# Chapter 6
## The Training of a Mathematician

**For twenty years the world has been storming the ramparts, demanding answers to the question: *What ever happened to Aleph the mathematician* ? One of my intentions in writing this book is to silence these voices once and for all. The historical record is clear: the unique endowments of most mathematical prodigies go into a steep decline in their mid-twenties. Still, despite 9 years of turmoil at Zelosophic U. on more than one occasion rising to a state of outright war, I was only 22 when I got out. And I can still evaluate a mean integral, although it is painfully obvious that in my 40's I can't begin to equal the facility I had as a child . One imagines that it might still be possible to make some sort of contribution to the Queen of the Sciences.**

**Why is it then, that after my ground-breaking communication in Celestial Mechanics, ( and apart from a number of cute algebraic number theory doodahs (which, like so much of mathematics, lead precisely nowhere )), my publication portfolio cannot boast of a single noteworthy result in any branch of mathematics , pure or applied? The short answer is that I don't know. The long answer is in the remaining pages of this book.**

**Ah! How I well remember the boundless joy of my first weeks as a student in Dr. Régard Nombril's course on advanced functional analysis! In 1948 Régard had abandoned uncooperative manifold theory to launch into the fledgling field of *Anti-almost-everything functionals* . He could have earned a Nobel Prize for his work, had there been a Nobel Prize in mathematics. It may be because he lacks the charisma that prize-winners, worthy or**

**otherwise, seem to need, he's never received any of the other prizes normally given to mathematicians either , the Bocher Prize, the Fields Medal, and so forth. Mathematicians knowledgeable in his field are unanimous is asserting that he's deserved them all.**

***Anti-almost-everything functionals*** **are a class of functions mapping large mathematical objects, even entire subjects like Group Theory, Topology and so on , into a vanishingly small subset of entities called, in fact, *non-entities* . It should not be confused with Category Theory, which map such objects into each other. By passing the non-entities through Filters and Ultra-filters, one ends up with an infinitesimal remnant, appropriately named *The Interpretation* .**

**Although the field of anti-almost-everything functionals is, properly speaking, a branch of pure mathematics akin to Robinson's Non-Standard Arithmetic, it has many practical applications. Fields as diverse as Philosophy, Sociology and Literary Criticism have benefited from its methodology. It was Régard's peculiar genius to recognize the similarities in the fundamental assumptions underlying these seemingly unrelated disciplines.**

**Uninformed laypersons often make comments to the effect that research in mathematics consists of some sort of sterile mental gymnastics , whereby arbitrary axioms are yanked about to produce mystical joyrides. Nothing could be further from the truth. Mathematics is our most effective mirror of the real universe, a mirror relentlessly polished until it is spotless. Anti-almost-everything functionals have been used to shed light in many dark closets of the mind. One welcomes its illuminating role in navigating the murkiest and mustiest bogs of stagnant thought,**

**particularly in those fields in which obscurity is the *sine qua non* of intellectual respectability.**

**As a notable example, through a judicious application of anti-almost-everything functions the whole of Heidegger's *Being and Time* can be reduced to a page and a half, where the half page is used up listing the various non-entities inherent in the text. Régard assigned this particular exercise to me as a seminar paper. From time to time I still relive in my mind that keen apperception of intellectual beauty experienced as we discovered together that 1000 pages of Heidegger's text could be reduced to 4 words plus a semotic signifier embodying a complex mathematical operation.**

**Régard's ingenious constructions lay the foundation for the emergence of Structuralism, a now defunct movement in academic discourse that is reputed to have been initiated by the mathematician Jean Dieudonné. It is known that Nombril and Dieudonné were in frequent communication during the structuralist vogue. Seen in this light, the major contribution of the so-called "structuralists", Claude Levi-Strauss, Roland Barthes, Jean Piaget, Noam Chomsky, Althusser, deSassure and so on, consists in the discovery of a class of non-entities more infinitesimal than any of those previously identified.**

**Had Régard Nombril been put exclusively in charge of my education there is little doubt in my mind that he would have made a mathematician of me. It was my misfortune to have been enrolled at the same time in Frank Kriegle's course on *Exceptional Logics* . Kriegle and I were born to be enemies. I was coerced into taking his course by the demands of academic politics. In fact, my enrollment in it was forced upon me because of an incident that**

**occurred one afternoon in the Graduate Student Lounge (GSL) in the very first term of my Freshman year.**

**The GSL at Zelosophic was, and still is, a honky-tonk of the intellect. Entering it one might easily imagine oneself in some video games arcade at 42nd and Broadway. One can't buy switch-blade knives or old swastika shoulder badges there ; yet in its seediness it exudes the same quality of the illicit . One also uncovers as much dirty underwear on display between male and female as in any triple-X movie.**

**Sizable alumni endowments had enabled Mathematics to purchase an unlimited quantity of brain-numbing distractions . A modest estimate of the inventory of games in the GSL in the late 1940's includes 10 chess sets, 18 Backgammon sets, 10 sets of Go pieces, 8 Go tables , 4 Nash boards, ( a game invented independently by Piet Hein and John Nash) , 10 Wff'n Proof sets, two boxes of Strategy, numerous decks of playing cards, 5 Mancala sets, 4 Erector Sets, 2 boxes of tinker toys, pick-up sticks, Chinese puzzles, and 3 rubber homeomorphism sheets. These games were promoted as mind-expanding devices. The comparison with psychedelic drugs is apt: for many the GSL functioned as a kind of headshop.**

**Typically on any weekday afternoon after 4 PM, one might find Dr. Mengenlehre squatting cross-legged on the floor blowing soap bubbles into Plateau frames; even in his leisure activities every inch the mathematician. Régard Nombril for the most part just sat around, lost in thought; but occasionally he and Wiegenlied Wissenschlaf might take turns stretching the rubber homeomorphism sheet, each dictating his observations to the other who wrote them up on the blackboard. When he wasn't doing**

**this, Wissenschlaf sat in a corner alone , staring through kaleidoscopes or competing against himself in solitaire card games of his own invention.**

**Owing to its propensities for brutality, the Oriental board game of GO, which I'd once found fascinating, eventually came to repel me. From its innocent beginnings as a challenging game of strategy and spatial aptitude, a GO match it could easily degenerate into a demonstration of amateur Karate. GO brought out latent viciousness in people one never imagined was in them , as well as bringing it out in individuals like Frank Kriegle, about whom the matter was never in doubt. Frank himself could be expected to overturn boards, sending pieces flying about the room, or deliver kicks on the shins of his opponents, or breathe on them, or commit other acts of capricious violence. When Frank Kriegle played GO, one expected violence. His entrance into the lounge served as the signal for many to hurry back to their research.**

**Gamers and gamblers from all over the university came to the GSL, playing the math department games until late at night. This produced a atmosphere permanently super-saturated with tension. Harmless board games could turn deadly unpredictably . Chess players stared at you with bloodshot eyes as you walked through the door, not bothering to return greetings. So thick was the ambient hostility that one was embarrassed to hear the sound of one's own voice. Although physical assaults was frowned upon in this penny arcade of the intelligentsia, swearing, shouting and grunting were the norm , while snide below-the-belt wit was frankly admired as evidence of manliness.**

**Yet the repartee rarely sparkled. Chagrined from losing a chess match, one of the aficionados might come up with some**

crushing remark at the level of : " I'm amazed you won that game, given that my IQ is 30 points above yours! " Hardly evidence of genius. Looks could be more effective than words: a game might hang suspended for as much as twenty minutes, each player rigid in a catatonic posture in a vain attempt to stare his adversary to the floor. One often saw that mixture of pity, amazement or contempt that one commonly finds among scientists and mathematicians in particular, when confronted with the stupidity of one's adversary. Frank Kriegle looked that way all the time.

For reasons unclear to me , I've never been any good at games, It often seems the better part of wisdom to let the other person win. His ego is bloated and you're free to think him a fool. The loser can't do worse than lose, but the winner has real problems. In the long run losing is better for one's peace of mind. Victory makes defeat that much harder to accept, and no one can win all the time. To round off these comments it seems fitting to relate the sorry tale of Marvin Bench, which happened around that time.

Bench was a smart first-year mathematics grad student. Colleagues familiar with his research characterized it as brilliant , even revolutionary. I read some of his papers and thought them pretty good myself .

What happened to him is therefore all the more tragic. In a few words, Marvin became addicted to ping-pong in his junior year. By the time he'd entered graduate school the game had taken over his life. Put a ping-pong paddle in his hands and he would froth at the mouth. When not attending class one could generally find him in the ping-pong court located in the basement of the Student Union, acting out his existential dilemmae.

**There Bench could be seen leaping about wildly, grimacing like a samurai, hissing violently between his teeth, emitting gut-grunts ripped from his innards, charging the entire court with an hallucinatory aura of terror. His opponents braced themselves for the inevitable thunderbolt, as Marvin reared himself up with demonic fury and, concentrating all his force, smashed the ball - *into the net* !**

**Marvin never won a game unless it was against a novice who hadn't yet learned how to serve or return the ball. Despite this, Marvin Bench saw himself as a great ping-pong player. He carried himself like one, too.**

**It must have been near the beginning of my second term as a Freshman, sometime in March of 1949. I was sitting in the GSL on the day that Bench came charging into the room, brandishing a ping-pong paddle, and looking for people to kill. We were all in danger: something had snapped. Without warning the mind of a once-promising young mathematician had spontaneously descended into the pit of incurable lunacy. Marvin flew about the lounge, spreading wreckage on every side . With one wicked swipe he broke Hans Mengenlehre's arm. On the rebound the paddle caught Wiegenlied's glasses. A broken sliver of lens penetrated his eye and had to be removed by surgery. I was among the five needed to hold him down. Alter Buba, who entered after hearing the commotion from the corridor, was able to calm him down by swaddling him in the homeomorphism sheet. Material damages included all of the room's glassware, 6 bowls for GO stones, 5 chess boards, all the card playing tables, 2 slide projectors, a few windowpanes, and the blackboard. An ambulance arrived. Marvin was put under sedation and taken to the psychiatric ward of**

**Philadelphia General Hospital. After that he migrated through the state mental hospital system. I met him at one of them during my own bout with mental illness a few years later. To this day he has not recovered: his mind appears to be locked into a vision of swarms of ping-pong balls massing to attack him like enraged bees, legions of enemies against which he is waging perpetual battle.**

**Bench's fate confirmed my instinctive feeling that one ought to be very wary of games. Yet one has to remember that I was just 13 , and still in the habit of disparaging my own judgment. Why should a 13-year old respect the opinion of another 13-year old, even if he happens to be himself? Consequently I participated to some extent in games, because of which I got into trouble. By a serendipity more cogently qualified as predestination, I almost always ended up playing chess with Felicia Salvador.**

**Our chess games were essentially pretexts for conversation. Neither of us cared about winning, and we rarely brought them to completion. Despite , or more likely because of this, the sight of us together had a corrosive effect on Frank Kriegle's normal irritability. In hindsight it might appear ridiculous that Kriegle could become jealous over his fiancee's affection for a 13 year old - but, well, I'm getting ahead of my story.**

**We tried to schedule our encounters in the graduate lounge on days when Frank wasn't likely to be around. If he walked into the lounge our game was as good as over. He interfered in every possible way. Either he leered over the board, or he indulged in shameless kibbitizing. Or he might throw out rude, pretentious remarks, or force us to engage in long discussions about trite mathematics; and other tactics of a similar nature. More often than**

**not he would completely take over one side of the game, shutting out its player completely!**

**Sometimes he became so thoroughly absorbed in our chess games that he would start playing both sides by himself. Stunned, Felicia and I watched as, sweating and cursing, Frank shifted pieces back and forth, changed their positions, reconsidered moves half a dozen times, treating us , not himself , as the spectators, when aware, that is, of our existence at all. If something made him really angry he would overturn the board, pull my ears and yank Felicia out of the room .**

**One afternoon near the end of my first term as a freshman, Hans Mengenlehre walked into the graduate lounge to encounter the following situation: at one end of the table sat Felicia and myself, speechless with amazement. At the other was Frank Kriegle, deeply absorbed in playing the two sides of our chess game in each of his hands. Every time he perceived that one of his hands had made a stupid blunder he banged his free fist on the table and swore.**

**Maintaining the classic pose of equanimity which is the hallmark of the true scholar, Hans walked over to our table , pulled up a chair and joined us. Felicia and I nodded to him in greeting. Frank remaining unaware his presence. Sucking at the stem of his pipe, he gazed at the three of us as if he'd made the historic discovery of some anomalous non-Euclidean triangle. Then he noticed what was clearly a foolish move that Frank was about to make with Felicia's rook poised aloft in his left hand.**

**Hans did nothing more than mutter a discrete "Uh-Oh". He immediately had cause to regret it, for it completely unhinged Kriegle. Without bothering to ascertain the identity of the**

**intruder, Kriegle lifted up the board, pieces and all, and threw it in Mengenlehre's face! Then he ran out of the room.**

**Hans Mengenlehre had some skill as an administrator. Whenever possible he preferred compromise to confrontation. He was not alone in feeling that the department couldn't afford to lose him: Frank was doing some notable research in mathematical logic at the time. In addition Hans's starry-eyed fantasies of myself as the department prodigy, and Frank and Felicia as the department marriage had not diminished. Although he could easily have asked for Frank's immediate resignation he decided to pursue a different tack. Frank encountered him in the halls a few days later and mumbled some sort of apology. For the moment Hans appeared to be content to let it go at that.**

**But a week later I was called down to the departmental o`ffice. Hans waited until we were seated face to face before informing me that I would have to take Frank Kriegle's course on Exceptional Logics. He urged me to make a real effort to be friendly to him. I gather he said something similar to Frank also; for soon afterwards I began receiving invitations from Frank to meet him at the local bar and have a ginger ale on him. Once again Hans indicated, politely of course, that it was my duty to accept.**

**I would not call Frank Kriegle a gifted conversationalist. There were only two subjects he cared to talk about. The first was his current research in mathematical logic . The other was a scheme he'd worked out for cheating his future mother-in-law out of her estate. He'd worked it out to the last detail: the blackmail, the subterfuge, even the costs of shipping her movable assets from Argentina. He'd calculated that the money he would make from**

**selling them would be enough to enable Felicia and himself to buy a house in Swarthmore once they were married.**

**I never understood the details, a matter of wills, dowries , contractual agreements, Argentinean law and so forth. His pride in his own cleverness was boundless. He constantly reassured me that he bore no ill-will towards Felicia's mother . In fact he liked her: she could come visit them in their house in Swarthmore at any time, though of course there could be no question of her living there.**

**His obvious determination to drive this elderly woman into bankruptcy was terrifying. He assured me that he would do the same to his own mother. His future mother-in-law's child-bearing days were over, he explained, while Felicia's were just beginning. It was only right that the elderly make way for youth. He called it the "wisdom of the animal kingdom", and gave credit to Darwin for the revelation. Legally the estate was Felicia's anyway. Besides they would need a place to live if ever, for some reason, they should want to make Argentina their home. It was all a matter of mathematics, really. It was at these *Brüderschaft* fests that I learned that Frank Kriegle, the most slovenly individual I'd ever met, saw himself as a paragon of high cultivation and sophisticated taste. It was common knowledge that he devoted months to searching out a Dunhill pipe adequate to his aesthetic requirements. Any composer other than Mozart he claimed to find repugnant. He wanted me to understand that his manner of dress set the standard for discerning fashion. In fact Kriegle was such a complete slob that it took me several weeks before I realized that every item of clothing he carried on his person was in fact quite expensive. There could be no question of his ever trying on**

**anything in a department store, let alone a thrift shop. Naturally I wondered how he could afford to buy all the clothing he mistreated on an Assistant Professor's salary . The answer was simple: Frank lived, free of charge, on the estate of his well-to-do parents in Wayne, a township out on Philadelphia's Main Line.**

**Discovering this simple fact opened up new vistas in my conception of the Kriegle phenomenon. It made him almost human. He was a misfit of course - yet he was also a rebel without a cause. The correlation between his filthy rich family to his filthy expensive clothing was simple and direct. His mere presence could create a burning sensation in the intestines, like a raw chili pepper; yet he was one of those who could afford to wear the raiment of a prince while reeking like a hog farmer. And if he was obnoxious and nasty it must have had something to do with his sense of being unloved by the anonymous lot of mankind.**

**There is more to it than that of course: a hog farmer's perverse odor is directly traceable to his profession; he has no intention of giving offense. Yet from his long, uncut, grime-incrusted nails to the outermost overtones of his poisonous reek, Kriegle had forged a weapon of his body as potent as anything outlawed by the Geneva Conventions.**

**Assuredly an alienated soul , therefore a fascinating human being.**

**And a single glance in Frank Kriegle's direction was enough to convince anyone that he was alienated. As for his having a soul, it was not to be doubted: something had to exist underneath all that toxic waste just to hold it together.**

**Such insights did not make it any easier to get along with him. I began attending his classes on exceptional logics at the**

**beginning of the Spring term of 1949. Everything that was most disagreeable about him emerged in a concentrated form when he stood before the blackboard at the head of a classroom room. Most of the first day of Exceptional Logics was devoted to reminding us that he was the teacher and we were the students. By the beginning of the second week we'd reached the conclusion that what he'd really meant was that he was the patient and we were the doctors. Frank Kriegle's comportment was in turns erratic, distracted, uncooperative, reproachful and suspicious. His basic pedagogical strategy consisted in his standing at the blackboard, staring at the floor, waving his arms about in every direction, and muttering to himself.**

**After 40 minutes or so of this charade we were allowed to ask him questions; yet his mind was of such a cast that he could not discuss any issue without obscuring it further. In due course of time one of the students got up the nerve to ask: " *What is exceptional about your exceptional logics ?* " Kriegle's initial response was to ask him "*Are you in the right class?* " The student said he thought he was, whereupon Frank launched into a long incomprehensible ramble through batches of symbols chaotically dispersed around the blackboards, references to about 20 papers, arbitrary definitions that made no sense and led nowhere, sweeping arm gestures, and incoherent, vaguely malevolent comments whispered to himself. He concluded his exposition by remarking that, inasmuch as he'd explained himself so well, he didn't expect to hear that question asked again by anyone else.**

**To this day I do not know what an exceptional logic is, what makes it exceptional, nor why there are so many of them. I've**

**always suspected that Frank's course was about good old-fashioned mathematical logic, one of the great achievements of modern mathematics and a subject I'd already studied in high school.**

**Then came the inevitable day when one of the undergraduates admitted to the class, advanced in mathematics but green in the ways of the world, foolishly blurted out the old chestnut: "What do we need to know for the final exam?"**

**It's just about the most irritating question a teacher has to face, particularly near the beginning of a term, and one could not blame even Frank for being annoyed. His first response was to light up another cigarette. Then he proceeded to glower at us through his bloodshot eyes, muddied by indelible barbarism. Snapping out of his trance he shook his fist at us and barked: " I haven't got a God-damned clue, but if you don't figure it out for yourself soon enough, I'm going to see to it that you flunk!" Which observation was followed by a bout of manic laughter. Acquainted as I was with Frank's sense of humor, I cautiously emitted a mild giggle. The rest of the class stared at me in horror.**

**" If you're smart, responsible *and not a total asshole* ! " , he went on, staring meaningfully in my direction on the final words, "you won't have anything to worry about." Then he withdrew even more completely into himself.**

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