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Physics and Mathematics in Beron's first textbook

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Abstract

Pierre Beron is eminent Bulgarian teacher, doctor, Maecenas, and author from Bulgarian Renaissance. We compare the content of his textbook with official program on physics and mathematics after the Bulgarian Liberation.

Keywords:

Pierre Beron, Textbook, Physics, Mathematics, Education, Bulgaria, 19 Century, History



Introduction

Pierre Beron (1799–1871) is one of Bulgarian education founders in the beginning of 19 century. We are celebrating 225 years of Beron's birthday and 200 years from the first Bulgarian textbook publication. Many articles and books have written about Pierre Beron. Some of them are about his family [1] in Kotel – Bulgarian village at the Ottoman empire, where he was born by the name Petrus Hadzi Berovich. He studied in his native town, Bucharest, Brasov (1821–1825), Paris, Heidelberg (1826–1927), and Munich (1827–1831) and wrote his books in Bulgarian, Greek, Latin, French, and German languages [2-6]. Beron became medical doctor in obstetrics (1831) [P3]. Documentary sources for him are indirect. We use his publication only. The present work aims to determine the place of his Fish Primer [P1] in Bulgarian educational literature during our Renaissance based on physical and mathematical texts mainly.

SISTENS
NOVUM LECANOMETRON
ET
EMBRYOMETRON
QUAM
PRO SUMMIS
IN
MEDICINA, CHIRURGIA ET ARTE
OBSTETRICA HONORIBUS
RITE OBTINENDIS
ILLUSTRISSIMAE FACULTATI MEDICAE
MONACENSI OMNI QUA PAR EST
OBSERVANTIA
OFFERT
Petrus Hadzi Beron
Thrax.

MONACHII MDCCCXXI.
Typis GEORGE JAQUET.

Fish Primer

Education is the first field in which Dr. Pierre Beron works. As a student, he taught Anton Iovanovich children in Brasov and wrote his first book – Primer with various lessons [P1]. This book is called Fish Primer because there is a dolphin on the cover. Scientists from different areas have investigated this book [7]. Nelly Buchvarova examines scientific text of Dr. Pierre Beron [8]. Physicist Milko Borissov dedicated a chapter of his book to Dr. Pierre Beron and his Fish Primer [9-10]. Mathematician Ivan Ganchev pointed Fish Primer as a first Bulgarian mathematical textbook [11].



Fish Primer is not just a primer in the modern sense of the word. It is the first textbook for an elementary school. The content of Fish Primer is a program about first level of two-level Bulgarian schools created on Greek school model in the beginning of 19th century. It also has used as a methodological guide for teachers. It has written in dialogic form and reprinted many times (1824, 1841, 1846, 1847, 1850, 1856, 1862). It seems, that different people have prepared the manuscript for every edition, because various words have used for one and the same object. All editions are digitized by Bulgarian National library. The aerial phenomena section in 1824 and 1841 editions have similar content and 3 pages volume. The same section in 1846, 1847 and 1850 editions have similar content, but much larger volume (15 pages). This section is missing in last two editions (1856 and 1862). May be, the reason is first Bulgarian textbook on physics publication in 1849.

Table of Fish Primer editions content

Section / Edition	1824	1841	1846	1847	1850	1856	1862
Addition	135	120	134	135	134	138-141	149-152
Adjectives	17	7	7	7	7	7	7
Adverbs	22-23	12	12-13	12-13	12-13	13-14	13-14
Aerial Phenomena	130-132	115-117	116-130	116-130	116-130		
Afterword	143-146						
Ants	120-122	105-107	106-109	106-109	106-109		
Aries						100-101	100-101
Arithmetic	133-141	118-127	131-143	133-143	131-143	133-157	144-167
Bat						113-114	113-114
Battleship						112-113	112-113
Bear						82-83	82-83
Beavers	104-106	91-92	91-93	91-93	91-93		
Bees	115-120	101-105	102-106	102-106	102-106		130-131
Bird Fish							142
Bird of Paradise							129-130
Buffalo						99-100	99-100
Camel						87-88	87-88
Canary						124-125	124-125
Cat						94-95	94-95
Clever Answers	41-51	30-39	30-39	30-39	30-39	37-47	37-47
Cock						116-118	116-118
Coffee	91-92	78	78-79	78-79	78-79	56-57	56-57
Collected Adverbs	26-27	15	15-16	15-16	15-16	17	17
Cotton	94	81	81	81	81	60	60
Cow						98-99	98-99
Crane	111-112		98	98	98		
Crocodile	106-108	92-94	93-94	93-94	93-94	126-128	134-136
Decalogue						65-66	65-66
Deer						90-91	90-91
Derivative Adverbs	23-26	13	13-15	13-15	13-15	14-17	14-17
Division	139-140	124-125	139-140	139-140	139-140	148-149	159-160
Dolphin	114-115	100-101	101-102	101-102	101-102	132	140
Donkey						105-107	105-107
Dragon						125-126	133-134
Eagle						123-124	123-124
Elephant	98-101	85-87	85-88	85-88	85-88	84-87	84-87
Examples	141	126-127	141-143	141-143	141-143	147-156	158-166
Fables	51-58	40-46	40-46	40-46	40-46	48-51	48-51
Falcon							127
Fish						130	138

Foreword	2-11						
Geography						66-68	66-68
Giraffe		97				89-90	89-90
Goat						102-103	102-103
Good Advice	37-41	26-30	26-30	26-30	26-30	30-36	30-36
Grammatical article	18	8	8	8	8	8	8
Hippopotamus	108-109	94-95	94-95	94-95	94-95		
Holy History						62-65	62-65
Horse						104-105	104-105
Hound						108-109	108-109
Letters	12-14	1-4	2-4	2-4	2-4	1-4	1-4
Linen	94-95	81	81-82	81-82	81-82	60-62	60-62
Lion						78-79	78-79
Lioness						79-81	79-81
Lynx						82	82
Man	122-130	107-115	109-116	109-116	109-116	68-77	68-78
Monkey	95-98	82-85	82-85	82-85	82-85	110-112	110-112
Moose	103-104	89-90	90-91	90-91	90-91		
Mule						107	107
Multiplication	137-138	122-123	136-138	137-138	137-138	144-145	155-156
Multiplication Table						146	157
Natural History						78-132	78-143
Names	15-16	5	5-6	5-6	5-6	5-6	5-6
Nature Stories	91	78	78-130	78-130	78-130	56-62	56-62
Numbers	133-135	118-120	131-133	131-133	131-133	155-157	166-167
Ostrich	109-111	95-97	95-97	95-97	95-97	121-123	121-123
Owl						115-116	115-116
Ox						97	97
Parrot							125
Peacock						118-119	118-119
Pig						93-94	93-94
Pronouns	19	9	9	9	9	9	9
Prayers	27-36	17-26	17-26	17-26	17-26	18-29	18-29
Prepositions	21-22	11	11-12	11-12	11-12	11-13	11-13
Rabbit						92-93	92-93
Rat						95-96	95-96
Raven							128
Rhinoceros	101-103	87-89	88-90	88-90	88-90	96	96
Salmon						129-130	137-138
Salt	91	78	78	78	78	56	56
Silkworm							131-133
Simple Prepositions						133-137	144-148
Sparrow							126
Stories	58-90	46-77	46-77	46-77	46-77	52-55	52-55
Stork	112	98	98-99	98-99	98-99		
Subtraction	136	121	135	136	136	141-144	152-155
Sugar	92-93	79	79-80	79-80	79-80	58	58
Swallow							126-127
Swallow Fish							143
Swordfish						131	139
Tobacco	93	80	80	80	80	59-60	59-60
Tuna Fish						128-129	136-137
Turkey-cock						120-121	120-121
Verbs	19-20	9	9-10	9-10	9-10	9-11	9-11
Water Snake							141
Whale	113-114	98-100	99-101	99-101	99-101		
Wild Boar							103

Table 1 [P1]

The eighth section of the Fish Primer has entitled Arithmetic in 1824, 1841, 1846, 1847, and 1850 editions. It has called Calculator in the last two 1856 and 1862 editions. The volume of this section is growing. In first edition (1824), the volume of this section is 9 pages. In the second edition (1841) it is 10 pages, because one-page examples with four operations has added on the end. Arithmetic section has volume 13 pages in 1846, 1847 and 1850 editions because have 3 pages for examples added. The volume of Arithmetic section in the last two editions (1856 and 1862) is 25 pages with 3 pages examples after each operation [Table 1].

Until the end of 18 century, the only Bulgarian schools are cellar schools (in a church room). Bulgarian cell education is individual and it depends from the teacher's capacity. Ecclesiastical and secular subjects have studied in this school. Modern physics and mathematics come to Bulgarian schools under the influence of Greek schools and literature (from the end of 18 century), through Russia (from 1835) and Western Europe (after the Crimean War). Teachers enclosed several textbooks in one book covers. It is an ancient literature practice students copy by hand all physics and mathematics lessons.

We find for the first time secular secondary education in the school of Emanuil Vaskidovich (1795–1875) in Svishtov. From 1815, his school had two levels primary and secondary. The chronicle of this school has written in Bulgarian language from 1824. We find its curriculum from 1828 with subjects: arithmetic, algebra, physics, history, political economy, geography, anatomy and Greek language. Vaskidovich made unsuccessful attempt manuscript of his textbook on physics to be published in Belgrade in 1835 [12]. Hrisant Georgiev Pavlovich (1804–1848) founded next secondary school in Svishtov in 1831. He wrote first textbook on Arithmetic or calculation science (1833) with volume 118 pages. The content of this textbook corresponds to the mathematics curriculum for first and second grade (today fifth and sixth) from 1890 [13]. Bulgarian physics and mathematics textbooks before 1878 have primary, secondary and high school level about 20 years earlier than generally accepted. There are secondary textbooks on physics and mathematics in the 1820s and high education textbooks on physics and mathematics in 1840s [14].

ONOMASTIKON
 ΕΛΛΗΝΙΚΟΝ
 1940
 ΠΕΤΡΟΣ Χ. ΒΕΡΟΣ
 ΙΩΑΝΝΟΣ Μ. ΙΑΝΝΟΥΔΗΣ
 ΔΑΡΕ
 ΟΥΛΙΚΟΝ
 ΜΑΡΤΙΟΣ



TOME PREMIER.

A PARIS,
CHEZ BACHELIER, LIBRAIRE-ÉDITEUR,
QUAI DES AUGUSTINS N° 26.

1846

**Bayerische
Staatsbibliothek
München**

TOME I^{ER}

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- I. L'EXPOSITION DES ÉQUIVALENTS EN TÉTRAÈDRES ET EN HOMOMÈRES ENTIERES;
- II. LES SEPT RAPPORTS ENTRE LES HOMOMÈRES DES ÉLÉMENTS ET DES COULEURS;
- III. LA POUSSÉE DE L'EXPANSION DES ÉLÉCTES PRODUISANT LA DENSITÉ;
- IV. L'ÉTAT DES CORPS ÉPROUVANT LA COMPRESSION DU BAROÉLECTRE;
- V. L'EXPLICATION DE LA PÉRENNITÉ ET DE SA PÔRTEFACTATION;
- VI. LA CORRESPONDANCE ENTRE LES INFLUENCES DES ÉLÉCTES ET LES ORGANES DES SENS.

PAR

PIERRE BÉRON

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②

ΔΙΑΤΡΙΒΗ

ΑΝΑΓΝΩΣΘΕΙΣΑ ΕΙΣ ΤΗΝ ΣΤΝΕΑΡΙΑΣΙΝ

ΤΗΣ ΕΝ ΑΘΗΝΑΙΣ

ΦΥΣΙΟΓΡΑΦΙΚΗΣ ΕΤΑΙΡΙΑΣ

κατὰ τὴν 15 Ἰανουαρίου ὑπὸ τοῦ ἀντεπιστά-
λοντος μέλους αὐτῆς

Κ. ΠΕΤΡΟΥ ΒΕΡΩΝΟΥ,
'Ιατροῦ.

'Ιατροῦ.

ΕΝ ΑΘΗΝΑΙΣ.

ΕΚ ΤΟΥ ΤΥΠΟΓΡΑΦΕΙΟΥ ΑΘΗΝΑΣ.
(Κατὰ τὴν ὁδὸν Κολοκοτρώνη, ἀριθ. 128)

1853.

Dr. Pierre Beron published many books. They are textbooks, dictionaries, and scientific works. References that are an element of scientific publication lack in Beron's publications. We suppose that they have intended for education. His works contain not understandable scientific terminology, because Dr. Pierre Beron used Greek language terminology (Table 2). We will mention his books "Système d'Atmosphérologie" (1846) [P4; P7], "System of Geology" (1847) [P5], "Grand Atlas Cosmobiographique" (1859) [P14], "Atlas Meteorologique" (1860) [P17], "Panèpistème" (1861–1867) [P19] "Physico-chimie" (1870) [P29], and "Système contre l'incendie" (1863) [P20]. Physical instruments a model of globe (1854) and a small telescope have shown in the only preserved oil portrait of Dr. Pierre Beron.

Beron described and illustrated many physical experiments in his book "Origin of physical and natural sciences" (1858) [P12]. Experimental proof about physical laws is an element of secondary education.

Slavonic philosophy is another Beron's book written in German language (1855) with volume 564 pages [P9]. There are sections physics (28 pages), meteorology (33 pages), astronomy (28 pages) and chemistry (12 pages) in it. We find mathematical formulas in this book. Mathematical prove of physical laws is an element of high school education.

P. Beron (p)	Greek	English
Anisorrhopie (3)	Anisorrhopie	Unequilibrium
Atmozone (44)	Atmozone	Steam portion
Elektrologie (1)	Ilektrologia	Electrotechnics
Elektern (1)	Elektern	Electricity/Charges
Epikyma (7)	Epi kyma	Upper wave
Endokyma (7)	Endo kyma	Inside wave
Hemihidatokymen (33)	Hemihidatokymen	Half water wave
Hidatokyme (33)	Hidato kyma	Water wave
Hipokyma (7)	Hipo kyma	Under wave
Isorrhopie (2)	Isorrhopie	Equilibrium
Zeugma (8)	Zeugma	Pair/Combination
Aether (10)	Aiter	Ether

Table 2 [P9]

Conclusion

Dr. Pierre Beron used descriptive method (without proofs) and only four arithmetic operation addition, subtraction, multiplication and division in his first book Fish prime. These elements determine his book as an elementary school textbook.

Dr. Pierre Beron Publications

- P1. *Берович, П.* Буквар с различни поучения. (1824, 1841, 1847, 1850, 1856, 1862) [Народна просвета, София, 1938, 1942, 1964, 1978, 2024].
- P2. *Beros, P., I. Iannosai.* Onomastikon Ellinikon sintahtin [Dictionary] (1828) 236 (Gr).
- P3. *Beron, P.* Dissertatio inauguralis sistens Novum Lecanometron et Embyometron quam pro summis in Medicina, Chirurgia at Arte. PhD, 1831.
- P4. *Béron, P.* Système d'Atmosphérologie. 1846.
- P5. *Béron, P.* Système de géologie et origine des comètes, ou Très-court résumé du deuxième volume de "l'Atmosphérologie" (1847)
<https://data.bnf.fr/fr/ark:/12148/cb125453396>
- P6. *Beron, P.* Geniki klimatologia [General Climatology], Atinai (1853) 200 (Gr).
- P7. *Beron, P.* Atmosfairologia [Atmospherology], Atinai (1853) 160 (Gr).
- P8. *Beronos, P.* Diatrivi anagnosteisa eis tin sinedriasin tis en Atinai ftziografikis etairias kata tin 15 Ianouagiou ipo tu antepistellontos melus [A dissertation read at the founding of the Athens Geographical Society on January 15 by the corresponding member Petros Beronos, physician] (1853) 24 (Gr).
- P9. *Beron, P.* Slawische Philosophie enthaltend die Grundzuege aller Nater und Morawissenschaften, Prag (1855).
- P10. *Béron, P.* Le Déluge, sa cause, ses actions et ses effets... considérés au point de vue de la philosophie slave, Paris (1857)
- P11. *Béron, P.* Texte du grand atlas cosmobiographique, contenant le mode de la production des corps célestes, de leurs mouvements, de leur forme ovale et de leurs métamorphoses physiologiques, et l'explication de tous les phénomènes célestes et géologiques suivant les lois physiques, Paris (1858).
- P12. *Béron, P.* Origine des sciences physiques et naturelles et des sciences métaphysiques et morales constatée selon les lois physiques dans l'origine commune des fluides impondérables, de la pondérabilité, de la pesanteur, du mouvement et des trois états des corps, Paris (1858).
- P13. *Béron, P.* Déluge et vie des plantes avant et après le déluge (1858).
- P14. *Béron, P.* Grand Atlas Cosmobiographique le mode de la production des corps celestes, de leurs mouvements, de leur forme ovale et de leurs metamorphoses physiologiques et L'explication de tous les phenomenes celestes at geologiques, Suivant les lois physiques, Paris (1859).
- P15. *Béron, P.* Atlas du magnétisme terrestre représentant l'aimantation de la terre par le soleil et l'aimantation du fer par la terre, avec un texte contenant l'explication de tous les faits magnétiques suivant les lois physiques. Appendice: variations diurnes, annuelles et séculaires des éléments magnétiques et suppressions des télégraphes produites par les changements thermométriques, Paris (1860).
- P16. *Béron, P.* Texte des explications des faits contenu dans l'atlas météorologique: représentant la formation des faits atmospheriques; la distribution des éléments climatologiques; l'aimantation de la terre par le soleil et du fer par la terre; la circulation de l'eau et sa diminution dans la terre; appendice: fin du monde ou du genre humain. Ouvrage indispensable aux marins. Paris (1860)
- P17. *Béron, P.* Atlas meteorologique. Paris (1860)
- P18. *Béron, P.* Texte des explications des faits contenus dans l'atlas météorologique représentant: 1°la formation des faits atmosphériques; 2°la distribution des éléments climatologiques; 3°l'aimantation de la terre par le soleil et du fer par la

- terre; 4^o la circulation de l'eau et sa diminution dans la terre. Appendice: fin du monde ou du genre humain. Ouvrage indispensable aux marins (1860).
- P19. *Béron, P.* Panépistème ou Ensemble des sciences physiques et naturelles et des sciences métaphysiques et morales, t. 1-7 (1861-1867).
- P20. *Béron, P.* Mémoire sur un système contre l'incendie, approuvé à Londres par la marine et le corps des pompiers. Paris (1863)
- P21. *Béron, P.* La Découverte de l'origine de la pesanteur démontrée (1863).
- P22. *Béron, P.* Météorologie simplifiée par l'application de la loi physique au mode de la production, Panépistème, T. 3, 723-944 (1863).
- P23. *Béron, P.* Découverte du fluide échogène démontrée, Panepisteme, T. 4 (1863) 289-352.
- P24. *Béron, P.* Physico-Physiologie, ou Application de la physique à l'explication de la vie et de la reproduction. Panépistème, T. 4, 627-892 (1864).
- P25. *Béron, P.* Aperçu de la physique céleste servant d'introduction au grand ouvrage, Panepisteme. T. 5 Paris (1865) 180 p.
- P26. *Béron, P.* Panépistème Physique Celeste, T. 6, Paris, (1866, 1867).
- P27. *Béron, P.* Supplément de la "Physique simplifiée". Panepisteme T. 5 (1968) 593-896.
- P28. *Béron, P.* Transformation de l'eau en minerais. Aperçu général des détails exposés dans la "Physico-chimie" dont cet ouvrage est le prospectus, avec invitation aux chimistes: I. de supprimer les incendies; II. de multiplier la lumière, la chaleur et les forces; III. de changer l'air en vapeur d'eau, (1868) 334 p.
- P29. *Béron, P.* Physico-Chimie, Panepisteme T. 8, Paris, Gauthier-Villars (1870) 783 p.

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