## Chapter 5 Initiation

My first semester at Zelosophic University was a happy one. To celebrate its acquisition of me the Mathematics Department arranged a reception, followed by dinner at the Faculty Club and a public lecture. The date, the last Thursday in September 1948, and two weeks after the opening of the Fall Term, came fairly close to my Bar Mitzvah. In many ways the event had all the trappings of a religious initiation. It gave the students and faculty of Mathematics and related fields an opportunity to meet and talk with me, and get my autograph. The more aggressive could paw me. The department's political strategy was simply to get me drunk (with flattery of course; it was painfully obvious that I was underage) from 4 to 6, serve me up as dinner from 6:30 to 8, then digest me in a leisurely fashion from 8 to 9 during my public lecture on the esoteric mathematical techniques in the Jupiter paper.

In 1948, Dr. Hans Mengenlehre was chairman of Mathematics. There are only a few people associated with Zelosophic U. today who might remember him. In 1954 he was the victim of a bizarre tragedy. Someone in Electrical Engineering had invited him to examine Zelosophic's first UNIVAC computer. As he stooped into the dense arrays of vacuum tubes the tips of his ears came into contact with a handful of exposed wires, and a thin vertical strip of synapses in his brain were zapped. This tiny region of the cortex happened to be the precise locus where all the fundamental mathematical operations take place.

He was given early retirement and a pension. At the going-away party, at which I was present, the department gave him an expensive chess set of carved ivory chess pieces and board, and an advance copy, autographed by all, of a *Festschrift* of research papers delivered in his honor, none of which he would ever again be able to understand. Soon afterwards Mengenlehre entered politics as a right-wing liberal conservative, whatever that means . He managed to get himself elected on the Republican ticket to a series of municipal offices, including a brief spell as mayor of Montclair, New Jersey, in all of which he made a real disgrace of himself. Scientists are trained to ask questions , politicians to give answers: the talent for doing both rarely cohabit the same soul.

Mengenlehre died in 1970. In 1948 he was still a robust man in his mid- 50's with a vigorous mind, active in research, admired by graduate students and colleagues alike. Though corpulent he was not obese. His facial folds collapsed comically into a hierarchy of jowls. He walked with slow wobbling steps as if along a trajectory determined by small random inputs. Standing at the blackboard and teaching, one sensed a benevolent shimmering about his brow.

His specialty was Sliver Homotopy, which I won't attempt to explain, except to say that the name "Mengenlehre" is legendary among sliver topologists, that enclave of a dozen or so specialists around the world who work in this narrow sliver of science. In the 1940's nobody believed that Sliver Homotopy would ever have any practical applications.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup>One was discovered on April 3rd, 1967.

Hans Mengenlehre sheltered me under his wing from day zeroplus. No doubt he had made a personal commitment towards me; one might even say that he adopted me. He took complete charge of every aspect of my grooming, both in conduct and appearance, for the role of department prodigy. All introductions and interviews had to be arranged through him.

Generally speaking, Mengenlehre's tutelage was invaluable. It was from him that I learned whom to court, whom to butter up, whom to avoid, whom to shun, whom to snub and whom to insult. He also did what he could to protect me from the hostility of those whose careers I was destined to wreck.

As we walked down Walnut Street in the direction of the Mellon Math-Physics Center, Hans drove home my need to understand the momentous importance of this reception for the success of my academic future . Many of the people I would be working with over the next four years , ( some of whom I was encountering for the first time) , would be there; they will crop up frequently in this narrative. My principal task, in which I believe I acquitted myself well, was to convince the skeptics in the department and the university, that Mathematics had done the right thing in admitting me at such a tender age.

Arriving on the 7th floor of the building we walked through a dim and cheerless corridor to the graduate lounge. Although the reception was not scheduled to begin for the next half hour, the lounge was already filled with upwards of 60 people. Many were waltzing about the room with index fingers sententiously upstuck, others already carried cokes or martinis in hand. Dr. Mengenlehre, his right arm

hugging my shoulders, cleared a road through this dense mass, stopping here and there to indicate some notable :

"That fellow over there "- Hans pointed towards a bright-looking, introverted graduate student in a frayed sweater, standing all alone in a corner, bent double as from a sudden attack of gastro-enteritis, and drawing schematic diagrams in the air with the fingers of both hands - " is Bob Boolean. He'll be getting his Ph.D. in June. Before you showed up, his was considered the most promising young mind in the department. He's 22. Don't be upset if he comes off as reserved, even unfriendly. Don't worry about that. Don't be pushy, don't show off what you know. Ask him a few questions to show you respect his erudition. If he asks you for information, act as if the subject is above your head. A little calculated hypocrisy never hurt anyone. Later on you can show your stuff. I'm convinced that things will work out splendidly between the two of you."

He sighed, as if about to bring up a subject that had been preoccupying him for some time :

"I'd be very happy if I could get the two of you to collaborate. In fact there's a research project I have in mind... ", boredom was written all over my juvenile brow, "Now; those two over there" - Mengenlehre directed my attention to a bearded, humorless individual, middle-aged and heavyset, with very high forehead and thick spectacles, talking to an elderly scholar with bad posture, dark circles around his eyes, a compulsive squint and creepy gestures -

"That's Professor Wiegenlied Wissenschlaf" ( This was the heavyset man, now slicing the air with his forefinger like a saw going through thick cheese)," and that's Professor Régard Nombril . Nombril

is very distinguished and I've put him in charge of your program of studies. He plays the violin abominably and I fear you may find yourself obliged to play duets with him once in awhile. Don't interpret it as an imposition; you're not here to study music. Hang onto his every word whenever he talks mathematics. He's in touch with modern developments in a dozen fields, and the world's leading authority on functional analysis over uncooperative manifolds. You may not yet know what an uncooperative manifold is , but if you stay with him you'll learn more about them than you'll ever need to know."

"An uncooperative manifold", I chirped, "is a space that satisfies all the axioms for a manifold but which, in all other respects, disappoints every expectation."

"Good boy!" Mengenlehre beamed, " Soon they'll be giving you my job!" He went on,

"At the risk of being indiscreet, Wiegenlied shot his bolt about 15 years ago. Since then his research, ( and he'd be the first to admit it ), hasn't been worth a damn. But he knows a lot and he's a competent teacher, so we keep him on. We do feel some responsibility towards him: 80% of all mathematicians are finished in their mid-20's. That doesn't mean they ought to beg in the streets."

As he was rounding off this bit of wisdom, something caught Hans' eye that seemed to cause him intense discomfort. Speaking out of the corner of his mouth, he asked me to twist my neck towards the door. I saw an aged, kindly looking man, hunched and gray-haired, dressed in ill-fitting clothing and a yarmulka, who stumbled as he walked and communicated a kind of eager embracing warmth. He'd just entered the lounge and was pushing his way through the crowds to get to us.

Mengenlehre glowered:

"The old geezer is Dr. Alter Buba; you're going to have to shake hands with him in a moment . He started his career as a rabbi. At the height of the Russian Revolution he returned to - I believe - Smolensk University – to get himself a degree in mathematics. I suppose I'm being kind in calling him a mystic. It's considered good form in this department to insult him because I can't get the university to kick him out. You must understand, Aleph", his eye- contact was perhaps a bit forced but tolerably square,

"The academic world judges a department by its productivity that is to say, its research - and we can't afford to carry dead wood."

Dr. Buba was practically on top of us by now, so Dr. Mengenlehre cut short his defamation to introduce us:

" Aleph McNaughton Cantor , I' d like you to meet Dr. Alter Buba, one of the - er – 'grand old veterans' - of the mathematics department."

Buba , jump-starting on his cue, grabbed my cheeks between his leathern hands - ( one could see that in Russia he'd lived a life of hard toil) - rocked my head back and forth until I felt my spinal vertebrae in danger of breaking , and burbled:

Crap or get off the pot! I wrenched my head free of his grasp : " Don't *hock mir a chainick, tzaydah!*", I barked , " Say your piece!"

Buba clasped his powerful hands together, gazed heavenwards and with radiant face praised the Lord:

I mean, who was the *meshugah* around here? This *alte cocker* was dangerous. He paused long enough for me to consider my reply, and for some reason it occurred to me that he wasn't really foolish, he just should never have gone into mathematics. He would have done famously as a den father for the children of traveling circus artists. Rather unsure of myself, I replied :

"Uh..*Rebbe*... would you mind repeating all of that, slowly?"

For a brief moment, Buba's face covered over with an ugly scowl. Then he laughed, broke out into a broad grin and said:

"Aleph, Vat ken you expect from en olt *chazan*? I don't know vat I'm sayink enymore. Good luck, good luck." He shook my hand with maddening vigor then disappeared back into the crowd.

Mengenlehre heaved an exaggerated sigh of relief:

" You see what I mean?"

" Oh I don't know - " I remained non-committal. I would make my own alliances in the Mathematics wars. In a strange way I liked the *rebbe* . Not having any cynicism to hide, he didn't try to disguise it.

" I'd like to hear some of his stories about trench warfare around Smolensk."

Suddenly we were encircled by a crowd of students and faculty . There was a predatory eagerness in the way they all stared at me. It was my first taste of fame and I decided that I liked it. Since first setting foot on this pestilential planet there had been no acknowledgment of what was due to me. Never before had so many people smart enough to know I was special come together in one place.

Bob Boolean was not among them. Craning my neck and standing on tip-toe, I saw him still in that same odd posture, more dejected if anything , his mind totally absorbed in something not of this world. The pretzel figures he drew with both hands had grown unbelievably complicated. He looked like someone trying to claw himself out from the belly of a boa constrictor. My conjecture, which turned out to be correct, was that his mind would be the most interesting I was likely to encounter in this department.

Dr. Mengenlehre appeared to have concluded that our audience had reached some kind of critical mass, for he suddenly started lecturing at me in a kind of falsetto sing-song reminiscent of Chinese Opera. His voice was so insistent that everyone, even the custodial staff who had already begun to clean up , stopped to listen to him. In the service of the great cause of the advancement of Science , Hans was not adverse embarrassing me as much as possible:

"Now Aleph, in your treatise on certain peripheral phenomena derivable from the laws of Celestial Mechanics, which *he wrote while still in junior high-school I would like to remind everybody!*, you make frequent references to the unsolved 3-Body Problem. Somewhere, if I

remember correctly, you make the comment that the world awaits exact solutions in closed form of certain special cases, before further advances in certain aspects of your research can be made . Are you at all familiar with the considerable literature that relates the 3-Body Problem to the unsolved Poincaré Conjecture in 3-dimensions ? *Ahem ......*"

The Poincaré Conjecture in 3 dimensions says that you ought to be able to take any solid mass without holes in it and knead it into the shape of a sphere; obvious to an idiot yet, to this date, unproven. I was about to say that, by an unorthodox mapping of a very strange object, from 279 dimensional hyperbolic space into 46 dimensional elliptic space, and by the performance of appropriate surgery maneuvers on the manifold , followed by an embedding into 3-dimensional Euclidean space which is so complicated that it's almost impossible describe , one obtains a counter-example to the Poincaré conjecture.<sup>2</sup> As I began to open my mouth , I stopped myself: it was incautious to reveal too much too quickly:

"There are some serious doubts ", I equivocated, "concerning the Poincaré conjecture in 3 dimensions. If I'm correct, then there do not exist exact solutions of the 3-Body Problem in those cases I'm looking at ." Following this introduction I launched into an unbearably tedious exposition of the matter.

By now I could neither avoid nor pretend to ignore the presence of an individual standing in the crowd quite close to me, a man in his middle 30's who manifested his unpleasantness in many ways. At that precise moment for example, he was earnestly engaged in blowing the

<sup>&</sup>lt;sup>2</sup> A flaw in this construction was discovered on June 14, 1970.

fetid smoke of an unfiltered Philip Morris up my nose. Reinforcing the smoke was the dirtiest tobacco breath encountered in all the days of my limited experience. His teeth were stained black as tincture of hebona, while nicotine streaks covered his right hand.

He was hostile. Rage suppurated from every nook and corner of his physiognomy. His face was covered with acne from the lobes of his ears to the point of his chin, not your garden variety acne either, but gathering in great clumps of raw, bright red pimples like tomatoes at picking time. Though he didn't seem to shave, he was not bearded either. Stiff patches of black facial hairs jutted above the pimple clusters like crabgrass over the rocks on Calvary. Nastiness twisted up his lips into the facsimile of a trefoil knot.

The skin on both sides of both thumbs had been scarified through incessant scratching from all his other grime-impacted fingernails. And you may just think I'm just making all of this up, when I assert that the long black hairs descending from his nostrils put one in mind of the dangling legs of black widow spiders , or that his teeth, eternally unbrushed, were as black as a Freewash coal-pit, and reeked like the lithium-sulphur lifeform from the planet Smyrnx , but every word is as true as the formulae in Hadamard's proof of the Prime Number Theorem . His was an unrenormalizable mess.

If that's what higher mathematics did to people, I wanted out. Now he boldly stepped forward to confront me. A mere two inches or so of enhanced proximity produced an exponential rise in his reek:

"You must have realized by now, *kid*, don't you, that on page 87 of that so-called 'research paper' of yours, you divide by zero?" I was ready for him. From the moment I'd laid eyes on him I'd been ready for him:

"Oh yes - I'm perfectly aware of it. If you had bothered to read the first six pages of the exposition, you would have learned that the "zero" defined in this particular situation is really an operator with special properties. Division by zero is permitted."

A wave of horror, repulsive as the slime from the lick of the giant tongue of some reptilian monster, surged in the heart of every person standing in the lounge. The dreadful pause of shocked silence was soon followed by a confused babble of voices that quickly swelled from timid utterance to a wild raging torrent of hoarse maledictions and imprecations, oaths, menacing scowls, shaking fists, a maelstrom of blind indignation that could well have carried me out the door and into the hands of a lynch mob! All appeared lost. Prepared as I was to die for my convictions I met the swelling fury with mute determination.

Imagine my astonishment and gratitude on hearing the nasal, insolent whine of none other than Bob Boolean coming to the rescue:

"No. Frank, you're wrong. Aleph knows his business. What he's done is quite remarkable in fact. In order to deal with a unique class of non-linear differential equations arising from the orbital behavior of Jupiter's satellites, he invented a new kind of Operator Algebra. The covering space of this Algebra is called a Jovian. Rather than "zero", he's talking about a kind of "cancellation of opposites". The division is made *before* the cancellation, *after* which the quantity vanishes."

"Bob is right! " I cried, ecstatic at having found an ally at my level : " A homomorphism takes the Jovian into a non-standard Clifford Algebra acting over the modular group. Divisibility is preserved intact until the operation is completed, and only disappears when quotiented out by a ramified algebraic structure incorporating certain ghost elements that seem to work because they give the right answers , although they should not properly be called objects of mathematics but highly unorthodox heuristics."

" Ingenious, Aleph, quite ingenious . A novel idea." Boolean's lips shaped themselves into the form of an odd, superfluous smirk, before returning to the tracing of Imagist sculptures in the air.

This interchange broke the dam. I found myself acclaimed and besieged by the multitudes. Some blurted out incoherent phrases. Others shouted at me, alternating outlandish flattery with snide insults. All seemed intent on making some gesture, anything at all, merely so that they could later say that they had intersected on that particular afternoon with the legendary Aleph McNaughton Cantor. One pipedand-tweedy sort invited me to his Oriental tea ceremony and ritual Gogame held on Monday afternoons in his office. Régard Nombril asked me to be the guest speaker at the monthly meeting of the national mathematics fraternity, Pi Mu Epsilon. Dr. Mengenlehre deftly handled the crowds like an old hand, fielding questions, encouraging some persons while turning others away, weeding out the bores, cutting in whenever someone appeared to be asking embarrassing questions, etc.

In a far corner of the room sat a young woman, whose dark oval face beckoned to me like the vision of a lovely mirage in a stifling desert. Her eyes were focused upon mine with a dense admiration amounting to sacral awe. Coming closer I discerned a face both intelligent and intense, with a distinctly Hispanic cast. I very much wanted to meet her, and started to walk across the room to introduce myself. In a flash the same dungpit who'd tried to trip me up, Frank, blocked my path. Determined to fulfill his role as a total crumb, he dug his filthy fingernails into the flesh of her upper arm and yanked her out the door.

Later that evening, as we waited in the lobby of the Faculty Club to go into dinner, I questioned Mengenlehre about them:

"That's Frank Kriegle: his nick-name around here is the 'latus rectum'. He's not known for being too sociable. Speaking frankly he's rather an ass. He's not stupid: you realize, of course, that nothing else matters in our profession. You would be amazed at the incredible research he's been turning out in Non-Standard Arithmetic since returning from his latest stay at the Philadelphia Psychiatric Institute. The slightest thing throws him off balance, so it's best to avoid him for the time being. Later, etc., etc...."

"Who's the woman he pushes around? She seemed charming!"

"Felicia Salvador . She's a postdoc from Argentina." Tears sprouted from underneath Mengenlehre's thick glasses. He removed then with his right hand as with the back of his left wrist he wiped away the accumulated lachrymose solute:

"A department marriage, Aleph! ...it makes me.. Forgive me if I blubber, young man, I don't know how to say it: it makes me feel young all over again, as if a tropical burst of sunshine is just melting away all those iced- over epsilons and deltas ! The engagement was announced last April. They're to be married in February. You know, Aleph, I've been department chairman for the last five years. There's nothing enviable about the job.", he dried his glasses on his jacket sleeve, " Most of it is incredibly petty. Nobody ever seems to understand that nothing personal is involved when you nix their pet project or, God forbid, you have to give them the sack . The university higher-ups call the shots in a great many of these cases. I'm just a flunky, really.

"Yet some small compensations remain, Aleph, for the ennui, the disillusion, the chagrin, the baseness of academic politics, and among them is the joy we all experience when the dagger of love smites our very own busom, when from the dull slogging everyday routine there emerges the miracle of romance , and from the grayness of all theory, there ushers forth...ah...er... "Life's green and golden tree! "

Why anyone would rejoice over the marriage of a sweet humming-bird with a chain-smoking tarantula was beyond me. Well, it was none of my business. I was too occupied with my own problems. As we walked into the Faculty Club dining-room, a graduate student thrust a paper in my hands, something about spectral analysis on Banach spaces. All of his results could be anticipated by a glance at the first page and, as I'd suspected, a perusal of page 11 confirmed that his principal theorem was invalidated by a trivial error. However I promised to look it over in my spare time, now and forever onward non-existent.

Another oppressive enthusiast had begun descanting to me in a whining voice about Number Theory. I cut him short by remarking that Number Theory was less interesting than a good TV sitcom. It wasn't too early to begin developing the characteristic rudeness appropriate to my chosen career.

Formal introductions were made to Régard Nombril and Wiegenlied Wissenschlaf later than evening . I eventually developed an enormous respect for Nombril. His delivery tended to be ponderous, but it was worth the effort to develop the patience to listen to him. With a few well-chosen observations he could open vistas.

Yet he did have some disconcerting traits. Régard had a way of halting his conversation in mid-stream and remaining mute for 10 or 15 minutes, even for hours. If you gave him a mathematics problem he found interesting, he might sink into a brown study - one had the impression on these occasions that he was literally staring at his bellybutton - from which nothing could rouse him until he had pondered all the issues right through the end. If you started to speak to him, he would shush you with a finger to his lips, indicating that he was still thinking about your problem.

This might go on for several days. Then, as if waking from a deep slumber, he could suddenly fix his eyes on you and begin picking up the conversation at the exact place where it had terminated. More often than not he'd come back with the right answer.

Wissenschlaf was a professional pedant. He could microtome a theorem into a thousand pieces with no intention of, or capacity for, putting it back together. An impassioned bore, if that phrase has any meaning: given any topic, he could turn it irrecoverably into a porridge of stale bibliography. Left to his own devices he could go on saying nothing for hours, and it was just about impossible to get around him because one would have to go back to ancient Sumer to find things he hadn't read. It came as no surprise to me that the Queen of the Sciences had wearied so quickly of her lover.

Like the body of some colonial heretic crushed to death from the iron weights loaded onto him by the Pilgrim Fathers, one's mind burst to scream out its confession to any crime, however dreadful, under the pressure of one hour of Wissenschlaf's merciless monologue. He was a mathematician primarily in the sense of his ability to manipulate

complicated lists of references in his mind like the factors of an algebraic equation. To maintain his status in the academic community these concordances were periodically published as articles in the mathematics journals. They were remarkable productions . One could cut them up, re-arrange them in any fashion and still come out with the same article. Perhaps he should have gone into music: he was an agile contrapuntalist.

The one course I took under Wissenschlaf, an unforgettable 3credit-hour course on Differential Geometry , did little for my interest in the subject, though it did quicken the eruption of my sex life. The combination of 3 hours each week in his custody with the hardwood seats of the Math-Physics auditorium, engendered so much jock irritation, that hormones blossomed forth which under other circumstances would have remained dormant for a few more years. Similar things happened to my other classmates: there never was a randier class of grad students. The departmental secretaries watched the clock in terrified anticipation of the moment when our classes let out. Those who could arranged to be away at those times .

That evening I met one other person of significance for my academic future. That was the Provost of the University, Dean Jameson Hardball. Mengenlehre had deliberately seated me next to him at the dinner table.

At 46, Dean Hardball came well qualified for his office: young enough to incarnate the clean virtues of the Ivy League yet sufficiently mature to cast his judgments into the judicious balance of eminent scholarship. He entered the administration from Medieval History, had no trouble surviving McCarthyism , then executed a gambit into the

presidency of Misty College in New Jersey, (where he is said to have done great things for the library), before returning to Zelosophic as Provost in 1947. In 1955 he would become President of the university.

The unsettling discomfort of Hardball's benign gaze impinged upon my consciousness mid-way through the shrimp salad. I looked up into the face of a pudgy, moderately intelligent, bland though not totally nondescript bureaucrat, sizing me up as he might a prized football player. He nodded at me and winked; I mimicked the gesture. Nudging his forefinger playfully in my direction. he said:

"Well, Aleph, I hope you'll be happy here. We expect great things of you."

"There's some serious questions as to whether I'll be happy here." , I said, truthfully. Hardball's cheeks sagged and his expression turned dour: "I gather you've already felt the lack of companionship in your own age group. We all try to be chums at Zelosophic . That's what a university's all about, really . I faced some of the same problems you're going to have to deal with having when I first came here in 1920. Zelosophic filled up with veterans after the First World War, and us newcomers felt left out of things. Aleph, maybe you should join a frat; that helps some froshes vault the hurdle. If you've got any problems don't hesitate to come up to see me and talk them over. Just come up for a chat! That's what I'm here for. That's what they pay me for. You've got a lot of green lads," he allowed himself the luxury of getting sentimental, "coming to the big university feeling they haven't got a friend in the world. That's what I am : the undergraduate's friend! Aleph, people sometimes get the wrong impression. They think my job is mostly paperwork..."

Hardball had been talking to his fork for some time, but I did not doubt that he meant to include me,

" - that's all wrong. Feel free to see me anytime...anytime at all!"

No sooner unburdened of his speech, Hardball swiveled away from me and began a conversation with the person seated across the table to his left, the Dean of the Medical School . I did make one more attempt to draw him out, on the matter of my curriculum. After a muffled remark to the effect that it would be taken care of, he stoically ignored me. For the rest of the meal he was incommunicado, even rude.

The food was acceptable by most academic standards. The lecture I gave afterwards was also very well received. Notably absent was Frank Kriegle. Everyone able to understand it had already read my paper, and appeared to be in agreement with its conclusions. Apparently Jupiter's moons will, after all disintegrate in a bit more than a million years!

I had been well catapulted into academic life. Between myself and the institution the highest expectations were reciprocated, with the *Gaudeamus Igitur*, as from many carillons of bells, already reverberating throughout my consciousness.

Yet: although it can be seen that my youthful beginnings were brilliant, even miraculous, at the very least astonishing, in its unfolding the remainder of this narrative will reveal only a pitiable train of humiliations and defeats, a swamp of fetid miscarriages, the shameless confessions of an academic outlaw!

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