My Geometry Notebook[1]

by

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It was in the year 1957, during my junior year, that Professor (Prof.) Ciro Herrera arrived to our high school[2]. He had been transferred from another Central High School to assume a full-time position teaching mathematics. At that time, the majority of our teachers worked only as hourly employees, on a part-time basis[3].

Soon enough, Prof. Herrera had persuaded his Plane Geometry students to carry a permanently updated notebook containing all the theorems of the course, proved in detail and colorfully illustrated. The notebook had to be carried in one's pocket at all times and it had to be read and re-read during the normal study hours as well as the idle ones --while waiting in line, traveling by bus or trolley, etc.

The possession of the precious notebook could be checked by Prof. Herrera whenever he casually met his students within or without the school. The knowledge of the subject --and the updating of the Notebook-- were controlled periodically in a pompous class ritual of uncertain schedule. This notebook was my first work of mathematical compilation. The care and attention that I dedicated to it set it fundamentally apart from all my other ones.

Prof. Herrera endowed the course with vibrant dynamism and charm. Illustrious Greeks like Euclid, Thales and Archimedes, among others, paraded like in a theatrical performance. He

[1] This work was supported by the CNPq. It is a translation of the article "A Caderneta de Geometria, published in Portuguese in "Revista do Professor de Matemática," vol. 21, 1992.

[2] The events take place in Lima, Peru. With the exception of Herrera, Flores and Almeza, all the names of the other teachers are fictional.

[3] We should regret that full-time positions for teachers in Peruvian high schools have long been eliminated.

conveyed the message that mathematics could serve as a link to the history of human thought and to the deductive rigor of reasoning. This is what drew my attention to geometry and, for the first time, I took a course in mathematics with authentic interest and a desire to learn.

Before I met Prof. Herrera, I thought of the study of the courses of his specialty as an obligation to be met only to the point of becoming technically crafty and fast in the calculations, for the exclusive purpose of getting the desired passing grade.

I have had traumatic experiences in my attempts at acquiring technical dexterity in Arithmetic (in 1954) and in Algebra I (in 1955).

In the first one Prof. Robledo, who was also a part time engineer, spent a lot of time --in a vertiginous race against himself-- demonstrating the criteria for divisibility (by 3, by 5, etc.), extracting long and painful square roots, and calculating boring percentages and compounded interests. Definitively, when I was 12 years old, I was far from being able to admire or even to understand the proofs of the divisibility theorems. I defended myself the best I could, using the methods for the calculations. My guess is that Prof. Robledo purged his guilt for the way he taught by passing the few who had learned something, but also the others.

In the second case, I started Algebra I lacking the necessary maturity and without any motivation. Prof. Huerta had a hoarse voice and a grim face. His classes were soporific. However, unlike Prof. Robledo, he felt no remorse. He really failed his students!

Towards the middle of the course, judging by my monthly grades, my mother realized that, unless an urgent measure was taken, I was surely going to fail mathematics. Thus, she sought the help of Prof. Flores who gave private classes to students in our neighborhood. In his first class, with meridian clarity and an exquisite calligraphy, he laid out on a paper “the basic rules for operations with algebraic expressions.” Afterwards, he gave me a little book with gradual exercises, to solve those I could. In the meantime, he worked with another boy. He took two students per class, not necessarily at the same level. At the ending session, he told my mother: “Don’t worry “Señora”, if the boy studies he will learn.”

On the night of Prof. Flores’ prophetic statement, my mother thanked fervently Santa Rosa de Lima and Friar Martin of Porras -- now a saint-- for having spared her from conceiving a son destined to be a failure in mathematics and, thus, to be handicapped for life.

Actually, what she wanted was for me to take the qualifying exams for admission to the prestigious Military Academy Leoncio Prado -- immortalized in the universal literature by Vargas Llosa in his novel "The City and the Dogs" ("La Ciudad y Los Perros"). The time was right since boys in the second and third grades of high school were being recruited. To register for the entrance exams it was necessary to have good grades. A poor grade would have been deadly for someone like me who had no "godfathers" in uniform. The Academy was the natural spring board to the Military College in Chorillos ("Escuela Militar de Chorrillos") and to a stable and well-paid career. Thus, the situation was one of high responsibility.

With a few classes from Prof. Flores I improved my algebra scores; even so, I run the risk of being failed due to my low average. Nevertheless, my small and wonderful world in those days still reserved unexpected opportunities and short cuts. I discovered that Prof. Huerta published independently every year, at an affordable price, a mimeographed practice portfolio with numerous exercises and generous blank spaces for the answers. Those who wanted to improve their averages had to buy the portfolio and present it properly filled with the solutions.

I passed Algebra I but, alas! I failed Zoology. In the oral exam, I confused the platyhelminthes with the nemathelminthes. I presented, to no avail, the album that I had prepared during the course, with drawings of hirsute protozoa and native camels. The shame of having to spend my vacation in a class with those who had failed merged with the happiness of not having to register in the contest for admission to the Military Academy. Personally, I found relief in not having to submit to the shameful ceremony of pre-military initiation, the infamous "baptism of the dogs."

My mother accepted the outcome so easily that it surprised me. Seeing me depressed, she said: "Take it easy, my son, it must be the will of the saints."

My troubled passage from the second to the third grade and the shameful experience of taking the remedial exam, marked also my transition from childhood to adolescence. With it came that irreversible distancing from the joy of building kites and of flying them while running through barren fields during the cold, July vacations.

Thanks to Prof. Flores, I acquired the experience with algebraic expressions and the skill with their rules of operation that allowed me to navigate, without sorrow or glory, the waters of Algebra II (systems of two and three linear equations, quadratic equations, some graphics of simple functions in the coordinate plane...) during 1956.

In my senior year --the fifth of high school-- in 1958, I briefly came to consider the Humanities and even Law as possibilities for university careers in the future. I secretly admired Abraham Valdelomar[4], his tales and poems. But, I could not appreciate the grandeur of novels. The writer Ciro Alegria had been censored for being leftist (in fact, "aprista"[5]) and I found boring and kilometric the peninsular classics. On the other hand, the attention I had been forced to pay to the study of Zoology had awakened my interest in the Biological Sciences.

At the same time the last mathematics course, Space Geometry and Trigonometry, was being taught --without a shadow of inspiration-- by a retired engineer. He had reduced the first half of the course to making calculations of volumes for solids and of areas for surfaces, starting with formulas that he, cabalistically, would pull out from his sleeves. For him, the second part consisted of a gigantic chain of trigonometric identities. How I missed Prof. Herrera!

Finally, after hesitating among the alternatives, I succumbed to the subliminal official propaganda: "We already have enough graduates in the liberal arts and lawyers, we need more scientists and technicians, they will lift our country from underdevelopment." Thus, I inclined towards a technical or scientific career. Nevertheless, I did not feel capable of competing for one of the coveted openings at the Engineering School. Its mathematics and physics exams were regarded as long and difficult. Among fellow students and friends of my neighborhood I knew boys that were applying --some for a second or third time, after years of study in private academies that trained them in a multitude of 'typical" tricky questions. I saw them as alert and fast, or simply well trained, and as serious adversaries in any contest. Somewhat intimidated, I decided to apply to the School of Medicine.

In the second semester of that year I enrolled in a training course to apply for admission to the basic sciences. Part of this course required a review of the entire high school mathematics program.

[4] Peruvian writer.
[5] Leader and founder of the socialist political party APRA (Alianza Popular Revolucionaria Americana).

With a slightly nasal voice, but with incomparable clarity and elegance Prof. Almeza explained the central points of the programs of arithmetic and algebra. Suddenly, I understood the theorems of divisibility. The ghosts that had hunted me since the time of Prof. Robledo disappeared like magic. As if illuminated by a ray of light, I had the impression of perceiving a secret unity existent between arithmetic, algebra and geometry (my base of solid support). This was how I choose Mathematics.

In arriving to this decision, I was helped a great deal by attending a series of short vocational courses organized for the seniors. Of course, nobody said a word about the marvels of the world of mathematics.

An officer discoursed about the glories of a military career. He mentioned the numerous heroes that had earned so many laurels for the Motherland.

Then came an engineer who showed us a picture of a hydroelectric plant encrusted on the Andean rocks. He finished saying: “The engineers will save our country from underdevelopment.”

A physician talked about the nobility of his profession and of the Hippocratic Oath. He evoked the immolation of the martyr, Daniel A. Carrion, who injected himself with the germ of the “verruga peruana” (bartonellosis). His sacrifice was a light that allowed a better understanding of the disease and its subsequent cure. Everything was going well with the medic’s presentation when, as a final note, a film about the profession of surgeon was shown. Among other things, they showed the operation of a huge, dark, cancerous tumor of the lung caused by smoking.

For several nights afterwards I was assaulted by horrible nightmares in which I endlessly manipulated viscera, black like coal, oozing incessantly a purulent blood that splattered on me, soiling my impeccably white apron. I would wake up with an incontrollable malaise. The decision of studying mathematics drove away the surgical nightmares (after I stopped smoking).

I realized that the place to accomplish my project of studying mathematics was not the School of Engineering but the Faculty of Physical and Mathematical Sciences of the University

of San Marcos. I felt happy, free from having to compete with the “experts” in the resolution of kinky little problems who were applying to engineering.

The classes ended in December. I burned the midnight oil in January and February studying for the admission examinations. The program seemed formidable to me: mathematics, biological sciences (including zoology), physics and chemistry.

Many afternoons during March of 1959 I went to the century-old building, on the University Park, called The Big House (“La Casona”), now a Cultural Center, where the examinations for admission were administered.

Like a powerful talisman pulsing in my pocket, radiating courage and confidence, the Geometry Notebook was my companion in those decisive exams.

On March 25th I went back to find out the results. I had passed! I went home with the notice of my approval, filled with emotion. Embracing me my mother said: “Those up above did not forget your birthday my son.”

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