The Map Is the Territory — Dissolving the Barrier Between Media and Nature

BERNHARD SIEGERT

Photo by Anne Kring

Every culture begins with the introduction of distinctions: human/nonhuman, inside/outside, female/male, sacred/profane, signal/noise, to name a few. These distinctions, including those between matter and form, nature and culture, or referent and sign, are not ontologically or transcendentally given, but are processed by networks of technically embodied operations, which we call media.

Cultural techniques, such as writing, reading, painting, counting or making music, are always older than the concepts—the media—that are generated from them. For instance, the making of images is older than the abstract concept of the image—people sing or make music without knowing anything about tones or musical notation systems, and counting is older than the abstract concept of numbers. However, operations such as counting or writing always presuppose technical objects capable of performing (e.g., an abacus or typewriter)— and to a considerable extent, determining—these technically embodied operations.

For nearly 20 years, my academic labors have been dedicated to methodologically establishing and theoretically expanding the exploration of the field of cultural techniques. Today, driven by an unrelenting and quasi-universal digital transformation, our highly technologized world is compelling us to rewrite the conceptual framework of cultural techniques in ecological terms. My research suggests replacing categorical distinctions like those just mentioned by metastable phases of ontogenetic processes.

Cultural Techniques

The study of cultural techniques is not new; rather, the field is a transdisciplinary methodological paradigm of the humanities and beyond, which sparks new methods, new ways of thinking and new insights within various disciplines. The cultural techniques discipline transcends the confines of literary studies, media theory, architecture, history of science and cultural studies and enters the domains of philosophy and anthropology. Advancing research in this field is highly risky because it replaces the problem of making categorical distinctions with the problem of drawing distinctions in the first place—the problem of discernability.

As other NOMIS researchers can well relate to, the discipline's high level of "transdisciplinarity" requires continuous cross-fertilization of ideas and dialogue across research networks and research ecosystems. The advancement of research on cultural techniques is thus highly influenced by evolving and thriving research networks. This alone has always posed a major challenge but the pandemic has further aggravated the issue. Revitalizing and nourishing research networks thus remains a major challenge to overcome, particularly when advancing new thinking on cultural techniques, which emerge at the intersection of the sciences.

The World Morphs into Media

To rewrite the conceptual framework of cultural techniques in ecological terms, we can look to computation and programming languages—the new cultural techniques of the computer age—which bridge the gap between machines and programmers and, later, users. Computation and coding turn cultural techniques in the old sense into infrastructures that become the fabric of our world.

As cultural techniques transform more and more into chains of operations that transcend the possibilities of human collectives of prediction and control and become more environmental, the barrier between system and environment begins to dissolve. What emerges as object, or as meaning, is therefore irrevocably permeated by technicity from the environment. "The map is not the territory" (i.e., an abstraction of something is not the thing itself) is a classical dogma of logical semantics and of common-sense philosophy. But the complexity embedded in the environment compels us to go beyond what common sense purports to know. The map is the territory—in other words, the map and the territory are temporarily stabilized results of a recursive process by which they differentiate themselves from each other. Media and nature, the symbolic and the real, are not distinguished in any categorical way: Instead they form a type of ecology, which operates beyond the nature/culture divide or the matter/form divide.

Background: Tapestry of the free arts, arithmetic, c. 1520, Musée de Cluny, Paris. The personification of arithmetic demonstrates calculation by Hindu-Arabic numerals and by the use of coins ("calculi").

Terminology

cellular automaton (CA)
a discrete model of computation studied in complexity science, computability theory, mathematics, microstructure modeling, physics and theoretical biology

cultural techniques
elemental practices (e.g., reading, writing, calculating), which precede the concepts that are generated by them; basic operations and differentiations that engender a range of conceptual and ontological entities that constitute culture; emerged in the late 19th century in agricultural engineering

lifeworld
phenomenal world of the individual constituted by the intentional activity of the subject's consciousness (according to Edmund Husserl)

medianature
hybrid entity produced by a recursive coupling of media operation and nature; sometimes called "second nature"

technonature
the idea that knowledges of our worlds are increasingly technologically mediated, produced, enacted and contested and that many modern people are ever-more entangled with things, with technological, cultural, urban and ecological networks, and with diverse hybrid materialities

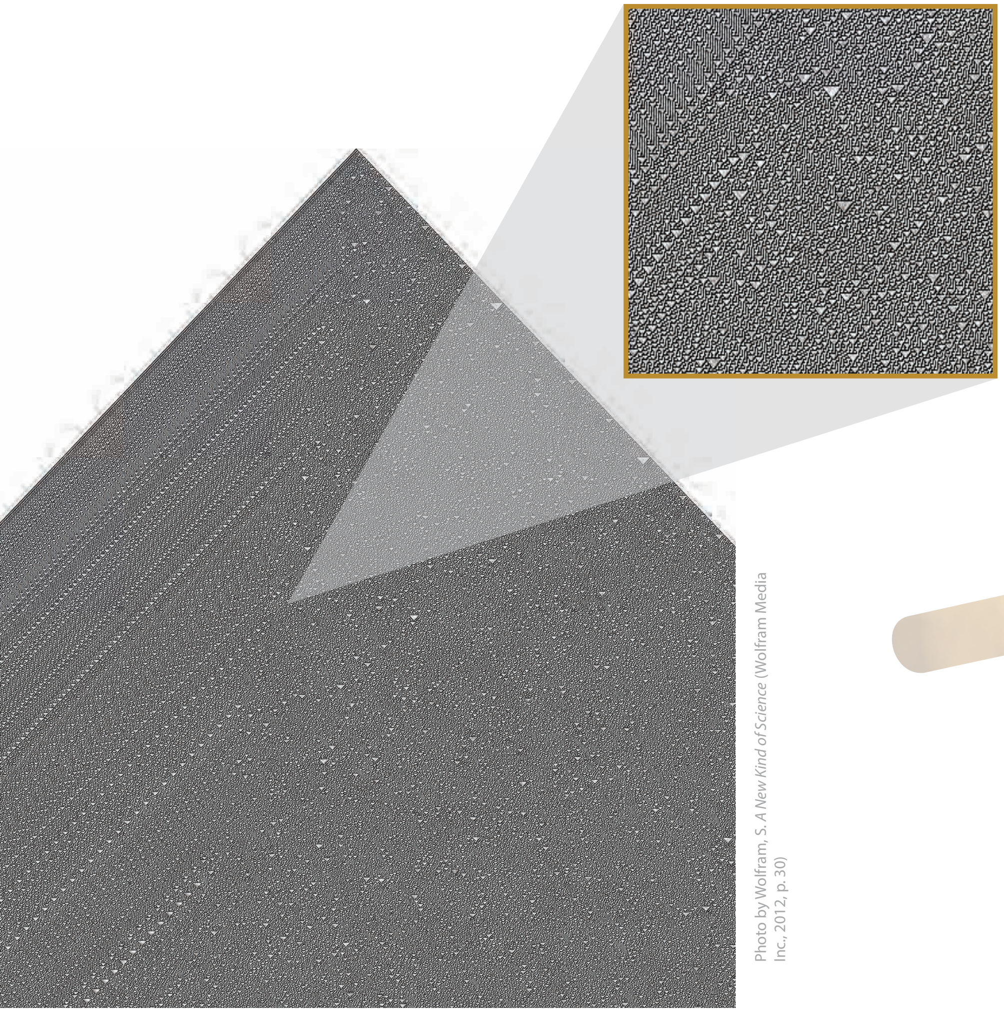

Photo by Wolfram, S. *A New Kind of Science* (Wolfram Media Inc., 2012, p. 30)

> "The complexity embedded in the environment compels us to go beyond what common sense purports to know."

Left (p. 20): Rule 30 cellular automaton, 1,500 steps computed. This highly complex pattern is generated by a CA with a simple rule, starting with a single black square. The picture shows the fundamental phenomenon that even with a simple rule a behavior of great complexity can be produced.

Right: A medianature: The seasnail *Conus textile* Linnaeus is a cellular automaton. The pigmentation pattern appears to have been generated by the same rule as the pattern generated by the cellular automaton represented on the left.

Photo © Billy Watkins / Alamy Stock Photo

Through a deep understanding of the ecologization of cultural techniques in the digital age and the environmentalization of computation into an invisible infrastructure of the world, we hope to challenge established beliefs, which act as barriers to advancing our understanding of cultural techniques and to what is perhaps "the new real."

Universal Computation

Imagine if the whole universe and everything that exists in it would be nothing but a universal Turing machine (UTM). This is what the "strong" or "physical" Church-Turing thesis claims. A Turing machine (TM) is a very simple abstract device, invented by the mathematician Alan Turing in 1936, to answer the question whether there is a general procedure by which one can decide if a given problem is computable or not. A general-purpose computer can be viewed as a technical realization of a UTM that can simulate any individual TM. Classical physics and the UTM do not obey the Church-Turing principle, because the former is continuous and the latter is discrete, or—in Lacanian terms—the real cannot be symbolized. However, as Deutsch showed in 1985, a universal quantum computer would be compatible with the principle.

Another thesis, fundamental to digital physics, is the Zuse-Fredkin thesis, which claims that the universe is a cellular automaton (CA). It can be shown that the Zuse-Fredkin thesis contains the Church-Turing thesis because there are CAs that are doing universal computation. Wolfram suggested in 1983 that the evolution of a certain class of CA not only represents very complex structures found in nature but is in fact responsible for those structures; i.e., that CAs are ontology. Thus, the seasnail *Conus textile* is a CA.

Toward a Theory of Computational Medianatures

If we conceptualize coding as a cultural technique of communicating with computers, we have to interpret the efficiency problem of coding as an ecological problem. Thus, codes appear as media by which cultural techniques (reading, writing, image making, making music, etc.) are adapted to a computational environment, which processes actions that are triggered by some conscious, living being, and produces answers that in turn constitute the Lebenswelt or lifeworld of that consciousness. For the first time in history, and with incalculable consequences for the human being and the social, the environment (Umwelt) and the lifeworld drift apart. Consciousness communicates with its algorithmitized environment only through a doppelgänger, a "data subject" who disposes of capacities of memorization of the immediate past and of an anticipation of the future, unavailable for the cognitive capabilities of the corresponding brain.

Our project, The New Real: Past, Present and Future of Computation and the Ecologization of Cultural Techniques, is not about fundamental physics or the universe; it is about the cultural techniques, which, like computing, not only have changed the notion of how physics is done but organize the infrastructure of the world in which we dwell, in order to make sense of it. Even if the physical interpretation of the Church-Turing thesis is wrong, we observe the rise of technologically embodied algorithmic processes that nevertheless may prove it effectively right—not in the sense that the UTM is ontology but in the sense that the cultural technique of computation is becoming environmental and thereby gives rise to a new elemental space, a new real, in which elemental and technological media become indiscernible.

In agriculture, for instance, where the term "cultural technique" originates, precision farming leads to a digitization of nature as plants are nurtured with an image of their own future. The idea that code is ontology is also key to what synthetic biology and bioengineering do. For several years the fields of synthetic biology have been working toward the short-circuiting between computing and living. Life forms are built in silico as much as they are bred in vitro. The operational chains of life merge with the operational chains of digital machines. Christopher Langton, who coined the term "artificial life," spoke of a "technonature" with regard to a CA called Game of Life—a zero-player game in which one creates an initial configuration and observes how it evolves—which was invented by John Conway in the 1970s. Later it was mathematically proven that Game of Life is equivalent to a TM. And perhaps the future of computation will compel us to radically rethink even the epistemological foundations of (geo)physics—and biology—as cultural techniques dissolve the barrier between media and nature.

A PLANE FLYING ABOVE RAIN-BEARING CLOUDS CAN CAUSE SUCH CLOUDS TO LOOSEN THEIR BURDEN OF PRECIPITATION BY SCATTERING DRY ICE THROUGH THEM. THEIR MOISTURE THEN BURSTS INTO SNOW, FALLING INTO WARMER LEVELS AS RAIN

CRUSHED DRY ICE FRAGMENTS

THICK CUMULUS CLOUDS AT RIGHT TEMPERATURE

RAIN FROM MELTED SNOWFLAKES

We CAN Control the Weather!

The electronic computer makes it possible, says Dr. Zworykin, scientist.

BY WILLIAM WINTER, based on an interview with DR. VLADIMIR K. ZWORYKIN, Vice President and Technical Consultant, RCA Laboratories

Dr. V. K. Zworykin.

WHEN Mark Twain made his famous quip that everyone talked about the weather but that no one ever did anything about it, he had no way of knowing that the science of electronics, even then in its infancy, not only would promise a revolution in forecasting but would show the way to actually control the elements.

Yes, thanks to electronics we soon will be able to predict in a few minutes the weather for several days ahead. Even more important, man may be able to prevent the development of hurricanes and other violent storms, or divert them, prevent killing frosts, eliminate local fogs, and even cause rain to fall in regions of drought. The benefits to aviation and agriculture alone would be tremendous, to say nothing of the direct savings in lives and property.

Many earlier attempts at controlling the weather will spring to mind. By dropping "ice seeds" or electrified sand from airplanes clouds have been forced to give up their moisture as rain. The Swiss have dispelled threatening hailstorms by setting off explosives. Other smaller but, perhaps, more familiar methods of weather control may be

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Mechanix Illustrated

Photo by *Mechanix Illustrated*, January 1948. Public domain

Computer pioneer John von Neumann and Vladimir Zworykin developed the idea, based on the principle of cellular automatons, that the atmosphere was an analog computer, which could be translated into digital electronic computers.

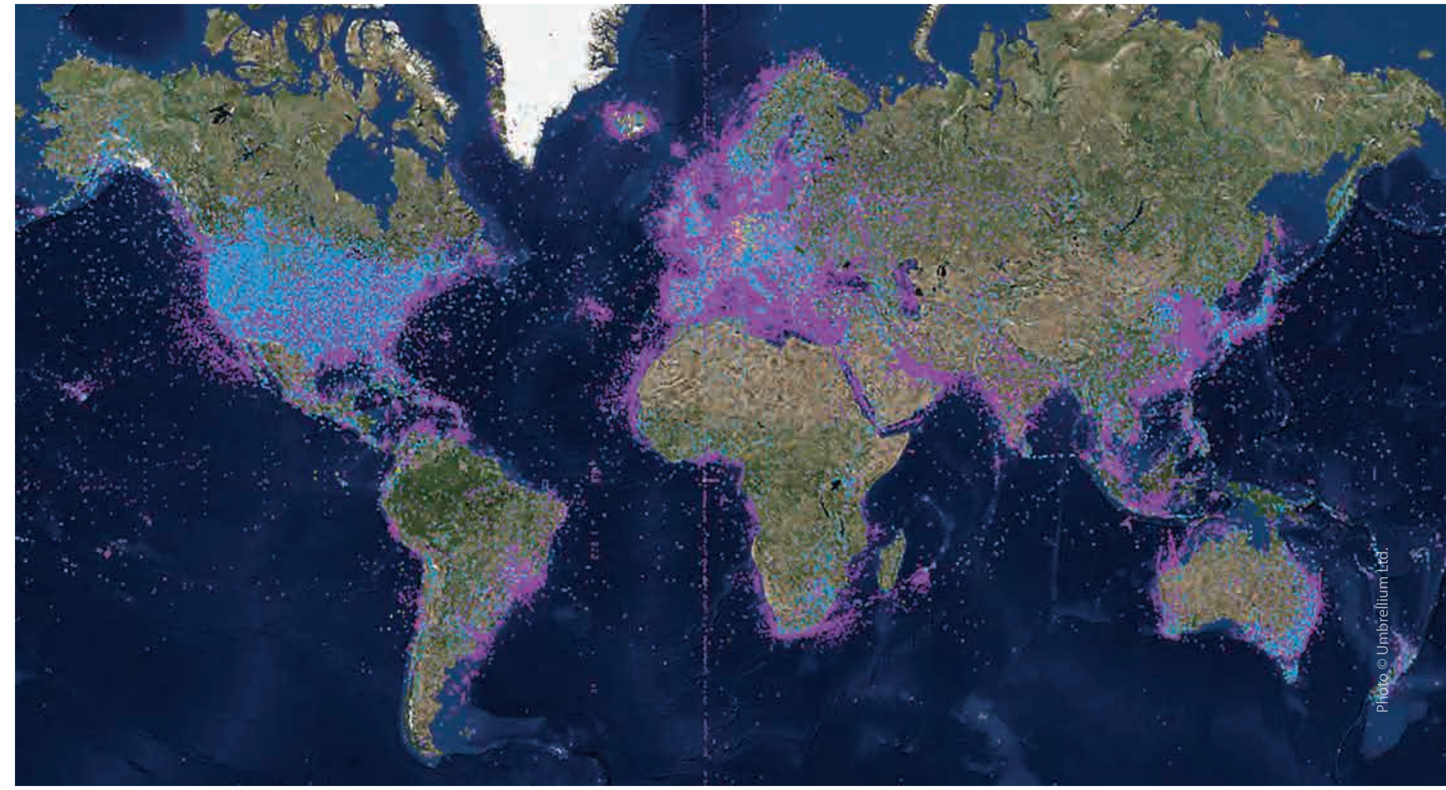
The cultural technique of computation also allows scientists to model Earth as a dynamical integration of various systems interlocked by feedback loops. Climate is perhaps the most prominent example for these technonatures or "medianatures" (Parikka). Already as early as 1946, mathematician and computer pioneer John von Neumann, engineer Vladimir Zworykin and meteorologist Jule Charney developed the idea that the atmosphere could be completely translated into digital computers precisely because it is a huge analog computer itself. If the atmosphere was a closed system of differential equations, then it could be regarded as a Turing table for constructing its solution from a known boundary and initial values. Interestingly, the computational model von Neumann used was developed by meteorologist Lewis Fry Richardson in 1922, which today is regarded as a precursor of the idea of cellular automata.

Ontologically, climate does not exist independently from computational models. This does not mean that climate change is not real. It does mean that we have to give a new meaning to what is real. The new real is no longer what is objectively given, but it is also not just epistemically or socially constructed. It is as real as the rest of the phenomenal world. Therefore we need to find ways to overcome the barrier between realism and constructivism in order to arrive at a new notion of phenomenality.

Toward a Geophysics of Information, Sensing and Communication Technologies

Phenomenologists say that what is relevant for us as perceiving and acting creatures, is the earth on which we walk and the soil in which we plant, not the molecules and the microbes discovered by scientists. In a physicalist description, the ground does not exist, and there are only packed molecules of carbon, nitrogen, silicon and so on. The environment is not the same as the physical world. But what if the way we walk and the mode in which we plant is determined by recollections and anticipations processed by an infrastructure of planetary dimensions? Against this backdrop, the research of cultural techniques will need to transform into a geophysics of information, sensing and communication technologies (which basically do what they do by performing computations).

What looms over the horizon of an algorithmically controlled environment is that our phenomenal world, our lifeworld, which intentionally creates by filtering out certain sensory stimuli from noise, is becoming climate-like. This process, which affects everything that concerns us—as living beings, as social beings, as scientifically and politically acting individuals—is waiting to be discovered.



Thingful.net. Beta phase of platform for the Internet of Things, displaying sensors worldwide. Screenshot.

New insights will come as result of a lesson that we still have to learn from climate change: From the perspective of an ecologized theory of cultural techniques, our lifeworld becomes more and more climate-like in the sense that the space–time structure of the objects with which we interact is no longer exclusively a product of our consciousness. This space–time structure, on the contrary, is increasingly processed by multilayered sensorial and computational infrastructure, which operates beyond consciousness, replacing the barrier between system and environment, the real and the symbolic, matter and form.

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About the Author
https://rb.gy/jpsgf3

Bernhard Siegert is Gerd Bucerius Professor for the History and Theory of Cultural Techniques at Bauhaus University Weimar (Germany). He is leading the project The New Real: Past, Present and Future of Computation and the Ecologization of Cultural Techniques.