The Consolation of Math in Plague Time

Barry Mazur

In reflecting about what I might do for the community, for my students, my family, myself, during these pandemic times, I found myself wrestling with preliminary thoughts, working them up into some notes that eventually took the form of an article.[1] When I submitted it to the Mathematical Intelligencer, it was suggested that I also submit an excerpt of it, or a short similar essay, to this volume. I'm very happy to do this!

I'm a mathematician devoted to rather theoretical issues. If I were an applied mathematician I am sure that I'd be delighted to be pressed into service: collecting, sorting, and classifying data. And formulating and calibrating models that help in interpreting what the data wants to tell us about what has happened in the past and what we can expect for the future.

But how can pure mathematicians be of help? Besides, of course, teaching Multivariable Calculus and Probability Theory to the future generation of epidemiologists and practitioners, and just homeschooling children or grandchildren and keeping contact with students; usually necessarily Zoom contact.

Well, we can just try to be avid students of the work of our applied colleagues—close listeners, and appreciaters. In a broader arena, we can look out for what we can do for the good of others. . . . but also: we could be looking in, for some mode of consolation.

As for "looking out," our government, our communities, our common humanity, our families—all need the closest of attention—and there is even welcome energy now—*now*— for the righting of long-lingering wrongs. The world faces a palimpsest of hundreds of thousands of personal misfortunes, tragedies some surely are; but

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[1] **Math in the Time of Plague**.

B. Mazur (✉)
Harvard University, Cambridge, MA, USA
e-mail: mazur@g.harvard.edu

we also see the emergence, perhaps, of vibrant energy[2]. to meet challenges, and effect some kind of long-range change.

As for "looking in," we have those gems of constancy: mathematical thought, and mathematics per se to understand and appreciate. Mathematics seems to be blessed with eternal youth—the freshness of new conjectures, methods, results, overviews, analogies—and, most curiously, the freshness of the old ones too! Every advance seems to offer us a higher perch, from which we see more, and then have more new questions to excite our imagination. And yet the old questions never lose their allure. A mathematician friend of mine once said that every time he thinks about the Pythagorean Theorem he is enchanted anew.

And mathematical ideas don't necessarily decrescendo during adverse times.

In one of those—from today's perspective, ridiculously minor—personal bad times, I managed to prove some (equally minor) lemma. Made happy by realizing that I actually could work in such times, I cheerily called my lemma *my consolation prize*. Happily, in good times, there is such exhilaration in doing mathematics—and in bad times: consolation.

But to move from the ridiculous to the sublime, there is the *Annus Mirabilis:* the bubonic Great Plague year 1665-6 some months of which Isaac Newton spent in a countryside retreat, to escape the plague in Cambridge, and. . . to invent Calculus. He wrote:

> . . . in those days I was in the prime of my age for invention and minded Mathematics and Philosophy more than at any time since.

I'm sure we all can cite grand examples of intense focus of intellectual energy during times of stress or hardship—from the composing of *Buchenwaldlied* by Hermann Leopoldi to Shakespeare's grand creations through a filigree of plagues.[3]

I was once very moved by an instance of *focus of mathematical energy* during a time of stress that I witnessed close up. I attribute the type of arresting *focus* I'm about to allude to—to the striking transcendental quality of mathematical ideas: transcendental, at the very least, in the naive sense that they endure; they transcend any aspect of our material surround.

I was relatively (in fact, actually) young, talking math with—and trying to understand the mathematics of—an older mathematician, when he suddenly seized up with an attack—an attack that later was seen to be caused by some internal bleeding.

I drove him to the emergency room of the hospital nearby (in Orsay, France) but we had to wait for quite a while—since that was the day when everyone drives home from summer vacation and the nearby highways were full of accidents.

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[2]E.g.: Black Lives Matter

[3]E.g., see Andrew Dickson's *Shakespeare in lockdown: did he write King Lear in plague quarantine?* (The Guardian; March 22 2020: https://www.theguardian.com/stage/2020/mar/22/shakespeare-in-lockdown-did-he-write-king-lear-in-plague-quarantine).

No matter how severe my older friend's illness was, and how much he needed immediate care, he ranked low in the triage of that emergency room because of those accidents. Consequently, we waited for an interminable—it seemed to me—time till he too could be wheeled in as a patient. During all that time he was—relaxedly it seemed to me—thoroughly engaged in our discussion, absorbed by some topological issue (I won't say what, exactly, it was, since (a) that's irrelevant and (b) you would think I rigged it if I said).

He was fully involved in these ideas, unfazed by where we were, and why—rather: he was transported by contemplating a certain mathematical analogy. But I—nervously—was quite otherwise, counting every new gurney that entered.

I said, some paragraphs ago, that "mathematical ideas endure; they transcend any aspect of our material surround." But that is too passive a claim. Mathematical ideas do better: they urge **us** to endure, to transcend. This is the real gift of Math in the time of Corona.
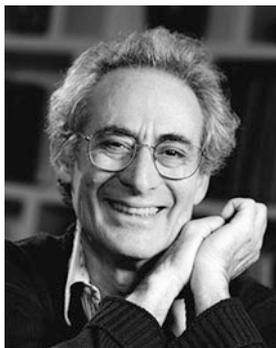
Barry Mazur (Photo taken by Jim Harrison)