

## Chapter 2

# Remembering Gian-Carlo Rota

### Invited Chapter

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I have known Gian-Carlo Rota for about half a century. I saw him very frequently during the periods that we overlapped in the Boston area (i.e. 1958-68 and 1996-97) and also on many other occasions. I remember Gianco as one of the most stimulating, insightful and witty persons. Here I will recall some of the indelible impressions he left on me.

Both Gian-Carlo and I went to the American School in Quito, Ecuador. We were in the same class, however we did not know each other then, I left for the US in 1945 and he came to Quito in 1946. Nevertheless I knew of him through my friends and relatives, he was an outstanding student and very popular. One of our common friends and classmates from those days was Alberto Muggia. He recently wrote me about Gianco: *"I think of him often. He is the person that really made me what I am. He taught me that what we learned at school was a negligible part of our educational experience. He taught me to separate my free time by the clock, devoting an hour to French, an hour to Latin, an hour to history etc. After school, a few of us went to his house, at least four times a week, and he showed us some of his books, and told us what we learn from them. He taught us to play many games such as chess and tarocchi. He taught me to read Flaubert and Balzac, stimulated me to learn French on my own, and helped me to translate Moliere's L'Avare from French to Spanish at the age of 13. It was more fun to go to his house, to study after school rather than doing anything else. He even tried to get me interested in Mathematics and Physics, but I was not a good pupil. I preferred the poets and writers of the 19th century, though I remember learning all about Galileo"*. Thus Gian-Carlo (or Gianco as he was frequently called) was a teacher and a scholar already in high school.

As an undergraduate Gianco went to Princeton in 1950 at the same time that I went to MIT. Gianco did his graduate work in Yale and I in Princeton. We finally met in Cambridge in 1958. At the time Gianco was working on his joint book with Birkhoff (see [1]). He worked in a closet which was just about large enough to fit a small desk and chair. The desk was covered with papers and there was a pile of books on the floor. Gianco said that working in such a cramped position forced him

to concentrate and kept him away from distractions. Many years later I visited Gianco in Los Alamos. We took a small trip through the neighboring hills. Gianco was greatly inspired by the spectacular scenery. The panorama, which changed with each turn, stretched out for miles in all directions. The contrast between these two physical surroundings parallels Gianco's strengths. On the one hand his ability to zero in on the critical technical details that underlie any discipline and on the other his ability to see the "big picture" and to deal with the ideas that drive any intellectual endeavor.

For many years Gianco was editor of the *Advances in Mathematics*. He had a very clear view of how a journal should be run and followed it. In that way he reminded me of Lefschetz when he was editor of the *Annals of Mathematics*. As with Lefschetz, his top priority was excellence. Thus many authors who submitted important articles were left waiting because outstanding took precedence over important and Gianco had very strong convictions about what was truly outstanding. A case in point is the a truly remarkable paper written by Charles Fefferman (see [2]). When I heard Fefferman's lectures on these results I was very impressed, I told Gianco about them, he asked for a preprint and after receiving it he called me. He was very excited, he declared that this paper was a "tour-de-force" and that, despite its length, he would like to publish it in the *Advances* as soon as possible. He did publish it promptly, even though it delayed the publication of a long line of previously accepted shorter papers.

A groundbreaking feature of the *Advances* were the short reviews written by Gianco. These were very succinct snap judgements which were almost always on target. Here are two examples:

"J. Passmore, *Recent Philosophers*, Open Court London 1985. When pygmies cast such long shadows, it must be very late in the day".

This review illustrates two recurring themes that were part of Gianco's "Weltanschauung". One is the disproportionate influence that mediocre thinkers have. When decrying the "fashions" in mathematics his usual example of a "pygmy" is a "Professor Neanderthal". This refers to a fussy pedant who refuses to see the woods for the trees. The other theme (the lateness of the day) is Gianco's repeated insistence that we (especially mathematicians), in order to prevail over the "pygmies", must change our ways before it is too late. He was especially concerned with the neglect of good exposition. He was also preoccupied by the fact that mathematicians are unable, or unwilling, to unite to advance the influence of their profession. I was amazed how masterfully he could fight for this cause when he led the Mathematics Section of the United States National Academy of Science. The main problem for mathematicians in the Academy is their underrepresentation as compared with the physicist and chemists. Gianco mastered the Byzantine politics involved with great skill and was successful in enhancing our section.

The following review illustrates Gianco's unbounded enthusiasm when he encounters something that he really likes.

“J. H. Conway and N. J. A. Sloane, *Sphere Packings, Lattices and Groups*, Springer, New York, 1988. This is the best survey of the best work in one of the best fields of combinatorics, written by the best people. It will make the best reading by the best students interested in the best mathematics that is now going on”.

Gianco had very definite views about what was best and what was worst in mathematics and he expressed his views very bluntly and eloquently, especially in informal discussions as well as in his book *Indiscrete Thoughts* (see [3]).

Most of my meetings with Gianco were punctuated by a meal. In the sixties we met, usually on Saturdays, to explore the bookstores on Harvard Square and invariably ended with a late lunch. There were also innumerable Sunday brunches and dinners after colloquia. Gianco was a gourmet. In the early days he would prepare, with skill and precision, eggs Benedict for brunch using his own special recipe for hollandaise sauce. Later, when waistlines and cholesterol intake became issues, his favorite brunch consisted of a dozen oysters (usually in the Charles Hotel in Cambridge). He maintained that the zinc in the oysters was good for the brain. During the academic year 1996-97 I spent a sabbatical year at Harvard and Sunday brunch with Gianco became a ritual. However, one Sunday Gianco announced that for the next month he will not be able participate in these brunches. The reason was that he had won the MIT yearly presidential teaching award and he had to give a one hour lecture to a general audience in one month. He felt that he had to use all the time available to prepare for that lecture. I went to the lecture and I concur with Peter Lax when he said: “A lecture by Rota is like a double martini”. It was packed with surprising insights, bold statements and humor, it was both informative and provocative. The preparation was unbelievable every move was accurately timed. This included his signature sip of Coca Cola which he performed with elegant deliberation, walking across the stage to pour himself a glass which gave the audience time to reflect on his last pronouncement.

Gianco was a remarkable teacher Not only in his incomparable lectures but in the rapport with students at all levels. His teaching credo is summed up in the following statement that he wrote in [3]. *“A good teacher does not teach facts, he or she teaches enthusiasm. Young people need encouragement. Left to themselves, they may not know how to decide what is worthwhile. They may drop an original idea because they think someone else must have thought of it already. Students need to be taught to believe in themselves and not to give up”*. I have met many of Gianco’s students, he always left a lasting impression. My wife’s first cousin, Riccardo DiCapua, was a student of Gianco’s undergraduate course 18.025 “The World of Mathematics” in 1969. Riccardo was profoundly influenced by Gianco, he writes: *“...He would enter the lecture hall in 10-250 impeccably attired in a black suit, jacket buttoned, a crisp white shirt, and a bright, red tie. The blackboard had to be wiped immaculately clean of any stray chalk marks left over from the previous class. The students waited breathless, in eager anticipation of a clean slate every class. Every non-lecture task was assigned to a student. One student had been given a certain amount of cash the first day of classes, and assigned the duty of buying*

*and bringing in a can of Coca Cola from the vending machine by Room 26-100 (the only vending machine on campus that is set to the exact temperature). It had to be placed before class started on the front, right corner of the instructors table. Another was charged with collecting homework at the beginning of class, while a third was responsible for handing back previous homework assignments and tests to the students. A fourth would take attendance ("quietly, please"). A fifth student had the most onerous responsibility: taking notes. Prof. Rota was insistent that his students pay attention to what he was saying: note-taking would distract their attention, he insisted. The designated note-taker would take copious notes, which the department secretary would photocopy after every class. Of course, there was a sixth student charged with handing out said notes the following day! The years passed. I worked for a few years and returned to Harvard University for an MBA. I went into management of diversified manufacturing companies. The years turned into decades, and thirty-five years later, I decided to "give back to the community" by teaching one or two courses every term at Broward College in Fort Lauderdale, FL, USA.... And maybe one of my students will carry that tiny spark of joyful inspiration many years hence to yet a third generation of practitioners and students of mathematics. Grazie, Gian-Carlo!"*

Years ago I dined with Gianco and a number of colleagues at an upscale San Francisco restaurant. Gianco asked for the wine list and was very pleased to find one of his favorite Barolos which he declared worth the elevated price. The waiter brought the wine in an uncorked bottle, Gianco was furious: "How is this possible? If the bottle is already opened I can't know that the wine is genuine. Take it back!" The waiter called the restaurant owner. All the people in the restaurant stopped eating and talking to watch the spectacle. The scene was theatrical: both Gianco and the restaurant owner were outraged and vented their emotions in colorful Italian-accented language which resonated in the hushed establishment. At last the restaurateur challenged Gianco to tell the difference between wine from a bottle to be opened at the table and the original opened bottle. He brought out a new bottle opened it and poured out two glasses, one from each bottle, behind Gianco's back. In the last scene Gianco tasted the wine from both glasses with a professional demeanor and declared that there was no difference between them. The restaurateur smiled but his smile soon disappeared as Gianco bluntly explained to him in great detail why serving an opened bottle is inappropriate and entirely unacceptable.

At MIT Gianco was always surrounded by undergraduate students, graduate students, postdocs, and younger colleagues. This crowd became known as the "Rota rooters". He was their leader and role model who prodded them into thinking about mathematics and philosophy. He had great influence on them both in intellectual and gastronomic endeavors. Thus I was very surprised when (sometime in the 1960's) Gianco accepted a position at Rockefeller University. Rockefeller Institute had been dedicated to biomedical research since 1901. In 1965 it expanded its mission to education and became Rockefeller University, one the first appointments was Marc Kac who was charged with attracting a topnotch mathematics faculty. Kac convinced Rota to accept a position at Rockefeller. As a new mathematics center the depart-

ment at Rockefeller was a relatively quiet place, it did not have the hustle and bustle of MIT. It was too solitary a place for Gianco, he became depressed, after two years he returned to MIT. In this period I visited New York frequently, on these occasions I often dined with Gianco. We explored Latin American cuisine which we both enjoyed, it reminded us of our childhood in Ecuador. This cuisine is very spicy and rich. After the meal we would take Alka-Seltzer to relieve of us from the discomfort caused by this exotic repast. Invariably we got into a discussion. Gianco maintained that the most efficient way to take Alka-Seltzer is to brake it into little pieces before dropping it into a glass of water. I maintained that it is more effective to drop it in whole. Gianco argued that the braking into small pieces increases the surface area in contact with the water and thus the speed of dissolution. My argument was that it is not desirable for the tablet to dissolve very quickly because that tends to create large bubbles which evaporate outside the liquid; whereas, the slower speed achieved by submerging the tablet intact results in smaller bubbles which do not escape the liquid and are ingested.

These discussions often led to larger scientific and philosophical issues. On such occasions we would catch up on some mathematical topics with which one of us was familiar and the other not. We also recounted “mathematical gossip”. This ranged from rumors about exciting new developments in mathematics to amusing incidents involving some of our colorful colleagues. One point that we frequently debated was Gianco’s view that a biographical sketch should include descriptions of the subject including the “warts”. I did not totally agree with this view, especially when it involved my teachers and colleagues in Princeton. My conversations with Gianco were always lively and a lot of fun. He always had thought provoking views which he presented with great eloquence and often with a humorous twist. I remember Gian-Carlo with great admiration for his many talents, his enthusiasm, his self confidence, his energy, and his relentless pursuit of those intellectual endeavors which he considered of primary importance.

## References

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From Combinatorics to Philosophy

The Legacy of G.-C. Rota

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