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How I First Heard About Calculus

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Synopsis

An attempt to motivate a class of engineering students leads to insights both personal and pedagogical.

The lecture

You want to know how I first heard about calculus?

It was April, 2016, and I was attempting once again to convince my engineering students that calculus is one of the great inventions of the human mind. I decided to offer a little personal history.

When I was a kid, there were black-and-white comic strips in the weekday newspaper, and sitting there alongside Peanuts and Blondie was the daily “science” comic. Five days a week, there was a science comic. Weird, eh?

Each week had a different theme. When I was about ten, the theme was calculus. Monday they said that calculus was usually presented as a pretty mysterious subject, left to teach at college, but the basic idea is pretty simple.

Tuesday they said “Here’s a problem. A race driver is going around a track, and his speed changes—he’s going faster and slower, avoiding a crash, speeding up on the straight-away—and we record his speed at each time on a graph.”

So they had a drawing of a race car—I drew a dodgy car on the board—and a graph of speed versus time—which I sketched under the car—and they asked the question: “HOW FAR DID THAT CAR GO OVER THAT TIME?”

End of comic.

Well, there was an interesting question!

I knew that if you drove 60 miles per hour for an hour you traveled 60 miles, and if you did it for 15 minutes you traveled 15 miles, etc. Same thing if you're traveling at 100 miles per hour, or 40. The newspaper was spread out before me on the hardwood floor in our living room. If I drew little blocks that covered the graph I could estimate how far the car traveled over each interval of time. I saw that if you made the blocks really narrow you could get a pretty good estimate of how far the car traveled, but I couldn't see how to get the exact solution, which would be precisely the area under that curve.

It was an afternoon paper, so I waited impatiently until after school Wednesday to get the answer.

Wednesday's comic first went through roughly the same process that I had used to approximate the answer.

And then it said calculus—calculus!—could give the exact answer.

I thought, man, that's a pretty good trick! There's no rule that gives that graph, if someone cuts in front of him he has to put on his brakes, anything could happen. I'll need to learn calculus!

When I started learning calculus in high school, I remembered that comic. I realized that calculus couldn't really tell me the area under that curve—jab at the board—that it only worked for certain predetermined curves defined by specific formulas. I was disappointed—I thought it was just another example of how adults lie to children.

Class was over.

The Age of Information

As I walked back to my office, the memory of that comic pushed all other thoughts from my mind. A daily science comic would have been unusual for that time or for *any* time, and this is the Age of Information: there *must* be some record of it online somewhere. And I should be able to find it.

Which I did: [1]. Figure 1 contains Tuesday's panel, which I had evoked fairly well on the blackboard. The series was produced and distributed by Press Feature Service, Sydney, Australia, and originally appeared in the *Sydney Morning Herald*; this particular strip appeared the week of August 10, 1962.

FRONTIERS OF SCIENCE

This week: THE SIMPLICITY OF CALCULUS — Part 2

Figure 1: Tuesday's panel from *The Simplicity of Calculus* [1].

Now we are seven

I wasn't ten in August, 1962, I had just turned seven. And let's be clear: I wasn't an evident math prodigy.

At seven I moved each day between very distinct realms. Mrs. Bezaire (called "Mrs. Brassiere" by some boys) attempted to teach us Grade 2 children addition with carrying. My mother struggled at home, pregnant and without a car, to take care of me and my younger sister and brother; at times it seemed that I was allowed in the house beginning only at dinner time, after my father returned from work.

The rest of the time I ran with a band of half-wild boys who roamed the bush that started a block from our house. We chased rabbits and collected crayfish. We built "forts" by digging holes in a field of coarse yellow straw. We'd cover the raw dirt floor with the straw, and lay the straw over the branches we set arching as roofs over the holes. Safely inside, we would peer at magazines stolen from somebody's older brother, play with matches, and sometimes set the entire field on fire, which brought out the volunteer fire department. Life was exciting!

So the summer after first grade I was figuring out calculus? It didn't make sense.

But some things *did* make sense. At ten, I was a big boy, big enough to hold the daily newspaper open in front of me—no need to spread it on the floor. My ten-year-old self would not have found an imaginary car race so captivating. The "adults" in this case hadn't really lied to me:

I had misinterpreted the carefully worded statement that “students of calculus are taught how to integrate many graphs by inspection only” to mean that they could integrate *this* graph—would I have missed this subtlety at ten?

Eventually I realized that even though this comic appeared in the *Sydney Morning Herald* the week of August 10, 1962, it may have appeared later in my local paper, the *Windsor Star*, of Windsor, Ontario, Canada. After some digging, I found the *Star*’s copy of the comic in the Google News archives—it had appeared the week of April 22, 1963, alone, among the classified ads, and *not* on the “comics” page [2, page 29]. I was still seven when it appeared, but near the end of second grade.

On morals

I’ve been a bit taken aback at some of the morals that people take from this story, so let me say that my moral is this: If you have the opportunity to explain even a little bit of science or mathematics to a general audience, then take it—you’ll never know the influence you might have. Over 50 years ago a comic produced in Sydney, Australia, was reproduced in a paper nearly 10,000 miles away in a mid-sized Canadian city and inspired me and who knows who else. In the Internet Age this influence is magnified manyfold.

The nature of memory

Of course, many of the details of my “memories” could be false. I may not have figured out the approximation process, I may just have remembered it from the next day’s comic. I “remembered” being ten when the comic appeared likely because I couldn’t have imagined it making such a big impression on me at an earlier age. And I had forgotten how the application of calculus in Thursday’s panel—accurate navigation of nuclear-powered submarines “armed with Polaris-type missiles”—firmly rooted the comic in the context of the Cold War.

But some memories were true: The comic existed; there was a drawing of a race car next to the graph of speed versus time; I understood the graph; the comic described how to approximate the distance traveled; the distance traveled is the area under the curve; “calculus” would be able to tell me that area.

Rarely does a person get an opportunity to understand an episode of his or her childhood from the perspective of adulthood.

So the most important personal outcome of my investigation may be this: a new understanding of myself as a little boy reading the daily paper on the living-room floor, already interested enough in science to search for a solitary comic among the classified ads each day—and how one particular topic caught his imagination and remained with him for many years.

References

- [1] Andrea Bresciani, Stuart Butler, and Bob Raymond, “The simplicity of calculus”, August 10, 1962. *Frontiers of Science*, Issue 53, published by Press Feature Service Pty. Ltd., Sydney, Australia. <https://digital.library.sydney.edu.au/nodes/view/1823>. Accessed 2020-04-11.
- [2] Hugh A. Graybiel, editor. *The Windsor Star*, April 23, 1963. <https://news.google.com/newspapers?nid=SaguW2jnL4UC&dat=19630423&printsec=frontpage>. Accessed 2020-04-11.

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