PREFACE

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Twenty years ago our research group in architecture and computing started at ETH Zürich. It is a group of about 16 researches, which does not need to run after money.[1] The interest never was to go for performance, optimisation or simulation. The focus was never on more colours, more details, more curves. We know that this positivistic, materialistic or structuralistic view of data plays in the realm of thermodynamics towards the ENTROPIC HORIZON of all time, the HEAT DEATH. Where everything has been said: all the words have been spoken, all pictures taken, and everything is polite, empathic and in balance. Nature and culture in silent harmony. Computers sit there at this horizon of our world. And they are LAUGHING (Philipp Weiss). They are coming back (negentropic) at us, with their new mathematics around group theory, with quantum physics, for example, and with computing. They are coming back from this horizon like ALIENS to talk about our world in new words. A world where we are not part of a single NATURE, but where we face and CONTRACT our natures as ACTIVE SUBJECTS (Michel Serres).

This sounds abstract. It is. But the result of this thinking is strikingly simple. To give an example of an alienated and negentropic ARCHI-TECTONIC FORM: The National Stadium in Beijing by Herzog & de Meuron, completed in 2008. The competition was won with a rendering of an irregular but homogenous pattern of beams. The problem was that everything looked fine on the front side of the rendering, but with the 3D model it turned out that the back is not homogenous at all: there are openings that are either too big or too small, at too wide or too narrow angles. It also turned out that if you fix a problem on

the back, you create multiple problems on the front. There was no way to solve this problem by hand. Winning the lottery would be a more probable outcome. A simple genetic algorithm on the other hand was able to find a constellation: start with a random solution, mark the 'errors', mutate the solution, mark the 'errors', if the mutation has fewer errors than its source, take the mutation as the new source for the next mutation...—repeat this sequence some 10,000 times and you will find a mutation without any error. That's it. A solution of some 100 lines, which cannot be constructed. You cannot get this result by reasoning, because the mutations are following random lines. And with the absence of reason there is no history, no process and no reproduction. This simple form, in every sense of the word, is not REAL, is not part of nature. It stands outside. A solution which comes from outer space, like an alien. (Of course our solution was not built; the stadium actually is constructed on the basis of controlled regularities.)

Far-fetched? Esoteric, even? I think it is important to be very precise in these conceptions. Because our cultures are challenged to their essence. And our discourses are of a disturbing fuzziness. Being precise, especially in MATHEMATICS (the Royal Path to Knowledge, because exclusively uncorrupted by any pragmatics) one can see that our cultures are facing this kind of challenge not for the first time. Look at the triangle of Pythagoras or Thales for example: you have the circularity of the stick, you have the proportionality of the shadow. Both legs of the triangle are real, they can be measured by numbers. But the hypotenuse is not countable (beyond CALCULABILITY in today's words. Euclid's *Elements X*, proposition 9), it is irrational. The hypotenuse is not real, it is an alien. But it is nevertheless the seed for a new RATIO provoking a new GEOMETRY: Euclid described a new conception of SPACE decoupled from actual THINGS. We find the same constellation in the time of the Renaissance, where the PERSPECTIVE drawing and ANALYTICAL GEOMETRY, again with a triangular construction, decoupled the movement of objects in a new conception of TIME from the reality of objects in space. And we find ourselves in the same constellation today: the probability matrices of connected data points decouple the vividness of objects, the conception of 'LIFE' forms the reality of objects in time. In our written cultural history we find three of these constellations. They are BRIDGES across history to learn from other times. Strictly different from the historical lines of argumentation we are used to and captured by, but in the proportional circularity of atomistic constellations.

This is how the aliens THINK. They provoke a kind of COPERNICAN TURN, where the solid ground of nature is lost and things circulate in open space like planetary systems. In all these phases in our history people become afraid. Of course. We leave mother nature behind and we are not safe out there. The smart and the brave ones understand this first and become powerful. And the others over time have to learn to talk and to write in their new vernacular tongues. Only these can be heard beyond the horizon of the old structured layout of their languages embedded in the truth of a nature lost. In antiquity, all this was tamed with phonetic WRITING, and in the Renaissance with DRAWING. And, as we are in the same constellation, I would suggest that today we tame it with CODE. I am talking about CIRCULAR WRITING to master the atomistic view of a planetary and circular world. The code of today is POETICS.

This, I would suggest, is the setup: we should be eye to eye with current mathematics, whose most prominent outcome is quantum physics (all classical mechanics, thermodynamics, statistics, stochastics, analyses are not on the right level and not powerful enough), and we should also affirm that computers are not classical machines, they are QUANTUM MACHINES. Then, surprisingly, all technology shows itself to be generic and easy to use. This is not a technological problem at all. All problems are solved in the same way. The OBJECTIVITY of today. And a new challenge arises: how to tune and play this INSTRUMENT. How to listen to all the natural VOICES around you. How to gain your personal voice. How to ARTICULATE masterfully. How to FACE mutually our natures. How to have NATURING AFFAIRS with active subjects like you.

1   Just to point out our specific kind of INDEPENDENCE in talking about ARCHITECTURE and the DIGITAL.