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Translation and Translatability in Intersemiotic Space

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Translating Time: Modelling the (Re)Processing of Emerging Meaning

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ABSTRACT

The choice between substance ontology and process ontology has been haunting our thinking since, at least, Ancient Greek philosophy. The assumption seems that things are the way they are and that one has to put work into changing them. Constancy or substance, in this view, is primary and change (or process) secondary. In translation studies, this plays out in the source text as the stable starting point that has to be transformed into a target text. Based on Peirce's process semiotics and other process thinkers, I inverse the above argument, arguing that change or process is primary and constancy or substance secondary. Because the universe is subject to the Second Law of Thermodynamics, it is a process taking form rather than a form changing. Any text is a process that has been constrained materially to be relatively stable, but the stability is not original; it is the effect of semiotic work, translation. My interest is in the semiotic work done to constrain the semiotic process into some form of stability and how one can get to know or understand these constraints. Part of this paper explores some of the implications of process thinking for translation studies. However, this reversal of ground and figure also challenges the modeling of translation. If translation is a process, how do we model it in a static medium such as print? Therefore, I explore the affordances that new computational technology offers for translating static models into dynamic ones.

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1. Introduction

It is probably fair to say that scholars have always considered translation to entail process in some respect. For example, Holmes' (1972) conceptualization of translation studies allows for process studies. Lefevere (1992) thinks that translation is a form of rewriting, which one could conceive as an instantiation in process. Robinson (1991; 2001; 2016) works out various aspects of the process nature of translation, particularly in his recent work on *icosis*, according to which translators, taken together, move towards a better understanding of source texts. Pym (1993; 2000; 2012) argues that translation is a meaning-making process in which the 'final interpretation' is pragmatically subject to real-world constraints such as time, energy, and money.

Apart from these more general conceptualizations of the translation process, three strands of thought have explicitly focussed on process. Firstly, the 'process school' considered translation a cognitive process (Bell 1991; Ehrensberger-Dow et al. 2015; Li et al. 2019). This includes earlier 'Think-Aloud-Protocol' approaches and later cognitive approaches. Secondly, sociological approaches to translation had to think about the social process of which translation practices are part (Chesterman 2015; Tyulenev 2014; Van Rooyen 2019; Wolf 2011; 2012). Thirdly, and most recently, neurological approaches have been trying to understand the brain processes involved in translation (Garcia 2019; Tymoczko 2012). However, there seem to be only a few scholars who link translation studies to process philosophy (Basalamah 2018; Blumczynski 2016) or entropy and the Second Law of Thermodynamics (Cronin 2017; Marais 2019) to consider the position of translation in a process ontology, rather than localized processes in a substantialist ontology.

At the same time, it is also probably fair to say that translation has been conceptualized predominantly in spatial terms. Taking a cue from its etymology, translation has been conceptualized in terms of "carrying over" or "crossing a river" (Nida, 1969). Even recent efforts to expand the conceptualization of translation maintained the spatial metaphor, for example, turning over (Tymoczko 2007). Also, St Andre's (2010) compilation contributed several metaphors that all have spatial underpinnings.

This spatial conceptualization and remnants of a substantialist ontology and the material affordances of modeling on paper influenced translation studies' conceptual tools decisively. Thus, translation studies distinguished a source text from a target text. It theorized moving either the source text or the target reader. It borrowed the term equivalence from natural sciences to determine a yardstick to measure stability. Besides, the debate about translatability is waged on two fronts.

On the one hand, scholars argue that the materiality of a source text is too determined to be translated to a greater or lesser extent. On the other hand, scholars argue, to a greater or lesser extent, that the meaning of the source text is too indeterminate to

be translated or at least that the indeterminacy of meaning is a translation problem (Robinson 2001). Even when, in recent years, the focus shifted to translation as change, the change was still predominantly conceptualized in spatial terms.

In this paper, I consider translation based on the assumption that all of reality is subject to the Second Law of Thermodynamics, and thus entropy. I build on an earlier conceptualization that considers translation to be the negentropic work performed on semiotic material to create meaningful human interaction (Marais 2019: 121-129). Thus, my interest is on process, time, and work in the socio-cultural domain – and their relationship. However, I do have a second interest in this paper, and that is the problem of modeling translation as a process in time, in four dimensions.

As a point of clarification, I need to mention that my aim in this paper is conceptual. I clarify this because I am convinced that observation is not neutral and that conceptual frameworks preclude one from observing certain things in reality. My conceptual framework aims not to give ready-made tools but rather to explore whether this 'way of looking' can allow us to see differently or see different things.

2. Translating time

To start, I present two quotes from Peirce:

> A sign is anything that determines something else (its interpretant) to refer to an object to which [it] itself refers (its object) in the same way, the interpretant becoming, in turn, a sign, and so on ad infinitum" (CP 2.303) […] conception of a 'meaning,' which is, in its primary acceptation, the translation of a sign into another system of signs […] (CP 4.127).

It is clear from these two quotes that meaning is always in the process of being made, it is always semiosis (not semiotic), translating one representamen into another. Based on this conceptualization, I proposed that translation be conceptualized as the work performed on semiotic material to constrain the material to engender meaning. This conceptualization, which I worked out in detail elsewhere (Marais 2019), requires translation scholars two things: to think of translation in terms of process and, thus, to think of translation in terms of time.

Like Queiroz and his collaborators (Aguiar et al. 2015; Queiroz & Ata 2018), Seibt (2003: vii) believes that, whether seen ontologically or phenomenologically, static entities like substances, attributes, relations, facts, and ideas dominate scholarly thought. Juarrero and Robino argue that the dominance of a mechanistic worldview had as a side effect a reduction in the complexity of views of development and emergence: "The subtle distinctions among mere development (the unfurling of preformed potential-

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ities), the emergence of novel but epiphenomenal properties and entities, and the emergence of higher order properties that can exert top-down influence on their particulate components remained unappreciated" (Juarrero & Rubino 2010: 7).

In addition, they make a crucial point, namely that the driving force in a world viewed as mechanistic is dissipation, i.e., entropy, while the driving force in a world viewed as thermodynamic is concentrative, i.e., negentropic (Juarrero & Rubino 2010: 9; Peirce 2010: 52). In this regard, Kant's (2010: 27) idea of an organism, namely that it is both cause and effect of itself, explains the negentropic work that sustains a live organism. Poincare (2010: 57) points out that this causal process is not necessarily reversible when the Second Law is applicable.

In process thinking, it is thus essential to clarify the relationship between time and space, as well as the relationship between change and stability. Alexander (2010: 81) reminds us that we cannot separate time and space. Time indicates change and motion, which endures in reality. In Bergson's (2010: 62) view, things change so continuously that we mostly do not notice them, but sometimes changes are so significant that we do notice them. Says Bergson (2010: 66), "[*t*]he more we study the nature of time, the more we shall comprehend that duration means invention, the creation of forms, the continual elaboration of the absolutely new." In his view, we 'cut' bodies out of the continuum like one would cut a figure out of paper, but the continuum was prior (Bergson, 2010: 67).

In translation studies, as in many other fields of study, we face the challenge of rethinking our ontological, epistemological, and phenomenological assumptions to bring them in line with physics' understanding of reality as a process. In my understanding, modern physics is built on the principle that the most basic 'parts' of reality are not 'substances' but energy in relation to other energy – organized energy (Deacon 2013). Matter is not the basic substance or reality but the effect of a more basic process through which energy is organized so that it becomes matter. For Whitehead (1985 [1978]: 22), "the actual world is a process, and … the process is the becoming of actual entities," so that the "the actual entity is the real concrescence of many potentials." This view implies that entities are not determined by their parts (only) but (also) by how they become, which means that the process that works on the substance is as relevant as the substance on which the process works. In Whitehead's (1985 [1978]: 23) words, the 'being' of entities is constituted by their 'becoming.' The process of emergence thus means that coherent entities come into existence from incoherence (Whitehead 1985 [1978]: 25). This means that they are not the "unchanging subject of change" (Whitehead 1985 [1978]: 29), but that all entities are themselves processes, constantly changing. Expanding the idea that one cannot cross the same river twice, Whitehead posits that the same thought cannot be thought twice, and the same experience cannot be had twice (Whitehead's 1985 [1978]: 29). For translation, this means that the same meaning cannot be repeated – and it is for translation studies to work out the implications of this claim. The same

word uttered a nano-second after the first does not have the same meaning because time has elapsed. In Whitehead's words, "progress is the growth and attainment of a final end. The progressive definition of the final end is the efficacious condition for its attainment" (Whitehead 1985 [1978]: 150).

While Whitehead argues for a process philosophy, he points out that reality is "a wavering balance between the two," namely between process and substance, or "a structure of evolving processes" (Whitehead 2010: 151). Bateson (2002: 181-189) supports this argument by arguing that form and process are related in a dialectical zigzag ladder and that both, as it were, co-construct one another. This is also in line with Deacon's (2013) ideas about constraints, which cause trajectories, causing further constraints – hence process and pattern co-construct one another. Put as elegantly as Bateson (2002: 188) can formulate: "Instead of a hierarchy of classes, we face a hierarchy of orders of recursiveness." I follow Whitehead in taking a complexity view in which process and substance are interrelated, as I shall proceed to model below. A process creates structures. They are the patterns of process, created by the constraints that operate on processes. In this view, process thinking turns typical emergence thinking on its head, not by denying substance or stability, but by explaining that substance or stability emerges from process. This means that we also need to turn our thinking on its head and realize that the big question in translation is neither how we can maintain the source text's stability/substance/meaning nor how we can disrupt the source text's stability. Incipient sign systems are processes that have been constrained through work to create meaning. Thus, it is not the nature of the particles (semiotic material) alone that determines meaning, but the nature of the constraints, the work performed on the material. It is thus not in the 'nature of meaning' that it is stable or unstable. The effect of the work performed on meanings renders them (relatively) stable or unstable. For example, the words and ideas in the constitution of South Africa are not more or less indeterminate than those used in a novel or those used in an advertisement. And yet, the Sesotho version of the constitution is legally as binding as the English one. Why? I think there are two reasons, at least. One is the organization of the text; in other words, the textual constraints that operate in the process of creating this particular meaning. Another is the social constraints brought to work on this text: teams of translators, revisions, checks by legal experts, and finally, a stamp by the office of the President to declare it legally binding.

The main reason we need to think in terms of process is that all of reality, including culture, society, and scholarship, is subject to the Second Law of Thermodynamics, which states that all of reality shows a tendency (not a law) towards equilibrium or entropy. The only way to counter this drive towards death is by performing work to harness local differences in energy that can be utilized to counter the entropy, for instance, in living beings or machines (Deacon 2013: 326-370). In this regard, Schrodinger (2010:

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201) then asks the question at the heart of the problem of the process: If everything is subject to the Second Law of Thermodynamics and thus to disorder, how do living organisms avoid decay? He answers that they do so through the process of metabolism, i.e., of taking from their environment what they need to counter entropy. Now, I think we need to extend this question towards society-culture: How does society-culture avoid decay – assuming that it is subject to the second law like everything else. In my view, this question lies at the heart of what translation studies are about.

One of the central debates in process thinking is about the location of causality. As Bickhard (2011: 5) says, if we grant basic causality to particles, it means that organization has no causal power, which means that there can be no causal power in emergent higher levels of reality. He argues that a process philosophy should be relational in that "process flow is an organization, thus a relational phenomenon" (Bickhard 2011: 11). Relationality implies that causality is complex because things stand in multiple relations, as Whitehead (1968: 164) states: "No event can be wholly and solely the cause of another event. The whole antecedent world conspires to produce a new occasion." This implies a certain circularity of cause and effect in processes (Blumczynski 2016: 80; Marais 2019). The father of systems theory, Von Bertalanffy (2010: 219, 224), points out that, even in physics, the issue at hand is organization, which also holds for society and culture. Bickhard (2011: 20) proposes an interactivist model to explain the emergence of mind in order to account for the mind as representing reality in such a way as to avoid error – rather than to find some truth. In this interactive model of cognition, the mind emerges as focused on future possibilities, not primarily on past actualities (Bickhard 2011: 21). He rejects substance or particle metaphysics in favor of ontological emergence that entails complex relations rather than complex particles (Bickhard 2011: 29).

Deacon (2013) also questions the primacy of particles, arguing that wholes precede particles and that arguments that assume reality as constellations of particles are inherently flawed. He (Deacon 1997) also criticizes linguistic models that take words as the building blocks of language. Instead, reality emerges under the constraints that limit the possibilities, which means that only particular possibilities are realized, which means that the possibilities that have been realized further constrain the realization of the 'remaining' possibilities. It is in this sense that Deacon argues that the unrealized possibilities, by dint of not being realized, exert causal power (Deacon 2013: 182-205).

As indicated above, Queiroz argues that much scholarly thinking assumes a substance ontology in which stability is primary and change secondary. Whitehead (1985 [1978]: 209) adds that humans tend to 'spatialize' reality, which implies that they tend to "ignore the fluency, and to analyze the world in terms of static categories." As indicated in the introduction, I think that translation studies suffer from this same bias. Instead, following Queiroz and like-minded scholars, I suggest a process ontology in which it becomes possible to think about translation in four dimensions. This means

that one will be able to think about translation in terms of both space and time. However, when assuming a process ontology, it also means that process is primary and stability or substance secondary. This changes the problem of translation. In a substance ontology, the problem of translation is a problem of change. How is it possible to change meaning if the incipient sign is stable? How is it possible to transfer meaning if the incipient sign is unstable? This kind of questions raises the typical issues in substance thinking, namely questions regarding the possibility of change.

Quoting Boden, Aguiar, Ata, and Queiroz (2015: 12) argue that semiosis is based on constraints that cause structures to emerge. They argue along lines similar to that of Deacon (2013), who believes that reality emerges through a complex interplay of parts and constraints on parts. For Deacon (2019), it is constraints that give form to reality, and this means that what we translate is the patterns of constraints. We do not translate substances, or parts, or wholes. In any translation, the translator works with the set of constraints that are determining the incipient sign and then decides, depending on function (or intention), what work to perform on those constraints to constrain a subsequent sign – to a large extent as envisaged by functionalism (Nord 2018). This means that meaning is a process, not a change to substance but a "constraining factor of possible patterns of interpretative behavior" (Aguiar et al. 2015: 12; Aguiar & Queiroz 2009; Queiroz & El-Hani 2006). The implication of this is that a representamen, determined by an object, is acting as a constraint on the interpretation process. Let us assume a mind at leisure, which means that this mind can, in the next moment, think of anything – the possibilities are unlimited. Now, let us assume this mind is confronted by a representamen. This representamen immediately focuses attention, limiting what the mind will think of next, limiting the unlimited possibilities. This is not to say that the representamen limits the thinking to 'one meaning,' but it does mean that it limits the potential meanings, thus engendering some meaning.

In a multi-level hierarchical system such as semiosis (Queiroz & El-Hani 2006: 96-97), one has constraints on constraints, which means that the translation process can be seen as work on these sets of constraints. Any incipient sign system will be a complex system of systems in which the systems constrain one another mutually (Queiroz & Aguiar 2015: 203). For instance, rhythm and rhyme would be two such constraining systems in a poem. Thus, the forms or patterns perceivable in semiotic systems are not substantial but are rather like eddies in a river – relative stable patterns maintained over time without being static or a-temporal (Queiroz & Loula 2011: 53).

In process ontology, then, change is assumed. Reality is regarded as a process of never-ending change. The question is then: How is stability achieved? What are the constraints imposed on processes for them to become substances (too)? Thus, my argument is that one has to see meaning-making (i.e., the 'stuff' of translation) as a process akin to metabolism. It is a biological process occurring in a nervous system and/or

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brain, and it is primarily a process. According to the extended mind hypothesis, this process is stabilized materially by external cognitive scaffolding such as spoken language, written language, film, cultural artifacts, cultural practice.

The question is now: Are we able to model process, time, and emergence?

3. Diagrammatical reasoning

Metaphors and models are quite common in the humanities, where they are regarded quite loosely as thinking tools in the creative process (Chesterman 2017; Queiroz & Ata 2018; St André 2010). In this paper, I explore the Peircean notion of diagrammatical reasoning to find a more rigorous method than analogy for motivating and designing models. While metaphors are admittedly relevant to the creation of new understandings, based on its ability to see anything as anything else, they lack rigor precisely because they allow 'any thing' to be seen as 'any thing' else. While one cannot deny the possibility that anything could be seen in terms of anything else, scholarly thought does not operate on possibility only but also on probability. Therefore, while it is possible to interpret Hamlet as a whale, in a green reading of Shakespeare, how probable is such an interpretation, and how does one determine the probability – as against the semiotic possibility that needs no proof.

In Peircean thought, diagrams are a special kind of icon that 'represent the internal structure of those objects in terms of interrelated parts, facilitating reasoning possibilities' (Stjernfelt 2007: ix). Icons are representamens that relate to objects through the qualities of the icon (CP2.92), by some similarity or resemblance with the object (Stjernfelt 2007: 27-29). Therefore, a diagram is an icon that represents selected structural features of its object. By manipulating aspects of the diagram, one can reason through specific problematic issues. For instance, while one could prove with algebra that the square of the length of the hypotenuse of a right triangle is equal to the added squares of the two legs' length, one could also draw a diagram to demonstrate that this thesis is true.

It is important to note that diagrams are never pure icons (actually, very few signs, if any, are pure – iconicity, indexicality, and symbolicity usually all play a role in generating meaning). In the case of diagrams, the diagram is obviously an icon of its object, but the diagram also points to a particular object as an index. In Peircean thought, an index is a representamen that refers to an object because it is existentially affected by it through contiguity of either space or time (Stjernfelt 2007: 27), rendering two types of indexes, namely designators and reagents. This means that an index is the effect of an action or work that has created it and to which it refers. In this sense, indexes are focussed on the past, on what has caused them. A diagram is thus an icon and an index

because it indicates a particular object simultaneously as it represents the internal structure of the object.

As a subcategory of hypo-icons, diagrams represent their objects employing a "skeleton-like sketch of relations" (Stjernfelt 2007: 90). These relations can then be manipulated to better understand or even new insight into the object. Any diagram thus needs to be accompanied by the rules according to which the relations can be manipulated (Stjernfelt 2007: 97). The problem with diagrams is that they tend to be static and seem to represent a substantialist ontology. In modeling translation, this static, substantialist ontology is precisely what one wants to avoid. In a brilliant paper, Champagne and Pietarinen (2019) argue that, if one can provide moving images, these can even, in the Peircean scheme of things, be regarded as more than diagrams. They could be arguments, which are fully-fledged, complex signs, which is what I shall attempt in the next section.

Peirce argues that the process of diagrammatical reasoning entails two phases. The first, he calls 'prescission', which is the process by which one focuses on a particular feature of the object you want to manipulate in the diagram, ignoring all others. In the second phase, called 'hypostatic abstraction,' one turns the predicate of the prescission into a subject, which then becomes the topic of manipulation. As an example, I identified process through prescission, as one aspect on which I want to focus, rendering the proposition 'translation is process'. Through hypostatic abstraction, I then turned the 'is process' into a subject in the next sentence, e.g. 'process is flow' or 'process is movement.' I can then experiment on the model with which flow or movement gives me less or more relevant insight into the translation process.

4. Modelling translation in four dimensions

In the above, I conceptualized translation as a process of imposing constraints on semiotic material, playing itself out in both space and time. In this section, I want to model this process to better understand and explain it. For this modeling, I am using the Peircean notion of diagrammatical reasoning, arguing that moving visuals are arguments (Champagne & Pietarinen 2019). Following Stjernfelt's (2007: 137) interpretation of the Peircean process of transformation through diagrams, I firstly use the strategy of prescission. In this case, prescission means that I disregard all other features of translation to focus on the following:

- process
- time
- complex streams of meaning
- emergent incipient and subsequent sign systems
- infinite semiosis
- difference/similarity.

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In future models, one could prescind other aspects of translation to focus on, e.g., boundary conditions, initial conditions, or constraints. Having prescinded these aspects, I then follow the second step in the procedure, namely "hypostatic abstraction" whereby I "make a new subject out of a predicate to facilitate further investigation" (Stjernfelt 2007: 137). I thus take the proposition 'translation is process' and turn the predicate into a noun, i.e., the process of translation, or the process nature of translation. For instance, I could test the proposition 'process is continuous' by manipulating the animation to have a continuous process, which I cannot do in three dimensions only, and see the implications for translation if we thought of it as happening in this way. This I do for all six aspects prescinded above.

In this section, I present three sets of data. The first set is from the study guides that I read as an MA student in 2004-2005. The second set is from rough sketches I drew and from PowerPoint presentations I made for conference presentations since 2013. The third is a set of three computer animations I commissioned in 2019. I analyze each set of data in terms of the six features of translation that I prescinded above. In some cases, I might analyze only one or two of them because the model is designed to focus on that particular feature.

4.1. Modeling translation in two dimensions

One of the problems of modeling any cognitive process is the limitations that available technology places on modeling. If sheets of paper were the dominant technology, one would find it difficult to model translation in four dimensions. The best you would be able to do is use space as a metaphor for time, typically by an arrow that points to process in time, such as in the first readings I did in translation in 2004 (reproduced from the module guide for TPP744) in Figure 1 and 2. Here you can see that translation is modeled in two dimensions only, on a flat page.

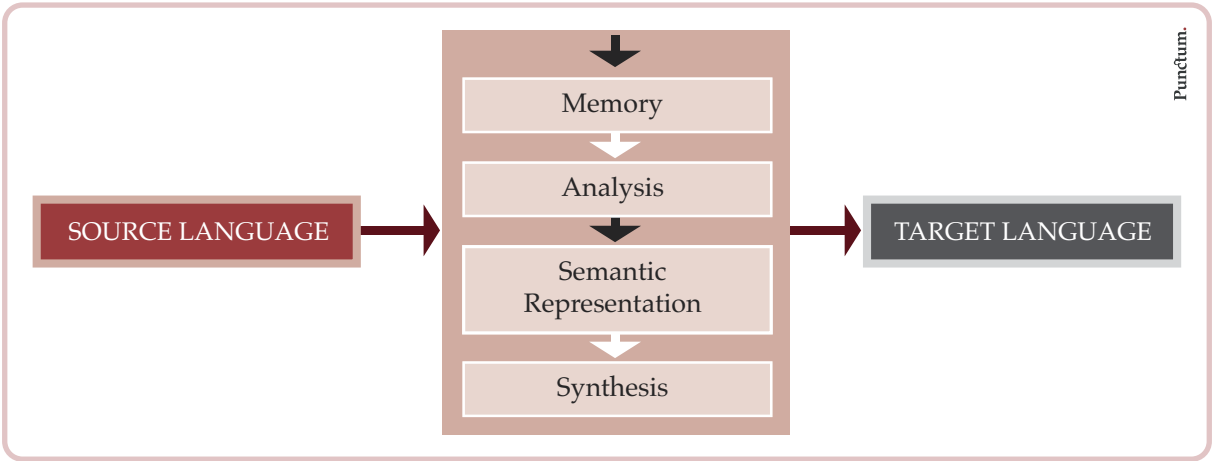

Figure 1. Modelling the translation process through space

Figure 1 models process and time spatially. In other words, one can see the whole process within one moment (translation not modeled in terms of time), but the spatial distinctions of three blocks and the arrows between them indicate that one should read the spaces as indicative of time lapses. The figure follows the Western writing convention (left to right), but it also follows the convention of top-down writing. There is only one stream of meaning that is the input and one that is the output. The incipient and subsequent systems are modeled in boxes, i.e., self-contained and not emergent. The semiotic process seems to be contained within this model. Whether the authors thought about further processes or not, the model itself does not represent infinite semiosis. The focus in this model is on similarity. The boxes for the source and target languages are equal in size, and the process seems to be homeostatic in that it aims at attaining similarity.

WORD LEVEL	**Overall translation strategy**	WORD LEVEL
PHRASE LEVEL	**Operational strategies**	PHRASE LEVEL
SENTENCE LEVEL		SENTENCE LEVEL
TEXTUAL LEVEL		TEXTUAL LEVEL
CULTURE	TRANSFER	CULTURE

Figure 2. Translation process at multiple levels

Comparing Figures 1 and 2, the main difference is that Figure 2 allows for a complex of streams of meaning, which Figure 1 does not. Though still static and using space to model time, in Figure 2, meaning is entailed at the word, phrase, sentence, textual and cultural level and is transferred as such. Figure 2 seems to model meaning in hierarchies with what one could call an atomistic assumption. I mean by this that the assumption is that one observes and deals with words first, then with phrases, and then with sentences, texts, and cultures. The problem with this kind of model is that words only make sense against the background of a text's genre or the context of a culture. Both the source and target hierarchies are given, not emergent. Furthermore, there is no sign of infinite semiosis, and the model seems to assume similarity rather than difference between the source and target systems.

4.2. Trying to model translation in 'three dimensions'

In my thinking, I tried to model translation as a relational process by also modeling time in terms of space (Figures 3 and 4).

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Initially, I used dotted lines to indicate the relatedness of translational phenomena (Figure 5). The dotted lines also served to model process because the different translation types are not separated in reality but instantiated in living processes. This kind of modeling is unsatisfactory because the process and the flow of time itself cannot be modeled.

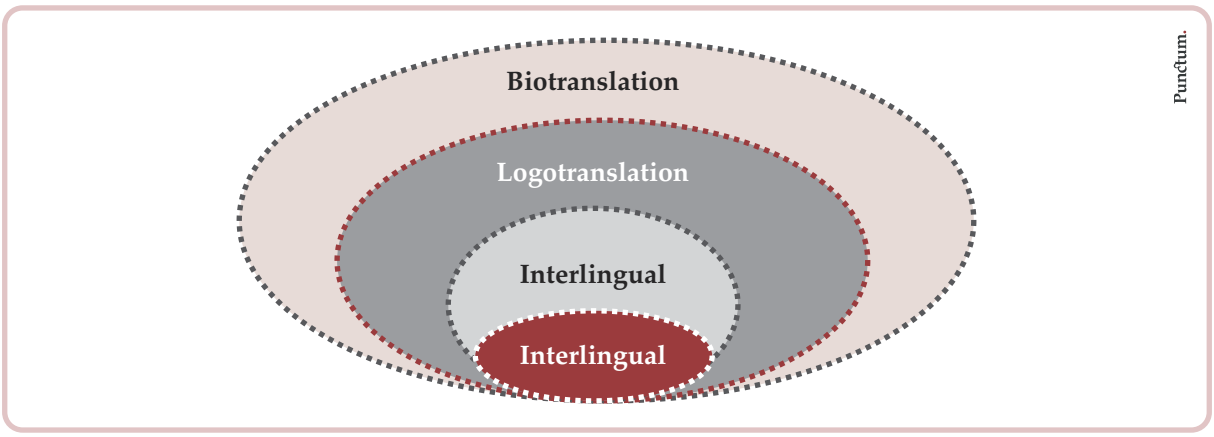

Figure 3. Dotted lines to model process

In Figure 4, I modeled the process of translation through space again, using embedded circles, dotted lines, and arrows to indicate complex processes. This model is static rather than processual, and time is absent or modeled in terms of space.

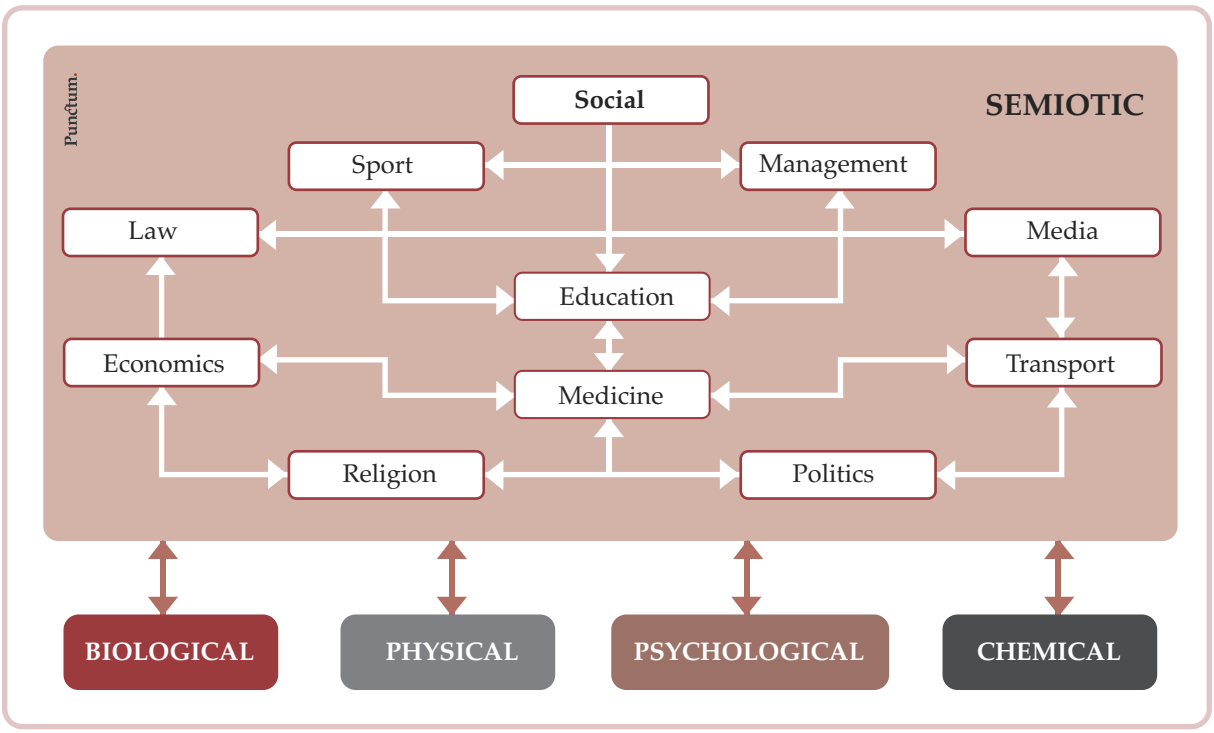

Figure 4. Embedded circles to model process

Then, I started using squiggly lines to model time and the complexity of the relationships between processes. In Figure 5, the squiggly line models the infinite semiotic process that turns interpretant into representamen, ad infinitum. Figure 5 still models time in terms of space, but its advantage is that it shows the complexity of semiosis in that the Peircean triad is not reducible to binaries. It probably does not model differences.

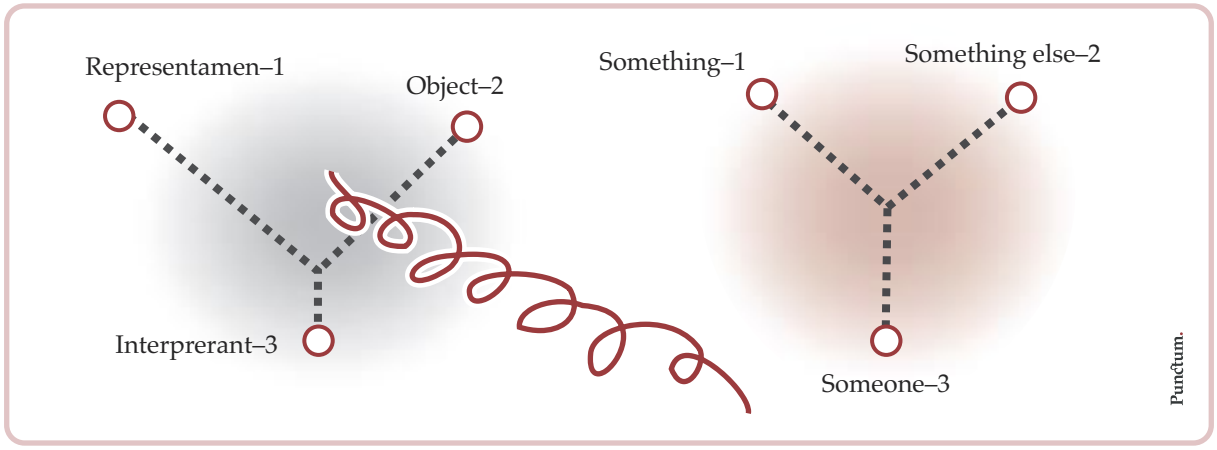

Figure 5. Modelling process through squiggly lines

The first effort at three-dimensional modeling was when I used the triple helix from DNA (Figure 6). In this model, each of the strands of DNA represented the representamen, object, and interpretant in a never-ending triple helix that binds them together. The model itself, however, was still two-dimensional and static as the triple helix does not move. Also, time remains modeled in terms of space.

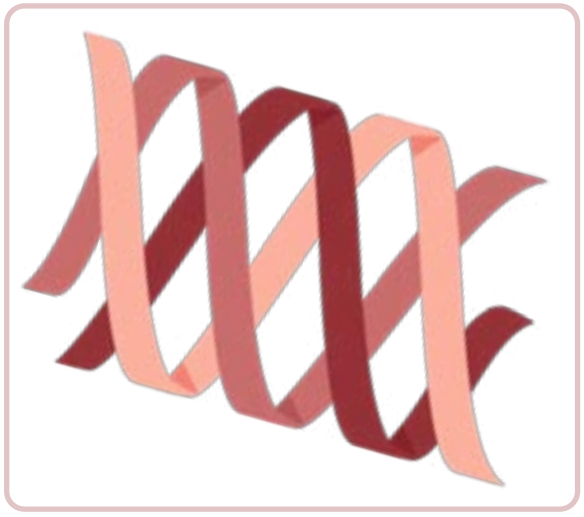

Figure 6. Modelling translation through the triple helix

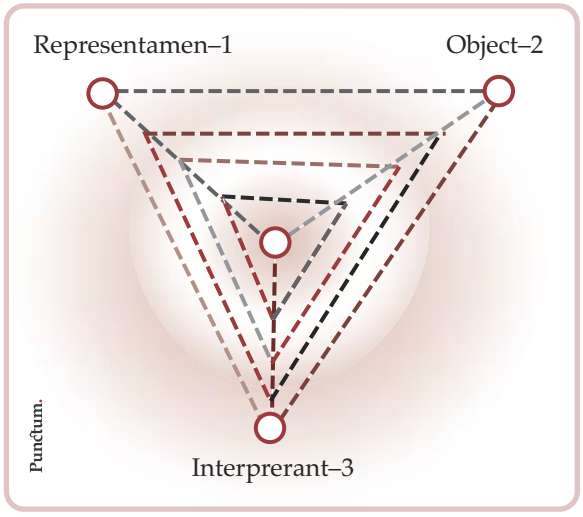

Figure 7. Modelling translation through a spider web

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Another effort was remodeling the Peircean triad into a spider web (Figure 7), which is similar to the rhizome metaphor used for semiosis by Deleuze and Guattari (1987). The spider web modeled the relational nature of semiosis, indicating that a change anywhere to any part of the process would entail translation. This model is very static, despite modeling the relations, and a three-dimensional, movable model would definitely enhance its use.

In 2016, I started thinking about fluid mechanics, and for a paper in 2017, I drew the picture of a river with two eddies in it (Figure 8). This drawing set me thinking about animated modeling. In this model, I assumed a translation of the children's poem 'Twinkle, twinkle, little star.' The various streams represent various streams of meaning like star, sky, and awe. In a particularly Christian translation of this poem, for instance, God's notion, which is not part of the incipient semiotic system, can be incorporated. Looking back, this model is obviously flawed in that streams of meaning and constraints on these streams (rhyme and rhythm) are presented as if they are the same. The model clarifies the complexity of what Queiroz calls multilevel hierarchical semiotic systems that go into making an incipient sign system and the fact that these are patterns created through constraints. In an incipient sign system, we have a pattern of constraints, irrespective of the material on which this pattern of constraints has been imposed. This model shows the emergent nature of incipient and subsequent signs, as well as infinite semiosis. It also models the difference between incipient and subsequent sign systems.

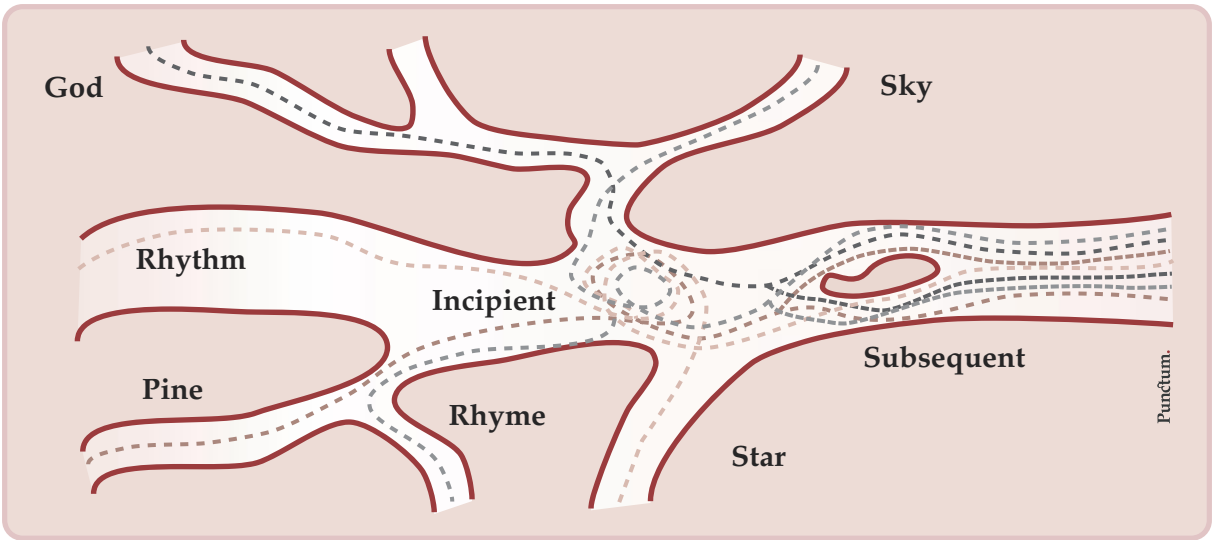

Figure 8. Modelling translation through fluid mechanics

Even though the models in this section aim to model three or four dimensions of translation, the models themselves are still two-dimensional. The triple helix models three dimensions on a two-dimensional plane, while the fluid mechanics models four dimensions on a two-dimensional plane. What remains missing is the fourth dimension.

4.3. Translation modeled in four dimensions

During this time, I discussed the issue with Caroline Mangerel, who contacted her husband, Luc Oligny, a pediatric pathologist. Someone has designed a moving DNA triple helix for him, which put me on the idea of modeling translation as a four-dimensional process. I subsequently contacted a graphic designer, Demitri Matthee, to work with me on computer-generated animations to model translation in four dimensions. I realize that the conceptualizations and products are still crude and that they will develop over time. A particular development that I foresee is that one would be able, in due course, to manipulate aspects of the flow as well as initial and boundary conditions to demonstrate the relative influence of semiotic streams in translation. In brief, I requested Demitri to provide me with two animations, one based on fluid mechanics and one based on aerodynamics. In addition, he came up with another model based on electro-magnetic fields. Readers can view the videos on my departmental web page.

For the fluid-mechanics model (Figure 9), the brief was to design a river with three eddies (the incipient and subsequent semiotic systems as well as the translator involved in the process). The river had to have several sources – we decided on five – that emerge randomly. The sources, each in a different color, could be things like other people, the internet, books or photos, and artworks. The idea is that some of these sources come together in the incipient system and some not, meaning that an incipient system already imposes constraints on the meaning-making process. After the first eddy, represented by a turbine, the colors of the sources mix and then flow into the second eddy, the translator's interpretive apparatus, which again changes the mix of semiotic streams. These then flow into the third eddy, the subsequent semiotic system. The colors flowing from that are changed again, indicating that the meaning in a translation process is never copied but always constructed. After the subsequent eddy, the stream breaks up in a number of streams, like a delta. This indicates that translations can give rise to many streams of meaning.

This diagram thus represents translation as a process in time because one has to wait to see the subsequent sign system, it shows complex streams of meaning and the emergent nature of the incipient and subsequent sign systems, it models infinite semiosis, and it allows one to consider difference and similarity (through the colors, for instance) in the process. By manipulating aspects of the diagram, such as changing the relative weight of different colors, one could imagine how a translation process is influenced by apportioning the semiotic streams in the incipient system different weights.

Demitri then came up with an electro-magnetic field animation similar to the fluid-mechanics one, but with a real ethereal feel to it (Figure 10). Here, we have only two 'eddies,' the incipient and subsequent systems. I particularly like this model for the ethereal feel it gives, which I think models semiotic processes quite well.

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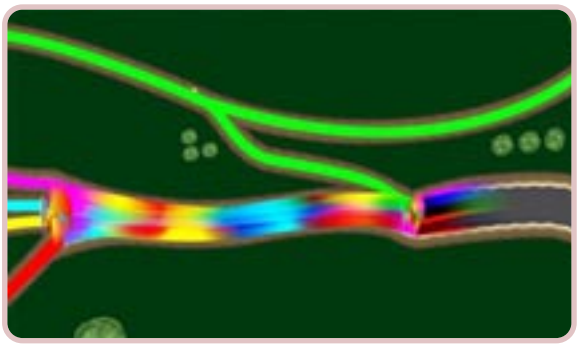

Figure 9. Modelling translation with fluid mechanics[1]

Figure 10. Modelling translation with electro-magnetic fields[2]

For the aerodynamics animation, the brief was to create a propeller with three blades, representing the Peircean representamen, object, and interpretant. I base this diagram on a model by Floyd Merrell (1998, p. 144; 2003, p. 116), who animated a Mobius strip into the Peircean triad, having transformed it into a Penrose triangle.

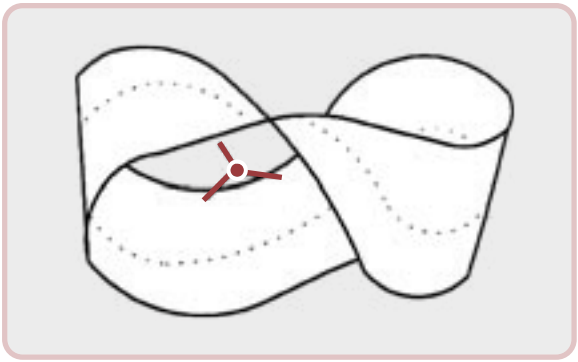

Figure 11. Mobius strip mapped onto the Peircean triad

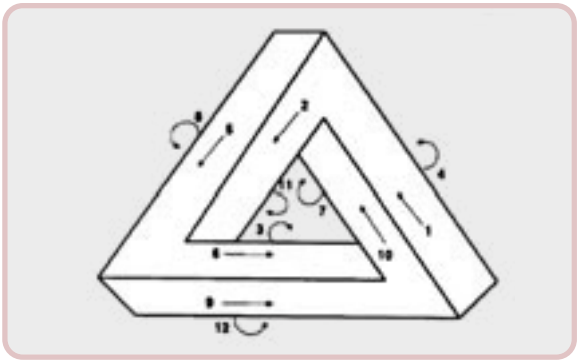

Figure 12. Peircean triad mapped onto a Penrose triangle

So the Mobius strip (Figure 11) is transformed geometrically into a Penrose triangle (Figure 12), the lines of which are then transformed into the Peircean triad to model the process nature of translation.

Merrell then transformed the Peircean triad, with its endpoints at various levels in the Penrose triangle, into a triad of running legs (triskelion), modeling the semiotic process's infinite process nature, i.e., translation (Figure 13).

Based on this model, I suggested that we model translation as a three-bladed propeller (the triskelion) that moves around its axis and in time, i.e., a four-dimensional

[1] The full animation is available on my departmental web page, as Video 1.
[2] The full animation is available on my departmental web page, as Video 2.

Figure 13. Peircean triad as triskelion

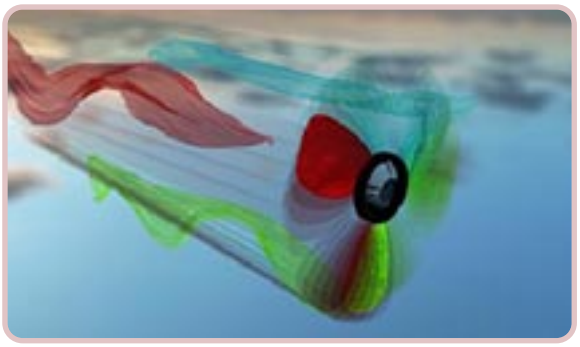

Figure 14. Translation modelled through aerodynamics[3]

animation. This animation models a number of features of the translation process. Firstly, it models the fact that semiosis is a process, like metabolism, that ends with or in death only. So, even the Peircean triad's linear models do not represent the fact that meaning is always a process and that the static triad is a 'freezing' of the process for the sake of manipulating the model in order better to understand it. In the model, the turning propeller renders a triple helix of representamens, objects, and interpretants in a continuum, out of which new triple helixes emerge, which I did not model at this point but which should render a fascinating rhizomatic model.

I then suggested to Demitri that we try to design a propeller that does not follow a straight trajectory (Figure 14) but moves in four dimensions itself. In terms of what the design software offers, this was much more difficult, but we came up with a model.[4] This figure models translation as a process that plays out over time, as complex streams of meaning are combined in an emergent, incipient, and subsequent pattern, as infinite and as a complex of similarity and difference. This video models the vital aspect of the emerging patterns of subsequent meaning. If one plays and stops the video in intervals of one second, the propeller's pattern is different each time, modeling the emergence of meaning as a historical process.

To summarize, I presented a number of models to explore the implications of conceptualizing translation in terms of process and time, of thinking through streams of meaning rather than a stream of meaning, as well as the emergent nature of sign systems, of infinite semiosis, and the problem of difference/similarity in translation.

[3] The full animation is available on my departmental web page, as Video 3.
[4] The full animation is available on my departmental web page, as Video 4.

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5. Implications and prospects

An elementary, perhaps even trivial, implication of this kind of modeling is that it allows us to see translation as a process. Up to now, we could imagine translation as a process, we could perhaps see parts of the brain light up one after the other in a brain process (Garcia, 2019), we could theorize translation as a social process (Chesterman, 2015), but we could not see it. So, a model like this is a cognitive tool - according to the extended-mind hypothesis (Clark & Chalmers, 1998)- to help us better understand translation, and adding a four-dimensional visual tool should help, if only in classrooms.

Probably the most significant implication of considering translation as a process is its influence on how we think of stability and change, which is closely related to the issue of translatability (Venuti, 2019). Translation studies currently see in interlingual translation – and perhaps also in intersemiotic translation – the incipient sign system as either stable or unstable. Those who see it as stable argue that translation is a process of inevitable derivation, hence the theory of shifts – as if there were meaning-making processes in which absolute stability was possible and translational meaning is derivative. Those who see it as unstable argue that translation is not possible because one cannot finally determine the meaning of the 'source,' and consequently, you have to translate 'approximately' and preferably disrupt the meaning as agent of some or other kind – as if there were meaning-making processes in which absolute novelty was possible. A complex process approach to translation brings new perspectives to this problem, and it turns the stability and change problem on its head. It argues that translation is, firstly, a process, and secondly, this process is constrained into (relatively) stable form. It never ceases to be a process, but it also never ceases to take some form – like the eddies in my models. Therefore, the issue in translation is not change, but stability. The big question is not how to change stable meaning or whether meaning is determined enough to translate. The question is: What constraints are brought to bear on a set of semiotic material to stabilize it, and to what extent? It is thus a complex position that maintains a complex relationship between incipient and subsequent sign systems. No translation process ever renders a copy, and no translation process ever generates absolute novelty. All translation processes take place as part of the broad process of semiosis. The stability or not of any semiotic system is an effect of the semiotic work performed, i.e., an effect of the translation process's nature.

So, why is it then possible to translate? Put differently, what do we translate? Translation is semiotic work that imposes constraints on semiotic material to facilitate interpretation. By constraining semiotic material, the participant in the process is guided towards the speaker's intention by limiting the interpretive possibilities – even if this intention is multiplicity in meaning as in literary texts. So, what we translate is neither

the substance nor the meaning, neither form nor content. What we translate is the set of constraints that are operative on what we have decided to be the incipient sign system under another set of constraints (e.g., the brief) that are operative on the translator, under yet another set of constraints that are operative in the subsequent sign system. By translating, we are reworking (maintaining or transforming or anything in between) patterns of constraints. The translator's agency lies not in the fact that she cannot but change the incipient system or that she has to change it because of some activist impulse. The agency lies in the fact that an incipient sign system is a complex, multilevel, hierarchical system, embedded conceptually and historically in infinite other systems, with an endless number of constraints that operate on it. The agency lies in the fact that the translator needs to make a judgment call about how to work on these complex sets of constraints.

Diagrammatical reasoning aims to form icons of complex conceptual problems and, by manipulating the icons, better to understand the problems. It should be clear to readers that the models suggested here are primitive because they cannot yet model matters like constraints, initial conditions, and boundary conditions. Further conceptual and design work is thus necessary to develop these rudimentary diagrams.

However, the big question is whether we could evolve this kind of thinking from modeling to simulation. In other words, could these kinds of models become the beginning of computational simulations in which one could statistically alter variables to compute different outcomes? This I cannot do, so I have to hand over the baton to someone with computational skills.

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