> *The harmony of the world is made manifest in Form and Number, and the heart and soul and all the poetry of Natural Philosophy are embodied in the concept of mathematical beauty.* D'arcy Thompson

All organisms are modular: life always consists of sub-organisms which are involved together in a biological network. The interrelations between organ and organism form a series of feedback loops, forming a cascading and complex surface. Each organ parasites off the next, but this segmentation is not spontaneous. Rather, it is development itself, the decoupling of non-communicating spaces for the organization of divergent series. Creative evolution, self-organization and modularity are the same idea.

The theory of the development of metabolic modularity is called morphogenesis. 'Morphogenesis' in its literal sense means the creation of shapes or forms. But in the (relatively) narrow sense we intend it here, morphogenesis is a self-symmetry of the biological structure (onto itself) which allows it to develop in such a way as to *divide while remaining unseparated*, that is: to 'individuate,' or split apart into fused symmetrical segments.

The transformations which occur during development, all the mad foldings and unfoldings, bifurcations and convergences, are somehow encoded linearly into our DNA. Each genomic triplet codes for a specific amino acid, which when chained together form proteins which form cellular subcomponents which form organs… Morphogenesis concerns the historical development of complex biological networks: the forces of evolutionary drift, of mutation and historical selection. Every segment, every scale can be mapped to a series of instructions: coupling or decoupling, how many times and in what order, how quickly or slowly. (Codes are libidinal, the secret is always erotic: why else would the meaning be hidden, transfigured?)

After combination and selection, the resultant components may be simpler or more complex. It is impossible to say before divergent series are brought into communication whether they will find a balance or not. There are always risks: I think of Aristotle and the golden mean. There always two ways for an aspect of human development to fail catastrophically, always two directions for a tiny shift in behavior to throw the system into chaos. Chaos, fluctuating fields of differential intesities, matter and energy: these are the raw forces of morphogenesis. Morphogenesis is not just biological. It means that energy organizes itself, forms complex asymmetrical networks, even evolve entirely new formations. Molecular evolution occurs cosmically and microscopically as well as biologically. Matter does not need a miracle to 'trans-individuate'.

One of the ideas that I'm really interested in is that highly organized behavior patterns can result from repeatedly applying simple rules. Adaptation is also finding a *suitable* new repetition, not just a different one. The genetic code is based on a fractal self-representation of the human body. But non-human processes of becoming also exhibit morphogenetic characteristics: we think of weather, galaxy formation, turbulence, crystals. These are expressive forces of nature, that is, an expression of the generative powers of matter to create new structures, to produces new self-organizing forms. Matter actively defines and creates the universe through self-organizing processes; and furthermore the formal structure of these processes has an order which can be abstractly understood.

This idea of morphogenetic evolution is actually very old, and probably much older than the Greeks. The story doesn't begin with human beings, it doesn't even begin with biology. It begins with matter, reality, singular events which have the possibility of breaking free from their environment, which are free to create new relationships between themselves and their environments. Richard Lewontin criticizes sociobiologists for reducing human behavior to genetics or to evolution. The point about evolution, and not just human behavior, is that it is radically free and radically constrained. It only takes place on the scale of individuals, in the asymmetrical interrelations between individuals. Even amoebas face one another; galaxies express an identity through light and sound no less than territorial songbirds through song and color.

Every moment an individuation occurs there is the self-unfolding of a new sequence, the beginning of a universe, from chaos, from void. The world is not inhabited by spirits, but by energy. After Deleuze, there are molecular processes of self-organization, and molar processes of deceleration and acceleration, convergence and divergence. Serres considers atomism to be a thought of morphogenesis, the origin of the turbulence, of new and complex forms from the tiniest difference in the speed of flowing energy. Chaos and difference are the origin; within the flurry and turbulence of activity, a spontaneous order results, as from many complex machines working tirelessly to organize matter and energy into symmetrical forms. Cosmic, molecular, geological, biological and social networks.

The point of chaos theory is to accustom us towards thinking inter-dimensionally, non-linearly, between orders. In other words, the essential thing is to think the process of morphogenesis itself apart from the individual; or rather, to see the individual as a moment of a complex evolving line of infinitesimal differences, as an expressive force whose implications are much larger and much smaller than the individual alone. To see the individual as a single link in a complex self-referential network, in-between dimensions, capable of only the tiniest mutations, the most tedious of differences. Catastrophe theory shows us that complex and chaotic variations emerge spontaneously from 'tiny' or differential modulations of intensity or speed. The action happens between dimensions, becoming is fractal: the origin of structure is also the origin of substructure. Modularity is scale-free, morphogenesis is both cosmic and molecular.

All forms are also information, but not everything unfolds endlessly into substructures; only singularities, only events can mulitply and form couplings and new resonances. In other words we also need situations; there must also be a preindividual field of intensities for the process of morphogenesis to act upon. It is not a force outside the system creating new forms: it is an internal capability of the system itself. Not 'information processing' but the production of new forms, the conveyance of information. Impregnate *digital* space with new codes, new formations: and here finally we have the production of a plane of virtual events. Digital morphogenesis refers to a plane of machinic consistency whose absolute convergence of all potential forms we would have to compare to Thompson's descriptions of mathematical beauty.

Machinic forms of self-organization are already up to their usual work; the question is how to accelerate positive processes of becoming, how to initiate dialogue between two non-communicating series, how to create new interfaces. Biocomputation take place in a curious interspace between scientific biology and theoretical mathematics. There is no formalism to pose

the question of machinic morphogenesis; we must create new kinds of self-organizing spaces: new environments, new machines, new processes of machinic becomings. We realize we already have the only kind of space it would be possible to develop machinic agents capable of modularity and morphogenesis, namely, digital space. The discretization of reality is the first step towards a machinic re-integration of the segmented components. Digital space is modular, internally-subdivided space; it has a perfectly discrete memory at any point in time. But its operation, the performative properties of the space, are not captured in the formal arrangement, but only in the execution process, only in the actual production of a user interface. The digital is always in a state of becoming-human, establishing new relations to (and representations for) the human.

The digital is swiftly emerging as the media for a revolution we are just beginning, a journey both outwards (between modes of existence, of (dis)assembling machines) as well as inwards (through specific events, forces and individuals.) Cultural space is already beginning to reflect the disintegration of the virtual in favor of the digital. Signals become miracles, we forget how to recognize morphogenesis. Organisms do not find a niche to inhabit; they dynamically create a relationships with the environment. And in fact there is no strict distinction between internal and external: all forces express potentials, there is a univocity of energy. What matters now is our power not only to experience machinic becomings, animal becomings, but to enact them, to create spaces where the impossible no longer seems out of reach. The political meaning of morphogenesis is that it represents the possibility of possibility, in other words, that the world doesn't have to be this way. We are capable of change, we can create new spaces and modes for interacting with one another and the world and ourselves. There is chaos and difference at the origin, but harmony is possible. I am fascinated by the idea that life evolves by creating interfaces between different spaces: fusing or decoupling, individuating or self-organizing, smoothing together or splitting apart. So, my final question is about the criteria we ought to use to evaluate spaces. For example, are we judging by the permeability of spaces to pleasurable activity, how soft and light a space is? Or are we rather judging by purely formal or aesthetic criteria, the poetry or proportions of the space? Or, finally — are we judging by the actual capacity for new and differentiating developments to take place in the space?