

## Can a scientist with tools of his science distinguish between chance and purpose or design ?

Alfred Driessen,

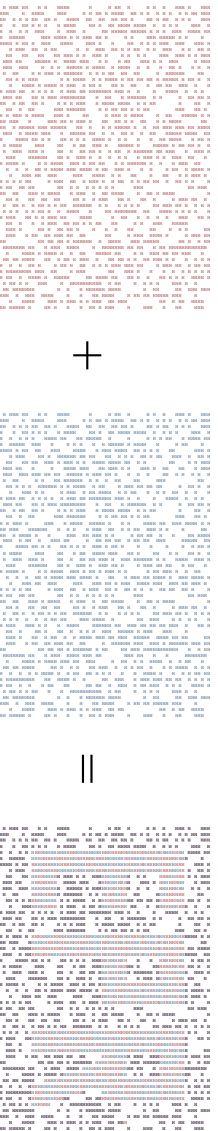
Department of Electrical Engineering, Applied Mathematics and Computer Science,

University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands,

e-mail: [A.Driessen@utwente.nl](mailto:A.Driessen@utwente.nl), web-site: <http://ioms.ewi.utwente.nl>

### Summary

In order to solve this question a Gedanken experiment originally conceived of John Bell [1] is considered. In this experiment coins are tossed and the results - head or tail - are displayed as set of characters in an array. Suppose now a magic power turning certain coins once more. Once again a random pattern appears. Only by superposing both random patterns, a letter combination EPR appears (see Figure).



Apparently there is purpose in the appearance of EPR, as the magic power is selecting certain coins to be turned once more. The scientist, however, who is looking at the two patterns will not recognize any structure beyond randomness and will describe the appearance of EPR as a pure matter of chance. There is no physical or scientific equipment to measure purpose. Only a philosophical analysis is able to decide whether there is something real beside the physical level. The result of this analysis yields two alternatives for a non-deterministic world: either there is only chance, or there is also purpose. Both are metaphysical statements. For illustration a few statements of philosophers (Gilson, Thomas Aquinas) as well as scientists (Hawking, de Broglie, Einstein, Nienhuis) are given. In the last part of the talk the role of the final cause, as already introduced by Aristotle, is emphasized. It leads to the conclusion that restricting reality to pure physical or biological systems, one excludes final aspects of causality. In that case, evolution is necessarily blind and directed by chance and complexity, order and beauty in nature are inherently incomprehensible.

### References

- [1] J.S. Bell, Indeterminism and nonlocality, in A. Driessen & A.Suarez (eds.) *Mathematical Undecidability, Quantum Nonlocality and the Question of the Existence of God*, Kluwer Academic Publishers, Dordrecht 1997, pp 84-100; see also <http://ioms.ewi.utwente.nl/members/membersdoc/driessen/philosophy/index.html>

### Biography

After studying physics in Cologne, Bonn and Amsterdam, Alfred Driessen obtained his Ph.D. on quantum solids in 1982 at the University of Amsterdam. After a postdoc period at the Free University Amsterdam he was appointed in 1988 as associate professor (2003 full professor) at the University of Twente in the field of integrated optics. Besides research in that field he is interested in philosophy and especially philosophy of science.