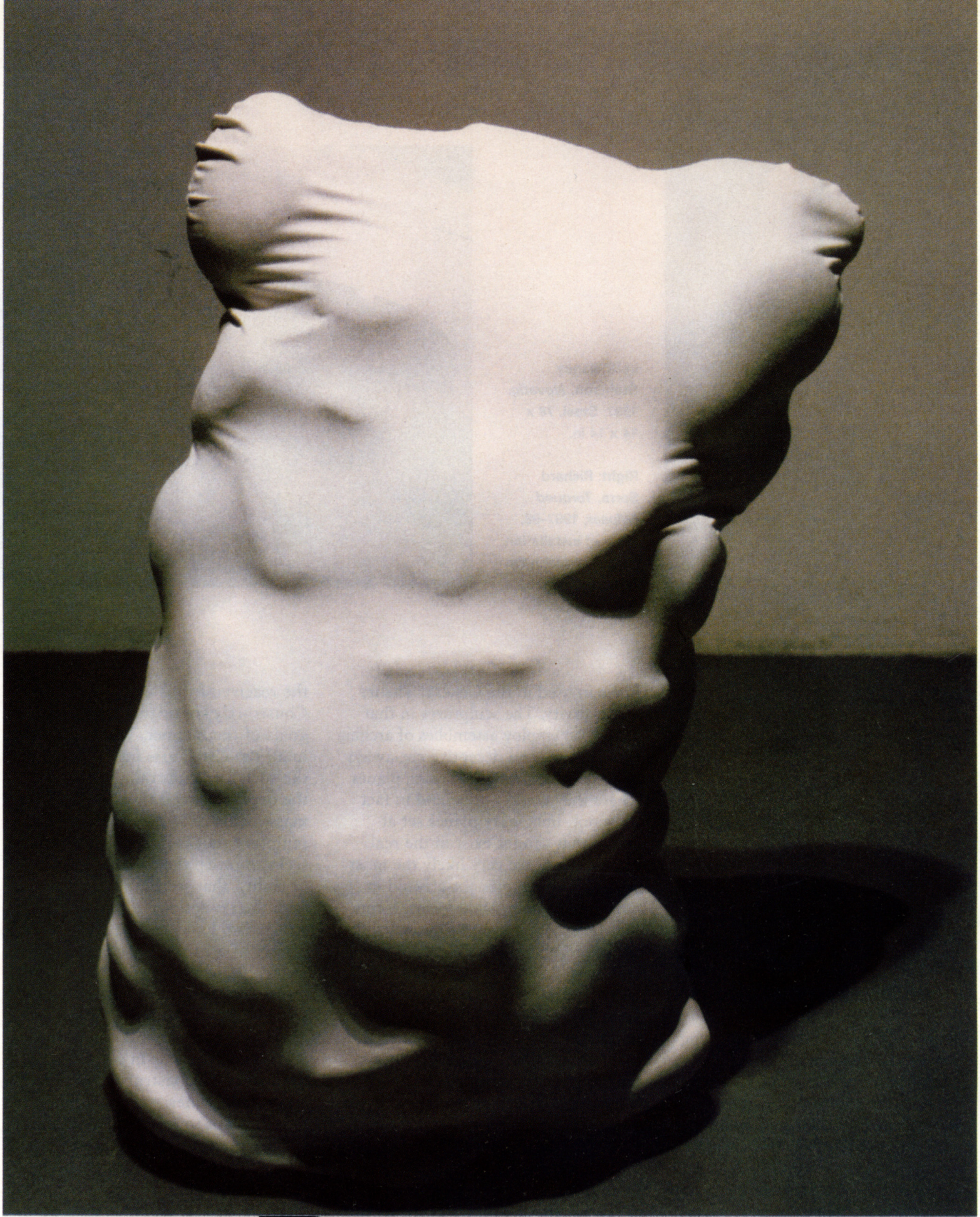

Biomorphs

Organic Abstraction and the Mechanics of Life

by Stephen Luecking

Albert Einstein, a physicist, is the icon of science, and for most of the 20th century, physics dominated the sciences and the popular image of science. In the arts, too, physics has been seen as the science whose thought and technology generated the most impact.

Now at century's turn physics nears stasis: theorizing continues, but significant experimentation confronts the limits of technology. The science of biology, on the other hand, is on the ascent. Elevated by the capabilities of computer modeling to clarify the complexity of life processes, the life sciences seem to have overtaken the physical sciences. Unraveling the human genome, creating information-based organisms, and synthesizing self-replicating molecules are among biology's recent successes. Even the material sciences now rely more on organics than on physics or chemistry.

Rosalind Krauss allies the onset of organic abstraction in sculpture to the resurgence of vitalism during the early decades of the past century. In *Passages in Modern Sculpture* she cites Jean Arp, especially, as seeking to manifest the life force, the *élan vital*, espoused by vitalists. Though it was short-lived, the popular resurgence of this age-old theory established the parallel between biology and sculpture that was to remain throughout this century.

Since Aristotle, vitalist philosophies had been the prime explanations for life. Usually, these explanations held a spiritual cast: in most of the world's religions the power to create life separated the creativity of the gods from the creativity of man. Pygmalion could fashion his Galatea, but it took Venus to infuse her with life.

In 1786, however, Luigi Galvani applied an electric charge to a severed frog leg, causing it to kick. His experiment proffered the idea that a natural force, akin to electricity, animated organisms. At the same time, physician Erasmus Darwin (grandfather of Charles) was proposing that life evolved with an underlying purpose to impel its progress.

This notion of the vital force as natural rather than spiritual gained intellectual support from the *Naturphilosophie* movement. A philosophical companion to Romanticism, this "natural philosophy" held that the sum total of reality was embodied in nature. No godhead or spiritual explanations were necessary in light of the creative power of nature.

The Romantic sculptor Antoine-Louis Barye aptly portrayed this intrinsic force. Building on skills he honed as a model maker for the Jardin des Plantes, a natural history museum in Paris, and inspired by Géricault, Barye set the surfaces of his animal sculptures roiling from an inner verve.

Just as Barye was creating his best-known works and scientific vitalism was reaching its prime in the early 19th century, the popular theory staggered under a blow from the fledgling field of chemistry. In 1828 Friederich Wohler synthesized urea from inorganic chemicals. His work countered the vitalist notion that organic compounds could only be produced within living forms. The felling blow came a few decades later, when, in 1859, Charles Darwin persuasively countered his grandfather by arguing that natural selection, a random and extrinsic mechanism, was sufficient to determine the path of evolution. Both discoveries reinforced the cause of mechanism. Heirs of Descartes and the rationalist philosophers, the mechanists contended that life was a complex affiliation of chemical and physical cause and effect. No other forces need be conjured up.

This view was persuasive, but troubling. If life and all of its processes are reducible to essentially mechanical relationships, then what of those human processes such as consciousness and morality? Are they, too, reducible to mechanical processes? The answer from biologist Thomas Huxley, mechanism's chief spokesman, was a reluctant yes.

Such an outlook would especially trouble Arp and his fellow Dada/Surrealists. In the wake of the destruction wreaked by the tanks and flying machines of World War I, machines and mechanism were conflated into one evil in the eyes of many intellectuals. Vitalism, with its advocacy of an irreducible principle of entelechy, would prove more embraceable.

Shortly before the turn of the century, Hans Driesch, the father of modern embryology, prodded vitalism back to life and gave it renewed intellectual prestige. Driesch recorded embryonic developments that at the time defied any plausible mechanistic interpretation. From fruit flies to whales, all embryos start out as dividing cells growing outward into a spherical cluster called a blastula. At some point the blastula hollows into a double-walled orb and, at the same time, dimples at one end. The dimple deepens into an orifice and the blastula transforms into the vaselike gastrula. The purposeful cell movement, or induction, that generated the gastrula continues. Clefts and bulges ripple its surface. One such bulge opposite the orifice is destined to become the head of the organism; the

Opposite: Thomas Skomski, *Body Bag (M)*, 1995. Cast hydrocal, 25 in. high. This page: Eva Hesse, *Tori*, August 1969. Fiberglass and polyester resin over wire mesh, each of nine units 30–47 x 12.5–17 x 11.25–15 in.

Vitalism was a superb
metaphor for the sculptor's infusion of dead matter with animated life.

orifice will become its anus. As growth continues the internal wall of cells will differentiate into organs; external undulations will differentiate into limbs, or wings, or fins and the like.

Though Driesch's questions about what initiates and directs cell induction and cell differentiation in the embryo still remain unanswered, vitalism has since been discarded by serious scientists. Vitalism had one big problem—it made for lousy science. In 1951 the philosopher of science Ernest Nagel declared it "a dead issue," a consequence of "the infertility of vitalism as a guide in biological research." As a theory it generated no useful investigations, unlike the enormously productive researches into the chemical and physical nature of life.

Vitalism, however, proved more fertile in the visual arts. It made a superb metaphor for the sculptor's infusion of dead matter with the illusion of animated life. The research of Driesch and others added to the Surrealists' vocabulary of primal organic forms and affirmed early Surrealism's non-rational, intuitive approach to abstract form. Through the works of Arp, Henry Moore, Louise Bourgeois, Richard Hunt, David Hare, Abbott Pattison, Cosmo Compoli, and others this approach drove organic abstraction well into the late 20th century.

Until the 1960s organic abstraction served as the alternative to the more rational, "scientific" investigations of Constructivism and its allies. In some ways it remained so, fueling in part Post-Minimalism's reaction to the severe industrial geometry of Minimalism. In other ways it was changed and arguably bolstered by the application of science.

Science offered three legs on which to build a study of organic form in sculpture. The first was the widespread application of perceptual psychology, especially gestalt principles, to art study. In the formalist '60s and early '70s, Rudolph Arnheim's writings, especially his highly accessible *Visual Thinking*, practically defined art theory in the schools. *Visual Thinking* frequently exemplified its ideas using Moore's sculptures as archetypes of nonverbal thought embodied in abstract form.

A second basis was mathematical, or quasi-mathematical, in the manner of Constructivism's heady mix of analysis and intuition. Naum Gabo's curvilinear sculptures, for example, alluded to or borrowed from the sculptural plasters that 19th-century geometers employed to illustrate their spatial equations. Gabo's late career teaching at Yale University influenced the spare curvilinear treatment of industrial materials in the early work of David Von Schlegel and Charles Wilson.

From exploration of new materials emerged the third leg of scientific support: physical process. The broad extension into new materials and new processes supplied, directly or indirectly, most of the huge growth in the 20th century's sculptural vocabulary. Certain materials, sculptors found, when subjected to certain forces will yield certain forms and capabilities. Much of Eva Hesse's Post-Minimalist strategy, for instance, was to translate minimal form into soft, elastic materials like latex—a material far more like skin than like stainless steel.

As it turns out, organic form, too, is shaped in nature's capture of physical processes. When focused on the dynamics of growth, physics and its handmaiden, mathematics, become prime tools of morphology, the branch of biology that strives to explain the mechanics by which life takes on the shapes that it does. Morphology seeks these explanations with the guidance of physical laws.

In 1917 a contemporary and intellectual antagonist of Driesch, zoologist D'Arcy Thompson, popularized morphology in his major work *On Growth and Form*. One of the past century's most influential books of nonfiction, the book's elegant prose (Thompson was also a classical scholar) lays out in case after case the role of mathematical transformations and physical growth in generating the strength and beauty of natural form. Six years before his death in 1948, Thompson released a second edition, and the book still remains a classic of popular biology.

Thompson's ideas attained posthumous status as apologies for '60s formalism in sculpture. To Arnheim's perceptual psychology Thompson's study added hard-science justification. The popularity of Thompson's ideas was given negative tribute by the conceptualist Joseph Kosuth when he put down formalism as "just morphology."

The timing was right, though, for both thinkers to meet with a receptive audience. Post–World War II art education had become increasingly university-based and the launching of Sputnik had given a jump-start to science education. The audience was also larger than ever, as waves of baby boomers hit college shores in the late '60s. As the artists from this generation mature, so does the language of organic sculpture. The mysteries sought by the Surrealists are still hunted, but the search is now more deeply informed.

Four sculptures—two by Lucio Fontana and two by Tony Cragg—on display in the Museum of Fine Arts Houston's Cullen Sculpture Garden exemplify the radical shift in formal approaches to organic abstraction during the past few decades. Fontana's 1965 bronzes, *Spatial Concept/Nature, No.1* and *No.2*, could serve as outsized depictions of gastrulated embryos. In each Fontana has gashed one end of a rough sphere to transform it from a

Opposite: Eva Hesse, *Sequel,* 1967. Latex and powdered white pigment, 76.2 x 81.3 cm. This page, top: Tony Cragg, *New Forms,* 1991–92. Bronze, installation view. Bottom: Lucio Fontana, *Spatial Concept/Nature, No. 1* and *No. 2,* 1959–60 (cast 1965). Bronze, view of outdoor installation.

THOMAS R. DUBROCK/COURTESY OF THE MUSEUM OF FINE ARTS, HOUSTON simple physical sphere into a primal organic form. The closed perfection breaks open to reveal an interior and exterior, a gullet and a shell. Space can move into and out of the penetrated sphere, much as food and waste or air and exhaust can move in and out of an organism.

As his titles suggest, Fontana was out to conjoin formal investigation of space with expression of nature. He succeeded. Both gastrulation and Fontana's gashing are examples of symmetry-breaking processes. The near-perfect spherical symmetry of the blastula and the bronze orbs "breaks" to a state of lesser, radial symmetry. In the latter stages of gastrulation the embryo's symmetry "breaks" again into the bilateral symmetry of the incipient creature.

Tony Cragg's two-part sculptural set, *New Forms*, incorporates this next stage of symmetry breaking. Narrow, attenuated openings partially cleave the smooth volumes transforming them from vessels into bisymmetric bodies, which in turn are distorting into asymmetry. Cragg's *Forms* seem caught in the process of change—a cell dividing or a pod opening.

Though the sculptures of Fontana and Cragg are more conversant with science than earlier organic sculpture (especially those of Cragg, who for a number of years worked in a biochemistry lab, before his sculpture training), their works seem somehow more ancient as well. The bronze, with its patina, helps, but it is more the reference to vessel forms that imparts this look. As vessels these four sculptures tap into the oldest and richest metaphor of the organic body: a vessel to hold and transport the physical and spiritual requisites for life. Pots and urns possess mouths, lips, ears, necks, bodies, and feet.

In all of the work discussed below the vessel is implicit. Most of the pieces are hollow, Post-Minimalist containers. Similar to the Minimalists' boxing and shelving of space, these sculptors bag space into sacs, pods, hulls, cocoons, shells, and the like. In biological terms these sculptures, too, are minimal, organic form stripped of all but soma, the core container of life processes.

Perhaps due to the power of the vessel metaphor and perhaps because of the toppling of boundaries between sculpture and craft, craft techniques and craft artists figure prominently in contemporary organic sculpture. For example, Magdalena Abakanowicz's burlap figures, arrayed in rows of eviscerated husks, or her warehouse piles of stuffed burlap ova aggressively staked out this territory for fiber artists. Another notable example is Ruth Duckworth's interrelating of architectonic and organic elements, which carried

The oldest and richest metaphor
of the organic body is a vessel for physical and spiritual life.

the tradition of British abstraction into ceramics. Of late, Duckworth has offered raw, more massive treatments of organics. In one recent exhibition she displayed stony chrysalids, dispersed across the gallery floor. In ceramic terms these were monumental, sized to hold a human body.

Such scale dominates recent biomorphic sculpture. Although the forms are often embryonic and larval in appearance, their realization is related to the size of the viewer. This creates what might be described as a somatic equivalency, a one-to-one tie between the body of the viewer and that of the sculpture. The effect can be powerful, visceral.

It can be quite elegant, too, as in Barbara Cooper's large, basketlike weavings of salvaged veneer strips. Though the fine woods are visually striking, it is more their physical character that interests Cooper. As she plaits the wooden strips, she allows them to bend as their slight variations in thickness and grain dictate. By the time she has closed off the intricately curving surfaces they have traced out a supple and largely unpredictable volume. The effect is akin to induction, with surface distortions determined by stresses innate to the material. As opposed to Abakanowicz's essays on decay or Duckworth's depictions of deathlike states, Cooper's forms emerge from growth.

Much of the shaping of life is determined by the response of organic matter to varied stresses, both external and internal. Life forms evolve shapes to cope with external forces imposed by their environments. Internal, or hydrostatic, pressure can shape form as well. This effect, much like filling a balloon with water, accounts for the fullness of curvature in much animal form.

Peter Agostini exploited this internal pressure in his hydrocal sculptures of the early '70s. He poured plaster into latex bags, which then swelled into tumescent volumes purposefully reminiscent of Arp's stone carvings. Where Arp captured the illusion of form generated by internal force, Agostini captured the real effects of hydrostatic pressures exerted onto an elastic membrane by liquid plaster. Agostini's innovations in direct casting have become exceptionally influential as a sculptural process. Using casting to freeze actual stresses upon flexible materials into a rigid and permanent state is now a mainstay of contemporary sculpture.

Opposite: Barbara Cooper, *Sonus*, 1995. Cherry veneer, 37 x 58 x 28 in. This page: Miriam Bloom, *Out of the Question*, 1996. Papier mâché, 19 x 35 x 29 in.

COURTESY OF FASSBENDER GALLERY

It is a process used particularly effectively by Tom Skomski in a recent series of "torsos." Skomski stuffed cotton sacks with smooth granite cobbles and let the sacks turn and sag to echo the gesture, musculature, and taut skin of seated torsos. From these he pulled plaster casts. Under gallery lighting the gypsum sparkles with a striking chiaroscuro. They evoke truncated statuary, like contemporary versions of the *Belvedere Torso*. Skomski's allusion to high style, tinged with parody, reflects the postmodern influences on organic abstraction today. References to myth, science, and art may coexist in mannered, highly stylized interpretations.

Miriam Bloom's bulbous papier mâché volumes are especially rife with such allusions. Carefully crafted to look like inflated pots, Bloom's pieces recall ancient fertility vessels. Her stylized references to growth and fertility vary from prehistoric Venus figures to embryonic shapes. The papier mâché serves as a substrate, over which she scripts row after row of unreadable passages, like murmured incantations. Bloom's forms seem to respire, filling with breath. The allusions here are to age-old beliefs of breath as the power of life and the unknowable Word as its instigator.

Ultimately art is not science. Though influenced and shaped by morphological principles, these recent sculptures are impelled by an artistic "vitalism." Though biologic notions may influence, directly or indirectly, the physical processes of their construction or their pursuit of form, their *élan vital* dwells in the aesthetic, symbolic, and personal goals of the artist. In science, however, the form-driver sought by Driesch is still being tracked. But enough is known of genetic coding, of the mathematics of form, and of the chemical and physical principles involved to maintain belief that a mechanical explanation is in the offing. This knowledge has blossomed, nurtured by the computer's husbanding of the codes and mathematics involved. Computer modeling of life processes has, in turn, begun to affect sculpture.

Stephen Luecking is a public sculptor and writer who teaches art and science at DePaul University.