

**ASTRONOMY TEACHING DEVELOPMENT AMONG SERBS, II**

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**ABSTRACT.** Continuation of the paper in Publ. Astron. Obs. Belgrade No. 56 (1997), 179. As a representative of the part of the northern regions, under administration of Pecuj, Novi Sad has been chosen, where almost all kinds of schools, existing in that times, have been located. A short review on elementary and secondary schools curricula, teachers, professors and textbooks.

**ELEMENTARY AND SECONDARY SCHOOLS, IN GENERAL, IN NOVI SAD**

**ELEMENTARY SCHOOLS.** - In the year 1703 the Serbian orthodox parish opened its Serbian Confessional Public Elementary School in Novi Sad. At that times the Government did not take care about teaching in schools - that was a private affair of the church. It has been thought that the school is an "adnexum" to the church. The priests were the teachers, and the main subject was the religious instruction. The textbooks were also of the religious character.

All elementary schools were divided into three kinds: country, so-called "trivial" schools, which had only one, eventually two classes, small-town schools with two separated classes, and town, "main" schools which had three separated classes. Only in the third kind there have been taught some basic notions in sciences and geography (if the pupil had an intention to continue its education in a secondary school). In the year 1856 the IV, and in 1868 the V and VI classes have been added. In the residency of the school department there was an elementary school, named "normal" - that one had normative character - all other should be ruled according to this one [Ognjanovic (1964)].

There were no much data left about teaching plans and programmes because in the revolutionary years 1848/9 more than 2/3 parts of Novi Sad have been destroyed and burnt. So, we may use only the poor informations which have been left.

We will focus our attention only to astronomical curriculum. In the third class, in geography, it has been taught: "...The shape of the Earth and its rotation as well as its revolution around the Sun. Four seasons..." In the fourth "...The firmament, horizon, Sun, planets, the Earth and its shape, its rotation and revolution, Moon, and its phases, eclipses of the Sun and Moon, the main concepts about stars and the Universe..." ["Skolski list", 1869, 327].

In "Elementary Reading Book", for the first class, by Dr. Djordje P. Natosevic, Novi Sad, 1875, last two pages are dedicated to the firmament, Sun, Moon and stars. In the "Reading Book" for the second class, by the same author, five pages describe first notions about: firmament, Sun, Moon, stars, time, days and hours, Weeks, months and years, as well as popular riddles concerning same notions. The "Reading book" for the third class, by the same author, has nine pages on The path of the Sun, The shadow and the sunray, How does the Moon shine, The stars (with popular names of the stars and constellations). The fourth class "Reading Book", written again by the same author, has seven pages on Earth' rotation, Eclipses, Stars.

**SECONDARY SCHOOLS.** - According to preserved manuscripts there existed between the years 1731 and 1789 the Orthodox Latin School in Petrovaradinski Sanac (Novi Sad

got his name in the year 1748), with six classes. The main goal was to teach the pupils Latin.

The book No.Gr.47 PHILOSOPHICAL MANUSCRIPTS,preserved in orthodox monastery Grabovac, now in the Orthodox library in Sentandreja, belonged to ieromonk Arsenije Teofanovic, who noted them on lessons he attended during his education. This manuscript has six parts written in Latin. We will pay our attention only to that parts which are interesting from astronomical standpoint. The title of the first is PROLEGOMENA TO GENERAL PHILOSOPHY. It is divided into parts, chapters, sections and paragraphs. The first part is purely philosophical. The second Prolegomena to Cosmology has chapters : I.. Notion of the World; II.Part Of the Universe,Section I - *Simple Parts of the Universe*, Section II - *Genesis of the Primordial Cosmos*, Section III - *Physical Nature of theBodies*. The third manuscript , in the same book,is The Science of Nature or Introduction to Physics with the subtitle On the Physical Nature. It is divided into tractates and they into chapters. The Tractate 7. considers The Motion, Tractate 8. has the title On Firmamentaly World And On Elements. Chapter 1. is named "On the Origins of the World", Chapter 3. speaks "On the Nature Of the Firmament",Chapter 4. has the title "On the Light of the Stars",Chapter 5. tells us "On the Motion Of the Bodies",in Chapter 6. one discusses "On Influences Of the Heavenly Landlords".

Notes in these manuscripts are very interesting. On the page 3o2a there is written:"1744, P.Varadini,A.Theophanovich",and on the page 399a:"Aprilis 16,1745.P.Varadini,ieromonk Arseniu Theophanovich" which tell us about place and time when Arsenije Teofanovic attended to classes.

In the manuscript No.Gr.49. A SHORT COURSE IN LOGIC - GENERAL DIALECTIC there is again and interesting note,on the page 2o2b,which informs us that A.Teofanovic on the 8th May 1745 completed his course in philosophy which was held by Dionisije Novakovic in Petrovaradinski Sanac. These three notes are enough to testify that in Petrovaradinski Sanac (Novi Sad) astronomy has been taught among other subjects.

Let us mention that there is one more manuscript under No.Gr.15.PROGNOSTIKON, written about 1768,where there are in Introduction, descriptions and characteristics of Moon,Mercury, Jupiter,Saturn, Sun and Venus [Jovanovic (1989),5].

In the years 1755/6 and 1756/7 one have used the Introductio in Orbis Hodierni Geographicam by Joannes Tomka-Saski [V.Stajic(1949),57].The lessons in geography were held on Tuesdays the whole forenoon (probably from 7 a.m. to 10 a.m.).According to Ratio Educationis from the year 1777, in the first and second class general notions from the mathematical geography should have been taught [V.Stajic(1949),171].

Let us notice that on the list of instruments which were given,on the 14th March 1788,to the director Andrej Gemza,there was an astrolabium with compass on a leg [V.Stajic(1949) 171]. Astrolabium is an ancient instrument used to measure the altitude of a celestial body. One simple form consisted of a graduated disc that could be suspended by a ring to hang in a vertical plane. Later replaced by sextant. Who used it and what for?

During the time there were several secondary schools, in Novi Sad, as well as schools of other confessions, attended by Serbs, concluding with Higher Girl's School (Girl's College). In all of them there were taught some parts of astronomical subjects, in geography and in physics,but we will let them out of consideration in this short reviewing. There is one exception which must be mentioned : The Serbian Teacher-Training School which has been established on the 1st May 1778 in Sombor. The last generation has been

educated in the year 1811. Then, a year later The King's Paedagogium Of the Ilirian People (the Serbs have been named, sometimes, Ilirians), has been founded in Sentandreja, but in the year 1816 it has been transferred to Sombor again, and is existing there until to-day. One of the professors was Vasilije Bulic (1785-1826) who wrote a textbook on Mathematical Geography in the year 1824. We will list only the titles of chapters of it, so that one may see what has been, probably, taught in that school. Part A. The Earth As A Body In Universe And In Relation To Other Celestial Bodies. I. Planets of the Solar System (Mercury, Venus, Earth, Moon, Mars, Vesta, Juno, Ceres, Pallas, Jupiter, Saturn, Uranus). II. Comets or Tailed Stars. III. Fixed Stars. IV. Apparent Sight of the Firmament, False Representation of Celestial Bodies' Size. V. Twinkling And the Apparent Magnitude of Fixed Stars. VI. Zodiacal Light. Part B. The Earth Itself ... contains, among other purely geographical texts, refraction and dawns.

To complete the picture of this school we will cite parts of the Teaching Program, for the years 1805/6 and 1806/7, for geography. First class: 1. Celestial Bodies In General - Sun, Planets, Fixed Stars. 2. Earth. Proofs that the Earth is Round. Horizon. Equator, Meridian And Other Circles And Points On the Terrestrial Sphere And Their Meanings. 3. Rotation Of the Earth Around Its Axes, And Around the Sun. Days And Nights. Year. 4. Moon And Its Phenomena. Eclipses Of the Sun And Moon. 6. to 17. have no astronomical interest ["Skolski list" (1867), 240].

#### GRAND GYMNASIUM OF THE SERBIAN ORTHODOX PARISH IN NOVI SAD

As we mentioned, after the year 1789, when the Orthodox Latin School has been closed, there were several secondary schools in Novi Sad. In the years 1794 to 1796 one has tried to reestablish the serbian gymnasium, but the authorities did not wish to give the opportunity to minorities to educate their youth in their national spirit.

On the 8th February 1810 Sava Vukovic undersigned his legacy of 20.000 forints for founding a serbiam gymnasium in Novi Sad. Other Serbs gave their contributions too so that on the 11th December 1811, by the ruler's resolution, the foundation has been granted. The teaching plan and the program should have been adapted to the same in Serbian Orthodox Great Gymnasium in Sremski Karlovci.

EDUCATION. - The gymnasium, after many complications, started its life on the end of the first semester 1815. Step by step, year by year, this school have got six classes: four grammar and two humanity classes.

Curriculum has been accomodated to the Ratio Educationis, from the year 1806. In the fourth class Ignjat Jovanovic (~1791-1868) taught in geography notions from mathematical geography. In the fifth class (humanitatis classis prima) Georgije Magarasevic (?-1830) teaches mathematical relations concerning the globe [V. Stajic(1949), 197-198].

There is a Ratio Studiorum in Reg. Priv. G. n. u. R. Gymnasio Neoplantensi, from 11th April 1824, in Latin, where it has been written that in classis humanitatis secunda (sixth class) in physics one should teach: "...celestial bodies, solar system, on the example of Earth all mathematical-physical relations..." That was the program according to which it has been taught from the beginning until that day [V. Stajic(1949), 199].

Djordje Djordjevic (1790-1868), professor on same Gymnasium, wrote on the 8th November 1824 to Jakov Gercic, also a professor, asking from him the textbook on

geography written by Eisenmann [V.Stajic(1949),226].

The minutes from the professors' collegium session, held on the 27th October 1825 contains teaching directions. So, we may read that in the fourth class (of grammar) one should treat more widely the mathematical geography than it was the case in the second class (of grammar). The recommended textbook was Stern's *Geographie*, the 1822 edition (Details on textbooks and handbooks will be given in the separate section TEXTBOOKS). The professor was again Ignjat Jovanovic [V.Stajic(1949),205]. In the second class of humanity (sixth class) Dr. Petar Jovanovic (1800-1855) teaches in the year 1841/2, in the second semester, physics, especially astronomical physics [V.Pusibrk (1896),76].

On the 12th June 1849 the school discontinued its activity because of the bombardment of Novi Sad during the revolution 1848/9 [V.Stajic (1949),228]. Due to this destruction and fire we have so few informations about life and teaching in this Gymnasium in the preceding period.

After a pause, on the 13/25 October 1852, with a festive celebration the so-called "Small Gymnasium", with four classes has been opened. On the 8th July 1865 by means of the czar's order the Gymnasium becomes a complete, with eight classes. In the school year 1865/6 there were opened the fifth and the sixth classes, in the next school year the seventh, and in 1867/8 as well as the eighth class.

More details on teaching plans and curriculum one may find in Programms (Annual Reports) which have been issued each year starting by the year 1867/8. In this academic year in geography, in the first class, professor Aleksandar Gavrilovic (1833-1871), with 3 hours a week, taught: "...Basic concepts in mathematical geography, and exact knowledge of the outer picture of the Earth..." using Bellinger's textbook. In the fourth class, with 3 hours a week, professor Vasa Pusibrk (1838-1917) in sciences taught: "... main parts of astronomy ..." according to the textbook by Kunzek. In the eighth class, again V. Pusibrk, with 3 hours a week, taught in sciences: "...Basic concepts in astronomy..." using Kunzek's textbook. In the school year 1868/9, in the first class, Milan Dimitrijevic taught the same curriculum in geography as in the previous year. The same case was in the fourth class, but under direction of Vasa Djurdjevic, and in the eighth there was only an hour weekly more, that is four hours a week. During the year 1869/70 Milan Dimitrijevic taught geography in the first class, without change. The same professor was in the fourth class, but in the eighth the textbook by Subic has been used now.

The school year 1870/1 brought changes. In the first taught Svetozar Savkovic as before, but in the fourth and in the eighth class astronomy disappeared. One must say that the authorities, without any obvious reasons changed the curricula sending decisions, neglecting at the same time, the rights of autonomy given by the ruler's resolution. Dr. Milan Djordjevic taught in the year 1871/2 geography in the first class similarly as in the previous year. In 1872/3 and in 1873/4 Stevan Nedeljkovic taught geography in the first class in the same way as his colleagues did before. There were no changes in 1874/5. The same in 1875/6.

In 1876/7 Milan A. Jovanovic taught in the first class, with 3 hours a week, according to the textbook by Ribari: "...Basic concepts of mathematical and physical geography..." During 1877/8 Svetozar Savkovic taught again in the first class without change, but Andrija M. Matic started to teach sciences in eighth class, with 5 hours a week: "...meteorology and elements of mathematical geography..." using Subic's textbook. In 1878/9 Stevan

Milovanov taught geography in the first class, and A.M. Matic in the eighth without changes. 1879/80 brought some news. Mathematical and physical geography has been transferred to the third class, with 3 hours a week. Svetozar Savkovic taught using Ribari's textbook. With 4 hours a week S. Milovanov, in the eighth class, taught in sciences: "...Elements of Cosmography (short review of meteorological phenomena and elements of astronomy)..." according to Subic.

1880/1 added only one hour weekly to geography in the third class, and a new professor - Milan A. Jovanovic. The same taught in the eighth sciences. No essential changes in the academic year 1881/2, only a new professor, S. Milovanov in the eighth. In 1882/3 S. Milovanov took over the third class too. During 1883/4 M.A. Jovanovic taught again in the third class, but with 2 hours a week. No changes in the academic year 1884/5. School year 1885/6 brought new professors: V. Pusibrk to the third and A.M. Matic to the eighth class. A small change took place in 1886/7: A.M. Matic taught in the third and S. Milovanov in the eighth class. In 1887/8 A.M. Matic took over both classes. S. Milovanov did the same thing in the year 1888/9. A.M. Matic repeated the same accomplishment in 1889/90.

M.A. Jovanovic taught in the third and S. Milovanov in the eighth class during the 1890/1. In 1891/2 V. Pusibrk was holding lessons in the third and A.M. Matic in the eighth. No changes in curricula were in the year 1892/3, only S. Milovanov taught in the eighth. The same in the year 1893/4. One must acknowledge some tolerance of the Hungarian government because they approved the use of the textbook in physics by Hondle which has been translated and published in Serbia, in Beograd. 1894/5 V. Pusibrk remained in the third, but to the eighth returned A.M. Matic. 1895/6 S. Milovanov gave lectures in both classes. The introductory part of this Annual Report is a thorough paper "Origins And Development Of the Serbian Grand Gymnasium in Novi Sad" (which exists as a separate book too), by V. Pusibrk. One may see there that the principal Dr Djordje P. Natosevic and professor Jovan Djordjevic (1826-1900): "...for lectures in astronomy acquired the necessary equipment..." To our great sorrow there is no date and no list!

In the academic year 1896/7 V. Pusibrk taught geography in the third, and A.M. Matic physics in the eighth class. During the year 1897/8 S. Milovanov replaced A.M. Matic in the eighth class. The textbook on Physics For Higher Classes Of the Secondary Schools, by Stevan Milovanov has been recommended. In the school year 1898/9 Djordje Vujaklija taught in the third and A.M. Matic in the eighth class. Dj. Vujaklija taught in the third and S. Milovanov in the eighth class during the academic year 1899/1900. In the next year S. Milovanov was in the third and A. M. Matic in the eighth class. All along the school year 1901/2 S. Milovanov taught in the eighth class. 1902/3 A.M. Matic gave lessons in the third and S. Milovanov in the eighth class. The same case was in the next year. Second edition of the Physics and Mathematical - Physical Geography, by Andrija M. Matic, has been recommended to the pupils.

In the 1904/5 academic year S. Milovanov taught geography with one hour more, a week, in the third class; the same professor was in the eighth class too. No changes in the following year. Starting by the academic year 1906/7 "...the main parts of mathematical and physical geography..." have been introduced into geography in the first class too. Marko Vilic gave these lectures with 2 hours a week. A.M. Matic remained in the third and S. Milovanov in the eighth class. Nothing has altered in the next year. M.A. Jovanovic taught in the first, and S. Milovanov in the third and in the eighth class during 1908/9. M. Vilic came again into the first, Dusan Jovanov started in the third and S. Milovanov remained in the eighth class in the

school year 1909/10.

Because of the increased number of pupils there were two sections of the first, Ia (M.A.Jovanovic), Ib (M.Vilic), and two sections of the third class, IIIa (D. Jovanov), IIIb (M.Vilic), VIII (taught by S.Milovanov) during the year 1910/1. Similar situation was in 1911/2 : Ia (S.Milovanov), Ib (M.A.Jovanovic), III (S. Milovanov) and VIII (A.M.Matic). During 1912/3 in Ia taught Dr.Velimir Juga, in Ib D.Jovanov, in III geography curriculum included: "...Elements of mathematical and physical geography with main concepts in physics...", and in VIII taught A. M.Matic. Abundance of schoolboys was as well as in 1913/4 : Ia (D.Jovanov), Ib (M.Vilic), IIIa (A.M.Matic), IIIb (S.Zamurovic), VIII (S.Milovanov). According to the inventory in the Collection of physics there were 23 pieces teaching aids for astronomy.It is a pity that there was no list by names so we do not know what kind of instruments were in use.

In the first year of the World war I, 1914/5, astronomy disappeared in the first class, but A. M. Matic, who gave lessons in the third, had in curriculum for geography:"...In mathematical geography: Orientation.Shape of the Earth.How shall we represent the Earth. Consisting parts of the Earth:land,water and air. Firmament and apparent motion of the stars. Rotation of the Earth about its axes and its pace around the Sun.Earth' belts.Motion of the Moon..." The same professor taught in the eighth class:"...Elements of astronomy (Apparent motion of the firmament. Horizon and the equatorial coordinate system.Shape of the Earth. The Earth rotates around an axes.Zodiac.Ecliptical coordinate system. The consequences of the revolution of the Earth around the Sun. Time. Calendar. Planets. Sun. Stars. Moon.Satellites)..." In the next academic year the curriculum was the same in both classes. Professor was S.Milovanov. During 1916/7 Stanko Zamurovic taught in the third class and S. Milovanov in the eighth. In the academic year 1917/8 A.M.Matic taught in the third and S.Milovanov in the eighth class.

TEXTBOOKS. - As one could see recommended and really used textbooks and handbooks were written in Latin, German, Hungarian and Serbian.The same were the languages in which the lessons have been given.

We will list and comment them in accordance to the order in which they came into the usage. In the case that we know it only by the name of the author we will give data with which we are familiar.

J.Belinger UPUTSTVO U GEOGRAFIJU (Introduction To Geography),translated into Serbian by Aleksandar Gavrilovic, Ignjat Fuks, Novi Sad, 1866, has been discussed thoroughly in Part I of this paper. We will now give the outlines. First section is devoted to "Foreknowledge In Cosmography", First chapter to "Celestial Bodies In General", and second to "Some Celestial Bodies In Particular". In use between the 1867/8 and 1874/5 school years in the first class.

LEHRBUCH DER EXPERIMENTAL PHYSIK (Textbook in Experimental Physics),by Dr.August Kunzek,Wien,1853.Used in IV classes between the 1867/8 and 1873/4 academic year.

LEHRBUCH DER PHYSIK MIT MATHEMATISCHER BEGRUENDUNG (Textbook In Physics With Mathematical Bases),Zum Gebrauch in den hoeheren Schulen und zum Selbstunterricht,by Dr.August Kunzek,Wilhelm Braumueller,Wien,1865,X+795 pp.Let us list only the titles of some paragraphs."Shape of the Celestial Bodies", "Gravitation", "Central Forces", "Optical Instruments", "Parallax", "Horizontal And Equatorial Coordinate Systems", "Apparent Annual Motion Of the Sun", "Precession, Nutation,

Secular Change of the Obliquity of the Ecliptic”, “Planets And Satellites”, “Perturbations”, “Fixed Stars (Variables, Double)”, “Nebulae”. As one may see very serious treatment of the subject with mathematical proofs. In use in VIII classes in the 1867/8 and 1868/9 years LEHRBUCH DER PHYSIK fuer Ober-Gymnasien und Ober-Realschulen, Pesth, 1861, by Dr. Simon Subic. In use between the 1869/70 and 1882/3 in VIII classes.

GEOGRAPHIE, I. Theil, by Ribari has been used between 1876/7 and 1878/9 in the first, as well as in academic years 1879/80 and 1880/1 in the third classes.

FOLDRAJZ a gimnaziumok hasznalatara (Geography for gymnasiums), by Albert Scholtz Franklin Tarsulat, Budapest, 1879, 140 pp. has been used in the third classes between school years 1881/2 and 1886/7. Purest geography without astronomy.

Dra. Wallentina FIZIKA za vise razrede srednjih skola (Physics for higher classes of secondary schools), translated from German by Dr. Oton Kucera, Zagreb, has been used in the VIII classes between the 1883/4 and 1890/1. Under the title Elements of Astronomy (Cosmography) there were the following chapters: 1. Apparent Diurnal Rotation of the Firmament. 2. Star Position Determination (Horizontal And Equatorial Coordinate System) 3. Sidereal Time. Sidereal Hour Angle. 4. Meridian and the Altitude of the Pole Determination on A Spot. 5. Shape And Dimensions of the Earth. 6. Interpretation Of the Apparent Motion of the Celestial Bodies Under Assumption That the Earth is Rotating Around Its Axes. 7. Geographic Longitude Determination. 8. Changes of Gravitation Because of the Rotation of the Earth Around Its Axes. 9. Apparent Annual Motion of the Sun. 10. Interpretation Of the Apparent Diurnal Rotation And Apparent Annual Motion of the Sun. 11. Ecliptical Coordinate System. 12. Calculation of the Diurnal Star Arc And Lasting of A Day. Seasons. 13. Apparent Solar Time And Solar Mean Time. Sidereal And Tropical Year. Sundial. Calendar. 14. Parallax. Distances to Celestial Bodies And Their Size Determination. 15. Motion Of the Planets. 16. Motion of the Earth' Moon. 17. Excerpts of the Newtonian Law of Gravitation. 18. Precession And Nutation. 19. Tides Phenomena. 20. Notes On the Structure of Some Celestial Bodies. In the concluding part of the book there are 51 problems under the title “Cosmical Physics”. Very thoroughly worked material, but, the language used in translation has been of the so-called “western” variant with which Serbs are not very familiar.

FIZIKA I MATEMATSKI I FIZIKALNI ZEMLJOPIS za III razred srednjih skola u Ugarskoj (Physics and Mathematical and Physical Geography for III Classes Of Secondary Schools in Hungary), by Andrija M. Matic, Second Edition, Braca M. Popovic, Novi Sad, 1901. The First Part belongs to physics. The Second Part is Mathematical and Physical Geography. 1. Orientation. 2. Shape of the Earth. 3. How Do We Represent the Earth. 4. How Is the Earth Represented On A Flat Sheet. 5. Composite Parts Of the Earth According to the Matter. 6. Firmament And Apparent Motion of the Stars. 7. Rotation of the Earth Around An Axes And Its Pace Around the Sun. 8. Belts On the Earth, Warmth, Wind, Rain, Snow, etc. Water circulation on the Earth. Climate. 9. Motion of the Moon Around the Earth And With It Around the Sun. Eclipses. 10. The Position of Our Earth In the Solar System. This is a textbook which a professor wrote for his pupils according to the curriculum. Very popular and clear. In use in III classes between 1887/8 and 1910/1, and 1913/4 and 1917/8!

KISERLETI TERMESZETTAN (Experimental Sciences), by Ipoly Feher, Franklin Tarsulat Budapest, 1888, 424 pp. has a part named Elements of Cosmography with following paragraphs: 236. Firmament And Its Diurnal Motion. 237. The Shape of the Earth. Its

Rotation: Horizontal And Equatorial Coordinate Systems. 238. Apparent Motion Of the Sun: The Ecliptical Coordinate System. 239. Time Measuring. 240. The Solar System. 241. Fixed Stars, Milky Way, Nebulae. Again a serious textbook with many details. In use in VIII classes between 1891/2 and 1893/4.

FIZIKA za više razrede srednjih skola (Physics for higher classes of the secondary schools), by Dr. A. Handl, translated by Ivan Stozir, Fr. Zupan, Zagreb, 1890, VIII+324 pp. with VI Part Elements of Astronomy. 349. Firmament. Horizon. 350. Equatorial Coordinate System. 351. Diurnal Motion Of the Stars. 352. Meridian And Polar Altitude Determination. 353. Annual Motion Of the Sun. 354. Apparent Solar Time And Solar Mean Time. 355. Ecliptical Coordinate System. Motion of the Equinox. Year. 356. Fixed Stars. 357. Planets. 358. Comets. 359. Meteors. 360. Moon. 361. Earth. 362. Foucault's Experiment With A Pendulum. 363. Tides. 364. Density Of the Earth, A serious textbook but, the translator, besides the "western" variant "invented" some new nouns and verbs and on that way made problems to serbian readers. In use in eighth classes during 1894/5 and 1896/7 academic years.

One more professor wrote a textbook for his pupils. FIZIKA za gornje razrede srednjih skola (Physics For the Higher Classes Of the Secondary Schools), by Stevan Milovanov, Serbian Great Gymnasium in Novi Sad, 1897, II+308+VI pp. in Chapter III. Mechanics of Rigid Bodies has a section: *General Gravitation* with paragraphs 60. Keplerian Laws. 61. Gravitation. 62. Gravity. 63. Work of Gravity. Potential. 64. The Field Of Earth' Gravitation. Chapter VIII. Light Phenomena has paragraphs: ...102. Shadow (umbra and penumbra in Solar and Lunar eclipses)...112. Light Velocity... 127. Solar Spectrum. 128. Spectra Of the Glowing Bodies. 129. Absorption Spectra. 130. Full Spectrum. 131. Influence of Glowing Bright Rays. 132. Colour Of Bodies: Firmament... 134. Rainbow. 135. Chromatic Aberration... *Optical Instruments*...145. Refractors and Reflectors. 146. Astronomical or Keplerian Telescope. 147. Terrestrial Telescope. 148. Galileian Telescope. 149. Reflectors: Gregorian, Newtonian, Herschel Telescope... Chapter IX. Heat Phenomena... 182. Cosmical Sources Are Sun And Earth... Chapter XI. Magnetic Phenomena... 207. Elements of Terrestrial Magnetism: declination and inclination... Chapter XIV. Elements of Astronomy consists of paragraphs: 260. Apparent Diurnal Motion Of the Firmament. 261. Horizontal And Equatorial Coordinate Systems. 262. Geographical Longitude And Latitude. 263. Distance of Two Spots. 264. Shape of the Earth. Its Dimensions. 265. The Earth Rotates Around Its Axes. 266. Apparent Motion of the Sun In A Year. 267. Relations Between Horizontal And Equatorial Coordinate Systems. 268. Zodiac. 269. Ecliptical Coordinate System. 270. Relations Between Ecliptical And Equatorial Coordinate Systems. 271. Consequences Of the Revolution of the Earth Around the Sun And the Fixed Obliqueness Of Its Axes. 272. Distance of the Sun; Solar Dimensions. 273. Time. 274. Calendar. 275. Precession And Nutation. 276. Planets. 277. System Of Planets. Some Of Planets. 278. Sun. 279. Stars. 280. Moon; Satellites. 281. Meteorites And Bolids. 282. Comets And Falling Stars. The conclusion of the book is again consisted of problems. As one may see the author tried to give to his pupils the most in a very clear way. In use in VIII classes between academic years 1897/8 and 1917/8!

ZEMLJOPIS za učenike srednjih skola, Prvi deo (Geography for the pupils of secondary schools, First Part), by Oton Varga, translated into Serbian by Milan A. Jovanovic, Srpska štamparija Dra Svetozara Miletica, Novi Sad, 1904, IV+97 pp. Pure geography. Used in the years 1906/7 to 1913/4 in first classes.



## CONCLUSION

Former investigators narrowed their attention only to geography. But, as one may see, thanks to Annual Reports we concluded that the astronomical matter has been taught more in physics. So, everybody interested in exploring must look on both sides! In those years many other books, textbooks and handbooks on astronomy could be found in libraries of our schools, and in private too, so, it is sure that all of them have been read by scholars, but we were limited our attention only to those officially recommended and cited in Reports or papers on this subject. I read many interesting suggestions how astronomy should be taught, many manuscripts concerning this matter, in general, but the shortage of space is guilty that this installment meets the world so meager and quite naked. I hope that the next parts (which will contain as well as the popularisation of astronomy), will be shown in their genuine and shining abundance.

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