

# Courage under small feet:

How ant-research changed the way  
we look at living beings



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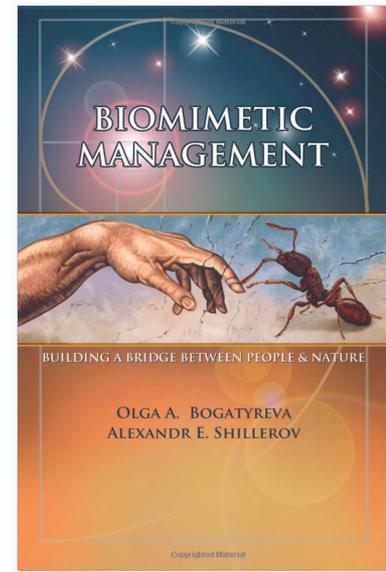
[www.triz.guru](http://www.triz.guru)

*"Ants are capable of not only  
simple perception,  
but they also have intelligence,  
consciousness and memory .. "*

*Cicero*

# What's Coming Up in the Presentation

1. Myths and truth about ants.
2. What is the role of an individual
3. Is an enthusiastic worker-ant just an metaphor or truth?
4. Cooperation or buttle of interests in a colony?



# 1. Myths about ants



- There is no government in a colony
- Collective intelligence
- Ants are identical “robots” with simple programmed behaviour
- Ants follow simple rules and colony complexity results of this simplicity.

# Truth about ants



- **Brain size**

An ant's brain is 6% of body weight.

Human brain is just over 2% of our body weight. If we apply the same proportions to a human head, it will triple the size!

- **Neurophysiology**

Less neurones than we have, but they are giant, less synopsises, hight speed of transmission

- **Memory, abstract thinking**

Ants use simple mathematics

- **Learning**

Antenna language is taught

- **Life span**

Queen lives 20 years, a worker 3-5 years.

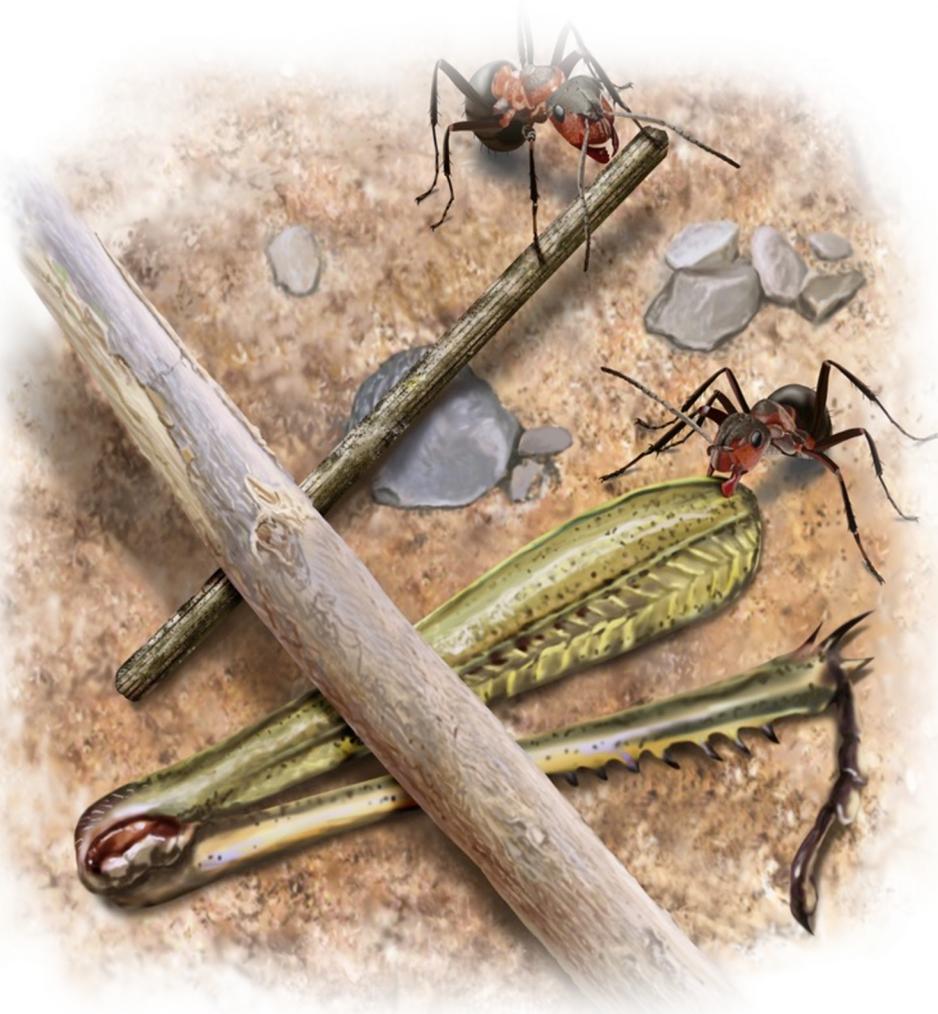


## 2. Dare we assuming similarity?

1. Learning
2. Decision-making
3. Communication, language
4. Making and using tools
5. Creativity and aesthetics
6. Self-awareness
7. Altruism,
8. Deception.
9. Intentions and goals, mind
10. Culture

The uniqueness of humans:  
**We are the only ant-like  
apes on this Planet!**

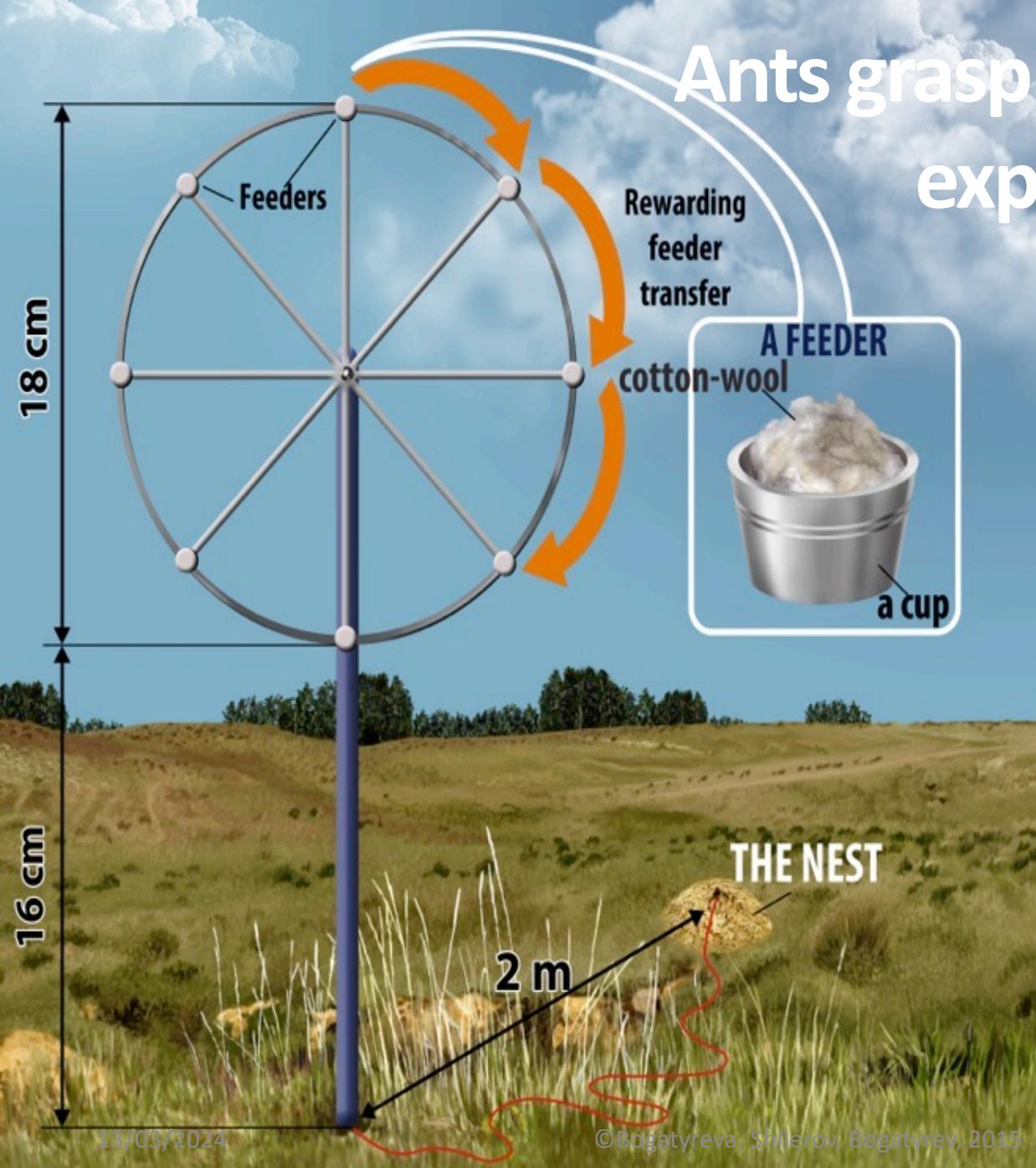
# Two genius ants



## **Ant's capabilities:**

knowing laws of physics,  
planning, decision making  
cooperation,  
communication,  
intentions,  
making forecasts

# Ants grasp the logic of the experiment



1. Learning
2. Decision-making
3. Communication, language

Who are the cleverest:  
Experts?  
Universals?

### 3. What is the role of an individual in colony history?



- Do ants have personality?
- Can one ant change the lifestyle of an entire colony?
- How to recognise individuals?

*Ant face cannot have an expression - ants have hard covers.*

# How to recognise ant's "faces"?

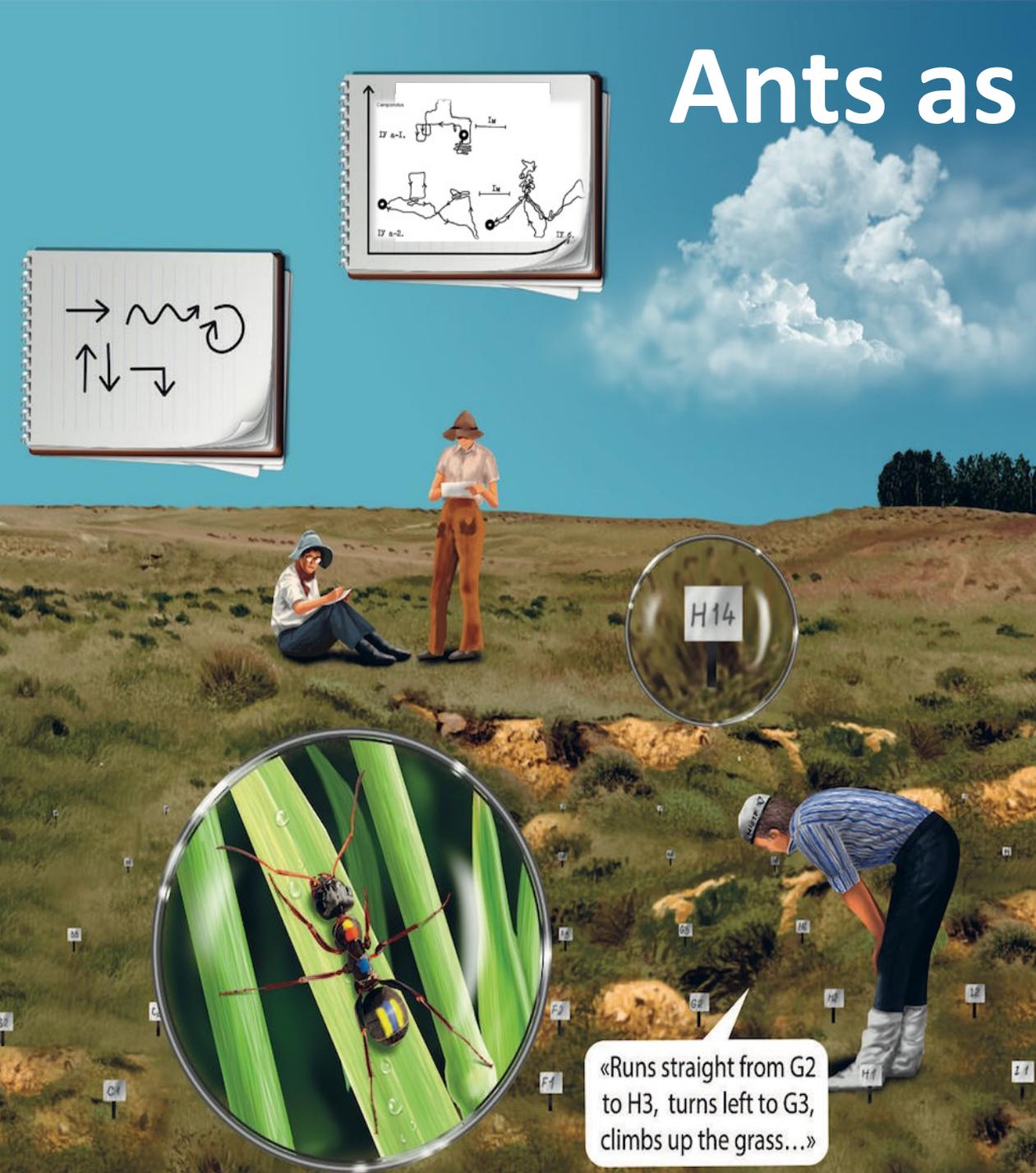


# Ants as individuals

Individuality is the main property of life

Tricks of statistics

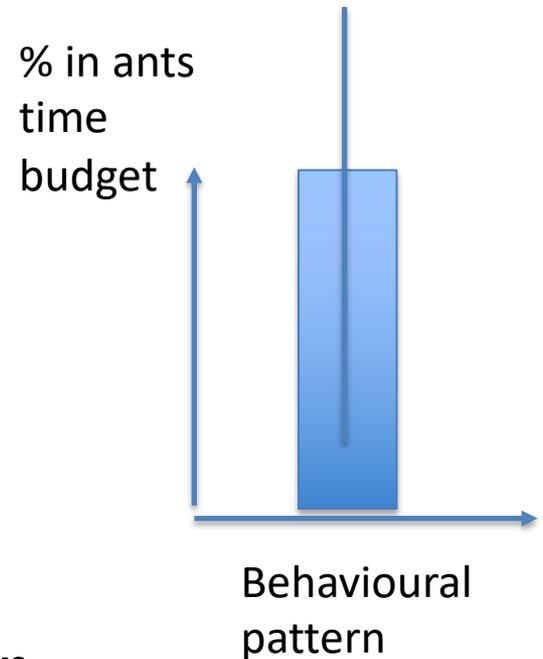
Significant role of non-significant data



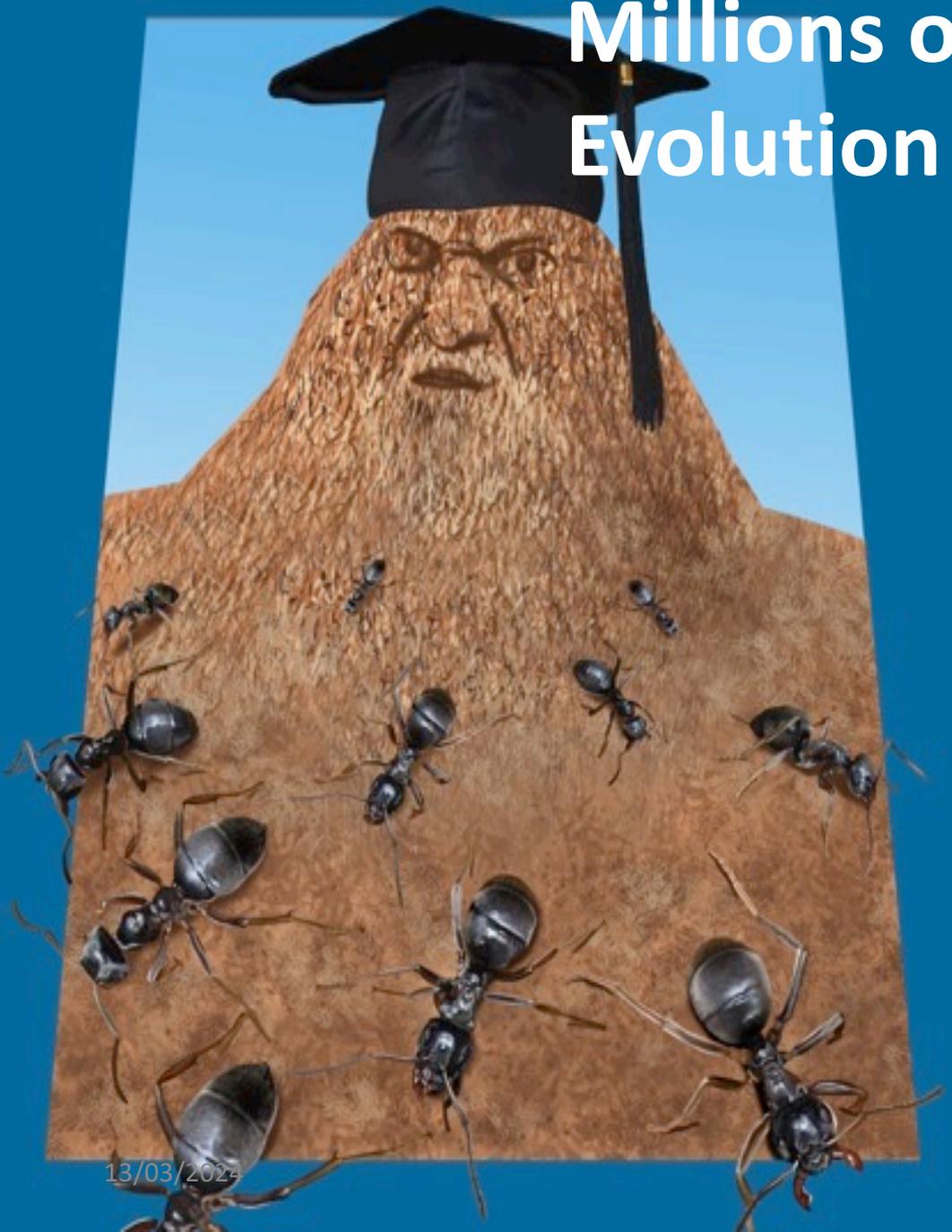
«Runs straight from G2 to H3, turns left to G3, climbs up the grass...»

# Indirect evidence of ants as individuals

- Statistics: average single ant repertoire had 80% standard deviation
- Ants supervisors on the ant hill
- Border guards know each other personally

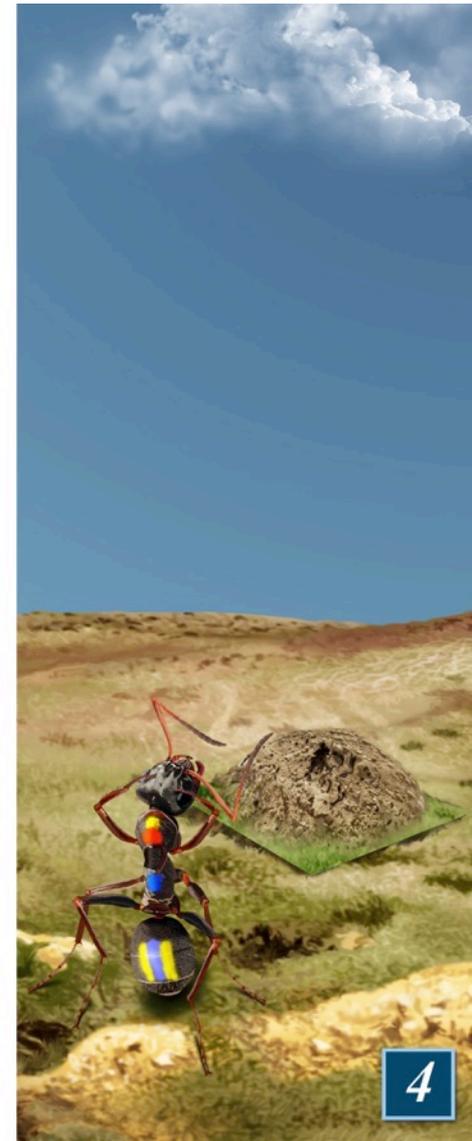


# Millions of Years of Social Evolution In Three Weeks



1. Ants are personalities
2. Single ant can affect management style of the colony
3. Ants take creative decisions
4. Ants work in teams
5. Teams have leaders
6. Ants can sabotage, break or change the rules
7. Theft and laziness

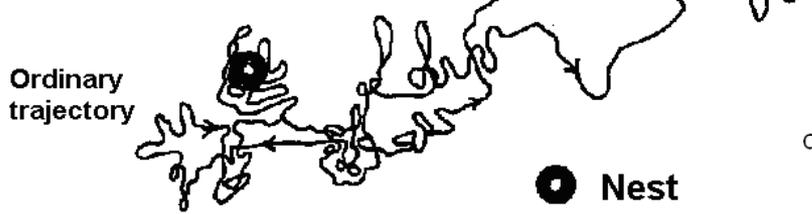
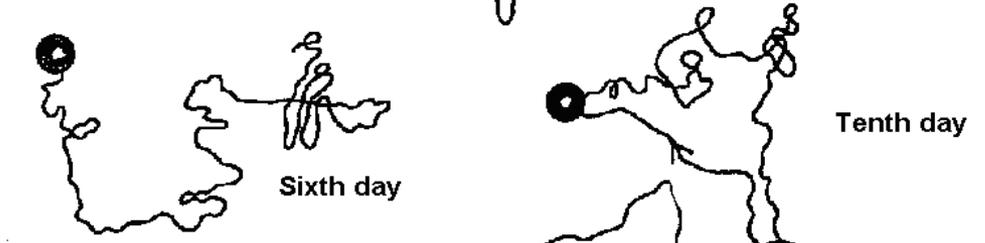
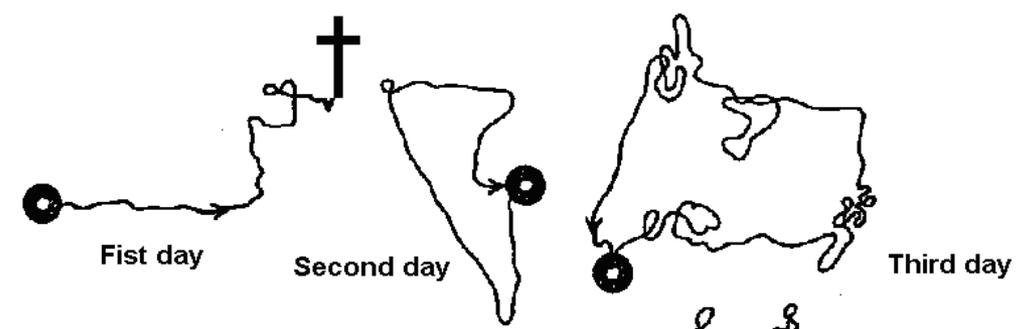
# Ecological crisis management “Moving house” experiment



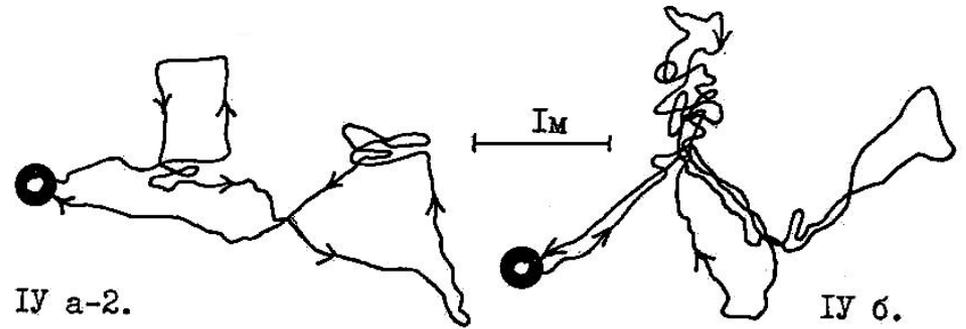
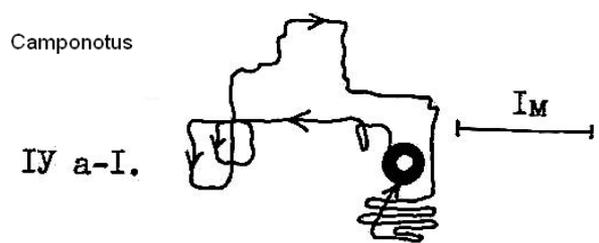
Exercise:  
cognitive map, intentions, goals  
evaluation and decision-making

Imagine that your house appeared in the forest where you have never been before, you can see the Sun and the sky.

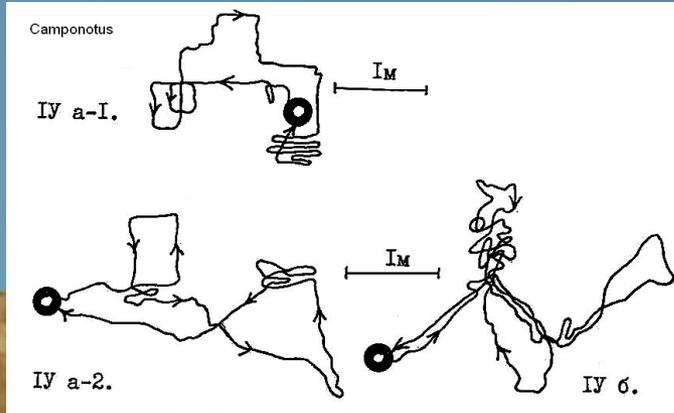
Please develop the strategy for exploration of a completely new territory, your target is to come back home eventually.....



● Nest



# Ant's solutions in ecological crisis



- Only 17 from 300 ants could find the answer, only 5 of them became leaders
- Leaders—professionals were replaced with socially active and creative individuals.
- Task partitioning disappeared – everyone was involved in all jobs.
- Hierarchy became steeper than in it used to be— leadership becomes stricter, almost authoritarian.
- Every ant should be aware of what is happening in the colony. Without this ants stop working



## We started with...



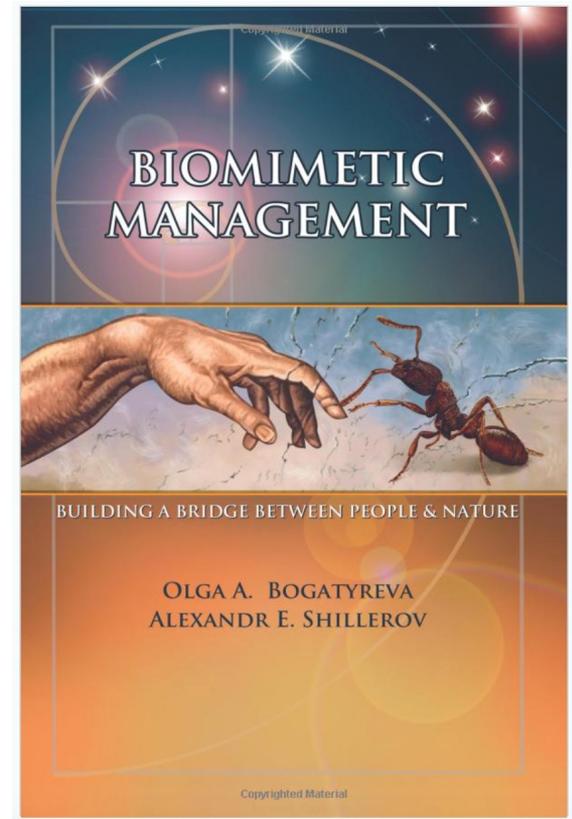
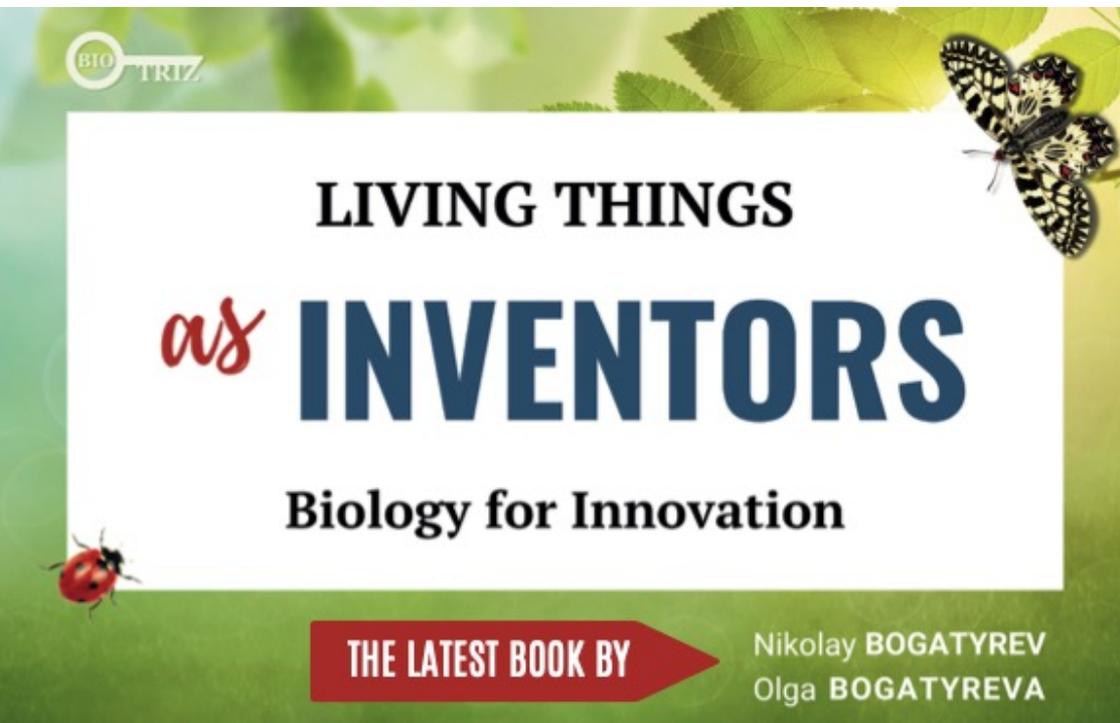
## We have found...

- No control centre or structure, order from chaos.
- Social Networks
- Simple rules for each ant
- Ant's individual behaviour has patterns.
- Ants follow the rules

- Control provides local actions with global awareness
- Hierarchy: ants work in teams with leaders
- No simple rules, just decision making
- No patterns, permanent decision making
- Ants create the rules

# Ant's Laws

- the law of Self-organisation: Fundamental Equation of Life
- the law of hierarchy (“who reports to whom”)
- the law of ultimate laziness (“who does what”)
- the law of local action with global awareness.





# THANK YOU QUESTIONS, PLEASE

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