The indeterminacy of scientific theories and the end of deterministic ideas

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"If we designate as past all those events of which we, at least in principle, can learn something, and as future all events on which we, at least in principle, can still act, then it corresponds to our naive idea to believe that there is only an infinitely brief moment between these two groups of events, which we can call the present point in time. That was also the idea on which Newton had based his mechanics." [i]

What Werner Heisenberg expresses with this statement was already pointed out over two thousand years ago by Heraklitus with just two words: "Everything flows". To this day, however, most people still find it very difficult to get used to the idea of being involved in this continually "flowing" change process and thus also being its co-creator. That is understandable because the vagueness of this process and the resulting unpredictability and uncontrollability of what is happening scares many people.

As an obvious coping strategy they, therefore, prefer to rely on control, clear decisions, clearly defined goals, and irrefutable rules and laws. To be involved as a mere co-creator in a process of development of living things that takes place without their involvement is just as unimaginable for the majority of people today as it was for most people (including most scientists) in the Middle Ages that the earth was round and circling the sun. Last but not least, the profound experience of the Enlightenment teaches us that not only the world in which we live but also the ideas we have about this world and our role in this world are constantly changing.

Heisenberg's diagnosis is a clear rejection of all efforts to maintain this process of change with the help of deterministic ideas and ideologies. Nevertheless, determinism and the resulting belief in the controllability of our lifeworld has remained the most influential doctrine to this day. But like all dominant relationships, ideologies, and convictions that were initially regarded as irrefutable and considered to be valid for all time, these deterministic ideas also fall victim to the inevitable changes in our world of life and experience.

With the Copernican turn, the all too narrow and tightly lashed medieval worldview collapsed like a house of cards. This enabled the dawn of the Age of Enlightenment. The resulting scientific and technical gain in knowledge has not only changed our world, digitized and globalized it, but also created an unprecedented level of complexity and mutual dependencies in this world. It is now called the VUCA world because of its Viability, Uncertainty, Complexity, and Ambiguity.

After the Copernican change, we are now facing a much deeper change in our previous understanding of the world and ourselves. It is characterized by the dissolution of deterministic theories and ideologies and forces us to consciously set off into a constantly changing, indeterminate, and never completely controllable world, of which we humans have been and will remain in the future.

With the considerations and findings presented here, we would like to help ensure that we succeed in this departure.[ii]

As a core concept, we interpret a new and current physical theory formation (the so-called Erlanger program by Klaus Mecke[iii]), while we synthesize this approach in the context of a logic which is based on – besides the

dualistic values true /false – an imaginary or unproven truth value – which roots back to Aristotle but is nowadays rediscovered by the Linguist Ulrich Blau and others.[iv]

Those settings enable a new derivation and presentation of the ontological location and status of neurobiological processes. According to this, the processes of the living appear as points of convergence that are to be sought in a previously unseen 'infinite' beyond the classical notion of space and time (that is, beyond the deterministic world). It follows from the Erlangen program that classically understood 'physical laws' have no validity for anything in the future. However, the points of convergence of life seem to lie in an 'infinite', which refers to a potential 'future' due to the origin of the universe. We refer to this logic as the "logic of touch and indeterminacy". From a quantum physical point of view, the “ability to touch” includes imaginary values, ie. energy-free and therefore not measurable (i.e. "indefinite") structures. It constitutes the core of our being human: namely the ability to continuously merge our personal “knowledge” with a “feeling” that unites living species into a larger whole.

The tangible meaning that reveals itself in our thoughts results from how these thoughts are arranged in a *larger whole* and manifesting the roots of human imagination and consciousness – beyond classical or semantic information. This larger wholeness also deeply corresponds to the structure of our values. That is one of the reasons why we are blind to these connections today and so much seems to melt away as firmly believed. However, how could these dimensions work together? How does information become imagination and vice versa?

While current information concepts are based on algorithmic and/or semantic base structurization and methods, they cannot intrinsically explain or help and support people on how to do the “right thing”. Those concepts do not yet offer to conceptualize ethical and moral questions from within a logic of “touch and indeterminacy”. For example, they cannot contribute physically-based reasons for continuous growth in energy consumption. For this reason, this study will give focus on a more realistic understanding of “information” and the further need to exploit human capability in imagination and doing the “right thing” from within a so far not discussed intrinsic perspective. That is what a growing amount of people seems to ask for.

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[i] Heisenberg, Werner: Atomforschug und Kausalgesetz, 1954, in ***UNIVERSITAS 1-2/1988***, online: http://hartwig.bplaced.net/text/alte_artikel/1954_Heisenberg/1954physik.htm, [Atomic research and the law of causality; transl. GL]

[ii] Luhn, G. and Hüther, G. (2017) ‘Thinking, future and ‘non’-causality. On life and consciousness in the complex plane’, Int. J. Foresight and Innovation Policy, Vol. 12, Nos. 1–3, pp.5–36.

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[iii] Mecke, Klaus: Raum - Zeit – Materie ∗ Auf der Suche nach einer einheitlichen Theorie der fundamentalen Naturgesetze. Erlangen 2018, Online https://theorie1.physik.uni-erlangen.de/media/pdf/publications/finites_weltbild-kurzfassung.pdf [Space - Time - Matter ∗ In search of a unified theory of the fundamental laws of nature; transl. GL],

[iv] Blau, Ulrich. Die Logik der Unbestimmtheiten und Paradoxien. Philosophische Impulse, vol. 8. Synchron Wissenschaftsverlag der Autoren, Heidelberg, 2008 [The logic of vagueness and paradoxes. Philosophical impulses; transl. GL]