The Philosophy of Mathematics – Paper II

Now these conclusions about Mathematics are still true, but the work of the Arabs, and subsequently their inheritors in the European Renaissance, led to a major flowering of the subject, which entrenched its dichotomies still further.
The processes of Abstraction became even more sophisticated. Indeed, the advent of symbolic equations using Algebra (an Arabic word), was a new and important step. Man found that he could encapsulate his isolated and extracted relations into Forms where symbols could be used to represent the crucial quantities that had been found to relate to one another.
Instead of just relating actual, concrete measurements, mathematicians could investigate the ***whole class*** of possible values by using symbols – usually letters of their alphabet – to represent them.
Relationships became succinct **equations,** and mathematicians began the task of manipulating these in as many ways as possible, without, in any way, losing the essential relation that had originally been extracted.
Mathematicians became the builders of worlds – small worlds, of course, but much wider than the original equation, and of great use in practical tasks too. So, algebraic forms supplied both sides of Mathematics with more powerful methods.
Yet, at the same time, the intellectuals were moving away from the pragmatists at an ever increasing rate. By the 17^{th} century mathematicians such as Newton and Leibnitz had begun to tackle **quantitative change**. They no longer were satisfied with the statidc use of equations to find corresponding pairs of values. They wanted to tackle dynamic change of such values, and, as a consequence, get a handle on the new variables that were even more important. Instead of merely ***Length***, they had ***Speed***, and very quickly after, ***Acceleration***. They needed a new form of Mathematics to facilitate such studies, and they invented the **Calculus.**
Here, they could determine speeds from equations relating distances, and even generate formulae covering speeds and accelerations. Rates of change of quantities became studiable by Mathematics.

Within a couple of centuries, Mathematics had exploded into many new areas, but it must be emphasized that these were STILL to do with **Idealised Form.** Whatever was being studied, the contribution of Mathematics was to deal ***solely*** with the **Form** of a situation, and this was, and still is, never the whole story by any means.

From its first appearance Mathematics made available for study relations within some area of Reality by wresting them from their real world context, isolating themand by discarding other existing and present relations (as Background Noise). Thereafter the completion of the process was to abstract them into equations, so that ALL that then remained from the original concrete existence was ***PURE DISEMBODIED FORM***.
Mathematics had become the study of Pure Form.

What we do when we use Mathematics in the Real world is POSIT back onto complex Reality our refined and polished abstractions. They NEVER fit perfectly, so we must be careful how we use them.

Our main method is CONTROL.
We constrain our area of Reality to conform, as closely as possible, to the conditions in which we first extracted our crude, initial relation. Once applied within a regime of such constraints, our abstract formulae will fit to a remarkable and useful degree. But we must never forget that our use is tailored and conditional on TWO things.

1. The control of the area of application as appropriate is essential
2. The area is NOT changing due to factors we have not considered and certainly do not control

It is condition 2 that holds the greatest dangers. Why? Because our method of original extraction of quantitative relations divides the controlled situation that we are studying into TWO parts

1. The dominant and obvious quantitative relations that we will extract and abstract into universal

forms (formulae)

2. The rest – which will be a multitude of tiny variations, due to many different factors, which initially deliver negligible contributions, and are therefore "dumped" as irrelevant.

Our studies take the dominant relations and turn them into universal relations independent of the particular context from which they were first extracted, and, of course, all subsequent areas of application too. This causes us to ignore the inner activity of ALL areas where we apply these equations. Thus, though we are well equipped for stability, we are grossly ill-equipped for significant changes in oour areas of application.

Thus, ALL formulae from Mathematics have limited areas of applicability, wherein they are reliable Forms that can be useful. Outside of these DOMAINS all formulae "blow up". They all fail catastrophically without any evident reason. Because they include NOTHING of the normally negligible factors (except as inactive "noise"), they **do not contain** any information as to what will happen when the negligible factors come into **dominance** themselves, and ***overthrow*** the stability necessary for our use of these formulae.

Now this is crucial!
Though Mathematics has included quantitative change of its recognised factors, it cannot cope with changes in its ignored, indeed thrown away, factors, which are always the **important** ones in Qualitative Change.

> Note: The simplest demonstration of this is in Changes of State – Solid to Liquid to Gas. Solid laws blow up on melting, while Liquid Laws do the same on boiling. Additive methods of simply joining the Laws from different Domains together, with parameters which make the inappropriate terms negligible in a certain range are merely FRIGS. They have NO explanatory or really existing content, and hence do NOT overcome this problem.

To be continued

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