

Misunderstanding Mathematics and some Cultural Consequences

by [Christopher Ormell](#) (July 2024)



Key Blue—The Mathematical Basis of the Arts, Joseph Schillinger (1934)

For the last three centuries, mathematics has been *the* major pillar of Western Civilisation. It was generally considered to be a kind of sacred source of unquestioned secular wisdom. But it is a pillar which many commentators now believe has collapsed. This is a crisis of the most serious kind.

It is a collapse of confidence in the heartland of our common disciplined thinking about the world. It needs to be sorted, as quickly as possible.

It is, patently, already triggering trends and events which have caused a massive meltdown of confidence in Western culture. Whatever has happened to our former pride in Western Civilisation? Why are we in the UK listening to amateur, third-rate, biased, discontented historians who have blackened our culture in almost every aspect? Unfortunately, their basic dissatisfaction with today's Status Quo in the UK is not entirely unfounded. There have been three recent scandals (The Windrush, the Contaminated Blood and the Post Office scandals) which can only bring intense shame onto those of us who mistakenly thought that our country was a just, open, compassionate polity. So the problem is not simply about how to wrongfoot these substandard historians. There is also a need to recognise that standards *have slipped* and that much of the previous rigour of Western culture has already, sadly, gone AWOL.

Such a *mea culpa* is essential if the cultural record is to be repaired. Recognising that we have been insufficiently vigilant is a source of shame. But even after such a concession, placing the blame mainly on the shoulders of the misguided gurus of math will come as a shock. One of the leading misguided gurus was Bertrand Russell—before he gave up math and mathematic logic (in despair) in the 1920s. It was Russell who clung so obstinately to the neoplatonic motif of math. It was Russell who first stooped to macho willpower to try to close down (fudge) the contradiction he himself had stumbled on (1901).

The imperative now is to make sure we *do* understand math, to make sure that we have a credible concept of what math *actually means*, and what it *does*. The really subversive idea is that math is an insoluble problem. It obviously isn't. Only those who gave up trying to understand math at school think this. The ancient Egyptians used a body of simple math—mainly logistics and geometry—to build the pyramids at Giza. Unfortunately, more than two thousand years later, Plato came along and either misunderstood, or didn't bother to think through, what they had so spectacularly done. Unabashed, Plato went on to introduce a new, fancy view of math, which, in effect, rubbished the amazing role math had played in building the pyramids. (Didn't he realise the sheer extraordinariness of math being able to generate enough gut confidence in a poor society to even *contemplate* spending more than twenty-five years on such a massive project as building the Great Pyramid of Khufu?) It involved conscripting thousands of workers, spending most of Egypt's meagre annual GDP. Plato's alternative notion of math could never do this. In Plato's eyes math was an aesthetic, dilettante, Godlike symbol/diagram game. This was a soft, comfortable line for him and his fellow gurus: it suited their in-house mantra: *forget the real world and enjoy handling the elegant math symbols!*. Unfortunately there were not enough realists and sceptics around to oppose a takeover by this head-in-the-sand agenda. And, as A. N. Whitehead later famously said, subsequent philosophy has consisted mainly of footnotes on Plato. Whitehead couldn't see, though, that Plato was a Trojan horse, and that his overblown, dilettante view of math could, and would in a future crisis, sabotage Western culture.

We now find ourselves in the midst of a most distressing, dangerous meltdown—of reason, clear thinking, responsibility, logic, ethics, manners and math. There are signs everywhere of insufficient rigour. Math, regarded as the main enforcer and flag-bearer of disciplined culture, has failed. It is not a case of a single misunderstanding of math, but of multiple

mistakes. The subject has not only been seriously misunderstood by its own gurus. It has also been misread (1) by the gurus of physics, (2) by practically-minded folk, (3) by mathophobic folk ... and last but not least, (4) by today's hyper-confident computerists. When the computer revolution came along, it was hopelessly misinterpreted and opposed by the mathematic hierarchy. Worst still, some of the math gurus' fundamental misunderstanding seems to have rubbed off onto the computerists themselves. The two groups were involved in a dog-eat-dog status struggle. The computerists, we know, won. Sixty years later the mathematicians are in the doghouse, and it is the computerists who are cheering on cloud nine.

But, ironically, the computerists subliminally took for granted the main belief of the math gurus—that math applied-to-the-real-world was not significant.

So how did this belief arise?

The mass, root, cause of all the wider misunderstandings probably lies in the manner in which math was, and still is, taught in schools. What has been taught in schools for many years reflects the honest, settled view of the leading Platonic gurus. It is not a ploy deliberately concocted by them to blind the ordinary student with tiresome, tortuous, unnecessary chores: it is simply the way it looks to the academic gurus. For them math is High Culture with a capital 'H' and 'C.' It is valued by them because they see it as a gateway to a marvellous "world" (in their eyes) of intriguing shapes, surfaces, curves, structures etc. and elegant reasoning ... The math gurus are highly intelligent, cool-minded people, who are good at exploring this clean, safe, artificial mental "world." Lurking in their background is the heady mystic feeling that it, "pure math," must be the highest mode of human knowledge. As such it is not treated as a functional activity of any kind, rather as an end in itself. So, it gets placed at the very top of the knowledge tree, and is sometimes described as "the language God must have used when he created

the universe!" No other branch of academic scholarship could get anywhere near this level of inbuilt self-importance, arrogance and superiority.

Plato had seen that math objects like the points, lines and triangles of geometry were really *ideals*. You could sketch a triangle with a stick in the mud, but when you learned a *truth* from this diagram, it wasn't just about ruts scratched in the ground. It was referring (drawing attention to) a kind of ideal knowledge about perfect lines and perfect triangles.

This way of thinking began as a grand idea, but it was essentially an idea born when reasoning with geometry was in its infancy. What looked like 'ideals' at the dawn of reasoning in math, looks like 'first steps' today. Yes, the geometric reasoning could be applied to more and more precise manifestations, but there are limits to the amount of precision anyone actually wants to explore. (Today we are principally interested in the kind of complexity involved in combinations of many points, lines and curves.)

In Plato's day this obsession with the ideality of the manifestations posed the awkward question: however are these *ideals* related to ordinary humdrum, empirical, knowledge? Plato probably thought about this dilemma for a long time. In the end he was able to resolve it with a stroke of genius. He "solved" the problem—by a typical mathematic method ... generalising it, and then going on to propose that *all* meaning must arise from ideals! The word 'cat' didn't merely mark out a family of domesticated animals. The true meaning of the word 'cat' wasn't that it drew attention to some furry beasts. The true meaning was that it was the *name of a perfect, fully catlike, well-self-licked, ideal cat* in the sky!

The great success of this conceptualisation was that it created a synthesis encompassing math and ordinary knowledge. Plato was incidentally elevating maths to the pinnacle of human cognition. (This striking synthesis happened to put math

at the top!) So he ended-up cementing (legitimising) the authority and privilege the gurus could, and already did, expect. We have recently learnt, surprisingly, what Plato said on the last day of his life ... he complained that a musician was playing out of tune. But Plato dominated the intellectual world of his own day, and this dominance continued after his death ... eventually becoming all-but immortal and irresistible. Its last hurrah was Russell's grandiose, ill-judged, ill-fated, neoplatonic attempt to turn plain, simple, self-evident math into dense, mazy, symbol strings.

The first thing to say is that math has not collapsed. It is actually being commissioned on a much greater scale than ever before, but in a largely invisible, unnoticed, automated guise, treated now merely as 'computer software.' The IT mega-corporations have deliberately decided to stop calling it 'math,' probably because the word 'math' has become—as a result of endless years of misguided schooling—a widely hated, dreaded word. The last thing these IT corporations want is for their gadgets to be blackened and shunned by any association with math.

What has now palpably caved is the Platonic, dilettante interpretation of math in academia. Ulam's Dilemma (1976) has dramatized the absurdity of scholars busily churning out ever more thousands of gnostic, unwanted, unread, arcane formulas ... which might as well be ju-ju, as far as the ordinary intelligent person (or anyone else) is concerned. They are never going to be *used* in any meaningful way, and this loss of usage condemns them to a kind of everlasting 'nearly meaninglessness.'

A feeling of futility inevitably forms. There is a downside ... the esteem and eminence the in which the gurus of math used to luxuriate, is now draining away. Math itself, even at the simplest levels, has lost its lustre.

The second thing to say is that the commercial exploitation of

math has eventually produced a situation which thankfully (and unintentionally) clarifies the essence of the math exercise.

The main role of maths—and the final source of its meaning now makes itself clear—it is the *illuminating foresight* it creates about projects, plans, campaigns, innovations, inventions, and scientific hypotheses of many kinds. It provides the best method we have to pathfind the future. This foresight was already present more than 4,000 years ago. It was the make-or-break condition for the project of building massive pyramids. Without a huge amount of previewing math, the Great Pyramid of Giza would never have been built. It provided the priceless confidence to turn what could have been mere fantasy into reality. Plato, though, wasn't interested in levels of confidence among builders, or in giant building projects: his interests were more aesthetic, indoor, ethical, and intellectual.

Today the barons of Silicon Valley may have stopped calling automated math, 'math,' but the sheer scale of the illuminative use of automated math since the 1960s can't be concealed. It speaks for itself. The computerists like to think that the magic came from their admirable machines. But these machines were utterly impotent without the insight of the able math-knowledgeable people who programmed them. Space travel would not have happened without prodigious math vision, faithfully executed by mathematic aces on these admirable machines. DNA wouldn't have happened. Atomic energy and solar energy wouldn't have come about. Everyone can see that the great change since the 1960s is that a tsunami of sophisticated technical, digital progress has been unleashed. It is not really down to the dumb machines: at its heart is the rigorous thinking, skill, vision and exploratory stamina of its ace-mathematic programmers-plus. (Ordinary programming doesn't require math creativity.) There has never been anything remotely like this amount of technical success in human history. These achievements are, in effect, "working miracles." The Barons of Silicon Valley may have stepped-in

and insisted that all the credit must go to the mainframes, the microchips, buses and clouds involved! Oh, do they think that their machines did it all on their own? No! It was unnamed human geniuses who made this happen (via illuminative math). Their reward: the insight, stamina, and flair by which they managed to pull the trick has been maliciously airbrushed out. The thorough explorative disciplined vision, which made these miraculous developments work, was, undoubtedly, math.

Going back to antiquity, Plato, we can now see, misled the intellectuals of his day—and 865,000 or so subsequent days as well—about the central meaning of math. His was a self-serving, playboy, misinterpretation, but all the blame for it cannot fall onto the naturally shy, reclusive gurus of math. The Emperors, Kings, Princes, Chieftains, etc. who gladly used the illumination provided by math (mainly to firmly envisage their building projects and military campaigns) could have easily straightened the record. Unfortunately, many of them were thugs, and probably they never stopped to think about, or even wonder, how the in-house math experts on whom they relied thought and felt about it.

Fortunately, after the 17th century most ordinary people began to disregard the existence of a circle of intensely inward-looking math gurus. In the 19th century higher math moved even farther away from its illuminative roots. At the same time, paradoxically, simple math became the accepted by-word for rigour, accountability, and responsibility.

This era lasted until around 1960.

Then the Barons of Silicon Valley started to steal the credit for the glorious success of *illuminative* automated math—taking it away from their talented, unnamed math-specialist artists. (And the higher math community did not bother to intervene, to put the record straight.) This has not just turned the Barons into billionaires. Much more seriously, it has rubbished the very concept of illuminative math among the public, among the

movers-and-shakers, among the teachers, the children in schools, and their parents.

In this way we have lost the principal discipline of responsibility, and it is going to be a huge challenge to get it back ... in time to stop civilisation from sliding into disorder and oblivion.

The author is an older philosopher who learnt Algol—an early programming language—in the 1960s and who thoroughly enjoyed using it to find new formulas for computing P, colouring maps, and other unsolved projects in math.

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Christopher Ormell is an older philosopher who came to philosophy via years of reflection on mathematical explanations. He shook hands with Alan Turing when he was an undergraduate in 1952.

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