

THE FIRST 100 GRADUATES IN ASTRONOMY FROM THE UNIVERSITY OF BELGRADE

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Abstract. The data about the first 100 graduates in astronomy from the University of Belgrade were collected from various sources: official papers, archives, personal statements, contacts with relatives and members of astronomical community. A list of short professional biographies was made and a simple analysis was given. The study about the graduates, initiated by the present author, is the first research of this type in Serbia.

1. INTRODUCTION

Education is a part of the history of every science. Therefore, it would be desirable to have a list of students who graduated in it, and to know how their education was used and valued. Such a research is not an easy one, particularly when the beginnings are far in the past and the number of graduates very large. In case of astronomy, circumstances were favorable. The time elapsed was not too long, and the number of graduates was not too large. Astronomy is the first study group in Serbia for which a study of professional biographies of all registered graduates is done (Milogradov-Turin, 2009).

The author's idea of writing biographies of all the graduates since the first graduation on July 2, 1936 has been realized for about a half of the list. The first 44 biographies were presented at the conference "The Development of Astronomy Among Serbs" in May 2008 (Milogradov-Turin, 2009). The other 56 were added at the XV National Conference of Astronomers of Serbia in October 2008, leading to a total of the first hundred graduates, thus covering the interval July 1936 - July 1982, referred to in the further text as "the interval concerned".

2. LIST OF GRADUATES

The list contains only the names of the graduates in astronomy from the University of Belgrade (UB). It does not include those who graduated in other study groups even if they subsequently worked in astronomy. It is not unusual: many astronomers have not graduated astronomy, and many of those who studied astronomy did not pursue the subject of their study.

2. 1. COLLECTION OF DATA

The names of the graduates were taken from official lists published by the Faculty in 1978, 1989, 1998 and 2003 (e.g. Mijajlović, 2003). Errors found in the lists were corrected; details may be found in Milogradov-Turin (2009).

The data about the professional lives of the first hundred graduates are collected here mainly through private communication with graduates, the members of astronomical community or with relatives of the deceased. All the data found in documents were also used, either for basic information or for checking. The author personally knew most of them as their teacher or colleague. Search for data of those employed at the Astronomical Observatory in Belgrade (AOB) or UB was an easier task, since the written material about them can be found in publications and archives; for those who got employed in schools or in business the records were not available. For some graduates only incomplete data were obtained. Some additions could be expected. Professional biographies in Serbian will be published elsewhere.

Addresses were used for the BAZA program initiated at the Department of Astronomy (Atanacković et al. 2009).

2. 2. BASIC IDEAS AND CRITERIA

The initial idea was not to write complete CV's but to focus only on top activities, functions and awards. Nevertheless, while attempting to draw overall conclusions, it became obvious that it was necessary to include the less important jobs, in the fields which occurred to be important for overview of professions, although not the significant jobs for a particular individual. Therefore, some additional analysis had to be carried after the list of biographies was completed. It also turned out that some graduates were active in so many fields that omitting any of them would not give a fair impression about the person considered. Such a collection of data has a value of its own.

The majority of the graduates did not change their professions in the course of their careers. Nevertheless, almost a half did change jobs, some even several times. Therefore, it was decided to present in this paper only a qualitative result concerning jobs. It seemed appropriate to insert every person employed in several fields (e.g. school, observatory, university) into all mentioned categories of jobs. Thus, the relevance of categories would hopefully be better emphasized.

3. RESULTS OF THE ANALYSIS

3. 1. GENERAL OVERVIEW

Although astronomy is not a field in which many persons could be employed, students were enrolling and getting jobs more or less in the fields they wished. Some astronomy students (7 out of the first 100) also graduated at some other study group since the other diploma gave them better chance for employment.

Basically those who worked at universities, institutes or observatories got a Ph.D. degree (35) or at least M.Sc. degree (31). Most Ph.D. theses were related to astronomy but some adhered to physics (4), mechanics (2), mathematics (1), meteorology (1) and engineering (1). The same holds for the M.Sc. theses, except for mechanics where no M.Sc. thesis was written by an astronomy graduate. In Serbia, from 1965 on, one could obtain a Ph.D. without obtaining the M.Sc. first only exceptionally. Therefore,

since early seventies most Ph.D's had previous M.Sc. degrees. Such a number of theses is due to the demands of the institutions and the fact that such type of jobs was undertaken by those persons who were devoted to the science.

Seventeen astronomy graduates (out of the 100 considered here) got Ph.D. degrees in astronomy and two in technical sciences, closely related to astronomy, from UB. Eleven of them fulfilled conditions for UB Ph.D. degrees within the interval concerned.

At the beginning, starting from 1958 when the first Ph.D. thesis in astronomy was defended at UB, Ph.D. theses were related to research work performed at AOB and UB. About half of Ph.D. theses were connected with AOB, while about a third were connected with the topics studied at UB. Tendency of studying new fields and doing research in foreign institutions started in early seventies.

Most of the first 100 graduates got employed in education: schools (including Planetarium in Belgrade) or universities. Majority of them taught in secondary schools. Some graduates first worked in schools and switched later on to other jobs, including AOB, University or computing business. Opposite cases were also noted. All the astronomy graduates employed at universities were engaged in teaching, with the exception of one who was a librarian.

Large fraction of graduates were employed in research institutions. Most went straight to the AOB. Three worked in physical institutes, and three were in meteorology.

Universities employed less graduates than the observatories did. Together, they employed more astronomy graduates than the secondary schools.

Amongst the graduates not employed in education or research, the most popular choice was computing and its applications.

Most graduates who went abroad or collaborated with foreign scientists achieved a remarkable success. Some of them even got high positions in the international astronomical community.

Only two graduates had professions not connected with teaching or research in natural sciences and mathematics (a journalist and a jockey), and three were only indirectly and weakly connected (engineers, flight controller). One graduate, initially employed as computer specialist, became a successful writer of stories for children. All have preserved love for astronomy.

Many were very active in organizations connected with astronomy. Four held important positions in IAU; the highest was that of the president of an IAU Commission. Three were presidents of the National Committee for Astronomy. Several organized important astronomical meetings. One was the secretary of the Society of Mathematicians, Physicists and Astronomers of Yugoslavia. Five astronomy graduates were elected to be the presidents of the Society of Astronomers of Serbia. One is the president of the National Astronomical Olympic Committee. One is the main instructor and leader of the Serbian astronomical olympic teams.

3. 2. TEACHING IN SECONDARY SCHOOLS

Astronomy teaching changed a lot within the time interval concerned:

- astronomy, named cosmography, was taught within geography in all gymnasias since 1930,
- astronomy as a separate subject in gymnasias started being taught after the Second World War, since the academic year 1945/46 with 2 lessons weekly until 1948/49, when

it was reduced to 1 lesson weekly and abolished next academic year,

- astronomy was reintroduced in 1965 with 1 lesson weekly in the 4th year in the schools which could provide possibilities of teaching it,

- after the academic year 1969/70, astronomy was a mandatory subject in secondary schools oriented on mathematics and natural sciences, with first 1 lesson weekly, and since 1978 with 2 lessons weekly.

Only the first graduate used a chance to teach astronomy after the Second World War, for the few years until 1949. The others who planned to work in schools graduated when astronomy was not in secondary school programs any more. They had to teach mathematics. The chance to teach astronomy have risen only after 1965. No astronomy graduate used this opportunity until 1969. The chances for employment improved when graduates in astronomy (astrophysics) got a right to teach astronomy and physics.

The first astronomy graduate taught firstly mathematics and then shortly, after the Second World War, astronomy in addition. The first one who taught only astronomy graduated in May 1969 while the one who taught only physics graduated in November 1969.

Most taught at least two subjects (astronomy and physics) since the number of astronomy lessons was insufficient for full-time job. Some taught in parallel mathematics also if needed. Astronomy was popular among the pupils, and many teachers enjoyed teaching it.

This achievement unfortunately lasted only until 1990, when astronomy topics were incorporated in the 4th year physics courses. Only recently (2008) the situation has improved as it was announced that astronomy will be reintroduced as separate and compulsory subject. The charm of astronomy has not faded.

Several of 100 astronomy graduates had leading positions in education: two were directors of schools, two deputy directors, one director of the Institute for Education and Pedagogy in Zrenjanin and one the director of the Planetarium in Belgrade. Three were regional school inspectors.

3. 3. UNIVERSITIES

Universities as employment possibilities have always been very attractive to good students, but the university criteria limited the number of those who could pursue a university career.

Position of astronomy at the University of Belgrade has changed significantly during the interval concerned. Astronomy staff was seriously outnumbered by mathematicians within the Department of Mathematics. The only professor who taught principal astronomical subjects was V. V. Mišković. M. Milanković, who started his career at UB as professor in Applied Mathematics, taught two astronomical topics, Celestial Mechanics and, later, History of Astronomy. The astronomy graduates elected for assistants were to work at the Astronomical Observatory, then belonging to UB, and to teach at the Faculty. None of those who graduated before the Second World War became assistants at the University of Belgrade. The first graduate went to secondary schools for family reasons and the second one, after teaching in schools, got employment at the University of Zagreb (1941) and became an assistant there in 1942.

Situation improved at the University of Belgrade in 1947, when the Chair of Mechanics and Astronomy was founded within the Faculty of Natural Sciences and Mathematics. One new professor, one assistant professor and three assistants started to teach astronomy even before foundation of the independent Chair of Astronomy in 1962. The first UB astronomy graduates who got jobs in astronomy at UB were two assistants employed in 1953-1954. Thence forth, the number of astronomy staff has been increasing but never over ten within the interval concerned. In total seven astronomy graduates got jobs as teaching assistants in astronomy (one previously employed at AOB), advancing gradually to higher rank. Within the interval concerned two became full university professors, one became associate professor and two became lecturers. Later, one of the first 100 graduates transferred from AOB and became first an assistant professor, and then an associate professor.

Other eight astronomy graduates got jobs at other Faculties of the University of Belgrade (Faculty of Architecture, Faculty of Economics, Faculty of Transport, Faculty of Civil Engineering, Department of Meteorology). Two graduates got jobs at the University of Novi Sad (Electrotechnical Faculty, Faculty of Agriculture). Almost all of them, except the meteorologist, were teaching high level mathematics and mathematical statistics or physics. They were doing research in the corresponding fields. Nevertheless, one professor (from the Faculty of Agriculture in Novi Sad) was doing research mainly in astronomy.

Two graduates employed at AOB have recently started to teach astronomical subjects at the University of Novi Sad.

Four graduates worked as university professors in other republics of Yugoslavia. Two graduates became university professors in Croatia (one in Zagreb, within the interval concerned, and the other in Dubrovnik, later on), teaching astronomy. Two graduates were teaching at the University of Montenegro part time. One astronomy graduate, principal research fellow at AOB, taught as full professor at the Maritime Faculty in Kotor from 2000 to 2005. The other graduate, senior research associate of AOB, has been teaching Geodetical Astronomy as assistant professor in Podgorica since 2004. Three graduates became astronomy professors abroad (Austria, USSR; within the interval and USA later on).

Astronomy graduates turned out to be good organizers. One became a dean, one a co-director, two vice deans and seven Heads of Chairs.

3. 4. OBSERVATORIES

Observatories were very attractive places to many graduates. The first four students who graduated after the Second World War, in the interval 1949-1951, became astronomers in observatories. More astronomy graduates (out of the first 100), got jobs at observatories than at universities. This is valid for the first jobs as well as for later employments in these institutions. Naturally, most graduates got employment at the AOB as the largest and nearest institution. It was particularly attractive at the time when new groups and services were formed and the number of available jobs increased.

At the beginning it was rare for female graduates to choose to work at the Observatory due to old fashioned views and difficulties in leading in parallel night work and family life with all the obligations of married females in Serbia.

Some students and assistants were occasionally volunteering at AOB.

Most of those employed at AOB reached higher positions (e.g. 6 directors, 14 chiefs of groups, chief of the AOB Computing Center) and many received awards for contribution to the development of AOB (11) and awards for scientific activity (4). Several of them have been leaders of research groups and principal investigators of scientific projects.

Three graduates got jobs at foreign observatories, in Austria, USSR and USA.

3. 5. INSTITUTES

After the Second World War two big institutes doing research in physics were founded: Nuclear Institute in Vinča and the Institute of Physics in Belgrade. This offered an opportunity to astronomy graduates for jobs in physics. One of them got a post in Vinča and later passed to the Institute of Physics. Two other astronomy graduates went directly to the Institute of Physics. One later passed to AOB. They all advanced to the position of principal research fellow. Those who stayed in physics were elected as professors at the Faculty of Physics too. Each of them wrote a book in the field of his own interest of a level satisfying foreign publishers.

Three graduates were using their knowledge of mathematics and statistics: in the Institute of Mathematics, Institutes of Economics and the Institute of Hygiene.

One of the astronomy graduates got a job in NASA.

3. 6. COMPUTING

It is interesting to note that 12 percents of the first 100 graduates worked at least part of their lives as programmers. The first astronomy graduate who got a job in computing business as his first and only employment graduated in 1962. It was quite early in development of computing in Serbia. Variety of ways in which astronomy graduates got jobs in computing is large. Six graduates left teaching in schools and started working in computing business. Two left astronomical work for programming. Two changed programming for completely different activities. One became a programmer after the work with optical instruments.

Astronomy graduates easily switched to computing and many of them got high positions there. Five were directors and two even became owners of computer firms in Serbia. The highest position in computing achieved by one of the first 100 graduates was the post of the director of the Computing center in Orsay (France).

4. CONCLUSION

The first 100 students graduated in astronomy from the University of Belgrade in almost half a century (46 years). Two graduated before the Second World War, none during the War, and several per year starting from 1949. Maximum number of graduates in an academic year was 8. Large number of them got employment according to their wishes and capabilities. Majority of high marks graduates got employed at AOB and UB while those with lower marks got jobs in schools.

The professional training they received was a solid one. Astronomy graduates have shown high degree of adaptability doing jobs compatible with but nevertheless different from astronomy. Those who went abroad achieved excellent results in several cases.

Therefore, it is quite correct to say that the University of Belgrade has a solid level and tradition in teaching astronomy.



Figure 1: The photograph taken at the XV National Conference of Astronomers of Serbia (Oct. 2, 2008) shows the group in which 19 graduated students out of the first hundred are present. From left to the right: Dragomir Olević, Stevo Šegan, Nadežda Pejović, Radomir Grujić, Mike Kuzmanoski, Zoran Knežević, Dragomir Simeunović, Slobodan Ninković, Vojislava Protić-Benišek, Assistant Minister of Science and Technological Development Tibor Sabo, Ratomirka Miler, Zorica Cvetković, Milan Dimitrijević, Veselka Trajkovska, the author, Ružica Trobozić, Olga Atanacković, Snežana Marković, Ivan Pakvor, Gojko Djurašević and Miodrag Đaćić. Tibor Sabo and the present author are not astronomy graduates.



Figure 2: The photograph taken at the XV National Conference of Astronomers of Serbia (on the 2 October 2008) of the group of 6 astronomy graduates (out of the first hundred) standing in front of the poster about the first 100 astronomy graduates. From left to the right: Snežana Marković (school teacher), Dragomir Olević (AOB astronomer), Dragomir Simeunović (UB professor), Ivan Pakvor (AOB astronomer), Radomir Grujić (AOB astronomer) and Ružica Trobozić (school teacher).

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