

CRISTINA JUNYENT

Jaume Terradas: a biography of the world

An interview

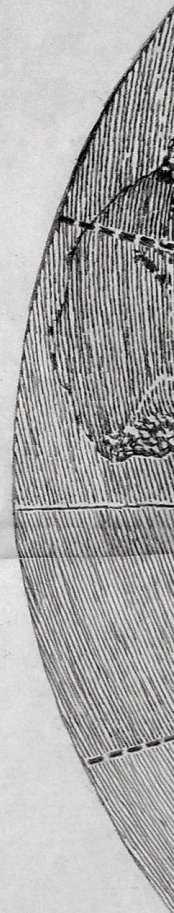
JAUME TERRADAS was born in Barcelona in 1943. He is Emeritus Professor of Ecology at the Autonomous University of Barcelona. Need and imagination led him to propose the creation of the Centre de Recerca Ecològica i Aplicacions Forestals (CREAF, Centre for Ecological Research and Forestry Applications), and he is now an honorary member of its board of trustees. In 2005, he published *Biografia del món. De l'origen de la vida al col·lapse ecològic* (Biography of the World: From the Origins of Life to Ecological Collapse), which was awarded the Serra d'Or Critic's Prize in 2007, one of the oldest, uninterruptedly-awarded prizes for works in Catalan.

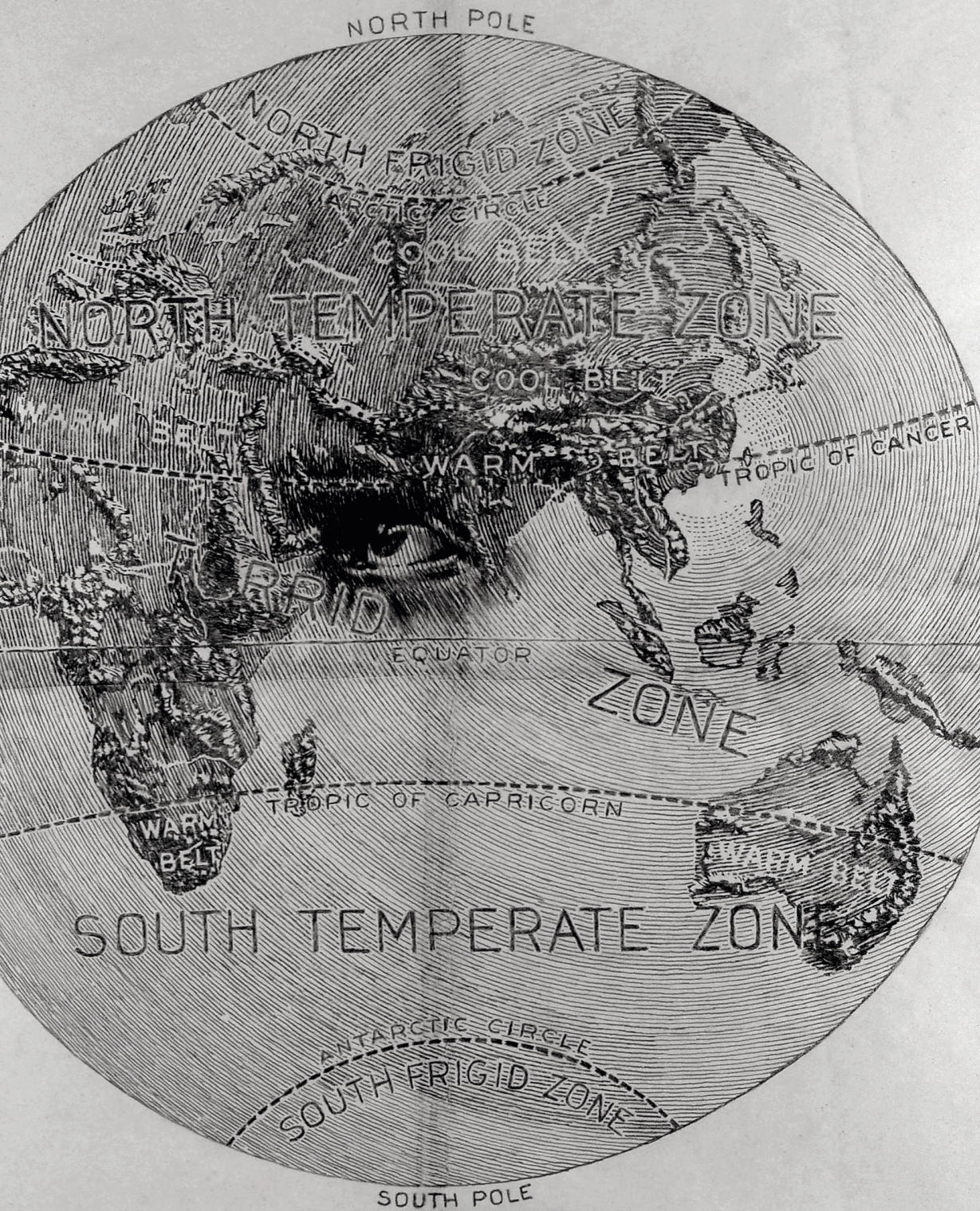
What led you to write *Biografia del món*?

In *Biografia del món* I put a lot of energy into trying to highlight two ideas. One was to give an idea of evolution that's a bit different from the usual fare. The second was to reflect upon the model of social growth and solutions that are being proposed on the basis of very high energy consumption.

What criteria besides genetic ones should be kept in mind when it comes to understanding the development of life on earth?

Genetic changes such as mutations could be called qualitative but there are also quantitative ones, for example the sum of the actions of organisms. Symbiosis, for instance, enables a new, more complex organism to have properties it didn't have before the organisms that comprise it came together. The origin of multicellular organisms is hard to imagine if it isn't understood that they were already in symbiosis with microbial organisms. There are not only mutations of a genome but also more complicated mechanisms, qualitative actions that are connected with the constant relationship between





Europe (Europa), Jaume Plensa (2001)
Mixed media and collage on paper, 196 x 122 cm

Darwin was a genius because he laid the foundations for the modern conception of life

organisms and their environment. Many organisms have learnt to use not only the basic resources but also to transform and use the environment, making nests, delimiting territories to be defended, and so on.

Organisms capable of organising their environment?

Margalef said that some organisms have become engineers, which is to say they've been able to organise the environment in their own favour. An anthill or termite mound is an example of environmental design because both keep the temperature stable. Most of the activities of relationship between organisms and territory tend to stabilise conditions.

It's what humans do.

If we look at evolution as a process by means of which organisms (some more than others) keep gaining control over the environment in which they live, then we can understand better that humans are not such an extraordinary exception. Human beings have developed mental and social capacities that are quite superior to those of other organisms but they are not radically different. There is continuity between what some species do and what humans or societies do.

So we humans aren't the only transformers?

The first bacteria to discover photosynthesis began to produce oxygen and to intoxicate other bacteria. And themselves. Some of them must have escaped intoxication because they adapted to the new conditions, even though the atmospheric change they brought about was very drastic. Hence, man is not the first organism that altered the planet's functioning in any far-reaching sense.

However, we have culture.

Culture is a very important qualitative change but not so important as to make us forget about where we come from and what we depend on. Our brain is made up of bits and pieces and added over the brains of other organisms; in fact, we share some functional aspects with the brains of reptiles.

So we're not the centre of the universe. What shall we do about the creationists?

I think that the debate between the creationists and the evolutionists revolves too much around Darwin. Darwin was a genius because he laid the foundations for the modern conception of life. However, if we confront people who talk about mutations and genetics with those who talk about God, they are rather too far apart. I believe we should explain evolution in terms that are accessible to the public in general.

I'm very worried that almost 60% of the Americans believe that Earth has been in existence for no longer than 10,000 years. The population keeps thinking in these creationist terms.

But these groups are engaged in a massive attack on the teaching of evolution in schools, alleging that there is an alternative theory.

It is difficult to understand that we have appeared, step by step, out of a process of mutation because it's not entirely true. Evolution has been making jumps in some cases. Which is to say it's been acquiring packages and mechanisms all at once, for example symbiosis, as we were saying: none of us can live without bacteria. These kinds of examples help people to understand that evolution is indeed possible and, in particular, over the 4,500 million years of the history of the Earth. There is no dissent among scientists on these basic facts.

Though there are people who are yet to be convinced.

We haven't convinced them because it's hard to understand and maybe we haven't explained it well. We've based it too much on selection and mutations, the most microscopic part of the process. It should be explained in a more general way: geological phenomena, atmospheric change, symbiosis, integration; the fabrication of tools, as in the case of chimpanzees... People with religious beliefs don't have to see them as altered by the fact of understanding evolution in the way that scientists understand it.

Now the theory of intelligent design is gaining ground.

Yes, because creationism has fallen out of favour. However, this is no more than a repetition of 17th and 18th century theories that asserted that the design of the world was so perfect that it could only be explained by the existence of God. The present-day pope upholds these ideas, which are completely without any scientific grounding. If man had been intentionally designed, he would certainly have been able to function better. He could have been designed to be happy, but instead we have children being born with malformations or having cancer when they are still foetuses... We are not perfectly designed but are the result of an evolutionary process.

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The second idea you wanted to convey is the part humans play in environmental problems.

I think that environmental problems are on the rise in the capitalist model of society, which is now practically the only model in the world. It is one in which the economy requires constant growth, which means transformation of the environment.

Can we avoid collapse brought about by climate change, for example?

The challenge of climate change is an economic one and our economy won't be able to manage it. If the temperatures start to climb all of a sudden and things can't be cultivated in the countries where they were once cultivated, and there can't be tourism in countries where tourists used to go, the economic system could fail.

And our societies could suffer.

There are a lot of countries that are very significant in demographic terms, and yet they don't do anything to change this.

I think they'll end up doing something in the United States. It will be more complicated for other countries to comply. The Chinese, the Indians and the Brazilians say, "It's true that there's too much CO₂ in the atmosphere and that this is a problem but you're the ones who put it there. We've hardly put any there yet and now it's our turn to get rich too". And they're right. If, of the six thousand million inhabitants of the Earth, three thousand million lived in the same way as the one thousand million rich people —Americans and Europeans— live, we'd certainly have very serious problems. For the whole world to live as we live, or as Americans in New York live, is unsustainable.

And there's more and more of us.

Human demography grew spectacularly as soon as we stopped being hunters and gatherers and leading the languid life of lions. By accumulating food stocks thanks to agriculture and animal husbandry, the population burgeoned. And it shot up again 200 years ago when a new supply of resources was discovered. Having a lot of energy for producing the resources that are needed makes it possible to maintain a lot more people. If the resources fail there'll be a demographic downturn. Fewer babies will be born and the old people won't get to be so old. There'll be a regression.

Does your theory compare humans with a colony of flies?

I think we're like flies that have found some manure in the middle of a field. There's demographic growth and lots of hustle and bustle all around it. But when's it going to run out? Technology tries to ensure that it won't run out, but this is a siren song. If we find a cheap, indefinite energy supply we can do what we want, we won't have food problems and we'll all be richer but we'll certainly bring the whole show down because we have endless capacity for transformation. As Buckminster Fuller said, "The most important thing about Spaceship Earth [is that] an instruction book didn't come with it". We need to be aware that we live in a limited space with limited resources. We're in a spaceship with no operating manual and we're taking on more and more fuel. It's not that I'm fatalistic but I do think it's a risk that's serious enough to be borne in mind.

How might all this end up?

If we're not able to rectify the model of open society with freedom of movement for people, freedom of ideas, and freedom for science and technology, then it might happen

that, as a result of major disasters, a fundamentalist alternative might be imposed. To put it in science-fiction terms, when there are major environmental catastrophes, fundamentalism might appear in the form of a society that could make a religion out of its relationship with the environment. And it might give rise to kinds of behaviour that restrict freedom to notable extremes, and that block technological development because it's deemed to be dangerous.

These are the three key words: *mitigation, vulnerabilities, and adaptation* [...] Future schemes will need to orient us towards a spirit of change in society

What can be done to avoid this?

Right now, the official responses are trying to mitigate climate change, accepting the Kyoto Protocol, cutting back energy expenditure and greenhouse gas emissions... Analysis should also be made of our vulnerable points and programmes of adaptation need to be developed. These are the three key words: *mitigation, vulnerabilities, and adaptation*. Five years ago, it was being proposed that we should take the path of sustainable development but this utopian position —liberty, equality, fraternity and sustainability— has had its day. Future schemes will therefore need to orient us towards a spirit of change in society.

What is the reason for this change of viewpoint that incorporates action into sustainability?

It's the result of two reports. First is the report of Nicholas Stern (commissioned by Tony Blair) and it says some very radical things such as if we spend 1% of the world's GNP to struggle against climate change we can get around it but, if we don't do so, the change could cost between 5% and 20% of the GNP. This figure alarmed the administrations because neither Stern nor Blair can be suspected of being ecologist sympathisers. Then again there's the IPCC (Intergovernmental Panel on Climate Change), which is clearly optimistic.

Why?

According to the IPCC, by the end of the century we need to stabilise atmospheric CO₂ at 550 ppm. Yet students of the carbon balance say that it's totally unfeasible to stabilise it even at 650 ppm, and we'll be going up to 700 ppm or more. In this case, temperatures will be going up still higher than what was envisaged. The [Spanish] Minister for the Environment, Cristina Narbona has said that, by the end of the century, the temperature in the hinterland of the Iberian Peninsula will be in the order of six or seven degrees higher than at present. If we add to this increased evapotranspiration (water losses) and less rainfall (it's estimated that in the centre and south of the Iberian Peninsula the rainfall will be only 35% or 40% of the present rate) we'll be faced with something very like a desert. It's impossible to maintain a city like

The great energy resource is saving energy, and it's very difficult to envisage a purely technological solution. We need changes in the model of society, the system of consumption, growth... it has to be gentler and qualitative, not so quantitative

Madrid (with 5 million inhabitants) in the midst of a plateau that's practically desert, unless it's with an enormous quantity of energy, like Kuwait.

With all these costs there's the additional one of the rise in sea level.

The IPCC is short of the mark on this point too. The scientists on the panel are now saying that their models haven't taken into account the speed of glacier meltdown as they're not sure how to go about it. Other scientists who've tried have obtained values for a rise in sea level of around a metre and a half instead of somewhere between a hand-span and a hand-span and a half, as the IPCC asserts. Then we'll find ourselves without any beaches, and cities and whole countries are going to have a lot of problems. If the sea level rises a metre and a half, island countries like the Nile Delta and Bangladesh could disappear. In the Nile Delta six million people will have to be moved and, in Bangladesh, between twelve and fifteen million. Where will they all go?

Most big cities are on the coast, so what could happen?

In the rich countries, there's a possibility of constructing barriers on the local scale but, when it's a whole coast, barriers aren't a viable option. Two centuries ago, in the London area, the island tipped at the same time as the sea level rose. The result was that the sea level went up by more than a meter and now 550,000 people are living below sea level.

We have a hundred years to spend money on different kinds of defence.

The rich cities can protect themselves a little by opening up wetlands in their environs so that the water has somewhere to spread, and by not occupying marshlands, which is what they did in New Orleans, where the catastrophe was a result of occupying and constructing the new city on vulnerable land.

Is it necessary to find out what the vulnerable points are so we can adapt to them?

In the 18th and 19th centuries in Barcelona, there were often catastrophic floods. The river waters had always risen but the flooding increased in direct proportion to how much the territory had been made impermeable. This went on until the floods became catastrophic. Then they took some measures of adaptation, with sewers and systems for drawing off the water, with the result that, even though there were still a

lot of sudden influxes of water after torrential rain, the catastrophic effects were less frequent.

What about situations that bring about a change of mentality in people?

Nowadays there's a bit of a scare in the administration but very little is being done so far. Administrative organisms are being created but, in the administration as a whole, these transversal issues are tucked away into specialised offices that have no real power or ability to have any effect on economic, territorial, industrial... policy. So, some things have shifted but they are still a long way from constituting any kind of real impetus that might change the present dynamics.

What is needed to change these dynamics?

Really distressing things will need to happen. For example, during the heat wave in France in 2003, the temperature was 10° higher than average. Thirty thousand more people died than what was anticipated in statistical terms. Many of the dead lived in cities where the temperatures went up even more because of the heat-island effect. Three thousand people died in Paris in one night alone. The German bombers never managed to kill so many people in a single night.

There's already a scarcity of fresh water.

There's less of it and it's evaporating faster. Summers will be harsher and the quality of the water will deteriorate, which could give rise to catastrophic situations like epidemics, especially in Third World countries. In the world today, there are about 2,000 million people who don't have a guaranteed supply of safe water. If the situation gets any worse it could unleash a humanitarian crisis that might lead to conflict.

Is it possible that environmental problems will end when the oil runs out?

Some people say we're very close to peak oil —when demand starts to exceed the rate of extraction. Demand in countries like China or India has rocketed and it will be very difficult to find oil resources to keep up with it. Even if the melting ice in the Arctic region makes it possible to reach unexplored zones, it still seems it would be difficult to meet the demand. Other sources of energy can be sought, for example biofuels, but they aren't any better than oil in essence. The problem remains the same: we go on burning, we keep on sending CO₂ into the atmosphere, and cultivating plants for fuel also requires energy for large-scale agriculture, watering, fertiliser, and so on. It's not a satisfactory solution. The great energy resource is saving energy, and it's very difficult to envisage a purely technological solution. We need changes in the model of society, the system of consumption, growth... it has to be gentler and qualitative, not so quantitative.

Do you think there could be a change of values?

This looks complicated because people don't change their values unless they are faced with a situation that really obliges them to. Environmental education won't bring this

about. It can make a small contribution, especially when addressed to key targets in society: politicians, the mass media and businesspeople, for example, but it won't change the substantial issues. However, if reinforcement comes from outside, there could be a change, which is what happened with tobacco. With tobacco, there's been a social revolution that has been imposed because people's perceptions have changed, partly because of the anti-cancer campaigns. If people are afraid of other things too, maybe they'll change their values too and social controls might be imposed so that certain things can't be done. Perhaps when it's understood that people are dying because of heat or polluted water, there'll be some reaction. For example, if an industrialist dumps effluent into a river, it will be much more frowned upon, much more punishable than it presently is.

Territory isn't being put to good use.

Territory is an asset that should be used with good sense, but all too often excessive haste doesn't permit this. In China, for instance, the environmental situation is a total disaster. In order to develop the country, they opted for growth at any price. Now there are tremendous dust storms because of deforestation, horrific floods... and they're paying a very high price for this bad use of their territory. Something similar has happened with the Aral Sea in the Ukraine, where the water dried up because of a state project. This is why governments, when they have a lot of power, are very dangerous; but it's also dangerous when they leave all the power in the hands of private parties. Private groups do the kind of things we have seen happening here. The urban developers complain because there are so many restrictions when construction generates wealth and pushes up the GNP. Maybe growth will be maintained, but who pays the costs of water purifying, supplies of drinkable water, air conditioning and sewers? It doesn't come from the pockets of the gentlemen who build the houses but it's society that has to pay the price. This has already happened in the Costa Brava and the Balearic Islands.

Is it irreversible?

In all very complex processes, the processes of destruction can be sudden, a threshold is crossed and the system collapses. Again, the building up of these systems is always slow because regulatory mechanisms need to be constructed. We don't have much idea of how complex systems function and it's almost impossible to predict the result of a particular impact on the system, and hence we need to be prudent, but we're not