Folded Landscapes: Deleuze's Concept of the Fold and Its Potential for Contemporary Landscape Architecture

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ABSTRACT Landscape architecture is a design profession with unique potential for stimulating dialogue with contemporary cultural issues of change, open-endedness, and complexity. An inspiring metaphor for this dialogue is the concept of the fold as interpreted by Gilles Deleuze in his 1993 book, *The Fold: Leibniz and the Baroque*. He traced the concept back to the Baroque—when some transformations to garden art had already been made—and concluded that a contemporary interpretation of the fold, which emphasizes the transmutation of formal objects into temporal unities, could be of similar inspiration today. Peter Eisenman and Laurie Olin's Rebstockpark in Frankfurt am Main and Charles Jencks and Maggie Keswick's Garden of Cosmic Speculation are two endeavors that have made the transition from concept to project in distinct, but formalistic and limited ways. Alternate models within contemporary landscape architecture show the potential of the discipline for working with the fold in a more rigorously conceptual way through continually infolding and unfolding events as opposed to designing static forms.

KEYWORDS fold, open-endedness, complexity, process philosophy, contemporary landscape architecture

THE CONCEPT OF THE FOLD

Change, uncertainty, and complexity are among the most striking characteristics of late 20th and early 21st century culture. For a culturally engaged landscape architecture, the exploration of conceptual and formal expressions of these contemporary developments is an ongoing task. In working to meet this challenge, designers may benefit from a close dialogue with other cultural fields such as philosophy, art, and ecology.

A concept with considerable potential for this dialogue is Gilles Deleuze's interpretation of the Baroque fold. In his 1988 book *Le pli. Leibniz et le baroque* (in English, *The Fold: Leibniz and the Baroque*), the French philosopher referred to the continuous changes and dissolution into infinity as expressed in folded objects from the Baroque era. In applying this idea to our time, Deleuze concluded, "The new status of the object no longer refers its condition to a spatial mould—in other words, to a relation of form-matter—but to a temporal modulation that implies as much the beginnings of a continuous variation of matter as a continuous development of form" (1993, 20).

The transmutation of formal objects into temporal unities as described by Deleuze with the metaphor of the fold bears upon contemporary debates in the landscape architecture profession on process, open-endedness, and change.[1] An examination of Deleuze's concept of the fold and the relationship between the Baroque and today's world provides a basis for the exploration of various approaches and expressions inspired by the fold.

The Origin of the Fold as an Operative Concept

As indicated by the title of Deleuze's book, the German philosopher and scientist Gottfried Leibniz was his main reference in developing a contemporary concept of the fold. During Leibniz's lifetime (1646–1716), a new European philosophy and mathematical physics emerged. Working independently, Isaac Newton and Leibniz invented infinitesimal calculus, which became the foundation of mathematical physics and celebrated its first success in celestial mechanics. From that moment, rational operations with infinity underpinned the explication of finite cosmic processes—what earlier had been regarded as the expression of divine order.

This was a major ontological shift: from the days of Plato to Renaissance Neo-Platonists, man had been embedded within the divine cosmos, with its harmonic order of species and celestial spheres, where infinity appeared as an abyss of chaos and unaccountability. With the new mathematical physics, a restless, dangerous cosmos, populated by multifarious accidental entities and events, invaded the earlier worldview—a transformation from the reign of ideal forms to the reign of natural law. Form and proportion retained only secondary significance; they were degraded into mere effects of natural laws.

Leibniz tried to reconcile the old rationalism of order with the radical dynamization of the cosmos, attempting to capture the infinity of natural processes within the notion of the fold. He envisioned the dynamic forms of physical processes as the results of the unfolding of infolded relations of a strictly notional and atemporal order. Indeed, he assumed the existence of elementary notions or ideas as an essential element of the rationalist tradition founded by Plato. Complex

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Figure 1. Baroque *broderie parterre*: infolding into infinity. Herrenhausen Gardens, Hannover, Germany. Photo by author.

Figure 2. Central axis with the Grand Canal at the horizon, reflecting the 'infinite sky.' Versailles, France. Photo by author.

ideas appeared as the result of combinations of such notions; elementary notions were ultimate, indefinable logical entities that served as the basis for the definition of more complex notions (Leibniz 1714, §46). Leibniz called these smallest elements *monads*. In his "Monadology and the Rational Principles of Nature and Grace," Leibniz expanded on the idea that all elements of the world, both animate and inanimate, consist of ultimate, indivisible particles, of in-dividuals in the strictest sense of the word: "These monads are the true atoms of nature and, in a word, the elements of things" (1714, §3).[2]

On this basis, Leibniz developed a metaphysics of infinity: the universe, an infinitely wondrous artifact, is infinite, and each of its parts, down to the infinitely small, is infinitely structured within itself (1714, §64–67). The facts of the created world, then, are *folds infolded in folds*, precisely ordered by God, himself the central monad of the universe. *The significance of the Leibnizian fold is to allow that the individual monad's microcosm mirrors the macrocosm of all the other monads by the infinite infolding into itself.*[3]

This philosophy in its essence reflected the optimistic stance of the Baroque worldview. Although man was banished from the physical center of creation as a consequence of the Copernican revolution—that most profound intellectual crisis of the West—he gained the certainty that nature is ruled by an order structured on a divine rationale of logic and mathematics and that he is able to understand the laws of this logic. Thus, the cosmos is contained within scientific rationality.

According to Deleuze, the conceptual importance of the fold for these intellectual transformations cannot be overestimated: "The criterion or operative concept of the Baroque is the Fold" (1993, 38). This metaphor, which stands for the rationalization of infinity, found many aesthetic expressions beyond philosophy or science, for example, in Francesco Borromini's architecture and Gian Lorenzo Bernini's sculpture. Baroque garden art addresses infinity with the fold in many ways. The endlessly infolded spirals of the *parterre de broderie* may be a reference to the infinitely small (Figure 1).[4] André Le Nôtre's water surfaces reflecting the sky in Vaux le Vicomte, Versailles, and Chantilly (*see* Weiss 1995, 79ff) are means of infolding the infinitely large (Figure 2). In Herrenhausen Gardens in Hannover, which attained their final form between 1696 and 1714 under the direction of Electress Sophia of Hannover and her French master gardener Martin Charbonnier (Leibniz contributed some hydrotechnical calculations), at the end of the central axis is found the most impressive fountain of the age, aspiring vertically towards infinity (Figure 3). The great fountain also reads as an impressive means of dynamizing the fold: folds of falling water masses evoke the majestic wave of a giant curtain.

In summary, many parallel reflections of the spirit of an epoch searching for the infinity of the cosmos and its logic are evident in the concept of the fold in Baroque science, philosophy and arts. Deleuze wrote of this as

inspiration for the modern world, which, of course, is also different.

The Fold Today

Current mathematical-dynamical thinking, originating in the 17th century, is far removed from any theistic panlogism as derived from Leibniz. The elementary entities of the universe are not the realizations of eternal, divine notions. Modern physics reveals the continual formation and destruction of new elementary particles, a process that seems essentially spontaneous. Imagining these to be physical realizations of logical structures contained in a divine mind would be anachronistic—not just because of today's secularized mindset but also because of an increasing awareness of the limitations and relativity of logic. After Kurt Gödel's 1931 proof of the incompleteness of large formal systems, an element of uncertainty clouded even pure mathematics and logic. Mathematics and logic have been pulled from heaven to earth. The creativity of human practitioners of mathematics and their freedom to invent formal systems have replaced the atemporality and absoluteness of the divine mathematician.

The present situation is far more complicated than the 17th century; the Copernican humiliation to the primacy of man was followed by two equally fundamental humiliations: Darwin's discovery of the origin of humankind in the animal kingdom and Freud's realization of the great power of the unconscious over consciousness, dealing a blow to the idea of freedom of the will. Additional discoveries, such as the limitations of computability in quantum theory and beyond, were experienced by many contemporary intellectuals as a dimunition of human primacy.

This cursory recapitulation of today's scientifically dominated worldview is sufficient to highlight the differences between the present situation and that of the Baroque. Whereas modern man possesses infinitely more powerful scientific-mathematical formulae and technical tools, he is unable to generate an integrating picture of the whole. Faced with uncertainty and complexity, Deleuze quoted Alfred North Whitehead in *The Fold* (Deleuze 1993, 86) as the heir to Leibniz and provided an interpretation inspirational for contemporary design, as will be demonstrated later. With his process philosophy dating from the 1920s and 1930s, Whitehead invented the greatest metaphysical system of the 20th century. While for a long period a relatively small circle of scholars studied that system, it has gained wider popularity in recent years, and Whitehead is one among the small group of great thinkers sometimes known as the "process philosophers." Others include Charles Sanders Peirce, William James, Henri Bergson, Samuel Alexander, John Dewey and Charles Hartsthorne. If Leibniz, guided by the spirit of traditional metaphysics, included all events constituting a monad's life into its substance, process thinkers are reversing this relation to assume the primacy of the event: all that appears to be substantial is but a momentary glimpse of universal process.

Figure 3. The Great Fountain at the end of the central axis: a dynamic, vertical striving for infinity. Herrenhausen Gardens, Hannover, Germany. Photo by author.

Modern metaphysical approaches, led by Whiteheadian process philosophy, transpose the Leibnizian interlacing of monadic eventuality and monadic fold into a new relation of event and active folding

(Whitehead 1937, 1979). The monad, ceasing to be a substance, has been turned into a process of active reflection of the macrocosm in the unfolding microcosm of a monad-event. Deleuze was well aware of the great potential of Whiteheadian metaphysics to radically renew the Leibnizian concept of the monad. His effort bridges the Baroque fold and process-philosophical infolding. Deleuze's book has moved many architects and landscape architects to deepen their understanding of the relation of event and folding. It may well be too early to attempt a comprehensive overview of artistic responses to the event-theoretical reading of the idea of the fold, but a glimpse of some current projects will provide an impression of the range of these responses.

CONTEMPORARY ADAPTATIONS OF THE CONCEPT OF THE FOLD

Deleuze's ideas regarding the fold were eagerly taken up in architectural theory soon after the initial French publication of *Le pli. Leibniz et le baroque* (1988). Examples include *Unfolding Frankfurt* (Geib and Kohso 1991) with John Rajchman's contribution, "Perplications" (Rajchman 1991), *Architectural Design*'s special issue *Folding in Architecture* (1993) edited by Greg Lynn, and Charles Jencks's *The Architecture of the Jumping Universe* (1995), in which he sketched a new paradigm for architecture. The quick absorption of Deleuze's ideas on the fold was due to their potential to classify and conceptually clarify trends in architectural theory and practice dating back to the 1980s.

Two ambitious examples of the simultaneity of philosophical writing, architectural and landscape architectural theory and built practice are Peter Eisenman and Laurie Olin's Rebstockpark in Frankfurt am Main, Germany, and Charles Jencks and Maggie Keswick's Garden of Cosmic Speculation in southern Scotland.

PETER EISENMAN/LAURIE OLIN: REBSTOCKPARK

In his introductory text for the design of Rebstockpark, Peter Eisenman formulated the idea that the world is witnessing "a paradigm shift from the mechanical to the electronic" in all areas of the design arts (1991, 9). Today's media are destroying the essence of an object and creating their own realities as a synthesis of new medial *environments*. The substantiality of objects dissolves into *events*. Eisenman concluded: "Architecture must now deal with the problem of the event" (1991, 9). He aimed to overcome the traditional contrast of the two static aspects of urban design—figure and ground—with the aid of the notion of the event. His frame of reference was the Leibnizian notion of the fold as reintroduced by Deleuze. Of special importance for Eisenman was the fact that the fold, as interpreted by Deleuze, is "neither figure nor ground, but contains aspects of both" (Eisenman 1991, 14f); it is thus not a dialectical synthesis of figure and ground but a redefinition of the essence of both, a viewing of everything that might appear on a terrain within a new context. In this way he attempted to create non-classical architectonic structures to be read as "open systems," that is, as "self-aggregating or evolving systems." This self-aggregation or openness results from the continual transition between figure and ground; it remains categorically incomplete, continually reinterpreted as unfolding events

The design concept for Rebstockpark. Peter Eisenman and Laurie Olin's winning entry for the design of the Rebstockpark site in Frankfurt in 1990 was an attempt to put the theoretical considerations of events and folds into the practice of contemporary urban design (Figure 4). The competition involved creating housing for 4,500 persons, office space for 5,500 workers, and a park with an overall area of 27 hectares (65 acres).

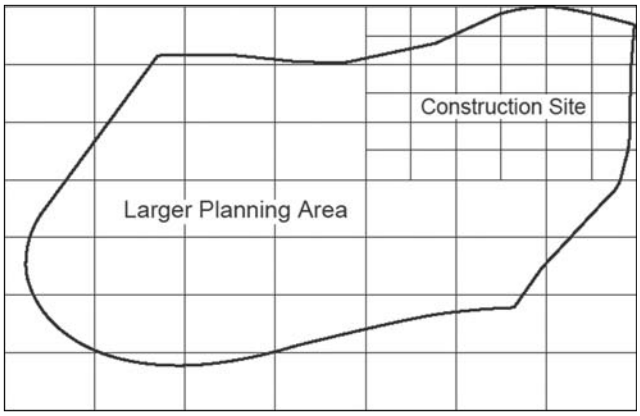
The design aims at an innovative combination of repetition and individuality of urban elements, using the fold as a single, unifying design principle. A continuous modification of the surface and building forms replaces the traditional repetition of rectangular building blocks in modern urban design. The classical principles of urban structuring—figure and ground—dissolve into the continuum of the fold (Eisenman 1993, 25).

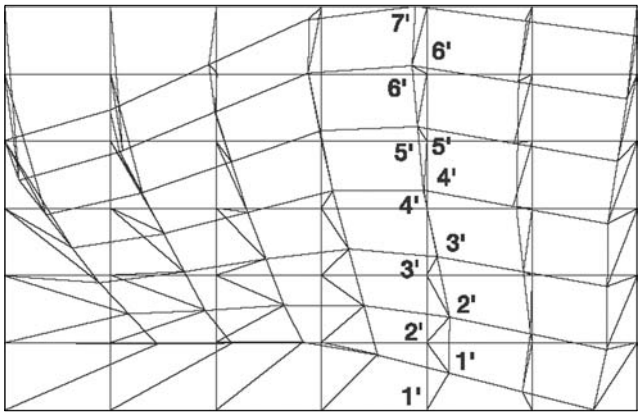
Figure 4. Rebstockpark: overview of Peter Eisenman and Laurie Olin's design. Frankfurt, Germany, 1990. ©Eisenman Architects.

The folding of the terrain in Rebstockpark was achieved through a highly abstract, formal method including elements from the mathematico-physical catastrophe theory developed by Rene Thom in the 1960s and 1970s. While emphasis here is on the inner area of the construction site, the process is similar for the larger "planning area." The design process was described in six steps (Rebstock Projektgesellschaft 2003):

1. The irregular perimeter-line of the construction site was tangentially circumscribed by a rectangle.
2. The circumscribing rectangle was subdivided into a raster of 6 × 6 segments by drawing seven lines vertically and seven lines horizontally across the construction site, in accordance with the favoring of the number seven from René Thom's catastrophe theory (Figure 5a).
3. The 6 × 6 raster from the circumscribing rectangle was also applied to the area of the actual construction site. Since this had an irregular shape, the second raster became twisted into a two-dimensional net with continual curvature. The corresponding raster points of each of the two nets were connected, and a folded, three-dimensional form appeared (Figure 5b).
4. The third dimension, height, was achieved by assigning height coordinates to each raster point. The height coordinates had to correspond with the maximum number of floors chosen by Eisenman. The application of a diagram known from catastrophe theory continued the folding of the net (Figure 5c). (The drawings for this step are beautifully complex, but they lack the logic of the previous steps. Arbitrariness was used creatively by Eisenman in this phase of the design process)
5. The projection of generic, rectangular building forms onto this folded three-dimensional net gave them a trapezoidal form—their final folding.
6. The footprints of the buildings, as well as the curvature of streets and paths, were defined by mapping these distortions back onto the ground plan.

Using this process Eisenman and Olin succeeded in connecting figure and ground—if only in the sense that the shape of the construction site, that is, its irregular perimeter line, left an imprint on the shape of each of the buildings through various transformations. Additionally, the local specificity of the asymmetrical





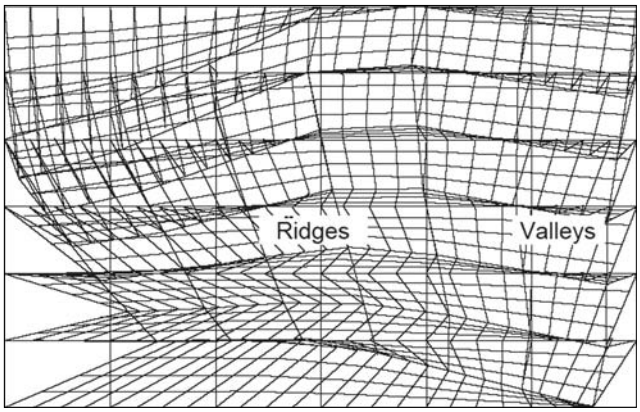


Figure 5a. (above left) Rebstockpark: first two stages of the design process. Rectangles are first drawn around the amorphous perimeter lines of the smaller construction site and the larger planning area, and then divided into a raster. ©Eisenman Architects.

Figure 5b. (above right) Rebstockpark: third stage of the design process. The amorphous surface area of the construction site gets a twisted 6×6 raster corresponding to the 6×6 rectangular raster of the previous stage. Raster points of the rectangular and the twisted raster with the same number are connected by a line—a folded landscape appears. © Eisenman Architects.

Figure 5c. (left) Rebstockpark: fourth stage of the design process. The slightly folded landscape undergoes several transformations towards a more complex Fold of ridges and valleys. ©Eisenman Architects.

shape of the construction site influenced the folding of the buildings, thus giving every place on the terrain an individual topological form of its fold. From identical, rectangular forms of buildings arose differentiated, folded forms, each of which could inhabit only the specific spot from which it arose (Figure 6).

Critique. The whole Rebstockpark constitutes an overall landscape, folded according to one principle, integrating buildings, roads, canals and open spaces. The continuum of this mathematico-formal folding thus dominates the individual buildings and exterior spaces; they are merely parts of a folded continuum. But if one were to follow Leibniz's concept of the monadic fold, each of the buildings and exterior spaces, to qualify as an individuality, would have to possess its own specific inner principle of folding to reflect on the other buildings and the whole complex from its own perspective. The differentiation of the outside appearance is not sufficient ground for individuality. *Leibnizian individuality consists of an internal dimension as the basis for an active perspectival relation of the monad to the outside world.* The folds of Leibniz are monads, that is, living *centers* of activity.

A monadic aspect might be conceded, though only in a philosophically vague sense, to Rebstockpark as a whole. Yet the individual buildings and exterior spaces can hardly be considered monads; they would have to participate more actively in the shaping of the overall fold. The super-ordinate continuum of the fold, governed by a single formal-algorithmic principle, dictated their form. Additionally, given its arbitrariness, the perimeter line of the project, which is the basis for the six stages of design, must be said to have acquired a rather too important role in determining the form of the exterior spaces and, therefore the buildings. The individual unities did not partake actively in defining their mutual relations; instead, these were largely determined beforehand just by the perimeter line. This *single* "principle of design" is a burden to them.

The exterior spaces and the buildings are degraded to weak structures whose essence consists of adaptation. Since they are not centers—as such they would possess individual principles of folding whose validity they would be tending to expand to the outside. They are not monads, and therefore neither are they folds in a Leibnizian sense. It should not be overlooked that, for Leibniz, the significance of the fold lay in the harmonic

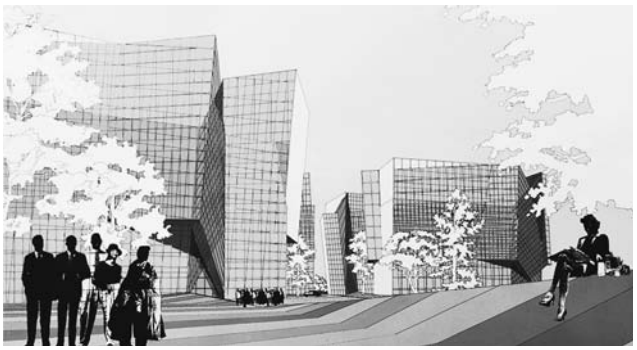


Figure 6. Rebstockpark: Perspective view. © Eisenman Architects.

interaction of outside conditions and *internal striving*. The outside conditions of a monad consisted in other monads' behavior towards them; they constituted the totality of the macrocosm. But the inner striving of the monad was the specific way in which the microcosm *actively and perspectivally* reacted to the macrocosm. The significance of the monadic fold lays precisely in that it allowed the microcosm to meet with the world autonomously and actively, rather than degrading it to a mere static reflection. The Rebstockpark design does not include such autonomous activity. If a monadic fold had been the guiding principle in planning, the design might not have followed a mere mathematical abstraction and the incidental form of the perimeter line. A monadic fold would, by contrast, have exhibited a strong centrifugal striving towards the world, an aspect well exemplified (despite its imperial impetus) by the Baroque garden's water fountains or the orientation of its axis towards infinity. Eisenman and Olin's plan does not imply such an aspect of active relation to the world beyond the site (which, of course, today could not have the absolutist style of the Baroque); it is introverted. In addition, the buildings are as static as in classic urban design—they did not become an event, which Eisenman proposed as a primary goal. Thus, we cannot agree with the usually positive critiques of Rebstockpark, for example that of John Rajchman, who attributes freedom and openness to the project: "What Rebstock would give to be seen is rather a displacement or 'un-placing,' that would be free and complex, that would instigate without founding, and that would open without prefiguring" (Eisenman 1991, 54).

In summary, there is much ambivalence in the Rebstockpark proposal. It certainly succeeded in its design of a project with considerable formal variety held together by a coherent overall form. But the theoretical explication of the strategy contains a number of incoherencies, especially a total lack of "infolded time"—the main conceptual goal.[5] Furthermore, the generation of folds from the site boundary and arbitrarily set construction heights are trivial concepts compared to the manifold cultural foundations of Baroque designs. The project might better have refrained from theoretical references to the fold.

Charles Jencks/Maggie Keswick: The Garden of Cosmic Speculation

Architectural theorist Charles Jencks and his late wife Maggie Keswick, a historian and specialist in Asian gardening, also attempted to translate theoretical ideas about the fold into landscape architectural design. In 1988 they began laying out their Garden of Cosmic Speculation in southern Scotland. Their initial plan was to devise a kitchen garden, but over the years it grew into a garden of about 120 hectares, a microcosm symbolizing the universe. Of the two designers, Jencks laid special emphasis on the invention of forms of waves and folds as a new grammar for landscape architecture capable of expressing the basic elements of nature discovered by recent science (Jencks 2003, 17). Throughout the garden, Jencks offered direct illustration of the highly abstract forms of physics, originally generated under strictly controlled laboratory conditions, using them to form specific park elements (Figure 7). He transferred abstract formulas one-to-one into garden forms, thus conflating the abstract and the concrete.

In his 1995 book *The Architecture of the Jumping Universe,* Jencks proposed complexity theory as a new basis for architectural theory, devoting a whole chapter to the question of the fold. Remarkably, his arguments on the fold did not take Deleuze or Leibniz as their starting point but were based on René Thom's catastrophe theory. Here, *catastrophe* means various forms of phase transitions. Jencks picks out the "cusp catastrophe" for special consideration, whose diagram Thom rendered as a folded or undulated plane: an imminent decision follows for a while the crest of the wave and then unforeseeably and suddenly falls to one of the sides.

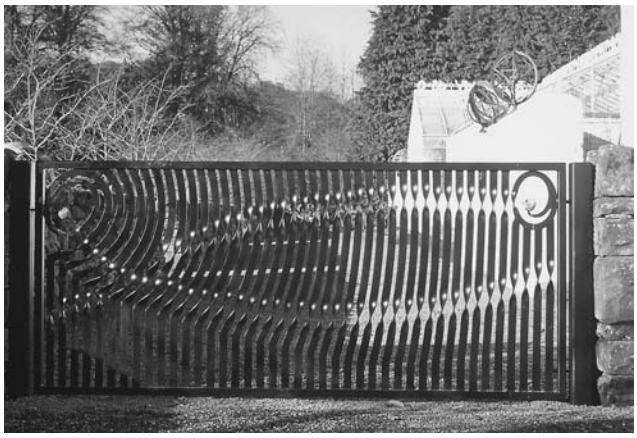


Figure 7. Garden of Cosmic Speculation, Scotland: gates shaped like soliton waves. Charles Jencks, 1990s. ©Weilacher.

Figure 8. Garden of Cosmic Speculation, Scotland: folded hills proposed as a transition between the central lake and the great meadow. Charles Jencks, 1990s. ©Weilacher.

Jencks deemed two qualities in this scientific theory applicable in architecture: the fold "can represent a sudden change of direction, assumption or mood. . . . Conversely it can resolve differences in a way . . . distinct from the other architectural methods of dealing with pluralism, such as collage. This is by enfolding, by connecting that which is different in a smooth transition" (Jencks 1995, 53f). Jencks mentioned the buildings of Zaha Hadid to exemplify another property of the fold, which Eisenman and Olin had also used in Rebstockpark: It works "as a connective device to create unity. Difference is enfolded into a continuity" (Jencks 1995, 57).

Critique. Jencks made use of these two aspects of the fold in his Garden of Cosmic Speculation by creating undulating, folded hills as a transition between the central lake and the great meadow (Figure 8). But did he really need these spectacular hill sculptures to achieve the fusion of the two realms? They seem to disrupt more than they connect. Each of Jencks's folded earth sculptures is merely one of a number of individual objects within a garden that might more fittingly be called a contemporary "physics theme park." Here, new theories are illustrated didactically with rather naive symbolisms.[6] The fold remains one formal object among others, and nowhere does it reach the goal of connecting element as Jencks interpreted it in Hadid's or Eisenman's projects. His strategy of illustrating the overall phenomenon of the fold through the direct formal representation of a fold did not succeed and should be considered a "formalistic fallacy"—the error of mistaking the abstract for the concrete, which Whitehead called the "fallacy of misplaced concreteness" (1937, 75).

OUTLOOK

In view of these formalistic examples, what is the potential for the fold in contemporary design? Can we formulate a more precise version of the idea of the fold and its focus on event-ness and on change as proposed by Deleuze?

For the Baroque, the fold functioned as a *symbol* of the rational explication and control of infinity—it was another element in the quest for certainty. But Deleuze brought the fold into a contemporary context, connecting it with acceptance of the categorical unpredictability of natural processes. The divine preordained order, which Leibniz considered capable of harmonically integrating all "incompossibilities— was unacceptable to Deleuze. With reference to Whitehead's process philosophy, he offered the following sketch of the contemporary situation:

> For Whitehead . . . bifurcations, divergences, incompossibilities, and discord belong to the same motley world *that can no longer be included in expressive units*, but only made or undone according to . . . variable configurations or changing captures. In a same

> chaotic world divergent series are endlessly tracing bifurcating paths. It is a "chaosmos". . . . Even God desists from being a Being who compares worlds and chooses the richest compossibles. He becomes Process, a process that at once affirms incompossibilities and passes through them. The play of the world has changed in a unique way, because now it has become the play that diverges. . . . It is a world of captures instead of closures. (Deleuze 1993, 92)

As a consequence, Deleuze stated, the dissolution of formal objects into temporal unities is characterized by a "modulation that implies as much the beginnings of a continuous variation of matter as a continuous development of form" (1993: 20).

This continual and endlessly variable modulation is the contemporary aspect of the fold. It integrates the plurality of the world and the categorical unpredictability of its course. This event-ness, this "fluidity", constitutes a great challenge for spatial design disciplines.

There is a great discrepancy between the built folds and the concept put forward by Deleuze in the contemporary context of Western landscape architecture. This is unfortunate, because the fold remains an intriguing concept with its emphasis on event-ness and its ability to in-fold contradictions. The purely formal-mathematical applications like those of Eisenman and Olin or Jencks and Keswick are insufficient. Yet, there is great potential within landscape architecture for inspiring realizations of the idea of the fold. With its living materials, it is able to design places of change—open unfoldings that allow for unforeseeable, creative developments. In conclusion, three projects from landscape architecture provide an idea of the spectrum of folded landscapes possible in a contemporary, Deleuzian sense.

Carlos Ferrater and Bet Figueras: El Jardí Botànic de Barcelona

The new botanical garden in Barcelona (JBB) is a folded landscape proposed by architect Carlos Ferrater and landscape architect Bet Figueras in a 1988 competition, three years before the Rebstockpark competition. Because of the 1992 Olympic Games and funding difficulties, construction started only in 1999. Similar to Eisenman and Olin's Rebstockpark, this design for Barcelona's new botanical garden is characterized by a unifying structure of folded surfaces. Nevertheless, there are significant differences. The logic of the formal structure does not derive from an abstract theory and a perimeter line but from the "inner" necessities of the site and the program. The 17-hectare site on Montjuïc has a height difference of 50 meters and slopes of up to 30 percent. The designers started with a regular grid typical for botanical gardens but soon decided that an irregular triangular grid, adapted to the morphological conditions of the site, was a more appropriate solution (Figure 9). At the same time, the evolving surfaces with their different conditions offered a structure for filling in future botanical collections of varying vegetation types (Figure 10). Marti Franch summarized the advantages of this approach, illustrating well the correspondence to Leibniz's and Deleuze's ideas of the fold:

> The resulting lot system allows for a very flexible and creative planning of the phytoepisodes. Formally, the design appears as a whole, where themes from the grand scale are echoed on the smaller scale. The fractal geometry of the triangulation plan is reinterpreted at the smaller scale, in the zigzagging, faceted layout of the path system, in the pavement, which is divided into small trapezoidal shapes, and in the "broken" volumes of the entrance buildings. (Franch 2007, 186)

The parts and whole of the JBB are in mutual relation. Each part has its own individuality—not only is its logic determined by the overall structure but also the specific conditions of each part determine the way of planting and each part is an individual reflection of the outside world of plant communities. At the same time, the triangulation grid is a flexible spatial strategy allowing change and extension, some determined by the growth of the plants themselves, while preserving the garden's overall identity.

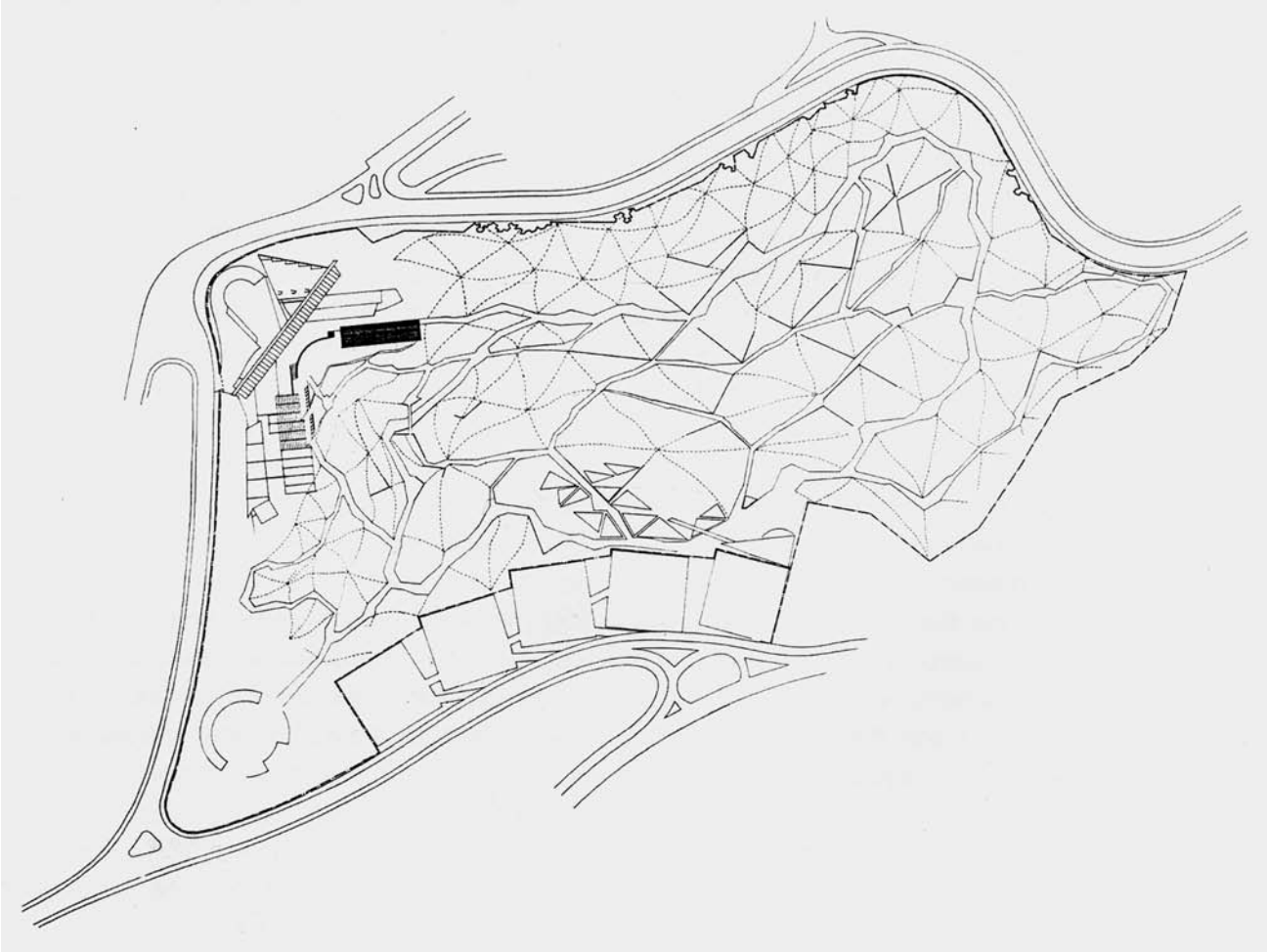


Figure 9. Botanical Garden Barcelona: Plan with triangulation grid. ©Ferrater.

Figure 10. Botanical Garden Barcelona: impression shortly after inauguration in 1999. ©Bagué.

The Jardí Botànic de Barcelona has a folded appearance, but in terms of achieving the conceptual potential of the fold, its formal language is not decisive, as is also the case in the two examples following.

Schweingruber Zulauf: Administration of Canton Zug

The Swiss office Schweingruber Zulauf is currently one of the most ambitious firms in dealing with unpredictability and processes. Well-known projects such as Oerliker Park in Zurich, its initial phase built in 2000, and the Schweingruber Zulauf proposal for the lignite opencast mine in Schöningen, Germany, awarded the Neuland landscape art prize in 2005, clearly express the firm's interest in "a continuous variation of matter as a continuous development of form" (Deleuze 1993). One of its smaller projects—The Administration of Canton Zug —expresses what can be understood as a landscape architecture unfolding unpredictably while continually infolding contextual conditions. In Zug, three public buildings—the canton administration, the local court, and the prison—share one connected site. The open space surrounding the buildings consists almost entirely of the roof of an underground garage. Lukas Schweingruber and Rainer Zulauf did not want to hide this artificial condition and proposed a design creating coherence through the use of a repetitive element on an open field of grey gravel: spherical plant-containers of blue polyester fabric that appear to be placed randomly on a grid "are not artificially watered and have been planted with sprawling plant types such as winter jasmine, summer lilac, dog rose, matrimony vine and Virginia creeper" (Wirz 2006, 52). From their starting position, these plants break out and grow across the grey gravel in an intentionally uncontrolled way (Figure 11). Their formal development is dependent on climate, competition, walking routes, and so forth. Thus, they are not a static feature but rather fluid matter reacting unpredictably to manifold conditions.

Figure 11. Administration of canton Zug/ Switzerland: spherical plant containers made of blue plastic, planted with creeping species. Schweingruber Zulauf, 1999. ©Schweingruber Zulauf.

Transformer

Between 1995 and 2000 the Vilaine River flooded an industrial area in Redon, France, five times. In 2004, a group of landscape architecture students from the Versailles Ecole Nationale Supérieure du Paysage, led by Marc Rumelhart and Gabriel Chauvel, began work to give this centrally located area of 10 hectares a new future. They devised a strategy involving transformational processes on many levels, consequently naming it Transformer (Rumelhart and Blanchon 2005). Nothing was to be removed from or brought into the area—only intelligent permutations of materials already present on the terrain were allowed. An important element of the project was participation by the local population, who actively contributed ideas and physical work.

An overview of the transformation of a storage hall, a small part of the overall project, will suffice here. The old hall with its metal shelf racks was renamed Metal Forest (Figure 12). Some of roof elements were removed to permit rain inside the hall, and palettes with soil and wooden waste were placed on the shelves (nicknamed Big Macs, Figure 13). These as well as other elements in the racks were successively colonized with plants (Figure 14). The concrete floor was partly ripped open and also populated with plants from the margins of the site (Figure 15). The interplay of elements is complex and their evolution unforeseeable.

Characteristically, the transformer strategy infolds and unfolds given components of the place. New structures arise but are not fixed. Their vagueness and flexibility combined with the autonomy of plant growth

Figure 12. Transformer: racks filled with a mixture of waste wood and soil as 'Big Macs,' initial phase. ©Rumelhart.

Figure 13. Transformer: racks filled with a mixture of waste wood and soil as 'Big Macs,' initial phase. ©Rumelhart.

Figure 14. Transformer: succession of plants in the racks. ©Rumelhart.

Figure 15. Transformer: parts of the concrete floor are drilled and planted ('Green dynamite'). ©Rumelhart.

permit the infolding of further events in unforeseeable ways. Despite its dynamism and openness, this folded landscape is not oriented to a cosmic frame like the Baroque. The landscape remains local, with specific entanglements in each place.

CONCLUSION

The three examples above offer only initial inspiration for contemporary theoretical applications of the fold short of formalistic fallacies. In comparison to the Baroque fold, these contemporary folds are modest. They do not hint at any kind of rationalization of infinity. Instead of fixed, spatio-symbolic systems, they are folding physical events, and the have prepared for further unforeseeable unfolding.

All three examples express that a specific form is not the most important factor. Folded landscapes might appear folded, as in the JBB, but they could look completely different. More important than form is a mutual relation between parts and whole in a Leibnizian sense and a structural openness to in- and unfold changes. There is a range between determination and openness, yet both aspects are always addressed.

As an answer to dealing with uncertainty, contemporary folded landscapes give meaning to significant cultural developments. Currently, unfolding metaphysics have shed the traces of classical rationalism (for example, of Leibniz), which assumed that uncertainty could be categorically overcome. The insights of quantum theory or complexity theory, as well as an increased awareness of process philosophies from the past century, allow a radically new approach to issues of the absence of absolute certainty. Increasingly, this absence is perceived not as the meaninglessness and contingency of human existence but as the positive force of spontaneous, uncontrolled creativity—the signature of a metaphysical principle in nature and society. With increasing awareness of the force of spontaneous, creative folding, the profession of landscape architecture has the potential to reflect this contemporary cultural awareness in its work. This may, in the near future, allow the fold to appear in yet another, original transformation. Perhaps this is what Deleuze thought of in writing the final sentence of *The Fold:* "We are discovering new ways of folding, akin to new envelopments, but we all remain Leibnizian because what always matters is folding, unfolding, refolding" (1993, 158).

NOTES

1. According to James Corner, "A truly ecological landscape architecture might be less about the construction of finished and complete works, and more about the design of processes, strategies, agencies, and scaffoldings—catalytic frameworks that might enable a diversity of relationships to create, emerge, network, interconnect, and differentiate" (1997, 102), or "A good strategy is a highly organized plan (spatial, programmatic, or logistical) that is at the same time flexible and structurally capable of significant adaptation in response to changing circumstances" (2004, 32). In his discourse on Landscape Urbanism, Charles Waldheim wrote: "Landscape is a medium . . . uniquely capable of responding to temporal change, transformation, adaptation, and succession. These qualities recommend landscape as an analog to contemporary processes of urbanization and as a medium uniquely suited to the open-endedness, indeterminacy, and change demanded by contemporary urban conditions" (2006, 39).
2. Monads are metaphysical entities; they cannot themselves be physically observed, but they function as formative elements of observable physical entities, living or dead (Leibniz 1714, §2). Leibniz understood these Monads to be intentionally active mental entities, endowed with autonomous purposefulness. They were individuals with actions directed towards the achievement of specific goals. In other words: Every monad has a mental side and can thus behave teleologically, that is, in an aim-oriented or purposeful way (Leibniz 1914, §16, §19). As a direct consequence of the simplicity of the monad, that is of the fact that as an atom it has no parts, none of its processes can be triggered externally, for it is impossible to change the place of anything in it or to conceive in it any internal motion that could be excited, directed, increased, or diminished therein, although all this is possible in the case of composites, in which there are changes among the parts (Leibniz 1914, §7).

   Because of the absence of an internal structure of composition from simpler elements, monads are not susceptible to external influences: "Monads have no windows, through which anything could enter or leave" (Leibniz 1914, §7). This is why Leibniz assumes "the natural changes of monads come from an internal principle, since an external cause cannot influence it internally" (1914, §11). Every monad unfolds a stream of *continual* activity derived from its inner principle. Monads, therefore, are centers of autonomous activity (1914, §14, 15).

   Thus the whole life of a monad is infolded within it, and it is continually unfolding in time. The existence of an infinite number of monads, unable to influence one another because they are windowless, demands some kind of overall harmonizing principle. Thus every monad contains in its internal principle of activity the unfolding of every other monad, and this "means that each simple substance has relations that express all the others, and, consequently, that it is a perpetual living mirror of the universe" (Leibniz 1914, §56).

3. This radical perspectivism may be one reason for the attraction that Leibniz's metaphysics still exert in the East Asian countries. The idea of the perspectival presence of the whole in each of its parts is also current in Western mysticism, but it has found significant expression in the East Asian mind.

   An example relevant to the monadological view of the fold is that of the Japanese gardens of meditation, for example, Ryoanji: each stone constitutes a powerful microcosmic center unfolding the principle of its form through expanding wave formations. All individual principles harmonize, and together they constitute a complete whole. Nonlocal, superordinate perspectivity results *precisely* from developing local individual-transindividual characters through mutual perspectivity and anticipation. This is why the creations and spaces of meditative spirituality inspire such admiration in Western viewers, regardless of the great temporal and cultural distance. They offer living examples of a synthesis of perspectivity and folding.
4. Ursula Erichsen-Firle analyzed the geometry of these spirals and found them similar to the logarithmic spiral (Erichsen-Firle 1971, 74ff). The proportions of this spiral are close to that of the Golden Section. Why this aesthetic preference? A possible answer could be that the Golden Section expresses infinite growth processes as exemplified in shellfish or snails. According to Gyorgi Doczi, the Golden Section is observed in nature by almost all growth processes whatever their size, length, thickness, and so forth. Thus the Golden Section assigns order to processes that theoretically extend towards infinity—a fact that must have fascinated Baroque designers.
5. "Folding in Time" is the title of Eisenman's 1993 article in *Folding in Architecture* (AD Profile 102) as well as the subtitle of the Rebstockpark book edited by Volker Fischer (Olin 1992).
6. Other projects by Jencks have similar shortcomings, as Catharine Ward Thompson points out in "Complex Concepts and Controlling Designs," a comprehensive critique of Jencks's Landform Ueda in Edinburgh (Ward Thompson 2007).

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