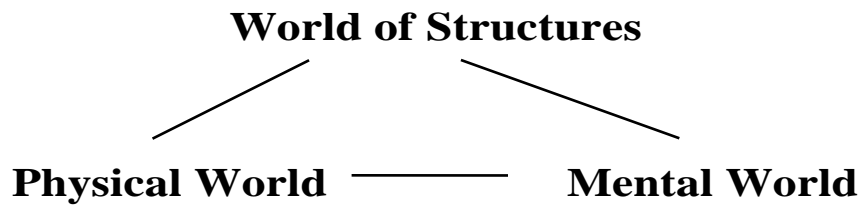


Materialization and Idealization of Information
or
the grand illusion

Mark Burgin
UCLA, CA, USA



The Existential Triad of the World

It consists of three components: the Physical (Material) World, the Mental World, and the World of Structures (Burgin, 2010). The Physical (Material) World represents the physical reality studied by natural and technological sciences, the Mental World encompasses different forms and levels of mentality, and the World of Structures consists of various kinds and types of ideal structures.

There is scientific evidence of the distinction between Physical (Material) World and the Mental World. The Mental World, as a rule, contains an image of the physical world. However, it can contain much more. For instance, according to the psychological object-relation theory of Melanie Klein, from the earliest moments of life, children construct imaginary “phantasies” creating the world of the “unreal real” (Klein, 1930/1975; Monte, 1999). Adults, especially, creative individuals also create mental images that do not exist in reality

While the Physical and Mental Worlds are accessible by human senses, the World of Structures can be achieved only by the intellect as Plato predicted (Burgin, 2017). To better understand the World of Structures, it is helpful to envision its necessity for the completion and elucidation of the interplay between two sensible Worlds.

Information as an important phenomenon in nature, society, and technology has a huge variety of information manifestations with a common feature – when people encounter information, it is associated with some physical entity. This situation brought many researchers to the conclusion that information is physical (cf., for example, (Landauer, 2002)).

According to the general theory of information (GTI), information belongs to the ideal World of Structures, which is the scientific incarnation of the World of Plato Ideas or Forms (Burgin, 2011; 2017). This place of information looks contradictory to the assumption that information is physical and to the fact of the incessant presence of information in nature, society, and technology.

I am going to show here that this is only a grand illusion. To better explain this clarifying the meaning of materialization and why being ideal, information only seems physical to people, I would like to suggest the **Flying Metaphor**.

The Flying metaphor

If we ask the question whether people can fly, the answer will be yes and no. Yes, an individual can take a plane or a helicopter and fly to another city, another country or even another continent. The answer is also no, because without technical means people cannot fly. So, to fly, an individual has to embed herself or himself into a technical device, e.g., a plane, which is designed for flying.

People cannot fly without technical means.



So, to fly, they have ...

to go to the airport,



to be embedded in a plane, which is a flying carrier,



and only then to fly



In a similar way, to come to the physical world of people, information, which belongs to the ideal world of structures, must be embedded into, or embodied with, a physical carrier. The process of this embedment (embodiment) is called **materialization**.

Some researchers argue that information is physical because it acts on physical things. This is similar to the argument that people are birds because people can fly.

A proof of the ideal nature of information can be achieved if we analyze the situation when different physical things carry (provide) the same information. Thus, such physical things are not portions of information but they contain a portion of information. For instance, different mails (letters) with the same text definitely contain the same information. The same phrase written on the paper and displayed on the screen of the computer in both cases contains the same information. Even different sentences can contain the same information. All these mails, letters, printed or written phrases and sentences are physical embodiments (carriers) of information.

Let us look at the following texts.

One sentence is a text.

One sentence is a text.

One sentence is a text.

One sentence is a text.

One sentence is a text.

Independently of their size, color or font, they convey the same information and we can clearly see that the physical embodiment of information is similar to clothes of people. A person wearing different outfits nevertheless remains the same person.

The same portion of information can be embedded in different physical objects but stays the same independently of this embeddings.

There is also the process of **information idealization**, which goes in the opposite direction and is reciprocal but not always inverse to materialization of information.

Both these processes are formally represented as named sets.

Burgin, M. *Theory of Information: Fundamentality, Diversity and Unification*, World Scientific, New York/London/Singapore, 2010

Burgin, M. (2011) Information in the Structure of the World, *Information: Theories & Applications*, v.18, No. 1, pp. 16 - 32

Burgin, M. (2017) Ideas of Plato in the context of contemporary science and mathematics, *Athens Journal of Humanities and Arts*, v. 4, No. 3, pp. 161 – 182

Burgin, M. and Markov, K. *A formal definition of materialization*, in *Mathematics and Education in Mathematics*, Sofia, 1991, pp. 175-179

Landauer, R. (2002) Information is Inevitably Physical, in *Feynman and Computation: Exploring the limits of computers*, Westview Press, Oxford, pp. 76-92

