

Testing the Ability  
to Deanthropocentrise.  
*Insect.*

Appendix.

Alisa Smorodina

Alyona Shapovalova



# About deanthropocentrism



Annihilation (2018)

*Contrary to popular belief, borders or separation won't save our health, but only rethinking of the unity with all the living creatures in the world and interchanging with them will. We need the Parliament, that isn't defined in terms of identity or nationality politics: The Parliament of (vulnerable) bodies, living on the planet Earth..*

*...To stay alive, to save life on the planet in the face of the virus, and in the face of centuries of ecological and cultural destruction consequences, means to introduce new structural forms of global cooperation. If we want to resist submission, we must also "mutate" just as a virus mutates.*

*Paul B. Preciado*

We, authors of the project, share the idea that in the changing world mankind should reassemble the principles of sociality and outdated foundations by which we all live, and, most importantly, change the way we interact with Nature, perceiving it not as a resource for the production of the goods we need, but as a living symbiotic union of non-human agents.

At the moment, the inhabitants of the planet are witnessing abnormal global changes: record high temperatures in the Arctic, the colossal consequences of the pandemic for the environment – massive pollution with disposable personal protective equipment, and much, much more.

In the face of constantly emerging new threats to the future of our planet, mankind, more than ever, should learn to act together, as creatures of the same kind, as a single organism.

To find new approaches to interacting with each other and our planetary neighbors – non-human agents, we turned to the study of social insects. The principles of eusociality inherent in them can potentially become the source of ideas for the reorganization of the human social structure.

When a human watches animals he or she tends to interpret their actions from the anthropocentric point of view

and behaviorism, endowing them with “human” qualities, saying, for example, that they have “their own language”, that they are capable of expressing emotions.

With the help of TAD.I, we want to find the ways to abstract from human experience and try to perceive living/inhuman experience, to draw the participants’ attention to what we, as human beings, usually turn away from, to what is usually perceived as creepy, disturbing, cruel and totally alien – on the life of insects.

# About the testing procedure



*...We must be vaccinated against the spiritual poison that divides us into national cultures, races, age groups and classes that compete with each other...*

*...We must identify the chains of contagion by global capitalism, which destroys the environment and makes citizens of nation states stupid, so that we all become continuous tourists and consumers of goods, the production of which will kill more people in the long term than all viruses put together.*

*Marcus Gabriel*

TAD.I – a standardized test for determining and developing human skills to consider objects, phenomena, situations from the point of view of insects.

We turned to the testing format in search of a non-trivial and more effective form of interaction with the viewer.

The procedure itself and gamification of testing has a number of important advantages: it allows you to encapsulate new information in the test and puts the test takers in conditions of a more attentive and thoughtful study of the material (since then they will have to choose the “correct” answer option). Also, in the test format there is a bureaucratic note so familiar to us, homage to the cybernetic bio-surveillance procedures implemented in our daily life during a pandemic.

Practical base of this speculative project consists of procedures of such common forms of international language testing as IELTS and TOEFL (as a kind of symbolic manifestations / tools of migration control), as well as corporate forms of psychological and career guidance tests to determine the level of intelligence or personality characteristics (as a means of controlling bureaucratic apparatus).

When forming and calculating the results, we refused to

obtain any numerical values, while not claiming the objectivity of passing this test and thus emphasizing the impossibility for us as human beings to achieve complete deanthropocentrization.

# Analysis of questions and correct answers



Arrival (2016)

Although all the test tasks consist of written text information, presupposing the inclusion of the thought process and the acquisition of new knowledge, our goal was to place emphasis on the factors that are easier for perception, aimed at the senses: sight, hearing and touch. Feelings available to insects.

The choice of the order of the parts is also not accidental. It's assumed that it's easier for the participant to plunge into the world of non-human perception gradually: from images familiar to a modern individual, through a more abstract auditory immersion in the atmosphere of non-human experience to the most repulsive form of interaction – through touch.

# Seeing

## 1. UV-VISION

This question gives insight into how the eyesight of bees is arranged. They, like people, have trichromatic vision, but at the same time they see ultraviolet light and distinguish red slightly worse.

The following 4 pictures are the images of the *Gelsemium sempervirens* flower, reproduced using the reflectance database of flowers. The subjects are asked to recognize which of the options is close to how the bee sees the flower. The correct answer is options C and D. Image A is how people see the flower – it's yellow for our eyes. The black and white image B can't be a bee image, since we have already found out that bees see more than two colors.



## 2. TROPHOBIOSIS

It shows the long proboscis of the aphid *Stomaphis*. And how ants help aphids to cope with this proboscis. This is followed by a question with a method to check, so to speak, for lice, and the answer options that are correct are where the participant does not show emotions or disgust, but soberly evaluates the story, detaching himself from his human experience.

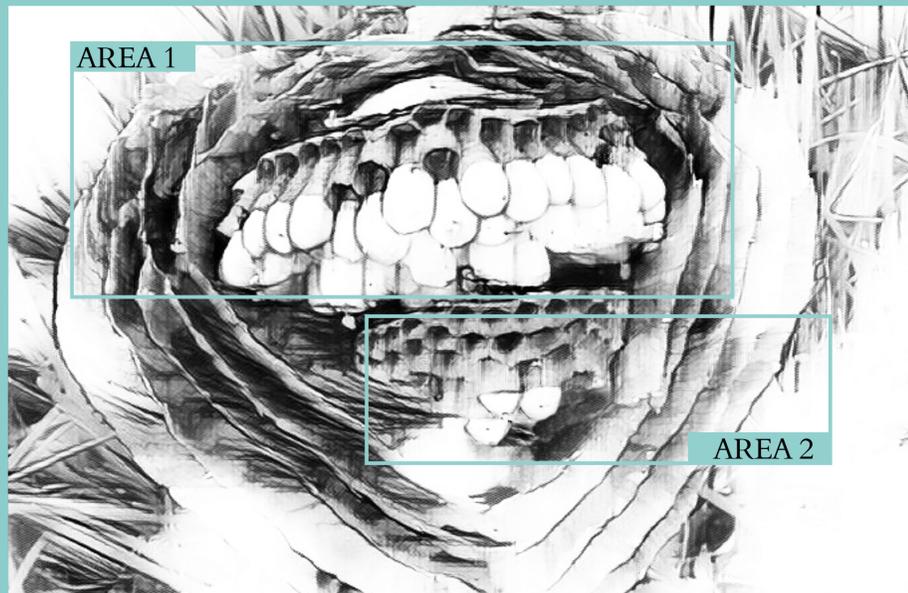
## 3. HANDMADE BY INSECTS

In this question, unlike many contained in the test, there is no obvious clue and you can answer it correctly either knowing the answer in advance, or intuitively. So don't be discouraged if your answer wasn't correct.

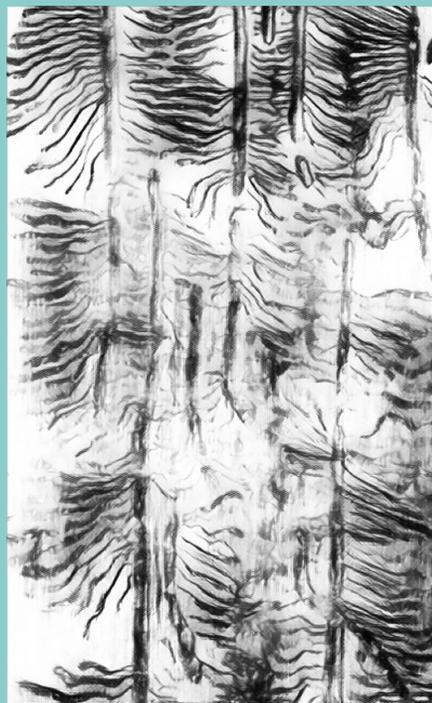
Weaver ants sew the leaves using the secretions of their larvae called larvae.

## 4. CASTE DETERMINED BY FOOD

The prompt to the right answer is in the text of the question. The amount of food that a wasp larva receives as it grows up affects which caste it will belong to. Future queens receive the largest amount of food, and, accordingly, their pupae are larger in size than all others. They are all located in area 1.



## 5. SUBCORTICAL HOUSE



This is the question about spatial thinking development, such questions are common in the language tests of IELTS. In this task, you mentally traveled through the bark beetle's dwelling. If you were attentive and used your imagination and spatial thinking, then it was not difficult for you to understand that the shape of the passages and galleries in the bark beetle house correspond to Figure D.

## 6. A HEAVY BURDEN

This question is about the altruism and self-sacrifice of the water bug, which, at the risk of dying, bears off-

spring alone. Despite the fact that many insects quite often demonstrate altruism and the desire to sacrifice themselves for the survival of the colony or offspring, it's very important to remember that this is a very rational behavior on which the survival of the species depends. Therefore, the correct answers in this question will be those which take this behavior neutrally or for granted.

## 7. TRAUMATIC INSEMINATION

Like the previous one, this question about traumatic insemination can cause a storm of emotions. Indeed, the insemination process is quite ruthless in relation to the female bug, but on the other hand, this is a bed bug that feeds on human blood! Answering this question, it's important to remember, that we are all competent members of a large ecosystem, processes and relationships in which are optimized so as to maintain a neutral balance. Therefore, the correct answer in this question is one that expresses a neutral attitude towards the process of traumatic insemination of bed bugs.

## 8. OTHER WAY OF SEEING

The last question of the "Vision" part was about study of the praying mantises' mechanism of stereovision. As in the question of trophobiosis, the answer options didn't contain specific facts and only test the participants' ability to distance themselves from human experience.

# Listening

## 1. THE SOUND OF A HIVE

Let's say it right away – this is a difficult question. It shows a bee model, which was placed in the hive. Further, it is proposed to listen to several audio recordings that are quite similar to each other and select the original sound of a bee hive. The question is based on [research](#) from NTU scientists, who found that bees make a funny “whoop sound” when they bump into each other in the hive or when the hive vibrates (from bumps or jolts). Accordingly, the right answer is where this sound is. But this question is difficult, don't be sad if you were wrong. You better listen to this nice and unusual sound again!

## 2. ON THE IMPACT OF RADIATION

Like many tests to determine the level of intelligence or personality characteristics, our test contains questions to check your wit. This is exactly such a question. It tells us about the research of Japanese scientists in the province of Fukushima. The following are audio recordings of alleged aphids when exposed to different levels of radiation. But in order to recognize the correct answer, you don't have to be an insect biologist. The [Kobayashi](#) laboratory at the University of Tokyo does exist. And there is even special recording equipment called Call Sensing Device. But the

Kobayashi Lab study looked at changes in bird song in relation to radiation levels. And the thing is that the aphid does not make any sounds at all, and the correct answer here is “None of the audio recordings presented.” We invite you to enjoy the [soundscapes of wildlife live](#) from the Fukushima exclusion zone.

## 3. A SINGLE EAR

We really wanted to tell you about this amazing single ear on the abdomen of a praying mantis that captures ultrasound. Unfortunately (or fortunately), the human hearing is unable to pick up ultrasound. But by the nature of the sounds themselves in audio recordings, it is easy to distinguish in which one the recording of a night forest with a subtle movement of the wings of a bat is presented. In other variants, the mice in the flock go about their daily activities, and do not hunt.

## 4. WHAT INTERFERES WITH ANTS' DREAM

In this question, the story is about Werner Herzog's parable film “[Where Green Ants Dream](#)” and about a series of experiments reflecting the effect of environmental noise on ants. And here it's quite easy to distinguish loud and disturbing industrial sounds from natural ones.

## 5. FAMILY COOPERATION

At first sight, the question about cooperation in the hive doesn't contain a direct indication of the answer. However, since the text deals with a complex and coordinated process of feeding the larvae, the correct answer here would be the one related to this process.

## 6. CORPUSCULAR SYSTEM

It's quite easy to give a right answer to this question — the question itself has a prompt that termites fly out to establish new nests immediately after heavy rain. Heavy and prolonged rain softens the earth and makes it easier to dig passages and chambers for a new home in it. You just had to choose an audio recording of the loudest and most intense rain.

## 7. A CROUCHING TERMITE

In this question, we are talking about the fact that termites are able to recognize the steps of ants, which are natural enemies of termites, by the vibrations of the soil.

To give the correct answer, it's necessary, having presented yourself as a termite, to recognize the steps of ants among the four records. It's rather difficult to answer this question correctly, but it is still possible. It's enough to imagine tens and hundreds of ant feet, asynchronously treading on the ground, and it becomes easy to recognize the correct record!

## 8. ACOUSTIC COMPETITION

The correct answer to the question about acoustic rivalry is in the name itself. Small water *Micronecta scholtzi* bugs compete with each other for the female with the loudest song. The louder the better, the more accurately the male can be determined in the general choir. Almost all of the answers in this question were correct, with the exception of one, which suggested that the loudest male should be avoided, because he is the most vulnerable to predators. If it were so, then in the process of natural selection the loudest insects would have long ago lost this unique ability.

# Sensing

## 1. PUBLIC DIGESTION

This question discusses the complex collective digestion process in a termite nest. One piece of wood can be digested in succession in the stomachs of several termites. Wood affected by brown rot is much easier for termites to digest than healthy wood, but termites avoid wood with white rot. To answer the question correctly, it was necessary to identify a piece of wood affected by brown rot: it has a characteristic brown-brown color.

## 2. CHEMOCOMMUNICATION

In four flasks for this issue, there were 4 samples of resin (hardened resin) from different species of coniferous trees – cedar, larch, spruce and pine. Do not be discouraged if you have not been able to give the correct answer to this question - the human olfactory apparatus, of course, is not able to pick up fluctuations in the concentration of terpenes. But we hope you liked the tart pine scent aroma!

## 3. XYLOMYCETOPHAGY

The question explains the symbiosis on the soil of alcohol between the bark beetle species *Xylosandrus germanus* and the ragweed mushrooms that feed on the larvae of the bark beetles. Beetles choose weakened or dead trees for nesting, the tissues of which contain ethanol. Alcohol is also present in some tissues of healthy trees, but in weakened ones it is more due to the lack of oxygen

experienced by diseased plants. At first glance, this behavior seems irrational, because ethanol is an antimicrobial agent that should harm the mushroom garden, but ragweed mushrooms are resistant to alcohol. But all the other “weedy” fungi and bacteria in ethanol die. Scientists from Cornell University, after conducting a series of experiments, determined that the optimal concentration of ethanol in the tissues of the tree is 2.5%. It was at this concentration that the biomass of the ragweed fungus and the number of larvae were maximal. It was difficult to guess a test tube with a solution of 2.5% ethanol, but it is possible: this concentration among all the options was minimal, which means that the smell of alcohol was also minimal.

## 4. ORPHAN FAMILY AND ABANDONED NESTS

In this question, you were asked to take up the orphan’s nest of the common wasp. It’s small because this family lost its founding female early and disintegrated.

There is no obvious prompt in this question, and, to answer it correctly, you really had to try to abstract from human experience and imagine the most optimal actions from the working wasp point of view. As a rule, workers fly away and try to join other, more successful families. Sometimes a dead female can be replaced by another. If this happens quickly enough, then the family continues to develop. Without a founding female, worker wasps are incapable of caring for brood and building a nest.

## 5. WHAT ARE GALLS

This question describes the bioengineering ability of insects to influence the genes and growth of plants and create original houses in them for raising offspring. As with many of the questions in this test, the correct answer is the one that reveals the participants' ability to be impartial and de-anthropocentric.

## 6. THE MYSTERY OF THE ABANDONED CITY

The author of the text for this question is Benjamin Bratton – professor, philosopher and theorist of computer science, urban studies and the structure of modern society, as well as a director of several research educational programs of the Strelka Institute – New Norm and Terraforming.

The story of the mystical emergence of a colony of orchid mantises in a futuristic abandoned city in Taiwan in the original text is accompanied by the following statement:

*The city of the future isn't for people. The Anthropocene will be short-lived. It will be rather not a geological era, but only a geopolitical moment. People disappear. Our cities don't belong to us. In fact, we are building habitats for other life forms. We are their tools; we are just robots for future insects. Sanji's extraordinary architecture and systems built by orchid mantises among UFO capsules have*

*become a valuable archaeological resource of the future in a short 30 years. This is not a failed future, but a successful one. This is our future. We are already its present. We, replaced by the orchid mantis.*

The subjects are encouraged to interact with a real mantis ootheca and recognize its function. The answer is simple: ooteca is a form of egg laying for this insect species.

## 7. TO TRY HONEYDEW

This is a story about another form of a kind of symbiotic interaction with aphids of various types of insects, in this case bees. When given the opportunity, bees collect honeydew - the sweet secretions of aphids. Collecting honeydew for bees is less laborious, but this product is more biologically active for them than plant pollen. The test takers are invited to try honeydew and give their verdict. Any of the answer options is quite subjective, but don't forget that you have become a participant in a speculative project.

## 8. USEFUL ACID

This question is about the well-known beneficial antiseptic properties of formic acid, and it also suggests using it for its intended purpose and analyzing your feelings. And the most correct answer here is the question of the ethics of obtaining such an acid.

Dear participants,

Thanks for taking part in our testing. Don't be sad if your results are far from complete deanthropocentrism, because the important thing is not to win but to take part.

# The results of the testing



District 9 (2009)

*What is this “spirit of the hive”, where is it?..  
He ruthlessly disposes of health and happiness,  
freedom and lives of all these winged creatures  
and, in addition, with prudence, as if it controls  
by oneself with a sense of the greatest duty.  
Maurice Maeterlinck. Life of the bees*

As it was already mentioned, the test result does not include numerical values. Instead, a list of characteristics usually inherent in eusocial insects was selected, and it can be easily transferred to the personal experience of the test taker and the structure of human society in general.

# Characteristics used in the calculation of results

## Altruism (lat. alter — other, others)



"Danko's Heart", illustration from "Old Izergil" a short story by Maxim Gorky

Social insects altruism — it's the action of an organism that increases the chances of another organism to survive while decreasing its own chances. Altruistic behavior is harmful to the individual, but it is useful for groups: groups in which there are many altruists will win and reproduce better, and groups where there are few altruists will gradually die out.

As the classical evolutionary theory of natural selection says, sacrificial behavior should be discarded over time: the more altruists die, the less genes of altruism are passed on to the next generations.

There are several theories in the modern science which explain altruistic behavior well. These are the theory of reciprocal altruism (the principle

"you are for me - I am for you"), the theory of indirect reciprocity (altruistic actions as a means of increasing your own reputation and social status) and the theory of kin selection (helping your relatives, you contribute to the spread of your own genes).

People live in a complex society, the rules of living together and the morality have been developed by society in the course of cultural evolution. Morality dictates behavior that benefits society, not the individual. In many situations, it's cultural morality that prompts us to take altruistic action.

Human altruism is almost always parochial, which means it's directed exclusively towards the group that a person defines as "his/her". This be-

havior developed as a result of intergroup clashes of primitive tribes, accordingly, altruism doesn't apply to "alien" ones. These phenomena have been entrenched at the genetic level for tens of thousands of years and usually develop in people aged 4 to 8 years, remaining interdependent from each other in adulthood. For example, if a person is kind to people from his or her circle, he/she turns out to be just as hostile towards those whom he considers outsiders. The "kind hormone" oxytocin acts in a similar way: it simultaneously improves a person's attitude to "friends" and increases his desire to strike a preventive blow at "aliens".

Unfortunately, homo sapiens evolution hasn't reached the level when we'd consider all the people (and even more other forms of life) "ours", regardless of racial, religious or any other affiliation. But each of us can try to make changes in this process.

## Kinopsis (greek. kinesis — motion; -sis — state)



Kinopsis is the perception by some animals of the movements and postures of other individuals living in the same community. This method of information exchange was discovered by R. Steger (1931) in red wood ants. A worker who has found a prey begins to run excitedly around it. Attracted by these movements, workers

in the vicinity begin to move in a similar manner and rush to the prey. As Steger supposed, the approach of workers is the result of the perception of movement, contact or odorous substances do not matter. This is explained by the fact that ants spend most of their lives in the dark labyrinths of their home, in close contact with each other. In the nest, it is difficult to exchange odors, and even unsafe for health, saturating it with gases. Therefore, ants must have developed sign and touch language. The ways ants communicate are diverse. After all, these are the most ancient social animals on our planet.

Pavel Marikovsky, famous Soviet entomologist, had studied the sign language of the colony of the red-breasted woodworm *Kamponotus herculeanus* (1954) for a long time. For convenience, each of the gestures was named according to its semantic

meaning, translated, so to speak, from the ant language into the human language. This gives their description a certain shade of anthropomorphism, a ghost that modern biologists are so afraid of and of which, of course, there is not even a trace here.

For example, when a strange smell comes to an ant, the meaning of which is still difficult to determine, it becomes alert, slightly rises on its feet and opens its jaws wide. This gesture is best expressed by the word “Attention!”

When an ant is preoccupied with a job, it is not always easy to switch it to other activities. An ant that tries to distract a busy worker receives from the latter a short blow with its jaws from a distance almost equal to the body. This signal is equivalent to the word “Leave me alone.” After receiving it, the busy ant is no longer touched.

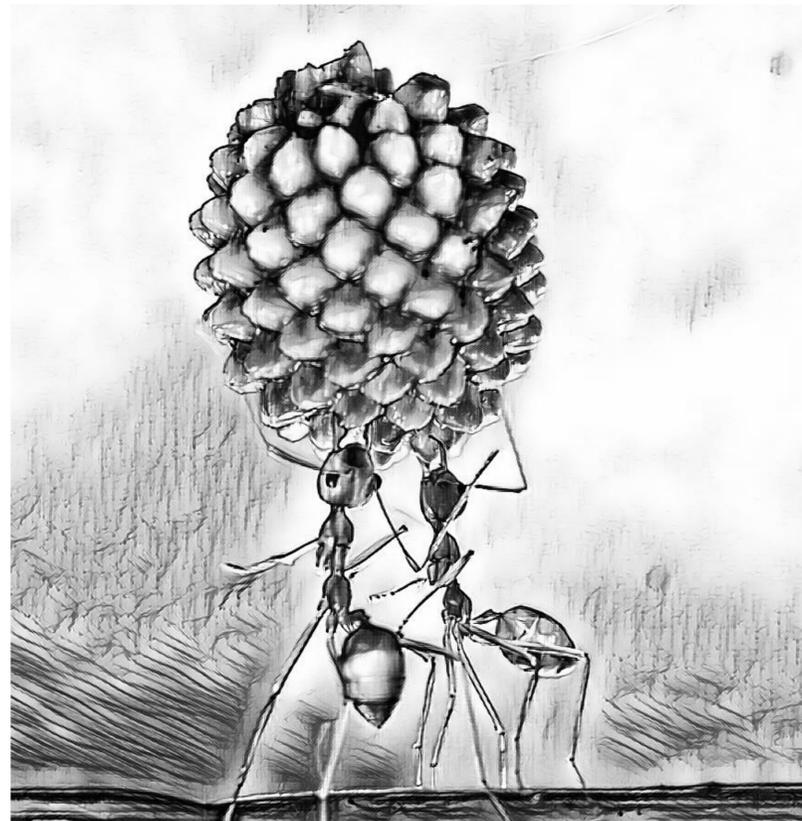
In the human environment, sign language is ubiquitous. This form of communication is much older than

verbal and is used mainly where there are acoustic limitations. The most striking example is, of course, sign languages used for communication by the deaf and people with the hearing problems. There is also the alphabet of military gestures used during hostilities, and the international code of distress signals given from the ground for airplanes / helicopters flying by. And in Guillermo del Toro’s “[The Form of Water](#)”, a voiceless heroine working at a secret US base during

the Cold War teaches sign language to a humanoid amphibian (of terrestrial origin), literally finding a common language with him and falling in love with him.

So, gradually we come to the conclusion that the inability to speak or even communicate as such in its human understanding does not always mean a lack of intelligence or the ability to think.

## Cooperation (Latin Cooperatio — partnership)



Cooperation is a form of labor organization in which several agents jointly participate in the same general process, or in different, but interconnected processes of labor or production.

Colonies of social insects are a vivid example of superorganisms based on altruistic cooperation, which permeates all processes. We have already talked about cooperation when wasps get food or about cooperation when termites avoid ants in the test. But no less

interesting is the process of allogrooming in higher termites, which plays an important social role. During molting, all termites: larvae, nymphs, workers, need outside help. A termite usually cannot molt on its own and dies without getting out of the old skin.

Termites about to molt lie on their side in the depths of the nest and, strongly arching their backs, curl up. Soon their skin bursts on the back, other termites who come to the rescue begin to lick the molting one, helping to get rid of the old skin.

Cooperation is also common in humans as in social insects. With regard to insects, we often talk about altruistic cooperation, when, for example, most individuals refuse to reproduce in order to take care of someone else's offspring. Remembering cooperation in human society, we rather mean cooperation as maintaining a balance between self and group interests.

## Symbiosis (Greek συμ — together; -βίος — life)



Acacia is one of the most common myrmecophyte plants that live in symbiosis with ants.

Symbiosis is the coexistence of living organisms belonging to different species. Not so long ago, symbiosis was considered a relatively rare phenomenon in nature. Now scientists have come to the conclusion that symbiotic complexes are the basis of many eco-

systems that provide the cycle of substances and energy. Moreover, since Darwin's time, it was believed that natural selection was the main engine of evolution, but, as it turned out, the main stages in the complication of animal and plant organization occurred

precisely due to the symbiosis or mutually beneficial cooperation of organisms.

One of the first representatives of life on the planet were stromatolites (3.5 billion years ago). In fact, it was a single organism, consisting of several layers of different types of bacteria. This type of symbiosis allows you to close biochemical cycles: the products released as waste products of some microbes are consumed by others, they release their waste, which is used by the third, and they release what is needed first as waste.

The human is also in a constant symbiotic relationship with various organisms. Most animals, including humans, are practically unable to digest plant foods. This process occurs due to symbiosis with a variety of microorganisms living in the intestine. And in a sense, a person is not just a single organism, but a superorganism, the metabolism of which is determined

by both human genes and microbial genes.

Having considered the closed model of the interaction of bacteria in stromatolites, one can find in the human society a larger-scale analogue of symbiotic interaction - the closed-cycle economy (ECE), based on the renewal of resources and which is an alternative to the traditional linear economy (creation - use - disposal of waste).

The basic principles of EZC are based on the transition from fossil fuels to the use of renewable energy sources and the processing of secondary raw materials. In 2002, China passed a law to promote EZC; South Korea has adopted a similar Green Development Strategy; in Japan they are building the “Society of the Correct Material Cycle”. Similar programs exist in Germany and Switzerland.

## Polyethism (Ancient Greek πολύς — numerous)



Dance to the Berdache, Drawing by George Catlin (1850)

Polyethism in insects manifests itself in the division of labor, when groups perform a certain set of operations.

So, for example, polyethism can be age-related - when specialization is associated with a certain age and changes throughout life. Age polyethism is well studied in the Transcaspian termite. Workers of this species are of 8 ages. The youngest termites are nannies, they look after eggs and larvae. Older termites are part of the royal couple's retinue. Even older termites become foragers or aquifers. Well, the oldest workers work in the role of reapers: they are the ones who cut dry grass, twigs of bushes and gnaw them into pieces.

If specialization is fixed, then one usually speaks of caste polyethism, which is closely related to the phenomenon of caste polymorphism. In most social insects, only one female is a reproductive individual in the colony, all other females are sterile and belong to the caste of workers who are engaged in feeding the female's offspring, arrang-

ing housing, obtaining food, protecting the colony from enemies, etc.

Speaking about examples of caste and age polyethism in humans, it is important to remember the unique "caste" of postmenopausal help grandmothers, which is not found in any other species.

Or, for example, among the Indian tribes of North America, there was a phenomenon of people of the third sex - the berdash, who formed a special caste, since it was believed that, assuming the gender identity of the other sex, a person becomes the owner of two souls. This allowed the bar-

## Stigmergia (Ancient Greek $\sigma\tau\acute{\iota}\gamma\mu\alpha$ — sign, label; $-\acute{\epsilon}\rho\gamma\omicron\nu$ — action, work)

Stigmergia is a mechanism of indirect interaction in which some agents leave marks, traces, signs in the environment, stimulating the activity of other agents. Stigmergia is a form of self-organization that allows complex struc-

tures to be created, but without any planning, control, or even direct communication between agents. das to mediate disputes between the sexes, help resolve marital conflicts, or act as matchmakers. Bardashi became parents for orphans or children from large families. Because of their special connection with gods and spirits, bardash men were often tribal shamans or medicine men.

In many institutionalized religions of the world, there are monastic orders, whose members voluntarily refuse to participate in reproductive behavior, forming a caste of people who live and work for the good of the population, but do not themselves have offspring, like the castes of working ants or termites.

tures to be created, but without any planning, control, or even direct communication between agents.

The term stigmergy was coined by French biologist Pierre-Paul Grasset



Umbrella Movement, Hong Kong, 2014

in 1959 to refer to the behavior of termites that use pheromones to build their complex nests, following a simple decentralized set of rules: Termites individually roll particles of earth into balls and mark them with their pheromones. There is no system in the arrangement of the balls, but where they accidentally accumulate (for ex-

ample, in hollows), the smell becomes stronger. This attracts other termites, and they begin to leave their balls of earth in the same place. As a result, the mountain of balls increases, and the termite mound grows to enormous sizes. Another example is ants that leave pheromones on their way back to the nest after they have found food.

Following these tracks, other ants are able to find their way to the same food source. This network of footprints functions as a shared external memory for the ant colony.

In the human community, we can also easily find traces of the manifestation of human to human stigmergia. Every time you order “hanging coffee” in a bar or cafe, you leave a sign, a label for a homeless or strapped person that he can treat himself to coffee, thereby cooperating with him and indirectly interacting.

Or here’s an example of a more sophisticated stigmergic structure: the [Umbrella Movement](#), or the Umbrella Revolution, which spontaneously emerged during the Hong Kong protests after police used pepper spray on peaceful protesters. The protesters tried to hide from the spray behind several yellow umbrellas, immediately turning them into a symbol of protest,

through which they began to leave messages to each other. And after the police used tear gas and water cannons against the demonstrators, thousands of people took to the streets and the protests lasted more than two months. The self-organization and decentral-

ization of protest movements today - with an almost complete absence of coordination centers and hierarchies - is even more like stigmergic interaction in insect communities.

in which the principles of polymorphism and polyethism in insects were transferred to human society. Huxley described five castes of the new world, differing in appearance, as well as mental and physical abilities into which humanity was divided. Starting from “alphas”, who have the maximum development, to “epsilons”, who are laborers and servants.

## Polymorphism (Ancient Greek πολύμορφος — varied)

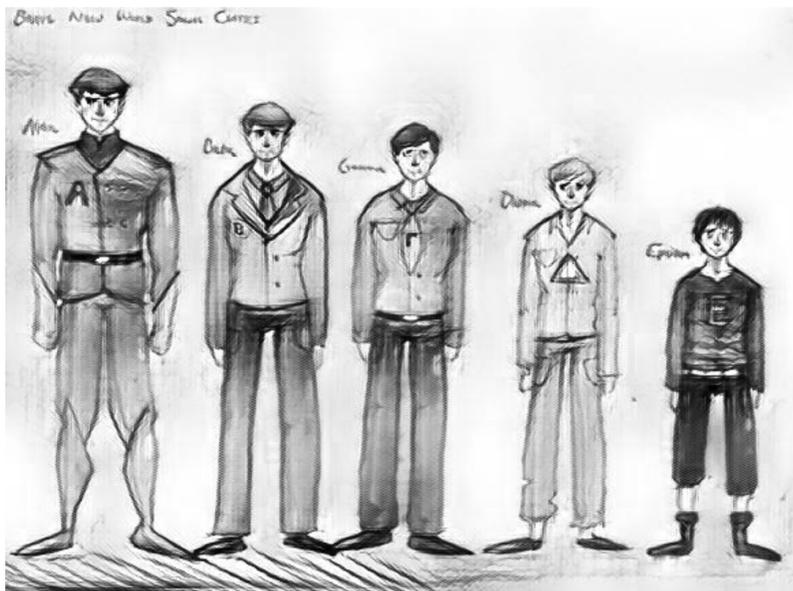


Illustration from [Brave New World](#) by Aldous Huxley

Polymorphism in insects is the existence of several outwardly different morphs in the same species. Different morphs are adapted to perform different functions in the population or

family of a given species. For example, sexual polymorphism is characteristic of all social insects that we encountered in the deanthropocentrism test. Ants, wasps, bees, and termites have males, females, and asexual workers. The term “caste” is used to refer to different morphs. Castes are quite different in external and internal structure, but nevertheless they belong to the same species.

Here it is interesting to recall the dystopian novel by the English writer Aldous Huxley “[Brave New World](#)”,

However, if we leave aside the grotesque necessary for the novel and look at polymorphism in a neutral way, we will find examples of its manifestation in a person who is characterized by balanced polymorphism, since our species has two sexes, differing in biochemical, morphological and behavioral characteristics. Another example of polymorphism in humans is the presence of different blood groups - A, B, AB and O. The frequencies of occurrence of different blood groups in the population vary, but remain constant from generation to generation.

## Trofallaxis (Ancient Greek τροφή — food, nutrition; ἄλλαξις — change)



The Madonna Litta, Leonardo da Vinci (1490—1491)

Trofallaxis is the exchange of food and glandular secretions between members of the community in social animal species (bees, ants, termites, and others) through mouth-to-mouth feeding (stomodaeal trophallaxis) or from the anus to the mouth (proctodaeal).

This process plays an important role in the transfer of information from one

individual to another, in strengthening connections within the population with the help of pheromones, as well as the exchange of symbiont organisms and other vital microbiota.

Many entomologists of the 19th and 20th centuries (such as the author of the term “trophallaxis” William Morton Wheeler or Adele Fielde) considered mutual feeding an integral part of the life of the nest as a social unit and associated this behavior with theories about the structure of human society. In particular, trophallaxis was viewed as a key to unraveling the origin of sociality as a whole.

In the book of the innovator-entomologist Auguste Forel “The social world of ants in comparison with the world of man” (1928), trophallaxis has a romantic and utopian interpretation. Trout saw here a confirmation of his optimistic belief in socialism. In the “shared stomach” concept, pheromones move with food, thereby limit-

ing the perimeter of the community. The philosopher Londa Schiebinger, describing the starting point of modern zoological nomenclature, reminds us that Karl Linnaeus, the so-called “father of modern taxonomy”, in 1758 coined the term Mammal (mammal), which means “(fed) from the breast,” a term capable of reach both humans and a wide class of vertebrates. A term that emphasizes precisely the way food is transmitted.

Food exchange and body contact have always been and will be an integral part of the human community. Numerous studies show that the so-called skin-to-skin contact between mother and child significantly affects the development and functioning of the infant’s brain. And among astronauts there is a practice of obligatory hugs to maintain the psychological stability of astronauts in a closed environment. Unfortunately, the pandemic has made a difference by introducing the concept of social distance. We can only hope that in the long term, all this will not negatively affect the structure of modern society.

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