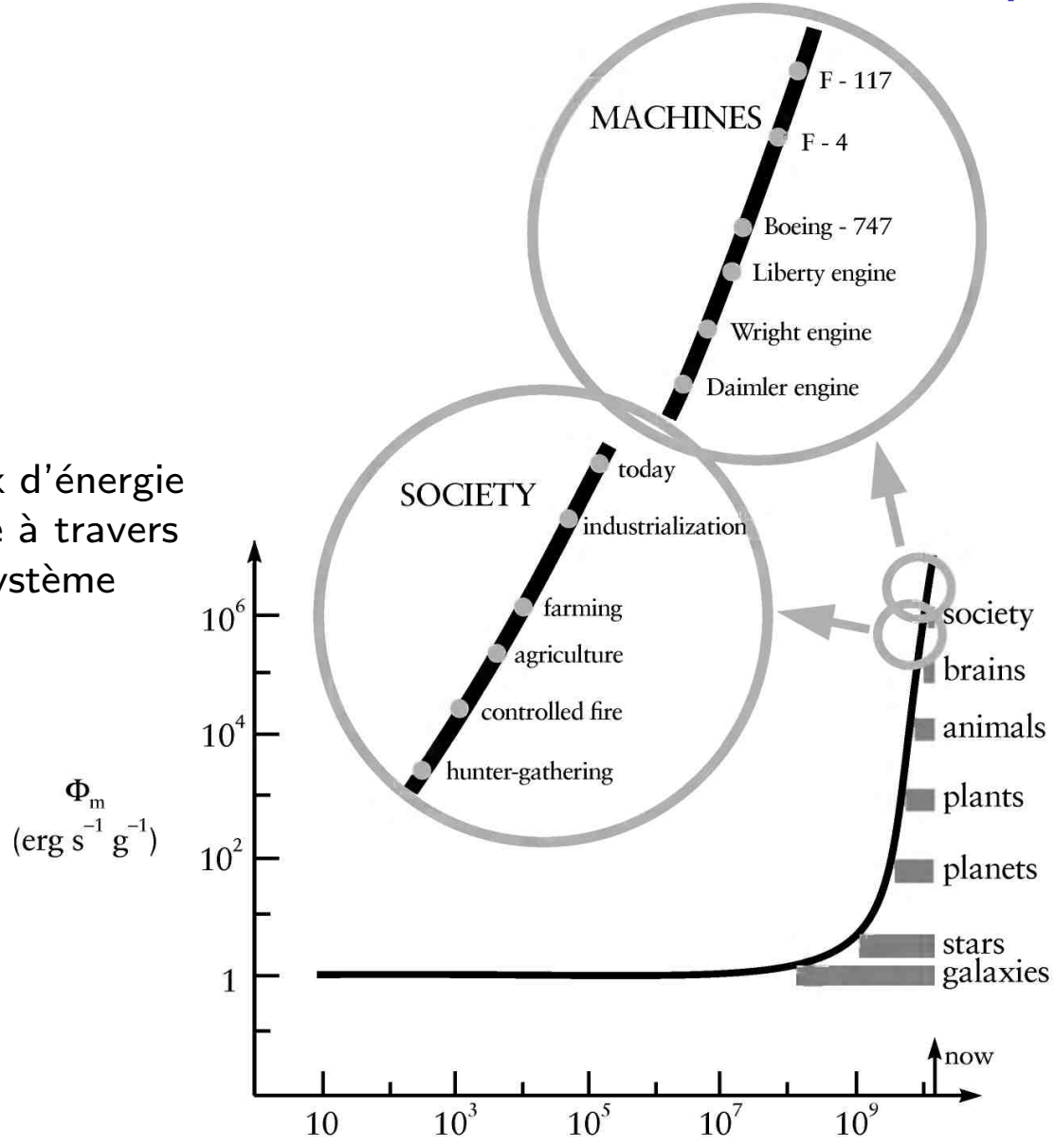


Chaisson, *Cosmic Evolution : The Rise of Complexity in Nature*, Harvard University Press, 2001

Le principe de puissance maximum

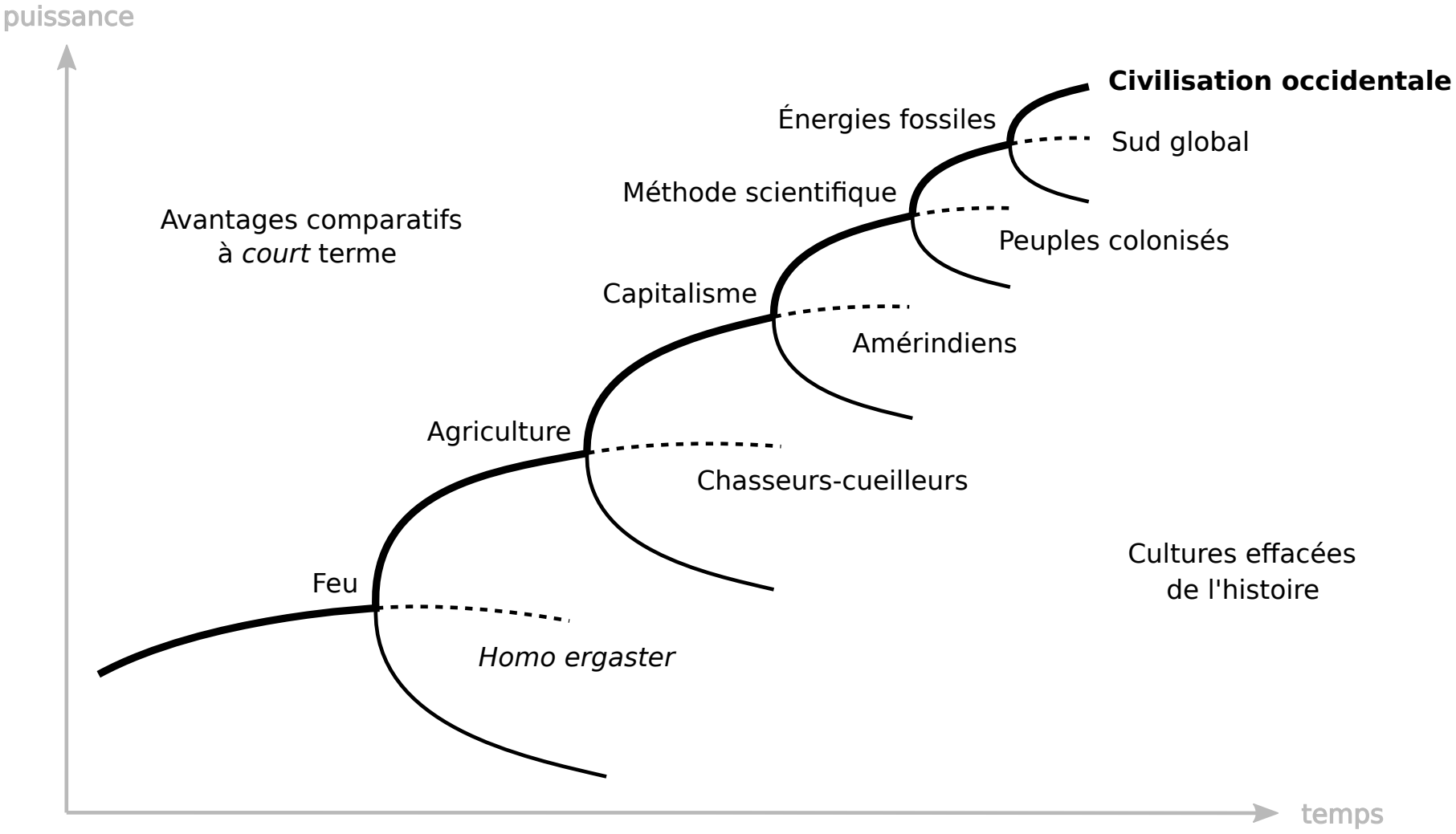
[...] natural selection tends to make the energy flux through the [organic] system a maximum so far as compatible with the constraints to which the system is subject.

Lotka, *Proceedings of the National Academy of Sciences* **8**, 147 (1922)

During self-organization, system designs develop and prevail that maximize power intake, energy transformation, and those uses that reinforce production and efficiency.

Odum & Pinkerton, *American Scientist* **43**, 331 (1955)

L'histoire vue au prisme de l'énergie



⚠ Naturalisation de phénomènes sociaux et culturels

L'histoire vue au prisme de l'énergie

I argue that history is genealogy and succession in an economic context of interactions among participants. Inequality is a ubiquitous property of economic interaction among responsive, metabolizing entities. [...] The prevailing party tends to be larger, to have a higher productivity or metabolism, to engage in a larger number of interactions, and to perform more functions at a higher level. [...] This leads to a pervasive increase in energy flux, both globally and per capita, among economic dominants, observable in the history of life as well as in the development of the human economy. Unpredictable disturbances such as mass extinctions temporarily reverse this trend.

Vermeij, *The American Naturalist* **153**, 243 (1999)