

## Reflections on Fluxions

by [Sarah Voss](#)

### *Newtonian World*

Back in the 1670's Isaac Newton wrote his Method of Fluxions, a masterful treatise which dealt with changing quantities, or fluents, and their rates of change, or fluxions. Newton's work has since become known as the differential calculus and has proven to have numerous and remarkable applications in our everyday physical world.

The method of fluxions offers a way of assigning a numerical quantity to something so illusive as change. For example, the "steepness" of a hill can be numerically described by the rate at which it rises or falls, that is, by its rate of change. We experience the practical aspects of such quantification when we are driving on a mountainous road and a yellow road sign with a black truck on a sharp wedge alerts us to an unusually steep grade ahead. "Warning, 16% grade next 24 miles."

Clearly, such "fluxions" have predictive characteristics. Did you know that more than half of the people who have ever lived on earth have lived in the 20th century?

Well, if you can't extrapolate from that simple fact to predict that we need to change our rate of population growth, I assure you that modern mathematicians can – using the 20th century corollary of Newton's fluxion. Through mathematics, we can predict with amazing accuracy what changes we need to make to ensure population slowdown, economic stabilization, the cessation of mineral depletion, vital resource preservation... to name just a few.

### *Religious Parallels?*

I admit to being seduced by the conciseness of such calculations. Somehow, it's comforting to be able to see options laid out in neat graphical patterns showing us what will happen if we do such and such and what will happen if we do thus and so. For those of us who fear humankind is headed for runaway disaster, quantification gives us a welcome sense of control over the situation.

Oh, but how I sometimes wish we could likewise quantify our religious pursuits! I am not alone in this desire. As early as 400 BC the ancient Greeks thought they had done just that, and when time (and the discovery of irrational numbers) proved their theory wrong, they dumped the evidence overboard rather than give up this golden wish. Today, with modern TOEs (Theories Of Everything) and GUTs (Grand Unified Theories) and even the mathematics of Chaos, we're still diligently searching for religious parallels. We may not profess faith in God, but we clutch at those numbers crunched out of computers with the undaunted expectation that the answer to everything lies within this maze of 0's and 1's. And we unrelentingly seek something more profound than the "42" which the hitchhikers found in Douglas Adam's "Guide to the Galaxy."

### *New Guide in Old Numbers*

In the Biblical guide to the wilderness, otherwise known as the "Book of Numbers," Moses leads

the tribes of Israel to the promised land. For forty years they wandered, until the generation which had sinned had died away. This beloved old “guide to the wilderness” is filled with quantification – the people are counted, the booty is counted, the people are recounted and separated according to the Lord’s mathematical proscription, laws are laid down for the beginning of the months, for the fourteenth day of the first month, for the first day of the seventh month, for the tenth day of the seventh month, for the fifteenth day of the seventh month.... The way to the promised land may be fraught with wilderness, but it is also marked by a mathematics meant to comfort and direct.

### *Reign of the Wilderness*

As a human race, we appear to be wandering still in the wilderness, ever waging war against each other, ever struggling to find food and sustenance, ever learning from the trials of our laborious journey, ever searching for the promised land. But in recounting history, can we not yet glean some understanding of the pattern of our collective fluctuations?

The tribes of Israel wandered forty years. Moses and Elijah went without food for forty days. Jesus himself wandered in the wilderness for forty days. Is there not a constant in this rate of change?

### *The Merging of Myth and Math*

Alas, our modern day insight casts doubt upon the accuracy of this quantification, and we strongly suspect that the round number forty is but a metaphor for, as the Revised Standard Version of the New Oxford Annotated Bible puts it, “a long distance.” Yet, therein is the beauty of what I have come to call “holy mathaphors.” By that I mean mathematical concepts used metaphorically to glean spiritual insight.

When we merge the precision of mathematics with the fantasy of myth, we arrive, finally, at a kind of new revelation. To put it succinctly, we change our wayward ways with a constant fluxion of forty – a very long distance. Either that or the only constant we can truly expect along the path to the promised land is that the landscape will always, inevitably, change. Yet, through the eye of the mathematician we can manage to predict the inevitable pattern, and see the name of it as hope.

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