

Ludwig Boltzmann and the Key to Connecting Crucial Physics and Social Science Theories

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Since 2019, I have been accompanying the development of the Mindsponge Theory (MT). In 2023, the book *Mindsponge Theory* was officially published, marking a significant milestone [1]. During this period, I completed my doctoral research and explored new methods to enhance work efficiency.

The journey was filled with challenges. Surprisingly, the difficulties arose from concepts that seemed small and basic, almost taken for granted as "already known." I was entrusted by my co-author—the father of the mindsponge mechanism—with the task of further developing the theory. He was not satisfied with what seemed like the final form, encapsulating Mindsponge theory as an information mechanism of biological systems.



Photo: My co-author [6] in Vienna, visiting the grave of Ludwig Boltzmann at the Central Cemetery Park in 2018. The Entropy formula (S) from the second law of thermodynamics is engraved above the bust.

This was a significant challenge because the next form could only be approached using scientific information from quantum physics, as predicted by Erwin Schrödinger [2]. Indeed, our exploration traversed many realms of physics and information. This journey was greatly supported by books like *Reality Is Not What It Seems* by Rovelli [3] and *On the Origin of Time* by Hertog [4], along with Shannon's principles of information theory [5].

The more valuable information we gathered, the more we realized the vast contributions left by countless brilliant minds, highlighting our own limitations. I was driven by a seemingly simple yet profoundly challenging question:

- What is value? What approach is needed to reach its deepest essence?

The insights presented in the latter part of the book helped us understand previously overlooked aspects [6]. It became evident that this seemingly tiny understanding demanded immense time and effort. Many times, just as we thought we had grasped it, it slipped away.

One crucial "clue" was the discussion about the relationship between heat, time, and information by Rovelli [3]. This naturally led to Boltzmann's entropy and the concept of information loss and energy interaction, opening connections to valuable answers for us. (Here, the term "value" comes into play again.)

Coincidentally, my co-author preserved a photograph taken next to Boltzmann's grave in Vienna, Austria, in 2018, with the entropy formula etched in stone [6].

References

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