

# MASAYOSHI NAGATA AND MATHEMATICIANS AROUND HIM IN KYOTO

MASAYOSHI MIYANISHI

**0.** On the occasion of the conference “The prospects for commutative algebra”, Professor Hibi invited me to give at the Banquet of the conference a talk on the memory of Professor Nagata and his research group in Kyoto. I have already written three articles, one in English [Masayoshi Nagata (1927–2008) and his mathematics. *Kyoto J. Math.* **50** (2010), no. 4, 645–659], and two in Japanese [Rikei no Sugaku, **4** (2009), 41–59; **7** (2009), 46–55]. Perhaps I have nothing more to add about mathematics of Nagata and my student time under him. But I have not talked about people who surrounded him. So, I accepted to give this small talk. But since memory fades out as one gets older, there might be many inaccuracies and mistakes. Almost nine years have passed since his death, and many people (including his students) who shared time with him in Kyoto have passed away. So, I would be pleased if this talk becomes a small help to remind the audience of Professor Nagata as he was.

Professor Nagata disliked himself called Professor Nagata and asked people to call him “Nagata-san”. Here we put “san” after the name to express mild respect to him/her. This feeling of Nagata is probably an expression of his dislike against what is authoritative. So I call him just Nagata instead of Professor Nagata.

**1.** Nagata was born in Ohbu near the city of Nagoya and spent his student period there and in Nagoya. He graduated from Nagoya Imperial University and soon after became an assistant of the mathematics department. This was in 1950, and then there still remained damages of the war all over in Japan. People were starving for promise of bright future. The university people were different because they could concentrate themselves again in education and research. But the organization of university was the same as it was before the war. Each of mathematics departments in major national universities had about five chairs like chairs of algebra, geometry, analysis, etc. Each chair has one professor, one assistant professor (corresponding to present associate professor), one instructor (corresponding to present assistant professor) and two

---

*Date:* July 11, 2017.

assistants (assisting the professor but eligible for research). A chair professor could decide whom to hire for the positions of the chair. The chair was guaranteed also a fixed amount of money as the running cost as well as a fixed number of students to supervise. This system lasted until 1960s. The advantage of this system is to keep you uninterfered by other chairs.

His advisor and the chair professor in Nagoya University was Tadashi Nakayama, and he read Pierre Samuel's paper on intersection multiplicities.<sup>1</sup> Nagata's first work on local rings, published in 1950, was a generalization of I.S. Cohen's theorem on the structure of complete local rings. Nagata did a good part of his works on local rings including famous papers on henselian rings, while he was in Nagoya. He had also started mathematical communications with algebra people in Kyoto University.

2. Yasuo Akizuki was professor of the chair of algebra in Kyoto University. He gathered young bright reseachers in the fields related to algebra and algebraic geometry, including Jun-ichi Igusa, Teru-hisa Matusaka, Yoshi-kazu Nakai, Hideyuki Matsumura, Heisuke Hironaka, etc. Their target was to learn algebraic geometry which was then renovated by the publication of A. Weil's book on *Foundation of Algebraic Geometry*. I heard the following episode on this book. One copy of this book was donated to Professor Akizuki, from which Matsusaka produced several carbon copies by typing the whole book and circulated them among interested people. Since there was no copying machine, people copied by hand-writing the contents to their note books but the circulated copy was hardly readable because many carbon copies were taken at the same time.

In 1953, Nagata moved to Kyoto as an instructor, became assistant professor in 1957 and a chair professor of algebra in 1963 succeeding Yasuo Akizuki. After moving to Kyoto, Nagata was inclined more into algebraic geometry. His first great achievement in Kyoto was his counterexample of the fourteenth problem of Hilbert. It is said that he spent a lot of time in this problem. His lifetime style of doing mathematics, which he also advised his students to follow, is to think of problems by themselves in the first place, not to look for hints in the

---

<sup>1</sup>There are several papers on multiplicities by P. Samuel. But thinking of the papers around 1950, it must be the following one: *La notion de multiplicité en algèbre et en géométrie algébrique*; I: J. Math. Pures Appl. (9) **30**(1951), 159–205; II : *ibid.* 207–274. I think that this paper motivated Nagata to a research in local rings and algebraic geometry.

references. In his lectures, he did not recommend the audience to take notes.

Prior to and a little later than me, there were the following people other than those listed above.

- Ko-taro Okugawa. He was more close to Yasuo Akizuki.
- Yoshiro Mori. He was a collaborator of Akizuki and has papers on the integral closure of an integral domain.
- Hajime Nishimura. He was close to Okugawa.
- Satoshi Suzuki. Differential modules. A collaborator of Nagata.
- Toshio Nishimura. Father of Jyun-ichi Nishimura.
- Teppei Kikuchi. He considered high order derivations.
- Tomoharu Akiba. He considered the generalized ring of quotients. Deceased in 2015.
- Akira Iwai. Homological algebra.
- Kayo Ohtsuka. She was a collaborator of Nagata.
- Satoshi Hasui. Probably the first student of Nagata in algebraic geometry.
- Takehiko Miyata. One of the most promising students of Nagata. Deceased in 1983 by a traffic accident.
- Tadao Oda. Everybody knows him by his Springer book.
- Hideyasu Sumihiro. Renowned for the equivariant completion theorem.
- Hiroshi Tango. Vector bundles.
- Masaki Maruyama. Renowned for the construction of the moduli space of vector bundles and sheaves. Deceased in 2009 after his hard work as a vice president of Kyoto University.
- There are many more including Sampei Usui, Ei-ichi Sato, Jyun-ichi Nishimura, Tetsushi Ogoma (deceased by paraglider accident), Shigefumi Mori, Shigeru Mukai, Mituyasu Hashimoto and Kazuhiko Kurano. But I cannot list them all.

**3.** Let me speak something about how he conducted his seminar. In Kyoto University, each chair professor had a spacious office which included the private office space with desk and facilities for guests, and the space for running seminars with capacity of about five people. Later, he made this spacious room a seminar room for common use and used an adjacent small room for secretary as his office.

Since Nagata was a chair professor of algebra, subjects of his weekly seminar ranged widely in algebra, including not only commutative algebra and algebraic geometry but also number theory. Nagata emphasized *learnig by ear*. If you ever listened to talks on what you are not

familiar with, you would not be afraid of listening to talks of different area next time.

So, at the seminar time, his office was usually filled by more than ten people including visitors from outside, researchers in his and neighboring fields and students of level higher than or equal to the master course. In most cases, talks were on original works of the speakers. My impression was that he made several comments but was mostly silent. Among many things Nagata did for benefits of the seminar members, I recall that he put all preprints mailed to him on the exhibition racks and made them available to all seminar members. When Hironaka proved his big theorem of resolution of singularities, Nagata organized a special seminar to read the thick typed manuscript of Hironaka.

When I became a master course student of Nagata, he assigned me to read P. Gabriel's thesis "Catégories Abéliennes", which must have also been a donation to Nagata. I guess that Miyata and Oda suggested Nagata to assign it to me. At that time, they were a real excitement and amazement to me as long as their knowledge of algebraic geometry and commutative algebra is concerned, though they were only one year senior to me. The time was just when Grothendieck's EGA began to be published as well as his huge seminar works. Nagata was a friend of Grothendieck since he met him in Harvard University. He watched in silence a new advancement of algebraic geometry, but did not discourage us to study it. The reason is, I guess, that Nagata himself developed a theory of algebraic varieties over Dedekind domains by introducing the notion of spots (collections of local rings) and most of the contents in EGA were already familiar with him. He was mostly interested in invariant theory and tried to prove the Mumford conjecture in positive characteristic. Miyata was really a collaborator in this research though he was a senior student in the master course. Miyata was only one person in Nagata's seminar to drink cups of instant coffee kept in Nagata's office and he was even allowed to borrow money from Nagata. Miyata used to write on the corner of the blackboard in the seminar room how much he borrowed from Nagata.

There are many more things and episodes to speak about, but the time given to me is now used up.

Kwansei Gakuin University and Osaka University  
miyanisi@kwansei.ac.jp