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## A MICRO-LEVEL SHIFT IN EDUCATIONAL "REGIME OF PRACTICES" UNDER THE HABSBURG MONARCHY: HISTORICAL AND PSYCHO-PEDAGOGICAL ANALYSIS OF LUKA KARAMAN'S WORK SCHOOL *BENCH*

**Abstract:** Eyes, exactly speaking the vision was the most important subject of pedagogical texts in Bosnia and Herzegovina from 1878 to 1918. We hold that two factors influenced it. Firstly, they recommended visual education (*Zorna obuka*) as a right way to educate the character, according to which our acquiring the unquestionable knowledge starts from the all-sided observance of everything around us. Secondly, they held that the vision is one of various factors for creating the loyalty to Habsburg monarchy, for example, through people's participation on Emperor Franz Joseph's visit to Bosnia and Herzegovina in 1910 as its spectators. It is therefore well-known that the visual representation was important to create loyal, pious, national character etc. Nevertheless, the scholarship has not analysed how the vision itself was understood in Bosnia and Herzegovina at that time. In this paper we investigate what kind of image of "observer" was re/produced by means of discourse on vision. As a starting point we analyze a book *School bench* of Luka Karaman (1910) that firstly discussed the school benches and myopia in the visual way. Besides it, we research the various texts in Bosnian and Croatian pedagogical periodicals and monographs that discuss the vision, especially myopia. In Bosnia and Herzegovina in the early twentieth century, the concept of cost effectiveness became increasingly prevalent in the educational sphere, depending on the progress of mechanization in society. We demonstrate that the correct vision in this context was considered as an economically rational approach to the nerves. Furthermore, psychosomatic activities encompassed the energy circulatory

system, involving neural networks and blood flows. Thus, myopia functioned as one moment to normalize the “observer”, that is, human who sees correctly in Bosnia and Herzegovina under the Habsburg regime according to mental and physical rational economy.

**Keywords:** *School bench, Myopia, Energy, Physiological psychology, Economy of human being*

## Introduction

Emperor Franz Joseph visited Bosnia and Herzegovina (hereafter called Bosnia) from 30 May to 4 June 1910, leaving a great impression on the population. The pro-government newspapers reported that the emperor’s visit should be regarded as a great opportunity to show loyalty and love for the emperor and his empire<sup>1</sup>. The *Serbian voice*, which was generally critical of the government, reported that the emperor’s visit inspired the nations such that they were “seeing” a better guarantee of their future<sup>2</sup>. What is common to the newspaper reports was the importance of *seeing* the emperor because *seeing* him was considered as the trigger to evoke certain emotions among the audiences, in particular, loyalty and love. That is why the *Sarajevo newspaper* complained that it was unable to provide any pictures, only text, to inform the nations of the decorated scenes for the emperor<sup>3</sup>. At the end of the nineteenth century, it became known in Western Europe that certain emotions, particularly patriotism, could be produced by manipulating the act of *seeing*<sup>4</sup>. In Croatia and Bosnia, this method of manipulation also became recognized with the rise of the crowd psychology, put forward by Le Bon, Tarde and Sighele<sup>5</sup>.

<sup>1</sup> Zijad Šehić, *U mojoj Bosni povodom stogodišnjice posjete cara Franje Josipa I Bosne i Hercegovine od 30. maja do 4. juna 1910.*, Sarajevo: Dobra knjiga, 2013, 12-13.

<sup>2</sup> Amir Duranović, *Historijska 1910. godina. Pogled u sarajevsku štampu*. Sarajevo: *Historijska traganja*, Institut za istoriju, 2011: 7, 62.

<sup>3</sup> *Ibid.*, 50-51.

<sup>4</sup> Jonathan Crary, *Suspensions of Perception. Attention, Spectacle, and Modern Culture*, Cambridge: The MIT Press, 1999, 242-247.

<sup>5</sup> Ljudevit Kašiković, *Psihologija Kolektiviteta*, Vukovar, 1914, 17, 25 and 31. Vladimir Gaćinović, who had read Le Bon’s book, probably in 1911, asserted that one factor for the successful revolution is “gestures, which stand in mystic psychology of crowd” in 1912. No. 15, letter from Vladimir Gaćinović, Geneva, in: *Mlada Bosna. Pisma i Prilozi*. (ur. Vojislav Bogičević), Sarajevo: Svjetlost, 1954, 58; Osvetnik, Smrt jednog Heroja, in: *Ibid.*, 286. Osvetnik is the nom de plume of Gaćinović.

However, seeing does not always produce a uniform effect. For instance, Jagoda Truhelka, the former principal of the Higher girls' school in Banja Luka, asserted that the perception of colours is not uniform. Actually, the perception or *seeing* depends on the seasons, the level of eye training and the colours perception. Perceived colours change as a result of the relation between light and colours, which was exemplified for Truhelka by her perception of the colours of leaves in the forest<sup>6</sup>. Truhelka may have perceived that nature is full of diverse colour changes because she enjoyed cycling in her spare time between busy jobs<sup>7</sup>. As this example illustrates, *seeing* does not simply involve the external world being reflected into the eyes, as the external world is transformed by *seeing* itself. That is why seeing *correctly* was required. Indeed, the educational idea that seeing *correctly* brings about *correct* understanding was common at that time.

The discussions were held on the school benches about various opinions when it comes to *seeing*. They appeared frequently in the early twentieth century, and the emphasis was placed on the negative effect of the unhygienic classroom upon children's growth<sup>8</sup>. Here, *seeing* correctly became a point of school hygiene because a negative effect was myopia. However, such a point was already discussed in the nineteenth century<sup>9</sup>. From nineteenth to twentieth century society demanded more strongly that more attention should be drawn to hygiene, according to which not only the family but also teachers and pupils must regulate their life. At the intersection of family, school and children appeared one book *School bench* of Luka Karaman, the principal of Secondary school (Realka) in Sarajevo, in 1910, which is the first monograph on the school benches in Bosnia.

The point to note here is that the main goal of education at that time was not simply to create *imperial or national subjects*. The Bosnian historiography has had a narrow focus on the national aspect of education under the Habsburg monarchy<sup>10</sup>. And recent scholarship on Habsburg monarchy has argued that science

<sup>6</sup> Jagoda Truhelka, *U carstvu duše*, Osijek, 1910, 97-101.

<sup>7</sup> Nacionalna i sveučilišna knjižnica u Zagrebu, Zagreb, Zbirka rukopisa i starijih knjiga, R7414b, letter from Jagoda Truhelka to Hermina Tomić, Banjaluka, 10. V. 1902.

<sup>8</sup> N. Vidaković, *Kratkovidni naraštaj po Falkengorstu*. Sarajevo: *Školski vjesnik*, 1900: VIII, 544; Bogoslava Keck, *Čovjek i njegovo zdravlje*, *Osvit*, VIII; no. 26, Sarajevo, 1. IV. 1905, 3; Anonym, *Školski liječnik*, *Srpska riječ*, II; no. 115, Sarajevo, 22. VIII. 1906, 3; Anonym, *Kakva treba da je školska klupa?*, *Srpska riječ*, II; no. 139, Sarajevo, 7. X. 1906, 6; Franjo Radošević, *Rukovogj za pisanke*. Sarajevo: *Školski vjesnik*, 1909: XVI, 648-649.

<sup>9</sup> See Leopold Glück, *Crtice iz higijene*, Sarajevo: *Školski vjesnik*, 1894: I, 26-30.

<sup>10</sup> rf. Vojislav Bogičević, *Istorija razvitka osnovnih škola u Bosni i Hercegovini u doba Turske i Austrougarske uprave (1463-1918)*, Sarajevo: Zavod za izdavanje udžbenika BiH, 1965; Mitar Papić, *Školstvo u Bosni i Hercegovini za vrijeme Austrougarske okupacije (1878-1918)*,

– human and natural – developed under nationalism and colonialism<sup>11</sup>. However, the pedagogical journals in Bosnia were not merely national, and their discussions emphasized citizenship rather than nationality as the educational purpose. It was claimed that education of the individual would contribute to civil society as a whole<sup>12</sup>. The intellectual and ethical completion of the individual, that is, the rational and self-sustaining human being, was sought as a result of education. Patriotism was simply regarded as one of the qualities required of such an individual or, alternatively, as a developmental stage in this individual's acquisition of sympathy<sup>13</sup>. For both patriotism and for intellectual and ethical completion, the starting point is the senses. One of the senses, as stated, is vision. However, as well as being influenced by external conditions, seeing is also influenced by human moods. Pajo R. Radosavljević, then the docent of Pedagogical faculty in New York, (1909) stated that customs and temperaments were related to how things are seen<sup>14</sup>. As Jonathan Crary (1992) commented, this signifies that seeing *correctly* is not an independent act but is inseparable from the physical presence of the human who sees *correctly*, that is, the “observer”<sup>15</sup>. Seeing is influenced by the individual “observer”, through his habits and temperament. Vision was the object of education, and seeing *correctly* was not innate but was also an artefact

Sarajevo: Veselin Masleša, 1972; Srećko M. Džaja, *Bosnien-Herzegowina in der österreichisch-ungarischer Epoche (1878-1918) Die Intelligentsia zwischen Tradition und Ideologie*, München: R. Oldenbourg Verlag, 1994. Recent scholarship has investigated the teachers' struggles to solve each concrete problem in social life. See Daliborka Škipina, Učiteljska društva u Bosni i Hercegovini o problemu obaveznog (obligatnog) polaska djece u školu (1878-1918), Užic: *Zbornik radova Učiteljski fakultet u Užicu*, 2011: XIV, 107-116; Robin Okey, The primary school movement in the South Slav lands of the Habsburg monarchy in the era of dualism. Ideal and reality, Sarajevo: *Godišnjak ANUBiH*, 2013: 42, 147-164.

<sup>11</sup> rf. Franjo Zenko, Filozofija na novoosnovanom Sveučilištu u Zagrebu (1874) na prijelomu stoljeća. Njezin odnos prema školskoj filozofiji u Beču u to doba, in *Fin de siècle Zagreb – Beč*. (prir. Damir Barbarić), Zagreb: Školska knjiga, 1997, 38-60; Tatjana Buklijas and Emese Lafferton, Science, medicine and nationalism in the Habsburg Empire from the 1840s to 1918, Amsterdam: *Studies in History and Philosophy of Biological and Biomedical Sciences*, 2007: 38/4, 679-686; Mitchell G. Ash and Jan Surman, The Nationalization of Scientific Knowledge in Nineteenth-Century Central Europe: An Instruction, in *The Nationalization of Scientific Knowledge in the Habsburg Empire, 1848-1918*. (eds. Mitchell G. Ash and Jan Surman), Basingstoke: Palgrave Macmillan, 2012, 1-29.

<sup>12</sup> Stjepan Basariček, *Pedagogija*, Zagreb, 1880, 248-249.

<sup>13</sup> *Ibid.*, 131.

<sup>14</sup> Pajo R. Radosavljević, Da li nas varaju naša osjetila? Sarajevo: *Školski vjesnik*, 1909: XVI, 557-558.

<sup>15</sup> Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*, Cambridge: The MIT press, 1992, 5-6.

acquired through education. As the word “correct” indicates, some *rationality* of the “observer” might be presupposed. At the same time, the possibility of seeing *erroneously* could not be precluded. Was failure predestined? As mentioned above, the goal of education was the development of a rational and self-sustaining individual. In 1896, the Provincial Government in Sarajevo recommended that the Bosnian population was sufficiently developed to deal with local affairs because of its “mental and political progress”. As a result, in 1897, the Joint Minister of Finance Benjamin Kállay agreed to introduce autonomous municipalities, although with some restrictions on their powers<sup>16</sup>. Thus, Kállay held an evolutionary idea, in that he considered that the Bosnian population was evolving and gradually developing sufficient maturity for autonomy, as Robin Okey (2007) indicated. According to Okey, Kállay’s successor, István Burián, also acted on the evolutionary idea that the Bosnians could be sufficiently “mature” to adapt themselves to a civic society<sup>17</sup>. On the other hand, the Serbian leaders pushing for autonomy claimed in their third petition to the Emperor in 1900 that “our nation has been mature with will and ability enough to decide our own destiny”<sup>18</sup>. What was missing at that time was an indicator measuring *maturity*. It is suggestive that, in 1906, Hugo Kutschera, the sectional chief of Joint Ministry of Finance, commented that the “absence of clear provision on human mature age” was complicating the problem of conversion law<sup>19</sup>. These testimonies show that knowledge of *maturity* was functioning as a “regime of practices”<sup>20</sup> to educate the Bosnians, that is, the central program, to govern and discipline their mind and body. The maturity regime, in which the “observer” who had to see *correctly* was positioned, still lacked the means to measure maturity<sup>21</sup>. However, this flaw

<sup>16</sup> Tomislav Kraljačić, *Kalajev režim u Bosni i Hercegovini 1882-1903*, Sarajevo: Veselin Masleša, 1986, 452-455.

<sup>17</sup> Robin Okey, *Taming Balkan Nationalism. The Habsburg 'Civilizing Mission' in Bosnia, 1878-1914*, Oxford: Oxford University press, 2007, 98, 130 and 178.

<sup>18</sup> Kraljačić, *op. cit.*, 396.

<sup>19</sup> Petar Vrankić, *Religion und Politik in Bosnien und der Herzegowina (1878-1918)*, Paderborn: Ferdinand Schöningh, 1998, 681. In regard to human mature age, there were conflicting views between Vrhbosna Archbishop Josip Stadler and the Habsburg authorities. This conflict was not completely resolved.

<sup>20</sup> Mitchell Dean, *Governmentality. Power and Rule in Modern Society*, London: Sage Publications, 1999, 18.

<sup>21</sup> Nikola Vidaković confessed that it is “unfortunately” not easy to determine whether each child is normal from his behaviours. Nikola Vidaković, *Umorna djeca po M. Hagenau-u, Školski vjesnik*, 1908: XV, 31. In 1912 Radosavljević introduced the Binet-Simon method, indicating that this method shows the children’s state only at the “present moment”. The IQ test, which provides a more constant index, appeared during the First World War. Pajo R. Radosavljević,

did not stop its regime. According to Dean (1999), a “regime of practices” functions and evolves through interactions between knowledge and its practical uses to govern the population effectively. Therefore, to govern is a program that calculates even the possibility of its failures beforehand, and it is a constantly changing rule to deal with various issues<sup>22</sup>. In other words, to govern is “to structure the field of possible action”<sup>23</sup>, according to which we can calculate, even if not determine, others’ activities. The pedagogical or psychological knowledge may be such a field. Then, we consider that myopia was such a failure from which a new educational program and idea of human being became constructed to fulfill the above-mentioned educational purpose.

First of all, we have to do the historical analysis of the human concept if we want to understand the various activities and their reasons, because every activity (political, social, economic, educational etc.) always presupposes, (re)produces, and modifies the certain concept(s) of human being. Recent scholarship has researched the conceptualization of human being in Bosnia and Croatia. Marijana Hameršak, who has investigated the historical changes of relation between fable’s idea and child concept in Croatia from the eighteenth century to the late nineteenth century, has demonstrated that the new psychological understanding of dream effected upon such a change in the 1880s<sup>24</sup>. And Dinko Župan, who has analysed, with Foucault’s term *discipline*, how femininity was constructed in the Croatian educational system from the second half of the nineteenth century to the beginning of the twentieth century, has pointed out that the pedagogical discourse negatively evaluated the dance on account of its bringing about “the dangerous desire” in female body although it valued the physical education<sup>25</sup>. From these

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*Uvod u Eksperimentalnu Pedagogiju*, Zagreb, 1912, 257; Kurt Danziger, *Naming the Mind: How Psychology found its Language*, London: Sage Publications, 1997, 79.

<sup>22</sup> Dean, *op. cit.*, 190; Michel Foucault, trans. by Robert Hurley, *The History of Sexuality. Volume I: An Introduction*, New York: Pantheon Books, 1978, 99.

<sup>23</sup> Dean, *op. cit.*, 14. According to Michel Foucault’s verdict, “the characteristic feature of power is that some men can more or less entirely determine other men’s conduct – but never exhaustively or coercively.” Michel Foucault, *Omnes et Singulatim: Towards a Criticism of ‘Political Reason’* [https://tannerlectures.utah.edu/\\_documents/a-to-z/f/foucault81.pdf](https://tannerlectures.utah.edu/_documents/a-to-z/f/foucault81.pdf) (accessed March 2, 2018), 255.

<sup>24</sup> Marijana Hameršak, *Pričalice. O povijesti djetinjstva i bajke*, Zagreb: Algoritam, 2011, 131-152, 157.

<sup>25</sup> Dinko Župan, *Odnos prema tijelu unutar hrvatskog školskog sustava druge polovine 19. stoljeća*, *Radovi Zavoda za hrvatsku povijest* 40 (2008), 192-194; idem, *Mentalni korzet. Spolna politika obrazovanja žena u Banskjoj Hrvatskoj (1868-1918)*, Osijek i Slavonski Brod: Učiteljski fakultet u Osijeku i Hrvatski institut za povijest – Podružnica za povijest Slavonije, Srijema i Baranje, 2013, 132-135.

facts, we observe that the psychological knowledge regulated how to associate with human being. However, those researches show that the various usage of psychological concepts in the discourse on human activity newly articulated the relationships between human and the society, but do not step into the concrete analysis of how to have (re)constructed idea of psychological mechanism itself. On the other hand, Mitsutoshi Inaba, who has examined the human concept in fin-de-siècle Bosnia, has focused on the analysis of the homology and variance between the evolutionary and antievolutionary human concept. Thus, he has not demonstrated how was the human concept (re)constructed to deal with each concrete problem in the school<sup>26</sup>. Therefore, this paper will contribute to such scholarship on the historicity of the human concept, especially in the pedagogical and psychological discourse on one educational failure, that is, myopia.

The first pedagogical periodical appeared in Bosnia in 1894. On the other hand, Karaman published his text *School bench* in 1910, in which he discussed the relationship between myopia and school facilities. This book was based on an open lecture delivered on 25 April 1910. This lecture had a large public response<sup>27</sup>. Thus, we analyse the concept of the human being, especially the "observer" in Bosnia around the beginning of the twentieth century.

## 1. Inappropriate Desks and Benches in Schools

Lecture on hygiene was introduced at the Teacher training school in Sarajevo since February 1905. Furthermore, district doctor Henrik Popper was appointed as its teacher in 1909/10<sup>28</sup>. These facts suggest that the society began to recognise the importance of the hygiene in Bosnia in the early twentieth century. This hygienic concern was linked to criticism for giving too much importance to intellectual education which dismissed the children's physical growth. And fear of degeneration spurred people to share that concern in society<sup>29</sup>.

<sup>26</sup> Mitsutoshi Inaba, *The Human concept in Fin-de-siècle Bosnia and Herzegovina*. Sarajevo: *Prilozi*, Institut za istoriju, 2011: 40, 97-133.

<sup>27</sup> Anonym, *Javno predavanje u profesorskom društvu*, *Srpska riječ*, VI; no. 86, Sarajevo, 4. V. 1910, 2-3.

<sup>28</sup> *Godišnji izvještaj učiteljske i s njom spojene I. narodne osnovne djačke škole kao vježbaonice u Sarajevu*, Sarajevo, 1905: XVII, 49; 1910: XXII, 5.

<sup>29</sup> Paja. P. Radosavljević, *Loše vaspitanje*, *Sarajevski list*, XXV; no. 51, Sarajevo, 30. IV. 1902, 1; Theodra Krajewska, *Jahresbericht der Amtsärztin Dr. T. Krajewska in Sarajevo für das Jahre 1902*, Wien: *Wiener medizinischer Wochenschrift*, 1903: 53, 1781; Davorin Trstenjak, *Covjek u budućnosti*, Sarajevo: *Školski vjesnik*, 1905: XII, 563; Slavko Kosić, *Gimnastika*

Furthermore, criticism was directed to unhygienic cities and houses, especially family lifestyle. Female doctors, who could work upon Muslim women, were mobilised to improve the unhygienic lifestyle. For example, Hedwig Olszewska at Donja Tuzla reported in March 1903 that Muslim women improved their lifestyle according to her advice<sup>30</sup>. Criticism was also directed towards school. In relation to school, one of the problems that teachers perceived in the early twentieth century was that their pupils did not sit properly. More focus is given to the school bench in the book entitled *School bench* (1910), written and published by Luka Karaman, the principal of Secondary school in Sarajevo. Karaman argued that a poorly designed bench could cause irregular growth of the lungs and spine but, above all, that it has a negative effect on vision. A bench that is appropriate for a pupil's physique will contribute to his good health. Consequently, many investigators measured the physiques of pupils to determine their average size and to design appropriate desks for this average size. The appropriate proportions of a desk, its bench and its back, for physical health and pedagogical purposes, were quantified. In particular, the height from the seat to the inner edge of the desk, referred to as the difference (*diferencija*), was considered to be the most important measurement for promoting proper posture, with 17% of the height of the body recommended as the ideal difference. The distance between the bench's back and the inner edge of the desk, referred to as the big distance (*velika distancija*), was also regarded as important; 19% of the body's height was the ideal, although it was noted that it could not be applied if a pupil was overweight. Karaman recommended that the big distance should be slightly larger than the length of the pupil's forearm<sup>31</sup>. Thus, miscellaneous gatherings of individuals were standardized by being processed statistically and this opened the way for teachers to consider pupils as a group, which could be represented by numerical values.

Prior to Karaman's book, there were some explanations of the link between the school bench and myopia. The *Pedagogical encyclopaedia* (1895-1906) provides a good example of such an explanation. It recommended a difference of around 16% of the height of the body, which is very close to Karaman's recommendation (17%), and it advised that the big distance should match the forearm's

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u našoj školi, Sarajevo: *Srpska škola*, 1907/08: I, 105-106; Emil Mattauschek, Einiges über die Degeneration des bosnisch-herzegowinischen Volkes, Leipzig and Wien: *Jahrbücher für Psychiatrie und Neurologie*, 1909: 29, 142.

<sup>30</sup> Arhiv Bosne i Hercegovine (hereafter called ABiH), Zemaljska Vlada u Sarajevu (hereafter called ZVS), 1904, box 37, sign 38-300/3.

<sup>31</sup> L. Karaman, *Školska klupa*, Sarajevo, 1910, 6-18.



length, as in Karaman<sup>32</sup>. However, the *Encyclopaedia* provided only one illustration, a side-view, of the ideal school bench and did not provide any pictures of a child sitting at the desk. In comparison, the innovative feature of Karaman's book was the abundant pictures and illustrations, through which he aimed to promote visualization of the appropriate bench and posture<sup>33</sup>. In particular, as the *Serbian voice* commented, reviewing Karaman's book, even "if we are not experts", his book enables us to perceive the (in)appropriateness of each school bench. At the end of Karaman's book, the rules of sitting are summarized, referring to two particular photographs. Karaman published a booklet *The Rules about the health for school youth* the following year and, interestingly, it included almost exactly these same rules<sup>34</sup>. Therefore, it is clear that the main purpose of the photographs in the 1910 book were to make it easier for teachers to guide their pupils as to the *correct* way to sit. However, in the context of the 1911 rule book, it may be that Karaman's secondary purpose was to enable the pupil to reflect on his own posture by looking at the pictures of the child sitting (*in*)*correctly* at the school bench.

As mentioned above, the *Encyclopaedia* discussed the appropriate characteristics of the school bench. However, Karaman expands on and quantifies the ideal dimensions and qualities of the school desk, arguing that the desk, the bench and its back must be properly related together. In particular, he explains the importance of the relation between the big distance and the distance (that is, the distance between the inner edge of the desk and the front end of the bench) using a graphic<sup>35</sup>. To illustrate the relations among the various values was regarded as very important. Indeed, a review in the newspaper the *Croatian dairy* reported that, in a lecture by Karaman, the most important point emphasized was that "the validity of the bench should be put more into an alliance with the mutual position of all these parts, rather than in alliance with the dimensions of them"<sup>36</sup>. More

<sup>32</sup> Mito Orlić, Klupa školska, in: *Pedagogijska enciklopedija*, Zagreb, 1895-1906, 612-613.

<sup>33</sup> Anonym, Književne vijesti. L. Karaman: »Školska klupa«, *Srpska riječ*, VI; no. 202, Sarajevo, 30. IX. 1910, 1; N. Vid., Književna smotra. L. Karaman: Školska klupa. Sarajevo: *Učiteljska zora*, 1911: VII, 178.

<sup>34</sup> L. Karaman, *Pravila o zdravlju za školsku omladinu*, Sarajevo, 1911, 12-14.

<sup>35</sup> Karaman, *op. cit.*, 1910, 12-13.

<sup>36</sup> Anonym, O školskoj klupi i o njezinu utjecaju na zdravlje gijaka, *Hrvatski dnevnik*, V; no. 101, Sarajevo, 6. V. 1910, 2. In 1890, Antun Lobmayer discussed the appropriate dimensions of the desk, the school bench and its back. Here, the term big distance was not used, but the difference + 2 cm was recommended as an appropriate dimension for the so-called big distance. However, there was no explanation of the relationship between big distance and distance. On the other hand, Ivan Zoch discussed the ideal size for distance and difference, but did not place any importance on the big distance, which is the thickness of the pupil's body. Thus,

specifically, Karaman asserted that “the seat, the desk and back of the bench need to be reciprocally combined and to make up one bench”<sup>37</sup>. Here, the integrity of these three factors is recommended on the grounds that, unless they are arranged in the *right* ratio, the pupil’s head will be bent and his eyes will be brought excessively close to the books when writing and reading. The result of the irrational relation of these three factors was regarded as myopia. Of course, as noted, this relation between the three factors alone was not enough and it was important that the pupil habituates himself to the *correct* posture. That is, the standardized desk, bench and its back should be aligned with the standardized body of the pupil. Each child was expected to adapt his body *correctly* to the *right* bench because doing so contributed to the health of the child. As a result, “a good bench needs to enable the pupil to keep naturally his right posture even if he simply sits, hears or reads and writes”<sup>38</sup>. Here, the child was considered as if it was a part of the bench. Thus, it was considered important not just to prepare the environment, but also to arrange the relationship between the child and its environment. At the same time, it was required that the environment, that is the school bench, had the appropriate feedback effect on the posture of each child.

The above discussion clearly indicated that Karaman’s book focused on children, especially pupils in school. As mentioned above, social interest in hygiene may have an effect on its attention to children, but does not quite explain the reason why attention was devoted especially to schools. From the 1900s, the irregular schooling became recognized as a social and pedagogical problem, and there were frequent calls for a compulsory education law to be declared. For example, on 4 July 1908, a meeting of the Teachers’ association of Elementary public schools for Tuzla region requested the introduction of compulsory education, insisting that the irregular schooling hampered the achievement of the desired learning results<sup>39</sup>. In the following year, the Teachers’ association of Elementary public schools for Travnik region submitted the resolution of introducing compulsory education to the Provincial Government in Sarajevo<sup>40</sup>. As a result of such

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he discussed a desk and school bench suitable for learning calligraphy in the absence of the pupil. Indeed, we find a figure of the desk and school bench without a sitting pupil in his book. A. Lobmayer, *Škola i zdravlje djece*, Zagreb, 1890, 20-21; Ivan Zoch, *Metoda krasopisa*. Sarajevo: *Školski vjesnik*, 1896: III, 362-363. In 1914 Roko Vrdoljak appreciated Zoch’s article discussing posture and how to sit. Roko Vrdoljak, *O slikarskoj umjetnosti uopće, a napose o modernom crtanju u osnovnoj školi*. Sarajevo: *Učiteljska zora*, 1914: X, 236.

<sup>37</sup> Karaman, *op. cit.*, 1910, 18.

<sup>38</sup> *Ibid.*, 25-26.

<sup>39</sup> ABiH, ZVS, 1908, box 90, sign. 67-100.

<sup>40</sup> ABiH, ZVS, 1909, box 41, sign. 67-80.

calls for compulsory education, a conditional compulsory education law was introduced in 1911, and a school committee was installed in each urban and rural municipality, which was responsible for enrolling school-age children. Punitive measures were imposed on parents who did not permit their children to attend school without sufficient reasons<sup>41</sup>. Therefore, it was at a time when there was increasing public interest in primary education that Karaman visualized the solution for a school problem, that is, the problem of the appropriate school bench, in a way that everyone could understand.

What was presented as a solution to myopia? In Karaman's book, we do not find out any measure against children with myopia. He asserted that it is important to prevent any disease in embryo (u zamjetku)<sup>42</sup>. The treatment is not important but prophylaxis. So, why did he pay attention to preventing myopia? In the course of giving answer to this question this paper will analyse the psychological discourse on myopia and vision.

## 2. The Visual Sense in Psychological Texts

Before we analyse the discourse on myopia, we will briefly examine how vision was explained in psychology and pedagogy in Bosnia in the late nineteenth century. *Pedagogy*, which Stjepan Basariček, one of the most famous pedagogues in Croatia, published in 1880, was used as a textbook on pedagogy until the end of the Habsburg rule at a Teacher training school opened in Sarajevo in 1886<sup>43</sup>. Therefore, we commence this section with an analysis of his views. What kind of mechanism did Basariček regard as underlying vision? His answer is too simple as he only explained that vision, the organs for which are the eyes, occurs through ether vibrations as a stimulus.<sup>44</sup> He regarded the body as serving the soul and grasped its centre as a nervous system<sup>45</sup>. However, the soul alone does not produce all psychological phenomena as they arise when the external world works on humans. It is the role of the nervous system to con-

<sup>41</sup> Ferdinand Schmid, *Bosnien und die Herzegovina unter der Verwaltung Österreich-Ungarns*, Leipzig, 1914, 705.

<sup>42</sup> Karaman, *op. cit.*, 1910, 5.

<sup>43</sup> Mitsutoshi Inaba, *Pedagogija i psihologija u Učiteljskoj školi u Sarajevu (1886.-1918.) za vrijeme austrougarske vladavine*. Zagreb: *Anali za povijest odgoja*, Hrvatski školski muzej, 2015: no. 14, 45.

<sup>44</sup> Stjepan Basariček, *Kratko izkustveno dušoslovje*, Zagreb, 1877, 22.

<sup>45</sup> *Ibid.*, 13.

vey the stimulus given by the external world from the brain to the soul, and the “entrance (vrata)” is each sensory organ. Finally, Basariček considered that the soul remains the subject of all psychological activities. His interpretation was that perception occurs only about the object to which the soul has directed its attention<sup>46</sup>. Even if vision is the core of mental growth, it was considered that its subject itself is the soul. Although important, vision is just one “entrance” to the soul, along with the other senses. In other words, the role of each sensory organ is to supply the “nourishment (hrana)”<sup>47</sup> necessary for the soul to grow. Inappropriate nourishment was considered as inhibiting human growth and, therefore, it was necessary to consider the appropriate “entrances” to the soul. Thus, according to Basariček, vision was one of many types of “entrances” supplying the soul with its “nourishment”.

In the 1890s, several new psychological books were published. Among them was *Psychology for the middle schools* (1892) published in Zagreb by Đuro Arnold, then the assistant professor of the Faculty of Philosophy in Zagreb, which was used as a textbook for psychology in the gymnasiums in Bosnia from 1896/97<sup>48</sup>. Arnold concurred with Basariček, in that he regarded the nervous system as an organ that plays a role in mediating between the body and the soul. Again, vision was explained as a sense caused by ether vibrations. Arnold explained that, after the light refracted by the lens of the eye reaches the retina, cilia consisting of the ends of the optic nerves are stimulated, and that stimulation is transmitted to the brain<sup>49</sup>. Unlike Basariček, Arnold interpreted the stimulated state on retina caused by the light as a visual object. This was in line with Johannes Müller’s influential thesis that vision is not the perception of the object but of the state of the optic nerve itself<sup>50</sup>. In addition, Arnold considered that our vision can only grasp ether oscillations from 450 billion to 790 billion per second. The numerical valuation of vision was occurring at this time<sup>51</sup>. Thus, building on Basariček’s psychology and pedagogy, more detailed anatomical and physical explanations of the mechanism occurring inside the eyeball were being developed.

<sup>46</sup> *Ibid.*, 16-18. There are similar ideas in the articles during the 1890s. See Ivan Nep. Farkaš, Prinos naučanju psihologije. Sarajevo: Škoski vjesnik, 1894: I, 475.

<sup>47</sup> Basariček, *op. cit.*, 1880, 26.

<sup>48</sup> *Godišnji izvještaj Velike Gimnazije u Sarajevu*, Sarajevo, 1897: XII, 33; *Izvještaj o srednjim školama u Bosni i Hercegovini za školsku godinu 1918./19.*, Sarajevo, 1920: I, 42.

<sup>49</sup> Đuro Arnold, *Psihologija za srednja učilišta*, drugo izdanje, Zagreb, 1895, 14-15.

<sup>50</sup> Edwin G. Boring, *A History of Experimental Psychology*, second edition, Englewood Cliffs: Prentice-Hall, 1950, 101.

<sup>51</sup> Arnold, *op. cit.*, 21.

Arnold agreed with Basariček that we are not conscious of all sensory stimuli, but he commented only that this depends on “differences in sensory organization and degrees of attention,” and did not use the word soul to explain this concept<sup>52</sup>. In Arnold’s psychology, emphasis was placed on the position of the eyeball because it was claimed that illusion can be rectified by adopting another viewpoint<sup>53</sup>. This argument seems similar to Basariček’s claim that there is a risk of one-sided observations providing imperfect “nourishment” to the soul. However, Arnold pointed to the existence of another physiological response that is brought about by the position of the eyeball. Specifically, when a light ray falls on the edge of the retina, after exemplifying the fact that the retina does not respond uniformly to all stimuli, Arnold argued that the edge of the retina is less stimulated than the centre, so the eyeball moves reflexively to the centre. Following this explanation, Arnold said that “every movement is performed by muscles, and its result is above all fatigue”<sup>54</sup>. Here, therefore, vision was associated with muscles that make eye movements.

In 1906, Ljudevit Dvorniković published his *Basics of psychology* in Zagreb. This book was reprinted in Sarajevo in 1913 with a new title, *Elements of psychology*, and a second edition was published in 1914. This work was intended to be teaching material for the Teacher training school in Sarajevo, but in the end, it was adopted as an auxiliary teaching material<sup>55</sup>. Dvorniković was born in Zagreb, recruited as a teacher of the Teacher training school in Sarajevo in 1902 and appointed as a professor in 1913<sup>56</sup>. Unlike Basariček and Arnold, Dvorniković worked as an educator in Bosnia. In his psychological book, vision is explained along with the eye movement nerve as being governed by one of 12 pairs of nerves that are connected with the cerebrum. Furthermore, the cerebral grey matter was seen as the centre of psychological activities in Dvorniković’s book; not only did he localize each psychological activity to a certain region of the cerebral cortex but he also visualized and included a cerebral anatomical map<sup>57</sup>. The

<sup>52</sup> *Ibid.*, 23.

<sup>53</sup> *Ibid.*, 56.

<sup>54</sup> *Ibid.*, 33. Vision became inseparably related to the movement involving discovery of indirect vision. Radosavljević explained this in his book. Edwin G. Boring, *Sensation and Perception in the History of Experimental Psychology*, New York: Appleton-Century Company, 1942, 171-173; Pajo R. Radosavljević, *Uvod u Eksperimentalnu Psihologiju*, Zagreb, 1908, 168-170.

<sup>55</sup> Inaba, op. cit., 2011, 103; idem, op. cit., 2015, 36.

<sup>56</sup> Istorijski Arhiv u Sarajevu (hereafter called IAS), O-DLJ-170: Lični fond Ljudevita Dvornikovića, DLj-4 and DLj-5.

<sup>57</sup> Ljudevit Dvorniković, *Temelji psihologije*, Zagreb, 1906, 17-19.

second edition of *Elements of psychology* included a new graphic showing that vision is localized on the posterior sphere of the cerebral cortex, which enabled vision to be represented as one anatomical route<sup>58</sup>. At the same time, this clearly indicates that vision was regarded as an organ directly linked to the cerebrum.

Why did Dvorniković pay so much attention to explanations of the nervous system? After demonstrating that we cannot memorize and remember correctly in a “drowsy, drunk or intoxicated state, that is, when our nervous system is troubled”, he asserted that the “worn-out state of the nervous system” is the main cause hindering the association of representations<sup>59</sup>. He interpreted intelligent activities, such as the association and recall of representations, as being related to the construction of neural pathways. He considered that each psychological activity passes through a certain neural circuit, causing a change in the molecular structure of the nerve every time. With this change, each similar psychological activity is adjusted to allow for a smoother passage through the route. There is no doubt that Herbert Spencer’s psychology had a major impact on his way of thinking<sup>60</sup>. Similarly, Arnold stated that when the nerve is stimulated moderately, a pleasant feeling arises, but if its stimulus continues, it will become blunt and dull<sup>61</sup>.

Unlike Arnold, who proposed adoption of another viewpoint on illusion, as a countermeasure, Dvorniković suggested eliminating obstacles to “accurate observation”<sup>62</sup>. He cited luminosity, excessively strong or excessively weak light, as an obstacle because the optic nerve does not adapt to these stimuli. Thus, this concept demonstrates Dvorniković’s idea that vision depends on the function of the optic nerves. Furthermore, he explained that although illusion is caused by external stimuli, hallucination arises from the stimuli of the sensory nervous centre, that is, from an extraordinary excited state<sup>63</sup>. He criticized faculty psychology and held that the intellect, feeling and volition are individual phenomena of mental activity. According to Dvorniković, what supported mental activity was the neural network that stretches through the whole body<sup>64</sup>. His psychology departed

<sup>58</sup> Ljudevit Dvorniković, *Osnovi psihologije*, drugo dopunjeno izdanje, Sarajevo, 1914, 13.

<sup>59</sup> Dvorniković, *op. cit.*, 1906, 48.

<sup>60</sup> Ljudevit Dvorniković, Herbert Spencer. Sarajevo: *Školski vjesnik*, 1904: XI, 129. rf. Mit-sutoshi Inaba, Obitelj u modernoj Bosni i Hercegovini iz perspektive pedagogije Herberta Spencera. Sarajevo: *Radovi (Historija, Historija unjetnosti, Arheologija)*, Filozofski fakultet, 2014: III, 321-340.

<sup>61</sup> Arnold, *op. cit.*, 25.

<sup>62</sup> Dvorniković, *op. cit.*, 1906, 35.

<sup>63</sup> *Ibid.*, 59-60.

<sup>64</sup> IAS, O-DLJ-170, DLj-42, *Nacrt socijalne etike* (Manuscript).

from Herbartianism, which dominated nineteenth-century Croatia<sup>65</sup>. Consequently, Dvorniković did not deny the importance of education based on associationism and, similarly to Basariček and Arnold, he acknowledged the role that observation plays in psychological growth when he wrote of "accurate observation", as mentioned above. The physiological psychology extended the function of the sensory and motor nerves to the whole human activity. It cooperated with the associationism psychology based on sensation and motion, which Spencer then promoted<sup>66</sup>. Dvorniković was also an active participant in this trend. He visualized the nervous system, especially the nervous centre, and aimed at *visualization of the invisible soul*. This great interest in nerves and brain activities was not limited to Dvorniković, but was the subject of many discussions during this era<sup>67</sup>. Dvorniković proposed that one could understand the human mind in terms of the healthy state of the nervous system. However, his explanations of the visual mechanism itself appeared old-fashioned as he interpreted the reversed image falling on the retina as being conveyed to the brain by the optic nerve. Therefore, his theory was optical rather than physiological<sup>68</sup>.

Basariček's approach to vision was metaphysical rather than psychological. Arnold drew attention to the nerve that connects the eyes and the brain together, building on the anatomical interpretation. At the same time, not only the eye itself as a visual device but also the muscles that move the eyeballs were included in his interpretation. Since the development of Goethe's colour theory, it was widely known that vision did not simply reflect the external world and that its function depended on the physical states of the "observer". At the end of the nineteenth century, physiology functioned as the main knowledge base from which to un-

<sup>65</sup> Zlatko Posavac, Jedan zaboravljeni estetičar. Psihologističko-pozivitistička estetika Ljudevita Dvornikovića, in: *Novija Hrvatska Estetika. Studije i Eseji*, Zagreb: Hrvatsko filozofsko društvo, 1991, 135.

<sup>66</sup> Robert Young, *Mind Brain and Adaptation in the nineteenth century. Cerebral localization and its biological context from Gall to Ferrier*, Oxford: Clarendon press, 1970, 199-200.

<sup>67</sup> Stj. Žanko, Nešto o školskoj higijeni. Sarajevo: *Učiteljska zora*, 1910: VI, 21. Jovan Galić did not provide a special interpretation of vision, but when the connection between the brain and the nervous system was taught, he recommended using visual teaching materials such as anatomical charts. Jovan Garić, *Mozak i živci*. Sarajevo: *Školski vjesnik*, 1902: IX, 541.

<sup>68</sup> Dvorniković asserts that it is the explanation "according to physical-optical law" and that the visual perception is not explained only by physical law. He points out the possibility that "taste", acquired or innate, could induce the direction of perception including vision. Thus, he may have simply illustrated the so-called *pure perception*. Dvorniković, *op. cit.*, 1906, 24-25; idem, O psihološkim osnovima estetskog osjećaja, u: *Essay-i iz Područja Psihološke Pedagogije i Estetike*, Sarajevo, 1905, 91; idem, Govor umjetnosti, u: *ibid.*, 107.

derstand human brain functions<sup>69</sup>. Hence, Dvorniković's physiological approach to vision itself was not a unique method. As a result, Dvorniković discussed the influence of state changes, such as fatigue or nervous excitement, on vision. He claimed that *correct* psychological activities would be carried out by *correctly* connecting the neural network. The graphic in his book showed that the neural network as consisting of 12 pairs of nerves and that it connected itself to the brain. Furthermore, in the second edition of *Elements of psychology*, he illustrated the hypothesis of functional localization on the cerebral cortex. Dvorniković indicated several people who contributed to brain research development, citing anatomy and pathology as contributing to brain study, and he argued that anatomical investigation of brain growth confirmed the hypothesis of localization on the cerebral cortex<sup>70</sup>. We infer that Paul Flechsig had a great influence on Dvorniković's anatomical comprehension of the brain. The important thing for Flechsig was not to show a mechanism, but a neuroanatomical meshing (*Verzahnung*)<sup>71</sup>. In Dvorniković' psychology, the brain was the centre of all nervous networks, and the anatomy functioned as an important cornerstone to *scientifically* reinforce his associationism, even though his idea of the visual mechanism was very old-fashioned. Based on this historical understanding of vision, in the next chapter, we will analyse the discourse on myopia.

### 3. Myopia

Myopia was a well-known disease in the nineteenth century. So, what was the problem of myopia that was perceived in the pedagogical discourse? According to Karaman, when reading or writing, a pupil brings his book closer to eyes if the difference or distance is too large. As a result, hydrostatic pressure at the back of the eyeball becomes stronger, and the dura sticks out in the front, leading to the interpretation that this expands the eye axis and causes myopia<sup>72</sup>. Furthermore, because of the deformation of the eyeball, various membranes expand and crack and paralysis occur. In serious cases, there is the possibility of blindness resulting from retinal detachment<sup>73</sup>. First, we understand that myopia itself was

<sup>69</sup> Crary, *op. cit.*, 1992, 70-71; Young, *op. cit.*, 31.

<sup>70</sup> Dvorniković, *op. cit.*, 1914, 20.

<sup>71</sup> Olaf Breidbach, *Die Materialisierung des Ichs. Zur Geschichte der Hirnforschung im 19. und 20. Jahrhundert*, Frankfurt am Main: Suhrkamp, 1997, 226. Radosavljević also used Flechsig's investigation to interpret the cerebral localization. Radosavljević, *op. cit.*, 1908, 92.

<sup>72</sup> Karaman, *op. cit.*, 190, 21.

<sup>73</sup> Stjepan Ratković, *Slijepi i njihovo odgajanje*, Zagreb, 1917, 15.



regarded as a problem because it was a disease that could give rise to blindness. However, blindness was not only an individual problem but also a social problem. In a society with few occupational options available to them, blind people became unemployable and dependent on others for assistance. Indeed, Vinko Bek, famous as the pioneer of typhological education in Croatia, insisted on vocational education as an important object for the blind because it would reduce the social burden of blindness<sup>74</sup>. This fact obviously reflects the reality of blindness at that time.

Thus, myopia was visualized as a social problem. This is shown by the statistics resulting from a survey conducted by Herman Cohn at Breslava, which indicated that, as the grades of pupils increased, more pupils had myopia, and there was a higher percentage of myopic pupils at urban schools than at rural schools<sup>75</sup>. Therefore, myopia was viewed as a disease that was growing along with cultural development<sup>76</sup>. The *scientific* fact of the increase of myopic pupils in schools and urban areas attracted attention to the living environments of the pupils rather than to myopia itself as a disease. What is common to the texts related to myopia is not criticism of myopia itself, but a focus on living environments or the way of life that gave rise to myopia. In the book *Our optic diseases* (1911), Vladimir Jelovšek, the oculist and editor of the medical periodical *Medical Herald (Liječnički vjesnik)*, argued:

Due to working excessively near, as is the case for school children, their eyes are continuously strained to promote close vision, and the ocular muscles extend their eyeballs to make the images clearer – and thus in some cases, myopia goes from bad to worse<sup>77</sup>.

That is, the focus of Jelovšek's criticism was the term "excessively (odviše)", in that the eyes are excessively close to their object. Karaman also held that having the eyes "excessively" close to the object makes them become strained and "tired"<sup>78</sup>.

<sup>74</sup> Franjo Tonković, *Vinko Bek i njegov utjecaj na odgoj i obrazovanje slijepih u Jugoslaviji*, Zagreb: Tiflološki muzej, 1960, 110.

<sup>75</sup> Franjo Klaić had already used this report in 1872, but did not concretely use its statistical numbers, whereas Karaman cited them in his book *School bench*. Lobmayer does not refer to the report and its statistical numbers. Franjo Klaić, *Njega duševnoga i tjelesnoga zdravlja dječeta, opomena roditeljima, učiteljima i školskim oblastima od profesora dr. Bocka*, Zagreb, 1872, 17-18; Lobmayer, *op. cit.*, 13; Karaman, *op. cit.*, 1910, 20-21.

<sup>76</sup> Ratković, *op. cit.*, 15.

<sup>77</sup> Vladimir Jelovšek, *Naše očne bolesti (Trahom)*, Zagreb, 1911, 64.

<sup>78</sup> Karaman, *op. cit.*, 1910, 21.

More specifically, we ask, what kind of optic structural components are strained? In his book *Caring for the mental and physical health of pupils* (1872), Franjo Klaić, the first principal of the Higher girls' school in Zagreb, insisted on the importance of distance between the eyes and the object but was mainly critical of excessive stimulation damaging the optic nerves<sup>79</sup>. Bek (1888) warned that exposure of new-borns to excessively strong light damaged the optic nerves and lead to future myopia<sup>80</sup>. As noted above, Dvorniković also focused on the ability of the nerves, including the optic nerve, to become worn out. Antun Lobmayer, the surgeon and editor of the medical periodical *Medical Herald*, commented in his book *Human and his health* (1898) that “when a child writes something, his eyes become enlarged due to an increase in blood pressure inside the eyeball by concentrating blood flow on the head because of bringing his head too close to the desk”. As a result, myopia occurs. In addition, even “when the light in the room is too strong or too weak, his eyes are forced to be strained so that the blood flow increases to the eyes and myopia occurs”<sup>81</sup>. According to Dragutin Mašek, the first professor of Medical faculty in Zagreb, the act of focusing is performed not by the lens itself but by the muscles surrounding it and this is also the muscle that becomes strained<sup>82</sup>. As mentioned above, Arnold also pointed to muscular fatigue of the eye.

Therefore, our answer to the above question, which optic structural components are strained, may be the nerves, blood vessels and the eye muscles. For example, in the article on sensory organs in the *Encyclopaedia*, Radosavljević introduced Hering's theory of the colour perception mechanism as more popular. According to this hypothesis, the perception of colour occurs because of the chemical change in “nourishment”, which the optic nerve on the retina receives from the blood flow<sup>83</sup>. Therefore, it was recognized that the activity of the optic nerve is not carried out independently of blood flow. Stjepan Blažeković, the author of various articles on pedagogy, held that the nervous function depends not only on the amount and vibration of the nerves but also on the quality of

<sup>79</sup> Klaić, *op. cit.*, 16.

<sup>80</sup> Vinko Bek, *Uzgoj slijepaca. I. dio. Uzgoj slijepaca u prvoj dobi po Entlicheru*, Zagreb, 1888, 11.

<sup>81</sup> Antun Lobmayer, *Čovjek i njegovo zdravlje*, Zagreb, 1898, 153. This book was approved as a reference book for hygiene lessons for the Higher girls' schools in Sarajevo, Mostar and Banjaluka in August 1917. ABiH, ZVS, 1917, box 118, sign. 67-59.

<sup>82</sup> Dragutin Mašek Bosnodolski, *Mala anatomija i fiziologija*, Zagreb, no date (1909 according to preface), 165.

<sup>83</sup> Pajo R. Radosavljević, Osjetila, in: *Pedagogijska enciklopedija*, Zagreb, 1895-1906, 858. The Young-Helmholtz hypothesis to interpret the perception of colours with three kinds of optic nerves was also in existence. See Jakov Kohn, Daltonizam. Sarajevo: *Školski vjesnik*, 1895: II, 405.

blood vessels providing the nerves their nourishment<sup>84</sup>. In fact, the idea that blood flow is related to brain function had already appeared among English physiologists in 1890<sup>85</sup>. Interestingly, Klaić (1872) held that eyes should be rested after their activities, as should the "brain"<sup>86</sup>. His book did not attempt to show the relationship between the brain and vision either anatomically or visually. However, as Dvoniković's psychology (1906) showed, when Karaman's book *School bench* was published, the optic nerve had already been visualized as the nerve directly connected with the brain. A 1917 paper cites Adolf Wittner's statement of this theory, as follows: "From the anatomical and genetic perspective, the eye is one part of the brain, a fortress of the central battery which is pushed out to the outside"<sup>87</sup>. Although the role of Karaman's book in Bosnia could be overestimated, we do consider in this pedagogical context that the accumulated texts on myopia culminated in his book, which provided *a visible example* highlighting the "excessively strained" state of school children's eyes, known as myopia<sup>88</sup>. As mentioned above, an important measure against myopia was prophylaxis, and its object was above all the "excessively strained" eyes. Why it should be avoided? That is why eyes, especially, optic nerves were related with brain, vessels and muscles. In short, the "excessively strained" eyes were considered in the context of mental and physical health. In the last chapter, we will analyse what kind of function the discourse on the "excessively strained" state performed in relation to the human concept in the 1910s.

#### 4. Nerves and Energy

We recognize the fact that using the eyes was not criticized. Human beings gradually grasp each object's shape, beginning with the perception of light and ending with the perception of various colours. Vision is acquired empirically. In fact, it was a widely accepted fact that training of the vision was a necessary condition to see<sup>89</sup>.

<sup>84</sup> Stjepan Blažeković, Umor. Sarajevo: *Školski vjesnik*, 1901: VIII, 622.

<sup>85</sup> Marcus E. Raichle, Visualizing the Mind, in: *The Scientific American Book of The Brain*, Guilford: The Lyons press, 1999, 46.

<sup>86</sup> Klaić, *op. cit.*, 19.

<sup>87</sup> Divljan, Ljudsko oko. Sarajevo: *Učiteljska zora*, 1917: XIII, 134-135.

<sup>88</sup> "I will only assert that every eye gradually breaks down if it is forced to watch from a too small distance". Karaman, *op. cit.*, 1910, 22.

<sup>89</sup> Nikola Maraković, Čula u prvom duševnom radu, *Sarajevski list*, XIV; no. 102, Sarajevo, 30. VIII. 1891, 1; Gjuro Protić, Bitnost i didaktična vrijednost nazorne nastave u prirodopisu.

It was also known, however, that seeing is accompanied by fatigue. In Basariček's *Pedagogy*, in relation to explanations of the need to strengthen the power of the sensory organs, it was pointed out that constant activity exhausts the sensibility, a problem that is not limited to vision<sup>90</sup>. Josip Preindlsberger, chief of the department of surgery at the Provincial hospital in Sarajevo, advised that the rules for "living rationally and orderly" should be followed to protect the optic health<sup>91</sup>. In 1897, Julije Golik, who had serialised the outline of psychology in the Croatian pedagogical periodical *Progress (Napredak)*, pointed out the correlation between nervous fatigue and the decline of psychological activities, stating that "physical strain reduces the ability to act mentally"<sup>92</sup>. In this way, the fatigue of the optic nerve was widely positioned within the context of human lifestyle. As a contribution to this idea, there was a trend towards describing the human body as a kind of power machine. Herman von Helmholtz had already interpreted the human being as an "energy transforming machine"<sup>93</sup>. Vladimir Novak, a gymnast of Tuzla Gymnasium, held that our body becomes useless unless it is refuelled through blood vessels, insisting that "the body is our perfect machine. (...) Heat transforms water into steam, and the machine moves with wheels. Our body needs to be heated similarly"<sup>94</sup>.

We indicated, in the first chapter, that Herbert Spencer influenced Dvorniković's psychology. However, Dvorniković explained that Spencer's psychology, based on the law of the conservation of energy, interprets human behaviours, in particular habituation, using the hypothesis that the energy movement is exercised in the direction of least resistance<sup>95</sup>. In other words, it was claimed that human psychological activity physiologically configured to move according to a principle of parsimony. Furthermore, Karaman asserted that the school desk is related to the human physical material, which is "the capital of the social economy"<sup>96</sup>.

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Sarajevo: *Školski vjesnik*, 1896: III, 185; Adam Grusling, Ljudsko živčevlje s pedagoškog gledišta. Sarajevo: *Školski vjesnik*, 1900: VII, 845; Ljud. Rajman, Važnost temeljita obrazovanja osjetila. Sarajevo: *Školski vjesnik*, 1907: XIV, 217.

<sup>90</sup> Basariček, *op. cit.*, 1880, 30.

<sup>91</sup> Josip Preindlsberger, Kako valja čuvati oči. Sarajevo: *Školski vjesnik*, 1896: III, 147.

<sup>92</sup> Julije Golik, Nekoliko opaske o rasporedu sati o duševnom radu. Sarajevo: *Školski vjesnik*, 1897: IV, 308.

<sup>93</sup> Crary, *op. cit.*, 1999, 320.

<sup>94</sup> Vladimir Novak, Mens sana in corpore sano. Tuzla: *Godišnji izvještaj Velike gimnazije u Donjoj Tuzli*, 1905: VI, 7.

<sup>95</sup> Dvorniković, *op. cit.*, 1904, 69.

<sup>96</sup> Karaman, *op. cit.*, 1910, 5.

Then, it becomes an issue not just of physical health and pedagogy, but also an economic concern to protect that "capital". This term "capital" suggests the social background of Karaman's works. During the late nineteenth century in Bosnia, the demands for everyday items were generally met through the traditional handicraft industries, and the mechanization of industry was still weak<sup>97</sup>. A power station was built in Sarajevo in 1893, and mechanization in the factories began to progress from the mid-1890s (primarily involving the steam engine, but there was some electrification). In the twentieth century, however, the construction and mechanization of factories accelerated. For example, a steam boiler was built at a cigarette factory in 1882, but mechanization of the tobacco packing work was only introduced in 1905. Also, in 1905, a cigarette paper factory based on electric power started operations<sup>98</sup>. Gasoline-engine cars were running in Bosnia at this time. For instance, in January 1912, a car taxi company appeared in Sarajevo<sup>99</sup>. Although the cases noted above took place only in Sarajevo, we hold that this mechanization of transportation and industry at the beginning of the twentieth century supported the growing understanding of the human being as an energy machine. In 1914, Marko Ilić, a brother of the leader of the youth movement in Tuzla Todor, claimed that the leader must be "energetic" like the "gasoline motor" to promote some activities if he wants to accomplish them<sup>100</sup>. At the same time, with the advent of various national political groups, many national banks were established. The establishment of a Chamber of Commerce and Industry was frequently proposed in the 1880s but, because the Bosnian people were considered "not mature enough for civil liberty", the realization of this institution did not occur at this point. The unstable position of Bosnia was cited as another reason for the delay and when this was resolved by the annexation in 1908, permission to establish the Chamber of Commerce and Industry was finally granted in January 1909<sup>101</sup>. As a result,

<sup>97</sup> Gojko Krulj, *Gradska privreda*, in: *Napor Bosne i Hercegovine za Oslobođenje i Ujedinjenje*, Beograd: Oblasni odbor Narodne odbrane u Sarajevu, 1929, 311; Ilijas Hadžibegović, *Bosanskohercegovački gradovi na razmeđu 19. i 20. stoljeća*, Sarajevo: Institut za istoriju, 2004, 46.

<sup>98</sup> Todor Kruševac, *Sarajevo pod Austro-Ugarskom upravom 1878-1918*, Sarajevo: Muzej grada Sarajeva, 1960, 209-213. An electrochemical plant was constructed in Jajce in 1897 and a power plant was built in Mostar in 1911. Peter F. Sugar, *Industrialization of Bosnia-Hercegovina 1878-1918*, Seattle: University of Washington press, 1963, 118; Hadžibegović, *op. cit.*, 73.

<sup>99</sup> This taxi company ended due to a fire on 22 January, about two weeks after its opening. Anonym, *Das ersten Autotaxi in Sarajevo*, *Bosnische Post*, XXIX; no. 7, Sarajevo, 10. I. 1912, 4; Anonym, *Das Ende des ersten Autotaxi*, *Bosnische Post*, XXIX; no. 17, Sarajevo, 22. I. 1914, 4.

<sup>100</sup> No. 46, letter from Marko Ilić, Reljevo, 2. III. 1914, in: *Mlada Bosna*, 117.

<sup>101</sup> Amila Kasumović, *Austrougarska Trgovinska Politika u Bosni i Hercegovini 1878-1914*, Sarajevo: Udruženje za modernu historiju, 2016, 256-258.

an entrepreneurial class gradually developed among the Bosnians. Workers were required to improve their *quality* to secure workplaces and, in this way, the commercial ambience improved<sup>102</sup>. In the periodical *Commercial-Craftsmen's Herald*, launched in 1911, "energy" was regarded as a key to the secret of commercial success. In particular, Čed. Mijatović regarded the individual's health as "capital" and recommended using the human workforce "rationally" to achieve business success<sup>103</sup>. Views regarding economic rationality and cost effectiveness rose in popularity and stringent reviews of schools from the viewpoint of educational outcomes occurred. In a 1904 report on the inspection of schools, the sectional chief Lajos Thallóczy asserted that "although the cost cannot serve as a gauge of the school policy, it is necessary to apply a critical criterion to justify these costs"<sup>104</sup>. Similarly, cost effectiveness was claimed by "weighty figures" in Serbian community against Serbian ethnic schools<sup>105</sup>. Furthermore, the formation of various educational support organizations by each national group (Napredak, Prosvjeta and Gajret) at the beginning of the twentieth century transformed the scholarship policy; instead of merely increasing the number of students, scholarship policy now took into consideration the *quality* of each applicant<sup>106</sup>. In such a social context, we understand that the physiological approach to vision opened the way of understanding human physical and mental activities as a problem of economic *rationality*, using the metaphor of energy.

We now turn to an analysis of the book *About the education of the youth*, which was published in 1913 in Sarajevo. Its author, Avram Altarac, entered the Teacher training school in Sarajevo in 1902/03 and passed the teacher's test in 1908/09<sup>107</sup>. Consequently, his book provides an appropriate case to analyse pedagogy and psychology in Bosnia just before the First World War. According to Altarac, the most important issue in modern times was human quality to survive in

<sup>102</sup> Ferdinand Hauptmann, *Die österreichisch-ungarische Herrschaft in Bosnien und der Herzegovina 1878-1918. Wirtschaftspolitik und Wirtschaftsentwicklung*, Graz: Institut für Geschichte der Universität Graz, 1983, 245-250.

<sup>103</sup> -o., Trgovačko samovaspitanje. Sarajevo: *Trgovačko-zanatlijski glasnik*, 1911: I, no. 3, 42; Anonym, Uputstva za uspjehe u životu. Sarajevo: *Trgovačko-zanatlijski glasnik*, 1912: II, no. 2, 18; no. 5, 65; no. 7, 98; Čed. Mijatović, Tajne uspjeha. Sarajevo: *Trgovačko-zanatlijski glasnik*, 1913: III, no. 11, 142; idem, Filozofija trgovine. Sarajevo: *Trgovačko-zanatlijski glasnik*, 1914: IV, no. 3, 34.

<sup>104</sup> ABiH, Zajedničko Ministarstvo Finansija, Pr. 1282 / 1904.

<sup>105</sup> Okey, *op. cit.*, 189.

<sup>106</sup> *Ibid.*, 155.

<sup>107</sup> ABiH, Sarajevo, ZVS, 1903, box 152, sign. 56-462; *Godišnji izvještaj učiteljske i s njom spojene I. narodne osnovne djačke škole kao vježbaonice u Sarajevu*, Sarajevo, 1909: XXI, 75.

the struggle for existence. Therefore, it was necessary to nurture children who are robust, not only mentally but physically. "The moderate state" was recommended as its quality. To keep "the moderate state", it was claimed that the physical needs of each child must be understood. Specifically, Altarac criticized excessive mental efforts, indifference to physical exercise and the reduction of rest time that strained and weakened children and gave rise to various diseases, including myopia. For these reasons, he considered that the time spent learning and that spent resting must be regulated rationally; for example, it was considered that three hours in school was appropriate for 8-9 years old and four hours for 10-11 years old<sup>108</sup>. Moreover, Altarac proposed a "natural division" with respect to a timetable for pupils. He asserted that the school timetable should not be regulated by some external factors but that human natural needs could regulate it because it is performed according to the "economy of human being"<sup>109</sup>. He considered a human to be an "economical and propagating property" and claimed that the "economy of human being" is to "save its power"<sup>110</sup>. This enables us to understand concretely what is meant by "the moderate" in Altarac's discourse. He asserted that "affordable profitability of economy of human being will be achieved if we pay special attention to consumption"<sup>111</sup>. According to Altarac, if the time spent on brain activity went beyond the desired standard, then physical growth would slow down accordingly. Overheated psychological activity would increase the volume of "nourishment" consumed and result in insufficient nourishment for other parts of the body. Imbalance should be avoided, and the aim should be *economy of human being*<sup>112</sup>. Thus, the concept of nourishment used by Basariček was also used by Altarac as a key component of his approach, which regarded human activities from an economic perspective of energy demand and supply. A state in which the demand and supply are balanced is required, that is, a "moderate" state. So, how can "the moderate" be measured? Altarac provided numerical values for appropriate times to be devoted to learning and to resting as a method of visualizing mental energy. This made it possible for anyone to determine "the moderate" and the excessive. Similarly, Stjepko Ilijić, the editor of the pedagogical periodical *Teacher's dawn*, insisted that there was a causal relationship between the excessive burden placed on pupils and the weakening of their nervous systems, and he

<sup>108</sup> Avram Altarac, *O obrazovanju mladeži*, Sarajevo, 1913a, 7-12.

<sup>109</sup> *Ibid.*, 17-20.

<sup>110</sup> Avram Altarac, *Viši razvoj, ekonomija čovjeka i naše prilike*. Sarajevo: *Učiteljska zora*, 1913b: IX, 6-7.

<sup>111</sup> Altarac, *op. cit.*, 21.

<sup>112</sup> *Ibid.*, 22.

based this criticism on the wasting of “life energy”<sup>113</sup>. By introducing the concept of energy, psychological studies opened up a new domain of sciences related to the body, namely physiology, medicine and dietetics. At the same time, the appropriate lifestyle became a problem for analysis, with the view that all diseases are caused by every incorrect lifestyle<sup>114</sup>.

As shown by a graphic of the neural pathway in Dvorniković’s psychology, the issue of vision or the optic nerve was not limited simply to a problem of the eyes themselves. It was related to the whole nervous system through the brain, or to the whole body and mind. In this context, we understand that myopia acted as one theme that exemplified the problem created by a lifestyle that was not *moderate*. Why was lifestyle regarded as a problem requiring analysis? We point to the influence of inheritance theory to answer this question. There was an increasing number of studies concerned with the risk of degeneration in Bosnia from the end of the nineteenth century. To avoid germinating an inherited tendency towards degeneration, these studies proclaimed the need for a lifestyle that avoids excessive burdens and that keeps the balance between the body and mind<sup>115</sup>. In this context, Altarac insisted that “power saving is more important than money saving” because “debt of the human economy” signifies exhaustion of the “capital” available for mental and physical work and, unless such power is saved, society would become stunted<sup>116</sup>. Because of lifestyle being regarded as a problem for analysis, as Altarac’s discourse suggests, the pursuit of a *moderate* upbringing was considered to be a necessary component of the education of a spontaneous human or citizen.

We recognize that Karaman’s book *School bench*, including the arguments for greater discipline for pupils, appealed to teachers. However, Karaman’s booklet, mentioned above, recommended that “if you get tired while writing, you must rest, but with a regular and comfortable posture for you”<sup>117</sup>. Here, the pupils are viewed as responsible for their rest time, not the teachers. The functions of the discourse on myopia was to let the pupils themselves choose *how to live* instead of forcing them to undertake certain actions, as a starting point in educating *rational and self-sustaining humans*. The *correct* way of life in this context meant consideration of the balance of nervous energy in the context of *economic rationality*.

<sup>113</sup> Stj. Ilijić, Uzgojni problem u našim školama. Sarajevo: *Učiteljska zora*, 1913: IX, 116-117.

<sup>114</sup> See Milan Bešlić, Školski uzgoj i nervoznost. Sarajevo: *Školski vjesnik*, 1908: XV, 147.

<sup>115</sup> Mitsutoshi Inaba, Ideja djetinjstva u Bosni i Hercegovini 1878-1918: Utjecaj Darvinizma. (Ph.D. diss., University of Sarajevo, 2016), 323-325.

<sup>116</sup> Altarac, *op. cit.*, 1913b, 6-7.

<sup>117</sup> Karaman, *op. cit.*, 1911, 14.



## Conclusion

In Bosnia in the early twentieth century, the mechanization of industry progressed, the commercial ambience improved, and the concept of cost effectiveness became increasingly prevalent, even in the educational sphere. In this social context, the book *School bench* by Karaman (1910) proposed the means to prevent myopia in pupils by determining the appropriate relations or measurements between the desk, the bench and the child's body. Karaman's method of educating the "observer" to see *correctly*, through the provision of visualized and quantified information, was intended to be shared not only by teachers and families but also by the pupils themselves. Emphasis was placed on determining and ensuring the appropriate relations between the children and their environment, that is, the desk and its bench, not just on adjusting their environment. The appropriate posture and the way each child faces his environment, or more broadly, the appropriate way of life, was considered to be a real problem that required resolution at the time.

What kind of concrete linkages were there between lifestyle and myopia? The importance of the function of the nerves in vision was emphasized in psychological texts from Basariček through to Arnold and Dvorniković. In particular, Dvorniković relied on Flechsig to visualize the anatomical neural network on a large scale. In this context, myopia was interpreted as resulting from "excessively" strained eyes. Specifically, the "excessive" functioning of optic nerves, muscles and blood vessels was identified as a cause of myopia.

However, exercising the eyes was not criticized, because vision was recognized as being improved by accumulated experiences. Truhelka warned Zdenka Marković against working too much as it makes the nerves too strained and she noted that, when she went out to sketch nature to heal the fatigue of her eyes, her eyes grew stronger<sup>118</sup>. Her perception of the diverse changes of colours may be a phenomenon she experienced during her activities to rest her eyes. In any case, the criticism of working "excessively" was based on the idea of understanding the nervous function as energy. Work consumes energy and new energy must be supplied. Thus, human psychosomatic activity was understood in terms of energy demand and supply. At the same time, it was considered that neural networks stretched throughout the body and the support of such psychosomatic activity also became considered in that framework, that is, the framework of energy demand and supply. Moreover, it was considered that balancing energy demand and supply requires a *moderate* lifestyle and, if this balance breaks down and energy

<sup>118</sup> No. 6. letter, 13. XII. 1902 and no. 8. letter, 29. III. 1903, in: *Pisma Jagode Truhelke Zdenki Marković*. (ur. Ana Batinić), Zagreb: Hrvatska akademija znanosti i umjetnosti, 2011, 123 and 125.

is concentrated on a certain organ, it was emphasized, not only this organ but the whole mind and body will be damaged. At the same time, the prevalence of inheritance theory made it possible to interpret lifestyle as a problem requiring resolution not only for the benefit of the individual but for the entire group to which he belonged. Seeing *correctly* in this context involved ensuring an economically rational approach to the activity of the nerves.

Altarac used time allocation as a visual means to measure economic *rationality*. Instead of using a certain rule to discipline school children, he established a timetable that aimed to suit their natural needs, which enabled the *normalization* of the “observer”, ensuring him to see *correctly* not as the imposed rule from without but as a norm generated from the activities of their mind and body<sup>119</sup>. Karaman confirmed that the three-dimensional combination of desk and school bench according to each child’s physique guaranteed a “natural right posture”. Educating the “observer” inspired not only the theories regarding the school bench but also theories relating to dietetics and other such fields. Exemplifying Gustav Fechner and Helmholtz, Crary insisted that, from the mid-nineteenth century, the “observer” was quantified and solved within a single and uniform field filled with energy and that “all the sciences in the nineteenth century beginning with the prefix *psycho-*” were related to the modernization of power<sup>120</sup>. Indeed, psychosomatic activities were not reduced to the eyes or vision but rather encompassed the energy circulatory system, involving neural networks and blood flows, and aimed to achieve the *normalization* of human beings. Here, the human being was reduced to the vital/biological activities, such as nervous activity illustrates, as if the object of education was not an “observer” as an individual subject, but rather “bare life” which is *normalizing* itself according to its own mechanism<sup>121</sup>. Therefore, we conclude that myopia functioned in this context as one entrance to attempt to normalize the *correct* “observers” in Bosnia under the Habsburg monarchy according to a mental and physical rational economy, that is, the neuro-physical natural demands.

<sup>119</sup> “The norm is thus intrinsic to the group that applies it to itself and hence is a form of regulation and stabilization that is independent of all philosophical or religious values”. Dean, *op. cit.*, 119.

<sup>120</sup> Crary, *op. cit.*, 1992, 147-148.

<sup>121</sup> Giorgio Agamben argues that in the extreme case “the biopolitical body (...) is not an inert biological presupposition to which the rule refers, but at once rule and criterion of its own application”. Giorgio Agamben, trans. by Daniel Heller-Roazen, *Homo Sacer: Sovereign Power and Bare Life*, Stanford: Stanford University press, 1998, 173.