In 1955 the RAND Corporation published the work A Million Random Digits with 100,000 Normal Deviates. The book contains exactly what the title predicts, namely a collection of a million random numbers. The reason for publishing a catalogue of this kind was the need for a body of random numbers for later experiments in (computer-) simulation to be based on. Randomness is a key condition in many computer-based simulations. Starting in the mid-1940s, while working on the problem of simulating complex systems at Los Alamos, Stanislaw Ulam and John von Neumann recognized the importance of randomness for computational simulations. To simulate randomness they developed a variety of parameters that formed the basis of a method that later became known as the ‚Monte Carlo Method'.

Ever since numerous strategies and computational technologies have been set up to harness the unpredictability of randomness in their quest to approximate life. Although generating pseudorandom numbers is easy (for example creating randomness by combining the mouse position with the current time and CPU load), producing randomness digitally remains an unsolved problem. It is one of the main premises of this project that randomness cannot be induced from ones and zeros. Randomness can only be found in nature: Nature is uncertain and ambiguous and has some form of absence of information. Algorithms, by contrast, cannot create this kind of randomness due to their inherent mathematical clarity and the total absence of (white) noise. Other than nature, I claim, the digital has no entropy.

APPLYING RANDOMNESS

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The project argues that the abstract machine based on algorithms, needs to be augmented with the analog world. To unfold this argument I pursue research in two main areas: Firstly, I will present an archeology of the technologies used to create randomness. The oldest example of such technology would be a perfect dice, or, in terms of ones and zeros: a coin. But rolling a dice or flipping a coin cannot be considered as usable 'random number generators'. Not only will I discuss various forms of physical random number generators, but also examine approaches to randomness in current sciences and the arts. Secondly, the project aims at identifying early intersections of simulation and computation. Analog computing machines that allowed for experimental simulation already existed in the 1940s. But how did the conditions for simulation change when analog computers turned digital? And what might the future of computational randomness look like?

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