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Preface

The aim of this book is to establish a *science of knowledge* in the same way that we have a *science of physics* or a *science of materials*. This might appear as an overly ambitious, possibly arrogant, objective, but I ask the reader to bear with me. On the day I am beginning to write it–June 7th, 2020–, still under the strict Covid-19 lockdown in Madrid that has lasted since mid-March and that has occasioned for me another productive spurt in my work as a scientist, I think I am in possession of a few things that will help me to achieve this objective. Again, bear with me.

The abovementioned aim is well reflected in the title I chose (just now) for this book: *Knowledge & Logic: Towards a science of knowledge*. Although I do not know if the ampersand will be replaced by the more humble *and* and I regret that this title does not contain the expression *knowledge science*, I already know a few aspects that will mark this book. The most important one is that I shall take logic to be to knowledge science as calculus is to physics or to materials science. I like this latter analogy in particular, because of the interdisciplinary character of materials science: Knowledge science, too, is essentially interdisciplinary. Note that I am not making analogies like "as statistics is to sociology or psychology," which should suggest that I do not envisage here yet another "human science;" or "as statistics is to data science," though data science and knowledge science are often conflated (confused, in my view).

Importantly, I do not intend to reclaim knowledge from the bosom of philosophy, in which, known as epistemology–or *gnoséologie*, just to annoy the analytics–its erudite discussion has hardly progressed since Plato first defined it as true belief with *logos*. As someone with an academic background also in philosophy, I do not see this lack of progress as a negative feature; maybe it is just the way philosophy is supposed to be but, be it as it may, the Platonic definition of knowledge, with only a few adjustments, will actually provide me with the right, science-bound start. More recently, knowledge has been reclaimed by the field of business administration, in particular by the subfield known as knowledge

management, a reclaim that has opened the box of Pandora: Among the evils, and perhaps at the head of the list, is an overly lay, essentially naive, notion of knowledge. But the very idea that one can have something like "knowledge (management) software" puts us on the right track.

Last but not least, I do not intend to reinvent the wheel, though I have a couple of tricks up my sleeve. Indeed, my strategy will be to some extent the bringing together of theoretical aspects and practices that are already (well) documented in published works, if I plan to see them from the eye of the knowledge scientist proper.

Madrid, June 7th, 2020

Luis M. S. Augusto

Observations

The idea is to post in this draft some contents contributing to the completion of this book. In particular, I plan to post, besides the original Preface (which will obviously be further elaborated), the evolving structure of the book and the bibliography cited/used so far. With respect to the structure, two main parts will in principle suffice: Truth (Part 1) and Epistemic justification (Part 2). I expect the book to be to a great extent a comprehensive elaboration on the contents of this paper of mine: Augusto, L. M. (2020). Toward a general theory of knowledge. *Journal of Knowledge Structures & Systems*, *1*(1), 63-97. (Available here: https://philpapers.org/go.pl?id=AUGTAG&aid=AUGTAGv1)

But no book without an introduction. In the case of this book, it is important to settle the following aspects in the **Introduction**:

- A long way since Plato's *Theaetetus*: Some historical remarks on (the study of) knowledge, with an emphasis on some essential authors such as Aristotle, Kant, and Nietzsche (Augusto, 2005)

- Definition and relevance of a *knowledge science*

- *Knowledge* and *knowledge science*: From *propositions* to *facts*

- Epistemology vs. (?) formal epistemology (e.g., Pettigrew & Weisberg, 2019); more specifically, *mainstream epistemology* vs. formal epistemology (e.g., Hendricks, 2006)
    - Logical epistemology
    - Computational epistemology
    - Bayesian epistemology
    - ...?

- The role of mathematics in the scientific status of disciplines, namely of knowledge science
    - (Meta-)logic and (meta-)mathematics:

Observations

  ∗ Theoretical foundations: Order relations, the well-ordering principle, the axiom of choice

  ∗ Logic and algebra: Algebraic logic

  ∗ Common structures and systems (e.g., lattices, closure systems, Galois connections, ...), namely as seen from the viewpoint of logical consequence (Augusto, 2020; Humberstone, 2011)

– Computer science I: From mathematical structures and systems to computing structures and systems

  ∗ Knowledge representation and reasoning

  ∗ *Knowledge software* in

   · Knowledge engineering

   · Knowledge management

   · ...

– Computer science II: Logic in computing

  ∗ Epistemic logic(s)

  ∗ Complexity and computability issues

Comments welcome: luis.ml.augusto at gmail.com

Bibliography

Augusto, L. M. (2005). *Who's afraid of idealism? Epistemological idealism from the Kantian and Nietzschean points of view.* Lanham, etc.: University Press of America.

Augusto, L. M. (2020). *Logical consequences. Theory and applications: An introduction.* 2nd ed. London: College Publications.

Birkhoff, G. (1967). *Lattice theory.* 3rd ed. AMS.

Dunn, J. M. & Hardegree, G. M. (2001). *Algebraic methods in philosophical logic.* Oxford: Clarendon Press.

Gettier, E. L. (1963). Is justified true belief knowledge? *Analysis, 23,* 121-3.

Hendricks, V. F. (2006). *Mainstream and formal epistemology.* Cambridge, etc.: Cambridge University Press.

Humberstone, L. (2011). *The connectives.* Cambridge, MA: Massachusetts Institute of Technology.

Koppitz, J. & Denecke, K. (2006). M-*solid varieties of algebras.* Springer.

Pettigrew, R. & Weisberg, J. (2019). *The open handbook of formal epistemology.* The PhilPapers Foundation.

Plato (......) *Theaetetus* [I haven't decided yet which edition / translation to use]

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