Models, mathematics and Deleuze's philosophy: some remarks on Simon Duffy's *Deleuze and the History of Mathematics: in Defence of the New* [draft of 25/11/15]

Simon Duffy's *Deleuze and the History of Mathematics* is a major stage in Deleuze interpretation because it demonstrates a series of important points for the reception of Deleuze's work. These can be put quite simply, without taking anything away from Duffy's intricate analyses of philosophy and mathematics. First, despite a relative lack of prominence, mathematics plays a significant role in Deleuze's philosophy; second, though not a highly trained mathematician, Deleuze is very proficient on the history of mathematics; third, in relation to his philosophical system, Deleuze has original things to say about that history; fourth, it is possible to see Deleuze as a distinctive figure in the line of philosophers close to mathematics, such as Leibniz, Bergson, Russell and Badiou; and fifth, there are many concepts in Deleuze's work that benefit from a knowledge of their mathematical influences.

These achievements go a long way to explaining why Duffy's book must be seen as one of the most noteworthy and original works of Deleuze interpretation. It fills a gap in Deleuze interpretation, by completing studies started by Manuel DeLanda and added to by, among others, Daniel S. Smith, Sean Bowden and Henry Somers-Hall. DeLanda, Bowden and Somers-Hall are subject to tough critiques in the conclusion to Duffy's book, despite their contributions to the general theme of the book. Without taking sides, the ensuing debates are to be recommended as an example of fruitful academic debate around Deleuze's work.

Duffy's emphasis on complete interpretation and his discovery of overlooked areas do not fully capture the controversial aspects of his book. His deepest and most far-reaching claim is of a different kind of originality to academic thoroughness. He proposes an overall interpretative approach to Deleuze's philosophy. A consequence of this approach is to bind the philosophy very tightly to mathematics in ways that I want to question. It is easy to overlook this aspect of Duffy's work because it is attached to a single claim and to one concept: the concept of model. Here is the key passage where Duffy's thesis is laid out in full:

> The mathematical problematics extracted from the history of mathematics are directly redeployed by Deleuze in order to reconfigure particular philosophical problematics in relation to the history of philosophy. This is achieved by mapping the alternative lineages in the history of mathematics onto corresponding alternative lineages in the history of philosophy, i.e. by isolating those points of convergence between the mathematical and philosophical problematics extracted from their respective histories. This is achieved by using the mathematical problems of these alternative lineages in the history of mathematics as models to reconfigure the philosophical problems by constructing an alternative image in the history of philosophy. The redeployment of mathematical problematics as models for philosophical

> problematics is one of the strategies that Deleuze employs in his engagement with and reconfiguration of the history of philosophy. (p 3)

To understand the scope and depth of these claims, it is helpful to focus first on the concept of problematics. It corresponds to two related ideas in Deleuze's work: the universal concept of a problem and the local problem of a limitation within a system. These can be rendered as 'problem' in ordinary parlance ('the problem of justice', 'the problem of how to surmount this new obstacle') but that's imprecise. The first use of problem means *an underlying and universal virtual series of different intensive directions that demand a response*. Unpacked, this definition means that a problem is virtual and universal as such (it is not about an actual and particular identified state). A problem involves a multiplicity of different pulls that cannot be reduced to a single or even countable number of options that can be judged satisfactorily. These pulls are intensive, rather than ones of fixed magnitude or made of discrete steps. A problem is only complete when expressed in a new way that responds to the tensions.

Virtual problems generate series of different solutions, which themselves express and transform the problem in different ways. There are two ways to begin to simplify problems. We can think of them as complex and recurrent puzzles requiring practical but necessarily incomplete solutions. Or we can think of them as different kinds of paradox generated from within a system. For example, we could think of the Foucauldian problem of discipline (the puzzle of disciplinary societies) with different pulls around intensive directions towards growing punishment, diminishing education, increasing correction, declining security and so on. Different prison and punishment systems provide actual but never finally satisfactory solutions to the ongoing and shifting underlying virtual problem. Or we could think of a problem around continuity and discontinuity in space as expressed in Zeno's paradoxes, then given a partial solution by Bergson's account of movement as indivisible. Importantly, even if the paradox is dispelled the problem always remains in a different form.

The second use of problem, the one I have associated with a limit within a system, has virtual and actual manifestation. It is closer to the common idea of a practical problem, but should be thought more precisely as *a pressure point that puts a system under unbearable strain forcing it to change*. So in an actual situation such a problem would be something like an epidemic of prison riots, or a deep funding crisis, or an extreme turning point in ideal or practical environments, such as the realisation of a serious historical wrong or reaching the breaking point of essential materials at a certain scale.

In a virtual problem, the idea of a limit-problem marks the point where virtual problems of different types meet, when prompted by an actual expression, and force each other into transformations and reconfigurations; for instance, when the incarceration problem meets the emancipation problem along a series of fault lines prompted by an actual historical event – the advent of universal suffrage, for instance.

These different versions of the problem, as universal and as singular limit, both virtual and actual, are always found together and cannot make full sense apart. This explains why Deleuze pairs universal with singular and with individual: as universal, a problem is incomplete unless determined by the singular and expressed through the individual. In *Difference and Repetition*, the universal-singular pairing is often treated through mathematics (grist to Duffy's mill) but also in relation to learning (less grist there). The universal-individual pairing is treated in relation to eternal return and the individual (minimal grist indeed): 'These Ideas, however, are expressed in individuating factors, in the implicated world of intensive quantities which constitute the universal concrete individuality of the thinker or the system of the dissolved Self.' (DR 259)

For instance, the actual global scandal of mass incarceration of different minorities to reassure a majority of its false freedom cannot be separated from a virtual history of ideal problems around freedom, emancipation, security, wealth, demonization, oppression and exploitation, and a history of successive actual 'solutions' to the limits encountered at both ideal and actual levels. But these actual solutions must not be seen as strictly general. Instead, they are only fully expressed and explained in the individual shame of past errors and the shame of their repetition in new forms of actual oppression and restricted liberty. To take a contemporary scandal: the universal problem of movement and its restriction is expressed in the general plight of refugees, but only achieves its full expression as actual in individual shame and individual suffering, which can both be collective, though not universal.

The reference to Foucault is telling. This is because in the same way that Deleuze's book on Foucault provides a new vision of Foucault's works as a whole (the diagram of Foucault), the two versions of the idea of a problem can be taken as a way of giving a diagram of Deleuze's system, at least in the mature form it reaches in *Difference and Repetition*. Virtual Ideas in Deleuze's masterwork are to be understood as virtual problems that have been constructed in response to actual and virtual limits to Deleuze's own system as it develops through his earlier readings of Hume, Nietzsche, Bergson, Kant and Spinoza (and, as Duffy shows us, many mathematicians).

When Duffy speaks of 'direct redeployment' of mathematical problematics onto philosophical ones, we should not understand this as a claim about part of Deleuze's system or as a result of it, but rather as a claim about the construction of the main concepts and diagram of the system. And when Duffy follows this with the idea of 'reconfiguring' the philosophical problematics, it should not be viewed as minor tinkering, but rather much closer to a Eureka moment: 'By Jove, it's mathematical problems I should be modelling on!' a Deleuze disguised as Holmes might say. The system comes to work as a system of problems of different kinds, because it is modelled on work in mathematics by Leibniz, Maimon, Bergson, Riemann and Lautman.

'To reconfigure' and to 'redeploy' are metaphors here. They are loose terms leading into the main technical concept of Duffy's argument: 'to model'. The transition first takes place through the term 'mapping', which can be understood as a function from the treatment of problem from the history of mathematics to Deleuze's philosophy as a construction with components from the history of philosophy, though the idea of a component is a loaded and unsatisfactory term – maybe the ideas of 'lines' would be better. Mapping gives the idea of a set mapping on to another set, but the more precise sense of what Duffy is driving at is of the mapping of a structure between the two sets. The structure of problems is extracted from the two historical disciplines and reconfigured from mathematics to philosophy.

This structural sense of modelling discounts other ways of understanding the terms. This is not modelling as in the copy of a figure, or the idea of a model in scientific practice, where the model works as a formal theoretical construct with explanatory and predictive roles, open to empirical testing. Instead, 'to model' is reconfiguration through an alternative image, where the image is a structure borrowed from mathematics, rather than a picture to be copied. Duffy develops this thought by referring to Deleuze's distinction, from *Difference and Repetition*, between metaphor or analogy and the model: 'what distinguishes a modelling relation from a relation of analogy or metaphor is that there are "correspondences without resemblances" between them.' (3) The correspondence is not about content, therefore, but about form. Duffy renders this as an absence of a correspondence between 'elements' but correspondence in 'conceptualizable character', a term taken from Deleuze's *Cinema 2*.

In *Cinema 2*, Deleuze uses the idea of conceptualisable character in opposition to scientific metaphor and laborious applications of science to other fields. For the former, the problem is its arbitrary nature; there's no wider justification for adopting the metaphor. For the latter, it is the problem of a forced application, where a different subject is bent to a scientific approach rather than converging with it. By conceptualisable character Deleuze means that a conceptual feature, such as a particular account of space or time, can be extracted from a science or from mathematics and used to explain a feature in cinema, such as amorphous spaces in Ozu or Antonioni, where spaces lose their Euclidian coordinates and appear empty and shapeless, without homogeneous relations between parts (*Cinéma* 2, 169).

To move into a more critical mode, I think this is a much more open and flexible understanding of conceptualisability than Duffy allows, because the idea of extraction is a wider and more varied process than Duffy envisages for the relation to mathematics. Duffy adds the concept of model and ideas of problematics, mapping and correspondence to the process of extraction. This is a formal restriction of the process. Deleuze is much more pragmatic, because his aim is explanation, rather than the tighter definition of problematics.

Different auteurs and different films will benefit from different explanatory strategies and there is the possibility of mixing sources and transforming them so long as the explanation is effective in unfolding a particular treatment of time in film, for example, or figure in painting, or conceptual creation in philosophy. The correspondence could be about some content that is conceptualised in a different context; for instance, when Deleuze extracts features from literature (Lawrence and shame; Dickens and 'a life').

An initial understanding of the difficulty Duffy's work faces as an overall interpretation of Deleuze's philosophy is then how to account for the 'synchretism' and constructivism of Deleuze's work: its mixture of sources, styles, ideas, subjects, bodies, times, spaces in pragmatic and experimental attempts to release intensity cautiously, but maximally too. In my view, Duffy's strong mathematisation of

Deleuze is an undue restriction on his pragmatics and creative experimentation, as we have seen in the non-mathematical treatments of universal, singular and individual in learning and in the reading of Nietzsche's eternal return in *Difference and Repetition*. Put in terms of Deleuze and Guattari's work, my claim would then be that Duffy's concept of a model is not consistent with their concept of the assemblage. An assemblage is never modelled on another structure. It might borrow from it and even take it in as complete structure, but this will always be according to a pragmatic transformation that goes beyond the tracing of a conceptual correspondence between assemblage and model.

It is open for Duffy to respond that the variety of sources and ideas shown by Deleuze are consistent with the mathematical interpretation. So the claim is not that mathematics offers *the* model, but *a* model. The ambiguity around the scope of Duffy's claim can be seen in this passage 'While for Lautman, a mathematical problem is resolved by the development of a new mathematical theory, definition, or axiom, for Deleuze, it is the construction of a concept that offers *a solution to a philosophical problem*, even if our understanding of the genesis of this newly constructed concept is modelled on the Lautmanian account of the mathematical real.' (131) The italics are mine, to stress the question of whether we should see mathematical modelling as the main way of understanding the construction of Deleuze's concepts, or one way among many.

According to my reading, it the stronger of the two claims, given the preponderance of the idea of model in Duffy's interpretation of Deleuze's concepts: in defining the concepts of singularity and continuity; in understanding the logic of different/ciation (page 46 – this is also where the idea of correspondence without resemblance operates, 45); in relations between objects of sensation and continuity (112); in the definition of the concept of problem (83, 131); in understanding Deleuze's 'more epistemologically modest' alternative to Badiou's mathematical foundationalism (138, 154 and 159); in the distinction between virtual and actual (182n); and perhaps most of all in Duffy's concluding thoughts about 'the role of mathematics in determining the structure of Deleuze's philosophy' (173).

This divergence of kinds of interpretation can be summed up in this way. Does the concept of a method, as applied to Deleuze philosophy as mathematically determined by extraction and structural mapping, show the fundamental approach to explaining Deleuze's philosophy? Or is this one approach among many? But if it is the latter, doesn't that alter the status of the method and its form? Shouldn't we see Deleuze's philosophy as much more eclectic and loose in its pragmatic and experimental approach, to the point where its systematic structure must itself be seem as more open, fluid and changeable than provided for by mathematical history? Finally, doesn't Deleuze's philosophy suggest ideas of time and history which challenge the idea of the historical development of mathematics found in Lautman's subtle structural Platonism? If that's right, then the philosophical creativity, found for example in Deleuze's reworking of Stoicism or Nietzsche's eternal return, is put at risk by the idea of a model based around mathematics.

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