

Mathematicians Can Also Write, Right?

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Writing, expounding, and such like, are not the sole preserve of those in the arts, humanities and social sciences. Mathematicians can contribute too, on equal terms, and no-one should find it remarkable.

Es liegt in der Natur des Menschen, sich zu beschränken.

On the voice of mathematics

All forms of discourse and dialogue have gradually been colonised by elements within the arts, humanities and social sciences, satisfying seemingly overplayed urges and appetites to be ‘noticed’ that have become almost routine aspects of behaviour. Recently, to redress the balance a little, we have witnessed the advent of self-styled popularisers and ‘celebrity’ presenters through which some of the so-called hard sciences have made their presence felt and gained increased appeal as a result, which is no bad thing whenever egos do not get in the way of content. Academics, as a group supposedly at the forefront of understanding, objectivity and learned contemplation – yet (aside from a few high profile exceptions over the years, carrying genuine gravitas) traditionally out of sight from public gaze – are no longer the rare breed they once were, ever more drawn in to the Daily Debate of Everything by all accounts. Spread over many forums, vast numbers of ordinary university staff want their say on a regular basis, and – with possibilities to propound, declare and vent indignation as numerous and varied as the issues raised themselves – the chatter is endless, only a portion of which is informative such is the way of things.



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Sónya Kovalévsky (1850–1891)

It is accepted that we mathematicians tend to concentrate our energies on technical tasks in hand, nonetheless as citizens of the planet we have views as such – lots of them in fact, on all sorts of things. In times past – primarily during the 18th, 19th and early 20th centuries – it was not uncommon to see minds wander from the narrow path of mathematics to advance commentary on the physical world, proffering sentiment with eagerness and no little insight on the condition of its human inhabitants. Touching on society, nature, philosophy, science, religion, economics and psychology, to name a few domains, the mathematician was deemed as eligible as anyone else to tender judgement, enlightenment and perspective. Let us not forget, too, that the well educated then formed an elite minority, expecting to be read and heard on any matter whatever their own discipline of expertise (if they had one) – nowadays everyone is invited to the party, so to speak. That said, unless there is a newsworthy event somewhere, mathematics has a pretty low exposure in relative terms – bar the efforts of a select coterie who do a fine, but necessarily limited, promotional job on the whole – and always has done. Most of our community do not have too much of a problem with this from what I’ve seen, and personal limelight isn’t high on the agenda as a rule – we still, for the most part, tend to proverbially hide our light under a bushel.

Moving outside of one’s box? Easier for some

There are people who reside well away from mathematics yet who still aver an affinity with it. When voiced, however, this is almost always doomed to be only a mirage of imagination since the non-specialist is largely (if not totally) oblivious to the authentic essence of our subject. For the broad populace – without the requisite analytic toolkit as an absolute bare minimum – it remains inaccessible other than at a superficial level and this sort of assertion, based on an unfortunate misbelief, will normally amount to nothing more than the delusion of the enthusiastic amateur. Access to areas of study outside our authority is, on the other hand, a good deal easier for lots of mathematicians (and indeed scientists and engineers) since a number of them are based principally on the acquisition of facts and their subsequent organisation, packaging and presentation (though things like assimilation and interpretation draw on serious measures of cerebral dexterity, comprehension and other aptitudes, unquestionably). Whilst something of a simplification, the point here is that those finely honed and acute skills demanded of mathematicians are not needed, and the outputs – however they are delivered using television, radio, or the written word as the vehicle of communication – are in the main digestible by many whose knowledge base does not cover the immediate topic of concern in any depth, if at all.

There is a small section of our mathematical community who show desire to escape from their comfort zones and engage in exposition (written and oral) on occasions. Somewhat striking when done well, the mould of stereotype is broken as wisdom and experience enrich discussions on pedagogic/research features

of mathematics (their current state, genealogy and future, for instance), on the wider HE sector, or even on completely unassociated themes. We have some excellent examples of this in the UK alone – evidence that disparate activities are able to complement each other rather than generate any internal conflicts or tensions in certain personalities – but history reveals that the phenomenon is not a new one and comes with a challenge when motivating forces act in directions of apparent mutual incompatibility, giving rise to shades of irresolution, ambivalence or vacillation that must be carefully and constructively managed if they are to be made productive.

The dualism of Kovalévsky

The Russian mathematician Sónya (Sophia) Vasilyevna Kovalévsky felt keenly a constant pull between very different spheres of aspiration. I should say at this juncture that I am not claiming to have anything approaching her abilities, but I am sympathetic to her emotions entirely. In her all too short life (spanning the years 1850–1891) Kovalévsky made valuable contributions to the theory of mathematics and mathematical physics, being the first woman in modern Europe to gain a doctorate in mathematics, the first to join the editorial board of a scientific journal, and the first to be granted a professorial post. In addition to these and other academic achievements, she was an advocate of women's rights, a champion of radical political causes and, more pertinently, gained repute as a writer (penning a *mélange* of works: poems, novels, plays, theatre critiques). It is this dichotomous drive to follow pursuits in mathematics and literature that marks Kovalévsky out as unconventional, and she described her feelings on fluttering between the two very accurately in a letter sent to compatriot Madame Schabelskoy (see Appendix H of the 1895 autobiography published posthumously and with biographical material having been added by Kovalévsky's Swedish friend Anna C. Leffler, Dutchess of Cajanello, in whose own documented life this quotation was included):

I understand your surprise at my being able to busy myself simultaneously with literature and mathematics. Many who have never had an opportunity of knowing any more about mathematics confound it with arithmetic, and consider it an arid science. In reality, however, it is a science which requires a great amount of imagination, and one of the leading mathematicians of our century states the case quite correctly when he says that it is impossible to be a mathematician without being a poet in soul. . . . As for myself, all my life I have been unable to decide for which I had the greater inclination, mathematics or literature. As soon as my brain grows wearied of purely abstract speculations it immediately begins to incline to observations on life, to narrative; and, *vice versa*, everything in life begins to appear insignificant and uninteresting, and only the eternal, immutable laws of science attract me. It is very possible that I might have accomplished more in either of these lines if I had devoted myself exclusively to it; nevertheless I cannot give up either of them completely. [1, pp. 316–317].

She wasn't perfect by any means – as both a hesitant mother, and an unpredictable individual, she struggled with issues arising from her own psyche, physical health, ambitions and upbringing, also fighting against constraints placed upon women of her era – but her talents were incontestable and organic; there was a price to pay in the way she lived a complex and disjointed existence, yet through sheer will and determination Kovalévsky did succeed in bridging the gap between opposing branches of travail.

Not everybody would entertain conceptually the position in which she found herself, of course, and we need look no further than the incomparable G.H. Hardy (born less than 30 years after her) who adjudged that variability in the perceived value of a livelihood would rarely 'turn the scale in a man's choice of a career' [2, p. 69], in relation to which, he wrote, dilemmas seldom occur. More specifically, he noted that

. . . they are particularly unlikely to present themselves to a mathematician. It is usual to exaggerate rather grossly the differences between the mental processes of mathematicians and other people, but it is undeniable that a gift for mathematics is one of the most specialized talents, . . . If a man is in any sense a real mathematician, then it is a hundred to one that his mathematics will be far better than anything else he can do, and that he would be silly if he surrendered any decent opportunity of exercising his one talent in order to do undistinguished work in other fields. Such a sacrifice could be justified only by economic necessity or age. [2, pp. 69–70].

Shortly after he added

Every young mathematician of real talent whom I have known has been faithful to mathematics, and not from lack of ambition but from abundance of it; they have all recognized that there, if anywhere, lay the road to a life of any distinction. [2, p. 73].

We should concede that Kovalévsky is, ultimately, remembered mostly for her mathematical exploits, but her legacy – as she would have wished – is much more than these and she remains a fascinating figure of the period.

So what?

The influence of nomenclature and notation as tools of the brain that can actually stimulate and channel investigation has long been recognised. George Boole (of famed Boolean algebra) sought to inquire what it is that renders language 'subserving to the most important of our intellectual faculties', making the following pronouncement in 1854:

That Language is an instrument of human reason, and not merely a medium for the [articulation] of thought, is a truth generally admitted. [3, p. 24].

Mathematicians – with whom perhaps lies the best developed example of a language used consciously for this purpose – realise this as much as anyone, if not more so, and it applies to an extent in the production of text where syntactic elements (word order, punctuation, semantics, and so forth) lend structure and support to dynamically *assist* the flow of ideas and intent instead of simply reflecting them; we can take advantage of this because of our training, I would suggest.

Writing with quality is not an easy thing to master but it can be done, without mystery, by practise and effort. There shouldn't, therefore, be any undue marvel or wonder when mathematicians are able to piece sentences together with cultured coherence and scholarly erudition (and, dare I say, flair?), but people seem truly unprepared for it and can be unfairly patronising in response. So long as magazine and newspaper opinion columns, professional media platforms, and the like, are dominated by those familiar kinds of suspects from the circles of fashion, art, politics, television, radio, history, medicine, sport, business, literature, law, theatre, etc. – plenty of whom are, incidentally, inexplicably able to proclaim arithmophobia and mathematical ignorance as strange badges of honour with neither embarrassment nor impunity here in the UK (the equivalent of which would be for any one of us to happily admit semi-literacy and grammatical deficiency, a perplexing situation to which the prominent English scientist and novelist C.P. Snow openly made reference nearly 60 years ago during his controversial 1959 Cambridge University Rede Lecture¹) – then not much will change. However, while the overwhelming majority of mathematicians prefer to get on with the 'proper' business of mathematics above anything else, this brief essay serves as a reminder that the endeavour is rich as a uniquely expressive one – with huge scope for creativity, inventiveness and originality – and announces the encouraging news that it also bestows gifts beyond a capacity for rational and logical thinking that, quite possibly, too often lie unused. Imagine that?

Acknowledgement

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Notes

1. This echoed comments made along the same lines by Hardy some two decades earlier, who wrote that while 'musical incapacity is recognized (no doubt rightly) as mildly discreditable, ... most people are so frightened of the name of mathematics that they are ready, quite unaffectedly, to [inflate] their own mathematical stupidity.' [2, pp. 86–87].

REFERENCES

- 1 Kovalévsky, S.V. (1895) *Sónya Kovalévsky: Her Recollections of Childhood* (translated from the Russian version by Hapgood, I.F.), The Century Co., New York.
- 2 Hardy, G.H. (1940) *A Mathematician's Apology*, Cambridge University Press, Cambridge (2011 reprinted edition).
- 3 Boole, G. (1854) *An Investigation of the Laws of Thought, on Which Are Founded the Mathematical Theories of Logic and Probabilities*, Macmillan and Co., Cambridge.

Presidential Address 2018 My Mathematics Bucket List



Institute of
mathematics
& its applications

Professor Alistair Fitt CMath CSci FIMA

The President, Professor Alistair Fitt, will give his Presidential Address at 6.30 pm on Wednesday 27 June 2018, at the Royal Society, 6–9 Carlton House Terrace, London, SW1Y 5AG, with registration opening at 6 pm. He will subsequently repeat his talk at our UK Branches.

The Institute's AGM will take place earlier on the same day, starting at 4.45 pm, with an expected duration of around 15 minutes. A separate notice about this will also be circulated with the June issue of *Mathematics Today*.

Date: Wednesday 27 June 2018.

Time: Registration opens at 6 pm and the Lecture begins at 6.30 pm, with the Reception following the Lecture.

Location: The Royal Society, 6–9 Carlton House Terrace, London SW1Y 5AG.

To attend: Admission is by advance booking only on a first-come, first-served basis. For those who wish to attend the address only there is no charge, whilst a payment of £16 is required for the reception which follows the address. All attendees must register in advance.

For further details, including registration, please visit: <https://tinyurl.com/IMA-PresAdd2018>

In the event of further questions, please email: alison.penry@ima.org.uk or gemma.reeves@ima.org.uk or call: 01702 354020.

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