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Abstract

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Disciplines

Science and Technology Studies

Technological World-Pictures

Cosmic Things and Cosmograms

*By John Tresch**

ABSTRACT

Martin Heidegger's notion of *things* as gatherings that disclose a world conveys the "thickness" of everyday objects. This essay extends his discussion of *things*—part of a sustained criticism of modern technology—to technological objects as well. As a corrective to his totalizing, even totalitarian, generalizations about "enframing" and "the age of the world-picture," and to a more widespread tendency among critics of modernity to present technology in only the most dystopian, uniform, and claustrophobic terms, this essay explores two species of technical object: cosmic things and cosmograms. The first suggests how an ordinary object may contain an entire cosmos, the second how a cosmos may be treated as just another thing. These notions are proposed as a basis for comparison and connection between "the industrial world" and other modes of ordering the universe.

THE WORLD AND EVERYTHING THAT IS IN THE CASE

Walking through a museum of anthropology, with its dioramas and glass cases full of tools, masks, statues, and weapons that encapsulate entire forms of life, perhaps you've wondered: What would such an exhibit for contemporary U.S. culture look like? No doubt it would have to include symbols and objects to evoke our contested plurality of religious, political, and scientific systems. But a prominent place would also go to technological objects: computers, cell phones, and pills, scale-model factories, airplanes, and freeways, with nuclear bombs looming against the blue painted sky. Though the matte plastic and gleaming titanium of these objects would contrast with the wood, shells, feathers, and bark in their neighboring exhibits, these are the things—like Mayan calendars, Songye *nkishi* statues, Kwakiutl canoes and totem poles—that define our cosmology, our relations with nature and with each other.

A cosmology is more than a system of classification, an origin myth, or a theory of the relationships among what there is in the universe; it also involves affective and aesthetic dimensions and the sense of coherence of a group's characteristic words, practices, and

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objects. Often, however, when modern technology is linked to a “cosmology” or “world-view,” we are offered a much thinner picture than that suggested by anthropology’s presentations of the ways humans have organized nature and society—a “mechanization of the world picture” simplifying all experience to utilitarian building blocks of masses and forces, functionalist means and ends.¹ A fear that “positivist” reduction and instrumentalization might come to dominate the entirety of human life runs throughout critical writings on technology. In this tradition, especially as it has reckoned with the technocratic destruction wrought by twentieth-century wars, machines are frequently identified with the brutally abstract quest for efficiency and exploitation.²

The later works of Martin Heidegger took this tendency to an extreme. Even the neo-Kantian language of “world-picture” or “worldview,” he argued, brings with it the aggression implied by the technological relationship to nature: “The fundamental event of the modern age is the conquest of the world as picture.” With the appearance of a “subject” to whom all of nature must be represented, the road is cleared for an “assault” by man, taken as the “lord of the earth”: “In the planetary imperialism of technologically organized man, the subjectivism of man attains its acme, from which point it will descend to the level of organized uniformity and there firmly establish itself. This uniformity becomes the surest instrument of total, i.e. technological, rule over the earth.”³ Heidegger’s late works paint all modern technology and science with this broad and scary brush. As many have noted, it is as though his disappointment with the Nazi regime, which he notoriously supported in the 1930s, mutated after World War II into antipathy for industrial society as a whole. Heidegger’s readers have had an indirect impact on science and technology studies—perhaps chief among them Michel Foucault, who turned many of his fundamental insights to unexpected ends; long a central figure in philosophy of technology, Heidegger is currently undergoing a minor, grudging revival.⁴ Though I am neither a specialist nor a

¹ E. J. Dijksterhuis, *The Mechanization of the World-Picture* (Oxford: Oxford Univ. Press, 1961), itself shows the complexity embedded in the notion of the “mechanical.”

² See Thomas Hughes, *Human-Built World: How to Think about Technology and Culture* (Chicago: Univ. Chicago Press, 2004), for the past two centuries of thinking about technology. Among the many exceptions to the “nuts and bolts” or “clockwork universe” treatment of technology and cosmology see Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal* (Oxford: Oxford Univ. Press, 2000); David Noble, *The Religion of Technology: The Divinity of Man and the Spirit of Invention* (New York: Penguin, 1999); and sections on “cosmology and technology” in D. S. L. Cardwell, *Turning Points in Western Technology: A Study of Technology, Science, and History* (New York: Science History Publications, 1972), esp. pp. 127–163. See also anthropologically oriented work in science and technology studies, including that of Hugh Gusterson, Donna Haraway, Stefan Helmreich, Bruno Latour, Paul Rabinow, and Sharon Traweek.

³ Martin Heidegger, “The Age of the World Picture,” in Heidegger, *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York: Harper, 1977), pp. 115–154, on pp. 134, 152.

⁴ Heidegger’s obstinately difficult style and the indelible stain of his support of Nazism make any reference to his works ambivalent. Yet for those who have found useful ideas in Foucault, Giorgio Agamben, Hannah Arendt, Jacques Derrida, Pierre Bourdieu, or many others, a direct confrontation with this source can be rewarding. On his centrality in philosophy of technology see Don Ihde, “Has the Philosophy of Technology Arrived? A State-of-the-Art Review,” *Philosophy of Science*, 2004, 71:117–131. For engagement with Heidegger in STS and related fields see Ihde, *Technology and the Lifeworld* (Bloomington: Indiana Univ. Press, 1990); and Joseph Rouse, *Knowledge and Power: Toward a Political Philosophy of Science* (Ithaca, N.Y.: Cornell Univ. Press, 1987). See also phenomenologically inspired ethnomethodological studies of science (e.g., the work of Michael Lynch) and, more recently, Lorraine Daston, “Speechless,” in *Things That Talk: Object Lessons from Art and Science*, ed. Daston (New York: Zone, 2004), pp. 9–26, on p. 16; Joseph Leo Koerner, “Bosch’s Equipment,” *ibid.*, pp. 27–65; and Bruno Latour and Peter Weibel, eds., *Making Things Public: Atmospheres of Democracy* (Cambridge, Mass.: MIT Press, 2005), esp. the essays by Graham Harman and Richard Rorty (pp. 260–275). Heidegger’s works have become a point of reference in postcolonial studies as well. See Timothy Mitchell, *Colonising Egypt* (New York: Cambridge Univ. Press, 1988); and Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Difference* (Princeton, N.J.: Princeton Univ. Press, 2000).

devotee of Heidegger's works, the theme of this Focus section invites a reconsideration of his arguments about technology and, most notably, "things."

Heidegger's philosophy is of interest now for another reason. While it arises from the same post-Kantian tradition that begat cultural anthropology, it suggests a response to criticisms brought against the anthropological concept of "culture" since it presents a *world* not as primarily a self-enclosed, idealized system of symbols, theories, or beliefs but, rather, as an interconnected web of practices and objects that are public and shared but cannot be fully articulated or rationalized. This aspect of his work has been aligned with the late Wittgenstein's "form of life" and his arguments against the "picture theory" of language. But even if we leave aside the existential echoes set off by *Being and Time*, Heidegger's works evoke imaginative, affective, and holistic dimensions of objects that most followers of Wittgenstein pass over in silence.⁵

As Heidegger's polemics about "the age of the world-picture" indicate, however, this holism at times brought with it totalizing—even totalitarian—generalities. As correctives to the tendency to present modern technology in only the most dystopian, uniform, and claustrophobic terms, this essay will discuss two species of technical object: cosmic things and cosmograms. The first suggests how an ordinary object may contain an entire cosmos, the second how a cosmos may be treated as just another thing. In the spirit of an "essay," these notions are proposed as a plane of comparison and connection between "the industrial world" and other modes of ordering the universe.

EQUIPMENT, WORLD, THINGS

Heidegger's works are dense, wide ranging, and in many ways forbidding. The following discussion, restricted to a handful of concepts in his works—equipment, world, artworks, and things—simply points to certain insights and oversights relevant to our question about the relationship between technological objects and cosmology.

The first half of *Being and Time* concentrated on the tacit understandings embodied in habitual activity and the unspoken, unexamined webs of meaning that precede "theoretical" or "objective" knowledge; these arguments in many ways anticipate current approaches in science and technology studies. More fundamentally, its "existential analytic of *Dasein*" rejected traditional philosophy's assumption that the basic relationship to the world is that of a subject who "represents" objects to itself in concepts, propositions, or beliefs.⁶ Instead

⁵ One exception is Stanley Cavell, whose role as sacred stranger to analytical philosophy may well "prove the rule." On Wittgenstein vs. Heidegger see Richard Rorty, "Wittgenstein, Heidegger, and the Reification of Language," in *The Cambridge Companion to Heidegger*, ed. Charles Guignon (Cambridge: Cambridge Univ. Press, 1993), pp. 337–357. In this light, Clifford Geertz's anthropology may appear as an attempt to reconcile positivism and phenomenology: in an essay whose title comes from the Wittgensteinian philosopher Gilbert Ryle, Geertz describes anthropology's fascination with the exotic in Heideggerian language, as "a device for displacing the dulling sense of familiarity with which the mysteriousness of our own ability to relate perceptively to one another is concealed from us," Clifford Geertz, "Thick Description: Toward an Interpretive Theory of Culture," in *The Interpretation of Cultures* (New York: Basic, 1973), pp. 3–30, on p. 14.

⁶ See, e.g., Ken Alder, "Making Things the Same: Representation, Tolerance, and the End of the Ancien Régime in France," *Social Studies of Science*, 1998, 28:499–545, which shows how an "objective" standard of tolerance in manufacturing machine parts, applicable in variable settings, emerged out of a conflict (or "break-down") between the habitual practices of artisans and the demands of representatives of the state in revolutionary France. For further resemblances see Heidegger's remarks on the "existential interpretation of science": Martin Heidegger, *Being and Time*, trans. Joan Stambaugh (Albany: State Univ. New York Press, 1996), p. 328; on the "existential analytic of *Dasein*" see *ibid.*, Part I, Division I.

of starting with a perceiving, synthesizing, or interpreting subject, Heidegger began with *Dasein* (“being there”): immersion in habitual practices and interactions that are “understood” without any need for recourse to explicit formulation, deliberate reflection, or conscious interpretation. These practices are the background for our explicit thematization of any object or, for that matter, any “subject.” “Being-in-the-world”—this tacit background of equipment, references, places, and goals—is the way in which *being* is disclosed for *Dasein*.

This background is ordinarily “transparent” to our uses. As in *Being and Time*’s famous discussion of equipment (*Zeug*), the hammer you pick up is simply an available, ready-to-hand (*zuhanden*) means to an end, such as hanging a picture. But when the hammer is unavailable, broken, or too heavy for the job, its specific characteristics are suddenly and obnoxiously manifest: the tool becomes *vorhanden*—“occurrent” or “present-at-hand” or “objectively present.”⁷ Such breakdowns make possible the “theoretical attitude” that considers objects apart from their ordinary contexts and uses; this is the starting point of scientific knowledge.⁸

At the same time, broken equipment makes us aware of the system of references of which it is a part: the “world,” or the context of significance and goals that “is ‘there’ before anyone has observed or ascertained it,” becomes manifest. Heidegger’s later works argue that the elusive “clearing” that opens up a world is different in different epochs.⁹ “The Origin of the Work of Art” registers this shift toward historicity with a discussion of Van Gogh’s painting of an old pair of boots and the way it discloses the world of the peasant: “A pair of peasant shoes and nothing more. And yet—From the dark opening of the worn insides of the shoes the toilsome tread of the worker stares forth. In the stiffly rugged heaviness of the shoes there is the accumulated tenacity of her slow trudge through the far-spreading and ever-uniform furrows of the field swept by a raw wind.” The painting’s frame functions in a way analogous to equipment breakdown. It sets aside a space in a “focal practice” that allows us to see the individual entity’s specific mode of being. In the case of the shoes, “the equipmentality of equipment first genuinely arrives at its appearance through the work and only in the work.” Furthermore, just as equipment breakdown makes visible a tool’s referential whole, the artwork makes visible the historically specific clearing within which entities are disclosed

⁷ Heidegger, *Being and Time*, pp. 62–67 (the phrases in quotation marks are translators’ versions of “*vorhanden*”). The notion of “transparency” in science and technology studies finds an anticipation here. See Trevor Pinch, *Confronting Nature: The Sociology of Solar Neutrino Detection* (Dordrecht: Reidel, 1986), pp. 212–214; and Simon Schaffer, “Glass Works: Newton’s Prisms and the Uses of Experiment,” in *The Uses of Experiment*, ed. Pinch, David Gooding, and Schaffer (Cambridge: Cambridge Univ. Press, 1989), pp. 67–104, on p. 70. Graham Harman’s *Tool-Being: Heidegger and the Metaphysics of Objects* (Chicago: Open Court, 2002) highlights Heidegger’s repetition of the *zuhanden/vorhanden* distinction.

⁸ Hubert Dreyfus takes Heidegger’s discussions of the “de-worlding” of theoretical knowledge as arguing that in physical science “there seems to be one right answer as far as physical causality is concerned”: Hubert Dreyfus, *Being-in-the-World: A Commentary on Heidegger’s Being and Time, Division I* (Cambridge, Mass.: MIT Press, 1991), p. 162. Conversely, Joseph Rouse extends Heidegger’s arguments about *Dasein*’s ungroundedness into a context-dependent “practical hermeneutics” from which the exact sciences are not exempt: Rouse, *Knowledge and Power* (cit. n. 4), pp. 73–80, 171–191.

⁹ Heidegger, *Being and Time* (cit. n. 6), p. 70. Gilles Deleuze notes the Heideggerian undertones of Foucault’s shifting epistemes or “historical a priori” but finds a significant difference in Foucault’s insistence on a gap between the seeable and the sayable—a “language-being” of discursive regularities entwined with, but opposed to, a “light-being” of architectural forms: Gilles Deleuze, *Foucault* (Minneapolis: Univ. Minnesota Press, 1988), esp. pp. 47–69, 108–123.

for a people: in his other example, a Greek temple “opens up a *world* and keeps it abidingly in force.”¹⁰

Curiously, however, this shift toward historical specificity led Heidegger to some of his grossest generalizations.¹¹ According to his later works, our age—as opposed to that of Greece, Rome, or the Middle Ages—is defined by technology. Its characteristic mode of revealing being is *enframing* (*Gestell*), which pushes us toward the world such that everything appears to us merely as “standing-reserve”—a stock of resources for ordering and use. Enframing, “the essence of modern technology . . . which is itself nothing technological,” threatens to block our access to a more primordial encounter with what is, the *poiesis* or poetic revealing that “lets what presences come forth into appearance.” Instead, our aggressive confrontation with nature shows up even in our basic philosophical categories. External objects (*Gegenstanden*) are understood as “standing against” the representing and experiencing subject, a relationship established by Descartes and refined by Kant.¹² In enframing, we grasp *what is* as an internal representation, as a world-picture (*Weltbild*) or worldview (*Weltanschauung*); the relationship between epochs and cultures is now understood as “a confrontation of worldviews.”¹³ Thus the age of technology is “the age of the world-picture,” in that man is now the being that enframes and represents the world to himself for his uses.

A suggestion of what it might mean to meet the world under other conditions than as representation, interpretation, or raw material for exploitation appears in Heidegger’s poetics of “the thing.” In his example, a jug—a *particular* jug—is what it is not because it has four sides and a bottom; a thing is more than a manifold of sensations, a physical object, a chunk of formed matter, or a serviceable tool. Instead, the jug is an *event*, a plentiful void that receives wine as part of a collective rite: “The jug’s jug-character con-

¹⁰ Martin Heidegger, “The Origin of the Work of Art,” in Heidegger, *Poetry, Language, Thought*, trans. Albert Hofstadter (New York: Harper & Row, 1971), pp. 17–87, on p. 36. Terminological note: In this essay I have not sought to avoid an ambiguity between the terms “world” and “cosmos,” which are distinguished by Heidegger: “cosmos” or “nature,” as the entirety of beings, is less primordial than “being-in-the-world” (see Heidegger, *Being and Time*, p. 66; and Heidegger, “Age of the World Picture” [cit. n. 3], p. 129). Yet his concept of “world” is hardly less cosmic than “cosmos”: in *Being and Time*, he specifies several senses of “world” (p. 61) and claims to concentrate on “world” as a delimited region of beings. Dreyfus, however, shows how his usage slips from “world” as “local context” or a single region of beings to a “single overarching totality”: Hubert Dreyfus, “Heidegger’s History of the Being of Equipment,” in *Heidegger: A Critical Reader*, ed. Dreyfus and Harrison Hall (Oxford: Blackwell, 1992), pp. 173–185, on p. 181. Terminological issues are closely linked to architectonic issues: a consistent vocabulary could, for example, help clarify a vertical distinction (or “ontological difference”) between ontically considered beings and “being” and the horizontal distinctions between ontic regions within a single overarching “world” (different sciences, cultural domains, or possibly Foucault’s “discursive formations”) or between several such totalities (what might be called intercultural relations).

¹¹ Jürgen Habermas names this tendency “abstraction via essentialization” in “Work and *Weltanschauung*: The Heidegger Controversy from a German Perspective,” in *Heidegger: A Critical Reader*, ed. Dreyfus and Hall, pp. 186–208, on p. 198.

¹² Martin Heidegger, “The Question Concerning Technology,” in Heidegger, *Question Concerning Technology and Other Essays*, trans. Lovitt (cit. n. 3), pp. 3–36, on pp. 21, 27. On the understanding of external objects see Heidegger, “The Thing,” in Heidegger, *Poetry, Language, Thought*, trans. Hofstadter (cit. n. 10), pp. 163–186, on p. 177; thus Kant’s conception of the “object” as a manifold of sensations or intuitions united by concepts is quite different from the “thing,” as discussed above. For more on Kant’s concept of synthetic judgment see Heidegger, *What Is a Thing?* (Chicago: Regnery, 1967).

¹³ Heidegger, “Question Concerning Technology,” p. 35. According to Heidegger’s neo-Kantian *bête noire* Wilhem Dilthey, a *Weltbild* or world-picture (as in Dijksterhuis), part of lived experience, can with reflection be elaborated into a systematized conception of the world or *Weltanschauung*; in both cases it remains an internal representation. For Heidegger the notion of a Greek or medieval “worldview” is self-contradictory, since in these epochs “subject” and “object” had not yet been recruited as the central players in the modern drama between human consciousness and the external world.

sists in the poured gift of the pouring out.” As suggested by the etymology by which “thing” originally meant “gathering,” the jug, or other humble entity like a bridge, is a focal object for a historical group whose use concentrates their shared modes of relating to each other and all the entities of the world—their entire way of being-in-the-world: “In the gift of the outpouring earth and sky, divinities and mortals dwell *together all at once*.” Uniting this “fourfold” in a concrete instance, the “thing” brings together and discloses a cosmos. The jug is a cosmic thing.¹⁴

We become open to this aspect of things through “meditative” (*besinnlich*) thinking, which Heidegger characterizes as “releasement toward things” or *Gelassenheit*—letting things be. Calculative thinking, on the other hand “never stops, never collects itself”; it is the mode of thought responsible for airplanes, radios, power stations, and atom bombs. For Heidegger, these technical objects, with their speed and destruction of distance, keep *being* at bay; they cannot compare to the traditional, artisanal bridges or jugs he treats as “things.”¹⁵

But such objects are undeniably constitutive elements of contemporary “being-in-the-world”; they contribute to the texture of relevances that make up our “equipmental totality.” Are they not, therefore, the sites in which *our* clearing—the ordinarily overlooked background of relations through which being now discloses itself—becomes visible? Must we deny technological things their own demented onto-poetics?

BUG, SUSPENDED

We never really first perceive a throng of sensations, e.g., tones and noises, in the appearance of things. . . . Rather we hear the three-motored plane, we hear the Mercedes in immediate distinction from the Volkswagen.
—Martin Heidegger, “The Origin of the Work of Art”

Consider the sculpture (see Cover and Figure 1) splayed like a dissected insect across the interior of the Institute of Contemporary Art in Philadelphia in 2002.¹⁶ The artist (and former owner), Damián Ortega of Mexico, named it *Cosmic Thing*. Surely Ortega’s title is ironic: What could be less “cosmic” than the scrapped parts of a dead 1960s Volkswagen Beetle, a cumbersome machine undoubtedly bound for the junkyard were it not for this detour (or *détournement*) into the art museum?

A dismembered jalopy and nothing more. And yet—in the silent sterility of the gallery, the object appears as what it was and is no longer: a reliable tool taken for granted. On

¹⁴ Heidegger, “The Thing” (cit. n. 12), p. 172. See also Martin Heidegger, “Building Dwelling Thinking,” in Heidegger, *Poetry, Language, Thought*, trans. Hofstadter (cit. n. 10), pp. 141–160, on p. 153. For a related discussion of “cosmological interpretations” and “epiphany-effects” in everyday things see Hans Gumbrecht, “Martin Heidegger and His Japanese Interlocutors: About a Limit in Western Metaphysics,” *Diacritics*, 2000, 30:83–101. Latour and Weibel’s *Making Things Public* (cit. n. 4), with its underlying concern for what Isabelle Stengers calls “cosmopolitics,” follows Heidegger’s etymological excursion about the “thing” as “gathering” through related chains of derivations and links “*res*” (Latin “thing” and root of “reality”) to the “public thing,” *res publica*, or “republic,” the pun of their title. See also Bruno Latour, “Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern,” *Critical Inquiry*, 2004, 30:225–248.

¹⁵ Martin Heidegger, *Discourse on Thinking: A Translation of Gelassenheit* (New York: Harper & Row, 1966), p. 47; and Heidegger, “The Thing,” pp. 165–166. On the inconsistency between the neutral presentation of “equipment” in *Being and Time* and Heidegger’s later enmity toward technology see Dreyfus, “Heidegger’s History of the Being of Equipment” (cit. n. 10); and Don Ihde, *Technics and Praxis* (Dordrecht: Reidel, 1979), pp. 103–129.

¹⁶ The epigraph to this section comes from Heidegger, “Origin of the Work of Art” (cit. n. 10), p. 28.

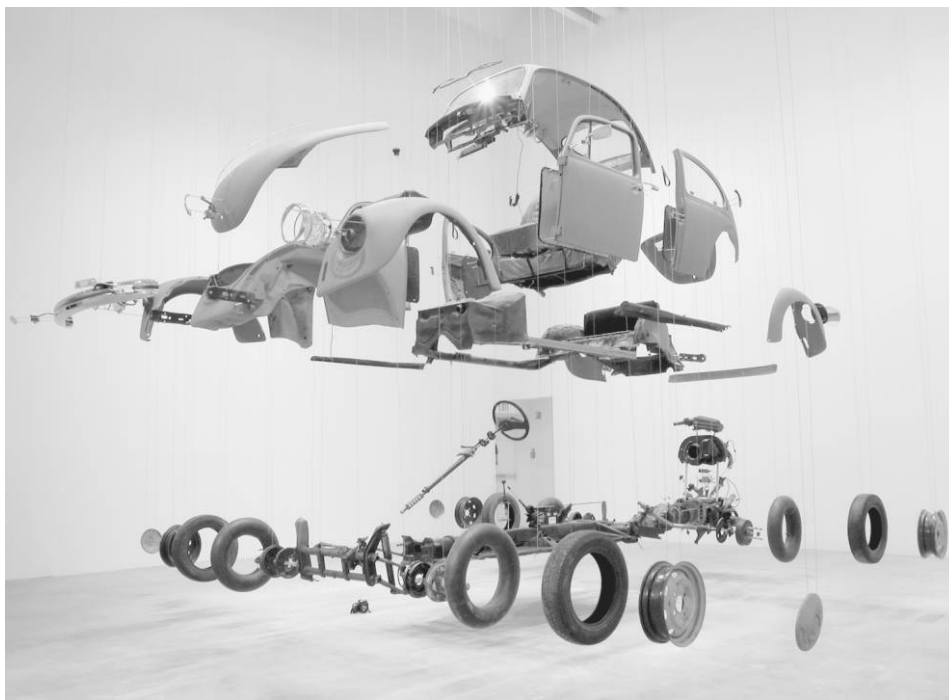


Figure 1. Damian Ortega, *Cosmic Thing*, 4 September–15 December 2002. Installation view, side. Institute of Contemporary Art, University of Pennsylvania. Photo by Aaron Iglar.

the well-worn seats we see coffee spilled in the dilated present of weekday traffic. Dents on the hanging bumpers inscribe the mass somnambulism of a crowded city. The tread of the tires bears the mark of pavement and dirt road, sudden stops and anxious errands, the grip of open possibility in outward flights. Through the glass we see landscapes approached and left behind, ocean and mountain, skyscraper and brick house; on the faded grey paint are traced the relentless action of sun, dust, rain, and air, alongside residue of bird shit and crushed mosquitoes.

Far from a self-standing (or self-moving, *auto-mobile*) object, the de-worlded machine's *distributed* character shines forth: like a scale-one, three-dimensional assembly diagram, the installation freeze-frames the labor, expertise, precision-engineered steel, glass, plastic, and rubber that centripetally fuse in this unique gathering, along with the weighty design choices and material innovations that kept it in motion—from the rear-mounted and air-cooled engine and detachable shell to its once-novel torsion beam suspension. It draws together paved roads, repair shops, gas stations, and oil suppliers—which, as we know too well, depend in their turn on fragile relations among powerful individuals, insatiable corporations, volatile governments.

In this convergence are joined the strife and pacification between poor and wealthy, among workers, profiteers, and consumers. These paths wind back through the histories of nations to the industrial fascism that rocked the Volkswagen's cradle: this car was first named the KDF (*Kraft durch Freude*—"strength through joy"), and Hitler's answer to Ford siphoned aspects of romantic holism to carry the Nazis' mystical unity of will, soil,

and *Volk* to the individual consumer.¹⁷ Salvaged by the British, VW opened a plant in Puebla, Mexico, in 1964—a passage distantly prepared by German involvement in Latin America going back at least to Alexander von Humboldt's voyages and his *Cosmos*. The last “old Beetle”—or *Vocho*, as they are nicknamed in Mexico—left the assembly line in 2003, but the integrated factory still births a thousand “new Beetles” each day for the U.S. market.

With this descent, the Beetle's metamorphosis in the 1960s into an icon of neoromanticism—the vehicle of choice for followers of Kerouac and Cassady reviving Meister Wilhelm's wanderings on the American *Autobahn*—is an uncanny demonstration of the interpretive flexibility of technological objects.¹⁸ In the American art gallery in 2002, the title recalls these countercultural associations, though with modification: in a moment of stalled critical and imaginative drive, the soaring aspirations of 1960s art and politics appear sadly rusted, suitable only for museological curiosity. Ortega's pre-anthropomorphized Beetle now appears in a burlesque ritual as its own commemoration: the remains of a beloved ancestor on its way to becoming a forgotten god.

This pang of disappointed utopianism alerts us that we may have been naive to look for any meaning at all in the irony-scorched halls of the avant-garde. If we see only the mute stolidity of the mass-produced, disconnected parts, the overdetermined threads of significance we traced now unravel; unable to live up to its hyperbolic title, the object is once again just a broken tool, mocking the monumentalizing tendency of the institutions of art. But perhaps it is here, in this evacuation of significance, that we draw nearest to another face of the “cosmic,” not as plenitude, but as void. The spacious object, suspended like a solar system or an atom, offers a flashing glimpse of “automobile” as arbitrary, essenceless assemblage—empty and ultimately insubstantial, like all dependently arising beings. The object now floats within the ripples of Eastern philosophy that have passed through Western conceptual art since at least the 1960s: First there is a *Vocho*, then there is no *Vocho*, then there is.¹⁹

The technological object may be a mere tool. Approached with the proper receptivity, however, a bridge, a subway car, a steam engine, a synthesizer, a washing machine, a gun, a standardized fruit fly, or a genetically modified mouse can reveal the ways in which individual things and the world humans share with them are made present. Like Van Gogh's peasant's shoes, Ortega's preserved and enshrined machine, though a product of mass industry and precise engineering, shelters everyday locomotion as it gathers a cosmos together.

¹⁷ See Walter Nelson, *Small Wonder: The Amazing Story of the Volkswagen Beetle* (Boston: Little, Brown, 1970). Wolfsburg, site of the VW plant, was conceived as the ideal Nazi workers' city.

¹⁸ The VW's trajectory creepily parallels that of Heidegger's texts, which were recuperated by existentialism and deconstruction as potentially critical and liberatory. To put brakes on such recuperation, Meyer Schapiro read “The Origin of the Work of Art” as a hymn to the Third Reich; for discussion see Michael Ann Holly, “Mourning and Method,” *Art Bulletin*, 2002, 84:660–669. Habermas's evaluation of the impact of Heidegger's involvement with Nazism on his philosophy is highly instructive; see Habermas, “Work and *Weltanschauung*” (cit. n. 11). On the intricate and polyvalent relationships among romantic holism, “freedom,” and totalitarianism see Anne Harrington, *Reenchanted Science: Holism in German Culture from Wilhelm II to Hitler* (Princeton, N.J.: Princeton Univ. Press, 1996); note especially the concluding remarks on 1960s holism (pp. 206–212).

¹⁹ See Jacquelyn Baas, *Smile of the Buddha: Eastern Philosophy and Western Art from Monet to Today* (Berkeley: Univ. California Press, 2005). On Heidegger's awkward encounters with Asian philosophy see Gumbrecht's hilarious comments in “Martin Heidegger and His Japanese Interlocutors” (cit. n. 14). In contemporary art, *Cosmic Thing* has been linked to the sculptural mutilation of a Citroën DS (or *déesse*) by Ortega's compatriot Gabriel Orozco; see Kate Bush, “First Take,” *Artforum*, 2003, 41:129.

THINGLY WORLD-PICTURES

At this point the cautious *Isis* reader might worry that our theoretical heap is being driven at an unsafe speed. What assurance do we have that the references traced into and out of this exploded Volkswagen bear more than a passing relation to the artist's intentions or to the exhibit's meaning in its time and place? Further, a car is just a car—or, rather, the car as driven, neglected, or cherished is different from an assembly-line worker's task, a mechanic's headache, a physicist's accelerating mass, or an artist's serious play; only in the artificial suspension of critical reflection does the object appear under all of these aspects at once. Yet however prudently we might follow disciplinary speed limits, even the most jittery passenger will agree that any hermeneutic project is prey to similar doubts: How do we know that the meanings we discover and the contexts we bring to bear in our interpretations of an object, text, or event are those relevant either to the makers or to the range of contemporary users and participants?

Such criticisms particularly haunt cultural anthropology, which for a long time grounded its interpretations in "culture," a concept much vilified of late. Many have argued that the assumption of an abstract system of meanings, theories, or beliefs that underlie and determine local understandings and actions is an artifact of the asymmetrical relationship between the "civilized" anthropologist-outsider and those being studied. Further, "culture" implies a bounded, homogeneous, and unified whole, which fails to account for variations, nuances, and exceptions or the range of attitudes actors may take in relation to public norms and traditions. "Culture," as the explanatory background or context, relies on assumptions that have been shown to be idealist, intentionalist, falsely homogenizing, and ahistorical.²⁰

Rather than offering an escape from the cultural interpreter's hermeneutic circle, I'd like to suggest a modest solution for drawing the circle tighter and making its turns more visible, starting from the fact that people *do* represent the universe as a whole to themselves and to others in objects—in concrete, visible artifacts. Even if we follow Heidegger in rejecting the assumption that all ages and cultures experience the world through internal representations or "worldviews," human groups have always created external depictions of the elements of the cosmos and the connections among them. These are *cosmograms*. These objects have been built in order to make explicit what a "cosmic thing" can be shown to imply.²¹ Examples are many: think of Lucretius's epic of the things of nature; Tibetan mandalas, at once temple blueprints, metaphysical maps, and meditation aids; mosques that unite God with creation beneath their domes without directly representing

²⁰ For a trenchant summation of critiques of "culture" see Lila Abu-Lughod, "Writing against Culture," in *Recapturing Anthropology: Working in the Present*, ed. Richard G. Fox (Santa Fe, N.M.: School of American Research Press, 1991), pp. 137–162. See also George Marcus and James Clifford, eds., *Writing Culture: The Poetics and Politics of Ethnography* (Berkeley: Univ. California Press, 1986); Roy Wagner, *The Invention of Culture* (Chicago: Univ. Chicago Press, 1981); and Pierre Bourdieu, *Outline of a Theory of Practice* (Cambridge: Cambridge Univ. Press, 1977). On postcultural anthropology see Matti Bunzl, "Were We Wrong? Rethinking the Postmodern Paradigm," paper presented in colloquium for the history of the human sciences, Univ. Pennsylvania, May 2006.

²¹ For a variety of takes on the notion of "cosmogram," in interviews with historians of art, cinema, science, and architecture, students of Buckminster Fuller, anthropologists, astronomers, and Biosphere survivors, see Melik Ohanian and Jean-Christophe Royoux, eds., *Cosmograms* (New York: Lukas & Sternberg, 2005); the sections by Peter Sloterdijk, Patricia Falguières, and Jean-Luc Nancy are particularly resonant with this essay's concerns. Geertz points to the concept of cosmogram with his observation in a footnote that "informants frequently, even habitually, make second order interpretations—what have come to be known as 'native models'": Geertz, "Thick Description" (cit. n. 5), p. 15 n 2.

him; cathedrals' pictorial narratives of creation and salvation and the labyrinths that lead the pilgrim into their hidden meaning; Dogon rites that wrap a cube crowned by a cone in a blanket to enact the fusion of heaven and earth; Hindu palaces situating the king precisely amidst people, government, and gods; Newton's *Principia*; Bacon's high-tech reinvention of Solomon's Temple in *New Atlantis*; encyclopedias, maps, and trees of knowledge of all kinds; university ground plans; information architectures and search engines; Joyce's *Ulysses*; Darwin's *Origin*; Charles and Ray Eames's *Powers of Ten*; Philip K. Dick's "How to Build a Universe That Won't Fall Apart Two Days Later"; the space between two steps in Buenos Aires that contains the "secret and conjectured object whose name is common to all men but which no man has looked upon—the unimaginable universe."²²

These unusually "thick" things offer a shortcut in the hermeneutic circle. In a given place and time, multiple cosmograms will be in circulation in shared, public space. We get a sense of an entity's "cosmic location," its place within a culture's choreography of contexts, by triangulating it from the vantage of multiple contemporary cosmograms. This provides a determinate but not definitive interpretation, as the entity will be revealed differently according to the maps on which it is placed. Further, because they are concrete and public, cosmograms are themselves continuously exposed to contestations, additions, deletions, and replacements; a permanently or universally valid presentation of the universe, whether by Borges or by Carnap, belongs to science fiction. Indeed, the recognition of the partiality and fallibility of any cosmogram—the gap between its vision of unity and the refractory entities it assembles—sets this approach apart from representational theories of knowledge, from the idealism of traditional history of ideas or the bounded determinism implied by internalized "worldviews," "cosmologies," or "cultures." Because they present a totality yet remain firmly within the local and the empirical, cosmograms raise the possibility of an open holism. They offer proposals of unification without requiring uniformity. We may study how individuals question or alter different cosmograms and how they select or alternate between the different temporal and referential frames they suggest.²³

A historical approach to our opening question about the relationship between modern technology and the cosmos could begin, for example, with an examination of cosmograms from the period in which new machines were first recognized as profoundly altering everyday life, when the "industrial revolution" was first recognized as such. Along these lines, I have been studying representations of the cosmos from the first half of the nineteenth century, primarily in France, and focusing on the place they give new technologies: steam engines, electromagnetic instruments, daguerreotypes, and other techniques of mass communication. In this time of ceaseless upheaval, a call for a new doctrine to unite society

²² J. L. Borges, "The Aleph," in *Borges: A Reader*, ed. Emir Rodriguez Monegal and Alistair Reid (New York: Dutton, 1981), pp. 154–163. "I saw the teeming sea; I saw daybreak and nightfall; I saw the multitudes of America. . . . I saw in a backyard of Soler Street the same tiles that thirty years before I'd seen in the entrance of a house in Fray Bentos; I saw bunches of grapes, snow, tobacco, lodes of metal, steam," a vista that overwhelms the narrator with "infinite wonder, infinite pity" (p. 161). As the narrator's rival puts it: "One hell of an observatory, eh, Borges?" (p. 162).

²³ Thus cosmograms are entirely amenable to the "ethnography of the particular" that Abu-Lughod advocates as an antidote to the generalizations implied by "culture"; see Abu-Lughod, "Writing against Culture" (cit. n. 20). Despite its generalizing and universalizing claims, any cosmogram has a material location and a specific history and is part of irreducibly local practices and events. For comparisons of the social forms in which cosmograms were constructed and debated in Greece and China see Geoffrey Lloyd and Nathan Sivin, *The Way and the Word: Science and Medicine in Early China and Greece* (New Haven, Conn.: Yale Univ. Press, 2005), esp. pp. 174–187, on the very concept of *cosmos* (first deployed by Heraclitus), and "The Book of Changes as a Map of the Cosmos," pp. 266–269.

was answered in an explosion of representations of the cosmos. Many of these panoramic diagrams, creation narratives, rallying slogans, and crystalline fragments reached their publics as unprecedented technological objects: journals, *feuilletons*, and books mass-produced by steam presses. Other cosmograms took nonverbal forms: Charles Dupin's charts and maps of productive forces; Charles Fourier's phalanstery; the hall built at the Paris Observatory for Arago's *Popular Astronomy*; Humboldt's *Views of Nature*; the colossal woman-temples designed by the Saint-Simonians; or the Religion of Humanity's guiding *imago mundi*, Auguste Comte's Positivist Calendar.

As the late work of Heidegger would lead us to expect, many of these cosmograms of the early industrial age depicted new machines as instruments to frame, modify, and exploit nature, with the earth (or the solar system, for Fourier) as a standing reserve of raw material to supply human needs. Yet where Heidegger often drew on romantic themes to *oppose* modern technology—as in his contrast between Holderlin's poem "The Rhine" and the modern hydroelectric power station on the same river—many of these cosmologists aimed at, or even claimed access to, a prereflective, emotional, aesthetic, and holistic engagement with nature and the ineffable source of being at the same time as they embraced new sciences and technology. They proposed alternative trajectories for modernity, in which technical objects and scientific knowledge were not understood as antithetical to "authentic" human existence—Heidegger's "nearness to being" or "dwelling poetically"; at the start of the industrial age, objective and subjective, mechanical and romantic, realistic and fantastic, were intricately and unexpectedly entwined.

Around 1915, Rilke wrote lines later echoed by Heidegger: "The spirit of the times makes vast storehouses of power, formless as the stretched tension it gathers from everything. Temples it knows no longer."²⁴ The following emerald-like construction, dreamed up in mid-nineteenth-century Paris and incarnated halfway around the globe, illustrates the notion of the cosmogram and offers a counterexample to Rilke and Heidegger's familiar lament.

TECHNOCRACY MEETS NECROCRACY

From his first writings as the polytechnician apprentice to Saint-Simon in the 1820s, Auguste Comte insisted on the necessity of replacing the lost authority of the Church with a new "spiritual power" to end the anarchy of the Revolution. No longer was humanity united by faith in fictional gods and idols; in its final state, humanity would believe only what could be seen and proved. To unify the sciences, to offer a coherent depiction of the world and humanity's place within it, and to guide the progress of industry, science itself would become a religion; philosophers trained in science would be the new priests. Comte's mental and physical collapse in the 1840s, from which he was guided back to health by his "angelic interlocutress," Clothilde de Vaux, showed him that he had neglected the emotions and female contributions to humanity. His new Positive System was a complete way of life, modeled on the Catholic Church; fetishism, the first religion, would be restored, but the love for external objects would be divorced from any mysticism. A century before Heidegger's declaration that "only a god can save us," Comte named and genuflected before a post-theological divinity: Humanity, the Great Being, of which we and all

²⁴ Rainer Maria Rilke, *Duino Elegies* (VII), quoted in Charles Taylor, "Heidegger, Language, and Ecology," in *Heidegger: A Critical Reader*, ed. Dreyfus and Hall (cit. n. 10), pp. 247–269, on p. 269.

those who have lived are a part.²⁵ The *Positivist Catechism* and its “Table of Sociolatriy” spelled out the dogma and rites of the Religion of Humanity, along with its prayers, spiritual exercises, priestly hierarchy, and descriptions of the banners and flags in green (the color of hope) that would adorn its temples. Comte died with these plans unrealized. But in 1895 the positivist word became flesh and stone in Brazil.

The Templo da Humanidade stands in Rio de Janeiro’s battered Gloria neighborhood, on the dusty Rua Benjamin Constant—named not after the Swiss romantic-liberal but after the positivist who wrote the constitution of the Brazilian Republic. The courtyard is overgrown with trees; the stones and rusted fence show their age, but the columns and façade, modeled on Paris’s Pantheon, stand unshaken.²⁶

This church embodies Comte’s system in concrete, glass, marble, and polished wood. Even the courtyard is a sacred/pedagogical space. The doorstep shows a compass with a branch pointing always toward Paris, the homeland of Comte and the Mecca of the new universal religion. The steps recapitulate the ladder of sciences in the *Course in Positive Philosophy* in the order in which they attained positivity, from the “grounding” of Mathematics up to Sociology and, at the landing, Morality, instituted and instilled in the church. At the temple’s apex flies the flag of humanity—a white globe on a green background—flanked by those of Brazil and France. In stark letters across the front runs the unchanging motto: “Love for Principle, Order for Base, Progress for Goal” (see Figure 2).

The spacious interior fills with eerie, aquarium-like light, shining through curtains and reflected off walls in shades of mint and chartreuse, colors from another century. Along the walls, beneath flags of the world’s nations, plaques inscribe the fundamental stages of knowledge and society: Space, Logic, Earth, and each of the sciences, along with Fetishism, Polytheism, Monotheism, and Metaphysics. Painted busts of great contributors to civilization, who also gave their names to the months of the Positivist Calendar, stare out in primary colors from the walls: we pass under the gaze of Moses (“The First Theocracy”) and Homer (“Ancient Epic”), through to Frederick II (“Modern Policy”) and Bichat (“Modern Science”). Underlining the importance of activity and invention in Comte’s system, and its deeply technological orientation, the first head we see on the left is that of Gutenberg, beneath the title “Modern Industry” (see Figure 3).

Like the ornamental stonework on the façade, these statues lend the interior a funereal, sepulchral impression—as if Diderot and d’Alembert had collaborated with Madame Tussaud. Above the exit is inscribed the slogan justifying what we might call Comte’s necrocracy: “The living are necessarily always and increasingly governed by the dead.” According to Comte, we owe all science, art, institutions, and language itself to people who are no longer alive. The temple is both museum and mausoleum, a place to learn and to

²⁵ Auguste Comte, *Catechisme positiviste; ou Sommaire exposition de la religion universelle en treize entretiens entre une femme et un prêtre de l’Humanité*, 3rd ed. (Paris: Larousse, 1890). For recent works on Comte’s philosophy and religion see Juliette Grange, *La philosophie d’Auguste Comte: Science, politique, religion* (Paris: Presses Univ. France, 1996); Annie Petit, ed., *Auguste Comte: Trajectoires positivistes (1798–1998)* (Paris: L’Harmattan, 2003); Bruno Karsenti, *Politique de l’esprit: Auguste Comte et la naissance de la science sociale* (Paris: Hermann, 2006); and, in English, the works of Mary Pickering.

²⁶ A series of angelic interventions made possible a visit to the Temple of Humanity in August 2006. I thank the President of the Positivist Club, Danton Voltaire Pereira de Souza, retired professor of physics at the Ecole Polytechnique of Brazil, for his generous introduction to Brazilian positivism and to the Temple of Humanity, as well as pre-positivist guides and fellow-travelers Arthur Ferreira, Claudia Ferreira Passos, Margarete Vöhringer, Birgit Schneider, Bonnie Evans, and Michael Hagner. Thanks also to Dagmar Schäfer for ideas about variable cosmologies of technology and to Keith Hart, Eduardo Viveiros de Castro, and Laura Desmond for helpful suggestions.



Figure 2. Exterior of the Temple of Humanity, Rio de Janeiro, 2006. Photo by Margarete Vöhringer.

remember together—to commemorate—the founders and the founding principles of our world. Along with these relics of positivist saints, paintings of Comte and Clothilde de Vaux fill the space round the altar: she weeps as the “eternal widow”; she lies on her deathbed as Auguste kneels beside her; as an ethereal presence, she whispers in the ear of the high priest while he writes.

At the center is a podium from which the priests will rally and link the people (*rallier et lier*), the function of religion (and the etymology of the word). Comte’s sociological successor Emile Durkheim revealed in *The Elementary Forms of the Religious Life* that, behind religions’ origin stories and divinities, the real object of worship is society itself and the feelings it produces.²⁷ The Temple of Humanity makes this logic explicit. The *déesse* worshipped here is *La Humanidade*, the title of the portrait behind the pulpit in which a woman with the face of Clothilde floats heavenward in a flowing gown, holding to her bosom an infant, the human race, past, present, and future (see Figure 4).

As a cosmogram, the temple is not just a symbol or a representation, not a reflection or a projection; it is an instrument, a machine for founding, maintaining, and extending a specific natural and social order and the emotions that will support it. Founded by Miguel Lemos, who, like the other positivist leaders, was closely connected to Brazil’s *Ecole Polytechnique*, the temple served as a focal point for a generation of reformers in politics and education who passed through its walls on the way to remaking the Brazilian state.

²⁷ Emile Durkheim, *The Elementary Forms of the Religious Life* (New York: Free Press, 1967).



Figure 3. *Bust of Gutenberg (Industria Moderna).* Photo by Margarete Vöhringer.

Positivists like Teixeira Mendes and Benjamin Constant were a major force in opposing both Church and Empire and in constructing the modern state; they led the opposition to slavery, proclaimed the Republic, drafted the constitution, and led agricultural reform and the development of railroads and industry.

A frayed tube stashed near the altar unrolls to reveal, on nineteenth-century graph paper, the hand-painted green, blue, and yellow draft made by the positivist painter Décio Vilares: the first sketch of the Brazilian flag. Its motto, “Ordem e Progresso,” echoes that on the church’s entrance and spans a blue circle depicting the firmament as seen from Rio on the night the Republic was declared, with each star representing one of Brazil’s states. This is a two-dimensional gathering of earth, sky, mortals, and the divinity of humanity, presented in the communicable format of turn-of-the-century internationalism—and in colors more recently worn by Pelé, Ronaldo, and their millions of admirers.²⁸

In this building, the relationships among humans and all other beings are laid out and

²⁸ See Marie-France Garcia-Parpet, “Les usages de la pensée française dans le Brésil du XIXe siècle: La question raciale, Auguste Comte et Arthur de Gobineau,” in *Auguste Comte et l’idée de science de l’homme*, ed. Michel Bourdeau and François Chazel (Paris: L’Harmattan, 2002), pp. 221–237.



Figure 4. Interior of the Temple of Humanity, Rio de Janeiro, 2006. Photo by Margarete Vöhringer.

reinforced. The temple shelters a clearing in which a people will dwell, preserving its history and projecting its future. It gathers a cosmos, like a Heideggerian *artwork* or *thing*. But within its embrace, within the world it encircles, a space is held open—strangely enough, a sacred space—for the theoretical and calculating sciences, for the works and machines of modern industry and technology.

LETTING TECHNOLOGICAL THINGS BE

It would not be difficult to portray Comte's positivism as the confirmation of Heidegger's most dismal diagnoses of modern science and technology. For Comte, all knowledge is relative to human needs: the sciences frame nature in order to act upon it; and as for "planetary imperialism," the title of the *System of Positive Industry: Treatise on the Total Action of Humanity on the Planet* speaks for itself. Nevertheless, many elements of his system—like those of his mechanically romantic contemporaries—do not jibe with technological enframing as detachment, uniformity, and unbridled exploitation. In its emphasis on the unique concepts, methods, and epistemological norms of each science, Comte's

epistemology resembles the “plural realism” Hubert Dreyfus finds in Heidegger or, quite differently, what the anthropologist Eduardo Viveiros de Castro, at Brazil’s National Museum, has called *multinaturalism*. The definition of “space” in the *Subjective Synthesis* as the “Great Milieu,” a foundational absence at the base of all social and intellectual orders, parallels Heidegger’s insistence on *Dasein*’s “uncanny” groundlessness. With its definition of the earth as the “Great Fetish”—in strange harmony with the Candomblé cults that abound in Rio’s Gloria neighborhood—the system urges gratitude, care, and above all love for the planet and its inhabitants, modes of attunement at odds with the aggressive setting-upon of enframing.²⁹

The simplest antidote to Heidegger’s totalizing and fatalistic conception of technological modernity, however, is implied by writing “cosmograms” in the plural. Rio’s Temple of Humanity is one of countless, variously effective objects that have aimed at unifying and making homely the worlds opened up by industry and technology. Two contrasting examples are close at hand: in Brasilia, the capital that replaced Rio, streamlined streets and curved government buildings designed by Le Corbusier’s student Oscar Niemayer offer a sleek, geometric vision of a transparent, calculable world; down the coast in Porto Alegre, the World Social Forum met in 2005 to sketch modes of global coordination to undercut the destruction wrought by the current “lords of the earth” and to enact the visionary motto “Another World Is Possible.”³⁰

In *Gelassenheit* Heidegger cryptically allowed that “openness to the mystery” and letting things be can “grant us the possibility of dwelling in the world in a totally different way”; they promise “a new ground and foundation upon which we can stand and endure in the world of technology.”³¹ A step toward this other way of dwelling—a step Heidegger never took—may be to let technology be more than just one kind of thing and recognize that it does not bring with it a single cosmos that is everywhere the same. Approaching technological objects as cosmic things and following the contours of the world-pictures traced by cosmograms are movements in this direction. Along this route, those of us who study science and technology can see our task as one shared with anthropologists: to collect and make familiar the practices and objects that make a cosmos visible, making a case for the clearing they hold open for what is, what has been, and what might be.

²⁹ Auguste Comte, *La Synthèse subjective d’Auguste Comte*, 2nd ed. (Paris: Fonds Typographique, 1900) (which Juliette Grange reads as proto-ecology; see Grange, *La philosophie d’Auguste Comte* [cit. n. 25]); Dreyfus, *Being-in-the-World* (cit. n. 8), p. 262 (on Heidegger’s “plural realism”); and Eduardo Viveiros de Castro, “From Multi-Culturalism to Multi-Naturalism,” in *Cosmograms*, ed. Ohanian and Royoux (cit. n. 21), pp. 137–156.

³⁰ On alternative modernities see Timothy Mitchell, ed., *Questions of Modernity* (Minneapolis: Univ. Minnesota Press, 2000).

³¹ Heidegger, *Discourse on Thinking* (cit. n. 15), p. 55. We might compare the “letting be” of *Gelassenheit* with the “step backward” Schiller advocated as a first move toward the “aesthetic state” in *On the Aesthetic Education of Mankind*, the work that first mourned the “disenchantment of the world”: “In order to exchange passivity for autonomy, a passive determination for an active one, man must therefore be momentarily free of all determination whatsoever, and pass through a state of pure determinability. He must consequently, in a certain sense, return to that negative state of complete absence of determination in which he found himself before anything at all had made an impression upon his senses.” Friedrich Schiller, *On the Aesthetic Education of Mankind*, trans. E. Wilkinson and L. Willoughby (Oxford: Oxford Univ. Press, 1967), p. 141.