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The Genius Box

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Synopsis

Who gets called a genius, and why? What effect does having a special category of people called “geniuses” have on an intellectual community and on individuals within it? Drawing on my own experience, and reflecting on writings by Moon Duchin, Elizabeth Gilbert, and others, I try to find some answers.

Mr. Jabez Wilson laughed heavily. “Well, I never!” said he. “I thought at first that you had done something clever, but I see that there was nothing in it after all.”

“I begin to think, Watson,” said Holmes, “that I make a mistake in explaining.”

Arthur Conan Doyle,
“The Red-Headed League” [1].

When I was a kid living in the Long Island suburbs, I sometimes got called a math genius. I didn’t think the label was apt, but I didn’t mind it; being put in the genius box came with some pretty good perks. For one thing, the kids who thought I was a genius at math had lower expectations of me

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when it came to other things, so to the extent that I was endowed with a normal measure of certain traits (like a healthy sense of humor), people were impressed by how normal I was — and to the extent that I had deficits of athleticism or common sense, people tended to be forgiving: “What do you expect? He’s a genius!”²

There were other kids I heard about, most of them living in New York City and attending Stuyvesant High School and the Bronx High School of Science, whose mathematical achievements were described in awed tones on the high school math grapevine, and I envied their endowments and their successes, but I didn’t think they were geniuses either. They knew lots of things that I didn’t know — things I wanted to know — but they didn’t know things in a different way than I did. The things those kids knew weren’t facts, but rather habits of thought: the kind of habits that won you top honors in math competitions and science fairs.

I got acquainted with some of those kids in my junior and senior years of high school, and they were awesomely good at solving math problems, but there was no uncanny aspect of their performance that seemed worth explaining away by appealing to some mystical inborn attribute like “genius.”

THE BIG POND

Then I went off to college and shook off the “genius” label for good. I may have been an outlier in my home town but I wasn’t one now. And that was a good thing; I’d found my people, and the pleasure of fitting in far exceeded the pleasure of standing out. I didn’t miss being called a genius, and I haven’t missed it since.

Or I didn’t think I missed it, till a few years ago when a friend of mine said “You know, I’ve known you and one other really smart math person, John D’Oh” (obviously not his real name; you may have heard of him, and I certainly had) “and I can’t really appreciate on a content level what either of you does professionally. But I knew John pretty well in college, and I’ve

² In my own family, the word “genius” (applied to me) was typically used ironically or in affectionate exasperation over my absent-mindedness, to such an extent that when my parents once called my six-year-old sister a genius, she took it as an insult and said “Don’t call me a genius!”

seen both of your minds in operation, and I can see the difference between you and him: you're a really smart person and John's a genius." And part of me imagined replying: "Oh, yeah? How would you know?" So obviously there is something about the "genius" badge that I still covet.

By the way, Prof. D'Oh recently came into a bit of public notoriety that hinged on his lack of tact and social skills — so, I'm good. (A little bit of *schadenfreude* goes a long way.)

The fact is, I still wear a badge; it just says "mathematician" rather than "genius." When I'm meeting people for the first time, and I say that I'm a mathematician, they may say "I hated math" or they may say "I loved math," but either way, the next things they say usually make it clear that they've decided that I must be very smart, and that what I have to say is worth hearing. It's been interesting to observe how, in other social situations where my badge doesn't get flashed, people don't defer to my comments and observations nearly as much. At some point, when I'm hopefully wiser, I'd like to write about this kind of "math privilege."

I'm aware that the "genius" badge (like the related, more common "gifted" badge) is harmful for some kids; they become self-conscious about making mistakes that could cause them to forfeit the badge, which ironically causes them to freeze up intellectually and not achieve their full potential. Fortunately that never happened to me. I've only recently begun to wonder why I escaped this peril. By the time I went to college, I was so immune to classroom performance anxiety that in one of my classes I made a point of asking questions that I knew would make me seem slower-witted than my classmates. I chose this path because it bothered me that the teacher left out steps that quicker and more experienced students like me could figure out in our heads but that slower and less experienced students might have trouble with; I felt that it fell to me to ask the questions that other people might be asking in their heads but be too shy to ask aloud. Nobody else was doing it, and it needed to be done.

Some of the other students (as I later learned) wondered what I was up to. "Why is Jim asking these questions?" they wondered. "He's smart; can't he fill in those steps himself?"

What I didn't realize then, but am coming to realize now, is that not everybody could've done what I did without forfeiting the esteem of classmates.

I may not have been wearing the “genius” badge anymore, but I was still wearing two other badges that made people say “Jim’s smart” even when my behavior might have made them think otherwise. I’m referring, as some of you have already guessed, to my “white” badge and my “male” badge. When a person who looks and sounds like me asks a dumb question (and yeah, I know, “there are no dumb questions,” but you know what I mean, so I’ll keep using that handy phrase), people tend to say “Why is this smart person asking such a dumb question?,” or sometimes even “Wow, he must be even smarter than I thought, if he feels so confident about himself that he’s willing to ask such a dumb question.” Whereas, when a person who doesn’t look or sound like me asks a dumb question, people tend to say “Huh, maybe she isn’t as smart as I thought.”³

GENIUS AND GENDER

I know this essay is long, but now I invite you to take a break to read something even longer: Moon Duchin’s wide-ranging and thought-provoking essay on the sexual politics of genius [2] which she wrote in 2004 (between proving theorems in Teichmüller theory) as a grad student at the University of Chicago. It’s not an easy read, or even a comfortable read, if like me you’ve uncritically lionized some of the icons of genius she’s scrutinizing through a cultural critic’s lens, and/or if like me you’ve been a beneficiary of the modern idea of The Genius.

³ I once had a conversation with a woman mathematician friend of mine about a related phenomenon: what happens when a teacher tells students “That’s a great question, and I don’t know the answer; let me get back to you about it.” She argued that men can get away with this more than women, and over the years I’ve come around to her point of view. She told me that many of her calculus students wrote on their teaching evaluations “Teacher does not understand the subject,” and that her colleagues (who were men) didn’t have this problem, even though anyone with a Ph.D. in math from a top-level institution is bound to understand as comparatively simple a subject as college calculus. My friend had run afoul of a phenomenon that has been well-attested elsewhere: students are not objective when it comes to assessing teaching quality, and their preexisting stereotypes influence their evaluations. (See for instance the Colleen Flaherty article [4].) The fact that the students in this particular incident were all women at an all-women’s college makes the incident more depressing but not necessarily more surprising; the study of the phenomenon of women being prejudiced against women goes back to the work of Philip Goldberg in the 1960s.

I call it a modern idea, because when the term “genius” was first used in reference to the creative process, it meant something quite different from what it’s come to mean today. In the Roman empire, geniuses were divine spirits that, on artists’ lucky days, helped them do their best work. Perhaps one of my readers will educate me about the respective nature of muses, daimons, and geniuses in Greek and Roman times; it seems to me that there’s a bit of murky overlap.⁴

Duchin’s guided tour starts with the public images of several iconic geniuses of the twentieth century. When I started reading the passages about Feynman, Hawking, Erdős, and Ramanujan, it was hard for me to resist the temptation to reflexively rise to their defense. I had to remind myself that the four are not her main focus; Duchin wants us to notice the cultural narratives that surround these men and that influence subsequent generations, spreading the message “This is what a genius is.” If you want to be a genius, you can be as chaste as Erdős or as promiscuous as Feynman, but you’d better be a man, or be prepared to be de-gendered like Emmy Noether. (Duchin doesn’t cite prototype theory, but it seems related to the subtle ways in which discrimination perpetuates itself.) Duchin writes “I argue that linguistic and iconic factors conspire to create a genius ideal that is inaccessible to women in an ongoing way, even as the doors of material and mental opportunity open to them.”

Duchin then takes us back to the origin of the modern concept of genius. We begin to see the pivot in a description of Isaac Newton penned by one of his contemporaries: “Does he eat, drink and sleep like other men? I cannot believe otherwise than that he is a genius, or a celestial intelligence entirely disengaged from matter.” Here the word “genius” is being used in something close to its original sense, and when Newton is called a genius, the use is metaphorical. The real switch comes in the work of European authors in the eighteenth and nineteenth centuries. I won’t repeat all the examples Duchin lays out, but they all witness the construction of “genius as an identity, with mystique and maleness at the fore.” (Note the word “mystique;”

⁴ There’s irony in the fact that the Muses, those near-kindred of the geniuses of antiquity, were women, whereas the incarnations of genius whom writers in the nineteenth century, without conscious metaphoric intent, simply called “geniuses,” were seen as flowers of a particular subtype of masculine excellence.

more on this later.) We see “a metonymic shift from the ancient notions (a spirit of genius and works of genius) to the modern model (people who embody the spirit).” By way of the idea of a person-of-genius we arrive at the modern idea of the genius-as-person, and the image is a male one.

In critiquing the idea of genius, Duchin is not making some sort of glib postmodernist claim that all assertions of value are culturally determined and that hence those assertions are empty of meaning. “Exposing genius as falling far short of its rumored objectivity and clarity does not compel us to jettison the core intuition. The problem is not being able to extricate instances of genius from the social factors of designation and judgment, and from its legacy of celebrating a solitary masculine heroic ideal.” (Note the word “solitary;” more on this later.)

I take heart from the recent spate of attention that the late mathematician Maryam Mirzakhani has gotten, in the aftermath of her death, and just as important, the nature of the coverage her work and her career were given.⁵ It’s vastly premature to announce that the concept of the genius has lost its sexist character, but I think things are better now than when Duchin wrote her essay in 2004.

MY FEYNMAN PROBLEM

I don’t agree with everything Duchin says, but I strongly suspect that I’ll agree with her more and more as I continue to mull over her point of view. Near the heart of my difficulty with Duchin’s essay is my knot of complicated feelings about Richard Feynman. I loved his two autobiographical books *Surely You’re Joking, Mr. Feynman!* and *What Do You Care What Other People Think?* when I was a teenager, and I still love many of his ideas about science and science education. I was especially taken with Feynman’s description of how abandoning his desire to live up to people’s expectations freed him to do his best work, and his prescription for success: “Study hard what interests you the most in the most undisciplined, irreverent and original manner possible.” And also: “What do you care what other people think?” This advice worked pretty well for me in my mathematical career.

But Duchin makes me ask, for whom does Feynman’s advice work well?

⁵ See [8] for a discussion of genius that originates from the career of Mirzakhani.

Who in our culture is forgiven for putting aside personal relationships in the name of single-minded pursuit of truth? Who is permitted to be a joker? And, on the other hand, who in our culture is taught from an early age to care what other people think?

As Duchin writes:

Commentators from the popular press seized on Feynman as busting that stodgy professor image once and for all: “If a single book can shatter the stereotype of the stuffy scientist, this may be the one,” proclaimed the Detroit Free Press. Of course, in shattering the old image, a new ideal is constructed; one of the most startling realizations about the effect of this account of Feynman is that in some ways it acts as a selection pressure on future physicists. As Science Digest puts it, “It almost makes you want to become a physicist” — though of course this must depend on the relationship of your self-image to the exploits that Feynman put up for offer. (page 10)

Also, who gets to study hard what interests them the most? Everyone? Class and economic advantage play a role. Even the case of Ramanujan illustrates this. Ramanujan’s rise from obscurity to fame can be read as a validation of meritocracy, but Duchin reminds us that he came from the Brahmin caste and thus had more educational opportunities than the average Indian of his day. And even then, most of the English mathematicians he wrote to ignored him; if Hardy hadn’t taken Ramanujan’s strange letter seriously, there might be no Ramanujan story for us to retell.

THOSE WHO HAVE LEFT THE ROOM

Duchin points out that, while there are many people who, like me, took inspiration from Feynman’s popular books or from E.T. Bell’s *Men of Mathematics*, it’s hard to measure the negative impacts of these books. “It goes without saying that people discouraged from pursuing mathematics by Bell’s forceful images are much harder to find on the record.”

And books are just a small part of the picture. There’s a whole math-macho culture that feeds, and feeds on, those books and others like them. If we ask “Is everyone in the classroom comfortable with what’s happening here?”,

and we approvingly note all the raised hands, we're not seeing the unraised hands of those who have already left the room.

And even when all the people one meets are welcoming, there's something about being different that can make one self-conscious, in a way that makes it harder to focus on what everyone else is focussing on. The notion of stereotype threat has gotten some press lately; I want to also bring people's attention to the slightly less-discussed notion of solo-status.

I haven't met people who were so turned off by the books by Bell and Feynman that they avoided math and physics entirely, but I've heard a bunch of stories over the years that go like this: "I really liked math, and I thought I was good at it, but then my freshman year roommate was this guy who just blew me away mathematically, so I figured I probably wasn't that good at it after all, so I should major in something else." The punchline of the story is always "And his name was ..." (insert name of really famous mathematician here). Part of what drove those disaffections from math is the myth that to have a happy life in mathematics, you have to be one of the very best. In the invidious words of Alfred Adler (quoted by Duchin): "A mathematician is great or he is nothing." Jordan Ellenberg writes in [3]: "One of the most painful aspects of teaching mathematics is seeing my students damaged by the cult of the genius. That cult tells students that it's not worth doing math unless you're the best at math — because those special few are the only ones whose contributions really count."⁶

I'm sure that the prevalent image of the solitary genius also dissuades some mathematically-inclined people from the math life. Never mind that number theorist Andrew Wiles first gained prominence from his collaborative ventures with Coates, Mazur, and others; the image that sticks in people's minds is Wiles working in isolation for seven years. The stories of Alexandre Grothendieck and Grigori Perelman tap into the pre-existing fairy-tale trope of solitary effort and long-deferred reward and give it further fuel, in a self-sustaining cycle.

As a corrective, it's helpful to remind people that the twentieth century's most prolific mathematician, Paul Erdős, was manically gregarious and

⁶ One of Ellenberg's sentences deserves special attention: "Genius is a thing that happens, not a kind of person."

collaborative. But Erdős, the eccentric celibate, is a bad role model in other ways. He liked to repeat his friend Alfred Rényi's quip: "A mathematician is a machine for turning coffee into theorems." Devoting one's life exclusively to math worked for Erdős, but it wouldn't work for most other people, women or men.

I like mathematician Christopher Moore's rewrite of Rényi's adage: "Mathematicians are devices for turning coffee, red wine, delicious food, world travel, the sight of beautiful gardens, the rhythm of poetry and literature, delightful partners, the joy of raising children, and excellent sex into theorems."⁷

SHOWING UP

Near the end of her essay Duchin suggests: "Maybe a partial remedy is restoring genius to its adjectival form from its now-dominant identity status."

A similar suggestion comes from the writer Elizabeth Gilbert, author of the runaway best-seller *Eat, Pray, Love* as well as other books (such as her widely praised novel *The Signature of All Things* about an invented nineteenth-century woman scientist). Just as Feynman felt the crushing weight of people's expectations in the aftermath of his early successes in physics, Gilbert struggled with how to approach the job of writing in the aftermath of *Eat, Pray, Love*. Actually, Gilbert's struggles with the writing life predated her success, and what she found most helpful was to partly disclaim her own role in the writing process, and to attribute the parts of her creativity beyond her conscious control to an external agency — a genius, in the antique sense. During a bleak patch in her process of writing *Eat, Pray, Love*, poignantly described in her much-viewed TED talk "Your Elusive Creative Genius" [5], she addressed her genius aloud, saying:

"Listen you, thing, you and I both know that if this book isn't brilliant that is not entirely my fault, right? Because you can see that I am putting everything I have into this, I don't have any more than this. If you want it to be better, you've got to show up

⁷ I especially like Cris Moore's insinuation that for the serious mathematician, the pursuit of pleasure is a professional duty: if you feed your body food that isn't delicious, or settle for sex that is merely passable, you won't live up to your full mathematical potential.

and do your part of the deal. But if you don't do that, you know what, the hell with it. I'm going to keep writing anyway because that's my job. And I would please like the record to reflect today that I showed up for my part of the job."

Gilbert's suggestion is that, given how little we understand about how creativity works, we could do worse than revive, as a working metaphor if not a literal belief, the old idea of the genius as visiting, collaborating, or inhabiting spirit. It's a bit like the way the "higher power" of Alcoholics Anonymous works, but for unlocking creativity rather than coping with addiction: if you can psych yourself into believing that your best work draws from an external source, you'll be able to relax in ways that enable you to do your best work, whether or not it's true. (Gilbert believes, or tries to believe, that the source is external; I'd love to live in an enchanted world containing divine spirits, but having seen no evidence of them, I'm reluctantly led to disbelieve.)

One thing I take from Gilbert's talk is that, even if the visiting genius is capricious, there are better and worse ways to coax it into visiting, or at least to be prepared for its visits. For instance, you can try to have a writing pad or voice recorder on hand at all times so that, if something comes to you in a moment of inspiration, you can grab that song or poem or proof before it evaporates.

Taking Gilbert's ideas in a different direction, I would say that for a mathematician (and probably for other sorts of scientists), it's extremely helpful to see things differently on some days than others, and possibly even helpful to be more intelligent on some days than others. For instance, on the days when you feel inspired, you should write things down, and on the days where you feel uninspired you should read the things you've written on your inspired days, to see if you understand them, because if you can't, your readers probably won't either. Or at least this is a form of solace that I try to psych myself into believing on days when my thinking seems dishearteningly muddled.

MYTH AND COUNTERMYTH

After the original version of this essay on the genius myth was posted on my Mathematical Enchantments website, several people posted responses involving a related myth that we might call the speed myth: the idea that a

hallmark of intelligence is lightning-quick thinking. The commenters supplied quotations from accomplished mathematicians who, contrary to the quickness myth, felt that their minds worked more slowly than other people's. At first I thought that these attestations were useful correctives to the genius myth, but now I'm not so sure. Just as the image of Feynman the irreverent prankster undermined one notion of genius only to replace it by another, I think these narratives of people who are not just slow but exceptionally slow (because they're so uncommonly *deep* don't you know) can be used to support the idea of geniuses as exceptional people who happen to be exceptional in a paradoxical way. Such paradoxes are nothing new in scientific hagiography; consider the commonly-repeated (though mostly baseless) assertion that Albert Einstein was a poor student.

I think the speed myth is just as pernicious as the genius myth, and perhaps more so, since it is often held to apply not just at the margins of human achievement but among ordinary students in ordinary classrooms. The people who shoot up their hands when the teacher asks a question must be smart, says the myth; if you don't shoot up your hand, maybe you're not as smart as they are. I'd like to see the speed myth (along with its sibling the prodigy myth) dismantled, and some of these quotes from mathematicians are very useful for this purpose. But these archetypes of depth-rather-than-speed do nothing to dismantle, and may even reinforce, the archetype of a solitaire (usually male) figure whose thoughts, be they quicksilver fast or tectonically slow, are beyond the capabilities of ordinary people.

Where, in the ever-changing marketplace of archetypes, is the archetype of the exceptionally gregarious mathematician who's able to unify disparate-seeming fields of study because she talk to lots of people? That's one I'd like to see.

MOVING BEYOND GENIUS

I don't think we'll be able to dislodge the notion of genius-as-person; it's too entrenched. And I don't think we can convince most people to believe that external spirits are the drivers of their creativity. But we can chip away at the idea of The Genius in other ways. For instance, we can subvert the elitism of the idea by repeating Thomas Edison's recipe for genius (1 part inspiration to 99 parts perspiration). Because hey, whatever other sorts of glands we possess or lack, we've all got sweat glands.

I also think that we can do a lot of good by resisting, on every level, the temptation to dazzle people with our brilliance. We have to ask ourselves: if we present a clever solution to a puzzle without indicating how we found it, are we implicitly teaching people that there are people like us who see such things instantly and people like them who never can? Just as mushrooms thrive in darkness, the genius myth thrives on a withholding of information. Mathematician Mark Kac, in his book *Enigmas of Chance* [7], tries to draw a distinction between smart people and geniuses. Actually, he draws a distinction between “ordinary geniuses” and “magicians,” which transposes the smart-person versus genius theme into a whole new octave. But the point I want to stress is the way Kac distinguishes between his two categories:

An ordinary genius is a fellow that you or I would be just as good as, if we were only many times better. There is no mystery as to how his mind works. Once we understand what they have done, we feel certain that we, too, could have done it. It is different with the magicians. ... Even after we understand what they have done, the process by which they have done it is completely dark. They seldom, if ever, have students because they cannot be emulated and it must be terribly frustrating for a brilliant young mind to cope with the mysterious ways in which the magician’s mind works. (page *xxv*)

The difference between an ordinary math genius and a math magician is that the magician’s thought processes are obscure. Does anyone see a moral hazard for mathematics here? If you are an ordinary genius and want to be thought a magician, all you have to do is not explain where your ideas come from!

Most smart people want other people to think they’re smart, and it’s all too easy to cultivate an appearance of brilliance by presenting the fruits of our labors without explaining the arduous processes that yielded them. But when we do this, to the benefit of our reputations, we pollute the intellectual commons with false impressions about who we are and the nature of the work we do. We need more smart people to rise to the challenge of making their leaps of intellect intelligible to others. We need more smart people to willingly trade the mystique of genius for the gratitude of others who want to learn things from them. And we also need a world that will reward smart people (all of them!) for doing this.

We'll always tell stories and we'll always want heroes, and journalists and other story-tellers will tend to tell the kinds of stories people like to hear. It's a feedback loop that can't be easily broken but, over time, it can be altered. (See Evelyn Lamb's two essays [9, 10].) I'm hoping that in the future we'll dislodge ideas about mystical ingrained abilities with stories that focus less on endowment and sudden flashes of unexplained insight and more on people's steady efforts in communities of people working together, engaged in the fun, frustrating, fulfilling work of figuring things out.

Postscript.

As mentioned earlier, this essay is an expanded version of a blog post I wrote a while back [11]. In this version, I have expanded upon some of the issues that I had left out before, such as the topic of slow vs. fast thinking. Another topic I'd hoped to fit into this essay, which did not make it in, was the distinction between early bloomers and late bloomers; we associate genius with precocity, but many people who've made important contributions to math weren't prodigies but came to math in college or later. Also, reader David Jacobi suggests that one quality we should celebrate in our scientific and mathematical heroes, as a separate thing from brilliance *per se*, is curiosity. It surely isn't coincidental that many of the accomplishments that lead us to celebrate certain people as "geniuses" were driven by passionate curiosity. Giving rein to our curiosity may free us from self-doubt and psychological blockage just as effectively as believing in divine sources of inspiration.

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