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FROM THE STUDY "LIFE AND WORK OF PETAR MUSEN"

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Abstract. In this excerpt from the study "Life and Scientific Activity of Petar Musen" are given the data concerning the scientific activity of Dr Petar Musen (1912, Nikolaev, Russia - 1996, Greenbelt, USA), mathematician and astronomer who started his career in 1938 at the Belgrade Astronomical Observatory, staying there during almost four years, till 1942.

His life path, from Nikolaev, via Belgrade, Berlin and Cincinati to Greenbelt (Maryland, USA), was, above all, conditioned by his life determination to work, as a mathematician, in the field of celestial mechanics. The decisive part in this belongs to his first papers dating from the days he spent at the Belgrade Observatory.

He was a very respected investigator of the NASA Goddard Space Flight Center where he was engaged from 1959 till his retirement in 1978.

He developed a theory of artificial-satellite motion which served in the ephemeris computation for one of the first American satellites, Vanguard I. An excellent theoretician in the fields of celestial mechanics and theoretical astronomy he published a number of papers in the leading world scientific journals.

During the last years he lived alone in the neighbourhood of the Goddard Space Flight Center, the street name was Orbit Lane (what a coincidence for a man who devoted his entire active period of life to the computing of orbits of celestial bodies!), in the USA, state Maryland, far from the land always considered by him as his native country and to which he always wished to come back.

Unfortunately, this desire of his has never become reality. He died in October 1996 at the age of 84.

The idea of learning more, and writing about Petar Musen, in fact of saving from oblivion his name and life achievements, is not a new one. It has evolved and matured within two personalities independently, to be turned, after a conversation of a few years ago, into a unified desire of throwing more light upon his contribution to the scientific-thought development in our midst.

Both of us, Prof. Dragan Trifunović and myself, each one individually, have had different motives. His, certainly more pragmatical, was to present Petar Musen's creativity in mathematics and astronomy within a special study. Mine has been, as usually, a sentimental curiosity, making allowanceat at this moment for the closeness of the scientific fields to which both of us devoted ourselves.

Namely, even today, on the wall over my desk is the photograph of the first staff of the new Astronomical Observatory, from 1939. My inevitable question, from my earliest childhood, was: "Who is that man on the photograph standing by my father's side?" It has always the answer: Dr Petar Musen. Also I, to many persons asking me this question now, answer in the same way: Petar Musen. He is .... then I stop, being surprised, always from the beginning, how, in fact, about him also I practically know nothing. And not only I.

Petar Musen's life and scientific activity is almost unknown even to the staff members of the Astronomical Observatory, though he spent there several years engaged as a new member and then as a research fellow.

Petar Musen was born on January 16, 1912 in Nikolaev, Russia. His father Vladimir was a physician, his mother Nadezhda a housewife. Scant data concerning them indicate that in the late forties they lived at Velika Kikinda in a flat within a home for the aged persons.

It is not exactly known when Petar Musen with his parents came to the Kingdom of Yugoslavia. It is known only that he finished the secondary school - "Donski kadetski korpus" (Don Cadet Corps) - at Bileće and Goražde, but it remains for later, more detailed, studies to examine his biographical data from the times of his primary and secondary educations which doubtlessly took place in the Kingdom of Yugoslavia. What can be reliably established on the basis of the existing evidence at the Belgrade Observatory is that he graduated from the Chair of Mathematics of the Faculty of Philosophy in Belgrade and that, on April 22, 1937, he obtained his PhD in mathematics "O bazama neprekidnih funcija" (On the Bases of Continuous Functions" under the supervision of Prof. Dr Mihajlo Petrović - Alas.

A document from November 1937 leaves us irresolute. Namely, the Municipal Government of Dubrovnik under No 313/17095/37 delivers a domicile to Petar V. Musen born in 1912 in Nikolaev (Russia) a member of this local community and consequently a citizen of the Kingdom of Yugoslavia.

At present it is unknown how Petar Musen came to Dubrovnik. The most probable variant is that he was there a teacher in a secondary school, immediately after graduating.

Soon afterwards, (as evident from a document of the Ministry of Education of the Kingdom of Yugoslavia - Secondary School Department II, No 5967, from March 10, 1938) he obtained a young teacher's position as a bachelor of Philosophy in a modern-side gymnasium at Ćuprija with a salary of 1275 dinars a month.

In the meantime, in January 1938, Dr Petar Musen, living in Pančevo, Učiteljski konvikt (address), married Nina Granitova, a bachelor from Philosophy, daughter of Vladimir, a clerk in the Ministry of Transport and Nina Granitova, a housewife from Belgrade. Both families Granitov and Musen were emigrants from Russia due to the October Revolution. The Granitovs came from Tiflis (Tbilisi) where Nina was born, also in 1912.

The wedding ceremony took place in a Russian Orthodox Church in Belgrade and the rite was performed by the priest Vitalij Tarasev (Book of married persons I, 85, No 2 - Russian Trinity Church in Belgrade).

Toward the end of this same year, 1938, (more precisely on December 22, 1938) Dr Petar Musen sent a request to the Belgrade Astronomical Observatory asking to be appointed a junior clerk.

This request of his, followed by a requirement of Prof. Vojislav V. Mišković, Observatory Director, was sent to the Ministry of Education, General Department, on March 28, 1939. It was required for Dr Petar Musen to obtain a position of "činovnika-pripravnika-astronomskog opservatora VIII grupe pri Astronomskoj opservatoriji Univerziteta u Beogradu" (a free translation: a young staff member - astronomical ob-

server at the Astronomical Observatory of Belgrade University).

A retroactive document on approving Dr Petar Musen's position at the Observatory was brought by the Ministry of Education on December 22, 1938.

In this way Petar Musen came to the Observatory and except Prof. Mišković, at that time already an academician, he was the only one with PhD at it.

He was cordially received by his colleagues: Ružica Mitrinović, Zaharije Brkić, Pero Djurković, Milorad Protić and Branislav Ševarlić.

His Observatory activity began in a way usual for that time: he was introduced into the work of only formed scientific groups, he learnt what were their basic tasks, he took part in the common preparation of Observatory publications such as: "Godišnjak našeg neba", "Nautički godišnjak", "Bulletin de l'Observatoire de Belgrade" and others. He also took part in preparing the ephemeris of minor planets, data on their heliocentric motion and in similar things.

In 1940 he, like other astronomers, made his dwelling within the Observatory.

In the Observatory Minutes from that time (the war had already begun) one finds the following lines:

On May 13, 1941 P. Musen reported that he had compared the data on unidentified asteroids.

On June 18, 1941 - under no 451 - P. V. Musen asked to undertake an extension of the theory concerning VI Jovian satellite which had not been thoroughly examined by that time.

On August 14, 1941 - under No 578 - P. V. Musen asked approval to begin introducing into the work of the Large-Refractor mechanism assisted by Z. Brkić.

On September 8, 1941 - under No 634 - P. V. Musen asked approval, after having been introduced into the Large-Refractor motion, to begin the determination of the instrument constants and to *devote himself to effective observations.*

He became the acting chief in the Service of Astronomical Calculations. At that time at the Observatory also worked Nina Musen as a calculator.

Her name one finds most frequently at the bottom of calculation forms of the Time Sevice, but also in other similar works: tape reading,time signal receiving, etc.

We also find this note: on January 10, 1941, Mrs Nina Musen requested a six-week leave because of her son's birth. The son of Petar and Nina Musen was named Djordje.

The war whirlwind,the sufferings of those discovering, even in the framework of a science like astronomy, the uncertainty of life gave rise in Musen anxiety and presentiments of an imminent danger.

Perhaps already a document of Education Ministry No 11927 of June 10, 1941 sent to the Observatory and requiring a list of its employees who were Jews (Musen was a Russian Jew) was decisive for Musen in resolving to leave Belgrade and Serbia.

On September 1, 1942, having not completed four years working at the Observatory Petar Musen made his resignation in the civil activity asking for it to be accepted. The reason was acceptance of a new position at the Astronomisches Rechen-Institut in Berlin.

Musen's resignation was presented by V. V. Mišković already on September 2, 1942 before the dean's office at the Faculty of Philosophy. In the meantime Musen, in an

utmost haste, left the Observatory. His resignation was accepted only after a month. In late September Nina Musen also resigned her public service.

What was then with the Musens? A letter sent to Prof. Trifunović in 1991 offers at least a partial answer.

"I left my country (Yugoslavia) during the Second World War, because I was a "candidate" for the German gas-stoves and too many people knew about that. The threat of denunciation came even from the family of my former wife (immediately after coming to Berlin the Musens divorced) and it was hanging over my head. Prof. Kopff at the Astronomisches Rechen-Institut in Berlin sheltered me (he knew about my background, but kept silence). In Berlin during the war I was computing the orbits of minor planets. Prof. Kopff (let he rest in peace!) recommended me to Dr Herget at Cincinati Observatory".

A relatively short engagement in the scientific research at the Astronomical Observatory was decisive to the further scientific vocation of Dr P. Musen.

He devoted his time completely to the research in the fields of theoretical astronomy and celestial mechanics. Together with the leading astronomers of the International Center for Minor Planets and Comets in Cincinati (Ohio) he was engaged in particular problems of artificial-satellite motion (as early as in 1957). He worked on ephemeris improvememt of satellite "Vanguard I", to move to NASA Goddard Space Flight Center, Maryland, where he was very successful in improving the orbits of cosmic flying apparatus. He was engaged in the Laboratory of Theoretical Studies and Special Space Programs of this centre.

Numerous scientific papers about, which will be subject in the study "Life and Scientific Activity of Petar Musen", produce an exceptional contribution to the theory of motion of terrestrial natural and artificial satellites, to the theory of special perturbations, as well as to the theory of lunar motion.

For more than two decades Petar Musen lived near the Goddard in the street Orbit Lane 8804, Lanham, in American State of Maryland. Alone and sad, in his thought often in Knez-Mihajlova street - he writes to Prof. Trifunović:

"What an address you have on your letter!

How many times I was walking on Knez Mihajlova! I also must say that the University of Belgrade is an excellent University. I used to work in Germany and USA and always remembered my teachers and the University with a warm feeling and gratitude. ..."

In May 1997 to the author's address was sent a letter of Mr Nicholas Taube from the state of New York saying: "my uncle Petar Musen passed away in October 1996. ...

On a more pleasant note, I must tell you I spent many happy memorable hours as I was growing up listening to my Uncle talk fondly of his days and work at the Observatory."

With this the life circle of Dr Petar Musen, scientist and thinker, was closed.

A Russian and Serbian emigrant, a modest young man with glasses and in a poor suit on a photograph from 1938 added to the mosaic of world astronomical science and celestial mechanics a few valuable stonelets.

We are proud of him and them.