Review of: "Classical Thermodynamics: Primacy of Dissymmetry Over Free Energy"

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Potential competing interests: No potential competing interests to declare.

Thank you for the invitation to review this paper. I enjoyed reading the historical quotes. A few things:

1. The article could be much more concise. The derivations are in most thermodynamics textbooks.
2. I don't know the format of Qeios articles, but this article's language is not consistently technical.
3. I am unable to comprehend the practical aim of the article. The author seems to argue against the universality of free energy dissipation, using isothermal processes as examples. This is directly evident in the fundamental Helmholtz and Gibbs relations. If the aim is to disprove Thomson's assertion, perhaps it should be written as a review article. I don't see anything wrong with the current understanding of the second law and the author's “dissymmetry over free energy”. Most good thermodynamics textbooks are quite consistent in explaining these concepts. Note that the second law can be seen/presented from different perspectives, and often times, one chooses the most convenient for the situation at hand.
4. The author wrote “To this day, the idea that although energy can never be destroyed in a system, it can be wasted or dissipated with the maximum amount of waste given as work output in a reversible operation has been the lesson taught to generations of engineers." This does not seem to be an accurate depiction of the energy analysis or availability/exergy analysis found in engineering thermodynamics textbooks.
5. The author does not include Ilya Prigogine's entropy balance, which includes entropy generation. This is also taught in undergraduate thermodynamics and gives a clear picture of the second law's application to real/irreversible processes. It could be considered within the scope of this article.

In conclusion, this article could be re-written as a historical review of interpretations/statements of the second law.