Greek edition of Wired magazine, profile of Jesse Ausubel by Dr. VASILIKI MICHOPOULOU

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https://wired.com.gr/article/jesse-ausubel-den-boroun-na-fane-sousi-ennea-disekatommyria-anthropoi/



“When only the emperor of Japan ate sushi, consumption was negligible. If nine billion people today decide they want to eat sushi, then we have a real problem. There are not enough marine resources to meet that demand.”

Using an almost humorous example, Jesse Ausubel highlights one of the most serious questions facing modern civilization: “How far can human consumption go without depleting the natural world on which it depends?”

Ausubel, director of the Program for the Human Environment at Rockefeller University in New York, has spent decades studying the relationship between technological progress and the use of natural resources.

His proposition is simple: a society can become wealthier and more technologically advanced without indefinitely increasing its consumption of natural resources.

And the key lies not only in clean energy or more efficient machines, but also in a resource that, he argues, is changing the rules of the game in the 21st century.

“The distinctive feature of the 21st century is the addition of a fifth resource. We have water, energy, land and raw materials. The fifth resource is information,” he tells WIRED Greece.

For Ausubel, the explosive growth in available data and artificial intelligence can transform agriculture, forestry and industrial production, enabling more efficient use of natural resources.

“We can impart intelligence even to the seed,” he notes, citing precision agriculture as an example.

“With better information, we can reduce unnecessary water consumption, use less fertilizer and fewer pesticides, and tailor our interventions to the actual needs of crops.”

There is, however, a crucial qualification: technology can make production more efficient, but it does not guarantee that overall consumption will decline.

The problem is not just supply. It is also demand.

If a product becomes cheaper and easier to produce, we may consume more of it. The benefits of increased efficiency may thus be diminished or even reversed by rising demand.

Ausubel insists that we must consider production and consumption together. Improving the products we use is not enough. We also need to reduce waste and reconsider our consumption habits.

Sushi is one way of illustrating the problem. Certain consumption patterns cannot be extended to the entire global population without putting enormous pressure on ecosystems.

Environmental progress, therefore, is not only about how we can produce more with fewer resources, but also about what we choose to consume.

Can humanity return land to nature?

One of the most important concepts associated with Ausubel’s work is land-sparing: setting aside land for nature. It is the idea that we can produce what we need using less land, leaving more room for natural ecosystems.

Agriculture, livestock farming, mining and urban development occupy vast areas that could otherwise support wildlife. Increased productivity can, in theory, free up space for forests and wild animals. This does not happen automatically, however. There is a risk that the land spared will be used for new economic activities rather than returned to nature.

When I ask him how we can ensure that this does not happen, his answer is disarming: “Science and technology can create the conditions for sparing land. Whether that land is ultimately protected is a matter of political choice.”

Ausubel also champions two other major concepts: decarbonization and dematerialization. The former concerns reducing dependence on carbon-intensive energy sources and limiting emissions, while the latter refers to reducing the quantity of materials required for a particular economic function.

Technological progress expands humanity's possibilities, but there is no guarantee that they will be used to benefit the environment.

Thus, the question "Can Technology Spare the Earth?" posed by the scientist in 1996 remains relevant three decades later.

The roots of a different approach

Jesse Ausubel was born in New York and grew up in a family with a keen interest in history, culture and education. His father, Herman Ausubel, was a professor of European history at Columbia University. A family environment filled with books, discussions and intellectual stimulation fostered his curiosity about the world from a very early age.

During his studies at Harvard and Columbia, he became increasingly interested in the oceans and natural resource management. A decisive turning point came in 1977 when, during a fellowship at the U.S. National Academy of Sciences, his mentors encouraged him to work on climate change, a field still in its infancy at the time. Two years later, he took part in preparations for the first United Nations World Climate Conference, held in Geneva in 1979.

Later, his work turned to another enormous research undertaking: documenting life in the oceans.

Ausubel played a leading role in the Census of Marine Life, a ten-year international research effort involving scientists from around the world, aimed at documenting the diversity, distribution and abundance of marine life. The program recorded approximately 230,000 known marine species and highlighted how many more remain unknown to scientists.

At the same time, the undertaking highlighted a fundamental challenge in biodiversity science: we cannot effectively protect what we do not know or cannot monitor.

To understand how ecosystems are changing, we need systematic observations, comparable data and technologies that enable us to study life on a large scale.

DNA barcoding and the Encyclopedia of Life are consistent with these objectives. The former allows species to be identified through specific segments of their genetic material, while the latter is an effort to create a digital encyclopedia of all known species of life on the planet.

DNA barcoding also has practical applications. In one notable example, two high school students in New York used genetic analyses to check whether fish sold in stores and

restaurants matched the names under which they were marketed. The investigation uncovered instances of mislabeling and became known as “Sushigate.”

One of the research directions pursued by Ausubel’s team at Rockefeller University involves the use of environmental DNA (eDNA).

Every organism leaves genetic traces in the environment through cells, tissues and other biological residues. A water sample from an area may therefore contain DNA from species present there, even if none of them has been directly observed.

The method allows scientists to detect organisms and monitor changes in the composition of ecological communities. It is not infallible, however, because DNA can be transported by currents or degrade. Nevertheless, it offers a new tool for monitoring biodiversity.

In research published in 2025, Ausubel and Mark Y. Stoeckle studied environmental DNA in New York’s East River and found that water samples could capture seasonal changes in fish DNA, as well as genetic traces of other vertebrates associated with the urban area and wastewater.

There is, however, a paradox: we are becoming increasingly capable of measuring environmental destruction, but we are not necessarily able to stop it.

“We can expand the realm of the possible. What people ultimately do is a broader question,” he notes.

“Science provides knowledge and tools. It does not make decisions on behalf of societies.”

According to Ausubel, the distinction between what we can measure and what we choose to do is linked to the need to reconsider how we assess progress.

“For decades, GDP and economic indicators have dominated the assessment of development. Yet an economy can grow while losing forests, increase its income while depleting fish stocks, or show lower domestic consumption of materials because it has moved its polluting production to other countries,” the scientist says.

Ausubel prefers physical measures to economic ones.

“The space made available for nature is something that interests me greatly,” he says, referring to tools such as the environmental footprint and the environmental rucksack (an ecological concept that measures the total weight of natural resources and materials extracted or moved from nature in the production, use and disposal of a product or service, minus the actual weight of the finished product itself). These tools capture the land, water and energy required to produce goods and services.

He sums up his philosophy in one phrase: “A hectare of land is always a hectare.”

Money changes and fluctuates in value. A hectare of land or a tonne of fish caught, by contrast, represents a physical quantity that can be monitored and compared over time.

This does not mean that assigning an economic value to nature is without merit. Biodiversity loss also translates into economic risk.

This was also the subject of a recent discussion entitled “Nature as Capital” at the Falling Walls Science Summit in Berlin, in which Ausubel participated alongside scientists and representatives of the environmental and insurance industries.

He warns, however, that we cannot rely exclusively on market prices to protect nature. People care about money, but not all their behavior is determined by it. There are values, cultural attitudes and forms of respect for the natural environment that cannot easily be expressed in a price.

The greatest value of Ausubel’s thinking lies in shifting the discussion away from the broad dilemma of “development or the environment” toward the questions “How well can we live without continually demanding more from the planet?” and “How much space do we leave for all the other species with which we share it?”

This requires political decisions and a different understanding of progress. Because if nine billion people decide they want to eat sushi, then we really do have a problem.

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