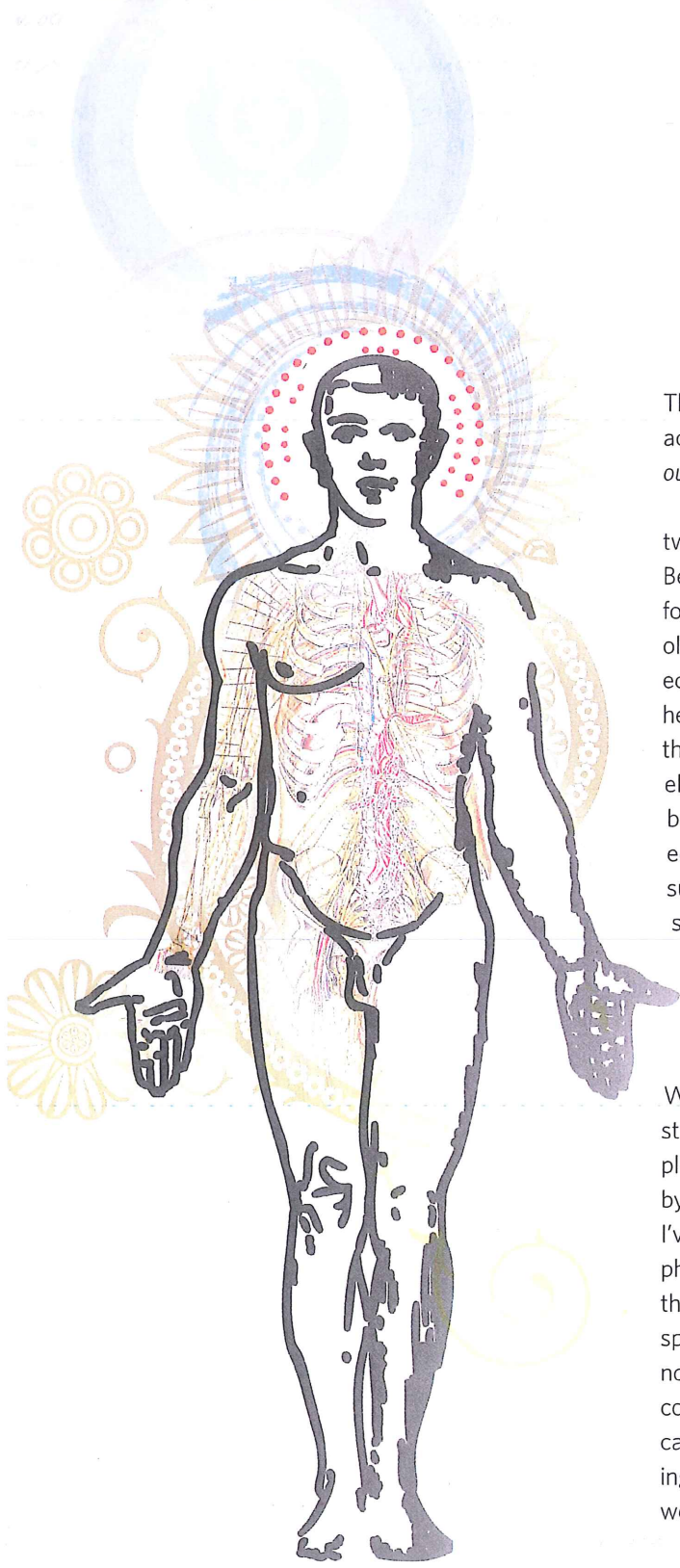


The Powers of the Universe

by Brian Swimme

There are many ways of characterizing the last four hundred years of modern science. My personal favorite is this: scientists began with the assumption that they were learning about the physical processes at work "out there" in stars, hurricanes, dinosaurs, and so forth.



Then one day, it began to dawn on us that we were actually studying the processes that *gave birth to ourselves*.

Let's take one example out of a million. In the mid-twentieth century, German-American physicist Hans Bethe discovered the intricate process whereby stars forge the various elements of the universe. Just imagine old Hans at his desk one night, contemplating his new equations. Suddenly it all comes to him. Perhaps as he glances at his fingers holding the pencil, he realizes that the elements of carbon in his skin, as well as the elements of phosphorus in his brain, were constructed by the very processes he has just articulated with his equations. What a moment that must have been, to suddenly recognize that he—his mind, his nervous system—is actually a space where this process has burst into awareness of *itself*.

"The Powers of the Universe" is my attempt to summarize what modern science has learned about the way in which the universe has constructed us. What an amazing moment we live in! It's like we've stumbled into some ancient castle and found the secret plans for our existence—plans that were never known by any earlier civilization. In the following summaries, I've drawn on widely accepted scientific knowledge in physics, astronomy, biology, geology, paleontology, and thermodynamics, and for the most part I've avoided speculative areas of science like string theory. I have nothing against speculation. But the planetary shift in consciousness we are in the midst of is already so radical that it is helpful to proceed in a grounded way, building our understanding of who we are upon knowledge we have reason to believe is reliable.

THE FOLLOWING WRITINGS WERE COMPILED BY BRUCE BOCHTE.



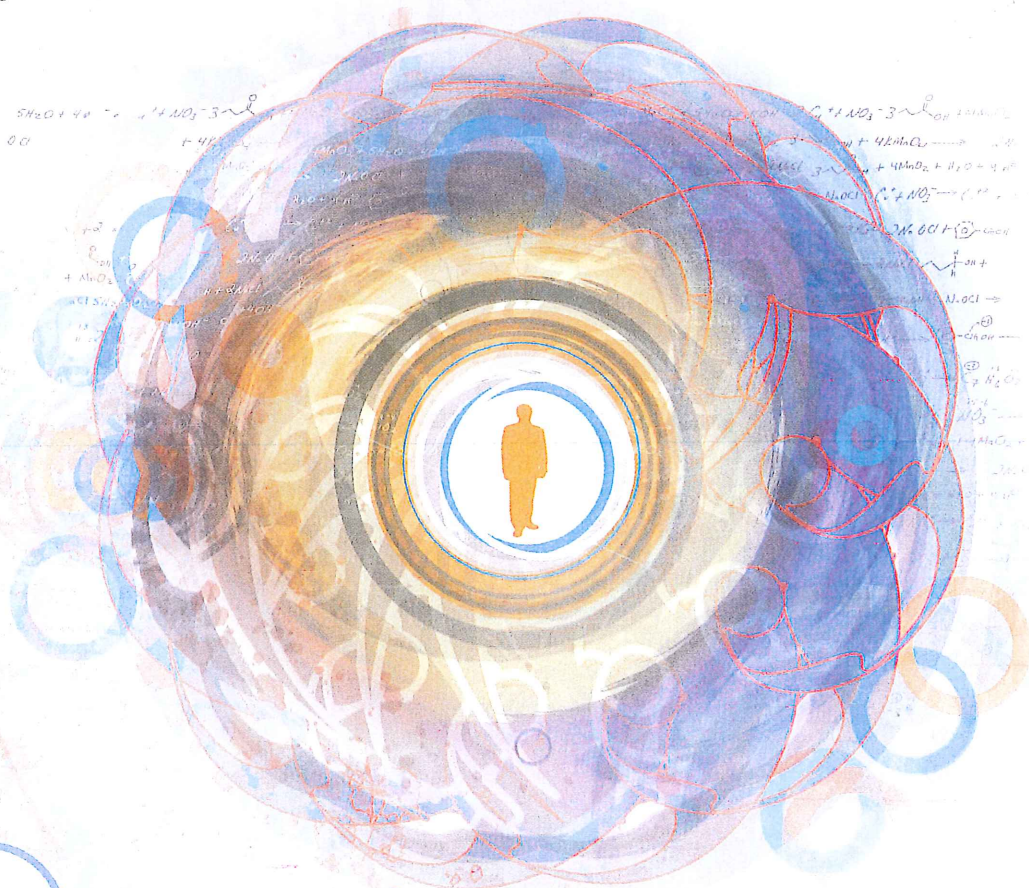
O Seamlessness

WE BEGIN OUR APPROACH to these powers of the universe with the little-understood idea of *seamlessness*. This is just my word for the Ground or Source of all Being—what classical Greek philosophy called the *apeiron*, sometimes translated as the realm of pure potentiality. Some scientists speculate that this primordial Ground might even correspond to what's known in elementary particle physics as the “vacuum” or the “quantum vacuum.”

The amazing notion of a quantum vacuum was first hypothesized in the 1920s and experimentally verified in the 1940s. We now know that pervading the entire universe is a realm that gives birth to an incessant stream of particles and anti-particles. These elementary quanta spontaneously burst forth into existence and then just as quickly annihilate

one another as they disappear back into seamlessness. Every verbal description of this realm is going to be adequate in some ways and inadequate in others. I used to call it “nothing-ness” as a way of indicating that this is not a realm of objects. But “seamlessness” carries the additional meaning of a divisionless domain replete with subtle connections.

In any event, even though our understanding of this domain is elementary in the extreme, we now know that the universe is more than just a place filled with things. Rather, the separate and distinct beings in the universe all have a common origin. This origin remains involved with the ongoing existence and functioning of each thing. Each being in the universe is grounded in a dynamic realm of pure generativity.



1 Centration


THE FIRST COSMOLOGICAL POWER is *centration*. Centration is the universe as a whole centering upon itself in order to give birth to a new being, a new person, a new animal, a new molecule.

Think about your own existence. You came forth from your mother and father.

Your mother and father came forth from your four grandparents, and that genetic information is compressed into molecular form in each of your cells. If you go back further and further, back to the beginnings of the vertebrate world, you realize that your lungs are formed because of the lives of particular fish hundreds of millions of years ago. That process for building lungs has been remembered all of this time and is now present in you. So too is the way in which we digest food, which first emerged over two

billion years ago; that same process, using the same molecules, is at work in us today. We have billions of years of the universe present in us, in our bodies.

But it's not just the knowledge or information that is in us. It's also the energy, the power to act. We have energy coursing through us from our last meal. This energy is from the sun. The sun has poured out its energy, which has been absorbed by the earth and transformed into food. So the sun's energy is coursing through us, but the sun gets its energy from the hydrogen atoms, which got their energy from the birth of the universe. The energy from the birth of the universe is coursing through us. In that sense, the universe gathers all of itself together and gives birth to each new being. That's the power of centration.



2 Allurement

THE SECOND POWER IS THAT OF *ALLUREMENT*. It's the way in which the whole universe holds itself together. At the level of the galaxies, we call this the gravitational interaction. Gravity is what keeps the galaxies in place; it's what draws the stars together. At the level of molecules,

it has a different name: it's called the electromagnetic interaction. The atoms and molecules in our body are being held together moment by moment by the attractive force of electromagnetism. The word *allurement* points to all of these various forms of attraction.



3

Emergence

THE THIRD POWER is *emergence*. We've discovered that the universe is not a place; it's a *story*, a story of an irreversible sequence of emergent events. For a long time, we thought the universe was an established realm that had its major creativity happening only at the beginning of time. We now understand that the universe is an *ongoing*

creative event. Stars came forth, galaxies came forth, planets have emerged, life burst into existence. This power of emergence could also be called ongoing creativity. In some ways, it's the greatest discovery in the history of the human sciences — that the universe as a whole, and each being within it, is permeated with the power of emergence.

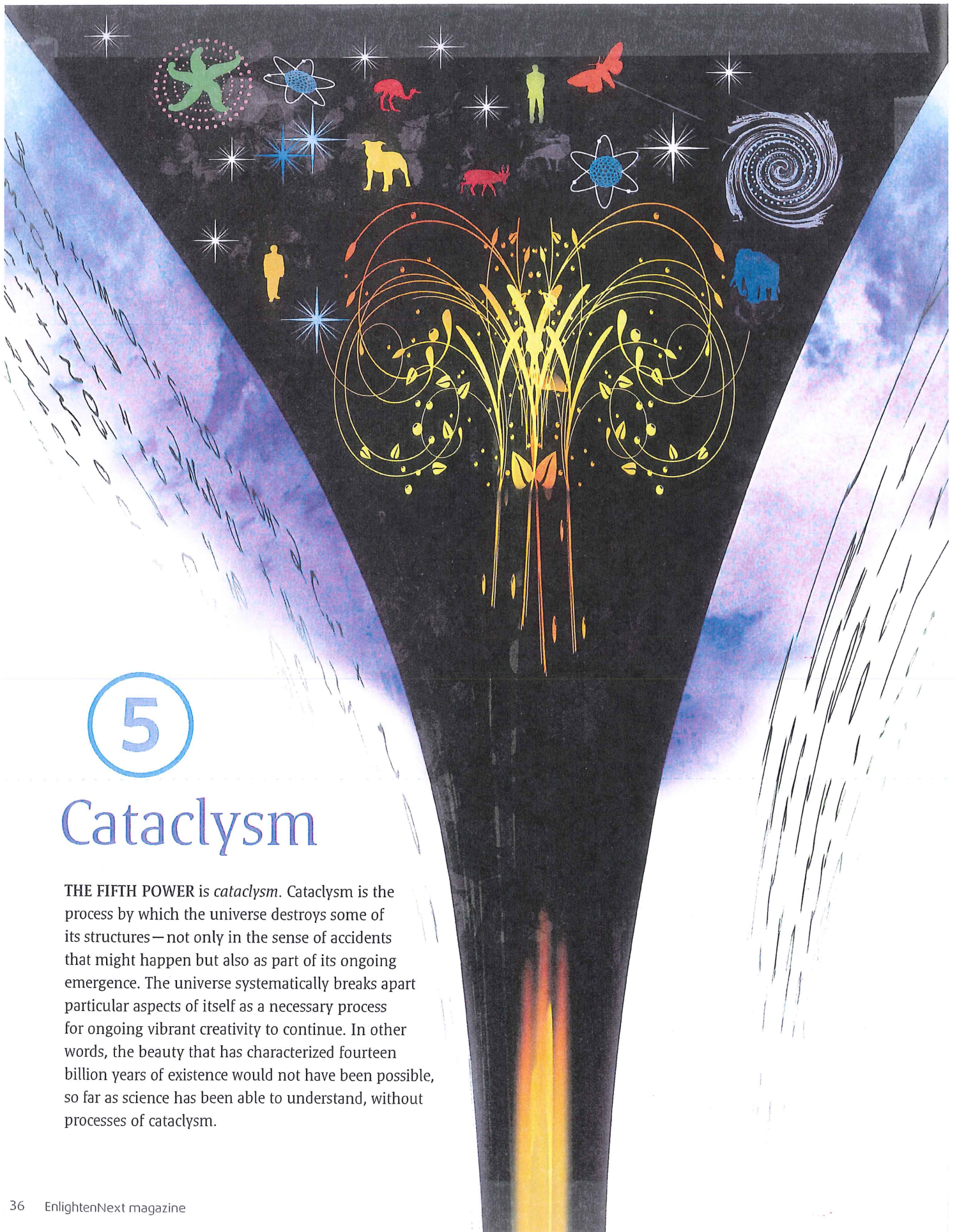


4

Homeostasis

THE FOURTH POWER is that of *homeostasis*. Homeostasis is the way in which the great achievements of the universe are maintained. The term comes from the science of physiology and originally referred to the way in which a mammalian body maintains its structures. We are using it here more generally to describe how the universe maintains its great achievements. They don't just come and go. The universe values its finest moments of magnificence and holds them together.

The oyster shell is one such achievement, which has held together for generations and generations. It's something that has worked beautifully. And the interactions taking place on the planet as a whole have enabled all of this beauty to continue to come forth. The homeostasis of Earth as a dynamic integrated system holds together its communities, including the atmosphere and the biosphere and the geosphere.



5

Cataclysm

THE FIFTH POWER is *cataclysm*. Cataclysm is the process by which the universe destroys some of its structures— not only in the sense of accidents that might happen but also as part of its ongoing emergence. The universe systematically breaks apart particular aspects of itself as a necessary process for ongoing vibrant creativity to continue. In other words, the beauty that has characterized fourteen billion years of existence would not have been possible, so far as science has been able to understand, without processes of cataclysm.

6

Synergy

THE SIXTH POWER is *synergy*. A synergistic relationship is one that gives birth to causal factors in the universe that would not otherwise exist. One of the most surprising examples of this pertains to elementary particles such as neutrons and protons. For instance, if a neutron is on its own, it will disintegrate after only a few minutes. But if the same neutron is brought into relationship with

one or more protons, it can easily exist for billions of years. That's one way synergy operates in quantum physics. In biology, synergy can be thought of as collaborative association in order to arrive at strategies that are ever more successful in the great drama of life. Fundamentally, synergy shows the ontological power of relationship.





7 Transmutation

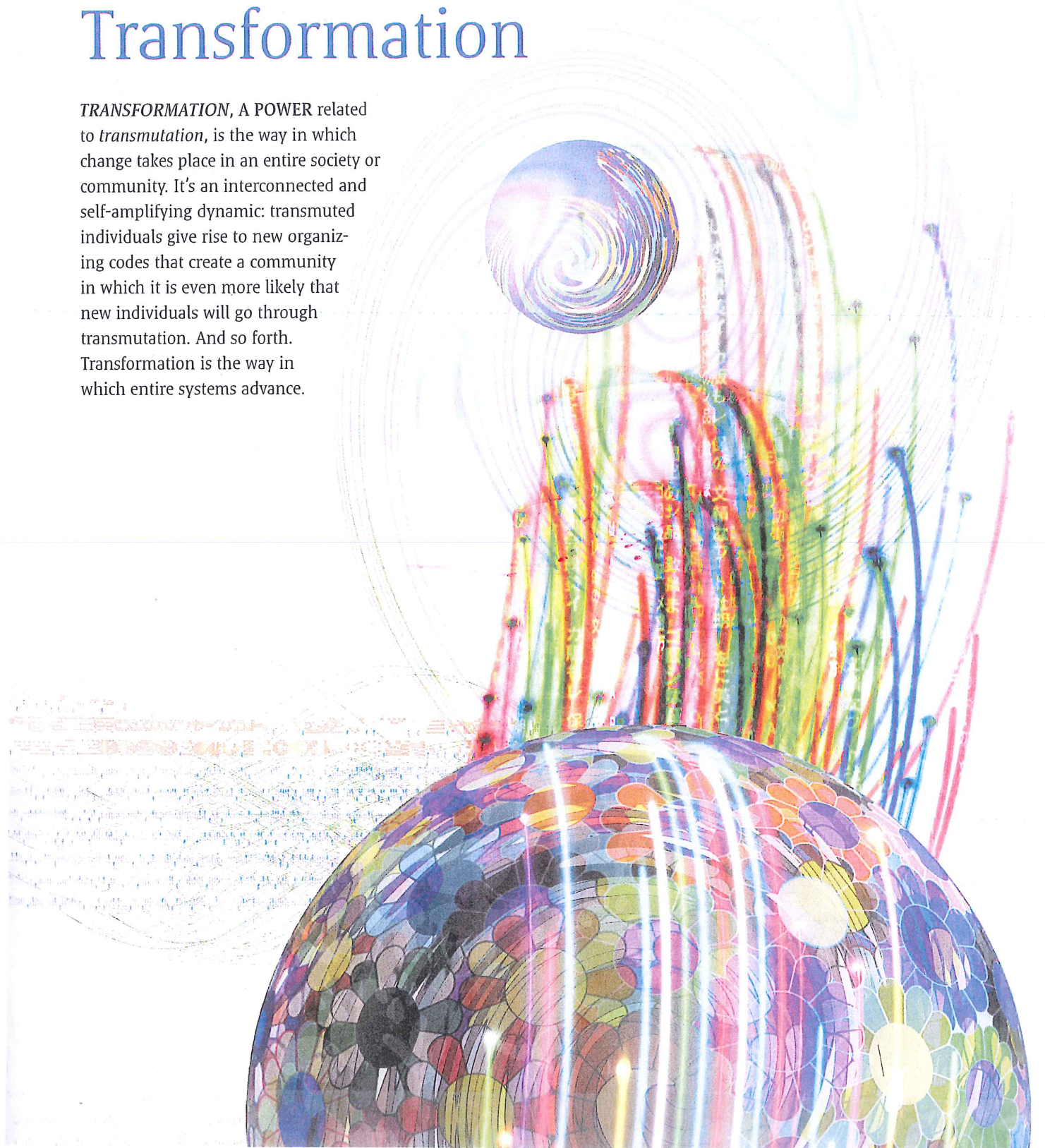
NUMBER SEVEN is the power of *transmutation*. This is the way in which the universe sometimes insists that something new come forth. The universe never seems completely satisfied. Why didn't it just settle down and relax once it had hydrogen and helium atoms? When Earth finally emerged and brought forth bacteria, why didn't the universe just call it a day? Isn't it enough that tiny pieces of Earth jump with life?

Apparently not. Our universe is a self-transcending community of beings, and transcendence is often a necessity. That is, the universe often arrives at a fork in the road with a terrible option: either transmute into a new form or evaporate from the story.

8

Transformation

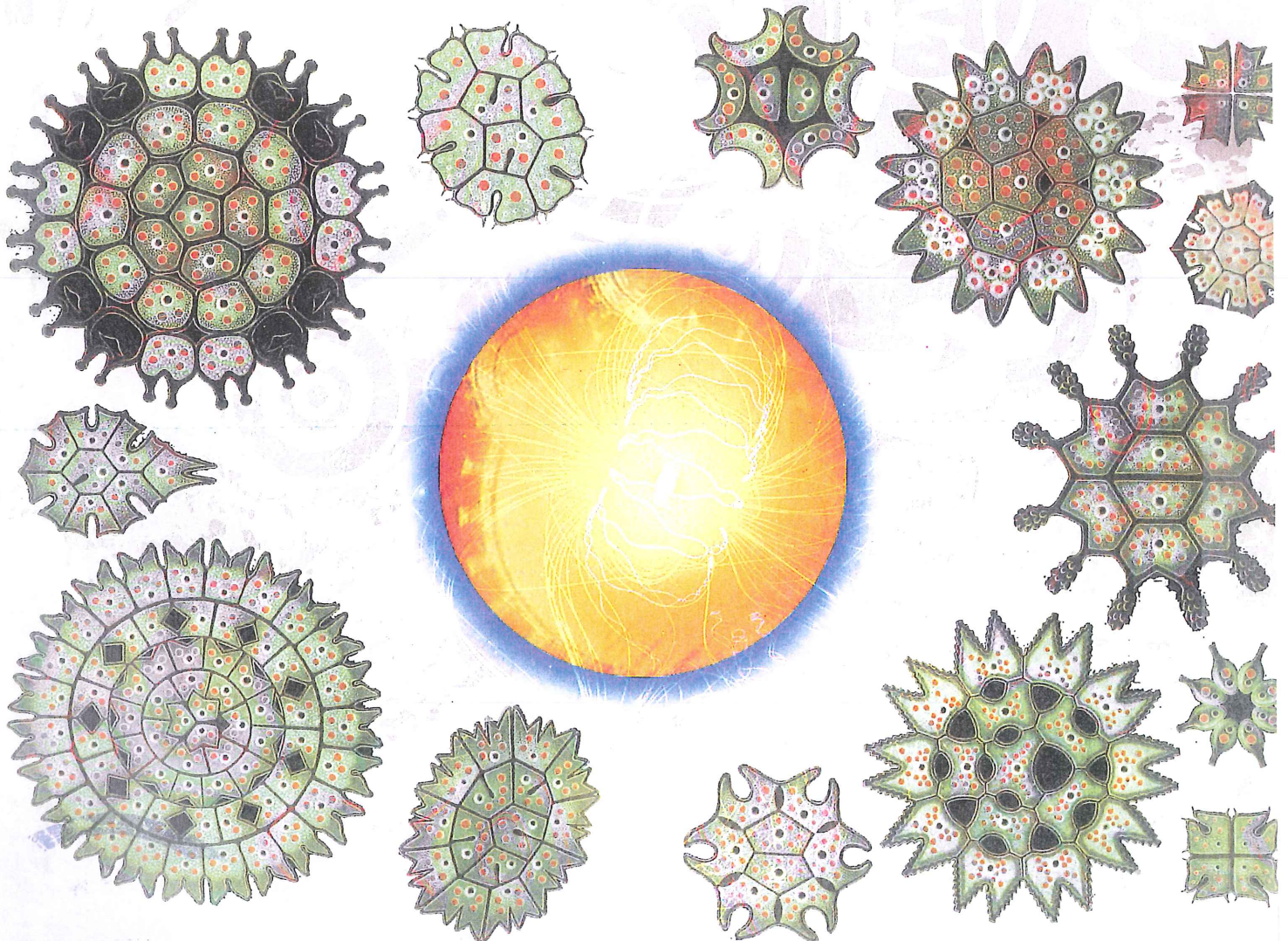
TRANSFORMATION, A POWER related to *transmutation*, is the way in which change takes place in an entire society or community. It's an interconnected and self-amplifying dynamic: transmuted individuals give rise to new organizing codes that create a community in which it is even more likely that new individuals will go through transmutation. And so forth. Transformation is the way in which entire systems advance.



9 Interrelatedness

NUMBER NINE IS THE POWER of *inter-relatedness*—the power of integrity and connectivity. It could even be called “wholeness.” It is the way in which each being in the universe depends in various ways upon other beings in the universe.

Our own existence, for example, depends upon tiny organisms in the Pacific Ocean as well as the activity of protons in the sun. Seen from the outside, this power is interconnectivity; seen from the inside, this power is care or compassion.



10 Radiance

THE TENTH AND LAST cosmological power is *radiance*. Radiance is the power referred to most directly by the second law of thermodynamics. In simplest terms, this law explains that any being with energy will disperse that energy. To radiate is the law of the universe. This is true of everything we examine. Even the coldest group of the finest hydrogen atoms in the

darkest night of intergalactic space are happily giving birth to, and releasing, photons of light instant after instant.

In my view, the power of radiance is an expression of the mysterious way in which the universe cannot contain the magnificence it houses. Instead, it is compelled to express itself in ten million different ways.

