

USS-SWC – 2015
Presentation:
ABM & History

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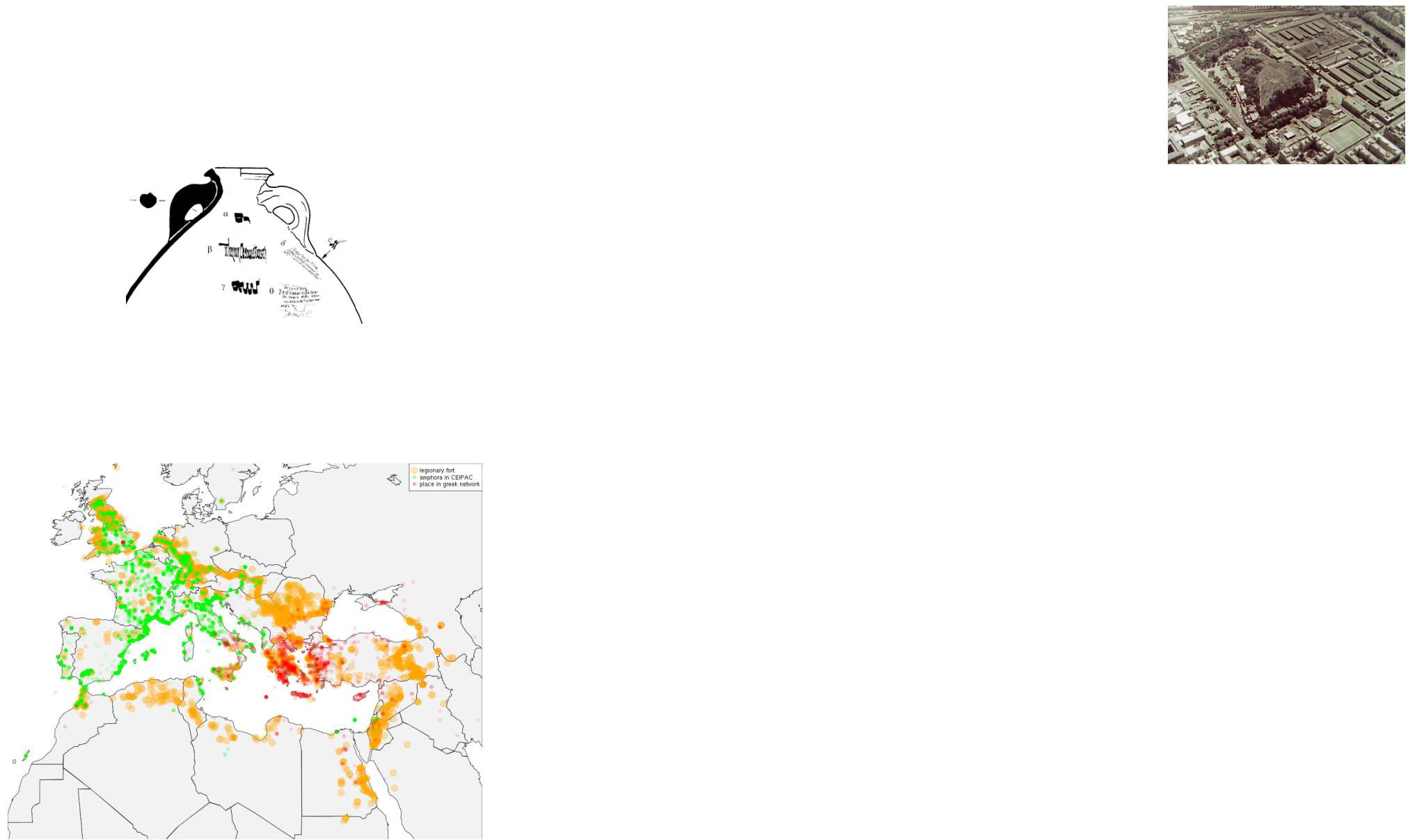
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An amphora garbage in Roma.



About 47000 amphora from CEIPAC database and other data in other databases (places in Pleiade, Greek names in Oxford...)



What was the nature of the Roman Economy?

The primitivism/modern debate

The Roman Economy was already a free-market similar as today vs all price were fixed by the state, no free market, us of slave.

An Agent Based Model mixing to main aspects (WSC – 2015):

- 1. a simple bargain mechanism,
- 2. and (cultural) evolutionary dynamics.

→ Implement a “simple” theoretical abstract model, *to be “complexified”*.

Bargaining

- ▶ Agents have :
 - ▶ Goods
 - ▶ Value they attribute to goods
- ▶ Agents produce 1 good and use it to exchange for the other goods, given the value they associate to each good.
- ▶ After the exchange, agents consume the goods and get a “score” (utility?) depending on the amount of good they gather and a scale of “universal intrinsic value” for each good.

Evolving

After 10 steps of exchange :

- ▶ The less successful (in term of utility) agents copy the set of value of the most successful agent (Biased-Copy/selection).
- ▶ Given a probability μ the value attributed to some goods are modified (Innovation/Mutation)

Illustrate the opacity :

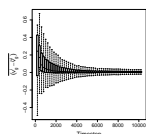
- ▶ **One simulation : 57min**
- ▶ 100 simulations (statistical need) : 5700min \approx 4 days

Lets try with :

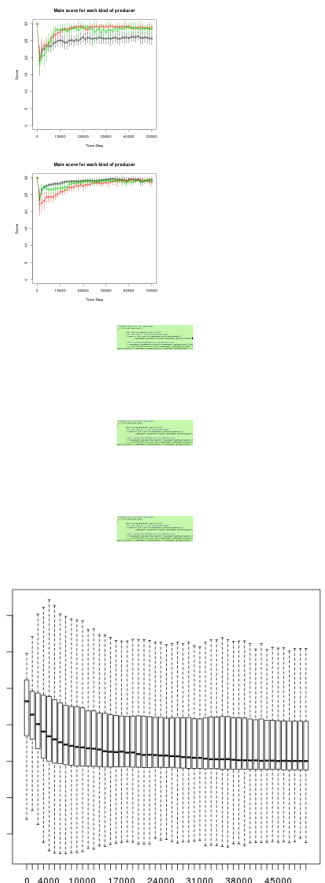
- ▶ 10 different probability exchange right. (0.001 to 0.20)
- ▶ 3 size of population (250 , 500 , 1000)
- ▶ And different number of goods : (3, 6 , 9)

Result for 3 goods and 500 agents

Without surprise, the system evolves toward an equilibrium where all agents adopt optimal prices (clearing-market prices).



$= 10 \times 3 \times 3 = 90$ “environments” (experimental setups).
→ **360 days of continuous simulations.**



Main score for each kind of producer

