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rubric

#2:
GRID

The grid implies structure, order... linearity. From these things comes the dependable nature of maps, which even in their approximations of the reality that they describe, have a consistency (a certainty) that the object being mapped usually doesn't. Maps refute the true infinite fractal nature of the terrain and so allow us to make practical sense of the structure of the world around us and allow us to place sane limits on the scope of our environment.

THE

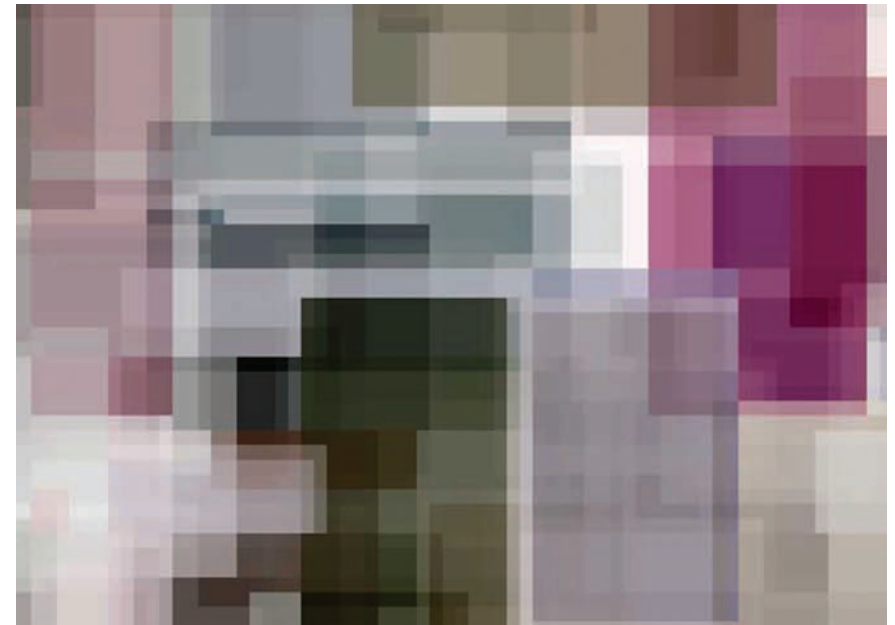
All this derives from the abstraction of the grid, such that it is an impossibly pure concept, almost intangible, and often completely invisible or simply implied.

RANDOM

The grid makes visible our numbers, 0, 1, 2, 3... as if the whole idea of counting things is just like measuring the coordinate of something on a grid. But the grid is much more than this, because it provides an escape from the straight-line of 1, 2, 3... into a seemingly impossible world of complex numbers, where numbers which have no physical meaning like the square-root of -1 are defined as casually as one would count the number of letters in this word. The ironic aspect of these non-physical numbers is that they have acted as a pivot for even more abstract mathematical frameworks which attempt to describe the true physical, possibly fundamental, nature of the world.

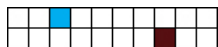
The dichotomy of using mind-bendingly abstract mathematics to describe the tangible matter which we can all touch and of which we are all made is something that even (perhaps, especially) the handful of people that fully understand it do not and cannot address (or pragmatically choose to ignore). In this sense, even in this God-less world of mathematics, the proposition that there is something transcendent behind it all remains neither proven nor unproven. The continuing unprovability of God even in the farthest reaches of modern physics perhaps defines the nature of God more than any conjecture or dogma has ever managed. Perhaps all that is left is to wonder that God is implicitly contained within the abstraction of the grid but will forever remain hidden, transparent, unidentifiable.

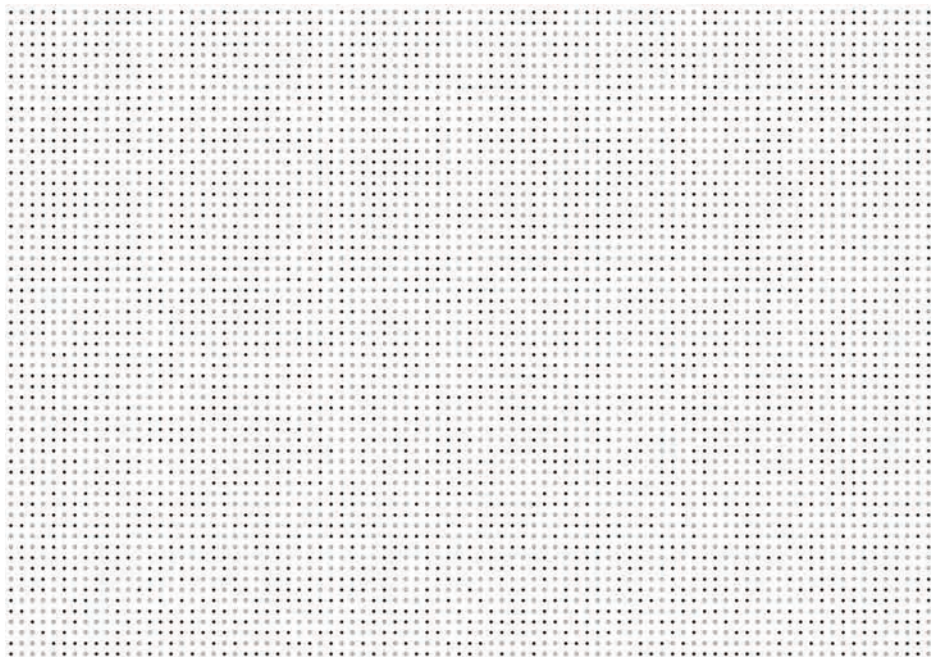
Mike Davies



One particularly difficult concept described by quantum mechanics (the branch of mathematics that seeks to describe the nature of reality at the smallest levels of matter—and hence our reality, separated from our senses by degrees of scale) is that of randomness. We have a vague, intuitive understanding of randomness because everyday things happen that seem to have no intrinsic cause or meaning. We recognise many things as being out of our control, some of which also seem to be coincidence, others pragmatically good/bad luck, and so we just get on with dealing with their consequences (or simply watch the chaos unfold...). But in quantum mechanics, randomness is a set of equations, certainty in a symbolic language that cannot be spoken.

There are few things in quantum mechanics that can be demonstrated (as if by a magician on stage, in-front-of-our-eyes...) but one is an experiment which directs a beam of light onto a semi-reflective mirror. If it was a full mirror, the light beam would reflect off the





mirror, and if it was just a plain piece of glass, the light would shine straight through. When the mirror is only half-reflective, it is perhaps no surprise that what happens is that half the light gets reflected and the other half passes through (the light is split into 2 beams of half-brightness). But at the level of individual photons of light (particles of light) what quantum mechanics describes is that whether a single photon passes through the mirror or gets reflected is intrinsically random. What this means is that even if you were God, and you were able to follow each photon (which if we pretend is an impossibly small pool ball travelling at almost 300 million meters per second) on its way to the mirror, you would not be able to predict whether your chosen photon will pass through the mirror or get reflected. All you can predict is that, on average, half of all the photons will pass through and the other half will get reflected.

This extreme kind of doubt about what will happen next, embedded throughout the mathematics of quantum mechanics, almost

defies understanding; but it can be shown to be real in electronic devices built to generate random numbers. These machines work by detecting the random nature of light photons in certain situations (perhaps not exactly like our mirror example but based on related mathematical concepts). You can buy such devices to use to generate your own absolutely-random lottery numbers (although they are quite expensive!). One such device, the Quantum Random Bit Generator, has been built in the Ruđer Bošković Institute, Zagreb, Croatia. This device generates a constant data stream of 1's and 0's (analogous to the photon passing through or reflecting off our mirror) which is then made available to scientists who require large amounts of random numbers for their research through the website <http://random.irb.hr/>

The 'quantum random number theory' series of images uses this raw random stream of data to visualise and explore the idea of pure randomness. The series starts with a picture of 10,000 dots representing the random 1's and 0's generated by the QRBG machine. The dots are arranged in a grid, and this image was then sampled and processed manually to produce a series of increasingly more complex, coloured abstract images. The series starts with the idea of absolute purity; 10,000 black and white dots laid out on a 100x100 grid. Subsequent versions of the picture progressively destroy this grid layout using simple processes repeated many times.

The creation of complex structures from a simple source through seemingly simple repeated processes is also what we understand to be behind the mechanism of evolution; in this case it is not the evolution of living cells that is being simulated, but the evolution of the underlying grid, the framework upon which all other frameworks are built. Our grid is not empty, it is filled with a mist of random numbers. What kind of map is that? Perhaps from this abstract randomness, structure and sense become real, and so we might look at all these random numbers and think, perhaps this is what we really are, beyond hope and hopelessness, with or without God. Because regardless of whether you believe in some kind of absolute randomness, or believe in God or not, there must always remain a sense of wonder, of unexplainability, without which our lives would gradually become drained of meaning and hope. This sense, this doubt, is encapsulated in the form of the grid, a perfect but empty structure, waiting to be filled with the substance of our lives.

